Final

Environmental Impact Statement for Basewide Water Infrastructure

MARINE CORPS BASE CAMP PENDLETON, CALIFORNIA

Prepared for: U.S. Marine Corps
Assistant Chief of Staff, Facilities
Marine Corps Base Camp Pendleton , California

Under Contract to: Department of the Navy
Naval Facilities Engineering Command Southwest Division
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August 2012

FINAL
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DRAFT FINAL ENVIRONMENTAL IMPACT STATEMENT FOR BASEWIDE WATER INFRASTRUCTURE MARINE CORPS BASE CAMP PENDLETON

Lead Agency for the EIS: Department of the Navy
Title of Proposed Action: Basewide Water Infrastructure
Affected Jurisdictions: San Diego County
Designation: Environmental Impact Statement

ABSTRACT

This Environmental Impact Statement (EIS) has been prepared by the Department of the Navy in accordance with the National Environmental Policy Act of 1969 (NEPA), 42 United States Code §§ 4321–4370h, as implemented by the Council on Environmental Quality regulations (40 Code of Federal Regulations [C.F.R.] Parts 1500–1508), Department of the Navy Procedures for Implementing the National Environmental Policy Act (32 C.F.R. Part 775); and the Marine Corps Environmental Compliance and Protection Manual, which establishes procedures for implementing NEPA (Marine Corps Order P5090.2A, Chapter 12, dated 21 May 2009). The proposed action would construct and operate two infrastructure projects entirely within Marine Corps Base Camp Pendleton funded by Military Construction (MILCON) program appropriation. These projects would include an advanced water treatment plant and associated facilities in the northern part of the Base (P-1044) and connection of the Base's northern and southern water systems (P-1045). Each project is a separate, distinct, and independently complete and usable action. Six alternatives, including the No Action Alternative, are evaluated in this EIS. This EIS evaluates the potential environmental impacts to the following resource areas: geology and soils, water quality and hydrology, biological resources, cultural resources, land use, visual resources, socioeconomics and environmental justice, traffic, air quality, noise, public health and safety, services and utilities, coastal zone management, and marine resources. Comments should be sent to the following address:

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ACRONYMS AND ABBREVIATIONS

AC	asbestos cement
AC/S	Assistant Chief of Staff
ADT	average daily traffic
AICUZ	Air Installation Compatible Use Zone
AMSL	above mean sea level
APCD	Air Pollution Control District
APE	area of potential effects
APZ	Accident Potential Zone
ARPA	Archaeological Resources Protection Act
AS/SVE	Air Sparging/Soil Vapor Extraction
AST	aboveground storage tank
AVR	Air Vacuum Release
AWT	Advanced Water Treatment
B.P.	years before present
BACT	best available control technology
BEAP	Base Exterior Architecture Plan
BEQ	Bachelor Enlisted Quarters
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BMP	best management practice
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
BSA	Biological Study Area
BTEX	benzene, toluene, ethylbenzene, and xylenes
BUI	Base Utilities Infrastructure
C.C.R.	California Code of Regulations
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CAMU	Corrective Action Management Unit
CAP	Corrective Action Plan
CARB	California Air Resources Board
CASQA	California Stormwater Quality Association
CCA	California Coastal Act
CCC	California Coastal Commission

CCD	Coastal Consistency Determination
CCMP	California Coastal Management Program
CDC	Child Development Center
CDP	Census Designated Place
CDWR	California Department of Water Resources
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
cfs	cubic feet per second
CH_4	methane
CNEL	Community Noise Equivalent Level
CDFG	California Department of Fish and Game
CNPS	California Native Plant Society
CO Protocol	Transportation Project-level Carbon Monoxide Protocol
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COC	contaminant of concern
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
DGPS	differential geographic positioning system
diesel PM	diesel particulate matter
DO	dissolved oxygen
DoD	Department of Defense
DoN	Department of the Navy
DPH	California Department of Public Health
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control
EAR	EAR Engineering, Construction & Support Services
EFH	essential fish habitat
EIS	Environmental Impact Statement
EMCS	Energy Management Control Systems
EMS	Environmental Management System
EO	Executive Order
ES	Environmental Security
ESA	Endangered Species Act

ESL	Environmental Screening Level
ESQD	Explosive Safety Quantity Distance
FEMA	Federal Emergency Management Agency
FEMP	Federal Energy Management Program
FMD	Facilities Maintenance Department
FMP	Fishery Management Plan
FHWA	Federal Highway Administration
FY	fiscal year
GAC	Granulated Activated Carbon
GHG	greenhouse gas
GIS	geographic information system
gpm	gallons per minute
GTF	Grow the Force
GWP	global warming potential
H_2S	hydrogen sulfide
HA	Hydrologic Area
HCM	Highway Capacity Manual
HHRA	Health Human Risk Assessment
HPTP	Historic Properties Treatment Plan
HU	Hydrologic Unit
I-5	Interstate 5
IM WTP	Iron/Manganese Water Treatment Plant
IMEF	I Marine Expeditionary Force
INRMP	Integrated Natural Resources Management Plan
IPCC	Intergovernmental Panel on Climate Change
IR	Installation Restoration
IRP	Installation Restoration Program
ISCO	In-Situ Chemical Oxidation
kg	kilogram
kV	kilovolt
LBP	lead-based paint
LCAC	Landing Craft Air Cushion
LCP	Local Coastal Program
L_{dn}	Day/Night Average Sound Level
LEED	Leadership in Energy and Environmental Design
L_{eq}	equivalent sound level
LF	linear feet
LFAM	Live Fire and Maneuver
LGAC	Liquid-phase Granulated Activated Carbon

LID	low-impact development
LOS	level of service
LRP	Legally Responsible Person
LUP	Linear Utility Project
LUST	leaking UST
MACT	maximum available control technology
Manual	*Corps of Engineers Wetlands Delineation Manual*
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCBCP	Marine Corps Base Camp Pendleton
MCCS	Marine Corps Community Service
MCL	maximum contaminant level
MCO	Marine Corps Order
MCTSSA	Marine Corps Tactical Support System Activity
MEC	Munitions and Explosives of Concern
MFA	Mortar Firing Area
mg/L	milligrams per liter
mgd	million gallons per day
MILCON	Military Construction
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MOE	measurement of effectiveness
MOUT	Military Operations in Urban Terrain
mph	miles per hour
MSA	Major Statistical Area
msl	mean sea level
MT	metric ton
MTBE	methyl tert-butyl ether
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAVFAC SW	Naval Facilities Engineering Command Southwest
NCIS	Naval Criminal Investigation Service
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO	nitrogen oxide

NOAA	National Oceanic and Atmospheric Administration
No.	Number
NO_X	oxides of nitrogen
NO_2	nitrogen dioxide
NO_3	nitrogen trioxide
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRTTP	Northern Regional Tertiary Treatment Plant
NWS	Naval Weapons Station
O_3	ozone
OPNAVINST	Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PA	Programmatic Agreement
PAH	polynuclear aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	primarily tetrachloroethene
PCW	Project Clean Water
PM	particulate matter
PMO	Provost Marshal Office
PM_{10}	particulate matter equal to or less than 10 microns in size
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in size
POL	petroleum, oil, and lubricant
ppm	parts per million
PPV	Private Public Venture
PRD	Permit Registration Document
PSD	Prevention of Significant Deterioration
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
RAICUZ	Range Air Installations Compatible Use Zone
RAQS	Regional Air Quality Strategy
RCRA	Resource Conservation and Recovery Act
Regional Supplement	*Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0)
RCUZ	Range Compatible Use Zone
RFA	RCRA Facility Assessment

RO	Reverse Osmosis
ROD	Record of Decision
ROG	reactive organic gas
ROI	region of influence
ROICC	Resident Officer In Charge of Construction
RONA	Record of Non-applicability
RORE	RORE, Inc.
RWQCB	Regional Water Quality Control Board
SAM	Social Accounting Matrices
SANDAG	San Diego Association of Governments
SARA	Superfund Amendments and Reauthorization Act
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCB	Southern California Bight
SCE	Southern California Edison
SCS	Soil Conservation Service
SDAB	San Diego Air Basin
SDG&E	San Diego Gas & Electric
SDWA	Safe Drinking Water Act
SECNAVINST	Secretary of the Navy Instructions
SES-TECH	Sealaska Environmental Services, LLC and Tetra Tech EC, Inc.
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMARTS	Stormwater Multi-Application and Report Tracking System
SO_2	sulfur dioxide
SO_4	sulfates
SONGS	San Onofre Nuclear Generating Station
SO_X	sulfur oxide
SRA	Subregional Area
SRTTP	Southern Region Tertiary Treatment Plant
STP	Sewage Treatment Plant
SVOC	semi-volatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TAPS	Tributary Area Pump Station
TCE	trichloroethene
TDS	total dissolved solids
TEC	The Environmental Company, Inc.

TIP	Transportation Incentive Program
TLS	trenchless
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPH-d	total petroleum hydrocarbons quantified as diesel
TPH-g	total petroleum hydrocarbons quantified as gasoline
TRPH	total recoverable petroleum hydrocarbons
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USMC	U.S. Marine Corps
UST	underground storage tank
UXO	unexploded ordnance
v/c	volume to capacity
VAV	variable air volume
VOC	volatile organic compound
WDID	Waste Discharge Identification
WDR	Waste Discharge Requirement
°F	degrees Fahrenheit

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EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Impact Statement (EIS) evaluates the environmental impacts associated with proposed infrastructure improvements at Marine Corps Base Camp Pendleton (MCBCP). Specifically, the proposed action would involve the construction, operation, and maintenance of infrastructure upgrades, expansions, and improvements to the Basewide water system. The projects would include a Northern Advanced Water Treatment (AWT) plant and associated facilities and connection of the Base's northern and southern water systems. The proposed action and alternatives to the proposed action are described in greater detail in Chapter 2.

The Department of the Navy (DoN) has prepared this EIS in accordance with the National Environmental Policy Act of 1969 (NEPA), 42 United States Code (U.S.C.) §§ 4321–4370h, as implemented by the Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (C.F.R.) Parts 1500–1508, Department of the Navy Procedures for Implementing the National Environmental Policy Act (32 C.F.R. Part 775); and the guidelines contained in Marine Corps Order P5090.2A, Chapter 12, dated 21 May 2009, Environmental Compliance and Protection Manual, which establishes procedures for implementing NEPA.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to allow the Base to efficiently meet its mission and to do the following:

- Provide improved water treatment capabilities, capacity, and drinking water system redundancy that would enable more efficient water delivery in the northern region of MCBCP and the Basewide delivery of services during periods of scheduled, unscheduled, and emergency system interruption.
- Provide new or upgraded, reliable, secure, and compliant water infrastructure systems to support military training and operations on MCBCP and quality of life services.

The need for the proposed action is to modernize and expand the capacity and capability of MCBCP's aging (1960s era) water system to do the following:

- Accommodate ongoing and future growth at MCBCP.
- Provide reliable water supply and alternate sources of water distribution for:
    - Ongoing normal system use,
    - Periods of planned and unplanned maintenance and repairs, and
    - Periods of emergency need and natural disaster recovery.
- Provide safety for pipeline maintenance in heavily traveled road segments adjacent to pipelines.
- Sustain compliance with current and pending/emergent regulatory and code requirements.
- Conserve and effectively manage resources.

The service population and associated demand for utilities infrastructure services at MCBCP have grown in recent years and will continue to grow, based on a number of different factors. These include, but are not limited to, long-programmed new housing on the Base that will be built in the near future and during the build-out of the 2030 Base Master Plan (U.S. Navy 2011). The ongoing and planned growth was or is being analyzed in separate NEPA documents. Ongoing growth was addressed in the environmental assessments for military family housing at San Mateo Point Phase 1 (U.S. Navy 1996), San Mateo Point Phase 2 (U.S. Navy 2008a), Western Wire Mountain (U.S. Navy 1998a), De Luz (U.S. Navy 1999), Wire Mountain Phase 1 and 2 (U.S. Navy 2002), San Onofre Mobile Home Park and South Mesa sites (U.S. Navy 2006), and Stuart Mesa Agricultural Field sites (U.S. Navy 2009a and U.S. Navy 2010f). Ongoing growth was also addressed in the categorical exclusions for military family housing at Del Mar (U.S. Navy 2008b) and San Luis Rey (U.S. Navy 2008c), the new Naval Hospital Camp Pendleton environmental assessment (U.S. Navy 2010a), and the Main Exchange Mall Complex environmental assessment (U.S. Navy 2010b). Potential future growth was also addressed, in part, in the Programmatic Environmental Assessment for Grow the Force Permanent Bed-Down Facilities (U.S. Navy 2010c).

Due to the existing water infrastructure's lack of redundancy/backup and its continued deteriorating conditions, portions of the Base have experienced more frequent interruptions to water delivery system services. In addition, wildfires have damaged system components (i.e., pump stations, pipes), resulting in service interruptions. As this system continues to age and as the demand continues to increase, the frequency of the interruptions will also increase, resulting in a greater impact on the mission. Repair and maintenance of this system are becoming more frequent and more expensive.

To fulfill its mission, MCBCP must have adequate water infrastructure for its existing and future personnel and facilities. Interruptions in water system services to any portions of the Base impede the capabilities of the affected cantonment areas to conduct the mission of the Base.

Specific Infrastructure Needs

The specific infrastructure needs of the proposed action are as follows:

1. Higher quality drinking water through advanced water treatment is needed throughout MCBCP, with the need being particularly acute in the northern portion of the Base. Currently, the water wells in the San Mateo and San Onofre basins, which will supply water to the Northern AWT, produce raw water for the northern region of MCBCP that includes the 53 Area (Horno), 52 Area (School of Infantry), 62 Area (San Mateo), 63 Area (Cristianitos), 64 Area (Talega), 51 Area (San Onofre), San Onofre housing areas, and the MCBCP San Onofre Beach recreation area. In the northern portion of the Base there is nearly 40,000 linear feet (LF) of water piping that dates back to the 1960s and is deteriorating, requiring frequent repairs. This results in an unreliable supply of water to ongoing operations and training functions as well as to support firefighting and other life safety needs. Also, current water treatment processes do not meet more stringent secondary drinking water standards for total dissolved solids (TDS) and may not meet the pending Safe Drinking Water Act Stage 2 Disinfectant Byproducts Rule, as total organic carbon (TOC) is not removed from the well water.

2. Additional drinking water distribution systems and an emergency backup drinking water system are needed at MCBCP. The northern and southern regions of MCBCP are currently provided potable water by multiple wells in the northern system and multiple wells in the southern system with each well capable of producing flow rates between 500 to 1,500 gallons per minute. The water systems of these two regions are not connected, maintenance is performed incrementally, and no backup system exists in the event of failure. At present, water cannot be distributed from one system to the other in times of emergency or peak demand. Furthermore, development served by the Las Flores well field and distribution system needs to be tied to a larger water

system because of the eventual planned shutdown of wells tapping the Las Flores aquifer due to water quality issues.[1]

DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes the construction, operation, and maintenance of potable water infrastructure upgrades within MCBCP. Implementation of the proposed action would construct a new Northern AWT plant and associated facilities and connect the northern and southern water systems. Each project is a separate, distinct, and independently complete and usable action.

The proposed Northern AWT and associated facilities would be designed and constructed to serve the northern region of MCBCP to reduce the TDS, TOC, and aggressiveness in the local raw water, and to significantly reduce the measurable amounts of copper in regional wastewater sludge. The wells produce mildly aggressive water (pH greater than 7.4 or less than 6.8), which causes leaching from the conveyance system and is causing the wastewater sludge to contain high levels of copper. As a result, some of the sludge from the wastewater plants is classified as hazardous waste by the State of California and imposes additional disposal costs on MCBCP. The system would include collection points at wellheads, piping and pumps for raw water conveyance, a Northern AWT facility with a capacity of up to 6.6 million gallons per day (mgd), a post-treatment distribution system made up of existing and new potable waterlines and new connections, and a brine disposal system.

The northern and southern water systems connection project would tie into the northern water system at the proposed Northern AWT or at an existing water line in Basilone Road, and provide a connection to the water system components to the south, both at the existing Las Pulgas Canyon pump station and at existing and/or new facilities in one or more locations farther south and/or east. These more-southern or more-eastern connections include the Vandegrift Boulevard/Magazine Road pump station, several existing nearby reservoirs, and a proposed 4-million-gallon reservoir above the pump station, as well as reservoirs on a ridgeline above the future AWT South at Haybarn Canyon. Construction of the future AWT South, MILCON P-113, began in 2011. The future AWT South is not part of this proposed action.

[1] These water quality issues are primarily due to the detection of hexavalent chromium in two of the wells (Wells 410621 and 41611).

ALTERNATIVE ANALYSIS

Five action alternatives and the No Action Alternative have been carried forward for analysis in this EIS. A comparison of the constituent projects and estimated costs associated with the proposed action alternatives is provided in Table ES-1. A detailed description of each of the alternatives is provided in Section 2.3 of this document.

Alternatives Carried Forward for Analysis

This section addresses six alternatives, including the No Action Alternative. Each of the development alternatives (Alternative 1, Alternative 2, Alternative 3, Alternative 4, and Alternative 5) consists of two Military Construction (MILCON) projects. Each of the constituent MILCON projects has four project-specific alternatives that correspond to the first four development alternatives; Alternative 5, the preferred alternative, represents a different combination of individual project alternatives selected from the four other action alternatives. Alternative 5 includes P-1044 Alternative 1 and P-1045 Alternative 3.

The alternatives analyzed represent a reasonable range of alternatives. The Marine Corps could select any one of the development alternatives, any combination of specific project alternatives analyzed in the development alternatives, a partial alternative, or the No Action Alternative. Each of the development alternatives meets the purpose and need of the proposed action.

All construction would comply with seismic standards and, where applicable, Americans with Disabilities Act standards. All construction laydown/staging areas would be within the project limits, primarily in previously disturbed areas, or in paved areas or in adjacent developed areas, unless otherwise specified. The analysis in this EIS assumes a maximum scenario of trenching for installation of piping except in those locations where trenchless (TLS) construction is planned, as described in the following sections. TLS construction requirements will be identified as part of the construction contractor’s request for proposal.

TLS construction would be employed to the extent practicable in locations with sensitive resources, such as watercourses and riparian areas. TLS construction avoids surface ground disturbance by passing pipelines underground through boreholes, using temporary working pits on either side of the sensitive area. Several methods of TLS construction are available, including horizontal directional drilling, microtunneling, and boring and jacking. In terms of effects on the ground, any of the methods available would use working pits that would be filled and restored after the operation was completed. Therefore, due to the overall conservative approach used in evaluating impacts in the EIS, actual impacts would likely be less. Each of these projects is a design-build project. The environmental analyses for these types of projects are based on preliminary designs with the final design and construction occurring after the NEPA process. If, during the design and/or construction process, the alignment of one of the pipelines or support facilities must be moved outside the area analyzed for environmental impacts, an initial review would be conducted. If these environmental impacts are substantially different or inconsistent with the context and intensity of the environmental impacts evaluated in the EIS, supplemental analysis must be conducted and reviewed and approved through Marine Corps and DoN chain-of-command.

Alternative 1

<u>Northern AWT and Associated Facilities (P-1044 Alternative 1: Site 6 with Basilone Road Conveyance Lines)</u>

This is the preferred alternative for P-1044. The proposed action would involve the construction and operation of a Northern AWT facility and water lines ranging in size from 8 to 24 inches in diameter for the conveyance of raw water, potable water, and brine in the northern region of MCBCP. The approximately 8.5-acre proposed Northern AWT site would be located roughly 2,000 feet south of Basilone Road, 500 feet northeast of the San Onofre Nuclear Generating Station (SONGS) East Mesa facility, and 3,000 feet southeast of the San Onofre 3 Housing Area, a location known as “Site 6” from an earlier siting study (Brown and Caldwell 2010). The new lines would connect the new Northern AWT to a number of cantonment or other developed areas in the northern region, including the 64 Area (Talega), 63 Area (Cristianitos), 62 Area (San Mateo), 51 Area (San Onofre), San Onofre housing areas, 52 Area (School of Infantry), and 53 Area (Horno).

The proposed Northern AWT would have an ultimate capacity of up to 6.6 mgd. The Northern AWT and associated facilities would include a Liquid-phase Granulated Activated Carbon/Reverse Osmosis (LGAC/RO) facility that includes four basic modules: iron/manganese removal, RO, LGAC, and a pH control chemical injection system, or equivalent/superior proven technology system, along with an associated brine disposal system. The brine disposal system, consisting of a brine storage facility, brine line pump station, and pipeline to disposal, would connect to the RO module.

Collection points at wellheads with piping and pumps would be constructed under the proposed Northern AWT and associated facilities project. After treatment, the finished water would be distributed through existing and new potable waterlines and new connections.

Raw water, treated water, and brine would be conveyed via new pipelines in four proposed linear corridors, with individual corridor segments varying in the combination of types of lines they would contain.

- One corridor would extend from the Northern AWT to Basilone Road, then west along Basilone Road to the San Onofre 2 Housing Area, the San Onofre 3 Housing Area, and the 51 Area (San Onofre), and then north again along several different roadway segments to the San Onofre 1 Housing Area, 62 Area (San Mateo), 63 Area (Cristianitos), and 64 Area (Talega).
    - This corridor would include lines to connect to reservoirs in or near the San Onofre housing areas (Reservoirs 51770, 51771, and 51772), the 62 Area (San Mateo) (Reservoirs 62310 and 62518), and the 63 Area (Cristianitos) (Reservoir 63210). It would also connect to the well field in the Sierra 1 Training Area, and a short connection about 5,000 feet south of the 62 Area (San Mateo) would serve the Infantry Immersion Trainer Phase 1 and 2. In one portion of this corridor, on the steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds, the pipeline would be constructed aboveground; all other pipelines would be underground. The geotechnical conditions under this slope would prevent TLS construction.
    - The lines in this corridor would extend beneath San Onofre Creek just south of Basilone Road and beneath San Mateo Creek just south of the 62 Area (San Mateo) using TLS construction. Both of the locations, one upstream and one downstream, near the proposed Northern AWT would be used for the San Onofre Creek undercrossing. Depending on the kind of TLS construction used, the upstream location could encroach into the 100-year floodplain, but the downstream crossing would not.
    - Three existing pump stations in this corridor would be retrofitted, including appropriately sized emergency generators, asphalt patches, connections to existing reservoirs, and distribution systems. The area of each pump station would vary between 0.25 and 3.5 acres, based on co-location with other facilities or project features.

- The second corridor would extend from the junction of the first corridor and Basilone Road east along Basilone Road to the 52 Area (School of Infantry) and 53 Area (Horno).
    - This corridor would include lines to connect to reservoirs in or near the 52 Area (School of Infantry) (Reservoir 52698) and the 53 Area (Horno) (Reservoirs 53116 and 53310).
    - TLS construction would be used for the crossing of San Onofre Creek between the 52 Area (School of Infantry) and the 53 Area (Horno).
    - No pump stations would be required along this corridor.
- The third corridor would extend south from the Northern AWT to connect to the ocean intake conduit on the seaward side of the main SONGS facility seawall and to the proposed MCBCP San Onofre Beach recreation area injection well field, west of Interstate 5 (I-5), for brine disposal.
    - The lines in the corridor crossing the freeway would extend beneath I-5 and the railroad using TLS construction.
    - No pump stations would be required along this corridor.
- The fourth corridor would extend west from the Northern AWT, passing north of the SONGS East Mesa facility and then running northwest along El Camino Real to proposed injection wells east of I-5.
    - No TLS construction for stream crossings would be required for lines in this corridor.
    - Pump stations for this corridor would be at the Northern AWT site.

The brine disposal pipeline would convey RO reject water from the Northern AWT to discharge locations. Three options are considered for brine discharge: 1) discharge through an ocean outfall, 2) discharge through two injection well fields, or 3) a discharge through a combination of ocean outfall and two injection field wells. At this time the brine would be discharged through the deep injection well fields. The SONGS option is not considered ripe for a site-specific environmental analysis due to the lack of final design and, although considered viable, will be evaluated on a programmatic level in this EIS. When design and associated real estate agreements are available a full environmental analysis would be completed along with required consultation for this option.

The ocean disposal would include use of the existing, abandoned SONGS 12-foot-diameter, 3,200-foot-long cooling water intake conduit in the Pacific Ocean. The existing conduit was previously used for cooling water intake for Unit 1, which was permanently shut down in November 1992; however, since the proposed action would use this line as an outfall for brine, this structure will be referred to hereafter as the outfall conduit. The SONGS outfall conduit would serve as a sleeve for the 12-inch brine discharge line. Current preliminary designs specify a 150-foot diffuser system with six ports at an approximate distance of 3,350 feet (3,200 + 150 feet) offshore.

After being passed beneath the freeway and railroad by TLS construction, the brine line would pass through the SONGS complex and under or through the SONGS seawall. It would then pass above the beach by trenching along a pedestrian pathway outside the SONGS seawall to the onshore part of the former Unit 1 intake conduit in a work area about 35 feet wide along the SONGS seawall. At the conduit, an excavation up to 50 feet deep would be required to reach the conduit and provide a work area for insertion of the brine line. All excavation for insertion of the brine line into the intake conduit would be above the high water line. Core drilling or abrasive blade cutting would be used to make an opening into the conduit through which the brine line would be inserted. The work area would be enclosed by an interlocking steel cofferdam.

The 12-inch-diameter brine discharge pipeline would be inserted into the former intake conduit onshore seaward of the SONGS seawall and anchored through the length of the conduit to the seaward terminus by fastening to the inside conduit surface or by bedding. At the terminus, the pipeline would pass through a mammal barrier, and a diffuser system would be installed for brine discharge into the ocean. The diffuser system would consist of a single, approximately 150-foot pipeline extending seaward from the conduit terminus with six diffuser ports with a 2-inch-diameter on 2-foot risers. A permanent rock blanket would be placed over the diffuser pipe. Installation of the diffuser and rock blanket could be preceded by leveling of the seabed, possibly using a dragline attached to a crane.

The SONGS outfall conduit would require periodic inspection to assess proper port operation at the points of brine discharge. Current technologies for diffuser designs similar to this type require minimal maintenance and cleaning.

Injection wells would be used to dispose of the brine solution. The brine waste would be injected deep within the saltwater wedge that occurs on the ocean side of the saltwater-freshwater interface, which occurs approximately 330 feet below the surface, or deeper (as much as 900 feet deep or more). Two locations are being proposed for these wells.

The injection wells would be constructed in a linear pattern where El Camino Real crosses the existing San Onofre percolation ponds between San Onofre Creek and I-5, and where the inland access road crosses the MCBCP San Onofre Beach recreation area along the BNSF (formerly known as Burlington Northern Santa Fe) Railway right-of way, west of Coast Road and northwest of the San Onofre Surf Beach area of San Onofre State Beach. The brine disposal would require up to eight wells up to 900 feet in depth. The entire injection well area would be approximately 1.6 acres with dimensions of 570 feet by 125 feet.

Approximately 40,000 LF of existing water line would be abandoned in place. This water piping dates back to the 1960s and is deteriorating, requiring frequent repairs. Removing the piping would result in ground disturbance and potential impacts to natural and cultural resources.

The paved maintenance access corridor would extend 8 feet from the outside travel lane striping. While the primary purpose of the paved corridor would be for pipeline maintenance and repair vehicles use, a secondary function would be to allow pedestrians, runners, and bicycle riders to use the roads but stay clear of traffic. Both functions of the maintenance access corridor would increase safety for road users. The maintenance corridors would be located on only one side of the road (the side with the pipeline) but were analyzed in this EIS on both sides of the road to provide a more conservative impact analysis until the design is complete. The maintenance corridors are only proposed for San Mateo Road, Basilone Road and Cristianitos Road. The roadways in these locations are two lanes wide and have blind horizontal and vertical curves. They are crucial links in the Base transportation network with relatively high volumes of traffic. A maintenance or military training vehicle stopping on the side of the road would not be able to get completely clear of traffic. This presents a safety issue. The maintenance corridor would provide a safe area for heavy vehicles to pull off the side of the road. Elsewhere, the pipeline would be along roads where traffic is light, and providing added paved surface for maintenance is not as critical. The proposed action would also include paving the existing dirt road from El Camino Real to the Northern AWT entrance to allow delivery trucks access to the site during all-weather conditions.

The project limits consist of the permanent and temporary impact areas of the proposed action. The permanent impact areas would include the Northern AWT, pump stations, maintenance access corridor, and injection wells; the temporary impact areas would include conveyance lines and TLS construction sites.

This project is funded for fiscal year (FY) 2012 at approximately $101 million. Construction would begin in 2013 and last for approximately 24 months.

Connection of Northern and Southern Water Systems (P-1045 Alternative 1 Route)

Under P-1045 Alternative 1, the proposed action would include the construction of potable water lines 36 inches or less in diameter to connect the northern and southern regions of MCBCP. The water line would start at either an existing water line in Basilone Road or the new Northern AWT (P-1044) at either Site 4, on Basilone Road (P-1044 Alternative 3 and Alternative 4), or Site 6, south of Basilone Road (P-1044 Alternative 1 and Alternative 2). (To be conservative in characterizing potential environmental impacts of P-1045 in this EIS, a longer corridor to a northern connection at Basilone Road/Northern AWT Site 4, which passes by the more southerly Northern AWT Site 6, is assumed for all of the alternatives. If the Northern AWT is constructed at Site 6, the length of this most northern P-1045 corridor segment would be reduced by the distance between Site 6 and a Basilone Road connection, roughly 3,000 feet, with an accompanying reduction of impacts. In this case, the connecting segment between the Northern AWT Site 6 and existing water lines in Basilone Road, and associated impacts, would be accounted for under P-1044, as noted in the P-1044 project description, rather than under P-1045.) From its northern connection point, the water line would extend south in El Camino Real to Stuart Mesa Road. At the junction of Stuart Mesa Road and Las Pulgas Canyon Road, a lateral pipeline would run north along Las Pulgas Road approximately 4.7 miles and terminate at existing Reservoir 43210. This lateral pipeline would be approximately 10 to 14 inches in diameter and connect to the Las Pulgas distribution system to link development in the Las Pulgas, Las Flores, and Stuart Mesa areas to the connected northern and southern water systems.

The main pipeline would continue along Stuart Mesa Road before splitting again into two branches. One of these branches would extend northeast on the west side of the Santa Margarita River along North River Road, passing east of the 32 Area (MACS-1) and 33 Area (Margarita) and west of the 23 Area (Marine Corps Air Station [MCAS] Camp Pendleton) to Basilone Road, and under the Santa Margarita River, to connect to several reservoirs along a ridge above Haybarn Canyon (Reservoirs 13151, 13154, 24140, and 24174). The second branch would continue south along Stuart Mesa Road, passing under the Santa Margarita River at the Stuart Mesa Bridge using TLS construction, or over the Santa Margarita River attached to the Stuart Mesa Bridge, to Vandegrift Boulevard. To be conservative in characterizing potential environmental impacts of P-1045 in this EIS, it is assumed that TLS would be used to cross under the

Santa Margarita River in the vicinity of the Stuart Mesa Bridge for this alternative (and other relevant alternatives), as this approach would account for additional environmental impacts due to the need for boring pits. If the pipeline were to be attached to the bridge instead, potential environmental impacts associated with TLS construction would be avoided. The line continues northeast on Vandegrift Boulevard approximately 1 mile to an existing pump station at Magazine Road and terminates at several nearby reservoirs (Reservoirs 20813, 20814, 20815, 200814, and 200815). P-1045 would also include the construction and operation of a new 4-million-gallon water reservoir in the Wire Mountain area and associated water line connections to serve the new Naval Hospital Camp Pendleton and the 21 Area (Del Mar). The new reservoir would be constructed adjacent to the other existing reservoirs. A new, up to 12-inch-diameter gravity flow water line would extend from the 4-million-gallon reservoir and run south and west and be installed completely within Wire Mountain Road through the existing housing areas. This line would connect to the new Naval Hospital Camp Pendleton, continue past Vandegrift Boulevard, and cross beneath I-5 via TLS to serve the 21 Area (Del Mar). A TLS bore pit would be located on the east and west sides of I-5, avoiding interference to I-5 and rail operations. A third or intermediate bore pit may be required in the previously disturbed ruderal vegetation between the railroad tracks and I-5. Should this bore pit be necessary, additional surveys would be required.

TLS construction would be used to avoid impacts to the Santa Margarita River at two locations (or one location if the pipeline is attached to the Stuart Mesa Bridge), San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, and I-5. TLS construction would be sized to accommodate two pipes for future expansion. The proposed water line would be installed in boreholes drilled beneath the four creeks, the Santa Margarita River, I-5, and the railroad. The crossing of the Santa Margarita River would also serve to bypass significant cultural resources and numerous utilities in the Vandegrift Boulevard/Basilone Road area. TLS construction would be employed from the west side of the Santa Margarita River at Basilone Road diagonally east to Haybarn Canyon, and from Stuart Mesa Road on the west side of the Santa Margarita River, beneath the river, to a site near Vandegrift Boulevard (assuming attachment to the Stuart Mesa Bridge is not used).

The project would also include the construction and operation of three pump stations along the alignment. One pump station would be within the project limits of the Northern AWT and a second pump station would be within a developed parking lot at the future AWT South. The future AWT South is not part of this proposed action and was covered under a separate NEPA document (U.S. Navy 2010e). A third pump station would be in a disturbed parking area on the southwest side of the intersection of El Camino Real and Las Pulgas Road.

All construction and demolition activity would be within the project limits, and the majority of the work would be contained within existing roadways and shoulders. Supporting activities would include asphalt patching of existing roads. The construction activities for the installation of the proposed pipelines except for a nearly 2-mile segment of Stuart Mesa Road in the 41 Area (Las Flores) and the segment in the Wire Mountain housing area could involve temporary impacts within a 125-foot-wide corridor approximately 63 feet on either side of the pipeline centerline. A trench for an up to 36-inch water main would be approximately 4 to 6 feet wide and as deep as 8 to 10 feet.

The two exception areas, a segment of Stuart Mesa Road in the 41 Area (Las Flores) and the segment in the Wire Mountain housing area, have substantial protected resources (i.e., vernal pools and fairy shrimp) adjacent to the roadways. MCBCP would work closely with USFWS in these areas during the project design to minimize resource impacts. The construction contractor would focus on installing the pipeline within the Stuart Mesa Road roadway to the greatest extent practicable but unforeseen construction situations (i.e., unknown existing utilities or geologic issues) often arise that result in construction activities occurring outside the roadway. A special design refinement for this nearly 2-mile segment would be a smaller area than anticipated impacts used in the analyses of all other pipeline segments in this EIS. Along the Wire Mountain Road segment from the proposed 4-million-gallon reservoir to Vandegrift Boulevard within the Wire Mountain Housing Area, a similar design refinement would require that all pipeline construction be confined to the roadway.

Maintenance and access would be provided within the project or from adjacent roadways, parking lots, or existing developed areas. Maintenance access corridors would also be included along key segments of the P-1045 pipelines. Similar to P-1044, the maintenance corridors would actually be constructed on only one side of the road (the side with the pipeline), but are analyzed in this EIS on both sides of the road to provide a more conservative impact analysis until the design is complete. The exception to this approach would be a nearly 2-mile segment along Stuart Mesa Road in the 41 Area (Las Flores). Maintenance access corridors would not be included in this segment along Stuart Mesa Road.

These road segments are critical to the operation of the Base, are narrow two-lane roads, and have blind horizontal and vertical curves. Maintenance vehicles parked in the traffic lanes could cause road closures and could create a danger to motorists and work crews if parked or moving slowly in the traffic lanes. The maintenance access corridor would serve a secondary purpose as bike or pedestrian lanes. The paved maintenance access corridors would extend 8 feet from the outside travel lane striping in two segments. One segment, approximately 5.5 miles long, would extend along Stuart Mesa Road from the housing area in the south to Las Pulgas Road and the other segment, approximately 4 miles long, would extend from the Las Pulgas Road/Stuart Mesa Road intersection to the 43 Area (Las Pulgas).

The project limits consist of the permanent and temporary impact areas of the proposed action. The permanent facilities would include pump stations, a 4-million-gallon reservoir, and the maintenance access corridor, and the temporary facilities would include conveyance lines and TLS construction sites.

This project would be funded in FY 2012 at approximately $125 million. Construction would begin in 2013 and last approximately 12 to 24 months.

Alternative 2

<u>Northern AWT and Associated Facilities (P-1044 Alternative 2: Site 6 with Non-Basilone Road Conveyance Lines)</u>

P-1044 Alternative 2 would be similar to P-1044 Alternative 1, with the exception of the routing of the conveyance lines. Raw water, treated water, and brine would be conveyed via new pipelines in three proposed linear corridors, with individual corridor segments varying in the combination of types of lines they would contain.

- One corridor would extend from the Northern AWT to the west, passing north of the SONGS East Mesa facility and then running northwest along El Camino Real to the 51 Area (San Onofre), before turning north along several different roadway segments to the San Onofre 1 Housing Area, 62 Area (San Mateo), 63 Area (Cristianitos), and 64 Area (Talega).
    - This corridor would include lines to connect to reservoirs in or near the 62 Area (San Mateo) (Reservoirs 62310 and 62518), and the 63 Area (Cristianitos) (Reservoir 63210). It would also connect to the well field in the Sierra 1 Training Area.
    - The lines in this corridor would extend beneath San Onofre Creek in the vicinity of the 51 Area (San Onofre) just east of I-5 and beneath San Mateo Creek just south of the 62 Area (San Mateo) using TLS

construction. Both the upstream and downstream alignments would be used for the San Onofre Creek undercrossing.

  - The pump station requirements within this corridor would be the same as what would be required for the analogous corridor under P-1044 Alternative 1.

- The second corridor would extend from the Northern AWT to Basilone Road and then branch. One branch would run west along Basilone Road to the San Onofre 2 Housing Area and the San Onofre 3 Housing Area, while the second branch would run east along Basilone Road to serve the 52 Area (School of Infantry) and 53 Area (Horno).
  - This corridor would include potable water lines to connect to reservoirs in or near the San Onofre Housing Area (Reservoirs 51770, 51771, and 51772), the 52 Area (School of Infantry) (Reservoir 52698), and the 53 Area (Horno) (Reservoirs 53116 and 53310).
  - Lines in this corridor would extend beneath San Onofre Creek just south of Basilone Road using TLS construction.
  - No pump stations would be required in this corridor.
- The third corridor would extend from the Northern AWT to the west, passing north of the SONGS East Mesa facility, and then run northwest along El Camino Real to the proposed injection wells east of I-5. The corridor would continue along El Camino Real before turning southwest to cross I-5 via an existing underpass and eventually running southeast along existing roadways to the proposed MCBCP San Onofre Beach recreation area injection well field and on to the main SONGS facility. Similar to Alternative 1, brine would be discharged through the deep injection well fields only. A secondary option is to discharge the brine through an ocean outfall at SONGS. This option is not considered ripe for a full analysis due to the lack of final design and, although considered viable, will be evaluated on a programmatic level in this EIS.
  - No TLS construction would be required in this corridor.
  - No pump stations would be required in this corridor.

Similar to P-1044 Alternative 1, this alternative would include the maintenance access corridors along San Mateo, Basilone, and Cristianitos roads. This alternative would be funded in FY 2012 at approximately $101 million and construction would begin in 2013 and last up to 24 months.

<u>Connection of Northern and Southern Water Systems (P-1045 Alternative 2 Route)</u>

P-1045 Alternative 2 would be similar to P-1045 Alternative 1 but would differ in the routing of the connection between a northern connection (to existing water pipelines in Basilone Road or one of the proposed Northern AWT sites as described in P-1045 Alternative 1) and the reservoirs on the ridge above Haybarn Canyon. The alignment of P-1045 Alternative 2 would start at an existing water line in Basilone Road or the new Northern AWT (P-1044) and extend south in El Camino Real to Las Pulgas Road and run north in Las Pulgas Road to Basilone Road. The water line would then extend along Basilone Road to Vandegrift Boulevard and run east past the future AWT South to connect to several reservoirs along a ridge (Reservoirs 13151, 13154, 24140, and 24174).

TLS construction would be conducted to avoid impacts to San Onofre Creek and the Santa Margarita River. P-1045 Alternative 2 would also include the construction and operation of three pump stations along the alignment. One pump station each would be within the project limits of the Northern AWT and the future AWT South. A third pump station would be in a disturbed area on the southwest side of the intersection of El Camino Real and Las Pulgas Road.

The sizing of the proposed line and all other associated support facilities (pump stations) would be similar to P-1045 Alternative 1. Demolition, construction, maintenance activities, and maintenance access corridors for this alternative would also be similar to those described for P-1045 Alternative 1, except one of the corridors would be along Basilone Road instead of Stuart Mesa Road. This alternative would be funded in FY 2012 at approximately $112 million and construction would begin in 2013 and last up to 24 months.

Alternative 3

<u>Northern AWT and Associated Facilities (P-1044 Alternative 3: Site 4 with Basilone Road Conveyance Lines)</u>

P-1044 Alternative 3 would be similar to P-1044 Alternative 1, with the exception of the siting of the Northern AWT. Under Alternative 3, the proposed Northern AWT would be adjacent to and south of Basilone Road, roughly 2,000 feet east of the San Onofre 3 Housing Area and 2,500 feet north of the SONGS East Mesa facility, a location known as "Site 4" from an earlier siting study (Brown and Caldwell 2010). The same maintenance access corridors would be part of the project, but access to the Northern

AWT would be from Basilone Road and the paved access road from El Camino Real to the Northern AWT would not be needed. This alternative would be funded in FY 2012 at approximately $100 million and construction would begin in 2013 and last for approximately 24 months.

Connection of Northern and Southern Water Systems (P-1045 Alternative 3 Route)

This is the preferred alternative for P-1045. P-1045 Alternative 3 would be similar to P-1045 Alternative 1 but would differ in routing between a northern connection (to existing water pipelines in Basilone Road or one of the proposed Northern AWT sites as described in P-1045 Alternative 1) and the southern water system. P-1045 Alternative 3 would connect the northern and southern systems but, unlike P-1045 Alternatives 1, 2, or 4, it would not directly connect to reservoirs on the ridge above Haybarn Canyon. The P-1045 Alternative 3 water line would start at an existing water line in Basilone Road or the new Northern AWT (P-1044) and extend south in El Camino Real to Stuart Mesa Road. At the junction of Stuart Mesa Road and Las Pulgas Canyon Road, a lateral pipeline would run north approximately 4.7 miles, terminating at existing Reservoir 43210. (This lateral would be the same as the Las Pulgas lateral described under P-1045 Alternative 1.) The main pipeline would continue south along Stuart Mesa Road, passing under the Santa Margarita River at the Stuart Mesa Bridge via TLS construction, or over the Santa Margarita River attached to the Stuart Mesa Bridge, to Vandegrift Boulevard before turning north. The line would continue northeast on Vandegrift Boulevard to an existing pump station at Magazine Road and terminate at a newly proposed 4-million-gallon reservoir and several nearby reservoirs (Reservoirs 20813, 20814, 20815, 200814, and 200815).[2] A new up to 12-inch gravity flow water line would extend from the 4-million-gallon reservoir to serve the new Naval Hospital Camp Pendleton and the 21 Area (Del Mar). This line would cross beneath I-5 via TLS to serve the 21 Area (Del Mar). As discussed for Alternative 1, a third or intermediate bore pit may be required in the previously disturbed ruderal vegetation between the railroad tracks and I-5. Should this bore pit be necessary, additional surveys would be required.

[2] The P-1045 Alternative 3 route mirrors the P-1045 Alternative 1 route, except that the P-1045 Alternative 1 route includes a segment that runs from Stuart Mesa Road near the west bank of the Santa Margarita River to reservoirs near the future AWT South, which is not included in the P-1045 Alternative 3 route. Also, Alternative 1 does not include the Alternative 3 segment from Stuart Mesa Road up the west side of the Santa Margarita River valley to Reservoir 32939 and across the Santa Margarita River to the Iron/Manganese Water Treatment Plant.

TLS crossings would be implemented to avoid impacts to San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, and the Santa Margarita River (assuming attachment to the Stuart Mesa Bridge is not used). The project would also include the construction and operation of two pump stations along the alignment. One pump station would be located within the project limits of the Northern AWT, and a second pump station would be located in a disturbed area on the southwest side of the intersection of El Camino Real and Las Pulgas Road.

The sizing of the proposed line and all other associated support facilities (pump stations) would be similar to P-1045 Alternative 1. Demolition, construction, and maintenance activities for this alternative would also be similar to those described for P-1045 Alternative 1. Maintenance access corridors would be in the same locations as proposed in Alternative 1. This alternative would be funded in FY 2012 at slightly less than $105 million and construction would begin in 2013 and last up to 24 months.

Alternative 4

<u>Northern AWT and Associated Facilities (P-1044 Alternative 4: Site 4 with Non-Basilone Road Conveyance Lines)</u>

P-1044 Alternative 4 would be similar to P-1044 Alternative 3, with the exception of the siting of the conveyance lines. These conveyance lines would be in the same location as the conveyance lines described for P-1044 Alternative 2; in other words, P-1044 Alternative 4 would be similar to P-1044 Alternative 2, with the exception of the location of the Northern AWT site. The same maintenance access corridors would be part of the project, but access to the Northern AWT would be from Basilone Road and the paved access road from El Camino Real to the Northern AWT would not be needed. This alternative would be funded in FY 2012 at approximately $106 million and construction would begin in 2013 and last for approximately 24 months.

<u>Connection of Northern and Southern Water Systems (P-1045 Alternative 4 Route)</u>

P-1045 Alternative 4 would be similar to P-1045 Alternative 1, with the exception of the routing between a northern connection (to existing water pipelines in Basilone Road or one of the proposed Northern AWT sites as described in P-1045 Alternative 1) and the reservoirs on the ridge above Haybarn Canyon. The P-1045 Alternative 4 route would incorporate the Stuart Mesa Road P-1045 Alternative 3 route from its northern terminus at an existing water line in Basilone Road or the proposed Northern AWT to its southern terminus at the existing reservoirs and the proposed 4-million-gallon reservoir near the

Vandegrift Boulevard/Magazine Road pump station. The Las Pulgas lateral line would branch off between the two termini. The P-1045 Alternative 4 route would add a segment from the Vandegrift Boulevard/Magazine Road pump station, from which it would run east of the 22 Area (Chappo) along a ridge above Haybarn Canyon before connecting to several reservoirs along the ridge (Reservoirs 13151, 13154, 24140, and 24174).[3]

TLS construction technology would be implemented to avoid impacts to San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, the Santa Margarita River (assuming attachment to the Stuart Mesa Bridge is not used), I-5, and the railroad. The project would also include the construction and operation of three pump stations along the alignment. One pump station would be located within the project limits of the Northern AWT, a second pump station would be in a disturbed area on the southwest side of the intersection of El Camino Real and Las Pulgas Road, and the third would be at the future AWT South.

Maintenance access corridors would be in the same locations as in Alternative 1. This alternative would be funded in FY 2012 at approximately $125 million and construction would begin in 2013 and last up to 24 months.

Alternative 5 Preferred Alternative (P-1044 Alternative 1 and P-1045 Alternative 3)

Alternative 5, the preferred alternative, would feature a combination of elements described under the previous alternatives. The project descriptions of the two individual projects are identical to the descriptions previously provided; only the combination of individual project alternatives is unique to Alternative 5. Specifically, it would consist of the following:

- Northern AWT and Associated Facilities: Site 6 with Basilone Road Conveyance Lines (previously described under P-1044 Alternative 1)
- Connection of Northern and Southern Water Systems Route 3 (previously described under P-1045 Alternative 3)

[3] Much of the P-1045 Alternative 4 route mirrors the P-1045 Alternative 3 route, except that Alternative 3 does not include the segment from the Vandegrift Boulevard/Magazine Road pump station to the future AWT South and nearby reservoirs, which is included in the P-1045 Alternative 4 route but is not included in the P-1045 Alternative 3 route. Alternative 4 does not include the Alternative 3 segment from Stuart Mesa Road up the west side of the Santa Margarita River valley to Reservoir 32939 and across the Santa Margarita River to the IM WTP.

Alternative 5 would result in comparable environmental impacts while providing the most operational efficiency, construction flexibility, and cost-effectiveness of the alternatives. P-1044 Alternative 1 would use Site 6 for the proposed AWT. Site 6 is the most optimal site from an operational standpoint due to its size, location adjacent to raw water wells, and proximity to the injection well sites (Brown and Caldwell 2010). In addition, P-1044 Alternative 1 can service more areas than Alternative 2. P-1045 Alternative 3 provides the key connections to the Naval Hospital Camp Pendleton and the 21 Area (Del Mar) that Alternative 2 does not provide. Of the two other alternatives (P-1045 Alternative 1 and Alternative 4) that also provide these connections, Alternative 3 is the least environmentally impacting and the most cost-effective.

Environmentally Preferred Alternative

The suite of projects in the environmentally preferred alternative for the proposed action would consist of Alternative 1 or 3 for P-1044 and Alternative 2 for P-1045. The four alternatives for P-1044 are very close in their impacts on natural and cultural resources. All four P-1044 alternatives would potentially impact five cultural resources eligible for the NRHP, but Alternatives 1 and 3 would each impact one less ineligible resource. For impacts on waters of the U.S. and federally listed species, P-1044 Alternatives 1 and 3 would have the same degree of impacts, which would be less than Alternatives 2 and 4.

For P-1045, Alternative 2 would potentially impact a total of 10 cultural resources (five eligible and five ineligible for the NRHP), whereas Alternative 1 would potentially impact a total of 29 resources (10 eligible and 19 ineligible), Alternative 3 would potentially impact a total of 15 sites (five eligible and 10 ineligible), and Alternative 4 would potentially impact a total of 23 resources (11 eligible and 12 ineligible). P-1045 Alternative 2 would impact the least total acreage of waters of the U.S. and total riparian acreage (permanent and temporary together) and not impact thread-leaved brodiaea, vernal pools, or listed vernal pool species (spreading navarretia, Riverside fairy shrimp, or San Diego fairy shrimp). The other three P-1045 alternatives would each impact thread-leaved brodiaea, more riparian habitat (permanent plus temporary), vernal pools, and populations of listed vernal pool species.

Overall, the environmentally preferred alternative differs from the alternative preferred for operational reasons (providing alternate water service to the new Naval Hospital and the 21 Area [Del Mar]) in favoring P-1045 Alternative 2 over P-1045 Alternative 3. For P-1044, the operational preferred alternative is equivalent to the environmentally preferred alternative.

No Action Alternative

Under the No Action Alternative, the proposed infrastructure improvements and expansions would not occur. The existing water systems on MCBCP would remain in their current unreliable condition and, in the case of the water distribution system; system redundancy would not be established. This would result in continued service interruptions, noncompliance with regulatory requirements, and increases in maintenance and repair costs. Ultimately, the mission of the Base and the quality of life of the Marines would be compromised.

Other Alternatives Considered

The following alternatives were considered in this environmental analysis but were not carried forward since they would not meet the purpose and need or the screening criteria of the proposed action.

Alternative Sites for Northern AWT Facility

Seven sites were evaluated for the proposed Northern AWT facility. During the EIS process, the original site was determined to have significant biological resources constraints; therefore, a siting study was conducted. The siting study evaluated six other potential sites (Brown and Caldwell 2010). Two of these sites, Site 4 and Site 6, are being fully analyzed in this EIS. The other four sites from the siting study and the original site have been eliminated from further analysis because they would not meet the purpose and need or the screening criteria of the proposed action.

I-5 Corridor

The use of I-5 as a water system infrastructure corridor was considered as an alternative route for P-1045. MCBCP owns the land under I-5, but it has issued a permanent easement to the California Department of Transportation to use this land for an interstate freeway. Thus, this area is not a viable alternative for north-south water system connection due to the potential disruption that would occur to interstate traffic flow and the difficulties it would place on continuing maintenance operations. In addition, it would be more difficult under this alternative to provide needed services to areas of the Base along the proposed alignment(s).

Utility Trenching for Stream/River Crossing

The proposed construction and installation of underground portions of the water system would be done by trenching throughout the majority of the project corridors. This is the most efficient approach in upland areas. Use of this method for construction and installation through creek and river crossings is potentially damaging to water and biological resources. Although trenching is being proposed through some smaller unnamed tributaries, this method is too environmentally damaging to be used for crossing of major creeks and rivers. This alternative does not meet the screening criterion for Environmental Sensitivity that requires the project "must be achievable while minimizing significant impacts to environmental resources." Therefore, this alternative method of construction was eliminated from further analysis for major creek and river crossings. TLS construction or installation of the pipeline above grade and fixed to a bridge crossing would be the preferred method for the major creek and river crossings.

Alternative Water Treatment and Storage Facility Technologies

Under this alternative, separate water treatment facilities and water storage facilities would be constructed to support each cantonment area. These facilities would be sized to meet the needs of each cantonment area and would be constructed within the cantonment area. Each cantonment area would function independently and would not rely on the overall Basewide system. A failure in one of the facilities would restrict the interruption in services only to that cantonment area. Individual facilities would be smaller than a central facility but there would be more of them, so this alternative would require more land overall. Maintenance and operation costs would increase because technicians would be needed at each facility. In addition, each facility would need to be oversized to accommodate future expansion or would be sized to meet current needs and potentially restrict expansion. To a large extent, this is the system currently in place, which does not have any redundant or backup system. Operationally, the Base is in need of a system that provides redundant and backup water that can be conveyed from one portion of the Base to another based on need. Separate independent systems would not allow that type of flexibility.

PUBLIC INVOLVEMENT

The EIS process is designed to involve the public in the federal decision-making process. Input from the public and agencies forms the basis of the alternatives and impact analysis. Input from the public and applicable resource and permitting agencies is used to evaluate the alternatives and environmental impacts before a final decision is made. In accordance with NEPA, the Marine Corps initiated a public and agency scoping process to assist in determining the issues to be addressed in the EIS. The range of issues analyzed in this EIS was determined from initial Marine Corps evaluation of the proposed action and written comments received during the public scoping process.

The public scoping period was initiated with the publication of the Notice of Intent to prepare an EIS in the Federal Register on 31 March 2010. The public scoping period extended from 31 March 2010 through 29 April 2010. A public scoping meeting was conducted on 16 April 2010. During the scoping process, one written comment letter, from the National Marine Fisheries Service (NMFS), a federal agency of the National Oceanic and Atmospheric Administration (NOAA), was received (NMFS 2010). NMFS requested that the EIS evaluate potential effects of the proposed action on southern California steelhead (*Oncorhynchus mykiss*), include measures to avoid or minimize any adverse effects, and propose compensatory mitigation measures as appropriate (Appendix A).

The U.S. Environmental Protection Agency (USEPA) published a Notice of Availability (NOA) for the Draft EIS on this proposed action in the Federal Register on 2 December 2011. The Draft EIS was circulated for review and comment to government agencies, local organizations, Native American tribes, and interested private citizens for 45 days between 2 December 2011 and 17 January 2012. The Draft EIS was also available for general review in three public libraries and was available online at www.marines.mil/unit/basecamppendleton/pages/basestaffandagencies/environmental/home.aspx. A public meeting was held on 5 January 2012 at the City of San Clemente Community Center. Public comments received during the meeting and the public review period were reviewed and are reflected as appropriate in the Final EIS, with responses to all comments presented in Appendix A-4 of the Final EIS.

REGULATORY ENVIRONMENT

The EIS has been prepared pursuant to the following:

- NEPA (42 U.S.C. §§ 4321–4370h), which requires an environmental analysis for major federal actions having the potential to significantly impact the quality of the human environment;

- CEQ Regulations (40 C.F.R. Parts 1500–1508), which implement the requirements of NEPA;
- Department of the Navy regulations for implementing the CEQ Regulations and NEPA (32 C.F.R. Part 775); and
- Marine Corps Order P5090.2A, Chapter 12, Environmental Compliance and Protection Manual, which establishes procedures for implementing NEPA.

This EIS has also been prepared considering the requirements listed in Table ES-2.

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental impacts on the following resources are evaluated in this EIS: geology and soils, water quality and hydrology, biological resources, cultural resources, land use, visual resources, socioeconomics and environmental justice, traffic, air quality, noise, public health and safety, services and utilities, coastal zone management, and marine resources. Table ES-3 provides a summary of potential environmental impacts, by resource area and alternative, for both MILCONs combined. Tables ES-4 and ES-5 provide a summary of potential environmental impacts, by resource area and alternative, for P-1044 and P-1045, respectively. By avoidance, no other resources are impacted. A detailed discussion of impacts to resources is provided in Chapter 4.

Table ES-1
Projects Addressed per Alternative, Funding Year, Funding Level, and Construction Years

Project (Funding Year)	Build Alternative Number (funding level $m [millions])					Construction (All Build Alternatives)		No Action Alternative
	1	2	3	4	5	Start Date	Duration (months)	
P-1044 (FY 2012)	Alt 1 ($101m)	Alt 2 ($101m)	Alt 3 ($100m)	Alt 4 ($106m)	Alt 1 ($101m)	Jan 2013	24	No development
P-1045 (FY 2012)	Alt 1 ($125m)	Alt 2 ($112m)	Alt 3 ($105m)	Alt 4 ($125m)	Alt 3 ($105m)	Apr 2013	18	No development
Total	**$226m**	**$213m**	**$205m**	**$231m**	**$206m**	**Jan 2013**	**36**	N/A

Table ES-2
Applicable Laws and Regulations Considered

Title	Citation
Archaeological Resources Protection Act of 1979	16 U.S.C. §§ 470aa–470mm
California Hazardous Waste Management	22 C.C.R. Div. 4.5
Clean Air Act	42 U.S.C. §§ 7401–7671q
Clean Water Act (1972, as amended)	33 U.S.C. §§ 1251–1387
Coastal Zone Management Act (1972, as amended)	16 U.S.C. §§ 1451–1466
Comprehensive Environmental Response, Compensation, and Liability Act (1980)	42 U.S.C. §§ 9601–9675
Endangered Species Act (1973, as amended)	16 U.S.C. §§ 1531–1544
Executive Order (EO) 12372 (Intergovernmental Review of Federal Programs) (1977, 1983, and 1984)	47 Federal Register 30959
EO 12898 (Environmental Justice) (1994)	59 Federal Register 7629
EO 11988 (Floodplain Management) (1977)	42 Federal Register 26951
EO 13045 (Environmental Justice for Children) (1997)	62 Federal Register 19885
EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management) (2007)	72 Federal Register 3919
EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) and Migratory Bird Treaty Act	66 Federal Register 3853, 16 U.S.C. §§ 703–712
EO 13514 (Federal Leadership in Environmental, Energy, and Economic Performance (2009)	74 Federal Register 52117
EO 11990 (Protection of Wetlands) 1977	42 Federal Register 26961
Marine Mammal Protection Act (1972, as amended)	16 U.S.C. §§ 1361–1407
National Historic Preservation Act of 1966, as amended (1994)	16 U.S.C. §§ 470–470x-6
National Register of Historic Places (1977)	36 C.F.R. § 60
Pollution Prevention Act of 1990	42 U.S.C. §§ 13101–13109
Resource Conservation and Recovery Act (1976)	42 U.S.C. §§ 6901–6992k
Rivers and Harbors Appropriation Act of 1899, Section 10	33 U.S.C. § 403
Safe Drinking Water Act	42 U.S.C. §§ 300f–300j-26
Magnuson-Stevens Fishery Conservation and Management Act	16 U.S.C. §§ 1801–1891d

C.C.R. = California Code of Regulations; C.F.R. = Code of Federal Regulations; U.S.C. = United States Code

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Table ES-3
Summary of Potential Environmental Impacts by Resource Area and Alternative, Both MILCONs Combined

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Geology and Soils					
Impacts Alternative 1 would have a total direct impact area of approximately 849 acres, with approximately 279,000 linear feet (LF) of trenching and 15,000 feet of trenchless (TLS) construction. Marine Corps Base Camp Pendleton (MCBCP) is not underlain by any active or potentially active faults. The majority of the soils within the study area have a moderate to severe erosion potential. With implementation of best management practices (BMPs), compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 2 would have a total direct impact area of approximately 636 acres, with approximately 258,000 LF of trenching and 10,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 would have a total direct impact area of approximately 707 acres, with approximately 233,000 LF of trenching and 11,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 would have a total direct impact area of approximately 812 acres, with approximately 270,000 LF of trenching and 11,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 5 would have a total direct impact area of approximately 709 acres, with approximately 234,000 LF of trenching and 11,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No geology and soils impacts would occur. **Mitigation** No mitigation measures are proposed.
Water Quality and Hydrology					
Impacts Water quality and hydrology could be affected where project corridors or facility project limits cross streams or encounter groundwater or floodplains. Under Alternative 1, TLS construction to avoid trenching would be conducted in the northern part of the Base near the proposed Northern Advanced Water Treatment Plant (AWT) at two locations on San Onofre Creek, at San Mateo Creek at the 62 Area, at San Onofre Creek at the 52 Area, and to cross Interstate 5 (I-5) and the railroad near the San Onofre Nuclear Generating System (SONGS). In the southern part of the Base, TLS construction would occur at Las Flores Creek, at one location for the French Creek and Aliso Canyon drainages, and at two locations on the Santa Margarita River. An additional crossing under I-5 is proposed to provide water to the 21 Area (Del Mar). Construction of the 4-million-gallon reservoir could result in erosion, off-site sediment transport, pollution, and construction material spills that impact receiving waters. Construction activities, including stream crossings, could result in erosion,	**Impacts** Alternative 2 varies from Alternative 1 in the northern part of the Base by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line. In the southern part of the Base, only one TLS crossing in total would be needed (Santa Margarita River northeast of the Basilone Road Bridge). Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 varies from Alternative 1 in the northern part of the Base by siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. In the southern part of the Base, TLS construction would be used at Las Flores Creek, at one location for French Creek and Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 varies from Alternative 1 in the northern part of the Base by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line, and siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. In the southern part of the Base, TLS construction would be used at Las Flores Creek, at one location for French Creek and Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 5 varies from Alternative 1 in the southern part of the Base, where TLS construction would be used at Las Flores Creek, at one location for French Creek and Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Current drinking water standards in northern MCBCP would continue to exceed the national secondary standard and could violate the Stage 2 Disinfection Byproducts Rule for drinking water and Title 22 for recycling water. Compliance with current water use and recycling regulations and goals would not be met and consumption of groundwater resources would increase. Damage or rupture of deteriorating water lines could result in sediment transport and surface water quality degradation. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Potential stream or creek bank damage could result from TLS construction, and short-term and temporary impacts to groundwater quality could result from the construction of deep injection well fields. Marine water quality impacts from modifying the SONGS outfall conduit for suitable discharge and dilution of disposed brine solution would occur from multiple benthic disturbances during construction that would cause increased turbidity, decreased light transmittance, and release of sediment constituents into the water column. Impacts would be avoided by implementation of a project-specific Storm Water Pollution Prevention Plan (SWPPP) with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before and during construction, and would continue through the postconstruction operational phase. Discharge of brine would require permitting from the State Water Resources Control Board, enforced by the San Diego Regional Water Quality Control Board (RWQCB). Application for, and issuance of, Waste Discharge Requirements (WDRs) and/or National Pollutant Discharge Elimination System (NPDES) permits would be required for brine disposal at the injection well and ocean outfall locations. Strict monitoring and reporting programs (in-plant and receiving water) would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.					
Biological Resources					
Impacts Under Alternative 1, anticipated direct impacts to plant communities and other cover types would consist of 66.14 acres of permanent impacts and 399.47 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 14.51 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.52 acre of thread-leaved brodiaea occupied	**Impacts** Under Alternative 2, anticipated direct impacts to plant communities and other cover types would consist of 68.34 acres of permanent impacts and 299.29 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.11 acre of permanent impacts and 1.83 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.51 acre thread-leaved brodiaea occupied habitat.	**Impacts** Under Alternative 3, anticipated direct impacts to plant communities and other cover types would consist of 50.24 acres of permanent impacts and 337.59 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 1.66 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.52 acre of thread-leaved brodiaea occupied	**Impacts** Under Alternative 4, anticipated direct impacts to plant communities and other cover types would consist of 55.93 acres of permanent impacts and 388.53 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 5.11 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.53 acre of thread-leaved brodiaea occupied	**Impacts** Under Alternative 5, anticipated direct impacts to plant communities and other cover types would consist of 58.31 acres of permanent impacts and 334.70 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 1.65 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.52 acre of thread-leaved brodiaea occupied	**Impacts** No biological resources impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 25 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the Integrated Natural Resources Management Plan (INRMP) and the 1995 Riparian and Estuarine/Beach Biological Opinion (Riparian BO). Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes. The plan would be reviewed and approved by the agencies and by the Assistant Chief of Staff, Environmental Security (ES) Land Management Branch.	Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 24 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 24 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 24 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. The U.S. Fish and Wildlife Service issued a Final Biological Opinion on 15 August 2012. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Cultural Resources					
Impacts Under Alternative 1, a total of 40 resources are identified, of which 25 are ineligible for the National Register of Historic Places (NRHP) and 15 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 1 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, the State Historic Preservation Officer (SHPO), and other consulting parties would execute and implement a signed Programmatic Agreement (PA) to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 2, a total of 22 resources are identified, of which 12 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 2 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 3, a total of 26 resources are identified, of which 16 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 3 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 4, a total of 35 resources are identified, of which 19 are ineligible for the NRHP and 16 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 4 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 5, a total of 26 resources are identified, of which 16 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 5 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties have executed and implemented a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** No cultural resources impacts would occur. **Mitigation** No mitigation measures are proposed.
Land Use					
Impacts Land use on MCBCP is well defined by the Base Master Plan. The proposed infrastructure project would be compatible with all land uses and is necessary to support many of those uses. The only new permanent aboveground structures in Alternative 1 would be the Northern AWT, near the SONGS East Mesa facility, two new pump stations within cantonment areas, an aboveground run of pipeline on a steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds, new pump stations within the Northern AWT and future AWT South sites, a pump station on Las Pulgas Road near the Las Pulgas gate, injection wellheads in the San Onofre percolation ponds, injection wellheads within a mown portion of the MCBCP San Onofre Beach recreation area, and a new 4-million-gallon reservoir in the Wire Mountain area. None of these permanent structures would significantly affect nearby land uses, or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, all aboveground structures would be the same and in the same locations as described under Alternative 1, except the 4-million-gallon reservoir would not be included in Alternative 2. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, all aboveground structures would be the same and in the same locations as described in Alternative 1, with the exception of a pump station at the future AWT South (which would not be needed) and of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Permanent land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, while some underground pipeline routes would be different than under Alternative 1, all aboveground structures would be the same and in the same locations as described under Alternative 1, with the exception of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses, or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 5, all aboveground structures would be the same and in the same locations as described under Alternative 1, with the exception of a pump station at the future AWT South (which would not be needed). Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses, or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** No land use impacts would occur. **Mitigation** No mitigation measures are proposed.
Visual Resources					
Impacts With the exception of the Northern AWT, permanent aboveground structures would be located in areas sheltered or substantially distant from viewpoints on- or off-Base and/or would be of minimal size and scale. The Northern AWT would be at	**Impacts** Under Alternative 2, all generally visible aboveground facilities would be the same and in the same locations as those described in Alternative 1, so the effects on viewers on- or off-Base would be the same. The exception would be that	**Impacts** Under Alternative 3, all generally visible aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility.	**Impacts** Under Alternative 4, all generally visible aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility.	**Impacts** Under Alternative 5, all generally visible aboveground facilities would be the same and in the same locations as in Alternative 1, so the effects on viewers on- or off-Base would be the same. No significant visual impacts would occur.	**Impacts** No visual resources impacts would occur. **Mitigation** No mitigation measures are proposed

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
least partially screened from motorists on Interstate 5 (I-5) or passengers on trains utilizing the BNSF Railway tracks by the SONGS East Mesa facility. From on-Base, it would largely be seen against the backdrop of the SONGS East Mesa facility, and would not be located in a sensitive viewshed. The 4-million-gallon reservoir would be adjacent to existing water reservoirs and the Santa Margarita and Wire Mountain 2 housing areas to the west and south. Some of the housing units would have direct views of the reservoir. This would be an adverse but not significant visual impact. The new reservoir would not constitute an element significantly different in size, bulk, scale, or location than currently exists in the area to other viewers. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	Alternative 2 would not include the 4-million-gallon reservoir in the Wire Mountain area. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1 but would not be in a sensitive viewshed. The proposed 4-million-gallon reservoir would have the same visual impacts to the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area to the west and south as described for Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1 but would not be in a sensitive viewshed. The proposed 4-million-gallon reservoir would have the same visual impacts to the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area to the west and south as described for Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed	
Socioeconomics and Environmental Justice					
Impacts Total cost for Alternative 1 is estimated to be $226 million, with funding from fiscal year (FY) 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $261 million and a single year employment peak of about 1,482 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 2 is estimated to be $213 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $226 million and a single year employment peak of about 1,283 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 3 is estimated to be $205 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $218 million and a single year employment peak of about 1,235 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 4 is estimated to be $231 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $245 million and a single year employment peak of about 1,392 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 5 is estimated to be $206 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $219 million and a single year employment peak of about 1,241 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** No socioeconomic and environmental justice impacts would occur. **Mitigation** No mitigation measures are proposed.
Traffic					
Impacts Construction traffic from Alternative 1 would be generated in 2013 and 2014 by an estimated 50 trucks per day, 120 workers per day, and 610 daily trips, of which 154 would be peak-hour trips. Construction traffic generated by Alternative 1, interacting with other construction phase traffic generated by a number of other projects aboard MCBCP, would contribute to adverse levels of	**Impacts** Construction traffic from Alternative 2 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** Construction traffic from Alternative 3 is estimated to the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** Construction traffic from Alternative 4 is estimated to the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** Construction traffic from Alternative 5 is estimated to the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** No traffic impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
service (LOS) at intersections and roadway segments that already have unacceptable LOS and/or would create adverse LOS at other intersections and roadway segments as a result of proposed action impacts. Under Alternative 1, project-related impacts would occur at five intersections in 2013 and 2014. No project-related impacts would occur on on-Base or off-Base roadway segments in 2013 or 2014. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during construction period only, and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than described under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during construction period only, and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	
Air Quality					
Impacts Under Alternative 1, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants of volatile organic compounds (VOCs), oxides of nitrogen (NO_X), and carbon monoxide (CO) in the San Diego Air Basin (SDAB), and VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ in the South Coast Air Basin (SCAB) would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 1 would conform to the State Implementation Plan (SIP) and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 2 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 3 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 4 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 5, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 5 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** No air quality impacts would occur. **Mitigation** No mitigation measures are proposed.
Noise					
Impacts Construction noise would be primarily limited to temporary daytime construction along the transportation corridors and developed areas of the Base. There are sensitive receptors, including residents in the San Onofre 1, San Onofre 2, San Onofre 3, Stuart Mesa, Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, Wire Mountain 2, Wire	**Impacts** Under Alternative 2, sensitive receptors would include residents in the San Onofre 2, San Onofre 3, and Stuart Mesa housing areas (but fewer in these areas compared to Alternative 1) and the San Onofre CDC. BEQs in the 43, 52, 53, 62, and 64 Areas would also be within proximity to pipeline corridors under this alternative.	**Impacts** Under Alternative 3, sensitive noise receptors close to pipeline routes would be the same as under Alternative 1, except BEQs in the 33 Area would not be near any corridors. Also under Alternative 3, the Northern AWT would be within approximately 500 yards of housing in the San Onofre 2 and 3 housing areas, as opposed to within approximately 1,000	**Impacts** Under Alternative 4, sensitive noise receptors close to pipeline routes would be the same as under Alternative 1, except BEQs in the 33 Area would not be near any corridors while the San Onofre CDC would be close to a corridor. Also under Alternative 4, the Northern AWT would be within approximately 500 yards of housing in the San Onofre 2 and 3 Housing Areas,	**Impacts** Under Alternative 5, sensitive noise receptors close to pipeline routes would be the same as under Alternative 1, except BEQs in the 33 Area would not be near any corridors. Also under Alternative 5, the Northern AWT would be within approximately 500 yards of housing in the San Onofre 2 and 3 housing areas, as opposed to within approximately 1,000	**Impacts** No noise impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Mountain 3, and Santa Margarita housing areas; the Stuart Mesa and Santa Margarita elementary schools; the Stuart Mesa and Browne child development centers (CDCs); the Abby Reinke Center; and Bachelor Enlisted Quarters (BEQs) in the 31A, 33, 41, 43, 52, 53, 62, and 64 Areas, within proximity to a number of the pipeline corridors under this alternative. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	yards of these same areas under Alternative 1. As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	as opposed to within approximately 1,000 yards of these same areas under Alternative 1. As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	yards of these same areas under Alternative 1. As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	
Public Health and Safety					
Impacts There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 1 corridors or site project limits. One or more project n limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 12 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) sites, 19 underground storage tanks (USTs), nine Installation Restoration (IR) sites, and nine aboveground storage tanks (ASTs), along with training areas and former pesticide use areas. There is also potential presence of Munitions and Explosives of Concern (MEC). Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 2 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 14 RFA sites, 19 USTs, nine IR sites, and six ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 3 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 12 RFA sites, 19 USTs, nine IR sites, and nine ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 4 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 11 RFA sites, 15 USTs, nine IR sites, and nine ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 5 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 11 RFA sites, 19 USTs, nine IR sites, and nine ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Aging asbestos concrete pipes are unreliable under water pressure changes. The P-1044 pipeline to be replaced extends from Basilone Road to the reservoirs above San Onofre II Housing, an elevation difference of 150 feet. If a break occurred, a flow rate of 13,700 gallons per minute would result until closed. The response time in an unexpected blowout would be approximately 1 hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire. **Mitigation** No mitigation measures are proposed

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Services and Utilities					
Impacts Under Alternative 1, while construction would involve some temporary demand on services and utilities, and operations would increase demand for electrical, communication, water, wastewater, and solid waste services at least to a degree, construction impacts would be temporary and operational impacts would be minor. In no case would increase demand exceed system capacity, especially with the upgrades of Basewide utility infrastructure currently underway; therefore, no long-term significant adverse impacts to services and utilities are anticipated. With completion of the proposed action, there would be a beneficial effect on Basewide services and utilities. With the completion of the Northern AWT and its supporting infrastructure, the northern portion of the Base would receive an improved drinking water system. With the connection of the northern, southern, and Las Pulgas water systems, the Basewide water system would gain redundancy. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 2, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 3, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 4, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 5, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Potential significant impacts could result from failure of the deteriorating facilities and pipe/conduit systems. Failures in existing aged systems would impact firefighting capabilities, quality of life, and training requirements. **Mitigation** No mitigation measures are proposed.
Coastal Zone Resources					
Impacts Aside from the SONGS brine discharge component of P-1044, Alternative 1 would not be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before, during construction, and continuing through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be required for ensuring environmental	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 2 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 3 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 4 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 5 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** No coastal zone resources impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.					
Marine Resources					
Impacts Under Alternative 1, marine resource impacts could occur from modification and reuse of an existing but currently nonoperational SONGS ocean cooling water conduit that would be used for routing the brine solution discharge pipeline. These impacts would involve multiple benthic disturbances during construction depending on the construction methods used and could impact marine organisms. Construction and brine discharge could also result in marine water quality impacts. Conduit modification and discharge of brine into ocean waters would be closely regulated by the U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. The ability to assess whether there may be long-term impacts (i.e., via brine dispersal at the outfall) to marine resources would be contingent on the development of a final design and the dilution modeling of that design relative to the proposed discharge outflow. But based on the available information (Brown and Caldwell 2012) it is not likely that there would be significant impacts to marine resources. The dilution will be designed to meet the California Ocean Plan limitations and therefore would not result in a significant impact. Potential construction impacts to marine mammals and federally listed sea turtles, including from underwater construction noise, would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 5, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** No marine resources impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

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Table ES-4
Summary of Potential Environmental Impacts by Resource Area and Alternative, P-1044

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
Geology and Soils				
Impacts Alternative 1 would have a total direct impact area of approximately 327 acres, with approximately 104,000 linear feet (LF) of trenching and 4,000 feet of trenchless (TLS) construction. Marine Corps Base Camp Pendleton (MCBCP) is not underlain by any active or potentially active faults. The majority of the soils within the study area have a moderate to severe erosion potential. With implementation of best management practices (BMPs), compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 2 would have a total direct impact area of approximately 304 acres, with approximately 98,000 LF of trenching and 4,000 feet of TLS construction. While this is somewhat less than Alternative 1, geological and soil conditions in the area are consistent with Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 would have a total direct impact area of approximately 325 acres, with approximately 103,000 LF of trenching and 4,000 feet of TLS construction. While this is about the same as Alternative 1, the location of the Northern AWT would differ. However, geological and soil conditions in the area are consistent with Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 would have a total direct impact area of approximately 302 acres, with approximately 97,000 LF of trenching and 4,000 feet of TLS construction. While this is a smaller total area and a smaller total trenching distance than Alternative 1, and while the Northern AWT would be in a different location than for Alternative 1, geological and soil conditions in the area are consistent with Alternative 1. With the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No geology and soils impacts would occur. **Mitigation** No mitigation measures are proposed.
Water Quality and Hydrology				
Impacts Water quality and hydrology could be affected where project corridors or facility project limits cross streams or encounter groundwater or floodplains. Under Alternative 1, San Onofre Creek would be crossed near the proposed Northern AWT at an upstream and a downstream location using TLS	**Impacts** Alternative 2 varies from Alternative 1 by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line. Otherwise, stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well	**Impacts** Alternative 3 varies from Alternative 1 by siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. Otherwise, stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1.	**Impacts** Alternative 4 varies from Alternative 1 by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line, and siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. Otherwise, stream crossings	**Impacts** Current drinking water standards in northern MCBCP would continue to exceed the national secondary standard and could violate the Stage 2 Disinfection Byproducts Rule for drinking water and Title 22 for recycling water.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
technology to avoid trenching impacts. In the area of the project with features common to all alternatives, TLS technology would be used to cross San Mateo Creek at the 62 Area and San Onofre Creek at the 52 Area. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Potential stream or creek bank damage could result from TLS construction, and short-term and temporary impacts to groundwater quality could result from the construction of two deep injection well fields. Marine water quality impacts from modifying the San Onofre Nuclear Generating Station (SONGS) outfall conduit for suitable discharge and dilution of disposed brine solution would occur from multiple benthic disturbances during construction that would cause increased turbidity, decreased light transmittance, and release of sediment constituents into the water column. Although analyzed programmatically in this EIS, use of SONGS is not part of the proposed action at this time. Impacts would be avoided by implementation of a project-	and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that apply to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A somewhat greater total direct impact area and longer total trenching distance than Alternative 1 would increase the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that apply to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that apply to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Compliance with current water use and recycling regulations and goals would not be met. Damage or rupture of deteriorating water lines could result in sediment transport and surface water quality degradation. **Mitigation** No mitigation measures are proposed.

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specific Storm Water Pollution Prevention Plan (SWPPP) with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the postconstruction operational phase. Discharge of brine would require permitting from the State Water Resources Control Board, enforced by the San Diego Regional Water Quality Control Board (RWQCB). Application for, and issuance of, Waste Discharge Requirements (WDRs) and/or National Pollutant Discharge Elimination System (NPDES) permits would be required for brine disposal at the injection well and ocean outfall locations. Strict monitoring and reporting programs (in-plant and receiving water) would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.				
Biological Resources				
Impacts Under Alternative 1, anticipated direct impacts to plant communities and other cover types would consist of 42.35	**Impacts** Under Alternative 2, anticipated direct impacts to plant communities and other cover types would consist of 40.23	**Impacts** Under Alternative 3, anticipated direct impacts to plant communities and other cover types would consist of	**Impacts** Under Alternative 4, anticipated direct impacts to plant communities and other cover types would consist of 32.16	**Impacts** No biological resources impacts would occur. **Mitigation**

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acres of permanent impacts and 151.09 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 0.55 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.51 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground facilities. Maintenance/access corridors under this alternative would run along Basilone Road from the 51 Area to the 53 Area and along Cristianitos Road from	acres of permanent impacts and 147.10 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 1.79 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.51 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, as these corridors and facilities would be identical under the two alternatives, except the maintenance/access corridor along Basilone Road would be shorter, running from the San Onofre 2 and San Onofre 3 housing areas to the 53 Area.	34.28 acres of permanent impacts and 153.98 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 0.55 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.51 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, except the Northern AWT would be located in a relatively undisturbed area along Basilone Road rather than near the SONGS East Mesa Facility. Temporary impacts would be the same as described in Alternative 1, as pipeline routing would be identical under these two alternatives.	acres of permanent impacts and 147.54 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 0.93 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.51 acre of thread-leaved brodiaea occupied habitat direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, except the Northern AWT would be located in a relatively undisturbed area along Basilone Road rather than near the SONGS East Mesa Facility and the maintenance/access corridor along Basilone Road would be shorter, running from the San Onofre 2 and San Onofre 3 housing areas to the 53 Area.	No mitigation measures are proposed.

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the 62 Area to the 64 Area. The only new permanent aboveground structures under this alternative would be a pump station within a disturbed portion of the 62 Area, a pump station adjacent to existing development in the 63 Area, injection wellheads within the existing San Onofre percolation ponds, injection wellheads within a mown portion of the MCBCP San Onofre Beach recreation area, and the Northern AWT, in a partially disturbed area near the SONGS East Mesa facility. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. The U.S. Fish and Wildlife Service issued a Final Biological Opinion on 15 August 2012. **Mitigation** Mitigation would be consistent with the Integrated Natural Resources Management Plan (INRMP) and the 1995 Riparian and Estuarine/Beach Biological Opinion (Riparian BO). Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements,	Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives. However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	**Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives (with the routing under Alternative 4 identical to the routing under Alternative 2). However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	

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mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.				
Cultural Resources				
Impacts Under Alternative 1, a total of 11 resources are identified, of which six are ineligible for the National Register of Historic Places (NRHP) and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 1 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, the State Historic Preservation Officer (SHPO), and other consulting parties have executed and implemented a signed Programmatic Agreement (PA) to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 2, a total of 12 resources are identified, of which seven are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 2 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 3, a total of 11 resources are identified, of which six are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 3 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 4, a total of 12 resources are identified, of which seven are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 4 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** No cultural resources impacts would occur. **Mitigation** No mitigation measures are proposed.

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Land Use				
Impacts Land use on MCBCP is well defined by the Base Master Plan. The proposed infrastructure project would be compatible with all land uses and is necessary to support many of those uses. Alternative 1 would construct the Northern AWT and provide underground pipeline connections to northern cantonment area reservoirs, the San Onofre Housing Area, the Infantry Immersion Trainer Phase 1 and 2, the well field in the Sierra 1 Training Area, injection wells, and the SONGS outfall, primarily using routes within existing roadways. Where routes diverge from existing roadways, no permanent aboveground structures would be present to potentially interfere with existing or future land uses, with the exception of one run of aboveground pipeline noted below. The only new permanent aboveground structures in Alternative 1 would be the Northern AWT, near the SONGS East Mesa facility; two new pump stations within cantonment areas; injection wellheads in the San Onofre percolation ponds; injection wellheads within a mown portion of the MCBCP San	**Impacts** Under Alternative 2, while some underground pipeline routes would be different than under Alternative 1, all aboveground structures would be the same and in the same locations as described under Alternative 1. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, all underground pipeline routes would be the same as under Alternative 1, and all aboveground structures would be the same and in the same locations as described in Alternative 1, with the exception of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, while some underground pipeline routes would be different than under Alternative 1, all aboveground structures would be the same and in the same locations as described under Alternative 1, with the exception of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** No land use impacts would occur. **Mitigation** No mitigation measures are proposed.

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Onofre Beach recreation area, and an aboveground run of pipeline on a steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds, none of which would interfere with open training and maneuver areas. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.				
Visual Resources				
Impacts Under Alternative 1, brine, raw water, and treated water conduits would be underground and would not be visible after construction, except for an aboveground run of pipeline on a steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds. Proposed aboveground facilities would include this run of aboveground pipeline, retrofitted pump stations in the 62 and 63 Areas, injection wellheads within the San Onofre percolation ponds near El Camino Real and within the MCBCP San Onofre Beach recreation area, and the Northern AWT. With the exception of the Northern AWT, these would be located in areas sheltered or substantially distant from	**Impacts** Under Alternative 2, as under Alternative 1, underground facilities would not be visible after construction. Aboveground facilities would be the same and in the same locations as those described in Alternative 1, so the effects on viewers on- or off-Base would be the same. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, as under Alternative 1, underground facilities would not be visible after construction. All aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility. The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but it would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1, but it would not	**Impacts** Under Alternative 4, as under Alternative 1, underground facilities would not be visible after construction. All aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility. The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but it would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1, but it would not	**Impacts** No visual resources impacts would occur. **Mitigation** No mitigation measures are proposed.

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viewpoints on- or off-Base and/or would be of minimal size and scale. The Northern AWT would be at least partially screened from motorists on Interstate 5 (I-5) or passengers on trains utilizing the BNSF Railway tracks by the SONGS East Mesa facility and would not be located in a sensitive viewshed. In terms of views from cantonment areas, housing areas, or recreational areas on-Base, the pump station in the 62 Area would not be visible from Bachelor Enlisted Quarters (BEQs) or recreation areas; the pump station in the 63 Area may be visible from BEQs, but changes in this location would be a retrofit of facilities already in place. The injection wellheads in the San Onofre percolation ponds would not be visible from permanently populated areas on-Base. The injection wellheads in the MCBCP San Onofre Beach recreation area would be visible to, at a minimum, users of the softball and group camp area. The Northern AWT would likely be visible to some residents in a portion of the San Onofre 3 Housing Area against the backdrop of the SONGS East Mesa Facility. The aboveground pipeline segment from Chaisson Road to the Sierra 1 Training Area percolation ponds area would		be in a sensitive viewshed. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	be in a sensitive viewshed. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	

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be within 100 feet of the homes, but would not be readily visible since it would be sloping away from the homes. This pipeline would be visible to vehicles traveling on I-5 south and to homes in southern San Clemente but, due to the small scale of the pipeline and the distance to sensitive viewers, this is not considered a significant visual impact. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.				
Socioeconomics and Environmental Justice				
Impacts Total cost for Alternative 1 is estimated to be $101 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $64.0 million per year, and employment output would be approximately 405 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $107.2 million per year, and employment output would be approximately 609 jobs per year.	**Impacts** Total cost for Alternative 2 is estimated to be $101 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. Because of the same funding level and the same timing of construction, the economic output and employment output for Alternative 2 would be the same as for Alternative 1. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation.	**Impacts** Total cost for Alternative 3 is estimated to be $100 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $63.4 million per year, and employment output would be approximately 371 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $106.1 million per year, and employment output would be approximately 602 jobs per year.	**Impacts** Total cost for Alternative 4 is estimated to be $106 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $67.2 million per year, and employment output would be approximately 393 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $112.5 million per year, and employment output would be approximately 639 jobs per year.	**Impacts** No socioeconomic and environmental justice impacts would occur. **Mitigation** No mitigation measures are proposed.

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The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	
Traffic[1]				
Impacts Construction traffic from Alternative 1 would be generated by an estimated 180 daily trips from workers and 125 daily trips from trucks, for a total of 305 daily trips, of which about 77 would be peak-hour trips in both 2013 and 2014. Construction traffic generated by Alternative 1, interacting with other future MCBCP traffic, would contribute to adverse levels of service (LOS) at intersections and roadway segments that already have unacceptable LOS and/or would create adverse LOS at	**Impacts** Construction traffic from Alternative 2 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1.	**Impacts** Construction traffic from Alternative 3 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1.	**Impacts** Construction traffic from Alternative 4 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1.	**Impacts** No traffic impacts would occur. **Mitigation** No mitigation measures are proposed.

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other intersections and roadway segments. P-1044 would not contribute to impacts at any on-Base or off-Base roadway segments in 2013, but would contribute to impacts at six on-Base and two off-Base roadway segments in 2014. P-1044 would contribute to impacts at five intersections in 2013 and seven intersections in 2014, but to no roadway segment impacts in either 2013 or 2014. Impacts would be temporary during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	Impacts would be temporary during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	
Air Quality				
Impacts Under Alternative 1, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants of	**Impacts** Under Alternative 2, the estimated annual emissions of nonattainment and maintenance pollutants in	**Impacts** Under Alternative 3, the estimated annual emissions would be approximately the same as described under	**Impacts** Under Alternative 4, the estimated emissions would be approximately the same as described under Alternative 2,	**Impacts** No air quality impacts would occur. **Mitigation**

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volatile organic compounds (VOCs), nitrogen oxides (NO_X), and carbon monoxide (CO) in the San Diego Air Basin (SDAB), and VOCs, NO_X, CO, and particulate matter (PM_{10} and $PM_{2.5}$) in the South Coast Air Basin (SCAB) would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 1 would conform to the State Implementation Plan (SIP) and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	SDAB would be slightly lower, due primarily to a shorter trenching distance and a smaller total direct impact area, than those under Alternative 1. These emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 2 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	Alternative 1, as trenching distance is about the same and the total direct impact area would be about the same size as under Alternative 1. The estimated annual emissions of nonattainment and maintenance emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 3 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	as trenching distance is about the same and the total direct impact area would be about the same size as under Alternative 2. All nonattainment and maintenance emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 4 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	No mitigation measures are proposed.
Noise				
Impacts Under Alternative 1, sensitive noise receptors adjacent to construction corridors and project limits include BEQs in multiple cantonment areas (52 Area, 53 Area, 62 Area, and 64 Area) and family residences in all three San Onofre housing areas. Other sensitive receptors located somewhat farther away include a school and youth center. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day	**Impacts** Under Alternative 2, sensitive receptors along the construction corridors and project limits would be the same as those described for Alternative 1, except fewer residences in San Onofre 2 and San Onofre 3 housing areas would be close to a construction corridor (with the elimination of a segment along Basilone Road) but an additional potential sensitive receptor, the San Onofre Child Development Center (CDC) would be added as the result of a change in a brine line	**Impacts** Under Alternative 3, construction noise impacts would be identical to those described under Alternative 1, except for construction of the Northern AWT, which would be located on Basilone Road, approximately 500 yards from the nearest residences in the San Onofre 2 and San Onofre 3 housing areas, rather than near the SONGS East Mesa facility, approximately 1,000 yards from the nearest receptor, under Alternative 1.	**Impacts** Under Alternative 4, sensitive receptors along the construction corridors would be to the same as those described for Alternative 1, except (1) fewer residences in San Onofre 2 and San Onofre 3 housing areas would be close to a construction corridor (with the elimination of a segment along Basilone Road); (2) an additional potential sensitive receptor, the San Onofre CDC, would be added as the result of a change in a brine line corridor; and (3) the construction of the Northern	**Impacts** No noise impacts would occur. **Mitigation** No mitigation measures are proposed.

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resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be limited to two pump stations, which would be enclosed by protective structures that would provide noise attenuation, structures containing pumps that would also be within noise attenuating protective enclosures and are otherwise not near sensitive receptors (except potential recreational users of a portion of the MCBCP San Onofre Beach recreation area), and the Northern AWT, which would be located approximately 1,000 yards away from any potentially sensitive receptors. The proposed facilities would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	corridor. All other potential construction-related noise impacts would be as described for Alternative 1. All postconstruction operational noise impacts would be as described for Alternative 1, due to permanent aboveground facilities being identical under the two alternatives. The proposed facilities would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	All postconstruction operational noise impacts would be as described for Alternative 1, due to permanent aboveground facilities being identical under the two alternatives, except for the location of the Northern AWT being closer to residential areas. The proposed facilities, however, would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	AWT, which would be located on Basilone Road, would occur approximately 500 yards from the nearest residences in the San Onofre 2 and San Onofre 3 housing areas, rather than near the SONGS East Mesa facility. All other potential construction-related noise impacts would be as described for Alternative 1. All postconstruction operational noise impacts would be as described for Alternative 1, due to permanent aboveground facilities being identical under the two alternatives, except for the location of the Northern AWT being closer to residential areas. The proposed facilities, however, would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
Public Health and Safety				
Impacts There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 1 corridors or site project limits. The Alternative 1 project limits (including corridors and sites) and 50-foot buffer contain nine Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) sites, but all but one require no further action; the project limits and 200-foot buffer contain 19 underground storage tanks (USTs), 10 of which are closed; the project limits and 500-foot buffer contain three Installation Remediation (IR) sites, two of which are closed; and the project limits and 10-foot buffer contain four aboveground storage tanks (ASTs). A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area. There is a potential presence of Munitions and Explosives of Concern (MEC) and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 2 corridors or site project limits. The Alternative 2 project limits (including corridors and sites) and 50-foot buffer contain eight RFA sites, but all but one require no further action; the project limits and 200-foot buffer contain 15 USTs, all but five of which are closed; the project limits and 500-foot buffer contain three IR sites, two of which are closed; the project limits and 10-foot buffer contain four ASTs; and a portion of the project limits is within Range 207 Military Range Area. A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area and there is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation**	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 3 corridors or site project limits. The Alternative 3 project limits (including corridors and sites) and buffers contain the same RFA sites, USTs, IR sites, and ASTs as Alternative 1. A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area and there is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 4 corridors or site project limits. The Alternative 4 project limits (including corridors and sites) and buffers contain the same RFA sites, USTs, IR sites, and ASTs as Alternative 2. A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area and there is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Aging AC pipes are unreliable under water pressure changes. The P-1044 pipeline to be replaced extends from Basilone Road to the reservoirs above San Onofre II Housing, an elevation difference of 150 feet. If a break occurred, a flow rate of 13,700 gallons per minute would result until closed. The response time in an unexpected blowout would be approximately 1 hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
and safety impacts. **Mitigation** No mitigation measures are proposed.	No mitigation measures are proposed.			**Mitigation** No mitigation measures are proposed
Services and Utilities				
Impacts Under Alternative 1, operation of the Northern AWT would increase demand on wastewater services. A beneficial impact would occur to potable water supply on the Base through the operation of the Northern AWT and increased availability of treated water in the northern part of the Base. Treatment at the Northern AWT would reduce, if not eliminate, measureable amounts of copper in wastewater sludge, eliminating the requirement of handling the wastewater sludge as a hazardous waste. Operation of the Northern AWT would increase the demand for Base electrical and communications services. Operations would not involve any demand for natural gas. Construction of P-1044 and the operation of the Northern AWT would increase the demand for solid waste collection and disposal. None of the increased services and utilities demand would exceed services and utilities capacity on the Base; therefore, no significant adverse impacts to services and utilities are anticipated.	**Impacts** Under Alternative 2, impacts from the operation of the Northern AWT would be the same as under Alternative 1, since Northern AWT operations would be identical under the two alternatives. Construction-related service and utilities demand would vary somewhat based on the amount of construction required, such as the amount of trenching described under geology and soils above. None of the increased services and utilities demand would exceed services and utilities capacity on the Base. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, impacts from the operation of the Northern AWT would be the same as under Alternative 1, since Northern AWT operations would be identical under the two alternatives. Construction-related service and utilities demand would vary somewhat based on the amount of construction required, such as the amount of trenching described under geology and soils above. None of the increased services and utilities demand would exceed services and utilities capacity on the Base. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, impacts from the operation of the Northern AWT would be the same as under Alternative 1, since Northern AWT operations would be identical under the two alternatives. Construction-related service and utilities demand would vary somewhat based on the amount of construction required, such as the amount of trenching described under geology and soils above. None of the increased services and utilities demand would exceed services and utilities capacity on the Base. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	**Impacts** Potential significant impacts could result from failure of the deteriorating facilities and pipe/conduit systems. Failures in existing aged systems would impact firefighting capabilities, quality of life, and training requirements. **Mitigation** No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
Mitigation No mitigation measures are proposed.				
Coastal Zone Resources				
Impacts Under Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. As described in the Water Quality and Hydrology resource description above, construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant	**Impacts** Under Alternative 2, as with Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Potential water quality and hydrology impacts of Alternative 2, which could result in coastal zone impacts, are described above in the Water Quality and Hydrology resource summary. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be required for ensuring	**Impacts** Under Alternative 3, as with Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Potential water quality and hydrology impacts of Alternative 3, which could result in coastal zone impacts, are described above in the Water Quality and Hydrology resource summary. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and	**Impacts** Under Alternative 4, as with Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Potential water quality and hydrology impacts of Alternative 4, which could result in coastal zone impacts, are described above in the Water Quality and Hydrology resource summary. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be required for ensuring	**Impacts** No coastal zone resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
and receiving water) would be required for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. Although analyzed programmatically in this EIS, use of SONGS is not part of the proposed action at this time. **Mitigation** No mitigation measures are proposed.	environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	receiving water) would be required for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	
Marine Resources				
Impacts Under Alternative 1, marine resource impacts could occur from modification and reuse of an existing but currently nonoperational SONGS ocean cooling water conduit that would be used for routing the brine solution discharge pipeline. These impacts would involve multiple benthic disturbances during construction and would depend on the construction methods used, and could impact marine organisms. Proper design and system evaluation would ensure marine water quality and marine resources impacts are avoided. Conduit modification and discharge of brine into ocean waters would be closely regulated by the U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, and RWQCB during both construction and operation to	**Impacts** Under Alternative 2, impacts to marine resources would be the same as described under Alternative 1. As the only operational project component that would have a direct impact on marine resources, the ocean outfall brine disposal component would be identical under the two alternatives, and construction monitoring would avoid impacts to federally listed marine species. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, impacts to marine resources would be the same as described under Alternative 1. As the only operational project component that would have a direct impact on marine resources, the ocean outfall brine disposal component would be identical under the two alternatives, and construction monitoring would avoid impacts to federally listed marine species. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, impacts to marine resources would be the same as described under Alternative 1. As the only operational project component that would have a direct impact on marine resources, the ocean outfall brine disposal component would be identical under the two alternatives, and construction monitoring would avoid impacts to federally listed marine species. **Mitigation** No mitigation measures are proposed.	**Impacts** No marine resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles, including from underwater construction noise, would be avoided by monitoring of construction by a trained observer. Although analyzed programmatically in this EIS, use of SONGS is not part of the proposed action at this time. **Mitigation** No mitigation measures are proposed.				

[1] Impacts from construction traffic are analyzed as a combination of traffic from each project alternative plus all other traffic that is anticipated to be occurring at the same time, including background traffic, P-1045, and other foreseeable projects scheduled for concurrent construction. Therefore, impact traffic volumes represent construction of the projects in their anticipated years of construction. P-1044 and P-1045 are scheduled for construction in 2013 and 2014.

Table ES-5
Summary of Potential Environmental Impacts by Resource Area and Alternative, P-1045

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Geology and Soils				
Impacts Alternative 1 would have a total direct impact area of approximately 522 acres, with approximately 175,000 linear feet (LF) of trenching and 11,000 feet of trenchless (TLS) construction. Marine Corps Base Camp Pendleton (MCBCP) is not underlain by any active or potentially active faults. The majority of the soils within the study area have a moderate to severe erosion potential. With implementation of best management practices (BMPs), compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 2 would have a total direct impact area of approximately 332 acres, with approximately 160,000 LF of trenching and 6,000 feet of TLS construction. While this is somewhat less than Alternative 1, geological and soil conditions in the area would be similar to Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 would have a total direct impact area of approximately 382 acres, with approximately 130,000 LF of trenching and 7,000 feet of TLS construction. While this is less than Alternative 1, geological and soil conditions in the area would be similar to Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 would have a total direct impact area of approximately 510 acres, with approximately 173,000 LF of trenching and 7,000 feet of TLS construction. Although this is a smaller total area and a slightly smaller trenching distance than Alternative 1, geological and soil conditions in the area affected would be similar to Alternative 1. With the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No geology and soils impacts would occur. **Mitigation** No mitigation measures are proposed.
Water Quality and Hydrology				
Impacts Water quality and hydrology could be affected where pipeline corridors cross streams or encounter groundwater or floodplains. Under Alternative 1, TLS construction to avoid trenching would be conducted at two locations on the Santa Margarita River, at San Onofre Creek (if the Basilone Road or	**Impacts** Under Alternative 2, TLS construction would be conducted to avoid trenching and water quality and hydrology impacts at San Onofre Creek (if the Basilone Road or Northern AWT connection site north of San Onofre Creek is chosen) and at the Santa Margarita River south of the 25 Area.	**Impacts** Under Alternative 3, TLS construction would be conducted to avoid trenching and water quality and hydrology impacts at San Onofre Creek (if the Basilone Road or Northern AWT connection site north of San Onofre Creek is chosen), at Las Flores Creek, at one location for French Creek and	**Impacts** Under Alternative 4, TLS construction would be conducted to avoid trenching and water quality and hydrology impacts at San Onofre Creek (if the Basilone Road or Northern AWT connection site north of San Onofre Creek is chosen), at Las Flores Creek, at one location for French Creek and	**Impacts** No water quality and hydrology resources impacts would occur. Damage or rupture of deteriorating water lines could result in sediment transport and surface water quality degradation.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Northern AWT connection site north of San Onofre Creek is chosen), at Las Flores Creek, and at one location for French Creek and Aliso Canyon drainage. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would be avoided by implementation of a project-specific Storm Water Pollution Prevention Plan (SWPPP) with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would also be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would also be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would also be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.
Biological Resources				
Impacts Under Alternative 1, anticipated direct impacts to plant communities and other cover types would consist of 23.79 acres of permanent impacts	**Impacts** Under Alternative 2, anticipated direct impacts to plant communities and other cover types would consist of 28.11 acres of permanent impacts	**Impacts** Under Alternative 3, anticipated direct impacts to plant communities and other cover types would consist of 15.96 acres of permanent impacts	**Impacts** Under Alternative 4, anticipated direct impacts to plant communities and other cover types would consist of 23.77 acres of permanent impacts	**Impacts** No biological resources impacts would occur. **Mitigation** No mitigation measures

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
and 248.38 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.03 acre of permanent impacts and 13.97 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.08 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 11 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to the project limits of maintenance access corridors and postconstruction aboveground facilities. New maintenance access corridors would run along Las Pulgas Road from El Camino Real to	and 152.19 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.04 acre of permanent impacts and 0.91 acre of temporary impacts. No direct impacts to federally listed plants are anticipated. There are no anticipated direct impacts to federally listed fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat. Permanent impacts associated with maintenance access corridors would differ from Alternative 1, as these corridors would run along Las Pulgas Road from El Camino Real to the 43 Area and along Basilone Road from the 43 Area to the 25 Area. Permanent impacts associated with new aboveground facilities would be the same as described under Alternative 1, as these facilities would be identical under the two alternatives. Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives, and total trenching distance is shorter	and 183.61 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.03 acre of permanent impacts and 1.11 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.08 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 10 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, except the pump station at the future AWT South would not be needed. Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives, and total trenching distance is substantially shorter under	and 241.00 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.03 acre of permanent impacts and 4.18 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.04 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 11 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, as these corridors and facilities would be identical under the two alternatives. Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives, and total trenching distance is shorter under Alternative 4 than under Alternative 1. However, as	are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
the 43 Area and along Stuart Mesa Road from Las Pulgas Road to the Stuart Mesa Housing Area. The only new permanent aboveground structures under this alternative would be one pump station within the project limits of the Northern AWT, a second pump station within a developed parking lot at the future AWT South, and a third pump station in a disturbed parking area on the southwest side of the intersection of El Camino Real and Las Pulgas Road. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian and Estuarine/Beach Biological Opinion (Riparian BO). Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting,	under Alternative 2 than under Alternative 1. However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	Alternative 3 than under Alternative 1. However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. The U.S. Fish and Wildlife Service issued a Final Biological Opinion on 15 August 2012. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.				
Cultural Resources				
Impacts Under Alternative 1, a total of 29 resources are identified, of which 19 are ineligible for the National Register of Historic Places (NRHP) and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 1 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, the State Historic Preservation Officer (SHPO), and other consulting parties would execute and implement a signed Programmatic Agreement (PA) to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 2, a total of 10 resources are identified, of which five are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 2 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 3, a total of 15 resources are identified, of which 10 are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 3 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties have executed and implemented a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 4, a total of 23 resources are identified, of which 12 are ineligible for the NRHP and 11 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 4 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** No cultural resources impacts would occur. **Mitigation** No mitigation measures are proposed.
Land Use				
Impacts Land use on MCBCP is well defined by the Base Master Plan. The proposed infrastructure project would be compatible with all land uses and is necessary to support	**Impacts** Although underground pipeline routing would be different, the aboveground structures constructed under Alternative 2 would be the same and in the same locations as described in	**Impacts** Although underground pipeline routing would be different, the aboveground structures constructed under Alternative 3 would be the same and in the same locations as described in	**Impacts** Although underground pipeline routing would be different, the aboveground structures constructed under Alternative 4 would be the same and in the same locations as described in	**Impacts** No land use impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
many of those uses. Alternative 1 underground pipelines would connect the northern, southern, and Las Pulgas water systems and the new Naval Hospital and 21 Area (Del Mar). The only new permanent aboveground structures in Alternative 1 would be a pump station at the Northern AWT, a pump station near the Las Pulgas gate, a pump station in Haybarn Canyon, and a 4-million-gallon reservoir in the Wire Mountain area. None of these pump stations are in open training and maneuver areas. The reservoir is adjacent to several existing reservoirs and to existing housing. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	Alternative 1 with the exception of the 4-million-gallon reservoir, which would not be included in Alternative 2. As a result, the land use impacts for Alternative 2 would be the same as described for Alternative 1. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	Alternative 1, with the exception of the pump station in Haybarn Canyon, which would not be needed under Alternative 3. As a result, the land use impacts for Alternative 3 would be the same or less as described for Alternative 1. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	Alternative 1. As a result, the land use impacts for Alternative 4 would be the same as described for Alternative 1. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	
Visual Resources				
Impacts Alternative 1 underground pipelines would connect the proposed northern, southern, and Las Pulgas water systems and the new Naval Hospital and 21 Area (Del Mar). The only new permanent aboveground structures in Alternative 1 would be a pump station at the Northern AWT, a pump station near the Las Pulgas gate, a pump station in Haybarn Canyon, and a	**Impacts** Under Alternative 2, the aboveground facilities would be identical to those described in Alternative 1, with the exception of the 4-million-gallon reservoir, which is not included in Alternative 2. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers. On-Base, these aboveground	**Impacts** Under Alternative 3, aboveground facilities would consist of two pump stations, one each at the Northern AWT and Las Pulgas gate area locations described in Alternative 1. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers. On-Base, these aboveground	**Impacts** Under Alternative 4, the aboveground facilities would be identical to those described in Alternative 1. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers. On-Base, these aboveground structures would not be visible from cantonment areas, housing areas, or recreational	**Impacts** No visual resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
4-million-gallon reservoir in the Wire Mountain area. The pump station at Las Pulgas gate would be across the street from the gate complex with its miscellaneous buildings and parking lots. The other two pump stations would be part of larger facilities, the Northern AWT and the future AWT South. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers. On-Base, these aboveground structures would not be visible from cantonment areas, housing areas, or recreational areas, and would not be incongruous elements in sensitive viewsheds. The proposed 4-million-gallon reservoir would be adjacent to existing water reservoirs and the Santa Margarita and the Wire Mountain 2 housing areas to the west and south. Some of the housing units would have direct views of the reservoir. This would be an adverse but not significant visual impact. The new reservoir would not constitute an element significantly different in size, bulk, scale, or location than currently exists in the area to other viewers. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	structures would not be visible from cantonment areas, housing areas, or recreational areas, and would not be incongruous elements in sensitive viewsheds. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	structures would not be visible from cantonment areas, housing areas, or recreational areas, and would not be incongruous elements in sensitive viewsheds. The impacts of the 4-million-gallon reservoir would be the same as described in Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	areas, and would not be incongruous elements in sensitive viewsheds. The impacts of the 4-million-gallon reservoir would be the same as described in Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Socioeconomics and Environmental Justice				
Impacts Total cost for Alternative 1 is estimated to be $125 million, with funding in fiscal year (FY) 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $79.2 million per year, and employment output would be approximately 464 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $132.6 million per year, and employment output would be approximately 753 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.	**Impacts** Total cost for Alternative 2 is estimated to be $112 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county region would be approximately $71.0 million per year, and employment output would be approximately 416 jobs per year. Over the six-county region, economic output would be approximately $118.9 million per year and employment output would be approximately 675 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 3 is estimated to be $105 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county region would be approximately $66.5 million per year, and employment output would be approximately 390 jobs per year. Over the six-county region, economic output would be approximately $111.4 million per year and employment output would be approximately 633 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 4 is estimated to be $125 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county region would be approximately $82.4 million per year, and employment output would be approximately 483 jobs per year. Over the six-county region, economic output would be approximately $138.0 million per year and employment output would be approximately 783 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. There would not be any disproportionately high and adverse impacts to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** No socioeconomic or environmental justice impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Mitigation No mitigation measures are proposed.				
Traffic[1]				
Impacts Construction traffic from Alternative 1 in both 2013 and 2014 would be generated by an estimated 180 daily trips from workers and 125 daily trips from trucks, for a total of 305 daily trips, of which about 77 would be peak-hour trips. Construction traffic generated by Alternative 1, interacting with other future MCBCP traffic, would contribute to adverse levels of service (LOS) at intersections and roadway segments that already have unacceptable LOS and/or would create adverse LOS at other intersections and roadway segments. P-1045 would contribute to impacts at five intersections in 2013 and seven intersections in 2014. P-1045 would not contribute to impacts at any on-Base or off-Base roadway segments in either 2013 or 2014. Impacts would be temporary, during construction. Postconstruction impacts would be minimal.	**Impacts** Construction traffic from Alternative 2 in both 2013 and 2014 would be generated by an estimated 180 daily trips from workers and 125 daily trips from trucks, for a total of 305 daily trips, of which about 77 would be peak-hour trips. Interactive construction phase impacts with other projects would be the same as described under Alternative 1. Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities.	**Impacts** Construction traffic from Alternative 3 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1. Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities.	**Impacts** Construction traffic from Alternative 4 is estimated to be the same as Alternative 2. While specific construction would be somewhat different from Alternative 2, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1. Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities.	**Impacts** No traffic impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Mitigation A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.		No postconstruction mitigation measures are needed.	No postconstruction mitigation measures are needed.	
Air Quality				
Impacts Under Alternative 1, the estimated annual emissions of nonattainment and maintenance pollutants in the San Diego Air Basin (SDAB) would be well below the *de minimis* levels for these pollutants in SDAB. As a result, Alternative 1 would conform to the State Implementation Plan (SIP) and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, the estimated annual emissions of nonattainment and maintenance pollutants in SDAB would be slightly lower than those under Alternative 1, due primarily to a slightly shorter trenching distance under Alternative 2, These emissions would be well below the *de minimus* level for these pollutants in SDAB. As a result, Alternative 2 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, the estimated annual emissions of nonattainment and maintenance pollutants in SDAB would be slightly lower than those under Alternative 1, due primarily to a shorter trenching distance under Alternative 3, These emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 3 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, the estimated annual emissions of nonattainment and maintenance pollutants in SDAB would be approximately the same as those under Alternative 1, as the trenching distances are approximately the same. These emissions would be well below the *de minimus* level for these pollutants in SDAB. As a result, this alternative would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** No air quality impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Noise				
Impacts Under Alternative 1, sensitive noise receptors near construction corridors and project limits are the Stuart Mesa School and multiple homes in the Stuart Mesa Housing Area along Stuart Mesa Road; multiple homes in the Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, and Wire Mountain 3 housing areas along with the Abby Reinke Community Center along Wire Mountain Road; and multiple homes in the Santa Margarita and Wire Mountain 2 housing areas where the corridor approaches the proposed new 4-million-gallon reservoir along multiple streets east of the intersection of Wire Mountain Road and Carnes Road. Other sensitive receptors would include Bachelor Enlisted Quarters (BEQs) in the 43, 41, 31A, and 33 Areas. The San Onofre 2 and San Onofre 3 housing areas are approximately 1 mile from the connection to Northern AWT Site 6 and about 0.3 mile from the connection to existing pipelines in Basilone Road or Northern AWT Site 4. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day	**Impacts** Under Alternative 2, sensitive receptors near the construction corridors would include BEQs in the 43 Area. The San Onofre 2 and San Onofre 3 housing areas are approximately 1 mile from the connection to Northern AWT Site 6 and about 0.3 mile from the connection to existing pipelines in Basilone Road or Northern AWT Site 4. Pump stations would be the same as described in Alternative 1. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise would be associated with the Northern AWT and future AWT South pump stations, where noise would be subsumed in the noise from operation of the plants (neither of which is a part of this project) as described in Alternative 1. No significant operational noise impacts to sensitive receptors would occur.	**Impacts** Under Alternative 3, sensitive noise receptors near construction corridors and project limits are the same as described in Alternative 1, except BEQs in the 33 Area would not be near any of the construction corridors. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be the same as described in Alternative 1. No significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, sensitive receptors along the construction corridors would be the same as those described in Alternative 1, except BEQs in the 33 Area would not be near a construction corridor. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be the same as described in Alternative 1. No significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No noise impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be limited to a pump station in the Northern AWT and one in the future AWT South, where noise would be subsumed in the noise from operation of the plants (neither of which is a part of this project). A third pump station would be near the Las Pulgas gate, well away from sensitive receptors and enclosed by noise-attenuating protective structures. No significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.			
Public Health and Safety				
Impacts There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 1 corridors or site project limits. The Alternative 1 project limits (including corridors and sites) and 50-foot buffer contain three Resource Conservation and	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 2 corridors or site project limits. The Alternative 2 project limits (including corridors and sites) and 50-foot buffer contain six RFA sites, all of which require	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 3 corridors or site project limits. The Alternative 3 project limits (including corridors and sites) and 50-foot buffer contain three RFA sites, all of which require	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 4 corridors or site project limits. The Alternative 4 project limits (including corridors and sites) and 50-foot buffer contain three RFA sites that require no	**Impacts** No public health and safety impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Recovery Act (RCRA) Facility Assessment (RFA) sites that require no further action; the project limits and 200-foot buffer contain no underground storage tanks (UST) sites; the project limits and 500-foot buffer contain three Installation Restoration (IR) sites, one of which is closed; and the project limits and 10-foot buffer contain five aboveground storage tanks (ASTs). Portions of the project limits are within the Range 14 Artillery Firing Area; Range D704 Live Fire Area; Range 15 Artillery Firing Area; Firing Line 103, X-ray Impact Area; and the 102, 103, and 104b Military Range Areas. There is a potential presence of Munitions and Explosives of Concern (MEC) and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	no further action; the project limits and 200-foot buffer contain four UST sites, one of which is closed; the project limits and 500-foot buffer contain three IR sites, all closed; the project limits and 10-foot buffer contain two ASTs. Portions of the project limits are within the Range 14 Artillery Firing Area; Range D704 Live Fire and Maneuver Area; Range 15 Artillery Firing Area; Range 16 Artillery Firing Area; Complex Firing Line Area 116; Range 116A KD Rifle Military Range Area; and Range 117A Military Range Area; Range D700 Live Fire and Maneuver Area; and Range RSOP 25. There is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	no further action; the project limits and 200-foot buffer contain no UST sites; the project limits and 500-foot buffer contain three IR sites, one closed; the project limits and 10-foot buffer contain five ASTs. Portions of the project limits are within the Range 14 Artillery Firing Area; Range 15 Artillery Firing Area; Range 16 Artillery Firing Area; Range D704 Live Fire and Maneuver Area; Range D704 Live Fire and Maneuver Area; Range 503 Firing Line; Range 505 Firing Line; Dudded Impact Area 1/503 Hand Grenade Range; and Non-Dudded Impact Area/Edson Range. There is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	further action; the project limits and 200-foot buffer contain no UST sites; the project limits and 500-foot buffer contain three IR sites, one of which is closed; and the project limits and 10-foot buffer contain five ASTs. Portions of the project limits are within the Range 14 Artillery Firing Area; Range 15 Artillery Firing Area; Range 16 Artillery Firing Area; Range D704 Live Fire Area and Maneuver Area; and Range FMSS Facility. There is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	
Services and Utilities				
Impacts Under Alternative 1, connection of the northern, southern, and Las Pulgas water systems would have a beneficial impact to potable water supply on the	**Impacts** Under Alternative 2, construction locations would vary from Alternative 1, but types of construction and operational impacts would be	**Impacts** Under Alternative 3, construction locations would vary from Alternative 1, but types of construction and operational impacts would be	**Impacts** Under Alternative 4, construction locations would vary from Alternative 1, but types of construction and operational impacts would be	**Impacts** Potential significant impacts could result from failure of the deteriorating facilities and pipe/conduit

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Base. While construction would involve some temporary demand on services and utilities, operations would increase demand for electrical service through additional pump operations but would not increase demand for communication, water, wastewater, gas, or solid waste services. Increased electrical demand would be minor and not exceed existing capacity; therefore, no significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	the same as described under Alternative 1. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	the same as described under Alternative 1. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	the same as described under Alternative 1. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	systems. Failures in existing aged systems would impact firefighting capabilities, quality of life, and training requirements. **Mitigation** No mitigation measures are proposed.
Coastal Zone Resources				
Impacts Under Alternative 1, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 1, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, Waste Discharge Requirements	**Impacts** Under Alternative 2, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 2, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, WDRs, and/or NPDES permits relative	**Impacts** Under Alternative 3, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 3, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, WDRs, and/or NPDES permits relative	**Impacts** Under Alternative 4, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 4, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, WDRs, and/or NPDES permits relative	**Impacts** No coastal zone resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
(WDRs), and/or National Pollutant Discharge Elimination System (NPDES) permits relative to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	
Marine Resources				
Impacts No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No marine resources impacts would occur. **Mitigation** No mitigation measures are proposed.

[1] Impacts from construction traffic are analyzed as a combination of traffic from each project alternative plus all other traffic that is anticipated to be occurring at the same time, including background traffic, P-1044, and other foreseeable projects scheduled for concurrent construction. Therefore, impact traffic volumes represent construction of the projects in their anticipated years of construction. P-1044 is the only project scheduled for construction in 2012. P-1044 and P-1045 are scheduled for construction in 2013 and 2014.

CHAPTER 1.0
PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

This Environmental Impact Statement (EIS) evaluates the environmental impacts associated with proposed infrastructure improvements at Marine Corps Base Camp Pendleton (MCBCP). Specifically, the proposed action would involve the construction, operation, and maintenance of infrastructure upgrades, expansions, and improvements to the Basewide water system. The projects would include a Northern Advanced Water Treatment (AWT) plant and associated facilities and connection of the Base's northern and southern water systems. The proposed action and alternatives to the proposed action are described in greater detail in Chapter 2.

The Department of the Navy (DoN) prepared this EIS in accordance with the National Environmental Policy Act of 1969 (NEPA), 42 United States Code (U.S.C.) §§ 4321–4370h, as implemented by the Council on Environmental Quality (CEQ) Regulations; 40 Code of Federal Regulations (C.F.R.) Parts 1500–1508; the Department of the Navy Procedures for Implementing the National Environmental Policy Act (32 C.F.R. Part 775); and the guidelines contained in Marine Corps Order (MCO) P5090.2A, Chapter 12, dated May 2009, Environmental Compliance and Protection Manual, which establishes procedures for implementing NEPA.

1.2 BACKGROUND

MCBCP is the Marine Corps' premier amphibious training base and its only West Coast amphibious training base, promoting "the combat readiness of operating forces by providing facilities, services, and support responsive to the needs of Marines, Sailors, and their families" (USMC 2007a).

MCBCP is the largest West Coast expeditionary training facility in the Marine Corps. The Base is home to the First Marine Expeditionary Force, 1st Marine Division, 1st Marine Logistics Group, and many tenant units, including Marine Corps Installation-West, 1st Marine Special Operations Battalion, Wounded Warriors Battalion–West, Marine Corps Air Station at Munn Field, Marine Aircraft Group 39, Marine Corps Tactical Systems Support Activity, Marine Corps Recruit Depot San Diego's Weapons and Field Training Battalion, Marine Corps and Army Reserve Forces, the Navy's

Assault Craft Unit 5, and a Naval Hospital. The Base also provides specialized schools and training as directed by the Commandant of the Marine Corps. These schools include Assault Amphibian School, School of Infantry–West, Field Medical Service School, and Marine Corps University (USMC 2011a).

More than 38,000 military family members occupy Base housing complexes. MCBCP has a daytime population of 70,000 (USMC 2011a), including military personnel and their families, civilian employees, civilian contractors, and residents of neighboring communities who conduct business there. Additionally, more than 28,000 retired military and 21,000 reservists depend on the Base's services and facilities.

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.3.1 Purpose

The purpose of the proposed action is to allow the Base to efficiently meet its mission, described in Section 1.4 below, and to:

- Provide improved water treatment capabilities, capacity, and drinking water system redundancy that would enable more efficient water delivery in the northern region of MCBCP and the Basewide delivery of services during periods of scheduled, unscheduled, and emergency system interruption.
- Provide new or upgraded, reliable, secure, and compliant water infrastructure systems to support military training and operations on MCBCP and quality of life services.

1.3.2 Need

The proposed action is needed to modernize and expand the capacity and capability of MCBCP's aging (1960s era) water system infrastructure to:

- Accommodate ongoing and future growth at MCBCP.
- Provide reliable water supply and alternate sources of water distribution for:
    - Ongoing normal system use,
    - Periods of planned and unplanned maintenance and repairs, and
    - Periods of emergency need and natural disaster recovery.

- Sustain compliance with current and pending/emergent regulatory and code requirements.
- Provide safety for pipeline maintenance in heavily traveled road segments adjacent to pipelines.
- Conserve and effectively manage resources.

The service population and associated demand for utilities infrastructure services at MCBCP have grown in recent years and will continue to grow, based on a number of different factors. These include, but are not limited to, long-programmed new housing on the Base that will be built in the near future and during the build-out of the 2010 Base Master Plan (U.S. Navy 2011). The ongoing and planned growth was or is being analyzed in separate NEPA documents. Ongoing growth was addressed in the environmental assessments for military family housing at San Mateo Point Phase 1 (U.S. Navy 1996), San Mateo Point Phase 2 (U.S. Navy 2008a), Western Wire Mountain (U.S. Navy 1998a), De Luz (U.S. Navy 1999), Wire Mountain Phase 1 and 2 (U.S. Navy 2002), San Onofre Mobile Home Park and South Mesa sites (U.S. Navy 2006), and Stuart Mesa Agricultural Field sites (U.S. Navy 2009a and U.S. Navy 2010f). Ongoing growth was also addressed in the categorical exclusions for military family housing at Del Mar (U.S. Navy 2008b) and San Luis Rey (U.S. Navy 2008c), the environmental assessment for the new Naval Hospital Camp Pendleton (U.S. Navy 2010a), and the environmental assessment for the Main Exchange Mall Complex (U.S. Navy 2010b). Potential future growth was also addressed, in part, in the Programmatic Environmental Assessment for Grow the Force Permanent Bed-Down Facilities (U.S. Navy 2010c).

Due to the existing water infrastructure's lack of redundancy/backup and its continued deteriorating conditions, portions of the Base have experienced more frequent interruptions to water delivery system services. In addition, wildfires have also damaged system components (i.e., pump stations, pipes, etc.), resulting in service interruptions. As this system continues to age and as the demand continues to increase, the frequency of the interruptions will also increase, resulting in a greater impact on the mission. Repair and maintenance of this system are becoming more frequent and more expensive.

To fulfill its mission, MCBCP must have adequate water infrastructure for its existing and future personnel and facilities. Interruptions in the Base water systems to any portions of the Base impede the capabilities of the affected cantonment areas to conduct the mission of the Base.

1.3.3 Specific Infrastructure Needs

The alternatives, including the proposed action, were designed to address the overall purpose and need summarized in Sections 1.3.1 and 1.3.2. The specific need for each category of infrastructure is described below.

1. Higher quality drinking water through advanced water treatment is needed throughout MCBCP, with the need being particularly acute in the northern portion of the Base. Currently, the water wells in the San Mateo and San Onofre basins, which will supply water to the proposed Northern AWT, produce raw water for the northern region of MCBCP that includes the 53 Area (Horno), 52 Area (School of Infantry), 62 Area (San Mateo), 63 Area (Cristianitos), 64 Area (Talega), 51 Area (San Onofre), San Onofre housing areas, and the MCBCP San Onofre Beach recreation area. In the northern portion of the Base there is nearly 40,000 linear feet (LF) of water piping that dates back to the 1960s and is deteriorating, requiring frequent repairs. This is resulting in an unreliable supply of water to support ongoing operations and training functions as well as to support firefighting and other life safety needs. Also, current water treatment does not meet more stringent secondary drinking water standards for total dissolved solids (TDS) and may not meet the pending Stage 2 Disinfectant Byproducts Rule of the Safe Drinking Water Act (SDWA) as total organic carbon (TOC) is not removed from the well water.

   The northern area of MCBCP needs improved potable water treatment of all water produced within the San Mateo and San Onofre basins to meet the more stringent secondary drinking water standards for TDS and to ensure compliance with the Stage 2 Disinfectant Byproducts Rule. There is a need to reduce the TDS/TOC levels in the well water to meet wastewater reuse requirements.

   Currently, four wells in the Sierra 1 Training Area of the San Mateo Basin and four wells in the San Onofre Basin (south of Basilone Road) supply water to the northern region, although the specific number of wells in service at any one time may vary. Water obtained from these wells exceeds the SDWA‘s secondary standard (500 milligrams per liter [mg/L]) for TDS. The reduction of TDS would ensure compliance with the SDWA secondary standard with the ancillary benefit of bringing wastewater into compliance with Title 22 to maximize reuse. The 1999–2008 TOC average is approximately 1.013 mg/L with an individual detection at 11 mg/L. TOC removal would ensure compliance with the pending Stage 2 Disinfectant Byproducts Rule of the SDWA. The wells produce mildly aggressive (pH greater than 7.4 or less than 6.8) water, which causes leaching from the conveyance system and also results in the wastewater sludge containing high levels of copper. As a result, some of the sludge from the wastewater plants is classified as hazardous waste by the State of California and imposes special disposal costs on MCBCP.

To ensure compliance with stringent TDS limitations for wastewater effluent, treatment of potable water is necessary to reduce TDS concentrations in the raw sewage influent to the Northern Regional Tertiary Treatment Plant (NRTTP) (U.S. Navy 2010d) and subsequently reduce TDS concentrations in tertiary treated sewage. The Regional Water Quality Control Board (RWQCB) Water Quality Control Plan for the San Diego Basin (Basin Plan) (RWQCB 1994) has established a limit of 500 mg/L for TDS. Wastewater effluent TDS concentrations from the NRTTP can be reduced below 500 mg/L with the implementation of an advanced potable water treatment facility that would reduce TDS to 375 mg/L.

2. Additional drinking water systems and an emergency backup drinking water system are needed at MCBCP. The northern and southern regions of MCBCP are currently provided potable water by multiple wells in the northern system and multiple wells in the southern system with each well capable of producing flow rates between 500 and 1,500 gallons per minute (gpm). Because the water systems of these two regions are not connected, maintenance is performed incrementally, and no backup system exists in the event of failure. At present, water cannot be distributed from one system to the other in times of emergency and peak demand. Further, development served by the Las Flores well field and distribution system needs to be tied to a larger water system because of the eventual planned shutdown of wells tapping the Las Flores aquifer due to water quality issues.[4] The reliability of water supply for the new Naval Hospital Camp Pendleton and the 21 Area (Del Mar) would be improved by redundant water sources.

3. Where the pipelines will be installed in the shoulders of heavily-traveled, two-lane roads, 8-foot-wide paved access and maintenance corridors are needed for worker and vehicular safety. These corridors would be installed on the one road shoulder outside the white line marking the edge of the traveled lane. These road segments are crucial links in the Base's transportation network. In

[4] These water quality issues are primarily the detection of hexavalent chromium in two of the wells (Wells 410621 and 41611).

many cases, they have horizontal and vertical blind curves, so that pipeline maintenance vehicles stopped or moving slowly constitute a hazard to traffic using the roadway. The paved corridors are needed for the safety of workers and motorists and, as a secondary function, could be used by pedestrians, runners, and bicyclists, increasing safety also for those users.

1.4 MISSION OF MARINE CORPS BASE CAMP PENDLETON

The purpose of the proposed action is to provide MCBCP with up-to-date, reliable and efficient water and roadway infrastructure of sufficient capacity in key areas for the Base to accomplish its mission now and in the future. The proposed action is needed because some water and roadway infrastructure elements are not currently adequate to support the mission. MCBCP has served as a military training Base since 1942, and some infrastructure elements currently in use are almost as old. MCBCP's mission is to "operate an amphibious training Base that promotes the combat readiness of operating forces by providing facilities, services, and support responsive to the needs of Marines, Sailors, and their families" (USMC 2007a).

1.5 PROPOSED ACTION LOCATIONS

MCBCP is approximately 40 miles north of downtown San Diego, extending approximately 17 miles along the Pacific Coast and 12 miles inland, and encompassing approximately 125,000 acres. The Base is bordered by the city of San Clemente to the northwest, the city of Oceanside to the southeast, the community of Fallbrook and the Cleveland National Forest to the east, and the Pacific Ocean to the west (Figure 1-1). Regional access to MCBCP is provided by Interstate 5 (I-5) and State Route 76. Mission Road provides additional local access from Oceanside and Fallbrook.

Water system upgrades, expansions, and improvements within MCBCP are being analyzed as part of the proposed action in this EIS. The proposed infrastructure improvements and expansions would be in the western part of MCBCP (Figure 1-2). They would use existing utility alignments where feasible; otherwise, new alignments in previously undeveloped areas may be required. Each project is a design-build project. The environmental analyses for these types of projects are based on preliminary designs with the final design and construction occurring after the NEPA process. If, during the design and/or construction process, the alignment of one of the pipelines or support facilities must be moved outside the area analyzed for environmental impacts, an initial review would be conducted. If these environmental impacts are substantially

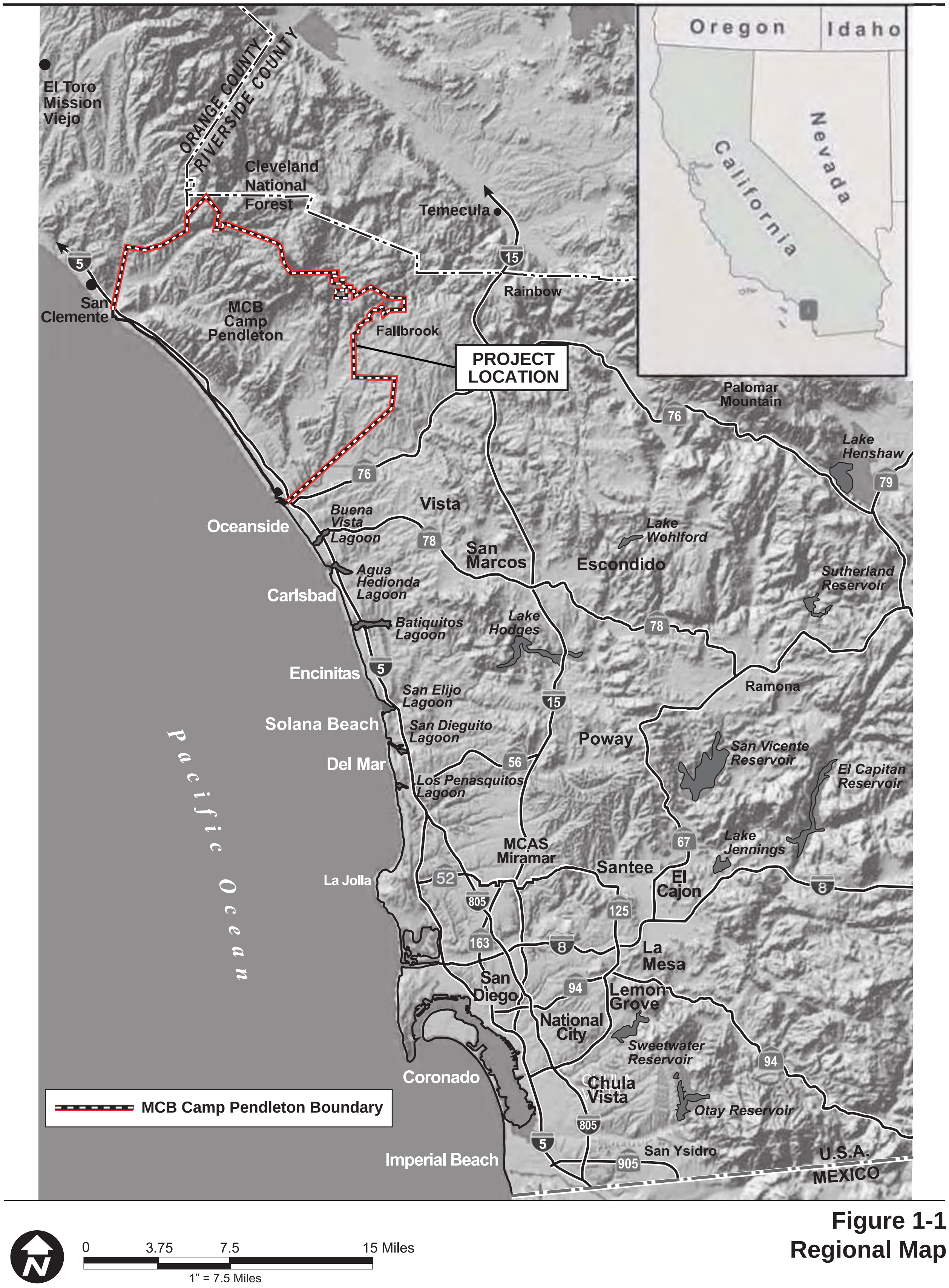
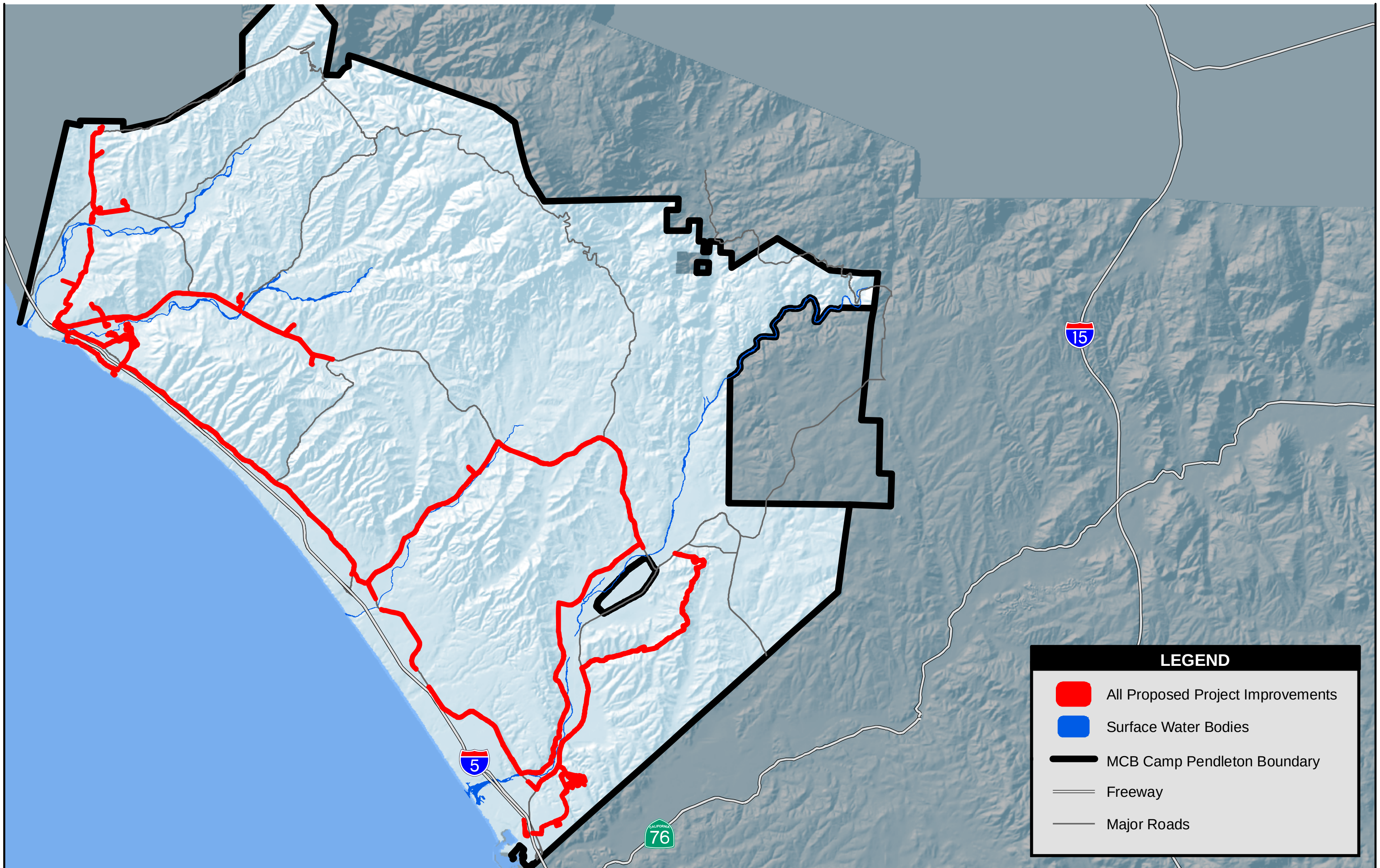


Figure 1-1
Regional Map



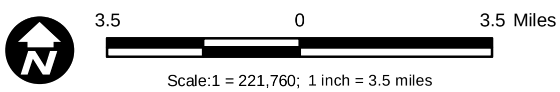


Figure 1-2
Project Location Overview-
All alternatives for both MILCONS

different or inconsistent with the context and intensity of the environmental impacts evaluated in the EIS, supplemental analysis must be conducted and reviewed and approved through Marine Corps and DoN chain-of-command.

1.6 ENVIRONMENTAL DOCUMENTATION

This EIS was prepared using a systematic, interdisciplinary assessment process designed to provide decision makers with an organized analysis of the environmental consequences of implementing the proposed action. The purpose and need for the proposed action are discussed in Section 1.3. The mission of MCBCP is described in Section 1.4. The proposed action locations are discussed in Section 1.5 and the environmental documentation is discussed in Section 1.6. The scope of the analysis is documented in Section 1.7 and the intergovernmental coordination in Section 1.8. The decisions to be made based on the information included in this EIS are summarized in Section 1.9. Subsequent sections of this document describe the proposed action and alternative actions considered (Chapter 2), characterize the affected environment (Chapter 3), and assess the environmental consequences of the proposed action alternatives (Chapter 4).

Cumulative impacts under NEPA are addressed in Chapter 5. Possible conflicts with federal, regional, state, and local land use plans, policies, and controls are addressed in Chapter 6. Chapter 7 discusses other NEPA considerations, including short-term uses and long-term productivity, irreversible and irretrievable commitment of resources, energy requirements, and unavoidable adverse effects. A list of EIS preparers and contributors is provided in Chapter 8, and Chapter 9 provides a list of points of contact, while document references are provided in Chapter 10. Chapter 11 includes a glossary and is followed by appendices.

1.7 SCOPE OF ANALYSIS

The EIS process is designed to involve the public in the federal decision-making process. Input from the public, as well as agencies, will be used to evaluate the alternatives and environmental impacts before a final decision is made. In accordance with NEPA, the Marine Corps initiated a public and agency scoping process to assist in determining the issues to be addressed in the EIS. On 31 March 2010, the Notice of Intent (NOI) to prepare an EIS was published in the Federal Register. The NOI invited agencies, organizations, and the general public to provide written comments between 31 March 2010 and 29 April 2010 relative to the proposed action alternatives and issues to be addressed in the EIS. The NOI also was published in local newspapers and announced a public meeting, which was held on 16 April 2010 at the City of San Clemente Community Center.

The range of issues analyzed in this EIS was determined from initial Marine Corps evaluation of the proposed action and written and recorded oral comments received during the public scoping process. During the EIS scoping process, one written comment letter from the National Marine Fisheries Service (NMFS), a federal agency of the National Oceanic and Atmospheric Administration (NOAA), was received. NMFS requested that the EIS evaluate potential effects of the proposed action on southern California steelhead (*Oncorhynchus mykiss*), include measures to avoid or minimize any adverse effects, and propose compensatory mitigation measures as appropriate. No other comments were received during the public scoping meeting or public scoping period.

Materials from the scoping meeting, including the written comment letter described above, are contained in Appendix A. Issues regarding the southern California steelhead, as requested by NMFS, are addressed in the Biological Resources sections of this EIS.

Environmental impacts that could occur as a result of implementation of the proposed action and alternatives are evaluated with respect to the following human and environmental resources:

- Geology and Soils
- Water Quality and Hydrology
- Biological Resources
- Cultural Resources
- Land Use (including Operations and Training)
- Visual Resources
- Socioeconomics and Environmental Justice
- Traffic
- Air Quality
- Noise
- Public Health and Safety (including Protection of Children)
- Services and Utilities
- Coastal Zone Resources
- Marine Resources

This EIS evaluates temporary, permanent, direct, indirect, and cumulative impacts that may occur as a result of implementation of the proposed action alternatives. The EIS has considered all construction and operational activities associated with the alternatives and the timeframe of the analysis.

The U.S. Environmental Protection Agency (USEPA) published a Notice of Availability (NOA) for the Draft EIS on this proposed action in the Federal Register on 2 December 2011. An NOA was published in two local newspapers of general circulation, the *North County Times* on 16, 17, and 18 December 2011 and the *San Clemente Sun Post News* on 17 December 2011. The Draft EIS was circulated for review and comment to government agencies, local organizations, Native American tribes, and interested private citizens for 45 days between 2 December 2011 and 17 January 2012. The Draft EIS was also available for general review in three public libraries and was available online at www.marines.mil/unit/basecamppendleton/pages/basestaffandagencies/environmental/home.aspx. A public meeting was advertised in the *North County Times* on 16, 17, and 18 December 2011 and in the *San Clemente Sun Post News* on 17 December 2011 and was held on 5 January 2012 at the City of San Clemente Community Center. Public comments received during the meeting and the public review period were reviewed and are reflected as appropriate in the Final EIS, with responses to all comments presented in Appendix A-4 of the Final EIS.

Following the close of the comment period, written and oral comments on the Draft EIS were reviewed and responses to comments developed (see Appendix A-4). This Final EIS was prepared by incorporating responses to comments and additional analyses as applicable. Public and agency comments on the Draft EIS revealed the need to clarify or enhance certain information in the Final EIS. These clarifications and enhancements improved the accuracy and thoroughness of the analyses. Minor editorial and typographical corrections also occurred. The following comprises the major changes and clarifications presented in the Final EIS:

- Replacement of the Stuart Mesa Bridge over the Santa Margarita River and associated roadway improvements (P-1039) has been deleted from the Final EIS due to the need for additional analysis and regulatory consultations. The USMC may reconsider the bridge replacement in a future NEPA document.
- The ocean outfall is not included in the preferred alternative due to the need for additional analysis and regulatory consultations. The USMC may reconsider the ocean outfall in a future NEPA document.

The Final EIS will be circulated for a 30-day public review period, and an NOA will be published in the Federal Register. The Final EIS will be available for public comment between 31 August 2012 and 30 September 2012.

1.8 INTERGOVERNMENTAL COORDINATION

As part of the NEPA compliance process, coordination and consultation with appropriate government agencies have been initiated to obtain regulatory input and guidance related to the proposed action. The purpose of this intergovernmental coordination is to ensure that all applicable laws, rules, regulations, and policies have been identified and that the proposed action has been duly considered in light of these considerations. These statutes and regulations may include, but are not limited to, those listed in Table 1-1.

Table 1-1
Applicable Laws and Regulations Considered

Title	Citation
Archaeological Resources Protection Act of 1979	16 U.S.C. §§ 470aa–470mm
California Hazardous Waste Management	22 C.C.R. Div. 4.5
Clean Air Act	42 U.S.C. §§ 7401–7671q
Clean Water Act (1972, as amended)	33 U.S.C. §§ 1251–1387
Coastal Zone Management Act (1972, as amended)	16 U.S.C. §§ 1451–1466
Comprehensive Environmental Response, Compensation, and Liability Act (1980)	42 U.S.C. §§ 9601–9675
Endangered Species Act (1973, as amended)	16 U.S.C. §§ 1531–1544
Executive Order (EO) 12372 (Intergovernmental Review of Federal Programs) (1977, 1983, and 1984)	47 Federal Register 30959
EO 12898 (Environmental Justice) (1994)	59 Federal Register 7629
EO 11988 (Floodplain Management) (1977)	42 Federal Register 26951
EO 13045 (Environmental Justice for Children) (1997)	62 Federal Register 19885
EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management) (2007)	72 Federal Register 3919
EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) and Migratory Bird Treaty Act	66 Federal Register 3853, 16 U.S.C. §§ 703–712
EO 13514 (Federal Leadership in Environmental, Energy, and Economic Performance (2009)	74 Federal Register 52117
EO 11990 (Protection of Wetlands) 1977	42 Federal Register 26961
Marine Mammal Protection Act (1972, as amended)	16 U.S.C. §§ 1361–1407
National Historic Preservation Act of 1966, as amended (1994)	16 U.S.C. §§ 470–470x-6
National Register of Historic Places (1977)	36 C.F.R. § 60
Pollution Prevention Act of 1990	42 U.S.C. §§ 13101–13109
Resource Conservation and Recovery Act (1976)	42 U.S.C. §§ 6901–6992k
Rivers and Harbors Appropriation Act of 1899, Section 10	33 U.S.C. § 403
Safe Drinking Water Act	42 U.S.C. §§ 300f–300j-26
Magnuson-Stevens Fishery Conservation and Management Act	16 U.S.C. §§ 1801–1891d

C.C.R. = California Code of Regulations; C.F.R. = Code of Federal Regulations; U.S.C. = United States Code

In addition, military organizations are required to comply with specific instructions designed to implement environmental management and protection measures, safety policies and procedures, and other orders and directives intended to guide practices and activities potentially affecting environmental conditions at each Base or training area. These practices and activities include managing hazardous materials, minimizing disturbance to known populations of sensitive species, and avoiding cultural resource areas. At MCBCP, several resource-specific procedures help to protect environmental resources. Environmental Security (ES) has responsibility for the protection of sensitive Base resources and was consulted on the preparation of this EIS.

1.9 DECISIONS TO BE MADE

This EIS will be forwarded through the Marine Corps and DoN chains-of-command for review and final decision by the Principal Deputy Assistant Secretary of the Navy, Energy, Infrastructure, and Environment. The Draft EIS was circulated for review and comment to government agencies, local organizations, Native American tribes, and interested private citizens for 45 days. Following publication of the Draft EIS, the Marine Corps responded to all comments, revised the analysis as necessary, and published this Final EIS. The decision to implement one of the proposed action alternatives or to implement a combination of elements from different alternatives analyzed in this EIS has been documented in a Record of Decision (ROD).

To support analysis of specific applicable laws and regulations (see Table 1-1) the following has been accomplished.

1.9.1 Endangered Species Act, Section 7 Consultation

Consultation with the U.S. Fish and Wildlife Service (USFWS) and NMFS is required under the federal Endangered Species Act (ESA) if the proposed action may affect federally threatened or endangered plant and animal species. Federally listed species that are known to occur or have the potential to occur in the proposed action areas are listed in Table 1-2.

None of the proposed action areas are within designated critical habitat for federally listed species. Any proposed brine outfall into the marine environment (or project-affected creeks) would be subject to consultation with NMFS. USFWS has issued a Final Biological Opinion on this action dated 15 August 2012.

Table 1-2
Federally Listed Species Known to Occur on MCBCP and Evaluated for the Proposed Action

Common Name	Scientific Name	Status
Plants		
Thread-leaved Brodiaea	*Brodiaea filifolia*	Threatened
San Diego Button-celery	*Eryngium aristulatum* var. *parishii*	Endangered
Spreading Navarretia	*Navarretia fossalis*	Threatened
Invertebrates		
Riverside Fairy Shrimp	*Streptocephalus woottoni*	Endangered
San Diego Fairy Shrimp	*Branchinecta sandiegonensis*	Endangered
Fish		
Southern California Steelhead	*Oncorhynchus mykiss*	Endangered
Tidewater Goby	*Eucyclogobius newberryi*	Endangered
Amphibians		
Arroyo Toad	*Anaxyrus californicus*	Endangered
Reptiles		
Green Sea Turtle	*Chelonia mydas*	Endangered
Loggerhead Sea Turtle	*Caretta caretta*	Endangered
Olive Ridley Sea Turtle	*Lepidochelys olivacea*	Endangered
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
Birds		
California Least Tern	*Sternula antillarum browni*	Endangered
Western Snowy Plover	*Charadrius nivosus nivosus*	Threatened
Light-footed Clapper Rail	*Rallus longirostris levipes*	Endangered
Least Bell's Vireo	*Vireo bellii pusillus*	Endangered
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered
Coastal California Gnatcatcher	*Polioptila californica californica*	Threatened
Mammals		
Pacific Pocket Mouse	*Perognathus longimembris pacificus*	Endangered
Stephens' Kangaroo Rat	*Dipodomys stephensi*	Endangered

1.9.2 Clean Water Act, Section 404

Pursuant to Section 404 of the Clean Water Act (CWA), the U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into wetlands and other "waters of the U.S." The Marine Corps must determine if the proposed action has the potential for such discharges to any wetlands or other jurisdictional waters. A Section 404 permit requires a CWA Section 401 Water Quality Certification from the State (issued by the applicable RWQCB and subject to the CEQA).

CWA Section 402 sets forth regulations that prohibit the discharge of pollutants into waters of the U.S. from any point source without obtaining a National Pollutant

Discharge Elimination System (NPDES) permit. The State Water Resources Control Board (SWRCB) implements the NPDES program by regulating point-source discharges of wastewater and agricultural runoff to protect the beneficial uses of both land and surface waters.

1.9.3 National Historic Preservation Act Section 101 and Section 106

Among the provisions of Section 101 of the National Historic Preservation Act (NHPA), a State Historic Preservation Program was established in each state and a State Historic Preservation Officer (SHPO) was given the responsibility to consult with the appropriate federal agencies in accordance with the NHPA regarding:

(i) Federal undertakings that may affect historic properties; and

(ii) the content and sufficiency of any plans developed to protect, manage, or to reduce or mitigate harm to such properties;

Section 106 of the NHPA requires federal agencies to:

> take into account the effect of their undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation…a reasonable opportunity to comment with regard to such undertaking.

SHPO and the Native American tribes have reviewed and signed the Programmatic Agreement on 7 August 2012.

1.9.4 Clean Air Act General Conformity Rule

USEPA published “Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule,” in the 5 April 2010 Federal Register (40 C.F.R. §§ 6, 51, and 93). The Marine Corps published its “Environmental Compliance and Protection Manual” in MCO P5090.2A (21 May 2009). Chapters 6 and 12 of MCO P5090.2A provide implementing guidance to document General Conformity Determination requirements under Section 176(c) of the Clean Air Act (CAA). Federal regulations state that no department, agency, or instrumentality of the federal government shall engage in, support in any way, provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the federal agency to determine, before federal action is taken, whether the action conforms to the applicable implementation plan (40 C.F.R. § 51.850(a)). Federal actions may be exempt from conformity determinations if they do not exceed designated de minimis levels for criteria pollutants (40 C.F.R. § 51.853(b)). The Marine Corps has determined that the proposed action would be below the respective de minimis levels for these pollutants, would conform to the State Implementation Plan (SIP), and a conformity determination is not required.

1.9.5 Coastal Consistency Determination

The federal Coastal Zone Management Act (CZMA; 16 U.S.C. §§ 1451–1456), as amended, requires that federal actions that affect any land or water use or natural resources of a state's coastal zone be consistent, to the maximum extent practicable, with the enforceable policies of a federally approved state coastal zone management plan. The California Coastal Management Program, which includes the California Coastal Act of 1976,[5] is the federally approved coastal zone management plan for California. Coastal zone regulatory authority, including federal consistency review authority, is granted to the California Coastal Commission (CCC). The Marine Corps has determined that the proposed action would have coastal effects and a Consistency Determination has been prepared and will be submitted to the CCC.

1.9.6 Marine Mammal Protection Act

The federal Marine Mammal Protection Act (16 U.S.C. §§ 1361–1407), as amended, established a federal responsibility to conserve marine mammals. Consultation with NMFS would be required regarding the potential for impacts to cetaceans and pinnipeds from any future use of the SONGS outfall. The SONGS outfall is not included in the proposed action at this time and therefore consultation is not required.

[5] California Pub. Res. Code §§ 30000–30900.

CHAPTER 2.0
ALTERNATIVES INCLUDING THE PROPOSED ACTION

CEQ regulations require that an EIS study, develop, and describe reasonable alternatives to an action. Agencies are directed to use the NEPA process “to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the environment” (40 C.F.R. § 1500.2(e)). Alternatives that are found to be unreasonable or do not meet the agency’s purpose and need for the action do not need to be evaluated.

This chapter includes a description of the proposed action (Section 2.1), the alternatives development process (Section 2.2), alternatives carried forward for further analysis including the preferred alternative and the environmentally preferred alternative (Section 2.3), alternatives considered but eliminated from further analysis (Section 2.4), and special conservation and construction measures for all alternatives (Section 2.5). A summary of potential environmental impacts for each alternative analyzed in the EIS is also included (Section 2.6).

The description of the proposed action and alternatives was derived from the Military Construction (MILCON) Program 1391 forms that provide documentation of individual projects, augmented by information from MCBCP and Naval Facilities Engineering Command Southwest (NAVFAC SW) personnel. This included information regarding the project background, planning and construction requirements, and cost implications.

2.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes the construction, operation, and maintenance of potable water infrastructure upgrades within MCBCP. Implementation of the proposed action would construct a new Northern AWT and associated facilities and connect the northern and southern water systems. Each project is a separate, distinct, and independently complete and usable action.

The proposed Northern AWT would be constructed to serve the northern region of MCBCP to reduce the TDS, TOC, and aggressiveness in the local raw water and to significantly reduce the measurable amounts of copper in regional wastewater sludge. The system would include collection points at wellheads, piping and pumps for raw water conveyance, a Northern AWT facility with a capacity of up to 6.6 million gallons per day (mgd), a post-treatment distribution system made up of existing and new potable waterlines and new connections, and a brine disposal system.

MCBCP consists of two primary population centers approximately 17 miles apart. Groundwater aquifers are also separated by a similar distance of 17 miles. The northern and southern water systems connection project would tie into the northern water system at the proposed Northern AWT, and provide a connection to the water system components to the south, both at the existing Las Pulgas Canyon pump station and at existing and/or new facilities in one or more locations farther south and/or east. These more-southern or more-eastern connections include the Vandegrift Boulevard/Magazine Road pump station, several existing nearby reservoirs and a proposed 4-million-gallon reservoir above the pump station, and several reservoirs along a ridgeline above Haybarn Canyon. Construction of the future AWT South, MILCON P-113, began in 2011, with completion expected in 2013. The future AWT South is not part of this proposed action and was covered under previous NEPA documentation (U.S. Navy 2010e).

2.2 ALTERNATIVES DEVELOPMENT PROCESS

To meet the purpose and need of the proposed action, MCBCP's water delivery system infrastructure would need to be improved and expanded to meet the mission and quality of life needs of current Base personnel, as well as enable growth in military personnel to be properly garrisoned and trained at the Base. The proposed action would improve the potable water treatment system and connect the northern and southern water systems.

In general, alternatives carried forward in this EIS for detailed environmental evaluation are those that (1) reasonably meet the needs of improving the deteriorating specified infrastructure of MCBCP and (2) support current projected growth (as identified in Section 1.3.2), while minimizing environmental impacts. Efforts were made to identify and evaluate feasible alternatives that could satisfy the purpose and need of the proposed action. The following screening criteria were used to identify reasonable alternatives:

<u>Sustainability of MCBCP's Military Mission</u>

- Alternative infrastructure improvements and expansions must not hinder the sustainability of MCBCP's military mission. Utility improvements and expansions must maintain or improve the quality of life services of the Marines.

Mission Support – Logistics

- Redundant water provision systems must be provided throughout the Base to avoid interruptions in service from wildfires, accidents, or equipment failures. Water systems must be reliable with options for alternate service.

Mission Support – Operations and Training

- Alternative infrastructure improvements and expansions should not cause unnecessary delays or disruptions in MCBCP's current mission or function and must allow the Marine Corps to properly train the force.

Economic Feasibility

- Alternative scenarios must be achievable within a reasonable cost relative to other alternatives.

Environmental Sensitivity

- Water systems should be contained wherever possible within an existing utility corridor or an existing roadway to reduce environmental impacts.
- Alternative scenarios must be achievable while minimizing significant impacts to the natural and human environment.

2.3 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

The alternatives analyzed represent a reasonable range of alternatives. The Marine Corps could select any one of the development alternatives, any combination of specific project alternatives analyzed in the development alternatives, a partial alternative, or the No Action Alternative. Each of the development alternatives meets the purpose and need as described in Section 1.3.

Preconstruction design of the projects may require ground-disturbing activities, such as geotechnical borings and other investigation activities. Biological and cultural resource monitoring of any such activity would be implemented as necessary to protect sensitive resources.

All construction would comply with seismic standards and, where applicable, Americans with Disabilities Act standards. All construction staging/laydown areas would be within the project limits, primarily in previously developed areas or in paved areas outside the project limits, unless otherwise specified. The analysis in this EIS assumes a worst-case scenario of trenching for installation of piping except in those locations where trenchless (TLS) stream crossings are planned, as described in the following sections. In other locations, TLS construction may be employed. TLS construction refers to the underground installation of pipes or cables with minimal surface disturbance to avoid or minimize impacts to sensitive resources such as surface waters or cultural sites. Several methods of TLS construction are available, including horizontal directional drilling, microtunneling, and boring and jacking. In terms of effects on the ground, any of the methods available would use working pits on either side of the resource to be crossed that would be filled and restored after the operation was completed.

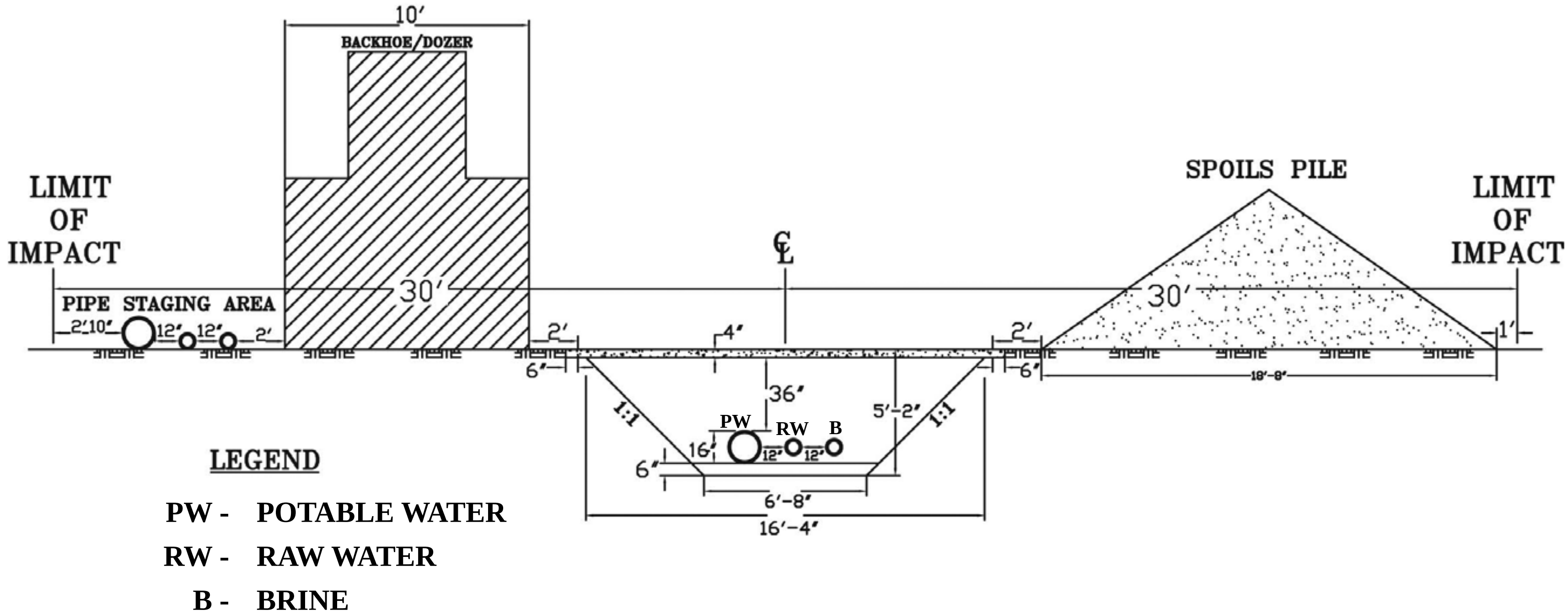
The effects of trenching to construct the proposed pipelines are evaluated in this EIS on a conservative basis. The analysis evaluated trenching impacts within a 125-foot corridor approximately 63 feet on either side of the pipeline centerline. Based on a typical cross-section for a joint trenching project (Figure 2.3-1), the actual impacts would most likely be confined to a corridor approximately 60 feet wide within the 125-foot wide corridor. Therefore, due to the overall conservative approach used in evaluating impacts in the EIS, actual impacts from both trenching and TLS construction would likely be less. The exception to this occurs for the installation of the water line for a segment that extends from the proposed 4-million-gallon reservoir through the Wire Mountain Housing Area to Vandegrift Boulevard. Construction of this pipeline segment would be confined to the limits of Wire Mountain Road.

Each of these projects is a design-build project. The environmental analyses for these two projects are based on preliminary designs with the final design and construction occurring after the NEPA process. If, during the design and/or construction process, the alignment of one of the pipelines or support facilities must be moved outside the area analyzed for environmental impacts, an initial review would be conducted. If these environmental impacts are substantially different or inconsistent with the context and intensity of the environmental impacts evaluated in the EIS, supplemental analysis must be conducted and reviewed and approved through Marine Corps and DoN chain-of-command.

2.3.1 Alternative 1

2.3.1.1 Northern AWT and Associated Facilities (P-1044 Alternative 1 – Preferred Alternative: Site 6 with Basilone Road Conveyance Lines)

This is the preferred alternative for P-1044. The proposed action would involve the construction and operation of a Northern AWT and water lines ranging in size from 8 to 24 inches in diameter for the conveyance of raw water, potable water, and brine in the



Source: MCBCP, SWDIV Naval Facilities Engineering Command

Figure 2.3-1
Typical Trench

northern region of MCBCP. The approximately 8.5-acre proposed Northern AWT site would be located roughly 2,000 feet south of Basilone Road, 500 feet northeast of SONGS East Mesa facility, and 3,000 feet southeast of the San Onofre 3 Housing Area (Figure 2.3.1-1), a location known as "Site 6" from an earlier siting study (Brown and Caldwell 2010). The new lines would connect the new Northern AWT to a number of cantonment or other developed areas in the northern region, including the 64 Area (Talega), 63 Area (Cristianitos), 62 Area (San Mateo), 51 Area (San Onofre), San Onofre housing areas, 52 Area (School of Infantry), and 53 Area (Horno) (Figure 2.3.1-2). Figure 2.3.1-1 provides a detailed view of the primary components of Alternative 1 and Figure 2.3.1-2 provides a view of the remainder of the project. The project alignments and components shown in Figure 2.3.1-2 are the same for all four development alternatives for P-1044.

The proposed new Northern AWT would be constructed to serve the northern region of MCBCP to reduce the TDS, TOC, and aggressiveness in the raw water from the San Mateo and San Onofre basins. These two basins supply the majority of drinking water for the northern region of MCBCP. Water obtained from these wells exceeds the secondary standard (500 mg/L) for TDS. The RWQCB Basin Plan has established a groundwater quality objective of 500 mg/L for TDS in the San Mateo and San Onofre basins. The proposed Northern AWT would reduce the wastewater effluent TDS concentrations to below 500 mg/L.

The proposed Northern AWT would also significantly reduce the measurable amounts of copper in the wastewater sludge possibly leaching from system-related bronze or brass fittings, bearings or seals in the conveyance system. Further, it should eliminate the requirement of handling the wastewater sludge as a hazardous waste. Currently, when the copper content of the sludge exceeds the regulatory limit, the sludge must be disposed of in a designated hazardous waste facility. At present, an out-of-state hazardous waste facility is being used for MCBCP sludge disposal with attendant hauling costs.

The proposed Northern AWT would have an ultimate capacity of up to 6.6 mgd, or 4,600 gallons per minute (gpm). The Northern AWT and associated facilities would include a Liquid-phase Granulated Activated Carbon/Reverse Osmosis (LGAC/RO) facility that includes four basic modules: iron/manganese removal, RO, LGAC, and a pH control chemical injection system, or equivalent/superior proven technology system, along with an associated brine disposal system. Buildings would be constructed of reinforced concrete masonry units with seismic upgrades, structural foundations, and

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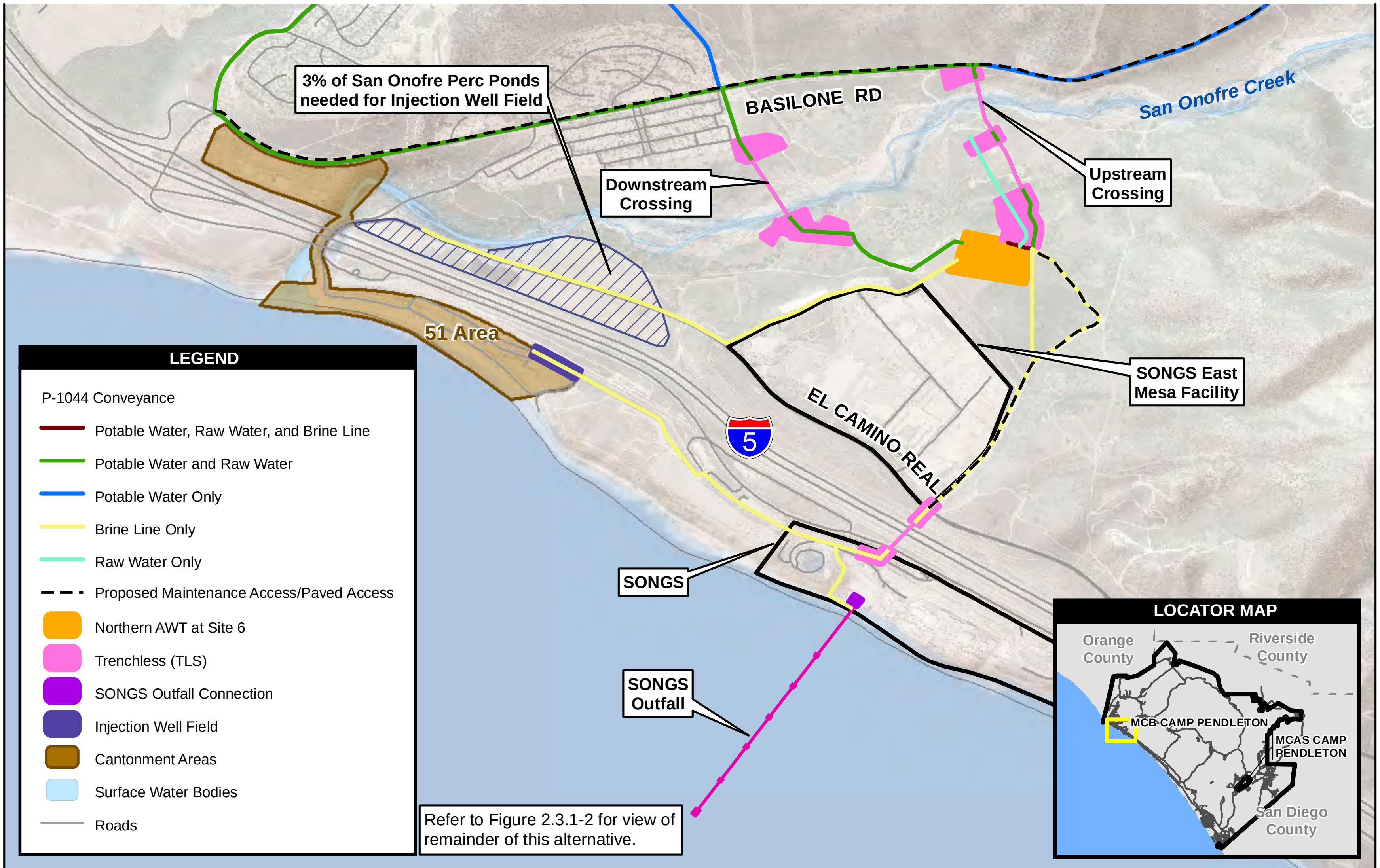


Source: MCBCP 2009

2,000 0 2,000 Feet

Scale: 1 = 24,000; 1 inch = 2,000 feet

Figure 2.3.1-1
P-1044 Alternative 1 - Preferred Alternative

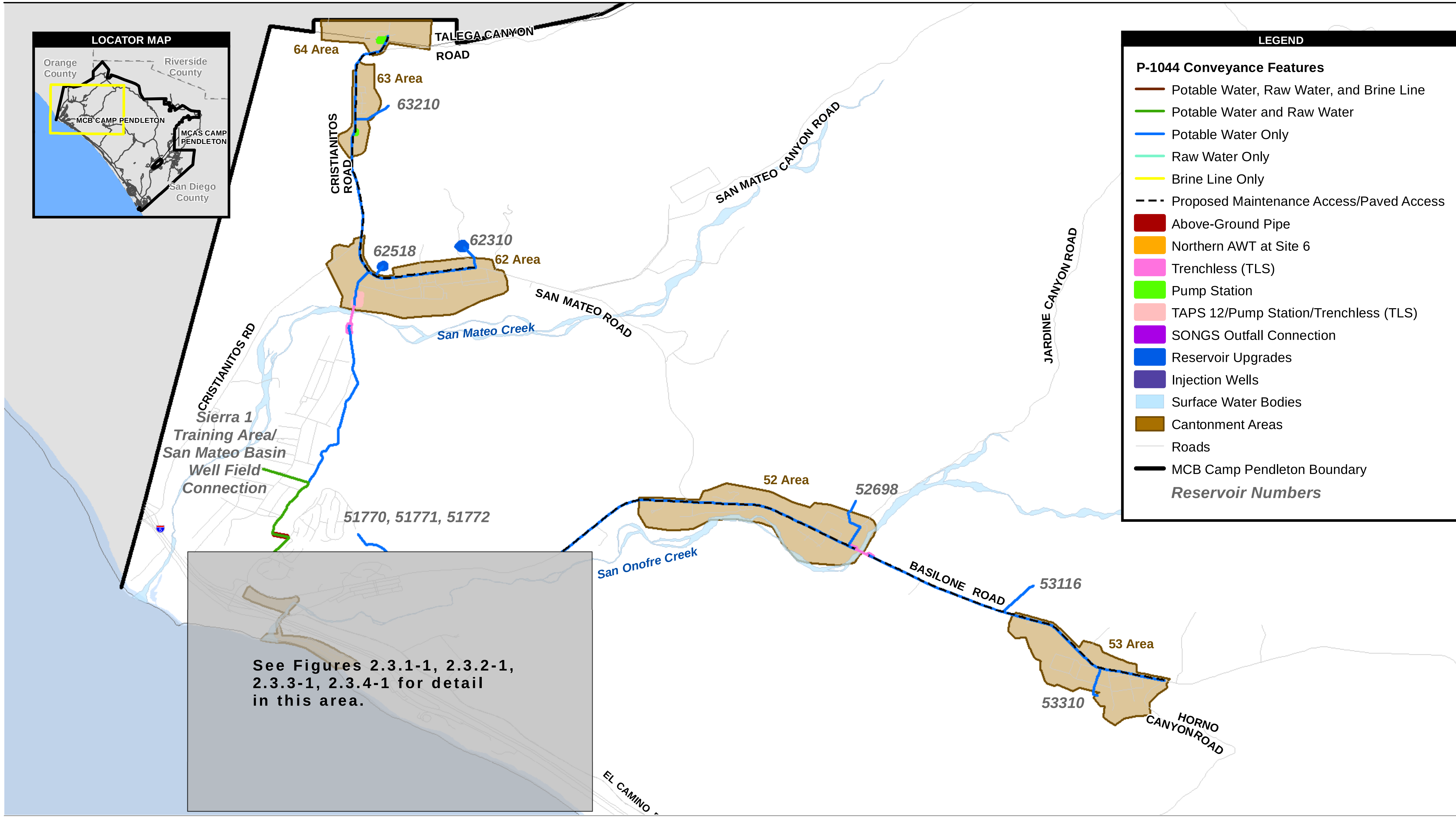
appropriate roofing systems. The facility would be designed in modular form for ease of expandability, although there are no current plans for expansion. The brine disposal system, consisting of a brine storage facility, brine pump station, and brine disposal line, would connect to the RO module. The facility would include a telecommunications room.

Collection points at wellheads with piping and pumps would be constructed under the proposed Northern AWT. After treatment, the finished water would be distributed through existing and new potable waterlines and new connections. Built-in equipment would include process equipment, chemical tanks, RO membrane on skids, chemical feed system, carbon unit, RO feed, and transfer pumps. Special foundation features for construction in structural fill and sand areas would also be constructed.

The proposed action would provide for electrical systems (fire alarms and fire monitoring/control panels, fire protection systems, information systems, energy management control systems, direct digital controls, communications, electrical distribution, exterior lighting, substation; common bank, and an equipment yard) and mechanical systems (heating, ventilation, and air conditioning systems; water utilities; sanitary sewer utilities; gas utilities; and an equipment yard). Electrical overhead lines would be extended from Basilone Road to the proposed Northern AWT. These lines would be located within the pipeline corridor.

Raw water, treated water, and brine would be conveyed via new pipelines in four proposed linear corridors, with individual corridor segments varying in the combination of types of lines they would contain. The descriptions below are the overall corridor routes; the types of conveyances along any particular corridor segment are shown in Figure 2.3.1-1 and Figure 2.3.1-2.

- One corridor would extend from the Northern AWT north to Basilone Road, then west along Basilone Road to the San Onofre 2 Housing Area, the San Onofre 3 Housing Area, and the 51 Area (San Onofre), and then north again along several different roadway segments to the San Onofre 1 Housing Area, 62 Area (San Mateo), 63 Area (Cristianitos), and 64 Area (Talega).
    - This corridor would include approximately 54,000 LF of potable and raw water lines to connect to reservoirs in or near the San Onofre housing areas (Reservoirs 51770, 51771, and 51772), the 62 Area (San Mateo) (Reservoirs 62310 and 62518), and the 63 Area (Cristianitos) (Reservoir 63210). It would also connect to the well field in the Sierra 1 Training Area,



Source: MCBCP 2011

4,250 2,125 0 4,250 Feet

Scale: 1 = 51,000; 1 inch = 4,250 feet

Figure 2.3.1-2
P-1044 Overview
Conveyance Features

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and a short connection located about 5,000 feet south of the 62 Area (San Mateo) would serve the Infantry Immersion Trainer Phase 1 and 2. Between the Northern AWT and Basilone Road, the pipeline would connect to several key wellheads south of San Onofre Creek. In one portion of this corridor, on the steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds, the pipeline would be constructed aboveground; all other pipelines would be underground. The geotechnical conditions under this slope would prevent TLS.

- o The lines in this corridor would extend beneath San Onofre Creek just south of Basilone Road and beneath San Mateo Creek just south of the 62 Area (San Mateo) using TLS construction. Both the upstream and downstream crossings would be used for the San Onofre Creek undercrossing, as shown in Figure 2.3.1-1. Depending on the TLS construction used, the upstream bore pit location could encroach into the 100-year floodplain, but the downstream crossing would not. The TLS boreholes would be sized to accommodate the proposed pipelines with room for future expansion. The drilling would require the excavation to an appropriate depth above the water table of a 20-foot by 40-foot boring pit on both sides of the creeks. The boreholes would be deep enough below the creek beds to protect the pipeline from scour. The depth would also be selected to bore through sediments that would minimize the potential for “frac-outs” during construction. Frac-outs are the unintended release of drilling fluids, such as drilling mud, during drilling operations and commonly occur when drilling through fractured rock or coarse deposits like cobbles and gravel. Measures to avoid impacts to the creek from TLS construction are discussed in Section 2.5. Pipe to be installed under the creeks would be assembled on one side of each creek in a linear staging area. This staging area would be in the roadway or on the disturbed shoulder area of the roadway running adjacent to the TLS boring operations area, such that no separate environmental analysis would be required for this area. An area of approximately 0.25 acre would be needed on each side of the creek for boring operations (with a larger area used for environmental review to provide flexibility of design). This area would be fully restored upon completion of construction.
- o Three existing pump stations would be retrofitted along this corridor, including appropriately sized emergency generators, asphalt patches, connections to existing reservoirs, and distribution systems.

        - One pump station would be needed in the 62 Area (San Mateo) on the north side of San Mateo Creek, largely as a backup. This pump station would be co-located with Tributary Area Pump Station (TAPS) 12 and a TLS boring site, with the overall site being approximately 3.5 acres.
        - One pump station would be required in the 63 Area (Cristianitos) on a 0.25-acre site.
        - One pump station would be required in the 64 Area (Talega) on a 1.18-acre site.
- The second corridor would extend from the junction of the first corridor and Basilone Road east along Basilone Road to the 52 Area (School of Infantry) and 53 Area (Horno).
    - This corridor would include an approximate 33,000 LF potable water line to connect to reservoirs in or near the 52 Area (School of Infantry) (Reservoir 52698) and the 53 Area (Horno) (Reservoirs 53116 and 53310).
    - TLS construction would be used for the crossing of San Onofre Creek between the 52 Area (School of Infantry) and the 53 Area (Horno) (Figure 2.3.1-2).
    - No pump stations would be required along this corridor.
- The third corridor, approximately 13,000 LF, would extend south from the Northern AWT to connect to the ocean intake conduit on the seawall side of the main SONGS facility seawall, and to the proposed MCBCP San Onofre Beach recreation area injection well field west of I-5 for brine disposal.
    - The brine line in the portion of the corridor crossing the freeway would extend beneath I-5 and the railroad via TLS construction.
    - No pump stations would be required along this corridor.
- The fourth corridor, approximately 6,600 LF, would extend west from the Northern AWT, passing north of the SONGS East Mesa facility and then running northwest along El Camino Real to the proposed injection wells east of I-5.
    - No TLS construction would be required for the brine line in this corridor.
    - Pump stations in this corridor would be at the Northern AWT site.

The brine disposal pipeline would convey RO reject water from the Northern AWT to discharge locations. The brine would be discharged through the deep injection well fields. A secondary option is to discharge the brine through an ocean outfall at SONGS. This option is not considered ripe for a full analysis due to the lack of final design and, although considered viable, will be evaluated on a programmatic level in this EIS.

Each discharge method is described below and will be addressed in Chapter 4.0. Climatic conditions in southern California are not arid enough for adequate brine disposal via reclamation or evaporation basins, and therefore these disposal options are not considered further. The flow rate of brine discharge from the Northern AWT operating at its 6.6-mgd capacity would be approximately 1.0 mgd. There would be two means of disposing of brine from the Northern AWT:

- *Ocean Outfall Disposal* – As explained above, this disposal option lacks sufficient design-level information for a complete NEPA analysis and is therefore evaluated at a programmatic level. This option is not included in this alternative. The ocean outfall disposal would include use of the existing, abandoned SONGS 12-foot-diameter, 3,200-foot-long cooling water intake structure in the Pacific Ocean.

  The former intake structure was used by SONGS until 2005. Southern California Edison (SCE) has begun decommissioning of the SONGS Unit 1 cooling water intake and discharge conduits (Associated Pacific Constructors 2004). All onshore components of the former cooling water intake structure for SONGS Unit 1 have been decommissioned. SCE has initiated permitting for abandonment of offshore components. The conduits were constructed and operated under a lease agreement with the California State Lands Commission (CSLC) and SCE has reached agreement with the CSLC to leave the conduits in place.

  SCE and CSLC have agreed that SCE will remove the vertical conduit terminal structures at the offshore terminus of the former intake and discharge conduits to eliminate their risk as navigation hazards. SCE has also agreed to remove the manhole access risers spaced along the conduits, with four on the former discharge conduit and five on the former intake conduit. The manhole access will be removed to the top of the conduit, 4 feet below the seafloor, which will allow the conduit to fill with sand. A mammal barrier will be placed at the terminals and at the former access manholes after the structures are removed. This SCE work on the conduits would be completed before construction of the Marine Corps' proposed use of the former intake structure.

The following description of a brine discharge system is based on the model used by Brown and Caldwell to determine the feasibility for discharge compliance with the California Ocean Plan and the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan) (Brown and Caldwell 2012). The final design for the diffuser system would be determined by the design-build contractor based on subsequent analysis.

The brine discharge pipeline would run south from the Northern AWT, beneath I-5, and pass through the SONGS complex and under or through the SONGS seawall. It would then pass above the beach by trenching along a pedestrian pathway outside the SONGS seawall to the onshore part of the former Unit 1 intake conduit. An access and work area 35 feet wide would be needed from the seaward side of the SONGS seawall to the conduit insertion excavation. An excavation up to 50 feet deep would be required to reach the conduit and provide a work area for insertion of the brine line. All excavation would be above the high water line. Core drilling or abrasive blade cutting would be used to make an opening into the conduit through which the brine line would be inserted. The work area would be enclosed by an interlocking steel cofferdam and may require dewatering. The cofferdam steel sheeting would be driven into place by hydraulic pushing to avoid excessive noise or vibration.

Trenching and excavation would be backfilled when the brine is in place outside the seawall. The ground surface would be restored to preconstruction conditions upon completion of construction.

As modeled by Brown and Caldwell, the 12-inch-diameter brine discharge pipeline would be inserted into the former intake conduit onshore seaward of the SONGS seawall and anchored through the length of the conduit to the seaward terminus by fastening to the inside conduit surface or by bedding. At the terminus, the pipeline would pass through the mammal barrier, and a diffuser system would be installed for brine discharge into the ocean. The diffuser system would consist of a single, approximately 150-foot pipeline extending seaward from the conduit terminus with six diffuser ports with a 2-inch-diameter on 2-foot risers evenly spaced along its length to provide dilution of the brine discharge. A permanent rock blanket would be placed over the diffuser pipe, extending approximately 15 feet on either side of the pipe and 15 feet beyond the end of the diffuser. Installation of the diffuser and rock blanket could be preceded by leveling of the seabed, possibly using a dragline attached to a crane.

Installation of the brine discharge pipeline inside the conduit would likely be performed under tension using winches at beach and barge locations by fusing high-density polyethylene pipe and pulling the pipe into the conduit after fusing. The segments could also be fused together into a floating string, followed by flooding and winching into the conduit from the seaward end. The pipe would be fixed in place inside the conduit by mechanical connections and/or backfill. Between the onshore insertion point into the outfall conduit and the diffusion system at the conduit terminus, installation of the brine line would be confined within the conduit structure.

The Marine Corps has coordinated with SCE for use of the intake structure as a component of the brine disposal ocean outfall system. An agreement for transfer of the intake structure will be required between the Marine Corps and SCE; this agreement process can only be completed when project design plans are available.

A reconnaissance of the conduit by Navy divers in 2009 found that two of the manhole riser covers along the conduit were damaged, preventing complete closure (U.S. Navy 2009b). As a result, the existing 3,200-foot-long intake structure is partially filled with sediment and organic material in some areas. SCE would remove the five access manholes and risers along the length of the conduit and replace them with mammal barriers, which would be approximately 4 feet below the seafloor. This could result in additional material being deposited in the conduit. Such material would either be removed or repositioned inside the pipeline as necessary to install the 12-inch-diameter brine discharge line. The brine pipeline would extend an additional 150 feet past the intake conduit structure terminus and discharge brine via six 2-inch-diameter diffuser ports. The proposed brine discharge pipe would be installed at a maximum depth of 25 feet or less (Figure 4.1.14-1). This disposal method could accommodate the entire RO effluent flow of up to 1.0 mgd. The existing conduit was used for cooling water intake but since the proposed action would use it as an outfall for brine, this structure will be referred to hereafter as the outfall conduit.

The disposal of brine solution via the SONGS outfall conduit has undergone conceptual design and fundamental plume dilution modeling (Brown and Caldwell 2012). The evaluation of trace metal impacts on brine disposal concluded that a 95:1 dilution ratio of seawater to brine was required to meet the requirements of the State of California Ocean Plan. Due to potential concentration of copper in the RO brine, a proposed subsurface discharge 25 feet deep with six 2-inch-diameter ports could be used to meet the required dilution ratio. The proposed subsurface discharge would be located approximately 4 feet above the ocean floor in approximately 29 feet of water, extending seaward from the terminus of the outfall conduit. Concentrations of other brine constituents that would already meet Ocean Plan limits before dilution would be reduced further. Initial dilution modeling of the brine discharge (Brown and Caldwell 2012) indicates that compliance with receiving water regulations would be achieved but may be indiscernible from the surrounding seawater depending on the turbidity of near-bottom waters near the point of discharge and the brine discharge itself.

- *Injection Well Disposal* – Injection wells would be used to dispose of the brine solution in this EIS. Two injection well locations would be proposed, one on the west side of I-5 and one on the east side of I-5 (Figure 2.3.1-1). The brine waste would be injected deep within the saltwater wedge that occurs on the ocean side of the saltwater-freshwater interface, which occurs approximately 330 feet below the surface or deeper (as deep as 750 feet).

In the western location, the injection wells would be constructed where the inland access road crosses the MCBCP San Onofre Beach recreation area along the BNSF Railway right-of way, west of Coast Road and northwest of the San Onofre Surf Beach area of San Onofre State Beach. Wells at his location have the capability to accommodate the maximum brine output of the proposed RO facility, approximately 1.0 mgd (Stetson 2011).

The injection wells field would be located within an area of approximately 1.6 acres with dimensions of approximately 570 feet by 125 feet. The entire area is developed or disturbed, with no biological or culture resources present. The wells would be on the southwest side of I-5 and Old Pacific Highway, with the brine line placed in the recreational access road northeast of a recreational vehicle parking area. Southwest of that road, up to eight wells would be drilled in up to five locations. The wells would inject water into the San Mateo geological formation at a depth ranging from 350 to more than 900 feet below the surface. More than one well could be placed at each drilling site, with slant wells branching off from a single surface location. At each drilling location would be a vault with the top at ground level, approximately 6 feet wide and 13 feet long.

Monitoring wells would be drilled into the San Mateo formation to check the results of injecting brine into the aquifer. The wells would serve to monitor the vertical and horizontal mixing of brine with the saltwater wedge and to ensure protection of all existing beneficial uses identified by the RWQCB. Seven monitoring wells are proposed, four on the coastal side of I-5 and three on the inland side. One of the seven wells exists and six would be drilled as part of the P-1044 project. The proposed locations would be in areas that are disturbed or developed and are within the survey corridor for this project, with no biological or cultural resources present. Two of the wells are within the 1.6 acres identified for the injection wells and would be used as test wells for injection. These two may also be used as injection wells after testing is complete.

Injection wells northeast of I-5 in the San Onofre percolation ponds have also been proposed (Figure 2.3.1-1). The injection wells would be within about 3 percent of the total area of the percolation ponds. As with the wells southwest of I-5, up to eight wells northeast of I-5 would be drilled and capable of injecting the daily brine output of the RO facility into the saltwater wedge of the San Mateo formation. One or more test wells and up to eight monitoring wells would also be drilled to monitor mixing and track the results of injection into the aquifer.

Construction Activities

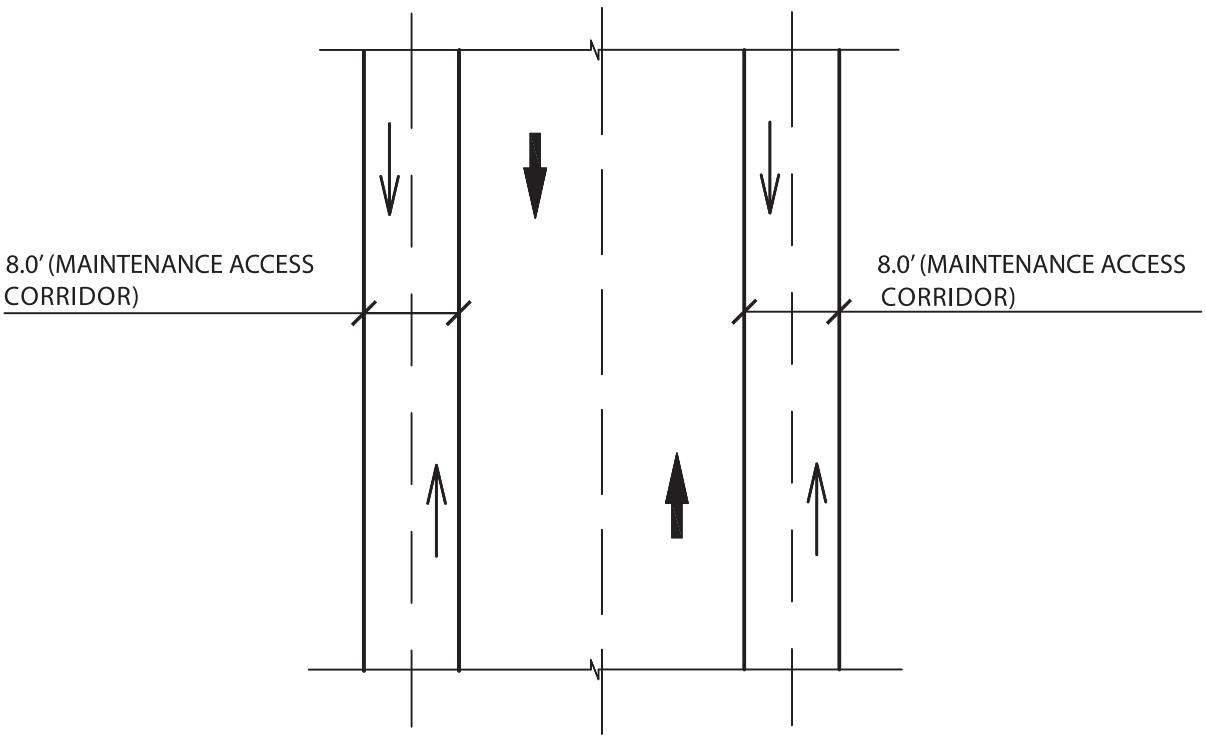
Site improvements for P-1044 would provide for backfill, bedding, compaction, excavation and trenching, hauling, horizontal boring, paving new roads and repaving existing roads, and storm water management during and after construction. The project would also provide for site preparation (excavation, clearing and grubbing, and site cleanup), security fencing, and gates. Supporting activities would provide for the mobilizing and demobilizing of new construction. Geotechnical bore holes, potholing (subsurface spot testing), test injection wells, and other investigation activities for utilities within the project limits would need to be done before and during design, and before initiation of construction activities to provide key information for the design. Approximately 40,000 LF of existing water line would be abandoned in place. This water piping dates back to the 1960s and is deteriorating, requiring frequent repairs. Removing the piping would result in ground disturbance and potential impacts to natural and cultural resources. The construction contractor may identify the need to replace additional existing pipelines due to deteriorating conditions. If this is required and any of the construction activity would occur outside the parameters of this EIS, an initial review by ES would be conducted to determine the appropriate NEPA analysis and documentation required.

The Base would install the water lines in the road or shoulder of the road. The intent would be to avoid installation in the center of the road because if a pipeline break occurred, the road could be completely shut down for the repairs. These roads are crucial roadways to the operation of the Base. The water lines would be installed on one side (road lane or shoulder) only; however, at this stage the preferred side of the road is not known. That would be determined by the design-build contractor.

Once the preferred side of the road is selected, it is the intent to stay on that side and not cross from one side to the other. There are two primary reasons for this. First, every fitting added for a direction change in the pipe would result in an energy loss in the water flow. Adding additional fittings may require the installation of larger pumps, which would increase energy use and project costs. Second, each time a pipeline crosses the road, the chance of the pipeline failure in the road increases and could result in temporary but complete shutdown of the roadway for repairs. Therefore, the EIS analyzes the impacts to a 125-foot corridor, approximately 63 feet on either side of the pipeline centerline, which allows flexibility for the system designer but increases the impacts identified in the EIS over what would actually be expected. The contractor would be required to take environmental factors into account in choosing pipeline routes.

The paved maintenance access corridor would extend 8 feet from the outside travel lane striping. While the primary purpose of the paved corridor would be for pipeline maintenance and repair vehicles' use, a secondary function would be to allow pedestrians, runners, and bicycle riders to use the roads but stay clear of traffic. Both functions of the maintenance access corridor would increase safety for road users. The maintenance corridors would be located on only one side of the road (the side with the pipeline) but were analyzed in this EIS on both sides of the road to provide a more conservative impact analysis until the design is complete. The maintenance corridors are proposed for San Mateo Road, Basilone Road and Cristianitos Road. The maintenance access corridor for P-1044 would be located in two project segments (Figure 2.3.1-3). One segment, approximately 7 miles long, would extend along Basilone Road from the 51 Area (San Onofre Housing) east through the 53 Area (Horno) and the other segment, approximately 3 miles long, would extend from the 62 Area (San Mateo) to the 64 Area (Talega). The roadways in these locations are two lanes wide and have blind horizontal and vertical curves. They are crucial links in the Base transportation network with relatively high volumes of traffic.

A maintenance or military training vehicle stopping on the side of the road would not be able to get completely clear of traffic. This presents a safety issue. The maintenance corridor would provide a safe area for heavy vehicles to pull off the side of the road. Elsewhere, the pipeline would be along roads where traffic is light and providing added paved surface for maintenance is not as critical. The maintenance corridors would not



Adapted from: Public Works Office, Marine Corps Base Camp Pendleton 2010

Not to Scale

Figure 2.3.1-3
Maintenance Access Corridor for P-1044 and P-1045

be needed for every segment of the pipelines. El Camino Real is not a public access road. It is a concrete road on a long straightaway and is used for military training and base maintenance personnel access. Sierra 1 Training Area is also not a public access area. The pipeline segment there would run along dirt roads where there is plenty of room to work.

The proposed potable water line from Basilone Road to reservoirs east of the San Onofre housing areas would replace two existing 14-inch asbestos cement (AC) pipes. The installation of the new pipe would likely impact the endangered Pacific pocket mouse. The Base evaluated numerous other conveyance and installation options with the intent to minimize or avoid impacts to the Pacific pocket mouse. Installation options included TLS, which is not preferred because it would still result in direct impacts due to bore pits with the potential for frac-outs affecting the hillside and Pacific pocket mouse habitat.

The Base also evaluated alternative alignments. Only one alternative alignment was determined to be feasible and it would install the pipeline farther to the west outside the Pacific pocket mouse habitat. In evaluating this option, MCBCP Public Works Office determined it would add approximately 3,000 LF of pipeline to the project, require installation of three pressure reducing valves, and necessitate routing around concrete drainage swales, all in rugged terrain. The added cost is estimated at approximately $1.2 million. This pipeline segment would be eliminated from the project due to the costs. The existing and aging AC pipes are functional however, their reliability is questionable. These aging pipes do not handle water pressure changes well. There is a good chance one or both of these lines could break in the future. From the reservoirs above San Onofre II Housing, there is an elevation difference of 150 feet. If a break occurred, a flow rate of 13,700 gallons per minute would result until the water valve could be manually closed. The response time for this manual shut-down in an unexpected blowout would be approximately 1 hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing massive property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire. For these reasons, the proposed water line in this location has been retained as part of the project.

The proposed action would also include paving the existing dirt road from El Camino Real to the Northern AWT entrance. These road improvements would be approximately

4,800 feet long and 50 feet wide. The paved road is needed to allow delivery trucks to access the site during all weather conditions.

The brine discharge pipeline would be installed by trenching and backfilling south from the Northern AWT to the northeast side of I-5. TLS construction would be used to pass it under I-5 and the railroad. After exiting from the TLS boring pit southwest of the freeway, it would be trenched to the SONGS complex. It would be installed through SONGS in a concrete-lined drainage channel and under the SONGS seawall. It would then pass above the beach by trenching along a pedestrian pathway outside the SONGS seawall to the onshore part of the former Unit 1 intake conduit. An excavation up to 50 feet deep would be required to reach the conduit and provide a work area for the insertion. All excavation would be above the high water line. Core drilling or abrasive blade cutting would be used to make an opening into the conduit through which the brine line would be inserted. The work area would be enclosed by an interlocking steel cofferdam and may require dewatering. The cofferdam steel sheeting would be driven into place by hydraulic pushing to avoid excessive noise or vibration.

Installation of the brine discharge pipeline inside the conduit would likely be performed under tension using winches at beach and barge locations by fusing high-density polyethylene pipe and pulling the pipe into the conduit after fusing. The segments could also be fused together into a floating string, followed by flooding and winching into the conduit from the seaward end. The pipe would be fixed in place inside the conduit by mechanical connections and/or backfill. Between the onshore insertion point into the outfall conduit and the diffusion system at the conduit terminus, installation of the brine line would be confined within the conduit structure.

Marine water quality impacts from modifying the SONGS outfall conduit for brine discharge would occur from multiple benthic disturbances during construction (e.g., anchoring, dredging, and construction) but would be dependent on the ultimate construction methods and materials used. The SONGS outfall conduit and modified terminal structure would serve as a sleeve for the 12-inch-diameter brine discharge line, thereby containing much of the construction-related disturbance within the pipeline and reducing impact to the outside benthos and water column.

Construction disturbances to the seafloor would be confined to the less environmentally sensitive soft-bottom habitats as much as possible. Temporary disturbance could be expected in areas about 50 feet square around the former manhole access ports, which could be used for access into the conduit for placement of the brine line. Temporary disturbance to the seafloor could occur within an area 50 feet wide by 250 feet long at the offshore terminus of the outfall. The seabed at the diffuser location would be leveled to provide a flat surface for the diffuser. Rock bedding would be placed on the leveled area and the diffuser placed on the bedding, then covered with a rock blanket extending about 15 feet to either side of the diffuser and 4 to 8 feet over the diffuser pipeline.

Water quality impacts to the marine environment can be estimated but not definitively assessed at this time. Multi-anchoring would be expected but would be dependent on contractor bids. Once design is finalized, the project would go out to contracting bid. Based on bids and the level of environmental impact of each, the favored bid would be selected. Based on proposed preliminary engineering considerations to date (Brown and Caldwell 2012), marine water quality impacts are expected but are anticipated to be mitigated through federal and state regulation and monitoring (e.g., monitoring and reporting program(s) mandated by USEPA/SWRCB NPDES permit(s)). As explained above, use of the SONGS outfall lacks sufficient design-level information for a complete NEPA analysis and is therefore evaluated at a programmatic level. This option is not included in this alternative.

Test wells, monitoring wells, and injection wells for disposal of RO brine into the San Mateo formation would be drilled by truck-mounted rigs. All of these locations would be in developed or disturbed areas and within the survey corridors for the proposed action. Construction, operation, and maintenance of the wells would affect no biological or cultural resources on the surface.

Maintenance of the SONGS outfall diffuser would require periodic inspection that may necessitate the need for cleaning of the brine diffuser system. Typical inspection frequencies in the industry are conducted annually but would be expected to be specified within the NPDES discharge permit authorized by RWQCB.

Light biofouling maintenance may be required annually, while more robust maintenance may occur every 5 to 10 years. Maintenance of the offshore diffuser system would also be contingent on oceanographic conditions (storm intensity, currents, astronomic tides, etc.), some of which would be impractical to predict.

The project limits consist of the permanent and temporary impact areas of the proposed action. The permanent facilities would include the Northern AWT, pump stations, maintenance access corridors, paving the existing dirt road from El Camino Real to the Northern AWT entrance, the offshore diffuser system, and injection wells. The temporary facilities would include conveyance lines, and TLS construction sites. Hydraulic modeling would be required in order to determine appropriate scour depth for creek crossings. In addition, new reservoir(s) designs would include properly constructed outfalls for reservoir draining/maintenance, with energy dissipation and concrete collars. Maintenance access road would be included within the footprint to allow future access to outfall point(s). This project is funded for fiscal year (FY) 2012 at approximately $101 million. Construction would begin in 2013 and last approximately 24 months.

2.3.1.2 Connection of Northern and Southern Water Systems (P-1045 Alternative 1 Route)

Under P-1045 Alternative 1, the proposed action[6] would include the construction of potable water lines 36 inches or less in diameter to connect the northern and southern regions of MCBCP. As shown in Figure 2.3.1-4, the water line would start at either an existing water line in Basilone Road or the new Northern AWT (P-1044) at either Site 4, on Basilone Road (P-1044 Alternative 3 and Alternative 4), or Site 6, south of Basilone Road (P-1044 Alternative 1 and Alternative 2).

To be conservative in characterizing potential environmental impacts of P-1045 in this EIS, a longer corridor to a northern connection at Basilone Road/Northern AWT Site 4, which passes by the more southerly Northern AWT Site 6, is assumed for all of the alternatives. If the Northern AWT is constructed at Site 6, the length of this most northern P-1045 corridor segment would be reduced by the distance between Site 6 and a Basilone Road connection, roughly 3,000 feet, with an accompanying reduction of impacts. In this case, the connecting segment between the Northern AWT Site 6 and existing water lines in Basilone Road, and associated impacts, would be accounted for under P-1044, as noted in the P-1044 project description, rather than under P-1045.

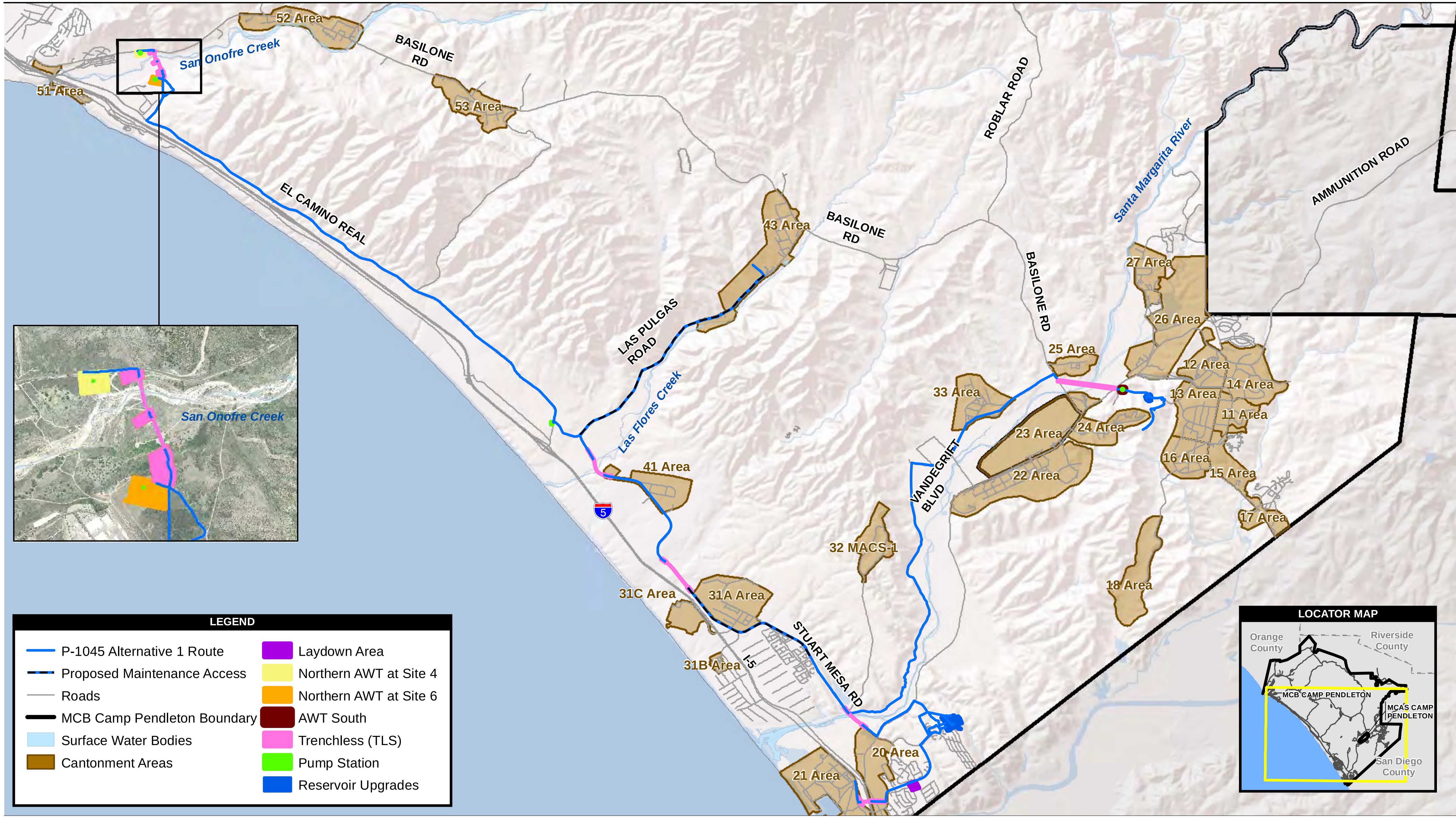
From its northern connection point, the water line would extend south in El Camino Real to Stuart Mesa Road. At the junction of Stuart Mesa Road and Las Pulgas Canyon Road, a lateral pipeline would run north along Las Pulgas Canyon Road approximately 4.7 miles and terminate at existing Reservoir 43210. This lateral pipeline would be approximately 10 to 14 inches in diameter and connect to the Las Pulgas distribution system to link development in the Las Pulgas, Las Flores, and Stuart Mesa areas to the connected northern and southern water systems.

[6] The project description in this section is largely drawn from P-1045 Military Construction Program Form 1391, dated 05 May 2009.

The main pipeline would continue along Stuart Mesa Road before splitting again into two branches. One of these branches would extend northeast on the west side of the Santa Margarita River along North River Road, passing east of the 32 Area (MACS-1) and 33 Area (Margarita) and west of the 23 Area (MCAS Camp Pendleton) to Basilone Road, under the Santa Margarita River by TLS construction, and connect to several reservoirs along a ridge above the future AWT South (Reservoirs 13151, 13154, 24140, and 24174). The second branch would continue south along Stuart Mesa road, passing by TLS construction under the Santa Margarita River, or over the Santa Margarita River attached to Stuart Mesa Bridge, to Vandegrift Boulevard.

To be conservative in characterizing potential environmental impacts of P-1045 in this EIS, it is assumed that TLS would be used to cross under the Santa Margarita River in the vicinity of the Stuart Mesa Bridge for this alternative (and all other relevant alternatives), as this approach would account for additional environmental impacts due to the need for boring pits. If the pipeline were to be attached to the bridge instead, potential environmental impacts associated with TLS construction would be avoided. Hydraulic modeling would be required in order to determine appropriate scour depth for creek crossings. Scour depth for Santa Margarita River should be modeled with at least the 100-year storm size increased to account for increasing upstream population and potential increasing flood sizes. In addition, new reservoir design would include properly constructed outfalls for reservoir draining/maintenance, with energy dissipation and concrete collars. Maintenance access road would be included within the footprint to allow future access to outfall point(s).

The line would continue northeast on Vandegrift Boulevard for approximately 1 mile to an existing pump station at Magazine Road and terminate at several nearby reservoirs (Reservoirs 20813, 20814, 20815, 200814, and 200815) in the Wire Mountain area. P-1045 would also include the construction and operation of a new 4-million-gallon water reservoir in the Wire Mountain area and associated water line connections to serve the new Naval Hospital Camp Pendleton and the 21 Area (Del Mar). The new reservoir would be constructed adjacent to the other existing Wire Mountain reservoirs. A new, up to 12-inch gravity flow water line would extend from the 4-million-gallon reservoir and run south and west and would be installed completely within Wire Mountain Road through the existing housing areas. This line would connect to the new Naval Hospital Camp Pendleton and would also continue past Vandegrift Boulevard and cross beneath I-5 via TLS to serve the 21 Area (Del Mar) (Figure 2.3.1-4). A TLS bore pit would be located on the east and west sides of I-5, avoiding any interference to I-5 or



Source: MCBCP 2009

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 miles

Figure 2.3.1-4
P-1045 Alternative 1

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_2\P-1045_ALT1.mxd, 7/3/2012, johnsonaa

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the adjacent railroad operations. A third or intermediate bore pit may be required in the previously disturbed ruderal vegetation between the railroad tracks and I-5. Should this bore pit be needed, additional surveys would be required.

TLS construction would be conducted to avoid impacts to the Santa Margarita River at two locations (or one location if the pipeline is attached to the Stuart Mesa Bridge), San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, and I-5 and the railroad. TLS boreholes would be sized to accommodate two pipes for future expansion. The proposed water line would be installed in boreholes drilled beneath the four creeks, the Santa Margarita River, I-5, and the railroad. The crossing of the Santa Margarita River would also serve to bypass significant cultural resources and numerous utilities in the Vandegrift Boulevard/Basilone Road area. TLS construction would be conducted from the west side of the Santa Margarita River at Basilone Road diagonally east to Haybarn Canyon. At the southern crossing, TLS construction would be conducted from along Stuart Mesa Road on the west side of the Santa Margarita River, beneath river, to a site near Vandegrift Boulevard (assuming attachment to the Stuart Mesa Bridge is not used).

TLS drilling would require the construction of a 20-foot by 40-foot boring pit on both sides of the creeks, river, and freeway/railroad in a construction area of approximately 0.25 acre. However, due to the proximity of Aliso Canyon drainage and French Creek to each other where the water line is proposed to cross, three bore sites would be used to cross both creeks. As discussed in P-1044, TLS boring pits would be excavated to an appropriate depth above the water table and then the borehole would be drilled beneath the creeks and river. The borehole would be deep enough to protect the pipeline from scour. The depth would also be selected to bore through sediments that would minimize the potential for “frac-outs” during construction. The project would incorporate measures designed to avoid potential impacts, such as unintentional release of drilling fluids, from drilling beneath the creeks and river. These measures are discussed in Section 2.5.

Air Vacuum Release (AVR) valves would be located every 0.3 mile on the alignment. The AVR valves would be approximately 2 feet square and 3 feet in height with a yellow bollard protecting each. The AVR valves would be installed within the roadway shoulder and would require a 25-foot by 25-foot temporary construction area to accommodate the excavation needed. Chlorine sampling stations would also be included approximately every mile along the pipeline to monitor the levels of chlorine in the water. These small stations (fire-hydrant size) would be located within the roadway shoulder or in developed areas.

The project would also include the construction and operation of three pump stations along the alignment. One pump station would be within the project limits of the Northern AWT and a second pump station would be within a developed parking lot at the future AWT South. As stated earlier, the future AWT South is not part of this proposed action. A third pump station would be in a disturbed parking area on the southwest side of the intersection of El Camino Real and Las Pulgas Road. Each pump station would include a chlorine sampling station within the pump station footprint and included within the footprint of the third pump station would be a chlorine storage and feed system. This system would provide accurate chemical dosing and would include chemical metering pumps, a water softening module, two chlorine residual analyzers, and chemical storage tanks. All chemical storage systems would be compatible with chemical use, equipped with secondary containment and leak detection, and equipped with appropriate safeguards and signage to meet all federal, state, and local regulations.

An appropriately sized emergency generator would be located at each pump station. Each pump station site would consist of an at-grade pump station facility in an area about 20 feet by 20 feet, shielded by a 6-foot-high block wall with a 20-foot buffer area surrounded by cyclone fencing. The total area involved would be about 60 feet by 60 feet.

Construction Activities

All construction and demolition activity would be within the project limits, and the majority of the work would be contained within existing roadways and shoulders. Geotechnical borings and other investigation activities for utilities within the project limits would need to be done before and during design, and before initiation of construction activities, to provide key information for the design. Supporting activities would include asphalt patching of existing roads.

Construction activities for the installation of the proposed pipelines within all areas except for a nearly 2-mile segment of Stuart Mesa Road in the 41 Area (Las Flores) and the segment in the Wire Mountain housing area could involve temporary impacts within a 125-foot-wide corridor approximately 63 feet on either side of the pipeline centerline. This is similar to the approach used for P-1044. Trenching for an up to 36-inch water main would be approximately 4 to 6 feet wide and as deep as 8 to 10 feet.

The two exception areas, a segment of Stuart Mesa Road in the 41 Area (Las Flores) and the segment in the Wire Mountain housing area, have substantial protected resources (i.e., vernal pools and fairy shrimp) adjacent to the roadways. The proposed pipeline segment along Stuart Mesa Road in the 41 Area (Las Flores) (Figure 2.3.1-4) extends nearly 2 miles through some of the Base's most dense and highest quality vernal pool habitat, and therefore special design detail would be required. Wire Mountain Road within the Wire Mountain housing area extends through another area rich in similar protected resources. MCBCP will work closely with USFWS in these areas during the project design to minimize resource impacts.

The construction contractor would focus on installing the pipeline within the Stuart Mesa Road roadway to the greatest extent practicable but unforeseen construction situations (i.e., unknown existing utilities or geologic issues) often arise that result in construction activities occurring outside the roadway. A special design refinement for this nearly 2-mile segment would be to limit potential impacts to 10 percent instead of the anticipated 48 percent impacts used in the analyses of all other pipeline segments in this EIS. The 10 percent factor, a best engineering estimate and a margin for error, is based on extensive Basewide utility installation experience.

Along the Wire Mountain Road segment from the proposed 4-million-gallon reservoir to Vandegrift Boulevard within the Wire Mountain Housing Area, a similar design refinement would require that all pipeline construction be confined to the roadway.

Maintenance and access would be provided within the project limits or from adjacent roadways, parking lots, or existing developed areas. Maintenance access corridors would also be included along key segments of the P-1045 corridor. Similar to P-1044, the maintenance corridors would actually be constructed on only one side of the road (the side with the pipeline), but are analyzed in this EIS on both sides of the road to provide a more conservative impact analysis until the design is complete (Figure 2.3.1-3). The exception to this approach would be a nearly 2-mile segment along Stuart Mesa Road in the 41 Area (Las Flores) (Figure 2.3.1-4). Maintenance access corridors would not be included in this segment along Stuart Mesa Road.

These road segments are critical to the operation of the Base, are narrow two-lane roads, and have blind horizontal and vertical curves. Maintenance vehicles parked in the traffic lanes could cause road closures and could create a danger to motorists and work crews if parked or moving slowly in the traffic lanes. The maintenance corridor would serve a secondary recreational function. The paved maintenance access corridors would extend 8 feet from the outside travel lane striping in two segments. One segment, approximately 5.5 miles long, would extend along Stuart Mesa Road from the housing area in the south to Las Pulgas Road and the other segment, approximately 4 miles long, would extend from the Las Pulgas Road/Stuart Mesa Road intersection to the 43 Area (Las Pulgas).

The maintenance corridors would not be needed for every segment of the pipelines. El Camino Real is not a public access road. It is a concrete road on a long straightaway and is used for military training and base maintenance personnel access. Vandegrift Boulevard is a four-lane road in which through traffic could still pass with the outside lane of traffic closed, so additional paved width at the shoulder would not be needed.

The project limits would consist of the permanent and temporary impact areas of the proposed action. The permanent facility sites would include pump stations, the 4-million-gallon reservoir, minor appurtenances, and maintenance access corridors, and the temporary facility sites would include conveyance lines and TLS construction sites (Figure 2.3.1-4). This project would be funded in FY 2012 at approximately $125 million. Construction would begin in 2013 and last approximately 12 to 24 months.

2.3.1.3 Location of Combined Alternative 1 Components

Figure 2.3.1-5 shows the combined location of the components of Alternative 1.

2.3.2 <u>Alternative 2</u>

2.3.2.1 Northern AWT and Associated Facilities (P-1044 Alternative 2: Site 6 with Non-Basilone Road Conveyance Lines)

P-1044 Alternative 2 would be similar to P-1044 Alternative 1, as described in Section 2.3.1.1, with the exception of the routing of the conveyance lines, as shown in Figure 2.3.2-1.

Raw water, treated water, and brine would be conveyed via new pipelines in three proposed linear corridors, with individual corridor segments varying in the combination of types of lines they would contain. The descriptions below are the overall corridor routes; the types of conveyances along any particular segment are shown in Figures 2.3.2-1 and 2.3.1-2. Figure 2.3.2-1 provides a detailed view of the primary components of Alternative 2 and Figure 2.3.1-2 provides a view of the remainder of the project. The project alignments and components shown in Figure 2.3.1-2 are the same for all four development alternatives for P-1044.

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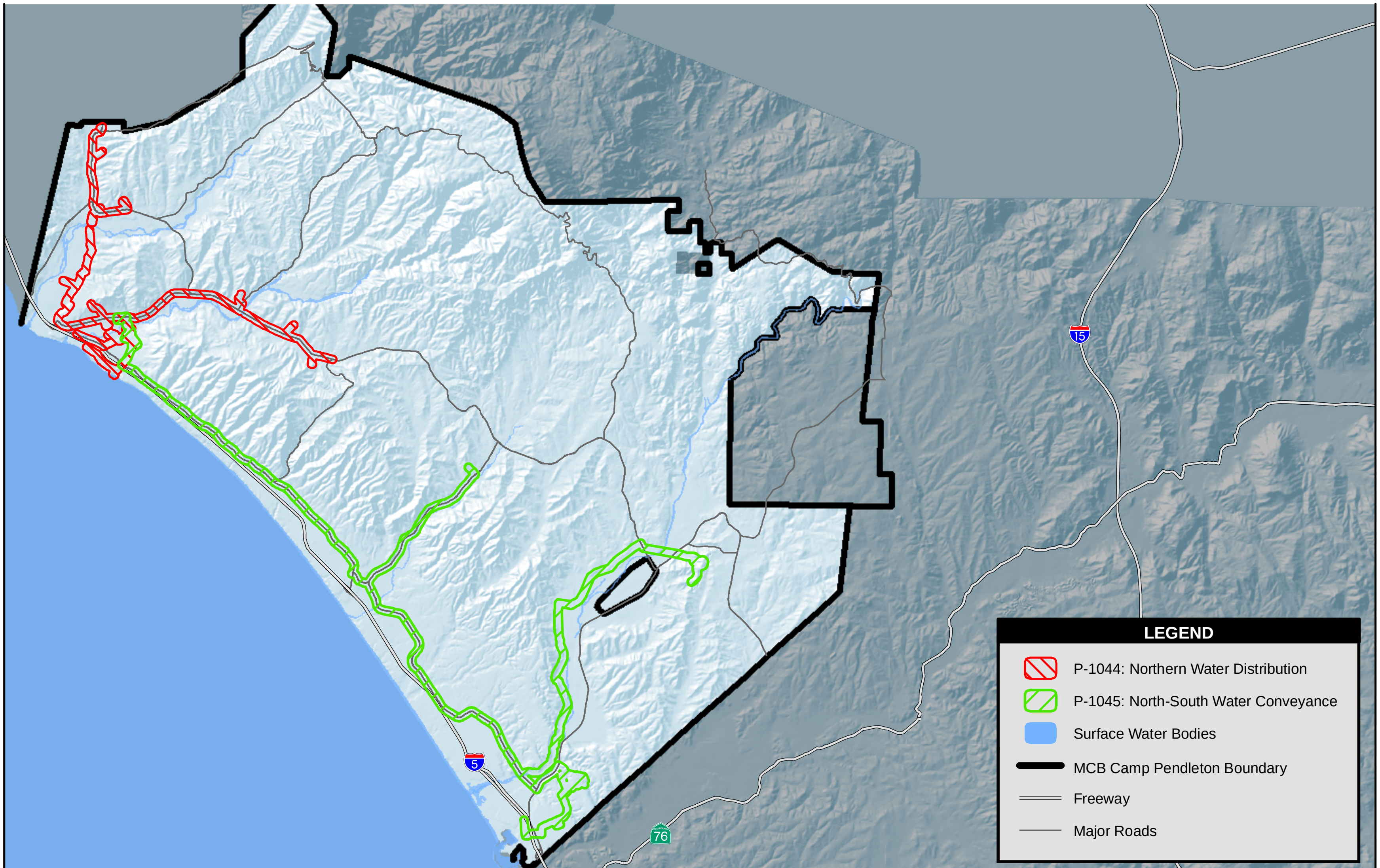

Source: MCBCP, AECOM, SANDAG

3.5 0 3.5 Miles

Scale: 1 = 221,760; 1 inch = 3.5 miles

Figure 2.3.1-5
BWI Overview
Alternative 1

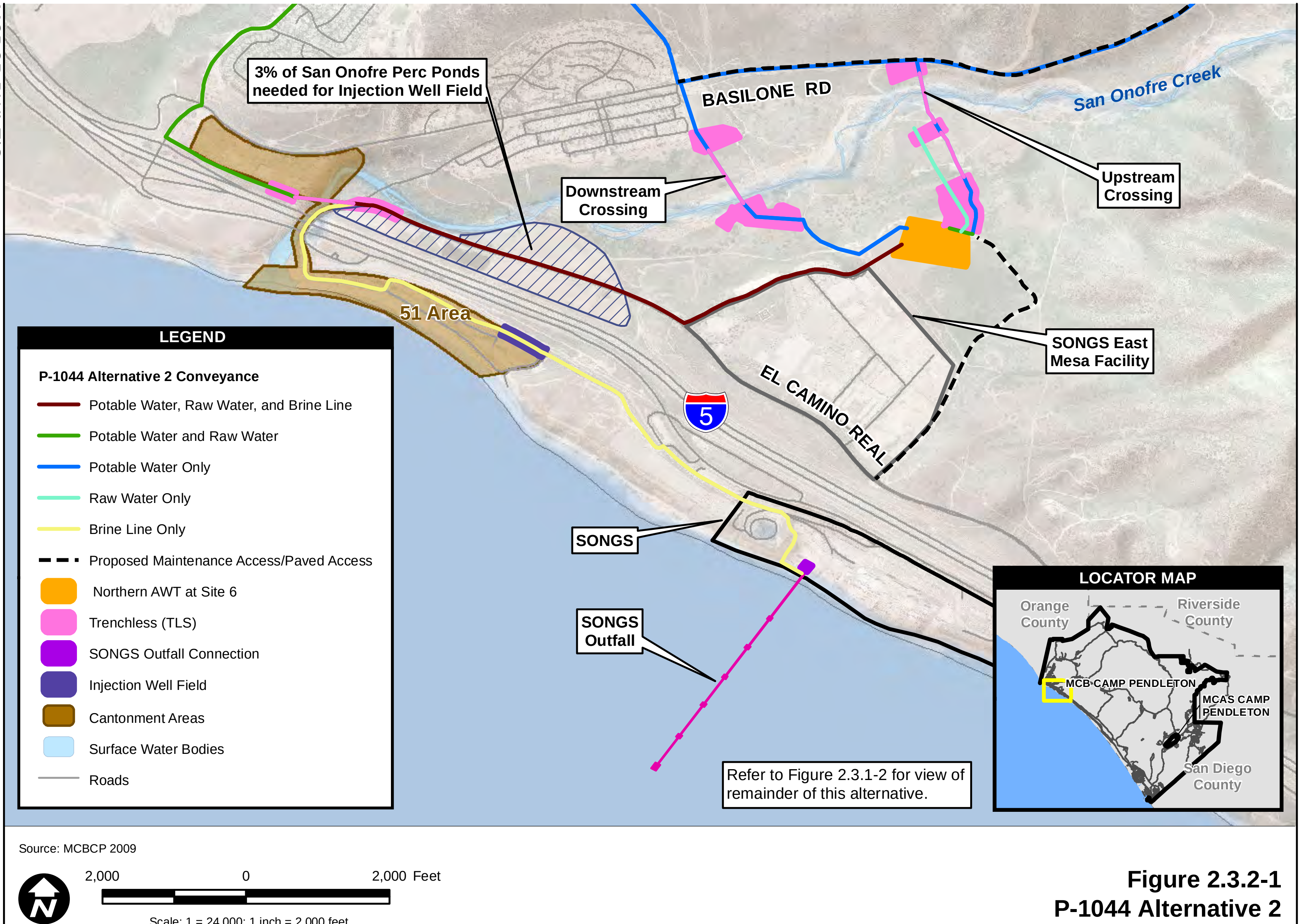

Figure 2.3.2-1
P-1044 Alternative 2

- One corridor would extend approximately 46,000 LF from the Northern AWT to the west, passing north of the SONGS East Mesa facility and then running northwest along El Camino Real to the 51 Area (San Onofre), before turning north along several different roadway segments to the San Onofre 1 Housing Area, 62 Area (San Mateo), 63 Area (Cristianitos), and 64 Area (Talega). This corridor would include raw and potable water lines.
    - This corridor would include lines to connect to reservoirs in or near the 62 Area (San Mateo) (Reservoirs 62310 and 62518), and the 63 Area (Cristianitos) (Reservoir 63210). It would also connect to the existing well field in the Sierra 1 Training Area.

      The lines in this corridor would extend beneath San Onofre Creek in the vicinity of the 51 Area (San Onofre) just east of I-5 and beneath San Mateo Creek just south of the 62 Area (San Mateo) using TLS construction. Both the upstream and downstream alignments would be used for the San Onofre Creek undercrossing, as shown in Figure 2.3.1-3. This pipeline would also be connected to the existing wellheads south of San Onofre Creek.
    - The pump station requirements within this corridor would be the same as what would be required for the analogous corridor under P-1044 Alternative 1 (Section 2.3.1.1).
- The second corridor would extend approximately 45,600 LF from the Northern AWT to Basilone Road and then branch. One branch would run west along Basilone Road to the San Onofre 2 Housing Area and the San Onofre 3 Housing Area, while the second branch would run east along Basilone Road to serve the 52 Area (School of Infantry) and 53 Area (Horno). These lines would be potable water lines.
    - This corridor would include lines to connect to reservoirs in or near the San Onofre housing areas (Reservoirs 51770, 51771, and 51772), the 52 Area (School of Infantry) (Reservoir 52698), and the 53 Area (Horno) (Reservoirs 53116 and 53310).
    - Lines in this corridor would extend beneath San Onofre Creek just south of Basilone Road via TLS construction, extend to the Northern AWT, and connect to wellheads south of San Onofre Creek.
    - No pump stations would be required in this corridor.

- The third corridor would extend from the Northern AWT to the west, passing north of the SONGS East Mesa facility and then run northwest along El Camino Real to the proposed injection wells east of I-5. The corridor would continue along El Camino Real, before turning southwest to cross I-5 via a two-lane road within an existing underpass and eventually running southeast along existing roadways to the proposed MCBCP San Onofre Beach recreation area injection well field and on to the SONGS outfall conduit. Both of these corridor segments would include brine conveyed from the RO plant for outfall conduit (The outfall conduit is included only at a programmatic NEPA level of analysis and is not part of the proposed action at this time.) and injection well disposal in two different well fields. This corridor would extend approximately 9,300 LF.
    - No TLS stream crossings would be required in this corridor.
    - No pump stations would be required in this corridor.

Construction Activities

Similar to P-1044 Alternative 1, this alternative would include the maintenance access corridors along San Mateo, Basilone, and Cristianitos roads; however, the length would be approximately 1 mile shorter than Alternative 1. This alternative would also include paving the existing dirt road from El Camino Real to the Northern AWT entrance. This alternative would be funded in FY 2012 at approximately $101 million and construction would begin in 2013 and last up to 24 months.

2.3.2.2 Connection of Northern and Southern Water Systems (P-1045 Alternative 2 Route)

P-1045 Alternative 2 would be similar to P-1045 Alternative 1, as described in Section 2.3.1.2, but would differ in the routing between a northern connection (to existing water pipelines in Basilone Road or one of the proposed Northern AWT sites as described in P-1045 Alternative 1) and the reservoirs on the ridge above Haybarn Canyon. As shown in Figure 2.3.2-2, the alignment of P-1045 Alternative 2 would start at an existing water line in Basilone Road or the new Northern AWT (P-1044) and extend south in El Camino Real to Las Pulgas Road and run north in Las Pulgas Road to Basilone Road. The water line would then extend along Basilone Road to Vandegrift Boulevard and run east past the future AWT South at Haybarn Canyon and connect to several reservoirs along a ridge (Reservoirs 13151, 13154, 24140, and 24174).

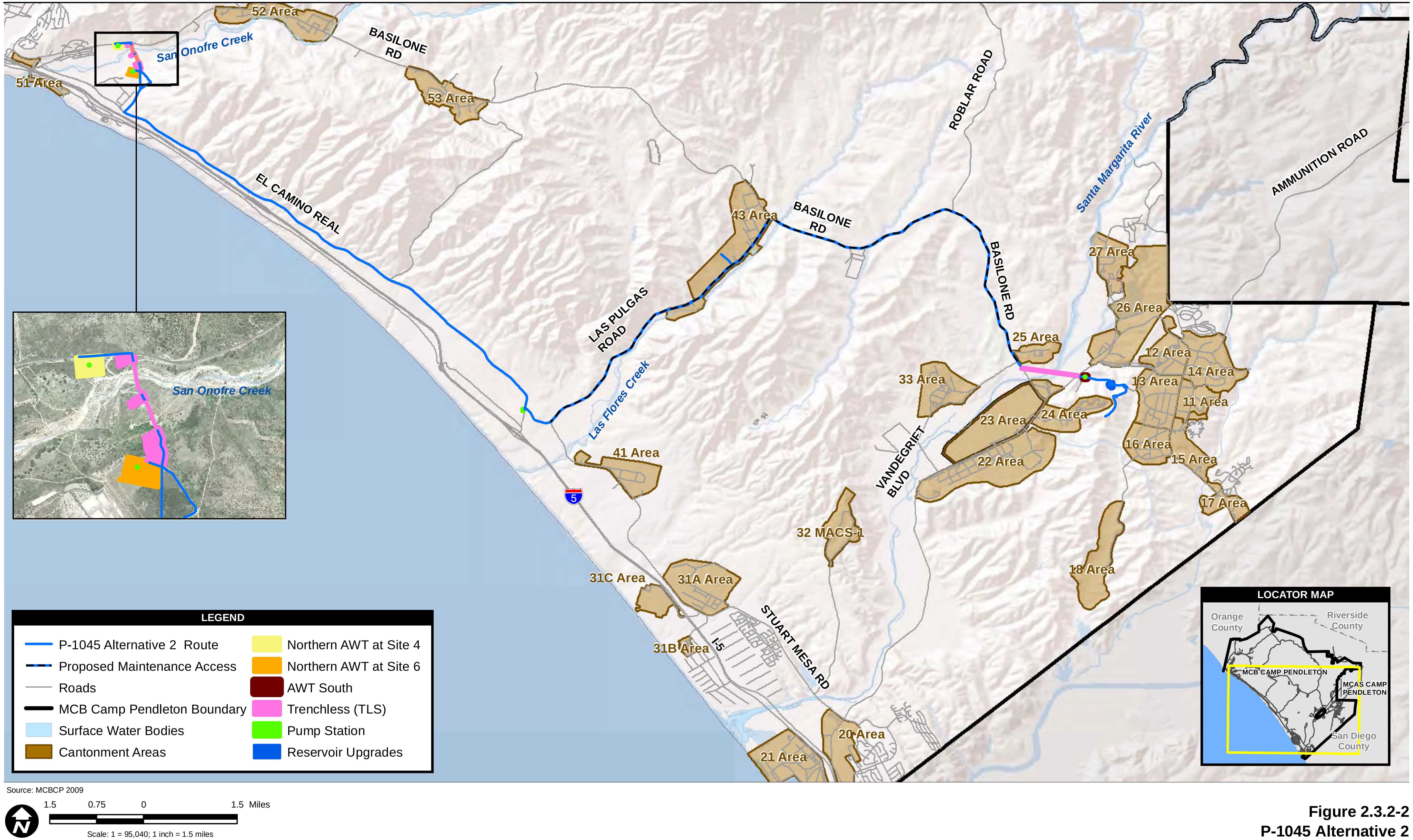

Figure 2.3.2-2
P-1045 Alternative 2

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TLS construction would be conducted to avoid impacts to San Onofre Creek and the Santa Margarita River. Similar to Alternative 1, the TLS boreholes would be sized to accommodate two pipes for future expansion. The proposed water line would be installed in boreholes drilled beneath San Onofre Creek and the Santa Margarita River. The crossing of the Santa Margarita River would also serve to bypass significant cultural resources and numerous utilities in the Vandegrift Boulevard/Basilone Road area. TLS crossing would be conducted from the west side of the Santa Margarita River at Basilone Road diagonally east to Haybarn Canyon.

The TLS operations would be similar in nature to the operations discussed for P-1045 Alternative 1 and require like-sized drilling pits. The project would incorporate measures designed to avoid potential impacts from drilling beneath creeks or rivers as discussed in Section 2.5. Also, P-1045 Alternative 2 would require AVR valves of the type, size, and placement intervals as described under P-1045 Alternative 1.

P-1045 Alternative 2 would also include the construction and operation of three pump stations along the alignment. One pump station each would be within the construction limits of the Northern AWT and the future AWT South. A third pump station would be in a disturbed area on the southwest side of the intersection of El Camino Real and Las Pulgas Road. Each pump station would have an emergency generator and would be sized and configured consistent with those described under P-1045 Alternative 1. None of the improvements within the Wire Mountain area would be included under this alternative.

Construction Activities

The sizing of the proposed line and all other associated support facilities (pump stations) would be similar to P-1045 Alternative 1 as discussed in Section 2.3.1.2. Demolition, construction, and maintenance activities for this alternative would also be similar to those described for P-1045 Alternative 1. The paved maintenance access corridors would extend 8 feet from the outside travel lane striping in two segments. One segment, approximately 6 miles long, would extend along Basilone Road from the 25 Area (Vado Del Rio) to the 43 Area (Las Pulgas) and the other segment, approximately 4 miles long, would extend from the Las Pulgas Road/Stuart Mesa Road intersection to the 43 Area (Las Pulgas).

This project would be funded in FY 2012 at approximately $112 million. Construction would begin in 2013 and last approximately 12 to 24 months.

2.3.2.3 Location of Combined Alternative 2 Components

Figure 2.3.2-3 shows the combined location of the components of Alternative 2.

2.3.3 <u>Alternative 3</u>

2.3.3.1 Northern AWT and Associated Facilities (P-1044 Alternative 3: Site 4 with Basilone Road Conveyance Lines)

P-1044 Alternative 3 would be similar to P-1044 Alternative 1, as described in Section 2.3.1.1, with the exception of the siting of the Northern AWT. Under Alternative 3, the proposed Northern AWT would be adjacent to and south of Basilone Road, roughly 2,000 feet east of the San Onofre 3 Housing Area, and 2,500 feet north of the SONGS East Mesa facility (Figure 2.3.3-1), a location known as “Site 4” from an earlier siting study (Brown and Caldwell 2010). Both the upstream and downstream alignments would be used for the San Onofre Creek undercrossing, as shown in Figure 2.3.3-1. Figure 2.3.3-1 provides a detailed view of the primary components of Alternative 3 and Figure 2.3.1-2 provides a view of the remainder of the project. The project alignments and components shown in Figure 2.3.1-2 are the same for all four development alternatives for P-1044. This alternative would not require the paving of the access road from El Camino Real, since access would be provide via Basilone Road. Maintenance access corridors would be included in the same locations as Alternative 1. This alternative would be funded in FY 2012 at approximately $100 million and construction would begin in 2013 and last up to 24 months.

2.3.3.2 Connection of Northern and Southern Water Systems (P-1045 Alternative 3 Route – Preferred Alternative)

This is the preferred alternative for P-1045. P-1045 Alternative 3 would be similar to P-1045 Alternative 1, as described in Section 2.3.1.2 but would differ in routing between a northern connection (to existing water pipelines in Basilone Road or one of the proposed Northern AWT sites as described in P-1045 Alternative 1) and the southern water system. While P-1045 Alternative 3 would connect the northern and southern systems, unlike P-1045 Alternative 1 (or P-1045 Alternative 2 or P-1045 Alternative 4) it would not directly connect to the reservoirs on a ridge above Haybarn Canyon. As shown in Figure 2.3.3-2, the P-1045 Alternative 3 water line would start at an existing water line in Basilone Road or the new Northern AWT facility (P-1044) and extend south in El Camino Real to Stuart Mesa Road. At the junction of Stuart Mesa Road and Las

MCBCP BWI EIS

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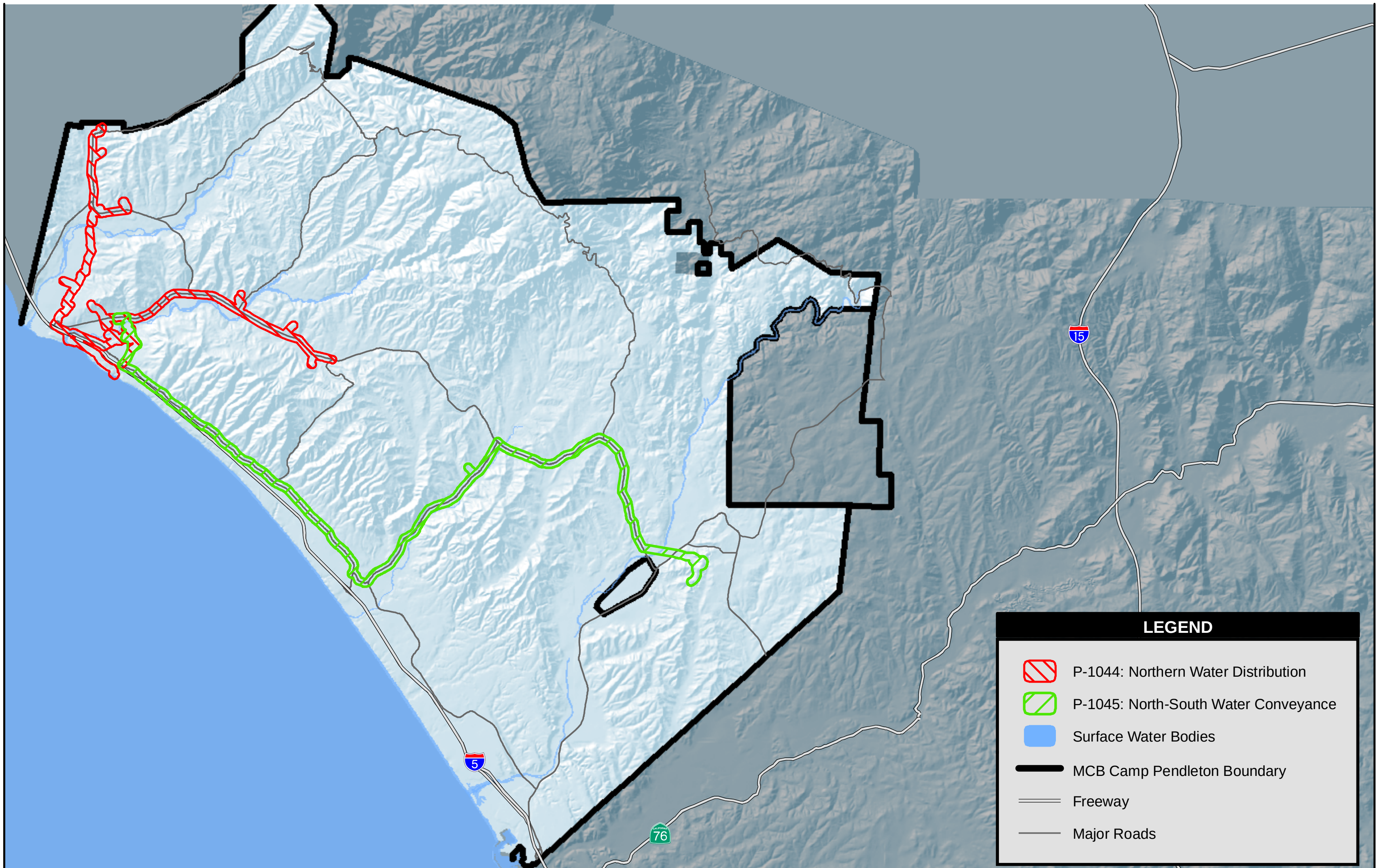

Source: MCBCP, AECOM, SANDAG

3.5 0 3.5 Miles

Scale: 1 = 221,760; 1 inch = 3.5 mile(s)

Figure 2.3.2-3
BWI Overview
Alternative 2

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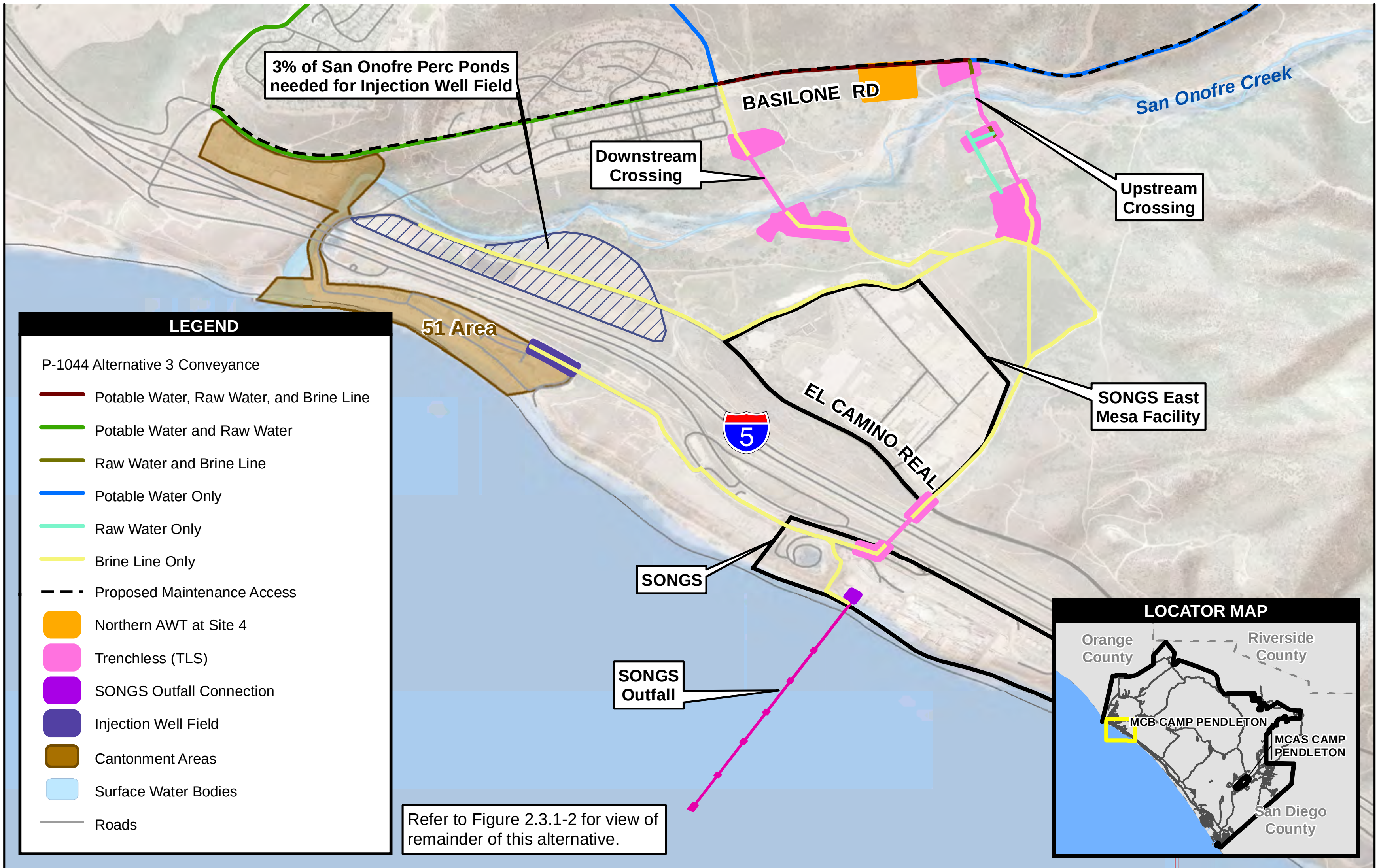
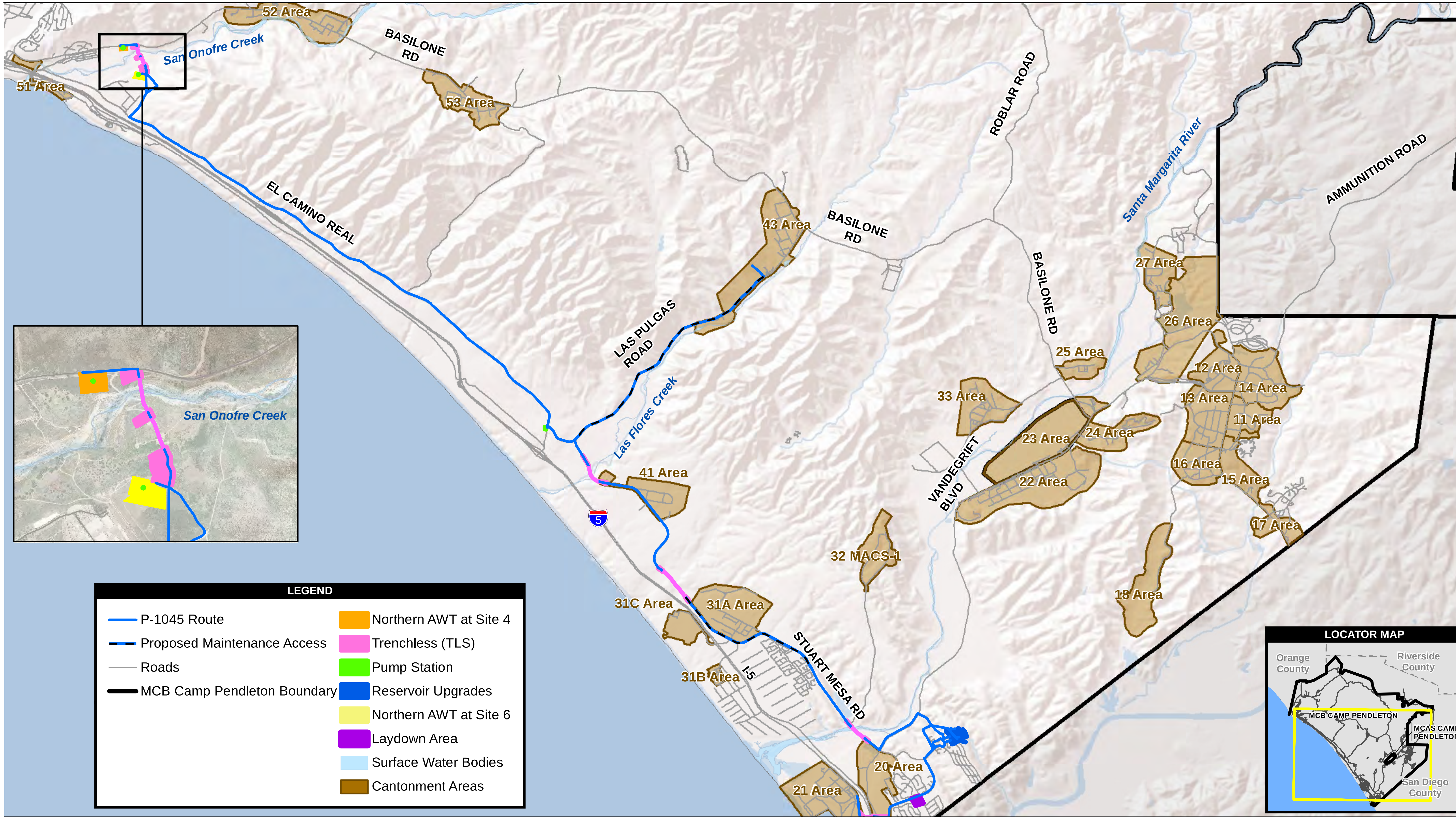


Source: MCBCP 2009

2,000 0 2,000 Feet

Scale: 1 = 24,000; 1 inch = 2,000 feet

Figure 2.3.3-1
P-1044 Alternative 3



Source: MCBCP 2009

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 miles

Figure 2.3.3-2
P-1045 Alternative 3 - Preferred Alternative

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Pulgas Canyon Road, a lateral pipeline would run north approximately 4.7 miles, terminating at existing Reservoir 43210. This lateral would be the same as the Las Pulgas lateral described under P-1045 Alternative 1. The main pipeline would continue south along Stuart Mesa Road, passing under the Santa Margarita River via TLS construction at the Stuart Mesa Bridge, or over the Santa Margarita River attached to the Stuart Mesa Bridge, to Vandegrift Boulevard before turning north on Vandegrift Boulevard. The line would continue northeast on Vandegrift Boulevard approximately 1 mile to the existing pump stations at Magazine Road and would terminate at several existing reservoirs (Reservoirs 20813, 20814, 20815, 200814, and 200815) in the Wire Mountain area.[7] Similar to P-1045 Alternative 1, this alternative would include the construction and operation of a new 4-million-gallon water reservoir in the Wire Mountain area and associated water line connections to serve the new Naval Hospital Camp Pendleton and the 21 Area (Del Mar). A new up to 12-inch gravity flow water line would serve the new Naval Hospital Camp Pendleton, and the 21 Area (Del Mar) would be installed completely within Wire Mountain Road through the existing housing areas. This line would cross beneath I-5 via TLS to serve the 21 Area (Del Mar). As discussed for Alternative 1, a third or intermediate bore pit may be required in the previously disturbed ruderal vegetation between the railroad tracks and I-5. Should this bore pit be needed, additional surveys would be required.

TLS crossings would be implemented to avoid impacts at San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, the Santa Margarita River (assuming attachment to the Stuart Mesa Bridge is not used), I-5, and the railroad. The boreholes would be sized to accommodate two pipes for future expansion. The proposed water line would be installed in boreholes drilled beneath the four creeks and the Santa Margarita River.

The TLS operations would be similar to the operations discussed for P-1045 Alternative 1 and require like-sized drilling pits. The project would incorporate measures designed to avoid potential impacts from drilling beneath creeks or rivers, as discussed in Section 2.5. Also, P-1045 Alternative 3 would require AVR valves of the type, size, and placement intervals as described under P-1045 Alternative 1.

[7] The P-1045 Alternative 3 route mirrors the P-1045 Alternative 1 route, except that the P-1045 Alternative 1 route includes a segment that runs from Stuart Mesa Road near the west bank of the Santa Margarita River to reservoirs near the future AWT South, which is not included in the P-1045 Alternative 3 route. Also, Alternative 1 does not include the Alternative 3 segment from Stuart Mesa Road up the west side of the Santa Margarita River valley to Reservoir 32939 and across the Santa Margarita River to the IM WTP.

The project would also include the construction and operation of two pump stations along the alignment. One pump station would be located within the project limits of the Northern AWT and a second pump station would be located in a disturbed area on the southwest side of the intersection of El Camino Real and Las Pulgas Road. Each pump station would have an emergency generator and would be sized and configured consistent with those described under P-1045 Alternative 1.

Construction Activities

The sizing of the proposed line and all other associated support facilities (pump stations) would be similar to P-1045 Alternative 1 as discussed in Section 2.3.1.1.

Demolition, construction, and maintenance activities for this alternative would also be similar to those described for P-1045 Alternative 1. Maintenance access corridors would be included in the same locations as Alternative 1. This project would be funded in FY 2012 at approximately $105 million. Construction would begin in 2013 and last approximately 12 to 24 months.

2.3.3.3 Location of Combined Alternative 3 Components

Figure 2.3.3-3 shows the combined location of the components of Alternative 3.

2.3.4 <u>Alternative 4</u>

2.3.4.1 Northern AWT and Associated Facilities (P-1044 Alternative 4: Site 4 with Non-Basilone Road Conveyance Lines)

P-1044 Alternative 4 would be similar to P-1044 Alternative 3, as described in Section 2.3.3.1, with the exception of the siting of the conveyance lines, as shown in Figure 2.3.4-1. These conveyance lines would be in the same location as the conveyance lines described for P-1044 Alternative 2 in Section 2.3.2.1; in other words, P-1044 Alternative 4 would be similar to P-1044 Alternative 2, with the exception of the location of the Northern AWT. Both an upstream and a downstream alternative would be used for the San Onofre Creek undercrossing, as shown in Figure 2.3.4-1. Figure 2.3.4-1 provides a detailed view of the primary components of Alternative 4 and Figure 2.3.1-2 provides a view of the remainder of the project. The project alignments and components shown in Figure 2.3.1-2 are the same for all four development alternatives for P-1044. This alternative would not require paving the access road from El Camino Real, since access

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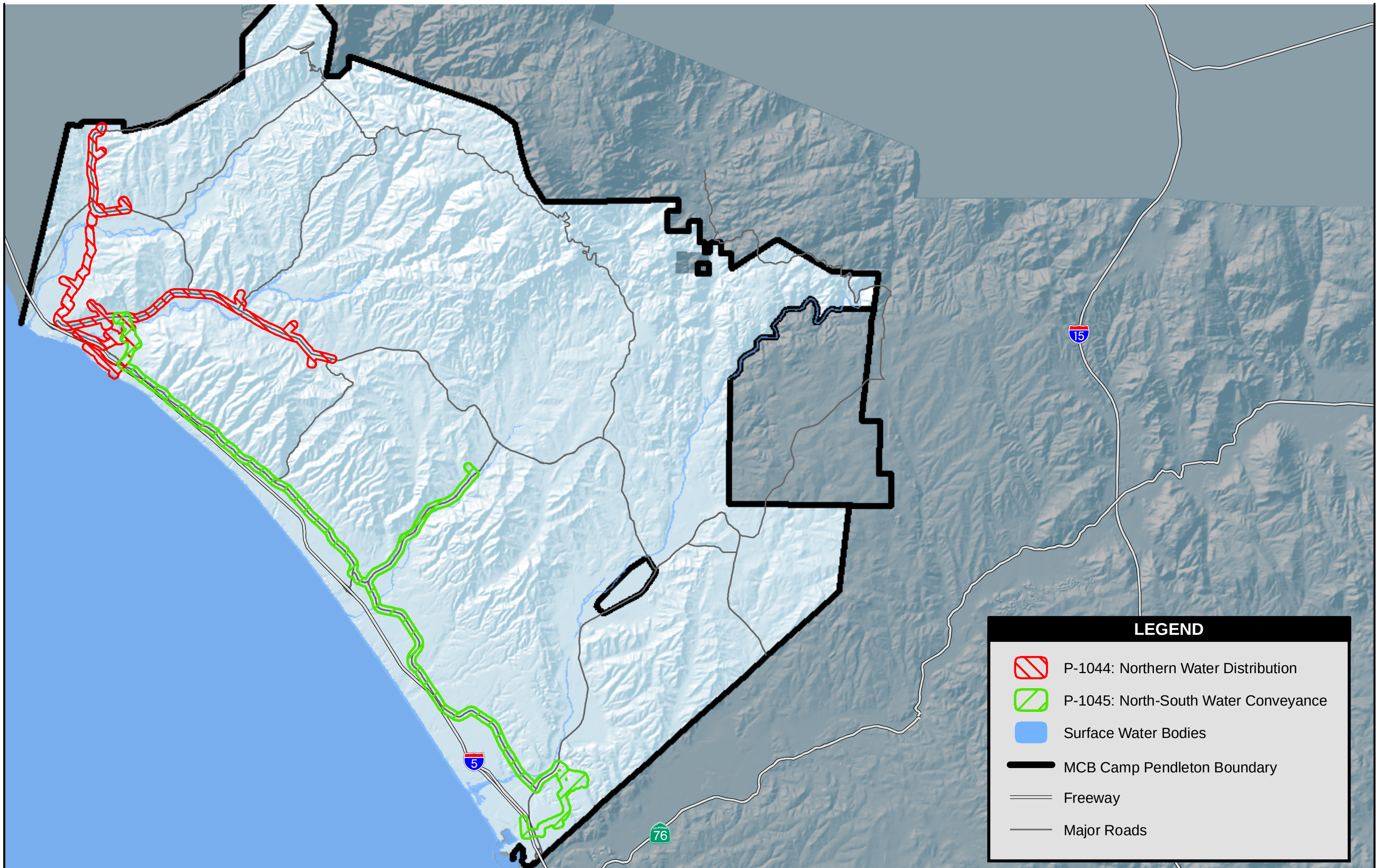

Source: MCBCP, AECOM, SANDAG

3.5 0 3.5 Miles

Scale: 1 = 221,760; 1 inch = 3.5 mile(s)

Figure 2.3.3-3
BWI Overview
Alternative 3

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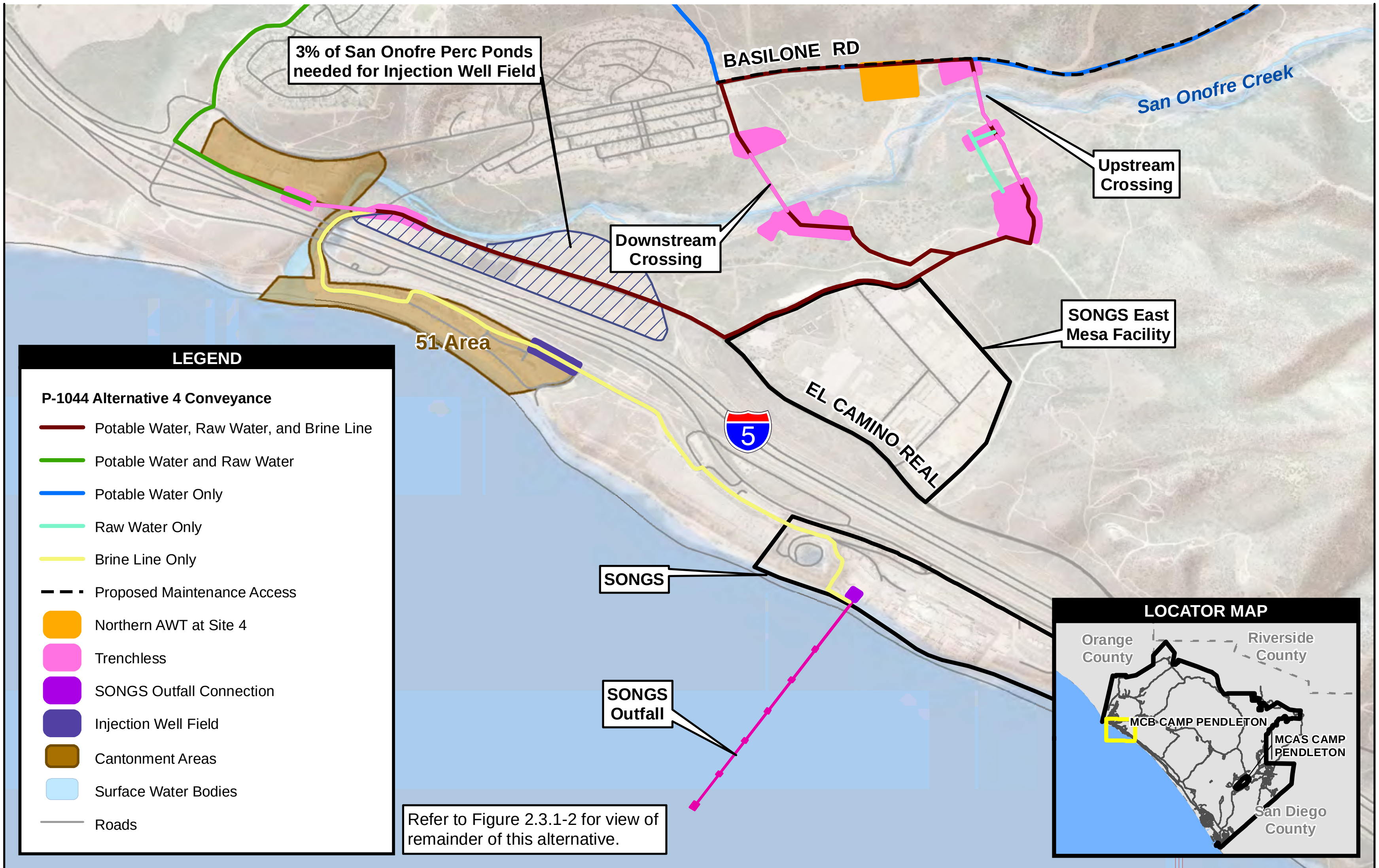

Source: MCBCP 2009

2,000 0 2,000 Feet

Scale: 1 = 24,000; 1 inch = 2,000 feet

Figure 2.3.4-1
P-1044 Alternative 4

would be provided via Basilone Road. This alternative would be funded in FY 2012 at approximately $106 million and construction would begin in 2013 and last up to 24 months.

2.3.4.2 Connection of Northern and Southern Water Systems (P-1045 Alternative 4 Route)

P-1045 Alternative 4 would be similar in nature to P-1045 Alternative 1, as described in Section 2.3.1.2, with the exception of the routing between a northern connection (to existing water pipelines in Basilone Road or one of the proposed Northern AWT sites as described in P-1045 Alternative 1) and the reservoirs on a ridge above Haybarn Canyon.

As shown in Figure 2.3.4-2, the P-1045 Alternative 4 route would incorporate much of the P-1045 Alternative 3 route, from its northern terminus at an existing water line in Basilone Road or the proposed Northern AWT to its southern terminus at the existing reservoirs and the proposed 4-million-gallon reservoir near the Vandegrift Boulevard/Magazine Road pump station. The Las Pulgas lateral line would branch off between the two termini. The P-1045 Alternative 4 route would add a segment from the reservoirs near the Vandegrift Boulevard/Magazine Road pump station that would run east of the 22 Area (Chappo) before connecting to several reservoirs along a ridge above Haybarn Canyon (Reservoirs 13151, 13154, 24140, and 24174).[8]

TLS construction would be implemented to avoid impacts to San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, the Santa Margarita River (assuming attachment to the Stuart Mesa Bridge is not used), I-5, and the railroad. The TLS boreholes would be sized to accommodate two pipes for future expansion. The proposed water line would be installed in boreholes that would be drilled beneath the four creeks, Santa Margarita River, freeway, and railroad.

TLS operations would be similar to the operations discussed for P-1045 Alternative 1 and require like-sized drilling pits. The project would incorporate measures designed to

[8] Much of the P-1045 Alternative 4 route mirrors the P-1045 Alternative 3 route, except that Alternative 3 does not include the segment from the Vandegrift Boulevard/Magazine Road pump station to the future AWT South and nearby reservoirs, which is included in the P-1045 Alternative 4 route but is not included in the P-1045 Alternative 3 route. Alternative 4 does not include the Alternative 3 segment from Stuart Mesa Road up the west side of the Santa Margarita River valley to Reservoir 32939 and across the Santa Margarita River to the IM WTP.

avoid potential impacts from drilling beneath creeks or rivers, as discussed in Section 2.5. Also, P-1045 Alternative 4 would require AVR valves of the type, size, and placement intervals as described under P-1045 Alternative 1.

The project would also include the construction and operation of three pump stations along the alignment. One pump station would be located within the project limits of the Northern AWT, the second would be in a disturbed area on the northwest side of the intersection of El Camino Real and Las Pulgas Road, and the third would be at the future AWT South. The future AWT South is not part of this proposed action and was addressed under previous NEPA documentation (U.S. Navy 2010e). Each pump station would have an emergency generator and would be sized and configured consistent with those described under P-1045 Alternative 1.

The sizing of the proposed line and all other associated support facilities (pump stations) would be similar to P-1045 Alternative 1 as discussed in Section 2.3.1.1. Demolition, construction, and maintenance activities for this alternative would also be similar to those described for P-1045 Alternative 1. This project would be funded in FY 2012 at approximately $125 million. Construction would begin in 2013 and last approximately 12 to 24 months.

2.3.4.3 Location of Combined Alternative 4 Components

Figure 2.3.4-3 shows the combined location of the components of Alternative 4.

2.3.5 Alternative 5 – Preferred Alternative (P-1044 Alternative 1 and P-1045 Alternative 3)

2.3.5.1 Preferred Alternative (Operational)

Alternative 5, the preferred alternative, would feature a combination of elements described under the previous alternatives. The project descriptions of the individual projects are identical to the descriptions already provided; only the combination of individual project alternatives is unique to Alternative 5. Alternative 5 would result in comparable environmental impacts while providing the most compatibility and least disruption to training and operations and the most operational efficiency, construction flexibility, and cost-effectiveness of the alternatives. P-1044 Alternative 1 would use Site 6 for the proposed AWT. Site 6 is the most optimal site from an operational standpoint due to its size, location adjacent to raw water wells, and proximity to the SONGS outfall

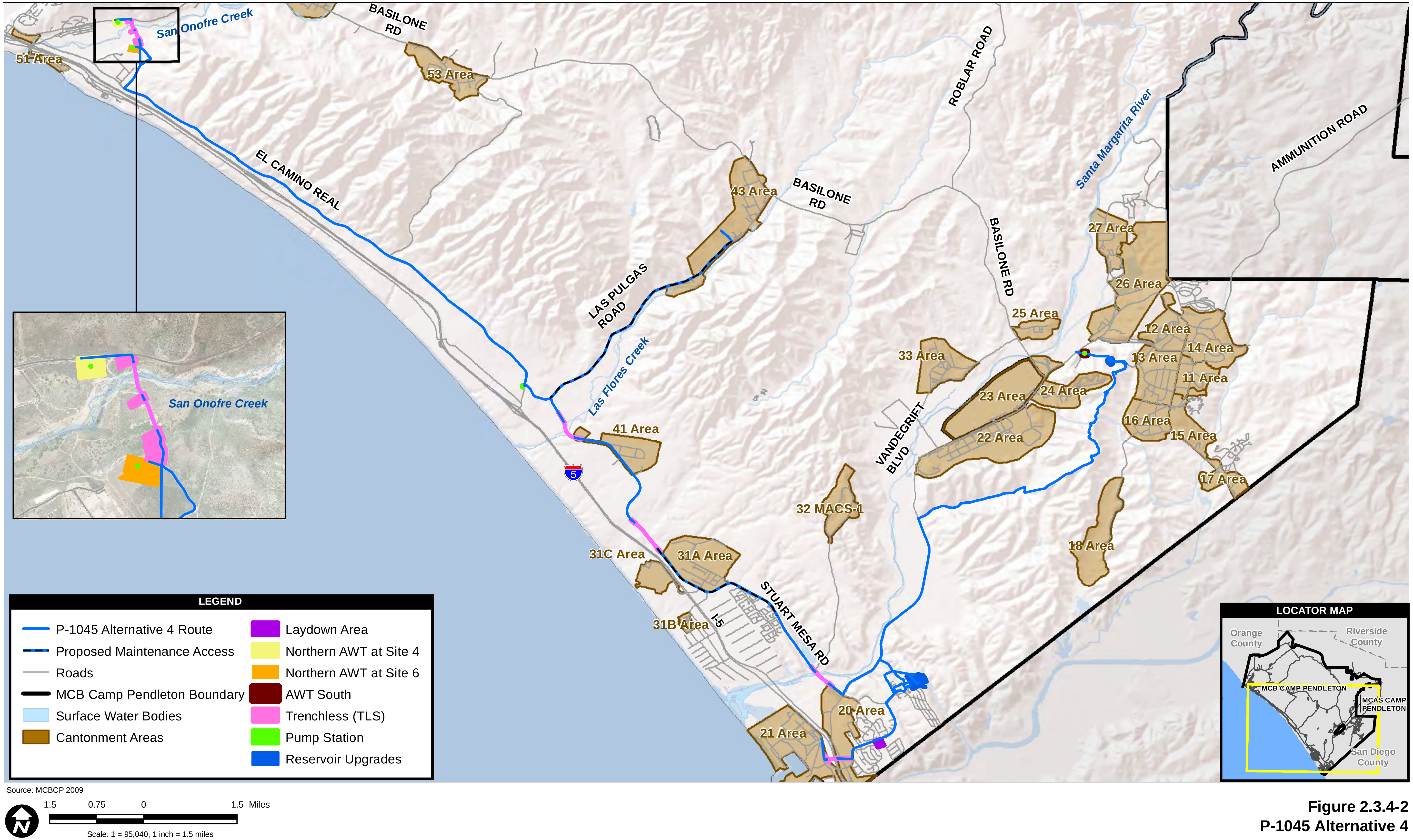

Figure 2.3.4-2
P-1045 Alternative 4

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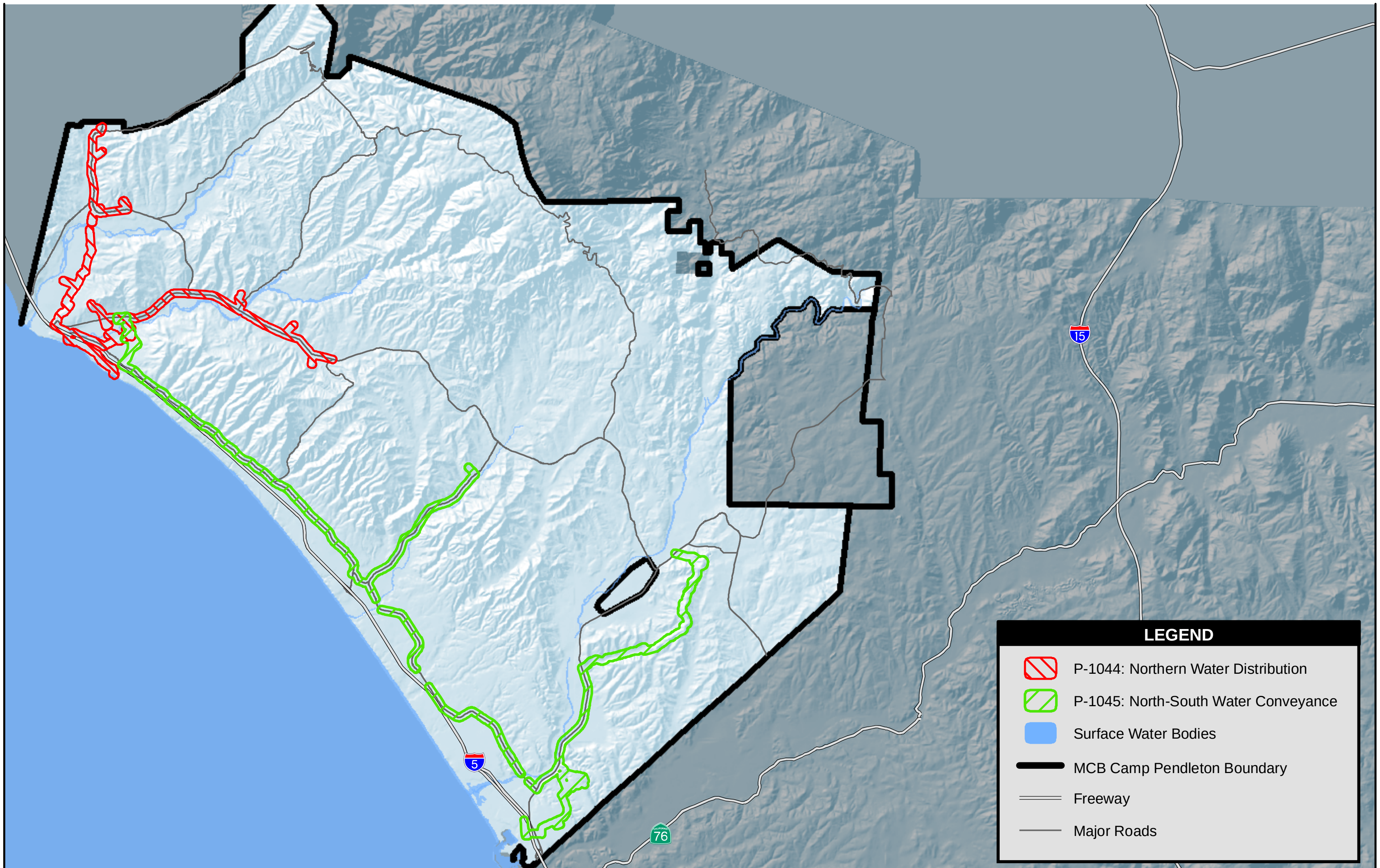

Source: MCBCP, AECOM, SANDAG

3.5 0 3.5 Miles

Scale: 1 = 221,760; 1 inch = 3.5 mile(s)

Figure 2.3.4-3
BWI Overview
Alternative 4

conduit (Brown and Caldwell 2010). In addition, P-1044 Alternative 1 can service more areas than P-1044 Alternative 2. Brine would be discharged through the deep injection well fields in P-1044 Alternative 1 and not through an ocean outfall at SONGS.

P-1045 Alternative 3 provides the key connections to the Naval Hospital Camp Pendleton and the 21 Area (Del Mar) that Alternative 2 does not provide. Of the two other alternatives (P-1045 Alternative 1 and Alternative 4) that also provide these connections, Alternative 3 is the least environmentally impacting and the most cost-effective because it would include 49,000 LF less conveyance lines than Alternative 1 and 43,000 LF less conveyance lines than Alternative 4.

2.3.5.2 Environmentally Preferred Alternative

The suite of projects in the environmentally preferred alternative for the proposed action would consist of Alternative 1 or 3 for P-1044 and Alternative 2 for P-1045. The four alternatives for P-1044 are very close in their impacts on natural and cultural resources. All four P-1044 alternatives would potentially impact five cultural resources eligible for the NRHP, but Alternatives 1 and 3 would each impact one less ineligible resource. For impacts on waters of the U.S. and federally listed species, P-1044 Alternatives 1 and 3 would have the same degree of impacts, which would be less than Alternatives 2 and 4. All four alternatives would have the same level of impacts to PPM.

For P-1045, Alternative 2 would potentially impact a total of 10 cultural resources (five eligible and five ineligible for the NRHP), whereas Alternative 1 would potentially impact a total of 29 resources (10 eligible and 19 ineligible), Alternative 3 would potentially impact a total of 15 sites (five eligible and 10 ineligible), and Alternative 4 would potentially impact a total of 23 resources (11 eligible and 12 ineligible). P-1045 Alternative 2 would impact the least total acreage of waters of the U.S. and total riparian acreage (permanent and temporary together) and not impact thread-leaved brodiaea, vernal pools, or listed vernal pool species (spreading navarretia, Riverside fairy shrimp, or San Diego fairy shrimp). The other three P-1045 alternatives would each impact thread-leaved brodiaea, more riparian habitat (permanent plus temporary), vernal pools, and populations of listed vernal pool species.

Overall, the environmentally preferred alternative differs from the alternative preferred for operational reasons (providing alternate water service to the new Naval Hospital and the 21 Area [Del Mar]) in favoring P-1045 Alternative 2 over P-1045 Alternative 3. For

P-1044, the operational preferred alternative is equivalent to the environmentally preferred alternative.

2.3.5.3 Northern AWT and Associated Facilities (P-1044 Alternative 1: Site 6 with Basilone Road Conveyance Lines)

Alternative 5 would include P-1044 Alternative 1 as described in Section 2.3.1.1 and shown in Figure 2.3.1-1.

2.3.5.4 Connection of Northern and Southern Water Systems (P-1045 Alternative 3 Route)

Alternative 5 would include P-1045 Alternative 3 as described in Section 2.3.3.2 and shown in Figure 2.3.3-2.

2.3.5.5 Location of Combined Alternative 5 Components

Figure 2.3.5-1 shows the combined location of the components of Alternative 5.

2.3.6 No Action Alternative

Under the No Action Alternative, the proposed infrastructure improvements and expansions would not occur. The existing water system on MCBCP would remain in its current unreliable condition and no system redundancy would be established. This would result in continued service interruptions, noncompliance with regulatory requirements, and increases in maintenance and repair costs. Ultimately, the mission of the Base and the quality of life of the Marines would be compromised. The no action scenario for each project is discussed in this section.

2.3.6.1 Northern AWT and Associated Facilities

The No Action Alternative would not provide the needed capacity of adequately treated water. The existing northern water distribution system does not meet the SDWA secondary standards or the Title 22 standards to maximize reuse. In addition, copper loading/leaching to the wastewater system would continue to result in some wastewater sludge being classified as hazardous waste, which would increase disposal costs from hauling to an out-of-state designated Hazardous Waste Facility.

The proposed potable water line from Basilone Road to reservoirs east of the San Onofre housing areas would replace two existing 14-inch asbestos cement (AC) pipes.

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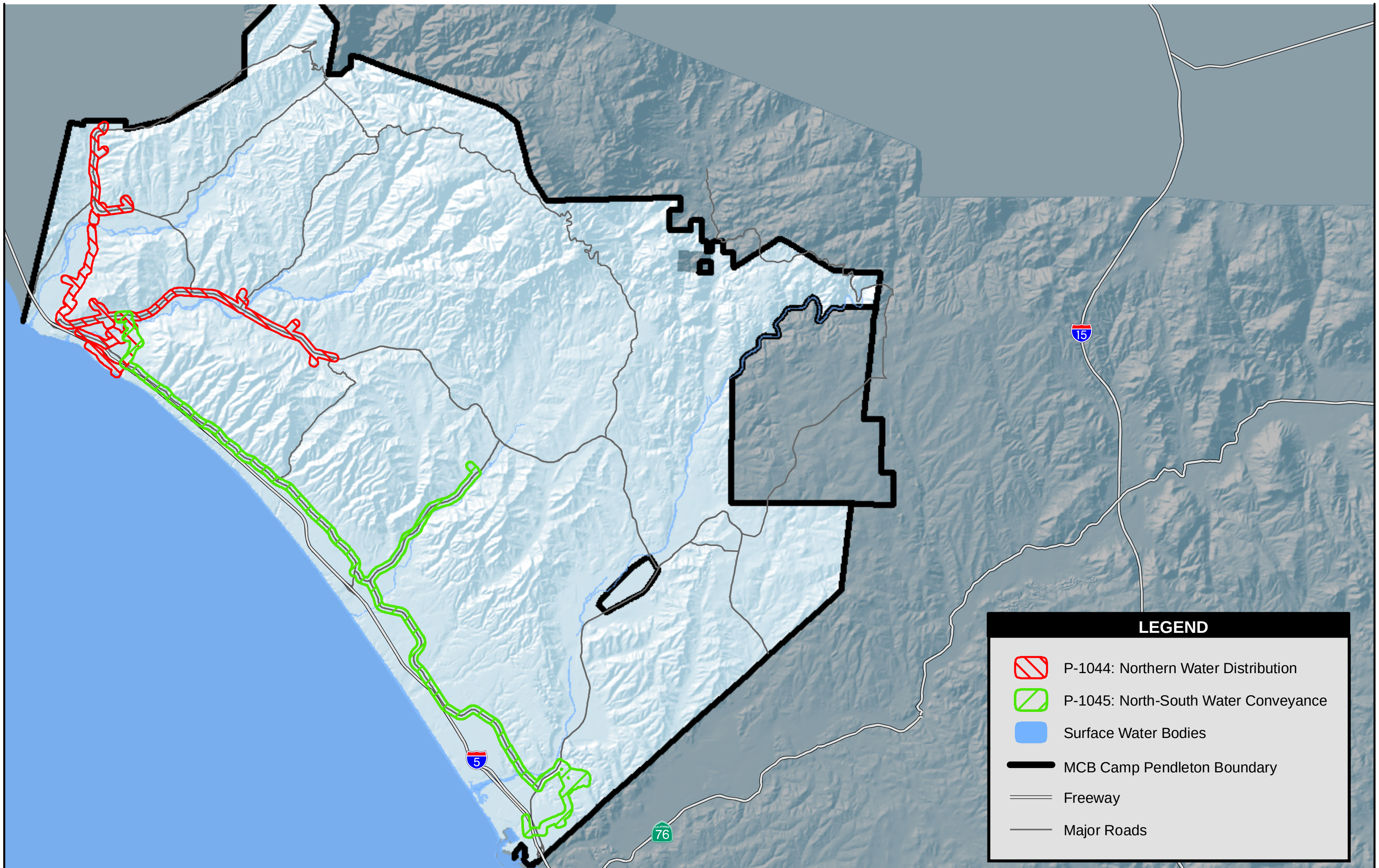


Source: MCBCP, AECOM, SANDAG

3.5 0 3.5 Miles

Scale:1 = 221,760; 1 inch = 3.5 miles

Figure 2.3.5-1
BWI Overview
Alternative 5

These aging AC pipes are unreliable and do not handle water pressure changes well. There is a good chance one or both of these lines could break in the future. If a break occurred, a flow rate of 13,700 gallons per minute would result until the water valve could be manually shut down. By the time the valve was manually shut down, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing massive property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire.

These conditions make the No Action Alternative a nonviable alternative that does not meet the purpose and need of the proposed action.

2.3.6.2 Connection of Northern and Southern Water Systems

Under the No Action Alternative, MCBCP would continue to rely on two separate water systems. Maintenance of the two systems would continue to be conducted incrementally. A lack of redundancy would continue to adversely affect the system’s reliability and ability to provide service in cases of accidental or catastrophic interruption. In the event of a system failure, one of the Base’s water regions (northern or southern) would lose the only source of potable water. The Base would have to transport potable water to the specific region in need. Unreliable water service to the Marines may result in suspension of training and operations, the inability to fight fires, and other life safety issues. The mission of the Base would be compromised. In addition, a reduction or loss of water volume or pressure needed for firefighting capability could result in loss of life and/or property. This alternative does not meet the purpose and need of the proposed action.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The following alternatives were considered in this environmental analysis but were not carried forward since they would not meet the purpose and need of the proposed action.

2.4.1 Alternative Sites for the Northern AWT Facility

Seven sites were evaluated for the proposed Northern AWT (Brown and Caldwell 2010). During the EIS process the original site was determined to have significant biological resources constraints (see additional information in Section 2.4.1.1 below); therefore, a siting study was conducted. The siting study evaluated six other potential sites. Two of these sites, Site 4 and Site 6, are being fully analyzed in this EIS. The other four sites from the siting study and the original site have been eliminated from further analysis. Each eliminated site is discussed below along with the justification for elimination.

2.4.1.1 Original Site

The original site of the Northern AWT was on the north side of Basilone Road approximately 0.5 mile east of the San Onofre housing areas. During the biological resources surveys, three endangered Pacific pocket mice were trapped on or near this site. As a result, this site does not meet the screening criterion for Environmental Sensitivity, which requires that the project "must be achievable while avoiding significant impacts to environmental resources." This site was subsequently eliminated from the proposed action to avoid impacting this protected species.

2.4.1.2 Site 1

Site 1 is in the eastern portion of the Sierra 1 Training Area north of the existing percolation ponds. The Northern AWT and required access road would present a land use conflict by precluding operations and training use of a portion of the Sierra 1 Training Area. This site does not meet the screening criterion for Operations and Training in that "infrastructure improvements and expansions should not cause unnecessary temporary delays or disruptions in MCBCP's current mission or function." Site 1 was therefore eliminated from further analysis.

2.4.1.3 Site 2

Site 2 is in the eastern portion of the Sierra 1 Training Area south of the existing percolation ponds. Similar to Site 1, the Northern AWT and required access road would present a land use conflict by precluding operations and training use of a portion of the Sierra 1 Training Area. This site does not meet the screening criterion for Operations and Training as discussed for Site 1. Therefore Site 2 was eliminated from further analysis.

2.4.1.4 Site 3

Site 3 is south of Basilone Road immediately east of the San Onofre 2 and 3 housing areas. The Northern AWT would present land use conflicts and utility conflicts, and would result in potential floodplain and biological resources impacts. Constructing and operating a water treatment facility immediately adjacent to existing family housing would introduce a land use conflict and impact. The existing San Diego Gas and Electric (SDG&E) transmission lines would likely need to be relocated. Site 3 is also partially within the floodplain of San Onofre Creek and the construction of levees for flood protection could be required, which would result in substantial riparian habitat impacts. In addition, Site 3 is currently a mitigation site for coastal sage scrub. Replacement of this habitat would be required elsewhere, possibly at a higher mitigation ratio. This site does not meet the screening criterion for Sustainability in that "infrastructure improvements and expansions must not hinder the sustainability of MCBCP and its mission" or the screening criterion for Environmental Sensitivity, which requires that the project "must be achievable while minimizing significant impacts to environmental resources." Therefore Site 3 was eliminated from further analysis.

2.4.1.5 Site 5

Site 5 is north of Basilone Road and northwest of the 52 Area (School of Infantry). The Northern AWT would present a land use conflict since Site 5 is located within the footprint of the existing San Onofre landfill. The landfill would have to be shifted or closed to avoid operational conflicts. This site does not meet the screening criterion for Sustainability in that "infrastructure improvements and expansions must not hinder the sustainability of MCBCP and its mission." In addition, Site 5 is located approximately 40 feet in elevation above, and approximately 1,000 feet north of, Basilone Road. Due to the elevation difference and distance from Basilone Road, significant pumping and piping would be required to connect to the conveyance system. This site does not meet the screening criterion for Logistics, which requires that the project "should utilize existing utility corridors and roadways as much as possible, to provide common access and maintenance points." Therefore Site 5 was eliminated from further analysis.

2.4.2 I-5 Corridor

The use of I-5 as a water system infrastructure corridor was considered as an alternative route for P-1045. The Department of the Navy owns the land under I-5, but it has issued a permanent easement to the California Department of Transportation to use this land for an interstate freeway. Thus, this area is not a viable alternative for north-south water system connection due to the potential disruption that would occur to interstate traffic flow and the difficulties it would place on continuing maintenance operations. In addition, it would be more difficult under this alternative to provide needed services to areas of the Base along the proposed alignment(s). Therefore, this alternative did not meet the purpose and need for the proposed action.

2.4.3 Utility Trenching for Stream/River Crossing

The proposed construction and installation of underground portions of the water system would be done by trenching throughout the majority of the project corridors. This is the most efficient approach in upland areas. Use of this methodology for construction and installation through creek and river crossings is potentially damaging to water and biological resources. This alternative does not meet the screening criterion for Environmental Sensitivity, which requires that the project "must be achievable while avoiding significant impacts to environmental resources." Therefore, this alternative method of construction was eliminated from further analysis for major creek and river crossings. TLS construction would be the preferred method for the major creek and river crossings.

2.4.4 Alternative Water Treatment and Storage Facility Technologies

Under this alternative, separate water treatment facilities and water storage facilities would be constructed to support each cantonment area. These facilities would be sized to meet the needs of each cantonment area and would be constructed within the cantonment area. Each cantonment area would function independently and would not rely on the overall Basewide system. A failure in one of the facilities would restrict the interruption in services only to that cantonment area. Individual facilities would be smaller than a central facility but there would be more of them, so this alternative would require more land overall. Maintenance and operation costs would increase because technicians would be needed at each facility. In addition, each facility would need to be oversized to accommodate future expansion or would be sized to meet current needs and potentially restrict expansion. To a large extent, this is the system currently in place, which does not have any redundant or backup system. Operationally, the Base is in need of a system that provides redundant and backup water that can be conveyed from one portion of the Base to another based on need. Separate independent systems would not allow that type of flexibility. Therefore, this alternative would not meet the purpose and need for the proposed action.

2.5 SPECIAL CONSERVATION AND CONSTRUCTION MEASURES

The measures contained in the following subsections are proposed during the design, construction, and postconstruction stages of the proposed action to minimize and avoid potential impacts. Table 2.5-1 provides a listing of the different resource areas for which measures are proposed, the measure designations used for each resource area, and the location of the tables that display the applicability of individual measures to specific projects included in the proposed action. These measures would be the responsibility of the design-build contractor; MCBCP Public Works; ES; and/or NAVFAC SW. These measures will be included in the Request for Proposal package sent to interested contractors as part of the contractor selection process. In addition, MCBCP will monitor the overall compliance of these measures.

Table 2.5-1
Special Conservation and Construction Measure Designations by Resource Area

Section	Resource	Measure Designation	Appears in Table
2.5.1	Water Quality and Hydrology	W-1 thru W-14	Table 2.5-2
2.5.2	Biological Resources (*general measures*)	B-1 thru B-22	Table 2.5-2
2.5.2 (cont.)	Biological Resources (*measures specific to jurisdictional waters, listed species, and migratory birds*)	B-23 thru B-82	Table 2.5-3
2.5.3	Cultural Resources	CR-1 thru CR-3	Table 2.5-4
2.5.4	Air Quality	AQ-1 thru AQ-16	Table 2.5-4
2.5.5	Noise	N-1 thru N-5	Table 2.5-4
2.5.6	Public Health and Safety	PS-1 thru PS-39	Table 2.5-5
2.5.7	Marine Resources	MR-1 thru MR-9	Table 2.5-4
2.5.8	Operations and Training	OT-1 thru OT-3	Table 2.5-4
2.5.9	Energy Efficiency	E-1 thru E-4	Table 2.5-4

Each of the measures is described in the text below. In the accompanying tables appearing at the end of this section, measures in each resource area that are applicable to both projects are grouped into a single column within the specific resource area. Measures that are applicable to only some projects are shown in separate columns and the nature of the measure is abbreviated in the column heading.

Construction would take place within the corridors and other areas surveyed for this EIS. Contractor(s) would be provided with digital files showing the centerlines and limits of surveys that were used for the environmental analyses in the Final EIS and informed that construction activity is to be confined to those corridors and other areas surveyed. Any work that is designed outside the parameters of this EIS would be subject to a supplemental analysis under NEPA and reviewed by the Marine Corps and DoN chains-of-command.

2.5.1 Water Quality and Hydrology

The applicability of specific water quality and hydrology measures to individual projects and alternatives may be found in Table 2.5-2.

Before the design phase, the following would occur:

W-1 Issues related to groundwater quality would be disclosed to the construction contractors, including disposal options and associated regulatory requirements for dewatering.

W-2 Contractors would be required to develop plans that ensure protection of workers and proper disposal of contaminated groundwater and saturated soil, if encountered.

W-3 If suspected or known hazardous substances would be exposed during any of the projects, the Base would be notified immediately and a comprehensive human health risk assessment would be conducted to identify appropriate health and safety measures required to ensure protection of human health and the environment.

W-4 Facilities would be situated as far as practicable from natural drainages to avoid or minimize hydromodification impacts as well as impacts to water quality as a result of project construction and operation.

Site design would incorporate the following:

W-5 Projects with a footprint of 5,000 square feet or greater would implement Low Impact Development (LID) features in accordance with the *Department of Defense Unified Facilities Criteria Low Impact Development* (UFC 3-210-10) (2010) and the Energy Independence and Security Act (2007). A comprehensive set of storm water planning, design, and construction elements must be used to maintain or restore predevelopment hydrology of the site with regard to volume, rate, and duration of flow, pollutant loading, and temperature for the 95th percentile, 24-hour storm. LID strategies are described in detail in UFC 3-210-10, Ch. 2. These strategies address the long-term postconstruction (operational) phase where enduring water quality benefits are provided by low impact design, source controls, and treatment controls. Depending on site conditions, purpose, and surrounding landscape, strategies would include but not be limited to the following:

W-5.1 Integrating detention basins, biofiltration cells, vegetated swales, infiltration strips, or other similar earth-based vegetated system for accepting and conveying runoff associated with new paved surfaces and other permanent impervious features. Designs should consider but not be limited to increasing the size of local flood control sites serving the project areas or including detention/retention systems in designs for parking areas or other sites.

W-5.2 Optimizing the use of suitable pervious materials for hardscaped surfaces (e.g., porous pavements, gravel walkways, grass pavers, etc.).

W-5.3 Maximizing soft-bottom drainage that is amenable to vegetative planting and natural treatment of runoff.

W-5.4 Integrating natural rock or similar material for protection against scour and sediment transport at discharge points and on streambanks of soft-bottom drainages.

W-5.5 Integrating meandering pathways within soft-bottom watercourses for increased residence time and improved vegetated runoff treatment.

W-5.6 Incorporating low-flow pathways for new hardscaped impervious drainages (e.g., concrete channels) to concentrate dry-weather flows along the thalweg (i.e., lowest point of flow), minimize vegetative growth, and reduce long-term maintenance.

W-5.7 Enhancing storm water infiltration in areas of poor soil permeability by incorporating buried percolation conveyance components (e.g., buried roof downspouts, subdrains for vegetated areas).

W-5.8 Selecting and designing project-related access routes to minimize impacts to receiving waters, in particular the discharge of identified pollutants to an already impaired water body.

W-5.9 Designing projects located within the 100-year flood zone to minimize the risk of property loss, injury, or death from flooding events.

W-5.10 Maximizing the use of underground or aboveground cisterns for the capture and reuse of rainwater.

Construction would implement the following:

W-6 Before initiation of projects, compliance with the planning requirements established by the new General Construction Permit (Order 2009-0009-DWQ, NPDES CAS000002) would be established for both traditional construction sites as well as Linear Utility Projects (LUPs). LUP activities include, but are not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits; substructures; pipelines; towers; poles; cables; wires; connectors; switching, regulating, and transforming equipment). These projects, as well as any other construction project disturbing more than 1 acre, must be covered by the new General Construction Permit. This new permit supersedes and consolidates the requirements of the previous Construction General Permit (Order 99-08-DWQ) and Linear Permit (Order 2003-0007-DWQ) and has been effective as of 1 July 2010. Under this General Permit, the following are required:

W-6.1 The contractor would provide a Qualified Storm Water Pollution Prevention Plan (SWPPP) Developer (QSD) to complete a risk determination and prepare a draft SWPPP in accordance with the risk level requirements in the General Permit and submit the draft SWPPP and risk determination to the Resident Officer In Charge of Construction (ROICC) for review 30–45 days before initiation of any soil disturbance. The SWPPP would be prepared by QSD certified by the California Stormwater Quality Association (CASQA).

W-6.2 The contractor would obtain coverage under the General Permit by uploading Permit Registration Documents (PRDs) (i.e., a Notice of Intent [NOI], SWPPP, and other compliance-related documents required of Order 2009-0009-DWQ) to the California Stormwater Multi-Application and Report Tracking System (SMARTS) website. The ROICC (acting as the Legally Responsible Person [LRP]) would review, certify, and submit the PRDs. A Waste Discharge Identification (WDID) number would be received from SMARTS before initiation of any soil disturbance.

W-6.3 Project construction would comply with all provisions described in the General Permit and would strictly follow the SWPPP under the direction of a Qualified SWPPP Practitioner (QSP) provided by the contractor. The QSP would maintain and provide minor updates to the SWPPP as necessary to track modifications, BMP location and implementation, training, etc. The certification statement would be included in the on-site SWPPP. The QSP must be on-site the majority of the time and must have one of the certifications listed in the permit, and be registered with CASQA.

W-6.4 The contractor would be responsible for conducting all required inspections, sampling, recordkeeping, and corrective actions. The contractor would upload all required documentation to the SMARTS website and notify the ROICC that documents are ready for review, certification, and submittal.

W-6.5 After completion of construction activities, the contractor would prepare the Notice of Termination (NOT) and supporting documentation for the ROICC (i.e., the LRP) to review, certify, and submit to the SWRCB via the SMARTS website. To terminate coverage, the project would have to meet permanent stabilization requirements specified by the General Permit, and an acceptance of the NOT would have to be received from the SMARTS system.

W-6.6 The contractor would prepare a draft Annual Report and submit it to the ROICC each August 1 to review, certify, and submit the Annual Report to the SWRCB by September 1 of each year. The Annual Report would have to be accepted by the SWRCB before the contractor could be released from the contract. An Annual Report is also due upon completion of the NOT.

W-7 The SWPPP would specify measures to avoid or minimize construction-related surface water pollution that include proper runoff controls, pollutant source controls, and runoff treatment controls (when other nontreatment controls are insufficient for reducing runoff pollutant loads). It would also include a frac-out plan and associated BMPs (see W-9.2). Project construction would comply with all provisions described in the General Permit and would strictly follow the SWPPP. The QSD would provide SWPPP updates for the QSP to implement such that conditions at the project site are in compliance as site conditions change, BMP locations and types are modified as necessary, and evolving training needs are met.

W-8 The contractor would be requested by Environmental Security (ES) Remediation Branch to walk the entire area within the proposed project limits and properly flag or otherwise mark existing groundwater monitoring wells to avoid construction-related damage or designate such wells for replacement/repair following construction.

W-9 The construction SWPPPs for the projects would include water quality protection and monitoring measures required in the Construction General NPDES Permit (Order 2009-0009-DWQ) but would also need to address the following project-specific practices:

W-9.1 Clearing and grading of native vegetation would be limited to the minimum amount needed to construct, allow access, and provide fire protection if earthwork is conducted during the wet season. Construction of creek crossings, whether by trenching or trenchless methods, should be done during the dry season in order to avoid impacts from frac outs, erosion, spills, etc.

W-9.2 TLS construction would be safeguarded against “frac-outs.” Unintended releases of drilling fluids or muds commonly occur during drilling operations when drilling through fractured rock or coarse deposits like cobbles and gravel. Geologic formations prone to frac-outs would be avoided or suitable emergency BMPs would be available when drilling beneath rivers, creeks, or similar watercourses. A frac-out plan consisting of measures to avoid frac-outs if possible and minimize impacts if frac-outs should occur would be prepared for each instance of TLS operations.

W-9.3 Advanced BMP treatment controls (e.g., active treatment systems employing sedimentation traps/ponds with flocculant addition; redundant BMPs or treatment trains; etc.) would be considered when construction sites are less than 500 feet from a sensitive receiving water (i.e., the Santa Margarita River, a CWA Section 303(d) impaired water body).

W-9.4 TLS construction would protect banks by employing protective mats or armoring in stream or creek bank areas where heavy physical impacts and traffic are expected (both sides of a given watercourse). Any discharges of slurries or drilling muds to land would comply with Conditional Waiver No. 9 of the San Diego Basin Plan Waste Discharge Requirements (WDR) Waiver Program

(RWQCB Resolution No. R9-2007-0104). Contact Environmental Security Storm Water Branch at (760) 725-9760 for further guidance. Armoring in jurisdictional waters of the U.S. may require a USACE permit.

W-9.5 Special attention would be paid to containment of drilling materials for watercourse protection during TLS construction. Temporary impervious surfaces (e.g., heavy plastic sheeting) would be installed where bentonite, soil spoils, and liquid products are managed. Perimeter berming around the work area and along adjacent watercourse banks would be installed to confine potential spills as conditions dictate.

W-9.6 Material and waste management programs would be implemented during construction within the site project limits as well as on equipment/material laydown areas, such as solid, sanitary, septic, hazardous, contaminated soil, concrete, and construction waste management; spill prevention; appropriate material delivery and storage; employee training; dust control; and fueling. Each of these programs would address proper secondary containment requirements, spill prevention and protection, structural material storage needs, perimeter and surface protection for laydown and maintenance areas, and relaying all such requirements to construction staff. Concrete washout water may not be disposed of on Base. Storage, use, and disposal of hazardous materials would be conducted in accordance with local, state, and federal guidelines pertaining to handling, storage, transport, disposal, and use of such materials.

W-9.7 The SWPPP and stormwater BMPs would consider design, placement, and discharge location to avoid impacts to listed species and their habitats (i.e., discharge, dewatering).

W-10 The following new storm water measures for pressure testing of potable water lines and drinking water wells outlined in RWQCB Order No. R9-2010-0003 (NPDES No. CAG679001), “General Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or Other Conveyance Systems” would be incorporated:

W-10.1 For discharges of potable water resulting from hydrostatic testing of new (unused) utility lines or existing water lines, or if there would be potable water discharges associated with drinking water purveyance and storage, contact ES Storm Water Branch for guidance at 725-9760. Disposal options may include the following:

W-10.1.1 Discharges to land would comply with the San Diego Basin Plan Conditional Waiver No. 2, “Low Threat Discharges to Land” in RWQCB Resolution No. R9-2007-0104. Runoff of these waters is prohibited.

W-10.1.2 Discharges to the sanitary sewer system would be coordinated through the ES Waste Water Branch at 725-9761 and AC/S, Facilities Wastewater Operation Supervisor at 725-4018.

W-10.1.3 If options 1 and 2 are not feasible, discharges to storm drains or surface waters (including seasonal waters) would obtain coverage under the Hydrostatic Test/ Potable Water Discharge Permit, RWQCB Order No. R9-2010-0003.

W-11 Stormwater BMPs would include but not be limited to the following practices, and these would be detailed in the SWPPP:

W-11.1 Stormwater and erosion controls would be installed before soil disturbance on the construction site. Where determined necessary, silt fencing, straw wattles, temporary earthen berm, or similar runoff barrier would be placed along the perimeter of the project site using methodologies and orientations appropriate to control erosion. The fence would be buried at the bottom and staked. Points of discharge from these BMPs or other points of concentrated runoff would employ scour/erosion control protection. Silt fencing, straw wattles, earthen berming, or a similar barrier would be placed around the perimeter of the project site and be properly installed and maintained.

W-11.2 Stockpiles of soil, concrete material, etc., would be covered with a tarp or blanket and/or surrounded with straw wattles or gravel bags. Slopes would be protected with straw wattles or blankets. All straw wattles would be certified as weed-free.

W-11.3 Whenever possible, grading would be phased to limit soil exposure and minimize potential sediment transport. Finished areas would be revegetated and/or hydroseeded with native species known to exist on the Base as soon as possible. Before construction-phase grading, topsoil would be salvaged, stockpiled, and later reapplied as the surface horizon following construction per the Riparian and Estuarine/Beach Biological Opinion (Riparian BO) (USFWS 1995, Appendix 1, page. 48).

W-11.4 Storm drain inlets would be protected using gravel bags or certified weed-free straw wattles, filter fabrics, absorbent socks, rubber covers, or other materials appropriate for the location. Construction entrances and laydown areas would be stabilized. Materials that could impact storm water runoff would be stored in lockers, on pallets, inside rubber berms, indoors, or under a cover. Material storage areas would be located away from existing storm drains and surface waters.

W-11.5 Sedimentation basins would be constructed where appropriate and would include standpipe design discharge outlets that allow collected water to drain off at a controlled rate (i.e., drain within 72 hours). Supplemental BMPs for scour protection and erosion control would also be integrated at discharge outlet points, overflow spillways, or similar areas prone to concentrated flow.

W-11.6 Check dams would be used to reduce runoff velocities where necessary.

W-11.7 BMP structural facilities would be regularly inspected and repaired. Damaged or worn silt fences, wattles, gravel bags, etc. would be replaced when BMPs are found to be inadequate or ineffective.

W-11.8 Fueling of equipment would take place within existing paved areas or the identified laydown area, but not closer than 100 feet to drainages. Cleaning and maintenance of vehicles and equipment would take place off-site. Collected rinsate would be transferred to a temporary holding tank or a vactor truck (a vacuum truck with a tank on board for collecting wastewater and sediment) for discharge off-site (e.g., batch discharge to a sanitary sewer with proper authorization and clearance).

W-11.9 Construction equipment staging and access, and disposal or temporary placement of excess fill within drainages or other wetland areas, would be prohibited.

W-12 If the proposed activity would involve groundwater extraction (dewatering), ES Storm Water Branch would be contacted for guidance. Dewatering permits would be obtained for areas where the groundwater level is high and groundwater is likely to be encountered during construction (particularly for TLS boring pits). If encountered, dewatering waste would be disposed of in accordance with RWQCB Order No. R9-2008-0002, "General Waste Discharge Requirements for Discharges from Groundwater Extraction and Similar Discharges to Surface Waters within the San Diego Region except for San Diego Bay" and RWQCB Resolution No. R9-2007-0104, "Conditional Waivers of Waste Discharge Requirements for Specific Types of Discharge within the San Diego Region," depending on the method of disposal.

W-12.1 Discharges to land would comply with the San Diego Basin Plan Conditional Waiver No. 2, "Low Threat Discharges to Land" found in San Diego RWQCB Resolution No. R9-2007-0104. Runoff of these waters is prohibited.

W-12.2 Discharges to the sanitary sewer system would be coordinated through the ES Waste Water Branch at 725-9761 and AC/S, Facilities Wastewater Operation Supervisor at 725-4018.

W-12.3 Discharges to storm drains or surface waters (including seasonal waters) would obtain coverage under the General Groundwater Permit, San Diego RWQCB Order No. R9-2008-0002. Application for permit coverage would be submitted 60 days before the planned commencement of the discharge.

The following postconstruction measures would be implemented:

W-13 Once construction of each project is completed, an operations and maintenance program would be implemented in accordance with the Small Municipal NPDES Permit (Order 2003-0005-DWQ or its predecessor currently in draft), which would be implemented for the life of the facility/project to ensure the continued effectiveness of postconstruction BMPs. Maintenance activities would vary from area to area depending on the BMPs in place but would include the following:

W-13.1 Cleaning and removing debris from BMP inlets, outlets, or catchments after major storm events.

W-13.2 Mowing and maintaining vegetated BMPs (e.g., maintaining swales and/or detention/retention systems to original cross sections and infiltration rates).

W-13.3 Removing accumulated trash, debris, and/or sediment from BMPs before each wet season (i.e., September). Per the Riparian BO (MCBCP 1995), during the breeding season, culvert clearing of all vegetation is to be done within 15 feet of culvert entry and exit points.

W-13.4 Repairing or replacing armor rock or stone aggregate that serves as scour protection (e.g., riprap).

W-13.5 Repairing, refurbishing, or otherwise replacing (in kind) all groundwater monitoring wells existing within the project limits before construction. For any groundwater monitoring well that is destroyed, damaged, or altered, the contractor shall return any affected well to a condition that meets or exceeds the previous existing well condition in accordance with the most current edition of the San Diego County Site Assessment and Mitigation (SAM) Manual Guidelines. Under special considerations, existing groundwater monitoring wells may be removed and replaced to meet the parameters of the construction project, but this would be done in consultation with the ES Remediation Branch.

W-13.6 Seeding or sodding to restore or maintain ground cover. Seed mix would be native species that are known from the Base and the seed mix list would be approved by ES Land Management Branch before application. The origin of the seeds, e.g., from San Diego County or from the Base, also would be specified and approved by ES.

W-13.7 Repairing erosion areas and stabilizing repairs with additional erosion control protection.

W-13.8 Removing and replacing all dead and diseased vegetation as necessary to maintain vegetation coverage and minimize erosion. Replacement vegetation would not include any invasive species, and the plant palette would need to be approved by ES Land Management Branch before planting.

W-13.9 Managing fertilizer use (particularly in the wet season) and minimizing or avoiding herbicide or pesticide applications during all times of the year.

W-13.10 Maintaining BMP vegetation health (i.e., periodic irrigation or batch watering) without causing overirrigation runoff.

W-13.11 Implementing structural and nonstructural programs (i.e., routine procedures or practices) to prohibit the storage of uncovered hazardous substances in outdoor areas and implementing good housekeeping procedures on a routine basis.

W-13.12 Inspecting and replacing inlet protection/filters as necessary.

W-14 An adaptive management plan would be included to maximize the available water supply and protect biological resources. Measures of the adaptive management plan would include the following:

W-14.1 Following 2 consecutive dry years, one-half of the additional pumping above historical baseline conditions would be eliminated.

W-14.2 Following the third consecutive dry year all additional pumping above historical conditions would be eliminated.

W-15 An underground injection well management plan or equivalent would be included with EPA/RWQCB permitting requirements to prevent degradation of underground drinking water sources from the brine injection. Minimum requirements would include:

W-15.1 Meeting Maximum Contaminant Levels (MCL), supplementary permit limits, and other health-based standards at point of injection;

W-15.2 Specifying appropriate BMPs;

W-15.3 Monitoring to characterize the quality of the injectate, both initially and on an ongoing basis; and

W-15.4 Maximizing or properly managing the supply/demand of the available water supply.

2.5.2 Biological Resources

The applicability of specific biological measures to individual projects and alternatives may be found in Tables 2.5-2 and 2.5-3. Species-specific measures noted below are consistent with the Final Biological Opinion (FBO) (FWS-MCBCP-12B0042-12F0058) Additional project-specific terms and conditions are also included in the FBO.

General

B-1 If, during the design phase of either of the two projects, ground-disturbing activity within the project limits such as geotechnical borings, potholing, test injection wells, and other investigation activities would be conducted, ES would be notified at least 15 days before the activity was scheduled to occur. ES approval would be required for any such activity, and the activity would be monitored by a biological monitor approved by ES to ensure minimal damage to sensitive resources and adequate restoration of disturbed areas. Geotechnical investigation surveys can move forward before USFWS receives construction-level design plans. All temporary impacts associated with the geotechnical investigation surveys would remain within the footprint of the project area, as described during the consultation. Geotechnical investigation surveys would take place with approved biological monitors present, as specified in the Biological Opinion (BO). The biological monitors would work with the boring crews to avoid and minimize listed resources to the maximum extent practicable, including driving routes to reach the boring sites. If it is determined that the geotechnical borings and other investigation activities would potentially result in permanent impacts to listed species, ES would coordinate accordingly with USFWS. If ground-disturbing activity would be required outside of the project limits, an analysis of potential effects to listed species would be required and consultation with USFWS would be reinitiated.

B-2 All construction would take place within the construction limits and corridors defined in the EIS, if unforeseen conditions arise, the Marine Corps would be notified to take appropriate action. Contractor(s) would be informed that construction activity must be confined within those limits. Contractors would be responsible for non-discretionary compensation for direct impacts to federally listed species and their habitats that occur as a direct result of construction activities outside the project construction limits. The compensation requirements would be determined by the Base in coordination with USFWS.

B-3 Contractor(s) would be provided with digital files showing the centerlines and project limits that were used for the environmental analyses in the Final EIS and will be informed that construction activity must be confined within those limits. Digital files and hardcopy maps would also include the locations of federally listed species, sensitive habitats (including vernal pools), and jurisdictional waters of the U.S. Any work that is required outside those corridors would be subject to an initial review by ES to determine if potential impacts could occur to environmental resources. Before the project was implemented, ES would inform USFWS and/or NMFS and/or USACE of significant changes to the project that may affect federally listed species or jurisdictional waters. Such changes may require reinitiation of consultation or permit amendment, with subsequent unknown approval timelines and the cessation of work on those areas until authorization to resume work is given by the relevant regulatory agency.

B-4 Avoidance and minimization measures adopted as part of the proposed action include those described in Chapter 4.5.3 of the MCBCP Integrated Natural Resources Management Plan (INRMP) (USMC 2007a), where relevant. These measures include worker environmental protection briefings, signs, markers, protective fencing, exclusion fencing, biological monitoring, erosion and sedimentation prevention, noise baffling, and restoration of areas temporarily affected.

B-5 Construction-level designs of the limits of construction activity and, as needed, revised impacts for listed species would be provided to ES Wildlife Management Branch for review and comment before implementation. Upon acceptance by ES, designs would be submitted to USFWS for concurrence. The designs would be required 14 days before construction inclusive of the following: construction access, access roads, TLS corridors (including entrance and exit pits), laydown areas, blasting materials, area of noise/demolition impact, permanent and temporary impact areas, and assessment for federally listed species. If the impacts associated with construction-level designs are not consistent with this biological opinion, the Marine Corps will reinitiate consultation to address additional impacts.

B-6 Project design would avoid direct and indirect impacts to vernal pools, riparian habitats, other sensitive wetlands, and jurisdictional waters to the greatest extent feasible, and no additional impacts would occur outside of the designated project footprints. Impacts outside designated project footprints must be reported to ES by the project biologist and may require reinitiation of consultation or permit amendment, with subsequent unknown approval timelines and the cessation of work on those areas until authorization to resume work is given by the relevant regulatory agency. The limits of existing restoration sites and sensitive wetlands buffer would be clearly marked in the field with markers or exclusion fencing, and the restricted areas would be monitored by the project biologist during construction phases to ensure that these areas are not being directly or indirectly impacted by project activities. If an existing restoration site needs to be accessed, ES would be notified. The project biologist designated for this task should be a trained wetland biologist with at least 2 years of independent experience in assessing riparian habitats and other sensitive wetlands, and jurisdictional waters in southern California.

B-7 Qualified project biologists contracted by the Government would oversee the avoidance and minimization measures specified in these conservation measures, including any required surveys and monitoring activities. Familiarity with the individual federally listed species and associated habitats would be required for work in all project areas supporting occupied or suitable habitat for such species. Different project biologists may be designated for specific measures based on the qualifications necessary to satisfy the specific measure. If multiple project biologists are required, their activities would be coordinated through one primary project biologist. Minimum standards for experience and training would be determined in advance by USFWS and would be dependent on the specific task being addressed by the biologists. A statement of qualifications including a resume of experience and training for each designated project biologist would be submitted for review and approval to ES. Upon approval, ES would then submit to USFWS at least 15 days before the initiation of the activity required. Generally, where qualified biologists are needed, the biologists would (1) be familiar with the federally listed species and associated habitats that require the survey or monitoring activity; (2) have a bachelor’s degree with an emphasis in ecology, wildlife science, or related science; and (3) have previous experience with applying the terms and conditions of a BO. In addition, where applicable, the qualified biologists would possess Section 10(a)(1)(A) permits specific to the species and type of surveying or monitoring required. Each biologist’s resume, qualifications statement, and permit number would be submitted to ES. As applicable to the required task, the biologists would have qualifying experience with 404 and 401 or other CWA compliance. Regardless, the correct number of appropriately trained monitoring staff would be present during all construction (preconstruction, construction, and postconstruction) activities (i.e., vegetation clearing, grading, trenching, drilling) to ensure ESA and CWA avoidance and minimization and mitigation compliance measures are carried out correctly. For the avoidance and minimization measures noted below, “qualified biologist” is hereafter referred to as “project biologist.” Compliance monitoring for stormwater-related requirements would be conducted by a monitor with specialized training in stormwater regulations and may not necessarily be a biologist. ES would approve these monitors.

B-8 The project biologist would monitor construction activities to ensure compliance with required conservation and mitigation measures and would keep the project engineer and ES informed of construction activities that may threaten significant biological resources. The project biologist would record daily construction activities and provide weekly electronic versions of weekly biological monitoring reports to ES. As needed, ES would provide reports to USFWS. Through regular communication with ES, the project biologist and ES would be kept informed of any updated information about significant biological resources that may affect monitoring activities where construction is planned.

B-9 All construction personnel would receive environmental training from MCBCP personnel or the project biologist before commencing work. If the training would be given by the project biologist, then MCBCP would brief the project biologist, and that biologist would brief the crew on the resources and avoidance/mitigation measures involved in the project and the requirements and boundaries of the project. Environmental training would include a description of sensitive species and habitats potentially occurring on or near the project site or greater project area, details on each species’ habitat requirements, the protective measures to be implemented for each species, the role of the project biologist and the responsibilities of those on-site to protect biological resources, the importance of complying with mitigation measures, and problem reporting and resolution methods. The contractor would be liable for unauthorized impacts to listed species habitat (e.g., work outside project limits).

B-10 The project would have a designated footprint on project reference maps and the project biologist would ensure that all construction personnel, laydown sites, spoil/stockpile sites, etc., remain within the limits of the project footprint for the duration of the project. Noncompliance with this requirement would be reported immediately to ES.

B-11 Where adjacent to native plant communities and determined necessary by ES and USFWS, construction fencing would be installed around the outer perimeter of the project limits to reduce human disturbance of these adjacent natural habitats.

B-12 Where determined necessary by ES and USFWS and/or NMFS, project design would include a permanent boundary fence where project components are adjacent to habitat occupied by a federally listed species. Before construction of the fence, ES would need to be consulted to ensure no impacts to federally listed species occur as a result of the construction of the fence. This fence would serve to prevent trespass into and damage of natural vegetation communities by future users of the facility. This would not apply to the conveyance line components of the projects.

B-13 Construction activities would be scheduled to avoid management/breeding seasons designated for listed species within MCBCP to the greatest extent feasible. If the management season cannot be avoided, the project biologist would implement all necessary conservation measures and terms and conditions specified in the BO prepared by USFWS for the proposed action. All clearing of native vegetation would be scheduled to avoid management/breeding seasons designated for listed species within MCBCP. Clearing of native vegetation would only be authorized within final design project footprints and as necessary to meet project requirements. Clearing of native vegetation outside of the designated management/breeding seasons or outside of designated final design project footprints must be authorized in advance by ES. If the management season cannot be avoided, the project biologist would implement all necessary conservation measures and terms and conditions specified in the BO prepared by USFWS for the proposed action.

B-14 Construction work at night and associated lighting adjacent to natural areas, especially riparian areas, would be avoided, thereby avoiding adverse effects of construction-related nighttime lighting and noise.

B-15 Where it cannot be avoided, nighttime construction lighting would be shielded from natural areas, especially riparian areas, so that light dispersal into adjacent native habitats is significantly reduced. In project areas affecting endangered species where security lights are needed, other methods of reducing light pollution (e.g., dusk-to-dawn sensor activation, motion-sensitive activation, low-lumen or limited-spectrum lighting) would also be applied as possible.

B-16 Permanent outdoor lighting installed at proposed facilities would be shielded to maximally reduce light pollution into adjacent natural plant communities. Other methods of reducing light pollution (e.g., dusk-to-dawn sensor activation, low-lumen or limited-spectrum lighting) would also be applied wherever possible.

B-17 Construction workers would be prohibited from bringing dogs or any domesticated pets to construction sites to ensure that domestic pets do not affect wildlife through harassment or predation in adjacent natural habitats.

B-18 Areas temporarily impacted by construction activities would be restored to native vegetation following construction. This would include the restoration of areas that are currently disturbed or vegetated with non-native species with the appropriate native vegetation community. The restoration plan would be submitted to ES before initiating any restoration work. Where temporary impacts involve grading of non-weedy topsoil and where determined necessary by the project biologist and ES, the topsoil would be salvaged to the maximum extent practicable, stockpiled, and then reapplied as the surface horizon following construction. Where feasible, restored areas would be recontoured to match the surrounding landscape. Plant species used must be derived from local source populations. Prior to initiating BWI projects, the ES would provide a copy of the restoration plan to USFWS for comment, review, and approval. The plan would include a map showing the existing vegetation communities that would be impacted and the native vegetation communities that would be restored, the methods that would be used in the restoration, monitoring requirements and time periods, success criteria, and follow-up measures, if needed. Restoration would be initiated immediately following completion of construction activities for each individual project.

B-19 If it is determined that a listed species is harmed, the action and condition of the individual plants or animals affected would be reported immediately to

MCBCP Environmental Security Wildlife Branch Head at (760) 725-9729 and the Administrative Office at (760) 725-4512.

B-20 To comply with Executive Order 13112, National Invasive Species Act, Federal Noxious Weed Act, and Noxious Plant Control Act, all equipment and/or vehicles would be thoroughly power-washed before entering MCBCP property. While washing wheeled vehicles, the front wheels would be turned lock-to-lock to allow for exposure of surfaces that may hold weed seeds. Invasive plants with overall moderate or high ranking in the most current California Invasive Plant Council Inventory would be considered as "weeds" for purposes of this measure. The project biologist would identify weed species that become established at the various project sites. The project biologist would report all new weed species invasions (whether they are new to MCBCP or new to the specific project site area) to ES for control. The designated project biologist for this measure would be knowledgeable of and able to identify weed species listed in the California Invasive Plant Inventory. Additional qualifications may be specified by ES for the project biologist handling weed management. The project biologist would report all new weed species invasions (whether they are new to MCBCP or new to the specific project site area) to ES Land Management Branch for control.

B-21 Landscaping conducted around new buildings would comply with the Base Exterior Architectural Plan (BEAP). Compliance with the BEAP would provide for appropriate review of landscape plans and ensure that invasive plant species are not included in landscape plantings. Landscaping would include local native plant species wherever possible and appropriate.

B-22 Conservation measures adopted as part of the proposed action include all those described in this section and those in the Final BO to be issued for the proposed action. Where in conflict, conservation measures listed in the BO would supersede those listed elsewhere.

B-22.1 The Marine Corps is considering off-MCBCP restoration or preservation as an alternative to on-MCBCP restoration and enhancement proposed in the species-specific conservation measures below; in the event that the Marine Corps decides to implement off-MCBCP restoration or preservation to offset project impacts to thread-leaved brodiaea, Riverside fairy shrimp, San Diego fairy shrimp, arroyo toad, California gnatcatcher, or least Bell's vireo, the Marine Corps would reinitiate consultation to address this change in the project description. Mitigation credits could be applied, in consultation with USFWS, for Readiness and Environmental Preservation Initiative (REPI) conservation projects that acquire and/or conserve additional land for these species.

Jurisdictional Waters

B-23 Project design would avoid direct and indirect impacts to vernal pools, riparian habitats, jurisdictional waters, and other sensitive wetlands to the greatest extent feasible. The limits of sensitive wetlands would be clearly marked in the field with markers or exclusion fencing, and the restricted areas would be monitored by the project biologist during construction phases to ensure that these areas are not directly or indirectly impacted by project activities. The project biologist designated for this task should be a trained wetland biologist with at least 2 years of independent experience in making wetland delineations in southern California.

B-24 Construction within waters of the U.S. would be subject to prior authorization by USACE under Section 404 of the CWA, and related Section 401 water quality certification by RWQCB. All terms and conditions of the USACE and RWQCB permits would be followed. Unavoidable impacts to waters of the U.S. would require mitigation consistent with the final rule for Compensatory Mitigation for Losses to Aquatic Resources issued by USACE and USEPA. This would include the preparation of a detailed mitigation plan to describe all compensatory measures that would offset the project’s unavoidable temporary and permanent impacts to jurisdictional waters and would include, as relevant to final project design and mitigation location(s), on-site restoration for temporary impacts, off-site mitigation for permanent impacts, and possible mitigation off-Base through purchase of mitigation credits. The mitigation plan for jurisdictional waters would be prepared collaboratively with ES and would need to be reviewed and approved by USACE and RWQCB before water impacts result from the project. If the unavoidable impacts to jurisdictional waters support federally listed species, then input from USFWS would also be required.

Thread-leaved Brodiaea

B-25 To avoid direct and indirect impacts to thread-leaved brodiaea, the following measures would be implemented:

B-25.1 Known occurrences within 500 feet of project boundaries would be identified on project construction plans. The brodiaea population located within the maximum pipeline corridor leading to Reservoir 52698 (P-1044) would be completely avoided by the final design pipeline construction corridor. All construction activities would remain at least 50 feet from this brodiaea population.

B-25.2 To provide for maximum avoidance of direct impacts to thread-leaved brodiaea, the Marine Corps would require the project coordinator to coordinate closely with ES to implement location-specific avoidance and minimization measures (e.g., TLS construction for pipelines or conduits and aligning segments or space utility poles to avoid impacts).

B-25.3 The project biologist would contact ES when any construction is taking place within 500 feet of thread-leaved brodiaea (ES Administration Office: (760) 725-4512 or ES Land Management Branch Head).

B-25.4 As determined necessary by ES or the project biologist, populations to be avoided would be clearly identified in the field with markers, exclusion fencing, or other physical barriers such as concrete K-rails.

B-25.5 Known thread-leaved brodiaea populations and restricted areas would be monitored by the project biologist during construction phases, as determined necessary by ES. Physical barriers would be left in place for post-construction protection of brodiaea populations or removed at the discretion of the ES. ES would inform USFWS where these barriers would be left in place and when they would be removed. Construction monitoring and measures implemented would be documented in regular reports submitted to ES.

B-26 Physical barriers would be left in place for postconstruction protection of thread-leaved brodiaea populations or removed at the discretion of ES and the Base Public Works Office. ES would inform USFWS where these barriers are left in place and when they are removed. The designated project biologist for measures associated with thread-leaved brodiaea would be a trained botanist with at least 2 years of independent experience conducting brodiaea surveys.

B-27 Where thread-leaved brodiaea populations are located downslope of construction areas, appropriate erosion and sedimentation prevention measures would be employed to protect these species. These measures would be fulfilled through installation of construction BMPs as stated in Chapter 4.6.1 of the INRMP (USMC 2007a). ES would review specific BMPs (e.g., sediment fencing intended to protect vernal pools) before measures are implemented to avoid potential adverse effects (e.g., altered hydrologic regime) of the BMP and determine whether special post-BMP measures are warranted (e.g., revegetation of areas temporarily impacted). Construction monitoring and measures implemented would be documented in regular reports submitted to ES.

B-28 Unavoidable direct or indirect impacts to 0.008 acre of occupied brodiaea habitat would be compensated through enhancement of 0.016 acre of occupied brodiaea habitat elsewhere on MCBCP (e.g., in the Lima Training Area). Enhancement would be achieved through a multiyear effort to control invasive non-native plants within occupied brodiaea habitat. Before initiating restoration work for brodiaea, a brodiaea habitat enhancement plan (Enhancement Plan) would be prepared and submitted to ES and USFWS for review and approval. The proposed enhancement efforts would also include a multi-year, controlled, empirical study evaluating the benefits to brodiaea populations on MCBCP achieved through the proposed enhancement activities. The Enhancement Plan would be completed prior to impacting brodiaea populations, while Enhancement Plan implementation would commence no later than six months following impacts. Any reduction of impacts to brodiaea habitat achieved as a result of avoiding brodiaea during the design or implementation phases of the project would proportionately reduce the amount of enhancement implemented.

Spreading Navarretia and San Diego Button-celery

B-29 To provide for complete avoidance of direct impacts to spreading navarretia and San Diego button-celery, if found within project footprints or adjacent buffers, the Marine Corps would require the project contractor to coordinate closely with ES to implement location-specific avoidance and minimization measures that would include the following:

B-29.1 The contractor would employ design and installation methods that would avoid all direct impacts to vernal pools and other ponded areas that support listed species (e.g., TLS construction for pipelines or conduits and aligning segments or spacing utility poles to avoid impacts).

B-29.2 All construction activity would be avoided within a 50-foot setback buffer surrounding the one pool in the 21 Area (Del Mar) occupied by spreading navarretia.

B-29.3 The designated project biologist would contact ES before any construction activities take place within 500 feet of spreading navarretia and San Diego button-celery populations. The project biologist would be present during all phases of construction near vernal pools, spreading navarretia, and San Diego button-celery populations, as determined necessary by ES.

B-29.4 The project biologist would have the authority to delay any project action that may impact spreading navarretia and San Diego button-celery populations until appropriate avoidance measures are determined by ES in coordination USFWS.

B-30 Avoidance of indirect impacts to spreading navarretia and San Diego button-celery adjacent to project sites would be fulfilled through implementation of construction measures such as specific BMPs outlined by the State of California under the Nonpoint Source Pollution Control Plan and Phase II Municipal Storm Water Permit, as stated in Chapter 4.6.1 of the INRMP (USMC 2007a). ES would review and concur with specific BMPs (e.g., sediment fencing intended to protect vernal pools) before measures are implemented to avoid potential adverse effects (e.g., altered hydrologic regime) of the BMP and determine whether special post-BMP measures are warranted (e.g., revegetation of areas temporarily impacted). No trenching would occur within vernal pool watershed areas in association with BMPs such as when installing fencing for ingress/egress or sediment control, or other BMP activities that involved trenching.

B-30.1 Direct and indirect impacts to spreading navarretia at the 21 Area (Del Mar) Spreading Navarretia Habitat Enhancement Project site would be avoided by moving the boring pit on the west side of A Street outside the 50-foot setback area, i.e., outside of the approved Spreading Navarretia Habitat Enhancement Project footprint.

B-30.2 Impacts from TLS construction resulting from "frac-outs" would be avoided. Unintended releases of drilling fluids or muds commonly occur during drilling operations when drilling through fractured rock or coarse deposits like cobbles and gravel. Drilling mud could present potential impact on soils including the hardpan clay layers located beneath vernal pool substrate. Geologic formations (including vernal pools) prone to frac-outs would be avoided or suitable emergency BMPs would be available when drilling beneath rivers, creeks, or similar watercourses. A frac-out plan consisting of measures to avoid frac-outs if possible and minimize impacts if frac-outs should occur would be prepared for each instance of TLS operations by the contractor for review and approval by ES. In addition, the batching of drilling muds (slurry materials) would be located outside of the 21 Area (Del Mar) Spreading Navarretia Habitat Enhancement Project site.

B-31 Although complete avoidance is expected, in the event that these species are detected within the project limits or buffer, and avoidance of direct or indirect impacts to spreading navarretia or San Diego button-celery is not feasible, any unavoidable direct permanent impacts to spreading navarretia and San Diego button-celery would require mitigation as determined necessary through Section 7 consultation between ES and USFWS. Mitigation measures may include:

B-31.1 Determine the vernal pool-specific microwatershed to accurately evaluate complete impacts.

B-31.2 Prepare a species and habitat mitigation plan for review and approval by ES. ES would provide the report to USFWS.

B-31.3 Salvage plants, plant litter, and surface soil from the habitat areas to be impacted.

B-31.4 Enhance degraded habitat, restore habitat, or create new habitat (e.g., translocation of salvaged seed to existing unoccupied habitat) in areas approved by ES. The final location for project-specific mitigation would be at a site on MCBCP that is mutually agreed to by ES and USFWS. If the vernal pool habitat is considered waters of the U.S., then the location would also need to be mutually agreed to by USACE. A vernal pool restoration plan would be prepared and submitted to ES for review and approval. ES would provide the report to USFWS. The plan would include restoration/creation locations, reference site locations, existing conditions of the restoration sites including protocol fairy shrimp sampling (wet and dry season), vernal pool floral inventory (March to May), topographic analysis and mapping to an accuracy of <0.5-foot contour, methodology for creating/restoring habitat, monitoring and management requirements and time periods, success criteria, and follow-up measures if needed. Restoration would be initiated a reasonable amount of time (preferably 6 months) following construction actions that would result in impacts to listed species. The timeline of construction and restoration may be affected by the timing for baseline surveys for the restoration effort.

San Diego Fairy Shrimp and Riverside Fairy Shrimp

B-32 Avoidance and minimization of indirect impacts to San Diego fairy shrimp- and Riverside fairy shrimp-occupied habitat adjacent to project sites would be fulfilled through installation of construction measures such as specific BMPs outlined by the State of California under the Nonpoint Source Pollution Control Plan and Phase II Municipal Storm Water Permit, as stated in Chapter 4.6.1 of the INRMP (USMC 2007a). ES would review specific BMPs (e.g., sediment fencing intended to protect vernal pools) before measures are implemented to avoid potential adverse effects (e.g., altered hydrologic regime) of the BMP and determine whether special post-BMP measures are warranted (e.g., revegetation of areas temporarily impacted). No trenching would occur within vernal pool watershed areas in association with BMPs such as sediment fencing, etc.

B-33 To avoid impacts to San Diego fairy shrimp and/or Riverside fairy shrimp, known occurrences within project boundaries or 500 feet of project boundaries would be identified on project demolition and construction plans and, as determined necessary by ES or the project biologist, occupied habitat would be clearly marked in the field with markers or exclusion fencing. Known populations and restricted areas would be monitored by the project biologist (familiar with the habitat of species) during construction phases, as determined necessary by ES.

B-34 Measures to provide for the complete avoidance of any type of direct impact to vernal pools occupied by San Diego fairy shrimp and/or Riverside fairy shrimp must be upheld. To provide for complete avoidance of direct impacts, the project biologist (in this case, a preapproved and qualified fairy shrimp biologist) would coordinate closely with ES to implement location-specific avoidance and minimization measures that may include:

B-34.1 Design and installation methods that would avoid all direct impacts to vernal pools occupied by federally listed species (e.g., TLS construction for pipelines or conduits and aligning segments or spacing utility poles to avoid impacts).

B-34.2 At locations determined necessary by ES, the project biologist would be present during all phases of construction.

B-34.3 To avoid impacts to pools occupied by San Diego fairy shrimp within San Onofre Mesa Vernal Pool Restoration Area associated with P-1044, final designs for this project would specify that the proposed brine pipeline extending past this area would be installed underneath or to the inland (northeast) side of the paved San Onofre State Beach access road. No permanent or temporary impacts would occur on the coastal (southwest) side of the paved road.

B-35 Where complete avoidance is not feasible for the underground utilities, unavoidable direct permanent impacts to vernal pools occupied by Riverside and San Diego fairy shrimp would require the following measures:

B-35.1 Unavoidable impacts to habitat occupied by San Diego fairy shrimp and/or Riverside fairy shrimp would be offset by restoration and creation of occupied San Diego fairy shrimp and/or Riverside fairy shrimp habitat. Based on estimated impacts to 7 basins occupied only by San Diego fairy shrimp, 1 basin occupied only by Riverside fairy shrimp, and 1 basin occupied by both San Diego fairy shrimp and Riverside fairy shrimp totaling 7,690 square feet of basin surface area, the Marine Corps would restore/create a minimum of 15,380 square feet of occupied habitat on MCBCP, including creation of at least as much San Diego fairy shrimp and Riverside fairy shrimp habitat as would be destroyed.

B-35.2 Any reduction of impacts to Riverside and/or San Diego fairy shrimp habitat achieved as a result of avoiding pools during the design or implementation phases of the project would proportionately reduce the amount of restoration/creation implemented.

B-35.3 Eleven basins (Pools 109, 126, 127, 399, 402, 405, 410, 428, 1949, 1963, and 2959) within the project corridor footprints were identified to contain an unidentified *Branchinecta* species that may be SDFS. Before construction that may impact these basins, the Marine Corps would do one of the following for each of these basins, as necessary:

B-35.3.a Provide USFWS information that establishes that a given basin would be completely avoided by project activities, or that implementation of appropriate conservation measures would ensure adverse impacts to the basin would be avoided.

B-35.3.b Where adequate genetic material is available within the cysts collected in each of these basins, implement and complete genetic analyses of collected cysts to determine species identity of cysts collected from each basin. Genetic analysis should be performed on multiple cysts from each basin to minimize the likelihood of “false negative” determinations. At least ten percent of the available cysts (up to a maximum of ten cysts per pool) should be genetically tested. The Marine Corps would report the findings of these analyses to USFWS prior to initiation of any construction activities that may impact these basins.

B-35.3.c Where adequate cyst genetic material is not available or genetic analyses are inconclusive, conduct additional fairy shrimp surveys, in accordance with USFWS protocols, to establish whether the basins described above are occupied by San Diego fairy shrimp. The Marine Corps would report the findings of these surveys to USFWS prior to initiation of any construction activities that may impact these basins.

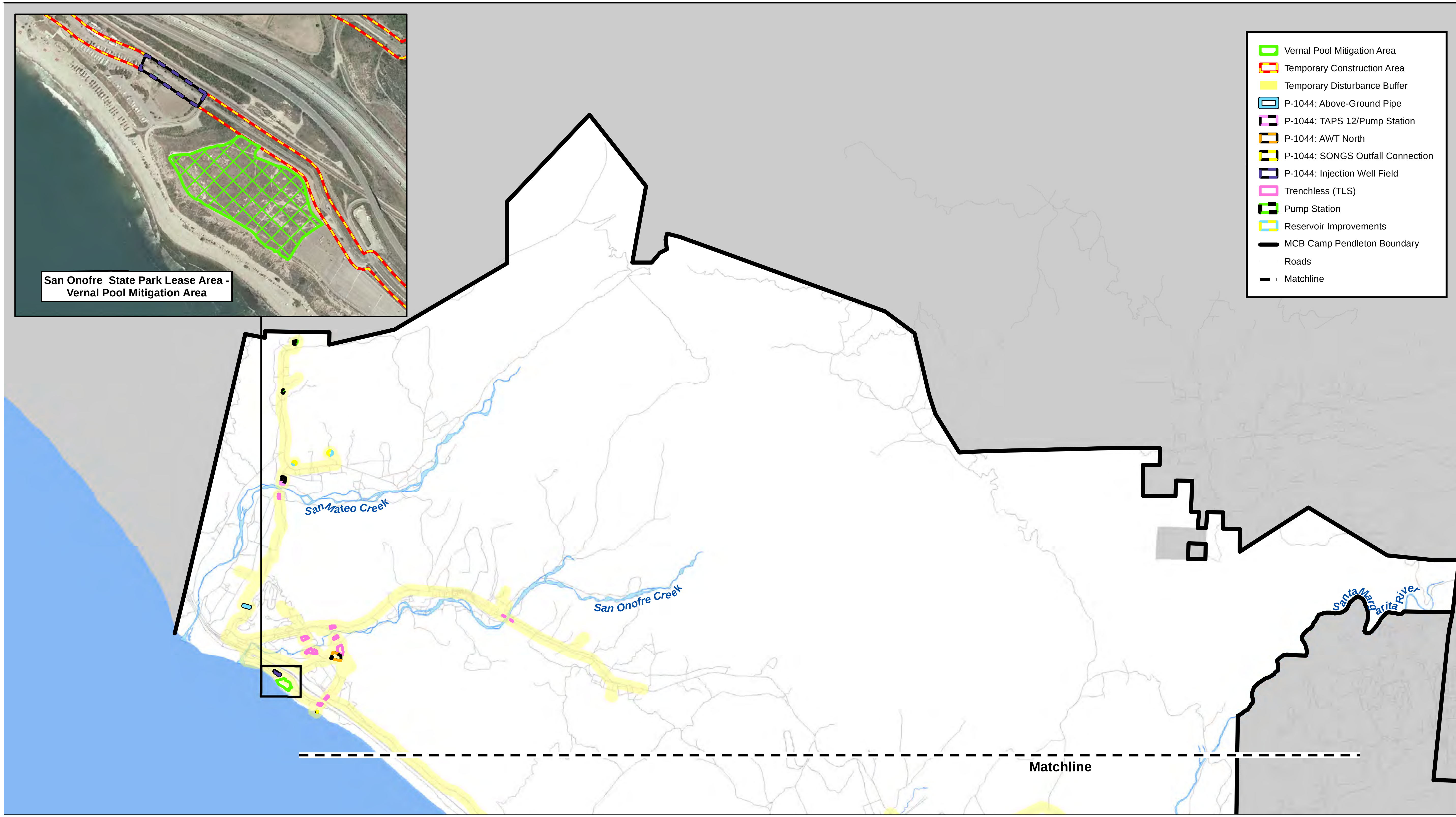
B-35.3.d If any of the specified basins subject to cyst analyses and/or further surveys are determined to be occupied by

San Diego fairy shrimp and cannot be avoided by BWI project activities, the Marine Corps would offset impacts to these pools consistent with B-36 and evaluate impacts to San Diego fairy shrimp and its habitat to ensure that they would be consistent with and within the limits specified by the effects analysis and incidental take statement in the USFWS issued biological opinion.

B-36 Before initiating restoration work for vernal pools, a vernal pool restoration plan would be prepared and submitted to ES for review and approval. ES would provide the report to USFWS for review and approval. Mitigation for vernal pools occupied by San Diego fairy shrimp is expected to be located at the San Onofre State Park Lease area and mitigation for vernal pools occupied by Riverside fairy shrimp would be located at the 41 Area (Las Flores) south of Stuart Mesa Road and at the Victor Training Area (see Figures 2.5-1a and 2.5-1b for anticipated project mitigation locations). The final location for project-specific mitigation would be at a site on MCBCP that is mutually agreed to by ES and USFWS. If the vernal pool habitat is considered waters of the U.S., then the location would also need to be mutually agreed to by USACE. The plan would include restoration/creation locations, reference site locations, existing conditions of the reference and restoration sites including protocol fairy shrimp sampling (wet and dry season), vernal pool floral inventory (March to May), topographic analysis and mapping to an accuracy of <0.5-foot contour, methodology for creating/restoring habitat, monitoring and management requirements and time periods, success criteria, and follow-up measures if needed. Restoration would be initiated within 6 months following construction activities that would result in impacts to listed invertebrates. The timeline of construction and restoration may be affected by the timing for baseline surveys for the restoration effort.

Tidewater Goby and Southern California Steelhead

The following avoidance and minimization measures are specific to the federally listed endangered tidewater goby and the federally listed endangered southern California steelhead.



Source: MCBCP 2009

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 mile(s)

Figure 2.5-1a
Proposed Mitigation Areas
North MCBCP

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Mitigation_North.mxd, 9/6/2011, janssenn

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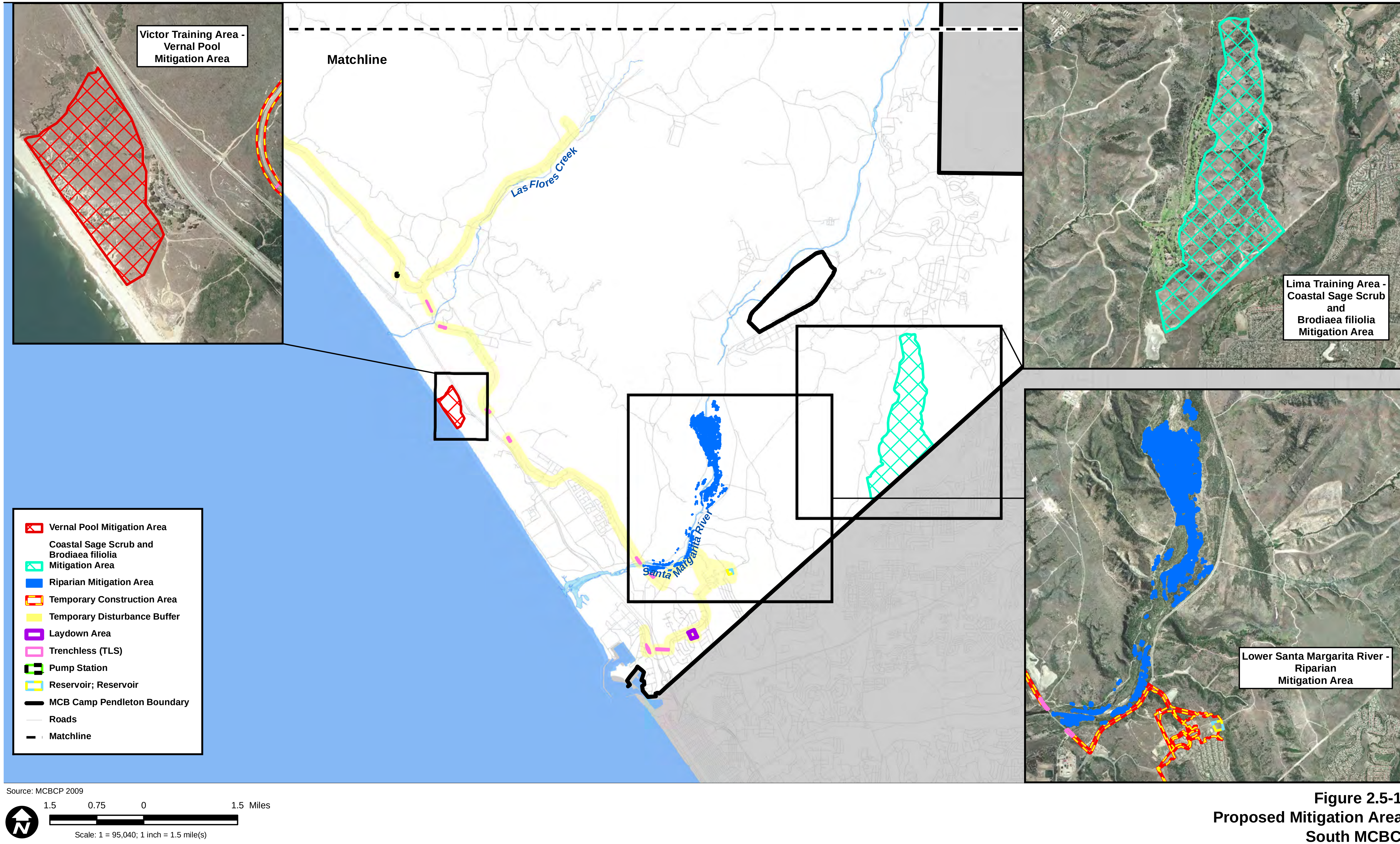

Figure 2.5-1b
Proposed Mitigation Areas
South MCBCP

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Mitigation_South.mxd, 8/14/2012, calantask

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B-37 To avoid direct and indirect impacts to tidewater gobies and southern California steelhead and their habitat, the Marine Corps would ensure that final construction plans comply with the following requirements:

B-37.1 Where feasible, ground-disturbing construction activities would be at least 200 feet from all estuaries. Where this is not feasible, ground-disturbing activities would be minimized to the extent possible.

B-37.2 Any underground utility line that crosses a major creek (TLS boring locations as identified herein) would be directionally bored underneath that creek.

B-37.3 Proposed overhead utilities would not involve placement of new utility poles within active stream channels. Where appropriate, utility lines may be attached to existing bridges (e.g., the Stuart Mesa Bridge over the Santa Margarita River).

B-37.4 Construction and project operation would be designed and implemented in a manner that would not adversely impact hydrology or fish passage within any creek.

B-38 Compensation for unavoidable direct effects to riparian habitat along a southern California steelhead transit reach would require in place habitat restoration and exotic plant removal to a level mutually agreed to by ES and NMFS.

B-39 Mitigation for unavoidable direct effects to riparian habitat, regardless of occupation by the tidewater goby or southern California steelhead, would require compensation as described in the Riparian BO. Mitigation may include habitat restoration and non-native invasive riparian vegetation removal. Mitigation for tidewater goby is discussed in the Riparian BO and would consist of creation of replacement riparian habitat, potentially at a ratio of 2:1. Similar mitigation would apply to southern California steelhead. Exotic species control for direct effects would occur at a ratio ranging from 1.5:1 to 2:1, depending on the vegetation type being affected. Temporary direct effects to riparian habitat may be compensated for at a 1:1 ratio by restoring the temporarily affected area with native vegetation following construction. Additional measures may be required through consultation with USFWS and/or NMFS, including preconstruction surveys or biological monitoring if it is determined tidewater gobies or southern California steelhead are present. Mitigation for riparian habitat is expected to be located in the lower Santa Margarita River where similar mitigation efforts are being implemented at MCBCP (see Figures 2.5-1a and 2.5-1b for anticipated project mitigation locations). The final location for project-specific mitigation would be at a site on MCBCP that is mutually agreed to by ES and USFWS. If the riparian habitat is considered waters of the U.S., then the location would also need to be mutually agreed to by USACE.

Arroyo Toad

B-40 Avoidance and minimization measures would be taken within suitable habitat of the federally endangered arroyo toad. Suitable habitat for arroyo toad can be both riparian and adjacent upland habitats. Arroyo toads have been documented as far as 0.7 mile (1.1 kilometers) from the nearest arroyo toad breeding habitat, but the majority of occurrences are within 1,640 feet (500 meters) (Holland and Sisk 2001). Arroyo toad movement to and from breeding areas is often tied to rainfall and high humidity, particularly outside of the breeding season; movement to breeding sites typically begins in February or March and goes through July (Holland and Goodman 1998; USFWS 1999).

B-41 The designated project biologist for measures associated with arroyo toad would have at least 2 years of independent experience conducting arroyo toad surveys and would have demonstrated experience in handling arroyo toads.

B-42 The project biologist would visit the work site periodically throughout the duration of the project to ensure that all specified measures are being employed to avoid incidental disturbance of riparian habitat and arroyo toads. The project biologist would be empowered to halt work activity if necessary to avoid impacts to arroyo toad. The project biologist would contact the MCBCP Environmental Security Wildlife Branch Head at (760) 725-9729 and the Administrative Office at (760) 725-4512 immediately to discuss necessary actions. As needed, ES staff would confer with USFWS to avoid additional impacts to arroyo toads at the site that may occur.

B-43 Temporary silt fencing would be installed at locations around or within all work areas (with the exception of geotechnical boring and other investigation activities) within suitable arroyo toad breeding or aestivation/dispersal habitat during the breeding season (15 March through 15 August) as determined necessary by the project biologist and ES and with the project biologist present. Once installed, arroyo toad fencing must remain in place until construction is complete.

B-43.1 The silt fencing would be installed at least 14 days before construction to allow enough time for completion of arroyo toad surveys during optimal conditions appropriate for toad activity (i.e., temperature, humidity, atmospheric pressure, moon phase).

B-43.2 Such fencing would consist of woven nylon netting approximately 3 feet in height attached to wooden stakes. This would prevent movement of toads into the project limits.

B-43.3 Before installing the fencing, a narrow trench approximately 6 inches in depth would be excavated and the fence buried to prevent burrowing beneath the fence. If trenching is not possible, the bottom lip of the fence should have sand bags laid against it to hold it in place and deter toads from burrowing under the fence.

B-43.4 All fencing materials (i.e., mesh, stakes, etc.) would be removed immediately following construction.

B-43.5 During any geotechnical boring and other investigation activities, a project biologist would be on-site to guide traffic and check for burrows before drilling. No vegetation would be removed for geotechnical investigation activities unless reviewed and approved by ES.

B-44 Before construction activities, but after exclusionary fencing has been installed, a minimum of 3 nights of surveys for arroyo toads would be conducted within the fenced area by the project biologist. These surveys would be conducted during appropriate conditions (temperature, humidity, atmospheric pressure, moon phase) and during the appropriate hours (i.e., evenings, nights, and mornings) to maximize the likelihood of encountering arroyo toads. If climatic conditions are not highly suitable for arroyo toad activity (no natural rainfall), arroyo toad habitat in the project footprint may be watered to encourage aestivating arroyo toads to surface. All arroyo toads found within the project area would be captured and translocated by the project biologist to the nearest suitable riparian habitat.

Upon completion of these surveys and before initiation of construction activities, the project biologist would report the capture and release locations of all arroyo toads found and relocated during these initial surveys to ES. As needed, ES would provide the report to USFWS.

B-45 After the initiation of construction, the project biologist would be present each morning before initial ground disturbance activities and during removal of excavation unit covers and soil stockpile tarps to check the integrity of the toad fence and survey for any toads along the inside perimeter of the fence that may have entered the area. The project biologist would be on-site at the end of each day to confirm that the silt fence is closed properly and to inspect the integrity of the silt fence.

B-46 The project biologist would be present at the end of each day to ensure that the excavations are properly covered to prevent toads from entering any open pits and to check the integrity of the toad fence. The project biologist would be on call and available as needed at other times in the event that a toad is encountered during the day's activities. The project biologist would be present on-site full time for the 3 days following any measurable rainfall event (i.e., 0.5 inch or greater) or other appropriate climatic conditions (e.g., high relative humidity and moderate temperatures) that are likely to elicit above-ground arroyo toad movement.

B-47 The project biologist would contact ES regarding any arroyo toad sighting within the project limits. As needed, ES would report the sightings to USFWS. Any incidental "take" of toads, which includes digging up, handling (i.e., relocating the toad), injury, or death would be reported immediately to ES, who would in turn notify USFWS.

B-48 Access to the sites would be via preexisting access routes to the greatest extent possible. Project-related vehicle travel would be limited to daylight hours as arroyo toads use roadways primarily during nighttime hours.

B-49 Ingress and egress of construction equipment and personnel would be kept to a minimum, but when necessary and where practicable, equipment and personnel would use a single access point to the site. This single access point would be closed and secured daily at the end of construction. The silt fencing would be inspected every morning for arroyo toads by the project biologist. Where movement of arroyo toads into the construction area is possible, a road grate with a design approved by ES would be installed at access points to prevent movement of arroyo toads into the enclosed area. Road grates would be inspected every morning for arroyo toads by the project biologist.

B-50 Dirt/sand piles left overnight would be covered with tarps or plastic with the edges sealed with sandbags, bricks, or boards to prevent toads from burrowing into the dirt. Holes or trenches would be covered with material such as plywood or solid metal grates with the edges sealed with sandbags, bricks, or boards to prevent toads from falling into holes or trenches. All holes and trenches within the potential arroyo toad habitat would be inspected each morning by the project biologist.

B-51 Activities that attract small insects (e.g., ants) and toad predators would be minimized by keeping the project site as clean as possible. All food-related trash would be placed in sealed bins or removed from the site daily.

B-52 Dust control (i.e., water truck spraying) would be performed only in areas where arroyo toad exclusionary fencing has been installed. Spraying would be performed in a manner which does not compromise the integrity of the fencing. Water truck spraying would be conducted in a manner that does not attract arroyo toads into the project activity areas. For example, over-spraying would be avoided and spraying near occupied habitat would occur only when arroyo toad exclusion fence has been installed.

B-53 All temporary and permanent impacts to riparian habitat would be offset as specified in the Riparian BO. Compensation may include habitat restoration and exotic plant removal.

B-54 Permanent impacts to occupied arroyo toad upland habitat would be offset through restoration of riparian vegetation (arroyo toad breeding habitat). Based on estimated permanent impacts to 15.5 acres of occupied arroyo toad upland habitat, the Marine Corps would restore 7.8 acres of riparian vegetation. Mitigation for riparian habitat is expected to be located in the lower Santa Margarita River where similar mitigation efforts are being implemented at MCBCP (see Figures 2.5-1a and 2.5-1b for anticipated project mitigation locations). Alternatively, the Marine Corps may restore upland habitat at a site on MCBCP that is mutually agreed to ES and USFWS. Based on the estimated impacts, the Marine Corps would restore

31.0 acres of upland habitat for arroyo toad. Any reduction of impacts achieved as a result of avoiding arroyo toad habitat during the design or implementation phases of the BWI Project would proportionately reduce the amount of restoration implemented by the Marine Corps.

B-55 Temporary impacts to occupied arroyo toad upland habitat would undergo appropriate restoration activities (e.g., recontouring, planting, weeding) upon completion of project activities.

B-56 For any restoration activities within occupied arroyo toad habitat, ES would provide a restoration plan for review and approval by USFWS before initiating restoration work. The plan would include the proposed restoration location, existing conditions of the restoration site, methodology for creating/ restoring habitat, monitoring requirements and time periods, success criteria, and follow-up measures if needed. There would likely be a requirement to initiate restoration within 6 months of construction activities that would impact occupied arroyo toad habitat.

Light-Footed Clapper Rail, Least Bell's Vireo, Southwestern Willow Flycatcher, and Coastal California Gnatcatcher

B-57 No direct impacts to occupied light-footed clapper rail or southwestern willow flycatcher breeding habitat would occur in association with the BWI Project. To the maximum extent practicable, construction and other project-related activities (e.g., vegetation clearing) that would occur within 500 feet of occupied clapper rail or flycatcher habitat would take place outside the clapper rail (March 1 to September 15) and flycatcher (May 1 through August 31) breeding seasons. If avoiding the designated breeding seasons at specific locations is not possible, then the following additional measures would be employed:

B-57.1 The project biologist would conduct pre-construction surveys for active clapper rail/flycatcher nests in and within 500 feet of the construction footprint.

B-57.2 For active clapper rail/flycatcher nests found within the survey area, the project biologist would use the distance to the project limits and local topography to determine if construction activities would likely directly damage the nest or significantly disturb nesting activities.

B-57.3 Where damage or disturbance of any clapper rail/flycatcher nest(s) would be likely, the Marine Corps would implement further measures to avoid the likelihood of nest destruction or disturbance, including temporarily halting clearing activities until nesting is completed, with construction activities directed to other areas further than 500 feet from the active nest(s).

B-57.4 Where mutually agreed to by ES and USFWS, straw bale walls may be constructed along the project perimeter to block visibility and sound from the adjacent construction, thereby reducing potential disturbance to active clapper rail/flycatcher nests. Also, signage would be installed to deter people from entering any area with an active clapper rail/flycatcher nest.

B-58 To the maximum extent practicable, construction and other project-related activities would take place outside the California gnatcatcher breeding season (15 February through 31 August) when occupied gnatcatcher habitat is present within 500 feet of areas proposed for disturbance or other construction activity.

B-59 To the maximum extent practicable and per the Riparian BO (MCBCP 1995), construction and other project-related activities would take place outside of the breeding/management season for least Bell's vireo and southwestern willow flycatcher (15 March through 31 August) when occupied habitat is present within 500 feet of areas proposed for disturbance or other construction activity.

B-60 If avoiding the breeding/management season is not practicable at specific locations, then the following additional measures would be employed for listed bird species before or during the breeding/management season, as approved by ES Wildlife Management Branch:

B-60.1 To the extent feasible, if it is known that construction activities cannot avoid the breeding season, the timing of construction should occur before the breeding season to discourage listed bird species from breeding on-site. If construction cannot be timed to occur before the breeding season and must occur after the breeding season has started, preconstruction surveys would be conducted for active nests within 500 feet of the proposed construction corridor during the breeding season at least 1 week before construction. The project biologist conducting surveys would be a trained ornithologist with at least 40 hours of observation in the field for target species being surveyed and with documented experience locating and monitoring nests of target species. In addition, ES would coordinate with USFWS on additional avoidance measures if listed birds and/or nests are detected during preconstruction surveys.

B-60.2 For active gnatcatcher or vireo nests found within the survey area, the project biologist would use the distance to the project limits and a topographical noise analysis to determine if construction activities are likely to significantly disturb nesting activities.

B-60.3 When damage or disturbance to the nest(s) is likely outside occupied Pacific pocket mouse habitat, the Marine Corps would implement further measures to avoid the likelihood of nest destruction, nest abandonment, or disturbance, including temporarily halting construction activities until nesting is completed, with construction activities directed to other areas farther than 500 feet (or as determined by ES and USFWS) from the active nest(s).

B-60.4 Where mutually agreed to by ES and USFWS, straw bale walls may be constructed along the project perimeter to block visibility and sound from the adjacent construction, thereby reducing potential disturbance to active gnatcatcher or vireo nests. Also, signage would be installed to deter people from entering any area with an active nest.

B-61 No night-time construction activities would be planned and lights are not anticipated. If for extraordinary circumstances construction lighting is required, all lighting structures would be shielded so that light does not enter plant communities occupied by the coastal California gnatcatcher. Any lighting for operational use would also be shielded. The project biologist would have the ability to halt activities if necessary to avoid impacts to light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, or southwestern willow flycatcher.

B-62 If night work is required for utility lines to cross a busy street or intersection where a listed species or habitat is present nearby, lighting would be shielded from affecting the habitat and the project biologist would be present during nighttime work.

B-63 All permanent impacts to light-footed clapper rail-occupied habitat would be offset by restoration of habitat elsewhere on MCBCP, in a location and at a level mutually agreed to by ES and USFWS. The permanent loss of light-footed clapper rail-occupied habitat would be compensated by restoration of habitat. All light-footed clapper rail-occupied habitat that is temporarily impacted by project activities would undergo appropriate restoration actions (e.g., recontouring, planting, weeding) upon completion of project activities. Any reduction of impacts to light-footed clapper rail-occupied habitat achieved as a result of further minimizing the project footprint would proportionately reduce the amount of restoration implemented.

B-64 Mitigation for unavoidable direct effects to riparian habitat, regardless of occupation by the least Bell's vireo and southwestern willow flycatcher, would require compensation as addressed in the Riparian BO (i.e., temporarily impacted riparian habitat would be restored, and permanent impacts to riparian habitat would be offset by removing non-native invasive riparian species and restoring native riparian vegetation on MCBCP).

B-65 All coastal sage scrub that would be temporarily impacted by project activities would undergo appropriate restoration actions (e.g., re-contouring, planting, weeding) upon completion of project activities. All permanent impacts to coastal sage scrub would be offset by restoration of coastal sage scrub elsewhere on MCBCP, in a location mutually agreed to by ES and USFWS. The permanent loss of an estimated 14.9 acres of California gnatcatcher-occupied coastal sage scrub at the project sites would be offset by restoration of 29.8 acres of coastal sage scrub. Any reduction of impacts to gnatcatcher-occupied coastal sage scrub achieved as a result of further minimizing the project footprint would proportionately reduce the amount of restoration implemented.

B-66 Prior to initiating projects that would impact gnatcatcher-occupied coastal sage scrub, ES would provide a copy of the coastal sage scrub restoration plan to USFWS for review, comment, and approval. The plan would include the proposed restoration location, a description of existing conditions of the restoration site, methodology for creating/restoring habitat, monitoring requirements and time periods, success criteria, and follow-up measures, if needed. Coastal sage scrub restoration would be initiated within six months of initiating projects that impact gnatcatcher-occupied coastal sage scrub.

Pacific Pocket Mouse

B-67 The project biologist (in this case, a preapproved and qualified Pacific pocket mouse biologist) would monitor all phases of construction at locations within 500 feet of known Pacific pocket mouse populations and would coordinate closely with USFWS and ES to implement location-specific avoidance and minimization measures that would include the following:

B-67.1 All project alignments would avoid direct impacts to occupied Pacific pocket mouse habitat to the maximum extent feasible. Known populations of Pacific pocket mouse within 500 feet of the project boundaries would be identified on project construction plans.

B-67.2 At locations where Pacific pocket mouse is known or has the potential to exist within 500 feet of the project boundaries, as determined necessary by ES, the project biologist would be present during all phases of construction.

B-67.3 The project biologist would have the authority to delay any project action that may impact occupied Pacific pocket mouse habitat. If work activity is halted, the project biologist would contact ES immediately to discuss the potential for unanticipated impacts to Pacific pocket mouse and would recommend actions to avoid these impacts. As needed, ES would discuss appropriate measures with USFWS to ensure that unanticipated impacts to Pacific pocket mouse are avoided.

B-67.4 Silt fences would be erected around portions of the project site that cut through Pacific pocket mouse occupied habitat. The fencing design and location would be reviewed and approved by ES and USFWS to ensure that fencing is appropriately placed and that Pacific pocket mouse cannot dig, crawl, or hop under or over the fence. Such fencing may consist of woven nylon netting approximately 3 feet in height attached to wooden stakes. Consistent with final specifications provided by ES, the bottom lip of the fence would either be buried in the ground or would have sand bags laid against it to hold it in place and deter burrowing under the fence. The project biologist would check the integrity of the fence each morning and evening. All fencing material would be removed following construction.

B-67.5 Before installing the fencing, methodology would be determined through consultation with USFWS to prevent burrowing underneath the fence. If trenching is determined to be undesirable or unfeasible, the bottom lip of the fence would have sand bags laid against it to hold it in place and deter burrowing under the fence. The project biologist would check the integrity of the fence each morning and evening, and will check that no Pacific pocket mice are using sandbags for cover. All fencing material and sandbags would be removed following construction.

B-67.6 After installing the fence, but before additional construction activities continue within the fenced area, a qualified biologist would trap for Pacific pocket mice that may be caught within the limits of the fencing and release the individuals to an approved area. The requirements for the trap and release of Pacific pocket mice would be developed with ES and USFWS and detailed in a trapping plan that must be submitted to USFWS at least 60 days before trapping is expected to begin. This plan would include measures to maximize the likelihood that Pacific pocket mice would survive and re-establish territories within the temporarily impacted habitat and would include follow-up monitoring to evaluate the success of the trap and release effort. Trapping of Pacific pocket mice would be conducted at the beginning of the breeding season (early May) when adult Pacific pocket mice are likely to have emerged from aestivation, but there has not been extensive breeding. Trapping would be conducted for at least 7 nights, with at least two consecutive nights of negative results at the end of the trapping session.

B-67.7 The soils from the impacted areas near occupied Pacific pocket mouse habitat would be stockpiled at a location determined by ES. Topsoil (the top 12 inches of substrate) would be removed and reserved separately from soil at lower horizons. All stockpiled soils would be completely covered until replaced or otherwise used. The topsoil would be placed on the top of temporarily impacted Pacific pocket mouse occupied habitat and Pacific pocket mouse suitable habitat as part of the restoration effort for these locations.

B-67.8 All temporary impacts to Pacific pocket mouse habitat, including suitable habitat and occupied habitat, would be restored consistent with B-18. A plan specifically for restoration of temporarily impacted Pacific pocket mouse occupied habitat would be submitted to USFWS for review and approval at least 60 days before any impacts to Pacific pocket mouse or Pacific pocket mouse occupied habitat would be anticipated. The plan would include quantitative performance criteria to ensure that the habitat is maintained as Pacific pocket mouse habitat. Considerations to be included in the restoration plan for Pacific pocket mouse occupied habitat include maintenance of the friable soils preferred by Pacific pocket mouse; planting of species, such as native grasses and forbs, that are prevalent within occupied Pacific pocket mouse habitat; incorporation of erosion control measures to minimize degradation of temporarily impacted habitat; and maintenance and monitoring of the site to ensure that performance criteria are met.

B-67.9 No nighttime work would occur.

B-67.10 Construction, re-contouring, installation of erosion control measures, and re-seeding of temporarily impacted Pacific pocket mouse occupied habitat would be completed as soon as possible following removal of Pacific pocket mouse and no later than August 31.

B-67.11 Pacific pocket mouse that would be removed from the project footprint would be released back into the temporarily impacted habitat following completion of construction activities and initial site preparation described in the Conservation Measure B-67.7. The release would take place as early as possible following completion of construction and initial site preparation and no later than September 7. With approval of USFWS and concurrence of the San Diego Zoological Society, the Marine Corps may instead provide Pacific pocket mouse removed from the project footprint to the San Diego Zoological Society to establish a captive breeding population.

B-67.12 Based on the estimated temporary impacts to 2.87 acres of Pacific pocket mouse occupied habitat, the Marine Corps would fund an appropriate and proportional level of resources for the San Diego

Zoological Society's effort to establish a captive Pacific pocket mouse population and reintroduce Pacific pocket mouse to locations within their former distribution. This funding would be provided prior to initiating project-related impacts to Pacific pocket mouse occupied habitat. The Marine Corps would also consider restoration of Pacific pocket mouse habitat outside the project footprint as an alternative to contributing funds to the captive breeding and translocation program; in the event that the Marine Corps would decide to implement Pacific pocket mouse habitat restoration outside the project footprint, the Marine Corps would re-initiate consultation.

Stephens' Kangaroo Rat

B-68 The project biologist (in this case, a preapproved and qualified Stephens' kangaroo rat biologist) would be required to have expertise in the ecology and sign of species, and to have had direct, supervised field experience handling a minimum of 10 to 20 individual Stephens' kangaroo rats.

B-69 No nighttime work would occur.

B-70 Within 2 weeks before initiation of construction, the project biologist would conduct a preliminary survey for Stephens' kangaroo rat sign within all areas of the project limits as identified in the proposed action's Biological Assessment, taking into account project realignments agreed to during formal consultation on the project. The survey area would include a 120-foot perimeter area around the project limits. The project biologist would mark all active Stephens' kangaroo rat burrows within or adjacent to the area that would be potentially impacted by construction activities. Burrow locations and other Stephens' kangaroo rat sign would be mapped and provided to ES before initiation of construction.

B-71 If Stephens' kangaroo rat sign is found during preconstruction surveys in or immediately adjacent to any part of the project limits not identified as occupied Stephens' kangaroo rat habitat, the area of occupation would be mapped and reported to ES upon completion of those surveys. This area would be used to adjust the construction impact zone where feasible to minimize impacts to Stephens' kangaroo rat. Where avoidance cannot be obtained, the new area(s) mapped would be used to adjust the estimate of impact to occupied Stephens' kangaroo rat habitat that would be described in the BO for the proposed action, and would also be used to quantify the area of required habitat creation for project mitigation.

B-72 The project biologist would monitor project construction to ensure that conservation measures are implemented and that there would be no unanticipated impacts to Stephens' kangaroo rat. The project biologist would have the authority to delay any project action that may impact occupied habitat, until appropriate avoidance measures are determined by ES and USFWS.

B-73 At the initiation of any trenching in or within 120 feet of habitat determined to be occupied by preliminary surveys, the project biologist would coordinate the trenching effort with the construction supervisor to determine the route that would least impact Stephens' kangaroo rat habitat. An attempt would be made to place trenching no closer than 20 feet from active Stephens' kangaroo rat burrows. If trench alignment is required within 20 feet of active burrows, the number of burrows within this distance would be reported to ES upon completion of trenching activities.

B-74 After the initiation of construction, the project biologist would be present each morning and evening, and would be on call and available as needed throughout the day.

B-75 In and within 120 feet of occupied Stephens' kangaroo rat habitat, trenches would either be dug and backfilled each day or open trenches would be covered each evening at the completion of work. Trench covers would consist of rigid boards or plates that cover all openings into the exposed trench.

B-76 If cover plates are used to cover trenches at night, the project biologist would be present when the cover plates are removed and would inspect and remove any animals that may have entered the trench during the night. The number and physical condition of individual Stephens' kangaroo rats found within the trench and subsequent relocation of the affected individuals would be reported to MCBCP Environmental Security Wildlife Branch Head at (760) 725-9729 and the Administrative Office at (760) 725-4512 immediately.

B-77 Before construction activity each morning, the project biologist would inspect any portion of the trenching in suitable but unoccupied Stephens' kangaroo rat habitat that has been left uncovered or unfilled overnight and identify and remove any animals that may have entered the trench during the night. If Stephens' kangaroo rats are found in the trench, the number and physical condition of individuals and subsequent relocation of the affected individuals would be reported to MCBCP Environmental Security Wildlife Branch Head at (760) 725-9729 and the Administrative Office at (760) 725-4512 immediately.

B-78 Unavoidable direct impacts to habitat occupied by the Stephens' kangaroo rat would require compensation as determined through Section 7 consultation between ES and USFWS. Compensation may include upland habitat enhancement or restoration at a 2:1 ratio to increase Stephens' kangaroo rat-suitable habitats as a result of a permanent loss of acreage.

B-79 For any restoration activities, a restoration plan would be provided to ES for comment, review, and approval. There may also be a requirement to submit the plan to USFWS for approval before initiating project activities that would impact occupied Stephens' kangaroo rat habitat. The plan would include the proposed restoration location, existing conditions of the restoration site, methodology for creating/restoring habitat, monitoring requirements and time periods, success criteria, and follow-up measures if needed. There would likely be a requirement to initiate restoration within 6 months of construction activities that would impact occupied habitat.

Migratory Birds

The following avoidance and minimization measures are specific to migratory birds.

B-80 Project design for all electrical upgrades and associated facilities would follow the raptor protection guidelines supported by the Base's avian protection program (HDR 2010). Following these guidelines would facilitate compliance with the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA).

B-81 All vegetation clearing required by the proposed project would occur outside of the nesting season for migratory bird species (15 February through 31 August). If avoiding the nesting season is not possible, then the following additional measures would be employed:

B-81.1 The project biologist would conduct preclearing surveys for active nests within 500 feet of the areas proposed for clearing. The designated project biologist for this measure would be a trained ornithologist with at least 40 hours of independent observation in the field for all federally listed bird species that may occur within or near the project limits.

B-81.2 For active bird nests found within the survey area, the project biologist would use the distance to the project limits and local topography to determine if clearing activities are likely to significantly disturb nesting activities.

B-81.3 Where damage or disturbance of any nest is likely, MCBCP would implement further measures to avoid any effects to the nesting bird, including temporarily halting the work until nesting is completed.

B-82 All attempts would be made to conduct vegetation clearing required by the proposed project outside of the nesting season for migratory bird species (15 February to 31 August). If avoiding the nesting season is not possible, then the following additional measures would be employed:

B-82.1 The project biologist would conduct preclearing surveys for birds and active nests within 500 feet of the areas proposed for clearing. The designated project biologist for this measure would be a trained ornithologist with at least 40 hours of independent observation in the field for all federally listed bird species that may occur within or near the project limits.

B-82.2 For active bird nests found within the survey area, the project biologist would assess the distance to the project limits and local topography to determine if clearing activities are likely to significantly disturb nesting activities.

B-82.3 Where damage or disturbance of any nest is likely, MCBCP would implement further measures to avoid any effects to the nesting bird, including temporarily halting the work until nesting is completed.

2.5.3 Cultural Resources

The applicability of specific cultural resources measures to individual projects and alternatives may be found in Table 2.5-4.

The following measures would be employed to avoid or minimize impacts to cultural resources during construction. A Programmatic Agreement (PA) among MCBCP, the SHPO, and other consulting parties is being developed and would be executed to ensure Section 106 compliance and resolve any adverse effects if avoidance is not feasible. This PA would also specify the appropriate procedures that would be followed during any unanticipated discoveries.

CR-1 Boundaries of NRHP-eligible properties less than 75 feet from the proposed action construction limits would be clearly marked to ensure that construction impacts would be avoided.

CR-2 Archaeological and Native American monitoring would be required during ground disturbance for the projects. The monitoring program, including procedures to be followed in the event of a discovery, would be specified in a Monitoring and Discovery Plan developed and approved by the Cultural Resources Branch Head before construction. Monitoring would be limited to archaeological sites, areas adjacent to archaeological sites, and areas of inadvertent discoveries as identified in the executed PA.

CR-3 SHPO would be given the opportunity to review and comment on the 100-percent designs for each project to ensure that archaeological sites are avoided to the extent feasible. SHPO would be provided a copy of the final designs for each project for their records.

2.5.4 Air Quality

The applicability of specific air quality measures to individual projects and alternatives may be found in Table 2.5-4.

The following measures would be employed to avoid or minimize the generation of pollutants during construction.

AQ-1 All active construction areas would be watered at least twice daily. Where suitable habitat for listed species occurs within proposed construction areas, avoidance measures would be implemented, as discussed in the species-specific measures above.

AQ-2 Open storage piles and disturbed areas would be stabilized by covering and/or applying water or chemical/organic dust palliatives where appropriate.

This would apply to both active and inactive sites and during workdays, weekends, holidays, and windy conditions.

AQ-3 Wind fencing would be installed and grading operations would be phased wherever appropriate, and water trucks would be operated for stabilization of surfaces under windy conditions.

AQ-4 All trucks hauling soil, sand, and other loose materials would be covered or maintain at least 2 feet of freeboard.

AQ-5 Material-hauling equipment would be protected from spillage and limited to 15 miles per hour (mph). Earth-moving equipment other than soil-haul trucks importing or exporting cut or fill material would be limited to 10 mph.

AQ-6 All unpaved access roads, parking areas, and staging areas at construction sites would be paved, have water applied twice daily, or have nontoxic soil stabilizers applied.

AQ-7 Streets would be swept daily with water sweepers if visible soil material is carried onto adjacent paved streets.

AQ-8 Use, trips, and idling of heavy equipment would be reduced to the extent practicable.

AQ-9 If practicable, construction equipment engines would be maintained and tuned per manufacturers' specifications to perform at USEPA certification levels and to perform at verified standards applicable to retrofit technologies. Periodic, unscheduled inspections would be employed to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. Engine certification data can be found at http://www.epa.gov/OMS/certdata.htm.

AQ-10 Tampering with engines would be prohibited and continuing adherence to manufacturers' recommendations would be required.

AQ-11 If practicable, leased equipment would be new and clean, and would meet the most stringent of federal or state standards. In general, leased equipment would conform to the best available emissions control technology. Tier 4 engines would be used for project construction equipment to the maximum extent feasible Model contract specifications can be found at http://www.epa.gov/otaq/diesel/construction/documents/cl-nedc-model.pdf.

AQ-12 Lacking availability of non-road construction equipment that meets Tier 4 engine standards, USEPA-verified particulate traps, oxidation catalysts, and other appropriate controls would be used where suitable to reduce emissions of diesel particulate matter and other pollutants at the project site.

AQ-13 Alternative fuels such as natural gas and electricity (plug-in or battery) would be considered for construction use.

AQ-14 Before groundbreaking, an inventory of all equipment would be prepared and the suitability of add- on emission control would be identified for each piece of equipment.

AQ-15 A construction traffic and parking management plan that maintains traffic flow and minimizes vehicle trips would be developed.

AQ-16 Sensitive receptors in the project area, such as children, elderly, and infirmed, would be identified, and the means to minimize impacts to these populations (e.g. locate construction equipment and staging zones away from sensitive receptors and building air intakes) would be specified.

2.5.5 Noise

The applicability of specific noise measures to individual projects and alternatives may be found in Table 2.5-4.

The following measures would be employed to avoid or minimize noise nuisance and impacts during construction.

N-1 Construction activities within 1,000 feet of known residential or lodging structures would not occur at night (7:00 p.m. to 7:00 a.m.), thereby avoiding adverse effects of construction-related nighttime noise.

N-2 Contractors would schedule construction activities within 200 feet of noise sensitive land uses to avoid simultaneous use of several pieces of high noise level-emitting equipment, to the extent practicable.

N-3 Construction equipment would be fitted with manufacturer's standard, or better, noise shielding and muffling devices to reduce noise levels to the maximum extent feasible.

N-4 Equipment maintenance and staging areas would be located as far away from local noise-sensitive uses as feasible.

N-5 At least 2 weeks before the start of construction, a notice would be posted at the project site and in conspicuous areas in BEQs and housing areas within 1,000 feet of planned construction activities. The notice would include the planned start date, hours of construction, duration of construction activities, and contact information for noise complaints. The notice should also inform residents that periods of disturbing noise may occur during the construction period.

2.5.6 Public Health and Safety

The applicability of specific public safety measures to individual projects and alternatives may be found in Table 2.5-5.

The following measures would be implemented for public health and safety-related issues (i.e., hazardous materials, hazardous wastes, wildfire, worker safety, unexploded ordnance, etc.) during construction and demolition activities.

PS-1 The proposed action would be accomplished with every effort to prevent damage to remediation equipment and the spread of potential contamination or release of potential contaminants to the environment in accordance with all federal, state, and local laws, regulations, and instructions.

PS-2 The Health and Safety Plan prepared by the contractor would include fire safety measures to be employed during construction to avoid potential wildfire impacts to native habitat.

PS-3 During proposed demolition and construction activities, standard safety measures and BMPs such as fencing, signs, and security would be implemented to minimize safety risks and unauthorized access.

PS-4 If soil contamination (discolored and/or odorous) is discovered during construction, the Installation Restoration/Remediation Branch at (760) 725-

9744/9774 would be contacted for necessary remedial requirements. If the construction of structures would be outside of any known, identified groundwater plume, additional regulatory concurrence would not be required. However, these locations would still be evaluated by Navy and Marine Corps Installation Restoration Program (IRP) managers to ensure they are not downgradient of an existing plume where further investigation and/or cleanup may take place.

PS-5 If the proposed construction would occur within a known plume area, three levels of evaluation or coordination must be conducted before finalizing the proposed location of structures.

- IRP managers would evaluate the location to determine if the placement of these structures would impede future investigations or cleanup. Generally, if the proposed locations would be within a plume area where the maximum contaminant level (MCL) for groundwater has not been exceeded, it is likely the proposed location would be acceptable as long as it would not impede further investigation or cleanup associated with an upgradient plume. If groundwater is encountered, sampling and analysis would be included to determine proper disposal of any groundwater removed.
- A human health risk assessment would need to be conducted for the proposed location to determine if there is a potential threat to human health.
- There would need to be coordination and concurrence from the Federal Facilities Agreement team members, which include USEPA, the state Department of Toxic Substances Control (DTSC), and RWQCB.

PS-6 Chemicals and other hazards associated with the Northern AWT would be handled in accordance with existing Occupational Safety and Health Administration (OSHA) standards included in 29 C.F.R. Part 1910, OSHA, subpart H, Hazardous Materials. The existing Sewage Treatment Plants (STPs) are connected to the MCBCP Environmental Management System (EMS) to monitor critical water levels, maintain sufficient influent and effluent flow capacities, and monitor emergency conditions at the wastewater treatment plants. In addition, the MCBCP EMS is responsible for monitoring the operational status of equipment, key analog signals such as flow rates and pump states, wet well levels, and critical alarm conditions associated with the existing wastewater treatment plants (USMC 2004).

PS-7 The ES Installation Restoration Branch would coordinate dewatering operations and would be involved in detailed project design to avoid impacts to IR Site 33. Sampling and analysis may be required for the appropriate disposal designation.

PS-8 Demolition and construction activities are expected to generate short-term construction noise levels and increase fugitive dust. To further eliminate the minor disturbances to individuals, especially children, who may come to or near proposed site areas, a construction emissions mitigation plan would be included and proper mitigation measures would be incorporated in the plan, including mitigation measures such as air quality monitoring, dust abatement, noise control, and BMPs, that would reduce and/or minimize construction impacts.

PS-9 The following additional measures would be incorporated in the construction emissions mitigation plan, where feasible and appropriate, to reduce impacts associated with emissions of particulate matters and hazardous materials from construction-related activities:

- Establish an activity schedule designed to minimize traffic congestion around the construction site.
- Locate construction equipment and staging zones away from sensitive receptors such as child-oriented facilities as well as away from fresh air intakes to buildings and air conditioners.
- Reduce trips and unnecessary idling from heavy equipment.
- Periodically inspect construction sites to ensure construction equipment is properly maintained at all times.
- Dust emissions would not extend beyond the property line for more than 3 minutes in any 60-minute period, and fugitive dust from track out/carry out emissions would be minimized during demolition, construction, and transport in accordance with San Diego Air Pollution Control District (APCD) Rule 55.

PS-10 In the event the contractor encounters contaminated soil and/or groundwater (hereinafter, "waste") during the project, the contractor would be responsible for all costs associated with any and all waste generated by such actions and would take all actions to dispose of the waste in accordance with all federal, state, and local laws, regulations, and instructions, including the requirements of the CWA and current MCBCP requirements and directives.

PS-11 Precautions to protect construction crews would be taken when working around active aboveground storage tanks (ASTs) and operational underground storage tanks (USTs).

PS-12 All hazardous waste would be packaged, stored, and shipped in accordance with 40 C.F.R., 49 C.F.R., and Code of California Regulations (C.C.R.) Title 22. All Hazardous Waste Manifests would be signed by the Hazardous Waste Branch, ES. An analytical or profile and Land Ban Restriction notice must accompany the manifest. MCBCP's CA2170023533 would be utilized for the generator's USEPA identification number.

PS-13 No construction activities would occur when weapons training is being conducted at any project corridor/site. The construction contractor would use caution due to the possibility of encountering unexploded ordnance (UXO). Excavation, grading, or digging within the boundaries of a former or current range would employ every effort to maximize safety and prevent the spread of any potential contamination or release of any existing contaminants to the environment in accordance with all federal, state, and local laws, regulations, and guidelines. Proper health and safety planning and execution of Munitions and Explosives of Concern (MEC) support would be implemented per site-specific project requirements.

PS-14 MCBCP's emergency response number, (760) 725-3333, would be utilized. The contractor would always use MCBCP's generator's name and mailing address:

ENVIRONMENTAL SECURITY
P.O. BOX 555008
CAMP PENDLETON CA 92055-008

The following measures are specific to P-1044 Alternative 1 and Alternative 3.

PS-15 Pursuant to the Resource Conservation and Recovery Act (RCRA), if contaminated soil is encountered from “no further action” RCRA Facility Assessment (RFA) Sites 185, 192, 199, 218, 221, 225, 236, and 280, appropriate precautions would be taken to protect construction crews.

PS-16 Construction at or in proximity to RFA site 220 would not occur until the RFA site has been remediated.

PS-17 If contaminated soil from closed USTs 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536 is encountered during construction, precautions would be taken to protect construction crews.

PS-18 If contaminated soil or groundwater is encountered during shallow excavation and/or dewatering activities near leaking UST (LUST) Site 62507, precautions would be taken to protect construction crews and to avoid damaging groundwater monitoring wells and remediation equipment in proximity to LUST Site 62507.

PS-19 If contaminated groundwater is encountered in proximity to Installation Restoration (IR) Site 33, precautions would be taken to protect construction crews and to avoid damaging groundwater monitoring wells around Buildings 52651 and 52655.

PS-20 If contaminated soil from closed IR Sites 11-2, 34, and 36 is encountered, precautions would be taken to protect construction crews.

PS-21 Construction within Sierra 1 Training Area (the former North Agricultural Lease Site) would take precautions to protect construction crews from potentially contaminated soil.

The following measures are specific to P-1045 Alternative 1 and Alternative 4.

PS-22 If contaminated soil is encountered near “no further action” RFA Sites 168, 278, and 279, appropriate precautions would be taken to protect construction crews.

PS-23 If contaminated groundwater is encountered in proximity to IR Site 7, precautions would be taken to protect construction crews.

PS-24 If contaminated groundwater is encountered in proximity to IR Site 1D, precautions would be taken to protect construction crews and to avoid damaging groundwater monitoring wells in proximity to IR Site 1D.

PS-25 If contaminated soil is encountered from closed IR Site 32, precautions would be taken to protect construction crews.

The following measures are specific to P-1044 Alternative 2 and Alternative 4.

PS-26 If contaminated soil is encountered from "no further action" RFA Sites 192, 199, 218, 221, 225, 236, and 280, appropriate precautions would be taken to protect construction crews.

PS-27 If contaminated soil is encountered near RFA Site 220, construction would not occur near the RFA site until the site has been remediated.

PS-28 If contaminated soil from closed USTs 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536 is encountered during construction, precautions would be taken to protect construction crews.

PS-29 If contaminated soil or groundwater is encountered during shallow excavation and/or dewatering activities near LUST Site 62507, precautions would be taken to protect construction crews and to avoid damaging groundwater monitoring wells in proximity to LUST Site 62507.

PS-30 If contaminated groundwater is encountered in proximity to IR Site 33, precautions would be taken to protect construction crews and to avoid damaging groundwater monitoring wells around Buildings 52651 and 52655.

PS-31 If contaminated soil from closed IR Sites 11-2, 34, and 36 is encountered, precautions would be taken to protect construction crews.

PS-32 Construction within the former North Agricultural Lease Site would take precautions to protect construction crews from potentially contaminated soil.

The following measures are specific to P-1045 Alternative 2.

PS-33 If contaminated soil is encountered from "no further action" RFA Sites 168, 170, 176/B1, 176/B2, 278, and 279, appropriate precautions would be taken to protect construction crews.

PS-34 If contaminated soil or groundwater is encountered during shallow excavation and/or dewatering activities near UST Site 43260, precautions would be taken to protect construction crews and to avoid damaging groundwater monitoring wells in proximity to UST Site 43260. If contaminated soil from USTs 43286-3 or 43286-4, or closed UST 43210, is encountered during construction, precautions would be taken to protect construction crews.

PS-35 If contaminated soil from closed IR Sites 1F, 2D, and 20 is encountered, precautions would be taken to protect construction crews.

The following measures are specific to P-1045 Alternative 3. They also apply to Alternative 5, which incorporates P-1045 Alternative 3.

PS-36 If contaminated soil is encountered near “no further action” RFA Sites 168, 278, and 279, appropriate precautions would be taken to protect construction crews.

PS-37 If contaminated groundwater is encountered in proximity to IR Site 7, precautions would be taken to protect construction crews.

PS-38 If contaminated groundwater is encountered during utilities trenching at IR Site 1D, appropriate actions would be taken if contamination is encountered, and damage to groundwater monitoring wells around IR Site 1D would be avoided.

PS-39 If contaminated soil is encountered from closed IR Site 32, precautions would be taken to protect construction crews.

2.5.7 Marine Resources

The applicability of specific marine resources measures to individual projects and alternatives may be found in Table 2.5-4.

The following measures would minimize impacts to marine resources if use of the SONGS outfall conduit for Northern AWT brine discharge is implemented.

MR-1 A habitat characterization of the ocean floor within the project footprint would be conducted before construction to identify sensitive communities (i.e., rock outcrops, hard-bottom substrates). The habitat characterization survey would update and cover the same bottom area shown in Figure 4.1.14-1. The project design would overlay the habitat characterization and be submitted to ES for review.

MR-2 Best available technology, best control technology, and BMPs would be employed where appropriate to the maximum extent practical.

MR-3 Anchor placement for construction vessels would be limited to soft-bottom habitats to minimize impacts on the more sensitive and biologically rich hard-bottom communities. Vessels would anchor in the same designated areas to the maximum extent practical throughout the construction process. Divers would confirm that anchors are not placed in sensitive communities and anchors would be lifted out of the bottom substrate during vessel movement or repositioning (i.e., not dragged through the bottom substrate). An anchoring plan would be developed to establish anchor zones to avoid or minimize turbidity and biological impacts to hard-bottom resources.

MR-4 During rock armor placement, material would be placed on the sea bottom from a low drop point and limited to the smallest area consistent with engineering requirements.

MR-5 All large whale species are protected under the MMPA and ESA and, although unlikely due to shallow depths in the project area, could travel close to shore and/or within proximity of the project area. However, gray whales are likely the only species of large whale that may regularly occur within the nearshore area of MCBCP (NAVFAC SW 2010). To the maximum extent practicable, construction would take place outside the December through March migration period for gray whales along the coast of California.

MR-6 To minimize the potential for vessel strikes involving federally protected species (including sea turtles and/or marine mammal species), construction-related vessels would remain at least 100 meters from individual(s) while traveling to and from the project area. If the individual marine species is in the path of the vessel, and avoidance measures cannot be implemented, the vessel would put its engine(s) in neutral and not re-engage propulsion until the individual(s) are observed clear of harm’s way. This measure is based on NMFS guidelines (NMFS n.d.) that apply to commercial marine mammal viewing vessels, which are of similar size to the vessels and barges that are anticipated to be used during construction of the brine discharge. Also, construction-related vessels would travel at the minimum speed necessary for safe steerage and reduce the potential for vessel strikes. This measure may be further defined between ES and NMFS during the consultation process.

MR-7 To avoid/minimize potential impacts to sea turtles and marine mammals (including cetacean and pinniped species), two to three observers (or a number determined through consultation with NMFS) who have completed the U.S. Navy's Marine Species Awareness Training, or an equivalent training, would be present during the duration of construction activities that occur in and along marine habitats (see measure B-7 for additional requirements that must be met for project biologists). Before the initiation of daily construction activities, the monitors would scan the project limits and within 500 meters of the projects limits (i.e., the project buffer/shut-down zone) for 30 minutes to ensure that federally protected sea turtles or marine mammals are not present in the designated monitoring zone to avoid startling marine species at the initiation of construction. After construction begins, observers would continue to monitor the designated monitoring zone. Should the observers detect the presence of marine species within or moving toward the project buffer/shut-down zone, construction activities would be halted until the individual(s) has been observed swimming away from or out of the project buffer/shut-down zone or is not observed within the designated area for a minimum of 5 minutes. This measure may be further refined between ES and NMFS during the consultation process and may include additional details, as needed, e.g., how/when ambient underwater noise levels will be measured and at what frequencies.

MR-8 Project noise levels would be monitored to the maximum extent practicable and compared to ambient conditions. Ambient noise levels would be measured in the absence of construction activities to determine background levels. The 500-meter buffer described in MR-7 is considered by NMFS as an acceptable safety zone when noise impacts are unknown, and until measurements can be verified in the field. This buffer may be expanded if noise levels within the safety zone exceed those expected to cause injury to marine mammals. A Noise Monitoring Plan would be submitted with final design. This measure will be further defined between ES and NMFS during the consultation process.

MR-9 Pinnipeds could potentially haul out on construction vessels that have a low deck. To keep pinnipeds from hauling out on construction vessels, fencing or other barriers of sufficient strength and durability will be installed along the outer edge of the deck to keep pinnipeds off the vessel. As needed, other measures as specified through coordination between ES and NMFS during the consultation process would also be employed.

2.5.8 Operations and Training

The applicability of specific operations and training measures to individual projects and alternatives may be found in Table 2.5-4.

The following measures would be implemented to avoid interference with Base operations and training during construction and demolition activities.

OT-1 Underground piping in artillery firing areas would be installed deeper below the surface to minimize concussion and vibration impacts to the structural integrity of the piping system.

OT-2 Hazard warning lighting would be installed on electrical power poles in military training areas and anywhere else these poles could pose a training hazard.

OT-3 Construction traffic management would be coordinated with Base Operations and Training before construction on critical training routes such as Basilone Road and El Camino Real.

2.5.9 Energy Efficiency

The applicability of specific energy efficiency measures to individual projects and alternatives may be found in Table 2.5-4.

E-1 Operating energy cost would be considered in water treatment plant design.

E-2 To the extent possible, water conveyance facilities would be laid out so that gravity moves water downhill.

E-3 Pipes would be laid out in the treatment facility so water is moved the shortest and most direct distances with the least turns and bends feasible.

E-4 Variable speed pumps and motors would be used to the extent compatible with the budget for P-1044 and P-1045 to match capacity with variable demand.

Table 2.5-2
Resource Avoidance and Minimization Measures for Potential Direct and Indirect Impacts within Sites and Adjacent Buffer Areas – Water Resources and Biological Resources (general measures)

Project Number	Alternative Number	Water Resources			Biological Resources		
		W-1 through W-9.1, W-9.6, W-11 through W-14 (various)	W-9.2, W-9.4, and W-9.5 (TLS specific measures)	W-9.3 (sensitive receiving waters)	W-10 (potable water testing measures)	B-1 through B-19, B-21 through B-22	B-20 (new buildings landscaping BEAP compliance)
P-1044	Alt 1/Alt 5	X	X	-	X	X	X
P-1044	Alt 2	X	X	-	X	X	X
P-1044	Alt 3	X	X	-	X	X	X
P-1044	Alt 4	X	X	-	X	X	X
P-1045	Alt 1	X	X	X	X	X	-
P-1045	Alt 2	X	X	X	X	X	-
P-1045	Alt 3/Alt 5	X	X	X	X	X	-
P-1045	Alt 4	X	X	X	X	X	-

Table 2.5-3
Resource Avoidance and Minimization Measures for Potential Direct and Indirect Impacts within Sites and Adjacent Buffer Areas – Biological Resources (measures specific to jurisdictional waters, listed species, and migratory birds)

Project Number	Alternative Number	Biological Resources (continued)									
		B-23 and B-24 (jurisdictional waters)	B-25 through B-28 (thread-leaved brodiaea)	B-29 through B-31 (spreading navarretia and San Diego button- celery)	B-32 through B-36 (San Diego fairy shrimp and Riverside fairy shrimp)	B-37 through B-39 (tidewater goby and southern California steelhead)	B-40 through B-56 (arroyo toad)	B-57 through B-66 (light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, and/or southwestern willow flycatcher)	B-67 (Pacific pocket mouse)	B-68 through B-79 (Stephens' kangaroo rat)	B-80 through B-82 (migratory birds)
P-1044	Alt 1/Alt 5	X	X	-	X	X	X	X	X	-	X
P-1044	Alt 2	X	X	-	X	X	X	X	X	-	X
P-1044	Alt 3	X	X	-	X	X	X	X	X	-	X
P-1044	Alt 4	X	X	-	X	X	-	X	X	-	X
P-1045	Alt 1	X	X	X	X	X	X	X	X	-	X
P-1045	Alt 2	X	X	-	X	-	-	X	X	X	X
P-1045	Alt 3/Alt 5	X	X	X	X	X	X	X	X	-	X
P-1045	Alt 4	X	X	X	X	X	X	X	X	-	X

Table 2.5-4
Resource Avoidance and Minimization Measures for Potential Direct and Indirect Impacts within Sites and Adjacent Buffer Areas – Cultural Resources, Air Quality, Noise, Marine Resources, Operations and Training, and Energy Efficiency

		Cultural Resources	Air Quality	Noise	Marine Resources	Operations and Training		Energy Efficiency	
Project Number	Alternative Number	CR-1 through CR-3 (various)	AQ-1 through AQ-16 (various)	N-1 through N-5 (various)	MR-1 through MR-9 (various)	OT-1 (pipelines in artillery firing areas)	OT-2 and OT-3 (hazard lighting on electrical power poles and construction traffic management)	E-1 and E-3 (water treatment plant specific measures)	E-2 and E-4 (gravity feed and pump efficiency)
P-1044	Alt 1/Alt 5	X	X	X	X	-	X	X	X
P-1044	Alt 2	X	X	X	X	-	X	X	X
P-1044	Alt 3	X	X	X	X	-	X	X	X
P-1044	Alt 4	X	X	X	X	-	X	X	X
P-1045	Alt 1	X	X	X	-	X	X	-	X
P-1045	Alt 2	X	X	X	-	X	X	-	X
P-1045	Alt 3/Alt 5	X	X	X	-	X	X	-	X
P-1045	Alt 4	X	X	X	-	X	X	-	X

Table 2.5-5
Resource Avoidance and Minimization Measures for Potential Direct and Indirect Impacts within Sites and Adjacent Buffer Areas – Public Health and Safety

Project Number	Alternative Number	Public Health and Safety						
		PS-1 through PS-5, PS-7 through PS-14 (various)	PS-6 (chemicals at water treatment plants)	PS-15 through PS-21 (measures specific to P-1044 Alt 1 and Alt 3)	PS-22 through PS -25 (measures specific to P-1045 Alt 1 and Alt 4)	PS-26 through PS-32 (measures specific to P-1044 Alt 2 and Alt 4)	PS-33 through PS-35 (measures specific to P-1045 Alt 2)	PS-36 through PS-39 (measures specific to P-1045 Alt 3)
P-1044	Alt 1/Alt 5	X	X	X	-	-	-	-
P-1044	Alt 2	X	X	-	-	X	-	-
P-1044	Alt 3	X	X	X	-	-	-	-
P-1044	Alt 4	X	X	-	-	X	-	-
P-1045	Alt 1	X	-	-	X	-	-	-
P-1045	Alt 2	X	-	-	-	-	X	-
P-1045	Alt 3/Alt 5	X	-	-	-	-	-	X
P-1045	Alt 4	X	-	-	X	-	-	-

2.6 SUMMARY COMPARISON OF EACH ALTERNATIVE

Table 2.6-1 shows the project components and whether they would have permanent or temporary effects. Table 2.6-2 shows new pipeline construction lengths by pipeline type and alternative for P-1044 and P-1045, as well as pipeline corridor construction length by construction type. When looking at pipeline lengths, it is important to note that in some areas more than one type of pipeline may occupy the some construction trench (as previously shown in project-specific figures), so actual construction length would be less than total pipeline length of all types of pipelines combined, as shown in the table. Further, the figures in the table include all alternative options, so actual pipeline and construction lengths as built would be less than those shown in the table. This table also includes total direct impact area for P-1044 and P-1045, including both pipeline corridors and facility sites, which would include both temporary and permanent impacts. Table 2.6-3 shows similar information, by alternative, for both MILCONs combined. Table 2.6-4 provides a summary comparison of permanent aboveground structures and accompanying permanent direct impact areas that would result from each MILCON, by alternative. As shown, a number of the structures what would result from these projects are retrofits of existing facilities, expansion of existing structures, or within or adjacent to developed areas, minimizing encroachment into otherwise open areas available for training and maneuver, among other uses.

Table 2.6-5 provides a summary of potential environmental impacts, by resource area and alternative, for both MILCONs combined. Tables 2.6-6 and 2.6-7, and provide a summary of potential environmental impacts, by resource area and alternative, for P-1044 and P-1045, respectively. Figures 2.6-1 and 2.6-2 provide side-by-side comparisons of the locations of each of the project-specific alternatives.

Table 2.6-1
Construction Impact Categories for All Build Alternatives

Projects	Temporary Impacts[1]	Permanent Impacts
MILCON P-1044 Northern AWT and Associated Facilities		
Northern AWT (including all treatment facilities and components, new roads, parking, fencing, and gates)		X
Pump Stations		X
Pump Station/TLS Construction Site		X
SONGS Marine Outfall Connection[2]		X
Paved Dirt Road from El Camino Real to Northern AWT		X
Injection Well Fields	X	
Maintenance Access Corridor		X
TLS Construction Site	X	
P-1044 Conveyance Lines (including underground part of SONGS outfall connection)[2]	X	
MILCON P-1045 Connection of Northern and Southern Water Systems		
Pump Stations and Air Vacuum Release Valves		X
Maintenance Access Corridor		X
4-Million-Gallon Reservoir		X
TLS Construction Sites	X	
P-1045 Conveyance Lines[2]	X	

[1]All temporary impacts would be restored to preexisting conditions upon completion of construction activities.
[2]Construction of underground utilities with restoration would normally be considered temporary impacts. However, if they were within new roadway improvements, if they were in Pacific pocket mouse occupied habitat or vernal pool drainage areas, or if they directly impacted brodiaea populations, the impacts would be considered permanent.

Table 2.6-2
Summary Comparison of Type of Pipeline and Length, Type of Linear Construction and Length, and Project Limits Area, by MILCON Alternative: P-1044 and P-1045

	P-1044				P-1045			
	Alt 1/ Alt 5	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 1**	**Alt 2**	**Alt 3/ Alt 5**	**Alt 4**
Type of Pipeline (LF)[1]								
Raw Water	26,000	20,000	17,000	29,000	-	-	-	-
Potable Water	86,000	91,000	79,000	91,000	188,000	165,000	137,000	179,000
Brine	20,000	17,000	30,000	27,000	-	-	-	-
Total	132,000	128,000	126,000	147,000	188,000	165,000	137,000	179,000
Type of Linear Construction (LF)								
Trenching	104,000	98,000	103,000	97,000	175,000	160,000	130,000	173,000
TLS	4,000	4,000	4,000	4,000	11,000	6,000	7,000	7,000
Aboveground	1,000	1,000	1,000	1,000	0	0	0	0
Total	109,000	103,000	108,000	102,000	186,000	166,000	137,000	180,000
Project Limits Area (acres)[2]								
Temporary Impact Area	284	269	285	270	492	299	360	480
Permanent Impact Area	42	35	39	32	30	33	22	30
Total Direct Impact Area	327	304	325	302	522	332	382	510
Northern AWT Location								
Site Number	Site 6	Site 6	Site 4	Site 4	NA	NA	NA	NA
Reservoir Connections								
Reservoir Number	63210 62518 62310 51770 51771 51772 52698 53116 53310	63210 62518 62310 51770 51771 51772 52698 53116 53310	63210 62518 62310 51770 51771 51772 52698 53116 53310	63210 62518 62310 51770 51771 51772 52698 53116 53310	13151 13154 24140 24174 20813 20814 20815 200814 200815 New[3]	13151 13154 24140 24174	20813 20814 20815 200814 200815 New[3]	13151 13154 24140 24174 20813 20814 20815 200814 200815 New[3]

[1] More than one type of pipeline may be placed in a single construction trench, as noted in individual project figures, so trenching totals are less than pipeline totals. Figures in this table also include all alternative options, so actual length of pipeline constructed would be less than shown. All linear feet (LF) numbers are rounded up to even thousands, so sum of individual numbers may not match totals due to rounding.

[2] Total direct impact area includes corridors (temporary impacts) and permanent facility or structure project limits (permanent impacts). Temporary impact area shown represents a maximum temporary direct impact area; the anticipated temporary direct impact area is substantially smaller (see biological resources discussion).

[3] Alternative includes a new and as-yet-unnumbered 4-million-gallon reservoir near the 20 Area.

Table 2.6-3
Summary Comparison of Type of Pipeline and Length, Type of Linear Construction and Length, and Project Limits Area, by Alternative

	Both MILCONs Combined				
	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Type of Pipeline (LF)[1]					
Raw Water	26,000	20,000	17,000	29,000	26,000
Potable Water	274,000	256,000	216,000	270,000	223,000
Brine	20,000	17,000	30,000	27,000	20,000
Total	320,000	293,000	263,000	326,000	269,000
Type of Linear Construction (LF)					
Trenching	279,000	258,000	233,000	270,000	234,000
TLS	15,000	10,000	11,000	11,000	11,000
Aboveground	1,000	1,000	1,000	1,000	1,000
Total	295,000	269,000	245,000	282,000	246,000
Project Limits Area (acres)[2]					
Temporary Impact Area	761	562	635	757	629
Permanent Impact Area	66	68	50	56	58
Total Direct Impact Area	761	562	635	757	629
Northern AWT Location					
Site Number	Site 6	Site 6	Site 4	Site 4	Site 6
Reservoir Connections					
Reservoir Number	63210 62518 62310 51770 51771 51772 52698 53116 53310 13151 13154 24140 24174 20813 20814 20815 200814 200815 New[3]	63210 62518 62310 51770 51771 51772 52698 53116 53310 13151 13154 24140 24174	63210 62518 62310 51770 51771 51772 52698 53116 53310 20813 20814 20815 200814 200815 New[3]	63210 62518 62310 51770 51771 51772 52698 53116 53310 13151 13154 24140 24174 20813 20814 20815 200814 200815 New[3]	63210 62518 62310 51770 51771 51772 52698 53116 53310 20813 20814 20815 200814 200815 New[3]

[1]More than one type of pipeline may be placed in a single construction trench, as noted in individual project figures, so trenching totals are less than pipeline totals. Figures in this table also include all alternative options, so actual length of pipeline constructed would be less than shown. All linear feet (LF) numbers are rounded up to even thousands, so sum of individual numbers may not match totals due to rounding.
[2]Total direct impact area includes corridors (temporary impacts) and permanent facility or structure project limits (permanent impacts). Temporary impact area shown represents a maximum temporary direct impact area; the anticipated temporary direct impact area is substantially smaller (see biological resources discussion).
[3]Alternative includes a new and as-yet-unnumbered 4-million-gallon reservoir near the 20 Area.

Table 2.6-4
Summary Comparison of Permanent Aboveground Structures and Permanent Direct Impact Area (Acres), by MILCON Alternative: P-1044 and P-1045

	New Feature or Modification of Existing Feature	P-1044[1]				P-1045			
		Alt 1/ Alt 5	Alt 2	Alt 3	Alt 4	Alt 1	Alt 2	Alt 3/ Alt 5	Alt 4
Northern AWT									
Site 6	New Structure	8.40	8.40						
Site 4	New Structure			5.39	5.39				
Aboveground Pipeline									
Chaisson Rd-Sierra 1	New Feature	0.70	0.70	0.70	0.70				
Pump Stations									
64 Area	Retrofit Existing Pump Station	1.18	1.18	1.18	1.18				
63 Area	Retrofit Existing Pump Station	0.25	0.25	0.25	0.25				
62 Area	Expand TAPS 12 Complex	3.50	3.50	3.50	3.50				
Las Pulgas Gate Area	Retrofit Existing Pump Station					0.52	0.52	0.52	0.52
AWT South Area	Within AWT South Complex					0.91		0.91	0.91
Reservoirs									
62310 (near 62 Area)	Upgrade/Expand Existing Structure	2.61	2.61	2.61	2.61				
62518 (near 62 Area)	Upgrade/Expand Existing Structure	1.62	1.62	1.62	1.62				
24174 (near 24 Area)	Upgrade/Expand Existing Structure					6.90	6.90		6.90
New Wire Mtn (near 20 Area)	New Structure					3.43	3.43		3.43
SONGS Outfall									
Landward Connection	Within Developed SONGS Complex	0.23	0.23	0.23	0.23				
Paving									
El Camino Real	Pave Existing Roadway	4.95		4.95		4.95	4.95	4.95	4.95
Maintenance Access Corridor	Expand Multiple Pavement Areas	18.90	16.78	18.80	16.68	13.76	19.79	13.73	13.73
Permanent Direct Impact Area									
Grand Total		**42.35**	**35.28**	**39.23**	**32.16**	**30.47**	**35.59**	**20.11**	**30.44**

[1] Note: P-1044 areas (all alternatives) do not include injection well fields in the San Onofre percolation ponds (estimated that 3% of perc pond area or approximately 1.39 acres would be needed for the injection wells) and the MCBCP San Onofre Beach recreation area (estimated 1.65 acres would be needed for the injection wells).

Table 2.6-5
Summary of Potential Environmental Impacts by Resource Area and Alternative, Both MILCONs Combined

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Geology and Soils					
Impacts Alternative 1 would have a total direct impact area of approximately 849 acres, with approximately 279,000 linear feet (LF) of trenching and 15,000 feet of trenchless (TLS) construction. Marine Corps Base Camp Pendleton (MCBCP) is not underlain by any active or potentially active faults. The majority of the soils within the study area have a moderate to severe erosion potential. With implementation of best management practices (BMPs), compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 2 would have a total direct impact area of approximately 636 acres, with approximately 258,000 LF of trenching and 10,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 would have a total direct impact area of approximately 707 acres, with approximately 233,000 LF of trenching and 11,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 would have a total direct impact area of approximately 812 acres, with approximately 270,000 LF of trenching and 11,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 5 would have a total direct impact area of approximately 709 acres, with approximately 234,000 LF of trenching and 11,000 feet of TLS construction. General fault and erosion conditions are the same as under Alternative 1. With implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No geology and soils impacts would occur. **Mitigation** No mitigation measures are proposed.
Water Quality and Hydrology					
Impacts Water quality and hydrology could be affected where project corridors or facility project limits cross streams or encounter groundwater or floodplains. Under Alternative 1, TLS construction to avoid trenching would be conducted in the northern part of the Base near the proposed Northern Advanced Water Treatment Plant (AWT) at two locations on San Onofre Creek, at San Mateo Creek at the 62 Area, at San Onofre Creek at the 52 Area, and to cross Interstate 5 (I-5) and the railroad near the San Onofre Nuclear Generating System (SONGS). In the southern part of the Base, TLS construction would occur at Las Flores Creek, at one location for the French Creek and Aliso Canyon drainages, and at two locations on the Santa Margarita River. An additional crossing under I-5 is proposed to provide water to the 21 Area (Del Mar). Construction of the 4-million-gallon reservoir could result in erosion, off-site sediment transport, pollution, and construction material spills that impact receiving waters. Construction activities, including stream crossings, could result in erosion,	**Impacts** Alternative 2 varies from Alternative 1 in the northern part of the Base by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line. In the southern part of the Base, only one TLS crossing in total would be needed (Santa Margarita River northeast of the Basilone Road Bridge). Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 varies from Alternative 1 in the northern part of the Base by siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. In the southern part of the Base, TLS construction would be used at Las Flores Creek, at one location for French Creek and Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 varies from Alternative 1 in the northern part of the Base by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line, and siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. In the southern part of the Base, TLS construction would be used at Las Flores Creek, at one location for French Creek and Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 5 varies from Alternative 1 in the southern part of the Base, where TLS construction would be used at Las Flores Creek, at one location for French Creek and Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that applied to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Current drinking water standards in northern MCBCP would continue to exceed the national secondary standard and could violate the Stage 2 Disinfection Byproducts Rule for drinking water and Title 22 for recycling water. Compliance with current water use and recycling regulations and goals would not be met and consumption of groundwater resources would increase. Damage or rupture of deteriorating water lines could result in sediment transport and surface water quality degradation. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Potential stream or creek bank damage could result from TLS construction, and short-term and temporary impacts to groundwater quality could result from the construction of deep injection well fields. Marine water quality impacts from modifying the SONGS outfall conduit for suitable discharge and dilution of disposed brine solution would occur from multiple benthic disturbances during construction that would cause increased turbidity, decreased light transmittance, and release of sediment constituents into the water column. Impacts would be avoided by implementation of a project-specific Storm Water Pollution Prevention Plan (SWPPP) with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before and during construction, and would continue through the postconstruction operational phase. Discharge of brine would require permitting from the State Water Resources Control Board, enforced by the San Diego Regional Water Quality Control Board (RWQCB). Application for, and issuance of, Waste Discharge Requirements (WDRs) and/or National Pollutant Discharge Elimination System (NPDES) permits would be required for brine disposal at the injection well and ocean outfall locations. Strict monitoring and reporting programs (in-plant and receiving water) would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.					
Biological Resources					
Impacts Under Alternative 1, anticipated direct impacts to plant communities and other cover types would consist of 66.14 acres of permanent impacts and 399.47 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 14.51 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.52 acre of thread-leaved brodiaea occupied	**Impacts** Under Alternative 2, anticipated direct impacts to plant communities and other cover types would consist of 68.34 acres of permanent impacts and 299.29 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.11 acre of permanent impacts and 1.83 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.51 acre thread-leaved brodiaea occupied habitat.	**Impacts** Under Alternative 3, anticipated direct impacts to plant communities and other cover types would consist of 50.24 acres of permanent impacts and 337.59 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 1.66 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.52 acre of thread-leaved brodiaea occupied	**Impacts** Under Alternative 4, anticipated direct impacts to plant communities and other cover types would consist of 55.93 acres of permanent impacts and 388.53 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 5.11 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.53 acre of thread-leaved brodiaea occupied	**Impacts** Under Alternative 5, anticipated direct impacts to plant communities and other cover types would consist of 58.31 acres of permanent impacts and 334.70 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.10 acre of permanent impacts and 1.65 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent impacts to 0.52 acre of thread-leaved brodiaea occupied	**Impacts** No biological resources impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 25 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. The U.S. Fish and Wildlife Service issued a Final Biological Opinion on 15 August 2012. **Mitigation** Mitigation would be consistent with the Integrated Natural Resources Management Plan (INRMP) and the 1995 Riparian and Estuarine/Beach Biological Opinion (Riparian BO). Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes. The plan would be reviewed and approved by the agencies and by the Assistant Chief of Staff, Environmental Security (ES) Land Management Branch.	Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 24 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 24 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 24 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground structures or facilities. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be the same under this alternative as under Alternative 1, relevant to the anticipated impacts.	

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Cultural Resources					
Impacts Under Alternative 1, a total of 40 resources are identified, of which 25 are ineligible for the National Register of Historic Places (NRHP) and 15 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 1 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, the State Historic Preservation Officer (SHPO), and other consulting parties would execute and implement a signed Programmatic Agreement (PA) to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 2, a total of 22 resources are identified, of which 12 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 2 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 3, a total of 26 resources are identified, of which 16 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 3 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 4, a total of 35 resources are identified, of which 19 are ineligible for the NRHP and 16 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 4 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 5, a total of 26 resources are identified, of which 16 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Undertakings that include Alternative 5 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties have executed and implemented a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** No cultural resources impacts would occur. **Mitigation** No mitigation measures are proposed.
Land Use					
Impacts Land use on MCBCP is well defined by the Base Master Plan. The proposed infrastructure project would be compatible with all land uses and is necessary to support many of those uses. The only new permanent aboveground structures in Alternative 1 would be the Northern AWT, near the SONGS East Mesa facility, two new pump stations within cantonment areas, an aboveground run of pipeline on a steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds, new pump stations within the Northern AWT and future AWT South sites, a pump station on Las Pulgas Road near the Las Pulgas gate, injection wellheads in the San Onofre percolation ponds, injection wellheads within a mown portion of the MCBCP San Onofre Beach recreation area, and a new 4-million-gallon reservoir in the Wire Mountain area. None of these permanent structures would significantly affect nearby land uses, or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, all aboveground structures would be the same and in the same locations as described under Alternative 1, except the 4-million-gallon reservoir would not be included in Alternative 2. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, all aboveground structures would be the same and in the same locations as described in Alternative 1, with the exception of a pump station at the future AWT South (which would not be needed) and of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Permanent land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, while some underground pipeline routes would be different than under Alternative 1, all aboveground structures would be the same and in the same locations as described under Alternative 1, with the exception of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses, or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 5, all aboveground structures would be the same and in the same locations as described under Alternative 1, with the exception of a pump station at the future AWT South (which would not be needed). Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses, or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** No land use impacts would occur. **Mitigation** No mitigation measures are proposed.
Visual Resources					
Impacts With the exception of the Northern AWT, permanent aboveground structures would be located in areas sheltered or substantially distant from viewpoints on- or off-Base and/or would be of minimal size and scale. The Northern AWT would be at	**Impacts** Under Alternative 2, all generally visible aboveground facilities would be the same and in the same locations as those described in Alternative 1, so the effects on viewers on- or off-Base would be the same. The exception would be that	**Impacts** Under Alternative 3, all generally visible aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility.	**Impacts** Under Alternative 4, all generally visible aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility.	**Impacts** Under Alternative 5, all generally visible aboveground facilities would be the same and in the same locations as in Alternative 1, so the effects on viewers on- or off-Base would be the same. No significant visual impacts would occur.	**Impacts** No visual resources impacts would occur. **Mitigation** No mitigation measures are proposed

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
least partially screened from motorists on Interstate 5 (I-5) or passengers on trains utilizing the BNSF Railway tracks by the SONGS East Mesa facility. From on-Base, it would largely be seen against the backdrop of the SONGS East Mesa facility, and would not be located in a sensitive viewshed. The 4-million-gallon reservoir would be adjacent to existing water reservoirs and the Santa Margarita and Wire Mountain 2 housing areas to the west and south. Some of the housing units would have direct views of the reservoir. This would be an adverse but not significant visual impact. The new reservoir would not constitute an element significantly different in size, bulk, scale, or location than currently exists in the area to other viewers. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	Alternative 2 would not include the 4-million-gallon reservoir in the Wire Mountain area. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1 but would not be in a sensitive viewshed. The proposed 4-million-gallon reservoir would have the same visual impacts to the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area to the west and south as described for Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1 but would not be in a sensitive viewshed. The proposed 4-million-gallon reservoir would have the same visual impacts to the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area to the west and south as described for Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed	
Socioeconomics and Environmental Justice					
Impacts Total cost for Alternative 1 is estimated to be $226 million, with funding from fiscal year (FY) 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $261 million and a single year employment peak of about 1,482 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 2 is estimated to be $213 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $226 million and a single year employment peak of about 1,283 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 3 is estimated to be $205 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $218 million and a single year employment peak of about 1,235 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 4 is estimated to be $231 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $245 million and a single year employment peak of about 1,392 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** Total cost for Alternative 5 is estimated to be $206 million, with funding from FY 2012–2013. The direct, indirect, and induced impact of the alternative on the six-county (San Diego, Orange, Riverside, Los Angeles, Riverside, and Imperial) region would have a single year economic output peak at about $219 million and a single year employment peak of about 1,241 jobs. The number of new employees for project operations would likely be minimal. No localized socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Impacts** No socioeconomic and environmental justice impacts would occur. **Mitigation** No mitigation measures are proposed.
Traffic					
Impacts Construction traffic from Alternative 1 would be generated in 2013 and 2014 by an estimated 50 trucks per day, 120 workers per day, and 610 daily trips, of which 154 would be peak-hour trips. Construction traffic generated by Alternative 1, interacting with other construction phase traffic generated by a number of other projects aboard MCBCP, would contribute to adverse levels of	**Impacts** Construction traffic from Alternative 2 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** Construction traffic from Alternative 3 is estimated to the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** Construction traffic from Alternative 4 is estimated to the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** Construction traffic from Alternative 5 is estimated to the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts	**Impacts** No traffic impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
service (LOS) at intersections and roadway segments that already have unacceptable LOS and/or would create adverse LOS at other intersections and roadway segments as a result of proposed action impacts. Under Alternative 1, project-related impacts would occur at five intersections in 2013 and 2014. No project-related impacts would occur on on-Base or off-Base roadway segments in 2013 or 2014. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during construction period only, and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	with other projects would be equal to or less than described under Alternative 1. Impacts would be temporary, during construction. As discussed for Alternative 1, construction phasing would be incorporated to maintain traffic flow. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during construction period only, and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	
Air Quality					
Impacts Under Alternative 1, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants of volatile organic compounds (VOCs), oxides of nitrogen (NO_X), and carbon monoxide (CO) in the San Diego Air Basin (SDAB), and VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ in the South Coast Air Basin (SCAB) would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 1 would conform to the State Implementation Plan (SIP) and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 2 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 3 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 4 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 5, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants would be slightly lower than those under Alternative 1 due to shorter trenching distances and smaller overall project limits, but like Alternative 1, they would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 5 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** No air quality impacts would occur. **Mitigation** No mitigation measures are proposed.
Noise					
Impacts Construction noise would be primarily limited to temporary daytime construction along the transportation corridors and developed areas of the Base. There are sensitive receptors, including residents in the San Onofre 1, San Onofre 2, San Onofre 3, Stuart Mesa, Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, Wire Mountain 2, Wire	**Impacts** Under Alternative 2, sensitive receptors would include residents in the San Onofre 2, San Onofre 3, and Stuart Mesa housing areas (but fewer in these areas compared to Alternative 1) and the San Onofre CDC. BEQs in the 43, 52, 53, 62, and 64 Areas would also be within proximity to pipeline corridors under this alternative.	**Impacts** Under Alternative 3, sensitive noise receptors close to pipeline routes would be the same as under Alternative 1, except BEQs in the 33 Area would not be near any corridors. Also under Alternative 3, the Northern AWT would be within approximately 500 yards of housing in the San Onofre 2 and 3 housing areas, as opposed to within approximately 1,000	**Impacts** Under Alternative 4, sensitive noise receptors close to pipeline routes would be the same as under Alternative 1, except BEQs in the 33 Area would not be near any corridors while the San Onofre CDC would be close to a corridor. Also under Alternative 4, the Northern AWT would be within approximately 500 yards of housing in the San Onofre 2 and 3 Housing Areas,	**Impacts** Under Alternative 5, sensitive noise receptors close to pipeline routes would be the same as under Alternative 1, except BEQs in the 33 Area would not be near any corridors. Also under Alternative 5, the Northern AWT would be within approximately 500 yards of housing in the San Onofre 2 and 3 housing areas, as opposed to within approximately 1,000	**Impacts** No noise impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Mountain 3, and Santa Margarita housing areas; the Stuart Mesa and Santa Margarita elementary schools; the Stuart Mesa and Browne child development centers (CDCs); the Abby Reinke Center; and Bachelor Enlisted Quarters (BEQs) in the 31A, 33, 41, 43, 52, 53, 62, and 64 Areas, within proximity to a number of the pipeline corridors under this alternative. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	yards of these same areas under Alternative 1. As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	as opposed to within approximately 1,000 yards of these same areas under Alternative 1. As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	yards of these same areas under Alternative 1. As under Alternative 1, construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Operational noise impacts would be limited to sensitive receptors near the operational facilities. The proposed facilities would provide the latest technology to minimize the operational noise levels. **Mitigation** No mitigation measures are proposed.	
Public Health and Safety					
Impacts There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 1 corridors or site project limits. One or more project n limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 12 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) sites, 19 underground storage tanks (USTs), nine Installation Restoration (IR) sites, and nine aboveground storage tanks (ASTs), along with training areas and former pesticide use areas. There is also potential presence of Munitions and Explosives of Concern (MEC). Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 2 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 14 RFA sites, 19 USTs, nine IR sites, and six ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 3 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 12 RFA sites, 19 USTs, nine IR sites, and nine ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 4 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 11 RFA sites, 15 USTs, nine IR sites, and nine ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones within Alternative 5 corridors or site project limits. One or more project limits/corridor(s) and relevant buffers(s) do contain a number of active/open or inactive/closed areas of potential public health and safety concern. These include 11 RFA sites, 19 USTs, nine IR sites, and nine ASTs, along with training areas and former pesticide use areas. There is also potential presence of MEC. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Aging AC pipes are unreliable under water pressure changes. The P-1044 pipeline to be replaced extends from Basilone Road to the reservoirs above San Onofre II Housing, an elevation difference of 150 feet. If a break occurred, a flow rate of 13,700 gallons per minute would result until closed. The response time in an unexpected blowout would be approximately 1 hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire. **Mitigation** No mitigation measures are proposed

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
Services and Utilities					
Impacts Under Alternative 1, while construction would involve some temporary demand on services and utilities, and operations would increase demand for electrical, communication, water, wastewater, and solid waste services at least to a degree, construction impacts would be temporary and operational impacts would be minor. In no case would increase demand exceed system capacity, especially with the upgrades of Basewide utility infrastructure currently underway; therefore, no long-term significant adverse impacts to services and utilities are anticipated. With completion of the proposed action, there would be a beneficial effect on Basewide services and utilities. With the completion of the Northern AWT and its supporting infrastructure, the northern portion of the Base would receive an improved drinking water system. With the connection of the northern, southern, and Las Pulgas water systems, the Basewide water system would gain redundancy. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 2, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 3, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 4, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Although total construction area would be somewhat less under Alternative 5, impacts to services and utilities would be the same as under Alternative 1, due to the similar nature of project construction and operation under the two alternatives. **Mitigation** No mitigation measures are proposed.	**Impacts** Potential significant impacts could result from failure of the deteriorating facilities and pipe/conduit systems. Failures in existing aged systems would impact firefighting capabilities, quality of life, and training requirements. **Mitigation** No mitigation measures are proposed.
Coastal Zone Resources					
Impacts Aside from the SONGS brine discharge component of P-1044, Alternative 1 would not be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before, during construction, and continuing through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be required for ensuring environmental	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 2 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 3 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 4 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** Aside from the SONGS brine discharge component of P-1044, Alternative 5 would not be located within the coastal zone. This brine system would be same under this alternative as under Alternative 1. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues, as specifically described for this alternative in the Water Quality and Hydrology summary above. Impacts would be avoided as described for Alternative 1. **Mitigation** No mitigation measures are proposed.	**Impacts** No coastal zone resources impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5 – Preferred Alternative	No Action Alternative
impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.					
Marine Resources					
Impacts Under Alternative 1, marine resource impacts could occur from modification and reuse of an existing but currently nonoperational SONGS ocean cooling water conduit that would be used for routing the brine solution discharge pipeline. These impacts would involve multiple benthic disturbances during construction depending on the construction methods used and could impact marine organisms. Construction and brine discharge could also result in marine water quality impacts. Conduit modification and discharge of brine into ocean waters would be closely regulated by the USACE, National Oceanic and Atmospheric Administration (NOAA), and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. The ability to assess whether there may be long-term impacts (i.e., via brine dispersal at the outfall) to marine resources would be contingent on the development of a final design and the dilution modeling of that design relative to the proposed discharge outflow. But based on the available information (Brown and Caldwell 2012) it is not likely that there would be significant impacts to marine resources. The dilution will be designed to meet the California Ocean Plan limitations and therefore would not result in a significant impact. Potential construction impacts to marine mammals and federally listed sea turtles, including from underwater construction noise, would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 5, potential impacts to marine resources would be the same as under Alternative 1, as brine discharge system construction and operation would be the same under both alternatives. Conduit modification and discharge of brine into ocean waters would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles would be avoided by monitoring of construction by a trained observer. **Mitigation** No mitigation measures are proposed.	**Impacts** No marine resources impacts would occur. **Mitigation** No mitigation measures are proposed.

Note: Conservation and construction measures, as listed in Section 2.5 of the EIS, are required. These measures are included in the construction and, if applicable, operation contracts and thus are incorporated into the project. Because they are therefore part of the proposed action, they are not regarded as mitigation.

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Table 2.6-6
Summary of Potential Environmental Impacts by Resource Area and Alternative, P-1044

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
Geology and Soils				
Impacts Alternative 1 would have a total direct impact area of approximately 327 acres, with approximately 104,000 linear feet (LF) of trenching and 4,000 feet of trenchless (TLS) construction. Marine Corps Base Camp Pendleton (MCBCP) is not underlain by any active or potentially active faults. The majority of the soils within the study area have a moderate to severe erosion potential. With implementation of best management practices (BMPs), compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 2 would have a total direct impact area of approximately 304 acres, with approximately 98,000 LF of trenching and 4,000 feet of TLS construction. While this is somewhat less than Alternative 1, geological and soil conditions in the area are consistent with Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 would have a total direct impact area of approximately 325 acres, with approximately 103,000 LF of trenching and 4,000 feet of TLS construction. While this is about the same as Alternative 1, the location of the Northern AWT would differ. However, geological and soil conditions in the area are consistent with Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 would have a total direct impact area of approximately 302 acres, with approximately 97,000 LF of trenching and 4,000 feet of TLS construction. While this is a smaller total area and a smaller total trenching distance than Alternative 1, and while the Northern AWT would be in a different location than for Alternative 1, geological and soil conditions in the area are consistent with Alternative 1. With the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No geology and soils impacts would occur. **Mitigation** No mitigation measures are proposed.
Water Quality and Hydrology				
Impacts Water quality and hydrology could be affected where project corridors or facility project limits cross streams or encounter groundwater or floodplains. Under Alternative 1, San Onofre Creek would be crossed near the proposed Northern AWT at an upstream and a downstream location using TLS	**Impacts** Alternative 2 varies from Alternative 1 by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line. Otherwise, stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well	**Impacts** Alternative 3 varies from Alternative 1 by siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. Otherwise, stream crossings and potential encounters with groundwater or floodplains would be the same as Alternative 1.	**Impacts** Alternative 4 varies from Alternative 1 by adding another TLS technology crossing on San Onofre Creek along El Camino Real to accommodate a brine line, and siting the Northern AWT plant to the north of San Onofre Creek rather than to the south of the creek. Otherwise, stream crossings	**Impacts** Current drinking water standards in northern MCBCP would continue to exceed the national secondary standard and could violate the Stage 2 Disinfection Byproducts Rule for drinking water and Title 22 for recycling water.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
technology to avoid trenching impacts. In the area of the project with features common to all alternatives, TLS technology would be used to cross San Mateo Creek at the 62 Area and San Onofre Creek at the 52 Area. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Potential stream or creek bank damage could result from TLS construction, and short-term and temporary impacts to groundwater quality could result from the construction of two deep injection well fields. Marine water quality impacts from modifying the San Onofre Nuclear Generating Station (SONGS) outfall conduit for suitable discharge and dilution of disposed brine solution would occur from multiple benthic disturbances during construction that would cause increased turbidity, decreased light transmittance, and release of sediment constituents into the water column. Although analyzed programmatically in this EIS, use of SONGS is not part of the proposed action at this time. Impacts would be avoided by implementation of a project-	and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that apply to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A somewhat greater total direct impact area and longer total trenching distance than Alternative 1 would increase the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that apply to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	and potential encounters with groundwater or floodplains would be the same as Alternative 1. Injection well and ocean outfall brine disposal locations would be the same as under Alternative 1. A smaller total direct impact area and a shorter total trenching distance than Alternative 1 would decrease the overall potential for construction-related impacts, such as erosion, but the same BMPs, permitting requirements, and monitoring and reporting program requirements that apply to Alternative 1 would apply to this alternative. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Compliance with current water use and recycling regulations and goals would not be met. Damage or rupture of deteriorating water lines could result in sediment transport and surface water quality degradation. **Mitigation** No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
specific Storm Water Pollution Prevention Plan (SWPPP) with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the postconstruction operational phase. Discharge of brine would require permitting from the State Water Resources Control Board, enforced by the San Diego Regional Water Quality Control Board (RWQCB). Application for, and issuance of, Waste Discharge Requirements (WDRs) and/or National Pollutant Discharge Elimination System (NPDES) permits would be required for brine disposal at the injection well and ocean outfall locations. Strict monitoring and reporting programs (in-plant and receiving water) would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.				
Biological Resources				
Impacts Under Alternative 1, anticipated direct impacts to plant communities and other cover types would consist of 42.35	**Impacts** Under Alternative 2, anticipated direct impacts to plant communities and other cover types would consist of 40.23	**Impacts** Under Alternative 3, anticipated direct impacts to plant communities and other cover types would consist of	**Impacts** Under Alternative 4, anticipated direct impacts to plant communities and other cover types would consist of 32.16	**Impacts** No biological resources impacts would occur. **Mitigation**

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
acres of permanent impacts and 151.09 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 0.55 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent and temporary impacts to 0.51 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to maintenance access corridors and the project limits of postconstruction aboveground facilities. Maintenance/access corridors under this alternative would run along Basilone Road from the 51 Area to the 53 Area and	acres of permanent impacts and 147.10 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 0.92 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent and temporary impacts to 0.51 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, as these corridors and facilities would be identical under the two alternatives, except the maintenance/access corridor along Basilone Road would be shorter, running from the San Onofre 2 and San Onofre 3 housing areas to the 53 Area. Temporary impacts would vary	34.28 acres of permanent impacts and 153.98 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 0.55 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent and temporary impacts to 0.51 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, except the Northern AWT would be located in a relatively undisturbed area along Basilone Road rather than near the SONGS East Mesa Facility. Temporary impacts would be the same as described in Alternative 1, as pipeline routing would be identical	acres of permanent impacts and 147.54 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.07 acre of permanent impacts and 0.93 acre of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent and temporary impacts to 0.51 acre of thread-leaved brodiaea occupied habitat direct impacts to federally listed fairy shrimp consist of permanent impacts to 14 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, except the Northern AWT would be located in a relatively undisturbed area along Basilone Road rather than near the SONGS East Mesa Facility and the maintenance/access corridor along Basilone Road would be shorter, running from the San Onofre 2 and San Onofre 3 housing areas to the	No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
along Cristianitos Road from the 62 Area to the 64 Area. The only new permanent aboveground structures under this alternative would be a pump station within a disturbed portion of the 62 Area, a pump station adjacent to existing development in the 63 Area, injection wellheads within the existing San Onofre percolation ponds, injection wellheads within a mown portion of the MCBCP San Onofre Beach recreation area, and the Northern AWT, in a partially disturbed area near the SONGS East Mesa facility. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. The U.S. Fish and Wildlife Service issued a Final Biological Opinion on 15 August 2012. **Mitigation** Mitigation would be consistent with the Integrated Natural Resources Management Plan (INRMP) and the 1995 Riparian and Estuarine/Beach Biological Opinion (Riparian BO). Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent	in their location from Alternative 1, based on different pipeline routing under the two alternatives. However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	under these two alternatives. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by AC/S, ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	53 Area. Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives (with the routing under Alternative 4 identical to the routing under Alternative 2). However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.				
Cultural Resources				
Impacts Under Alternative 1, a total of 11 resources are identified, of which six are ineligible for the National Register of Historic Places (NRHP) and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 1 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, the State Historic Preservation Officer (SHPO), and other consulting parties have executed and implemented a signed Programmatic Agreement (PA) to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 2, a total of 12 resources are identified, of which seven are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 2 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 3, a total of 11 resources are identified, of which six are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 3 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 4, a total of 12 resources are identified, of which seven are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 4 in undertaking P-1044 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** No cultural resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
Land Use				
Impacts Land use on MCBCP is well defined by the Base Master Plan. The proposed infrastructure project would be compatible with all land uses and is necessary to support many of those uses. Alternative 1 would construct the Northern AWT and provide underground pipeline connections to northern cantonment area reservoirs, the San Onofre Housing Area, the Infantry Immersion Trainer Phase 1 and 2, the well field in the Sierra 1 Training Area, injection wells, and the SONGS outfall, primarily using routes within existing roadways. Where routes diverge from existing roadways, no permanent aboveground structures would be present to potentially interfere with existing or future land uses, with the exception of one run of aboveground pipeline noted below. The only new permanent aboveground structures in Alternative 1 would be the Northern AWT, near the SONGS East Mesa facility; two new pump stations within cantonment areas; injection wellheads in the San Onofre percolation ponds; injection wellheads within a mown portion of the MCBCP San	**Impacts** Under Alternative 2, while some underground pipeline routes would be different than under Alternative 1, all aboveground structures would be the same and in the same locations as described under Alternative 1. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, all underground pipeline routes would be the same as under Alternative 1, and all aboveground structures would be the same and in the same locations as described in Alternative 1, with the exception of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, while some underground pipeline routes would be different than under Alternative 1, all aboveground structures would be the same and in the same locations as described under Alternative 1, with the exception of the Northern AWT, which would be located north of San Onofre Creek along Basilone Road rather than south of San Onofre Creek in the same general area. This location would not interfere with active open training and maneuver areas. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. Land uses under this alternative would be compatible with the Base Master Plan and would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	**Impacts** No land use impacts would occur. **Mitigation** No mitigation measures are proposed.

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Onofre Beach recreation area, and an aboveground run of pipeline on a steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds, none of which would interfere with open training and maneuver areas. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.				
Visual Resources				
Impacts Under Alternative 1, brine, raw water, and treated water conduits would be underground and would not be visible after construction, except for an aboveground run of pipeline on a steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds. Proposed aboveground facilities would include this run of aboveground pipeline, retrofitted pump stations in the 62 and 63 Areas, injection wellheads within the San Onofre percolation ponds near El Camino Real and within the MCBCP San Onofre Beach recreation area, and the Northern AWT. With the exception of the Northern AWT, these would be located in areas sheltered or substantially distant from	**Impacts** Under Alternative 2, as under Alternative 1, underground facilities would not be visible after construction. Aboveground facilities would be the same and in the same locations as those described in Alternative 1, so the effects on viewers on- or off-Base would be the same. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, as under Alternative 1, underground facilities would not be visible after construction. All aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility. The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but it would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1, but it would not	**Impacts** Under Alternative 4, as under Alternative 1, underground facilities would not be visible after construction. All aboveground facilities would be the same as those described in Alternative 1, with the exception of the Northern AWT, which would be located on Basilone Road rather than near the SONGS East Mesa facility. The Northern AWT may be briefly visible at least in part to motorists on I-5 or passengers on trains utilizing the BNSF tracks, but it would be distant from those viewers and would not be located in a sensitive viewshed. The Northern AWT would be closer to the San Onofre 2 and San Onofre 3 housing areas and Basilone Road than in Alternative 1, but it would not	**Impacts** No visual resources impacts would occur. **Mitigation** No mitigation measures are proposed.

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viewpoints on- or off-Base and/or would be of minimal size and scale. The Northern AWT would be at least partially screened from motorists on Interstate 5 (I-5) or passengers on trains utilizing the BNSF Railway tracks by the SONGS East Mesa facility and would not be located in a sensitive viewshed. In terms of views from cantonment areas, housing areas, or recreational areas on-Base, the pump station in the 62 Area would not be visible from Bachelor Enlisted Quarters (BEQs) or recreation areas; the pump station in the 63 Area may be visible from BEQs, but changes in this location would be a retrofit of facilities already in place. The injection wellheads in the San Onofre percolation ponds would not be visible from permanently populated areas on-Base. The injection wellheads in the MCBCP San Onofre Beach recreation area would be visible to, at a minimum, users of the softball and group camp area. The Northern AWT would likely be visible to some residents in a portion of the San Onofre 3 Housing Area against the backdrop of the SONGS East Mesa Facility. The aboveground pipeline segment from Chaisson Road to the Sierra 1 Training Area percolation ponds area would		be in a sensitive viewshed. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	be in a sensitive viewshed. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	

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be within 100 feet of the homes, but would not be readily visible since it would be sloping away from the homes. This pipeline would be visible to vehicles traveling on I-5 south and to homes in southern San Clemente but, due to the small scale of the pipeline and the distance to sensitive viewers, this is not considered a significant visual impact. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.				
Socioeconomics and Environmental Justice				
Impacts Total cost for Alternative 1 is estimated to be $101 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $64.0 million per year, and employment output would be approximately 405 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $107.2 million per year, and employment output would be approximately 609 jobs per year.	**Impacts** Total cost for Alternative 2 is estimated to be $101 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. Because of the same funding level and the same timing of construction, the economic output and employment output for Alternative 2 would be the same as for Alternative 1. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation.	**Impacts** Total cost for Alternative 3 is estimated to be $100 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $63.4 million per year, and employment output would be approximately 371 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $106.1 million per year, and employment output would be approximately 602 jobs per year.	**Impacts** Total cost for Alternative 4 is estimated to be $106 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $67.2 million per year, and employment output would be approximately 393 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $112.5 million per year, and employment output would be approximately 639 jobs per year.	**Impacts** No socioeconomic and environmental justice impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	
Traffic[1]				
Impacts Construction traffic from Alternative 1 would be generated by an estimated 180 daily trips from workers and 125 daily trips from trucks, for a total of 305 daily trips, of which about 77 would be peak-hour trips in both 2013 and 2014. Construction traffic generated by Alternative 1, interacting with other future MCBCP traffic, would contribute to adverse levels of service (LOS) at intersections and roadway segments that already have unacceptable LOS and/or would create adverse LOS at	**Impacts** Construction traffic from Alternative 2 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1.	**Impacts** Construction traffic from Alternative 3 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1.	**Impacts** Construction traffic from Alternative 4 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1.	**Impacts** No traffic impacts would occur. **Mitigation** No mitigation measures are proposed.

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other intersections and roadway segments. P-1044 would not contribute to impacts at any on-Base or off-Base roadway segments in 2013, but would contribute to impacts at six on-Base and two off-Base roadway segments in 2014. P-1044 would contribute to impacts at five intersections in 2013 and seven intersections in 2014, but to no roadway segment impacts in either 2013 or 2014. Impacts would be temporary during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	Impacts would be temporary during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.	
Air Quality				
Impacts Under Alternative 1, the estimated annual emissions in tons/year of nonattainment and maintenance pollutants of	**Impacts** Under Alternative 2, the estimated annual emissions of nonattainment and maintenance pollutants in	**Impacts** Under Alternative 3, the estimated annual emissions would be approximately the same as described under	**Impacts** Under Alternative 4, the estimated emissions would be approximately the same as described under Alternative 2,	**Impacts** No air quality impacts would occur. **Mitigation**

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volatile organic compounds (VOCs), nitrogen oxides (NO_X), and carbon monoxide (CO) in the San Diego Air Basin (SDAB), and VOCs, NO_X, CO, and particulate matter (PM_{10} and $PM_{2.5}$) in the South Coast Air Basin (SCAB) would be well below the respective *de minimis* levels for these pollutants in SDAB and SCAB. As a result, Alternative 1 would conform to the State Implementation Plan (SIP) and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	SDAB would be slightly lower, due primarily to a shorter trenching distance and a smaller total direct impact area, than those under Alternative 1. These emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 2 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	Alternative 1, as trenching distance is about the same and the total direct impact area would be about the same size as under Alternative 1. The estimated annual emissions of nonattainment and maintenance emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 3 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	as trenching distance is about the same and the total direct impact area would be about the same size as under Alternative 2. All nonattainment and maintenance emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 4 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	No mitigation measures are proposed.
Noise				
Impacts Under Alternative 1, sensitive noise receptors adjacent to construction corridors and project limits include BEQs in multiple cantonment areas (52 Area, 53 Area, 62 Area, and 64 Area) and family residences in all three San Onofre housing areas. Other sensitive receptors located somewhat farther away include a school and youth center. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day	**Impacts** Under Alternative 2, sensitive receptors along the construction corridors and project limits would be the same as those described for Alternative 1, except fewer residences in San Onofre 2 and San Onofre 3 housing areas would be close to a construction corridor (with the elimination of a segment along Basilone Road) but an additional potential sensitive receptor, the San Onofre Child Development Center (CDC) would be added as the result of a change in a brine line	**Impacts** Under Alternative 3, construction noise impacts would be identical to those described under Alternative 1, except for construction of the Northern AWT, which would be located on Basilone Road, approximately 500 yards from the nearest residences in the San Onofre 2 and San Onofre 3 housing areas, rather than near the SONGS East Mesa facility, approximately 1,000 yards from the nearest receptor, under Alternative 1. All postconstruction	**Impacts** Under Alternative 4, sensitive receptors along the construction corridors would be to the same as those described for Alternative 1, except (1) fewer residences in San Onofre 2 and San Onofre 3 housing areas would be close to a construction corridor (with the elimination of a segment along Basilone Road); (2) an additional potential sensitive receptor, the San Onofre CDC, would be added as the result of a change in a brine line corridor; and (3) the construction of the Northern	**Impacts** No noise impacts would occur. **Mitigation** No mitigation measures are proposed.

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resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be limited to two pump stations, which would be enclosed by protective structures that would provide noise attenuation, structures containing pumps that would also be within noise attenuating protective enclosures and are otherwise not near sensitive receptors (except potential recreational users of a portion of the MCBCP San Onofre Beach recreation area), and the Northern AWT, which would be located approximately 1,000 yards away from any potentially sensitive receptors. The proposed facilities would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	corridor. All other potential construction-related noise impacts would be as described for Alternative 1. All postconstruction operational noise impacts would be as described for Alternative 1, due to permanent aboveground facilities being identical under the two alternatives. The proposed facilities would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	operational noise impacts would be as described for Alternative 1, due to permanent aboveground facilities being identical under the two alternatives, except for the location of the Northern AWT being closer to residential areas. The proposed facilities, however, would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	AWT, which would be located on Basilone Road, would occur approximately 500 yards from the nearest residences in the San Onofre 2 and San Onofre 3 housing areas, rather than near the SONGS East Mesa facility. All other potential construction-related noise impacts would be as described for Alternative 1. All postconstruction operational noise impacts would be as described for Alternative 1, due to permanent aboveground facilities being identical under the two alternatives, except for the location of the Northern AWT being closer to residential areas. The proposed facilities, however, would provide the latest technology to minimize the operational noise levels. As a result, no significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
Public Health and Safety				
Impacts There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 1 corridors or site project limits. The Alternative 1 project limits (including corridors and sites) and 50-foot buffer contain nine Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) sites, but all but one require no further action; the project limits and 200-foot buffer contain 19 underground storage tanks (USTs), 10 of which are closed; the project limits and 500-foot buffer contain three Installation Remediation (IR) sites, two of which are closed; and the project limits and 10-foot buffer contain four aboveground storage tanks (ASTs). A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area. There is a potential presence of Munitions and Explosives of Concern (MEC) and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 2 corridors or site project limits. The Alternative 2 project limits (including corridors and sites) and 50-foot buffer contain eight RFA sites, but all but one require no further action; the project limits and 200-foot buffer contain 15 USTs, all but five of which are closed; the project limits and 500-foot buffer contain three IR sites, two of which are closed; the project limits and 10-foot buffer contain four ASTs; and a portion of the project limits is within Range 207 Military Range Area. A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area and there is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 3 corridors or site project limits. The Alternative 3 project limits (including corridors and sites) and buffers contain the same RFA sites, USTs, IR sites, and ASTs as Alternative 1. A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area and there is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 4 corridors or site project limits. The Alternative 4 project limits (including corridors and sites) and buffers contain the same RFA sites, USTs, IR sites, and ASTs as Alternative 2. A portion of the project is also within a former pesticide use area. A portion of the project limits is within Range 207 Military Range Area and there is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Aging AC pipes are unreliable under water pressure changes. The P-1044 pipeline to be replaced extends from Basilone Road to the reservoirs above San Onofre II Housing, an elevation difference of 150 feet. If a break occurred, a flow rate of 13,700 gallons per minute would result until closed. The response time in an unexpected blowout would be approximately 1 hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire.

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and safety impacts. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.			**Mitigation** No mitigation measures are proposed
Services and Utilities				
Impacts Under Alternative 1, operation of the Northern AWT would increase demand on wastewater services. A beneficial impact would occur to potable water supply on the Base through the operation of the Northern AWT and increased availability of treated water in the northern part of the Base. Treatment at the Northern AWT would reduce, if not eliminate, measureable amounts of copper in wastewater sludge, eliminating the requirement of handling the wastewater sludge as a hazardous waste. Operation of the Northern AWT would increase the demand for Base electrical and communications services. Operations would not involve any demand for natural gas. Construction of P-1044 and the operation of the Northern AWT would increase the demand for solid waste collection and disposal. None of the increased services and utilities demand would exceed services and utilities capacity on the Base; therefore, no significant adverse impacts to services and utilities are anticipated.	**Impacts** Under Alternative 2, impacts from the operation of the Northern AWT would be the same as under Alternative 1, since Northern AWT operations would be identical under the two alternatives. Construction-related service and utilities demand would vary somewhat based on the amount of construction required, such as the amount of trenching described under geology and soils above. None of the increased services and utilities demand would exceed services and utilities capacity on the Base. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, impacts from the operation of the Northern AWT would be the same as under Alternative 1, since Northern AWT operations would be identical under the two alternatives. Construction-related service and utilities demand would vary somewhat based on the amount of construction required, such as the amount of trenching described under geology and soils above. None of the increased services and utilities demand would exceed services and utilities capacity on the Base. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, impacts from the operation of the Northern AWT would be the same as under Alternative 1, since Northern AWT operations would be identical under the two alternatives. Construction-related service and utilities demand would vary somewhat based on the amount of construction required, such as the amount of trenching described under geology and soils above. None of the increased services and utilities demand would exceed services and utilities capacity on the Base. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	**Impacts** Potential significant impacts could result from failure of the deteriorating facilities and pipe/conduit systems. Failures in existing aged systems would impact firefighting capabilities, quality of life, and training requirements. **Mitigation** No mitigation measures are proposed.

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Mitigation No mitigation measures are proposed.				
Coastal Zone Resources				
Impacts Under Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. As described in the Water Quality and Hydrology resource description above, construction activities and TLS stream crossings could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be	**Impacts** Under Alternative 2, as with Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Potential water quality and hydrology impacts of Alternative 2, which could result in coastal zone impacts, are described above in the Water Quality and Hydrology resource summary. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be required for ensuring environmental impacts are	**Impacts** Under Alternative 3, as with Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Potential water quality and hydrology impacts of Alternative 3, which could result in coastal zone impacts, are described above in the Water Quality and Hydrology resource summary. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be	**Impacts** Under Alternative 4, as with Alternative 1, aside from the SONGS brine discharge component, no portion of the project would be located within the coastal zone. This alternative would not impact access to the shore (recreational or otherwise) or cause land use incompatibility. Potential water quality and hydrology impacts of Alternative 4, which could result in coastal zone impacts, are described above in the Water Quality and Hydrology resource summary. Impacts would be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. For the SONGS brine discharge component, WDRs and/or NPDES permits enforced by the San Diego RWQCB would be required. Strict monitoring and reporting programs (in-plant and receiving water) would be required for ensuring environmental impacts are	**Impacts** No coastal zone resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1044 Alternative 1 – Preferred Alternative	P-1044 Alternative 2	P-1044 Alternative 3	P-1044 Alternative 4	P-1044 No Action Alternative
required for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. Although analyzed programmatically in this EIS, use of SONGS is not part of the proposed action at this time. **Mitigation** No mitigation measures are proposed.	avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	required for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	
Marine Resources				
Impacts Under Alternative 1, marine resource impacts could occur from modification and reuse of an existing but currently nonoperational SONGS ocean cooling water conduit that would be used for routing the brine solution discharge pipeline. These impacts would involve multiple benthic disturbances during construction and would depend on the construction methods used, and could impact marine organisms. Proper design and system evaluation would ensure marine water quality and marine resources impacts are avoided. Conduit modification and discharge of brine into ocean waters would be closely regulated by the U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, and RWQCB during both construction and operation to reduce the potential for	**Impacts** Under Alternative 2, impacts to marine resources would be the same as described under Alternative 1. As the only operational project component that would have a direct impact on marine resources, the ocean outfall brine disposal component would be identical under the two alternatives, and construction monitoring would avoid impacts to federally listed marine species. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, impacts to marine resources would be the same as described under Alternative 1. As the only operational project component that would have a direct impact on marine resources, the ocean outfall brine disposal component would be identical under the two alternatives, and construction monitoring would avoid impacts to federally listed marine species. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, impacts to marine resources would be the same as described under Alternative 1. As the only operational project component that would have a direct impact on marine resources, the ocean outfall brine disposal component would be identical under the two alternatives, and construction monitoring would avoid impacts to federally listed marine species. **Mitigation** No mitigation measures are proposed.	**Impacts** No marine resources impacts would occur. **Mitigation** No mitigation measures are proposed.

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significant impacts to below a level of significance. Potential construction impacts to marine mammals and federally listed sea turtles, including from underwater construction noise, would be avoided by monitoring of construction by a trained observer. Although analyzed programmatically in this EIS, use of SONGS is not part of the proposed action at this time. **Mitigation** No mitigation measures are proposed.				

[1] Impacts from construction traffic are analyzed as a combination of traffic from each project alternative plus all other traffic that is anticipated to be occurring at the same time, including background traffic, P-1045, and other foreseeable projects scheduled for concurrent construction. Therefore, impact traffic volumes represent construction of the projects in their anticipated years of construction. P-1044 and P-1045 are scheduled for construction in 2013 and 2014.

Table 2.6-7
Summary of Potential Environmental Impacts by Resource Area and Alternative, P-1045

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Geology and Soils				
Impacts Alternative 1 would have a total direct impact area of approximately 522 acres, with approximately 175,000 linear feet (LF) of trenching and 11,000 feet of trenchless (TLS) construction. Marine Corps Base Camp Pendleton (MCBCP) is not underlain by any active or potentially active faults. The majority of the soils within the study area have a moderate to severe erosion potential. With implementation of best management practices (BMPs), compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 2 would have a total direct impact area of approximately 332 acres, with approximately 160,000 LF of trenching and 6,000 feet of TLS construction. While this is somewhat less than Alternative 1, geological and soil conditions in the area would be similar to Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 3 would have a total direct impact area of approximately 382 acres, with approximately 130,000 LF of trenching and 7,000 feet of TLS construction. While this is less than Alternative 1, geological and soil conditions in the area would be similar to Alternative 1, and with the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Alternative 4 would have a total direct impact area of approximately 510 acres, with approximately 173,000 LF of trenching and 7,000 feet of TLS construction. Although this is a smaller total area and a slightly smaller trenching distance than Alternative 1, geological and soil conditions in the area affected would be similar to Alternative 1. With the implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No geology and soils impacts would occur. **Mitigation** No mitigation measures are proposed.
Water Quality and Hydrology				
Impacts Water quality and hydrology could be affected where pipeline corridors cross streams or encounter groundwater or floodplains. Under Alternative 1, TLS construction to avoid trenching would be conducted at two locations on the Santa Margarita River, at San Onofre Creek (if the Basilone Road or	**Impacts** Under Alternative 2, TLS construction would be conducted to avoid trenching and water quality and hydrology impacts at San Onofre Creek (if the Basilone Road or Northern AWT connection site north of San Onofre Creek is chosen) and at the Santa Margarita River south of the 25 Area.	**Impacts** Under Alternative 3, TLS construction would be conducted to avoid trenching and water quality and hydrology impacts at San Onofre Creek (if the Basilone Road or Northern AWT connection site north of San Onofre Creek is chosen), at Las Flores Creek, at one location for French Creek and	**Impacts** Under Alternative 4, TLS construction would be conducted to avoid trenching and water quality and hydrology impacts at San Onofre Creek (if the Basilone Road or Northern AWT connection site north of San Onofre Creek is chosen), at Las Flores Creek, at one location for French Creek and	**Impacts** No water quality and hydrology resources impacts would occur. Damage or rupture of deteriorating water lines could result in sediment transport and surface water quality degradation.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Northern AWT connection site north of San Onofre Creek is chosen), at Las Flores Creek, and at one location for French Creek and Aliso Canyon drainage. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would be avoided by implementation of a project-specific Storm Water Pollution Prevention Plan (SWPPP) with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would also be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would also be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	Aliso Canyon drainage, and at the Stuart Mesa Road crossing of the Santa Margarita River. Construction activities, including steam crossings, could result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. Impacts would also be avoided by implementation of a project-specific SWPPP with BMPs relative to site-specific needs and conditions. BMPs would be required and implemented before construction, during construction, and continuing through the operational phase. Strict regulatory agency monitoring and reporting programs would be enforced for ensuring environmental impacts are avoided or minimized. No significant impacts would occur. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.
Biological Resources				
Impacts Under Alternative 1, anticipated direct impacts to plant communities and other cover types would consist of 23.79 acres of permanent impacts	**Impacts** Under Alternative 2, anticipated direct impacts to plant communities and other cover types would consist of 28.11 acres of permanent impacts	**Impacts** Under Alternative 3, anticipated direct impacts to plant communities and other cover types would consist of 15.96 acres of permanent impacts	**Impacts** Under Alternative 4, anticipated direct impacts to plant communities and other cover types would consist of 23.77 acres of permanent impacts	**Impacts** No biological resources impacts would occur. **Mitigation** No mitigation measures

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
and 248.38 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.03 acre of permanent impacts and 13.96 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent and temporary impacts to 0.01 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 11 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Construction of all facilities would be designed to avoid impacts to protected resources to the maximum extent practical, e.g., jurisdictional waters and habitats occupied by federally listed species. Permanent impacts would be confined to the project limits of maintenance access corridors and postconstruction aboveground facilities. New maintenance access corridors would run along Las Pulgas	and 152.19 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.04 acre of permanent impacts and 0.91 acre of temporary impacts. No direct impacts to federally listed plants are anticipated. There are no anticipated direct impacts to federally listed fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat. Permanent impacts associated with maintenance access corridors would differ from Alternative 1, as these corridors would run along Las Pulgas Road from El Camino Real to the 43 Area and along Basilone Road from the 43 Area to the 25 Area. Permanent impacts associated with new aboveground facilities would be the same as described under Alternative 1, as these facilities would be identical under the two alternatives. Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives, and total trenching distance is shorter	and 183.61 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.03 acre of permanent impacts and 1.11 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent and temporary impacts to 0.01 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 10 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, except the pump station at the future AWT South would not be needed. Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives, and total trenching distance is substantially shorter under	and 241.00 acres of temporary impacts. Anticipated direct impacts to waters of the U.S. consist of 0.03 acre of permanent impacts and 4.18 acres of temporary impacts. Anticipated direct impacts to federally listed plants consist of permanent and temporary impacts to 0.02 acre of thread-leaved brodiaea occupied habitat. Anticipated direct impacts to federally listed fairy shrimp consist of permanent impacts to two basins occupied by Riverside fairy shrimp and 10 basins occupied by San Diego fairy shrimp. Anticipated direct impacts to other federally listed wildlife consist of permanent and temporary impacts to habitat occupied by arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher. Permanent impacts associated with new maintenance access corridors and aboveground facilities would be the same as described under Alternative 1, as these corridors and facilities would be identical under the two alternatives. Temporary impacts would vary in their location from Alternative 1, based on different pipeline routing under the two alternatives, and total trenching distance is shorter	are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Road from El Camino Real to the 43 Area and along Stuart Mesa Road from Las Pulgas Road to the Stuart Mesa Housing Area. The only new permanent aboveground structures under this alternative would be one pump station within the project limits of the Northern AWT, a second pump station within a developed parking lot at the future AWT South, and a third pump station in a disturbed parking area on the southwest side of the intersection of El Camino Real and Las Pulgas Road. Construction in most project corridors would be designed to result in only temporary impacts to biological resources. All feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian and Estuarine/Beach Biological Opinion (Riparian BO). Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part	under Alternative 2 than under Alternative 1. However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	Alternative 3 than under Alternative 1. However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. The U.S. Fish and Wildlife Service issued a Final Biological Opinion on 15 August 2012. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	under Alternative 4 than under Alternative 1. However, as under Alternative 1, all feasible restoration of areas temporarily disturbed by pipeline installation would be conducted, with areas disturbed by trenching backfilled and native areas restored. **Mitigation** Mitigation would be consistent with the INRMP and the 1995 Riparian BO. Where avoidance of impacts to regulated biological resources is not feasible, e.g., permanent facility-related improvements, mitigation would be determined based on ongoing negotiations between MCBCP and the resource agencies, and finalized as part of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.	

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
of Section 404 permitting, Section 401 certification, and Section 7 consultation. Review and approval by ES of a detailed mitigation plan would be required as part of the permitting and consultation processes.				
Cultural Resources				
Impacts Under Alternative 1, a total of 29 resources are identified, of which 19 are ineligible for the National Register of Historic Places (NRHP) and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 1 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, the State Historic Preservation Officer (SHPO), and other consulting parties would execute and implement a signed Programmatic Agreement (PA) to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 2, a total of 10 resources are identified, of which five are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 2 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 3, a total of 15 resources are identified, of which 10 are ineligible for the NRHP and five have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 3 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties have executed and implemented a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** Under Alternative 4, a total of 23 resources are identified, of which 12 are ineligible for the NRHP and 11 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites would not be significant. **Mitigation** Alternative 4 in undertaking P-1045 would have an adverse effect on historic properties. Avoidance is the preferred treatment measure. MCBCP, SHPO, and other consulting parties would execute and implement a signed PA to ensure Section 106 compliance and resolve the adverse effects if avoidance is not feasible.	**Impacts** No cultural resources impacts would occur. **Mitigation** No mitigation measures are proposed.
Land Use				
Impacts Land use on MCBCP is well defined by the Base Master Plan. The proposed infrastructure project would be compatible with all land uses	**Impacts** Although underground pipeline routing would be different, the aboveground structures constructed under Alternative 2 would be the same and in the	**Impacts** Although underground pipeline routing would be different, the aboveground structures constructed under Alternative 3 would be the same and in the	**Impacts** Although underground pipeline routing would be different, the aboveground structures constructed under Alternative 4 would be the same and in the	**Impacts** No land use impacts would occur. **Mitigation** No mitigation measures

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
and is necessary to support many of those uses. Alternative 1 underground pipelines would connect the northern, southern, and Las Pulgas water systems and the new Naval Hospital and 21 Area (Del Mar). The only new permanent aboveground structures in Alternative 1 would be a pump station at the Northern AWT, a pump station near the Las Pulgas gate, a pump station in Haybarn Canyon, and a 4-million-gallon reservoir in the Wire Mountain area. None of these pump stations are in open training and maneuver areas. The reservoir is adjacent to several existing reservoirs and to existing housing. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	same locations as described in Alternative 1 with the exception of the 4-million-gallon reservoir, which would not be included in Alternative 2. As a result, the land use impacts for Alternative 2 would be the same as described for Alternative 1. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	same locations as described in Alternative 1, with the exception of the pump station in Haybarn Canyon, which would not be needed under Alternative 3. As a result, the land use impacts for Alternative 3 would be the same or less as described for Alternative 1. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	same locations as described in Alternative 1. As a result, the land use impacts for Alternative 4 would be the same as described for Alternative 1. This alternative would not significantly affect nearby land uses or operations and training. **Mitigation** No mitigation measures are proposed.	are proposed.
Visual Resources				
Impacts Alternative 1 underground pipelines would connect the proposed northern, southern, and Las Pulgas water systems and the new Naval Hospital and 21 Area (Del Mar). The only new permanent aboveground structures in Alternative 1 would be a pump station at the Northern AWT, a pump station near the Las Pulgas gate, a pump station in	**Impacts** Under Alternative 2, the aboveground facilities would be identical to those described in Alternative 1, with the exception of the 4-million-gallon reservoir, which is not included in Alternative 2. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers.	**Impacts** Under Alternative 3, aboveground facilities would consist of two pump stations, one each at the Northern AWT and Las Pulgas gate area locations described in Alternative 1. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers. On-	**Impacts** Under Alternative 4, the aboveground facilities would be identical to those described in Alternative 1. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers. On-Base, these aboveground structures would not be visible from cantonment areas,	**Impacts** No visual resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Haybarn Canyon, and a 4-million-gallon reservoir in the Wire Mountain area. The pump station at Las Pulgas gate would be across the street from the gate complex with its miscellaneous buildings and parking lots. The other two pump stations would be part of larger facilities, the Northern AWT and the future AWT South. The proposed pump stations would not be visible from off-Base, except perhaps for brief views of the Las Pulgas gate pump station by railway passengers. On-Base, these aboveground structures would not be visible from cantonment areas, housing areas, or recreational areas, and would not be incongruous elements in sensitive viewsheds. The proposed 4-million-gallon reservoir would be adjacent to existing water reservoirs and the Santa Margarita and the Wire Mountain 2 housing areas to the west and south. Some of the housing units would have direct views of the reservoir. This would be an adverse but not significant visual impact. The new reservoir would not constitute an element significantly different in size, bulk, scale, or location than currently exists in the area to other viewers. No significant visual impacts would occur.	On-Base, these aboveground structures would not be visible from cantonment areas, housing areas, or recreational areas, and would not be incongruous elements in sensitive viewsheds. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	Base, these aboveground structures would not be visible from cantonment areas, housing areas, or recreational areas, and would not be incongruous elements in sensitive viewsheds. The impacts of the 4-million-gallon reservoir would be the same as described in Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	housing areas, or recreational areas, and would not be incongruous elements in sensitive viewsheds. The impacts of the 4-million-gallon reservoir would be the same as described in Alternative 1. No significant visual impacts would occur. **Mitigation** No mitigation measures are proposed.	

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Mitigation No mitigation measures are proposed.				
Socioeconomics and Environmental Justice				
Impacts Total cost for Alternative 1 is estimated to be $125 million, with funding in fiscal year (FY) 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $79.2 million per year, and employment output would be approximately 464 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $132.6 million per year, and employment output would be approximately 753 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income	**Impacts** Total cost for Alternative 2 is estimated to be $112 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county region would be approximately $71.0 million per year, and employment output would be approximately 416 jobs per year. Over the six-county region, economic output would be approximately $118.9 million per year and employment output would be approximately 675 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.	**Impacts** Total cost for Alternative 3 is estimated to be $105 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county region would be approximately $66.5 million per year, and employment output would be approximately 390 jobs per year. Over the six-county region, economic output would be approximately $111.4 million per year and employment output would be approximately 633 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. No disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.	**Impacts** Total cost for Alternative 4 is estimated to be $125 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county region would be approximately $82.4 million per year, and employment output would be approximately 483 jobs per year. Over the six-county region, economic output would be approximately $138.0 million per year and employment output would be approximately 783 jobs per year. The number of new employees for project operations would likely be minimal. Enhanced recreational opportunities along the new maintenance access corridors would be beneficial. No significant socioeconomic impacts would be anticipated from the postconstruction operation. There would not be any disproportionately high and adverse impacts to minority or low-income populations. No environmental justice impacts have been identified.	**Impacts** No socioeconomic or environmental justice impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
populations. No environmental justice impacts have been identified. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.	
Traffic[1]				
Impacts Construction traffic from Alternative 1 in both 2013 and 2014 would be generated by an estimated 180 daily trips from workers and 125 daily trips from trucks, for a total of 305 daily trips, of which about 77 would be peak-hour trips. Construction traffic generated by Alternative 1, interacting with other future MCBCP traffic, would contribute to adverse levels of service (LOS) at intersections and roadway segments that already have unacceptable LOS and/or would create adverse LOS at other intersections and roadway segments. P-1045 would contribute to impacts at five intersections in 2013 and seven intersections in 2014. P-1045 would not contribute to impacts at any on-Base or off-Base roadway segments in either 2013 or 2014. Impacts would be temporary, during construction.	**Impacts** Construction traffic from Alternative 2 in both 2013 and 2014 would be generated by an estimated 180 daily trips from workers and 125 daily trips from trucks, for a total of 305 daily trips, of which about 77 would be peak-hour trips. Interactive construction phase impacts with other projects would be the same as described under Alternative 1. Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities.	**Impacts** Construction traffic from Alternative 3 is estimated to be the same as Alternative 1. While specific construction would be somewhat different from Alternative 1, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1. Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to	**Impacts** Construction traffic from Alternative 4 is estimated to be the same as Alternative 2. While specific construction would be somewhat different from Alternative 2, the same estimated number of construction crews would be required for the project and the duration of construction would be similar enough as to not substantially influence traffic outcomes. Interactive construction phase impacts with other projects would be the same as described under Alternative 1. Impacts would be temporary, during construction. Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to	**Impacts** No traffic impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Postconstruction impacts would be minimal. **Mitigation** A traffic construction management plan would be implemented to minimize the impacts to intersections and roadway segments. This plan would apply during the construction period only and would not require permanent physical improvements to facilities. No postconstruction mitigation measures are needed.		facilities. No postconstruction mitigation measures are needed.	facilities. No postconstruction mitigation measures are needed.	
Air Quality				
Impacts Under Alternative 1, the estimated annual emissions of nonattainment and maintenance pollutants in the San Diego Air Basin (SDAB) would be well below the *de minimis* levels for these pollutants in SDAB. As a result, Alternative 1 would conform to the State Implementation Plan (SIP) and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 2, the estimated annual emissions of nonattainment and maintenance pollutants in SDAB would be slightly lower than those under Alternative 1, due primarily to a slightly shorter trenching distance under Alternative 2, These emissions would be well below the *de minimus* level for these pollutants in SDAB. As a result, Alternative 2 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 3, the estimated annual emissions of nonattainment and maintenance pollutants in SDAB would be slightly lower than those under Alternative 1, due primarily to a shorter trenching distance under Alternative 3, These emissions would be well below the *de minimus* levels for these pollutants. As a result, Alternative 3 would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, the estimated annual emissions of nonattainment and maintenance pollutants in SDAB would be approximately the same as those under Alternative 1, as the trenching distances are approximately the same. These emissions would be well below the *de minimus* level for these pollutants in SDAB. As a result, this alternative would conform to the SIP and a conformity determination is not required. There would be no significant adverse air quality or odor impacts. **Mitigation** No mitigation measures are proposed.	**Impacts** No air quality impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Noise				
Impacts Under Alternative 1, sensitive noise receptors near construction corridors and project limits are the Stuart Mesa School and multiple homes in the Stuart Mesa Housing Area along Stuart Mesa Road; multiple homes in the Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, and Wire Mountain 3 housing areas along with the Abby Reinke Community Center along Wire Mountain Road; and multiple homes in the Santa Margarita and Wire Mountain 2 housing areas where the corridor approaches the proposed new 4-million-gallon reservoir along multiple streets east of the intersection of Wire Mountain Road and Carnes Road. Other sensitive receptors would include Bachelor Enlisted Quarters (BEQs) in the 43, 41, 31A, and 33 Areas. The San Onofre 2 and San Onofre 3 housing areas are approximately 1 mile from the connection to Northern AWT Site 6 and about 0.3 mile from the connection to existing pipelines in Basilone Road or Northern AWT Site 4. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day	**Impacts** Under Alternative 2, sensitive receptors near the construction corridors would include BEQs in the 43 Area. The San Onofre 2 and San Onofre 3 housing areas are approximately 1 mile from the connection to Northern AWT Site 6 and about 0.3 mile from the connection to existing pipelines in Basilone Road or Northern AWT Site 4. Pump stations would be the same as described in Alternative 1. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise would be associated with the Northern AWT and future AWT South pump stations, where noise would be subsumed in the noise from operation of the plants (neither of which is a part of this project) as described in Alternative 1. No significant operational noise impacts to sensitive receptors would occur.	**Impacts** Under Alternative 3, sensitive noise receptors near construction corridors and project limits are the same as described in Alternative 1, except BEQs in the 33 Area would not be near any of the construction corridors. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be the same as described in Alternative 1. No significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** Under Alternative 4, sensitive receptors along the construction corridors would be the same as those described in Alternative 1, except BEQs in the 33 Area would not be near a construction corridor. Construction noise impacts at any specific receptor would be minimized along corridor routes by a construction rate of approximately 200 LF per day resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be the same as described in Alternative 1. No significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	**Impacts** No noise impacts would occur. **Mitigation** No mitigation measures are proposed.

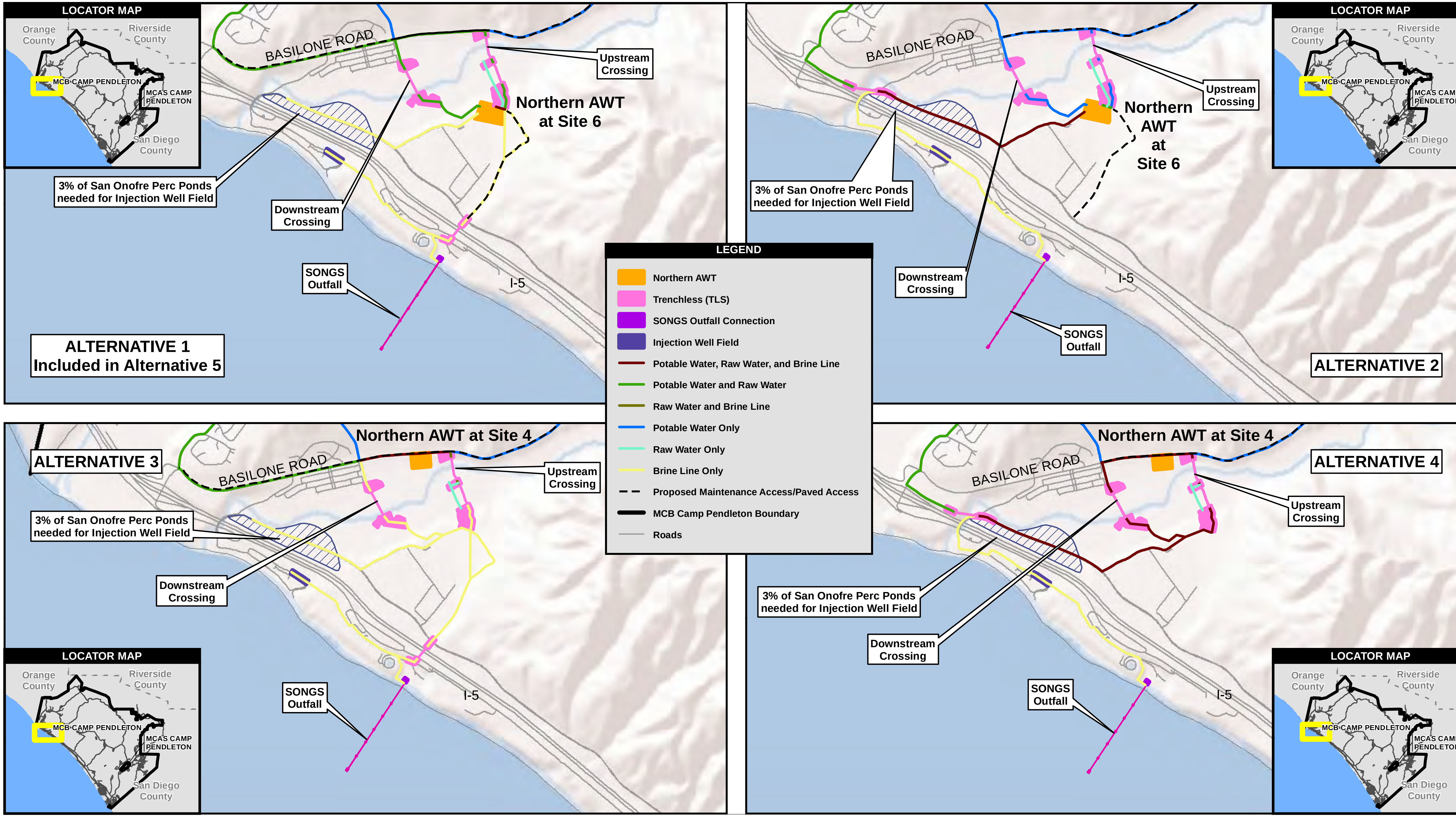
P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
resulting in relatively brief local construction durations, noise attenuation with distance from generation sources, and, in the case of residential receptors, restrictions on nighttime construction. Postconstruction operational noise sources would be limited to a pump station in the Northern AWT and one in the future AWT South, where noise would be subsumed in the noise from operation of the plants (neither of which is a part of this project). A third pump station would be near the Las Pulgas gate, well away from sensitive receptors and enclosed by noise-attenuating protective structures. No significant operational noise impacts to sensitive receptors would occur. **Mitigation** No mitigation measures are proposed.	**Mitigation** No mitigation measures are proposed.			
Public Health and Safety				
Impacts There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 1 corridors or site project limits. The Alternative 1 project limits (including corridors and sites) and 50-foot buffer contain three Resource Conservation and	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 2 corridors or site project limits. The Alternative 2 project limits (including corridors and sites) and 50-foot buffer contain six RFA sites, all of which require	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 3 corridors or site project limits. The Alternative 3 project limits (including corridors and sites) and 50-foot buffer contain three RFA sites, all of which require	**Impacts** There are no active hazardous waste storage sites, explosive safety quantity distance arcs, electromagnetic hazard areas, or accident potential zones with Alternative 4 corridors or site project limits. The Alternative 4 project limits (including corridors and sites) and 50-foot buffer contain three RFA sites that require no	**Impacts** No public health and safety impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Recovery Act (RCRA) Facility Assessment (RFA) sites that require no further action; the project limits and 200-foot buffer contain no underground storage tanks (UST) sites; the project limits and 500-foot buffer contain three Installation Restoration (IR) sites, one of which is closed; and the project limits and 10-foot buffer contain five aboveground storage tanks (ASTs). Portions of the project limits are within the Range 14 Artillery Firing Area; Range D704 Live Fire Area; Range 15 Artillery Firing Area; Firing Line 103, X-ray Impact Area; and the 102, 103, and 104b Military Range Areas. There is a potential presence of Munitions and Explosives of Concern (MEC) and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	no further action; the project limits and 200-foot buffer contain four UST sites, one of which is closed; the project limits and 500-foot buffer contain three IR sites, all closed; the project limits and 10-foot buffer contain two ASTs. Portions of the project limits are within the Range 14 Artillery Firing Area; Range D704 Live Fire and Maneuver Area; Range 15 Artillery Firing Area; Range 16 Artillery Firing Area; Complex Firing Line Area 116; Range 116A KD Rifle Military Range Area; and Range 117A Military Range Area; Range D700 Live Fire and Maneuver Area; and Range RSOP 25. There is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	no further action; the project limits and 200-foot buffer contain no UST sites; the project limits and 500-foot buffer contain three IR sites, one closed; the project limits and 10-foot buffer contain five ASTs. Portions of the project limits are within the Range 14 Artillery Firing Area; Range 15 Artillery Firing Area; Range 16 Artillery Firing Area; Range D704 Live Fire and Maneuver Area; Range D704 Live Fire and Maneuver Area; Range 503 Firing Line; Range 505 Firing Line; Dudded Impact Area 1/503 Hand Grenade Range; and Non-Dudded Impact Area/Edson Range. There is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	further action; the project limits and 200-foot buffer contain no UST sites; the project limits and 500-foot buffer contain three IR sites, one of which is closed; and the project limits and 10-foot buffer contain five ASTs. Portions of the project limits are within the Range 14 Artillery Firing Area; Range 15 Artillery Firing Area; Range 16 Artillery Firing Area; Range D704 Live Fire Area and Maneuver Area; and Range FMSS Facility. There is a potential presence of MEC and small arms rounds. Implementation of standard construction review procedures and immediately reporting any MEC or hazardous materials would avoid any public health and safety impacts. **Mitigation** No mitigation measures are proposed.	
Services and Utilities				
Impacts Under Alternative 1, connection of the northern, southern, and Las Pulgas water systems would have a beneficial impact to potable water supply on the	**Impacts** Under Alternative 2, construction locations would vary from Alternative 1, but types of construction and operational impacts would be	**Impacts** Under Alternative 3, construction locations would vary from Alternative 1, but types of construction and operational impacts would be	**Impacts** Under Alternative 4, construction locations would vary from Alternative 1, but types of construction and operational impacts would be	**Impacts** Potential significant impacts could result from failure of the deteriorating facilities and pipe/conduit

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
Base. While construction would involve some temporary demand on services and utilities, operations would increase demand for electrical service through additional pump operations but would not increase demand for communication, water, wastewater, gas, or solid waste services. Increased electrical demand would be minor and not exceed existing capacity; therefore, no significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	the same as described under Alternative 1. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	the same as described under Alternative 1. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	the same as described under Alternative 1. No significant adverse impacts to services and utilities are anticipated. **Mitigation** No mitigation measures are proposed.	systems. Failures in existing aged systems would impact firefighting capabilities, quality of life, and training requirements. **Mitigation** No mitigation measures are proposed.
Coastal Zone Resources				
Impacts Under Alternative 1, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 1, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, Waste Discharge Requirements	**Impacts** Under Alternative 2, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 2, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, WDRs, and/or NPDES permits relative	**Impacts** Under Alternative 3, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 3, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, WDRs, and/or NPDES permits relative	**Impacts** Under Alternative 4, no portion of this project would be located in the coastal zone. Potential water quality and hydrology impacts of Alternative 4, which could result in impacts to coastal resources in the coastal zone from construction activities and TLS stream crossings (e.g., erosion, sediment transport, pollutant exposure to storm water, and/or material spills), are described in the Water Quality and Hydrology resource summary above. Impacts would be avoided by implementation and regulatory enforcement of a project-specific SWPPP, WDRs, and/or NPDES permits relative	**Impacts** No coastal zone resources impacts would occur. **Mitigation** No mitigation measures are proposed.

P-1045 Alternative 1	P-1045 Alternative 2	P-1045 Alternative 3 – Preferred Alternative	P-1045 Alternative 4	P-1045 No Action Alternative
(WDRs), and/or National Pollutant Discharge Elimination System (NPDES) permits relative to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	to site-specific needs and conditions. BMPs and monitoring/reporting programs would be required and implemented before construction, during construction, and continue through the postconstruction operational phase. **Mitigation** No mitigation measures are proposed.	
Marine Resources				
Impacts No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No feature of P-1045 would directly affect marine resources. Indirect impacts could result if construction of inland facilities were to affect waters downstream but would not be significant because measures described under Water Quality and Hydrology would be implemented. **Mitigation** No mitigation measures are proposed.	**Impacts** No marine resources impacts would occur. **Mitigation** No mitigation measures are proposed.

[1] Impacts from construction traffic are analyzed as a combination of traffic from each project alternative plus all other traffic that is anticipated to be occurring at the same time, including background traffic, P-1044, and other foreseeable projects scheduled for concurrent construction. Therefore, impact traffic volumes represent construction of the projects in their anticipated years of construction. P-1044 is the only project scheduled for construction in 2012. P-1044 and P-1045 are scheduled for construction in 2013 and 2014.



Source: MCBCP 2009

3,000 1,500 0 3,000 Feet

Scale:1 = 36,000; 1 inch = 3,000 feet

Figure 2.6-1
P-1044 All Alternatives

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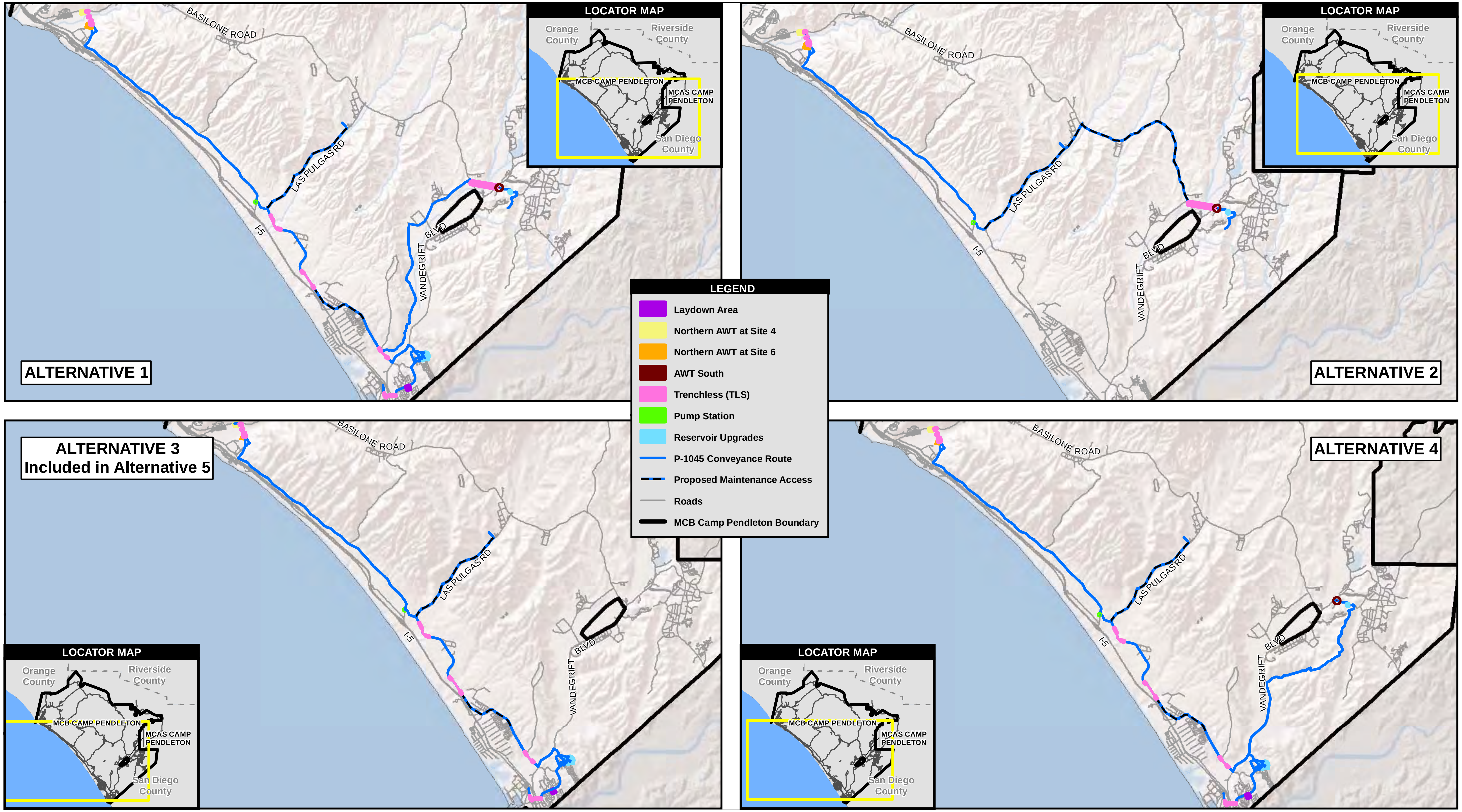

Source: MCBCP 2009

3 1.5 0 3 Miles

Scale: 1 = 190,080; 1 inch = 3 miles

Figure 2.6-2
P-1045 All Alternatives

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_2\P1045_allALTs_4windows.mxd, 7/3/2012, johnsonaa

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CHAPTER 3.0
AFFECTED ENVIRONMENT

This chapter describes the existing environmental conditions in and around MCBCP for resources potentially affected by implementation of the proposed action alternatives as described in Chapter 2. Information presented in this chapter represents baseline conditions against which the proposed action alternatives are evaluated (in Chapter 4) to identify potential impacts. A region of influence (ROI) is defined for each resource presented. The ROI is a geographic area in which potential environmental effects would occur with regard to a particular resource. In compliance with NEPA, CEQ regulations, and U.S. Navy and Marine Corps procedures for implementing NEPA, the description of the affected environment focuses only on those resources potentially subject to impacts. Accordingly, the discussion of the affected environment (and associated environmental analyses) focuses on geology and soils, water quality and hydrology, biological resources, cultural resources, land use, visual resources, socioeconomics and environmental justice, traffic, air quality, noise, public health and safety, infrastructure and utilities, coastal zone management, and marine resources within the defined ROI for each resource.

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3.1 GEOLOGY AND SOILS

3.1.1 Definition of Resource

Geological resources are defined as the geology, soils, and topography of a given area. Geology includes bedrock materials, mineral deposits, and fossil remains. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. Topography is typically described with respect to the elevation, slope, aspect, and surface features found within a given area. Long-term geological, seismic, erosional, and depositional processes typically influence the topographic relief of an area. The principal geologic factors influencing the stability of built structures are soil stability and seismic properties.

3.1.2 Regulatory Setting

Construction taking place on-Base would require the formation of a SWPPP and other BMPs required by the general construction activity storm water permit issued by SWRCB. The SWPPP would be subject to review and approval by RWQCB. Soil erosion and sediment control measures are currently enacted on-Base, so erosion would not significantly affect development.

The Alquist-Priolo Special Studies Zone Act of 1993 (California Public Resources Code §§ 2621–2630) provides regulatory guidance for construction projects that are located in seismically active regions in the State of California. The purpose of the Alquist-Priolo Act is to provide increased safety to minimize the loss of life during earthquakes by facilitating seismic retrofitting to strengthen buildings against ground shaking. The Alquist-Priolo Act prohibits the construction of structures for human occupancy within 50 feet of an active fault. The state geologist is required to continually review new geologic and seismic data and to revise the earthquake fault zones or to delineate new zones based on new information.

Current soil erosion control programs at MCBCP include road maintenance, grading, culvert maintenance and installation, water runoff control, traffic control in erosion damaged areas, and mulching areas with a protective cover of organic material such as wood chips and vegetation.

Although not required, geotechnical investigations are typically performed as part of the design and retrofit of structures. Construction plans are reviewed for conformance with provisions of the Alquist-Priolo Act. Soil erosion is minimized through the implementation of terms and conditions of applicable BOs, including the Riparian BO (USFWS 1995), and by implementation of the measures contained in the MCBCP Soil Erosion Management Practice Handbook (USMC 2000) and the INRMP.

3.1.3 Region of Influence

The ROI for geological resources includes most of the area within 2 miles of the coast along almost the entire length of the Base, the Santa Margarita River valley as far inland as the 34 Area (Vado Del Rio), all of the San Mateo Creek valley and the 62 Area (San Mateo), the areas near the SONGS main facility and East Mesa facility and along Basilone Road between the 51 Area (San Onofre) and the 53 Area (Horno), the area between the lower Santa Margarita River and the reservoir area northwest of the Wire Mountain 2 Housing Area and the Santa Margarita Housing Area, the route from the Wire Mountain reservoirs and Haybarn Canyon between the 22 Area (Chappo) and 24 Area and the Headquarters Area, the route to the 21 Area (Del Mar), and the area from the east side of the 31A Area (Edson Range) to the reservoirs north of the 32 Area (MACS-1). This is the geographic area in which construction or operation of facilities associated with the proposed action alternatives would occur and where existing geological resources would be potentially affected. The ROI does not contain a substantial amount of economically significant mineral resources, and no active or abandoned mines are located within the ROI (USMC 1997). Mineral resources are not addressed further in this section.

3.1.4 Existing Conditions – Basewide

Geology

The physiographical formations of MCBCP are largely the result of the Base's underlying geologic composition. The oldest stratum on the Base is thought to be the pre-Tertiary basement rock of the Santa Margarita Mountains, made up of pre-Tertiary granitic, igneous, and metamorphic rock (U.S. Navy 1992). As a reference for geologic time periods, see the geologic time chart in Figure 3.1-1. Granitic basement rocks are generally stable where unfractured, forcing any excavation effort to include blasting and ripping. Erosion is more likely if the basement rock is fractured and subsequently exposed to weathering.

The intermontane area separating the Santa Margarita Mountains and the San Onofre hills is mainly composed of the soft sandstones and shales that form the La Jolla Group (U.S. Navy 1992). These rocks are of marine origin, formed in the Eocene epoch. Due to their relative softness, La Jolla Group rocks are easily excavated and especially vulnerable to erosion.

The San Onofre hills are formed by a breccia formation consisting of resistant middle Miocene conglomerates, sandstones, shales, and breccia (angular conglomerates). This breccia formation has come to be known as the San Onofre Breccia. The Base's northernmost hills include areas where Tertiary Monterey and Capistrano formations overlie the San Onofre Breccia. These are middle Miocene to lower Pliocene marine shales and siltstones. Overlying some areas of the Capistrano formation is the younger San Mateo formation, made up of large sandstones formed in the mid-Pliocene to Pleistocene periods, as well as conglomerate silty sandstone and siltstone interbeds (U.S. Navy 1992).

Quaternary materials, mainly unconsolidated terrace and alluvial deposits, underlie most of the coastal plain and stream valleys within MCBCP. These nearly horizontal deposits are marine or alluvial in origin. Pleistocene alluvial terraces can be found exposed in the coastal plain area and as terrace remnants on top of coastal bluffs and hills adjacent to major streams. The coastal plain also includes a small area of sand dunes formed in the Pleistocene epoch and made up of fine, windblown sand deposits. Layers up to 100 feet thick of Holocene alluvial deposits of gravel, sand, and silt with cobbles and boulders make up the active stream channels and overbank areas. Large-scale landslides during the Holocene formed disorganized blocks of highly fragmented debris. Exposed Quaternary units are locally vulnerable to erosion (U.S. Navy 1992).

Topography

Located within the Peninsular Ranges geomorphic province, MCBCP can be divided into five distinguishable physiographical features: the coastal plain, the coastal hills (San Onofre hills), the Santa Margarita Mountains, an intermontane area between those hills and mountains, and a series of valleys/canyons cut by streams flowing through the Base and into the Pacific Ocean.

The coastal plain consists of the area running adjacent to the shoreline, rising from sea level to an elevation of 200 feet, and varying in width from 0.25 mile to 2.25 miles. Accounting for this variation is the slope of the plain, which is more intense along the Base's northern coast and relatively subtle along its southern coast. Immediately east of the coastal plain are the San Onofre hills, which quickly ascend to 1,725 feet. The Santa Margarita Mountains are located farther inland, rising to 3,000 feet. The intermontane area runs between these mountains and the San Onofre hills. The continuity of these mountains and hills is interrupted by a number of stream valleys, which carve through the landscape on their way toward the Pacific Ocean.

Slopes of 15 percent to over 30 percent dominate the north-northeastern portion of MCBCP. Southern MCBCP is relatively flatter, as the coastal plain and intermontane area widen.

Seismicity

Tectonically, numerous northwest-trending, right-lateral strike-slip fault zones transect the Peninsular Ranges province. These fault zones subdivide the province into several subparallel fault blocks, which are topographically expressed as northwest-trending mountain ranges and intervening valleys. The San Jacinto, Whittier-Elsinore, Newport-Inglewood, and Rose Canyon fault zones represent the predominant fault zones within the province (Figure 3.1-2). The Cristianitos fault zone, located in the northwest portion of the study area, consists of a number of northwest–southeast-trending strike-slip faults. The offshore extension of the Cristianitos fault zone continues south to southwesterly where it merges with the Offshore Zone of Deformation, which is thought to be the offshore extension of the Rose Canyon fault zone.

<u>Regional Faults</u>

There is no known regional fault passing through or adjacent to MCBCP (U.S. Navy 1992). However, several such faults nearby are known to produce major earthquake events capable of significantly impacting the Base.

The regional fault system impacting MCBCP consists of several large, northwest-trending faults running parallel to and west of the San Andreas fault. Starting at the Base and moving eastward, the first regional fault crossed is the Whittier-Elsinore fault (18 miles to the east), known to have produced a large seismic event in 1769. The next regional fault to the east is the San Jacinto fault (42 miles to the east), known to have produced significant events in 1890, 1899, and 1918. East of the San Jacinto fault is the San Andreas fault, the region’s largest and most dominant fault.

Also capable of significantly impacting MCBCP is the Santa Monica to Baja California Zone of Deformation, composed of several northwest-trending faults located, for the most part, 4 to 6 miles offshore. Included in this deformation zone are the Newport-Inglewood fault zone to the northwest and the Rose Canyon fault to the south.

Local Faults

MCBCP's local fault system is a subject of debate among relevant authorities. Most of this debate concerns the southern half of the Base, where the Stuart Mesa fault, Las Pulgas fault, and other faults are thought to exist.

The Cristianitos fault is the only fault on the Base that is universally recognized among authorities. It is inactive and trends north to northwest for about 25 miles. The fault's southern portion lies in the northwestern corner of the Base, where at the coast it shows 90 feet of vertical separation. The fault's maximum vertical separation ranges from 3,500 to 4,000 feet in the northwestern section of the fault, northwest of MCBCP (U.S. Navy 1992).

Seismic Conditions On-Base

The largest credible seismic event likely to affect the ROI would be an earthquake of Richter magnitude 7.5. Known sources in the area capable of producing a temblor of this magnitude are the active offshore Zone of Deformation, located approximately 6 miles to the west-southwest; the Whittier-Elsinore fault; and the San Jacinto fault (USMC 2007a). While the ROI is not underlain by active or potentially active faults, two faults are suspected to exist within the vicinity; however, their existence is subject to disagreement among scientists. These faults are the Las Pulgas fault and the Stuart Mesa fault. Evidence of these faults is provided by the photoalignments (linear traces) observed in aerial photographs. Photoalignments are often signs of fault displacement.

Since the ROI does not overlie any known active or potentially active faults, there is no ground surface rupture hazard. The seismic hazard most likely to be detrimental to the ROI is ground shaking resulting from a large earthquake generated on either a major regional or local fault.

Earthquake activity on MCBCP consists mainly of isolated events registering less than 4.0 on the Richter scale. Seismic activity has yet to be reliably correlated with the previously named faults on or immediately adjacent to the Base, the one exception being the northern portion of the Santa Monica to Baja California Zone of Deformation.

Tsunamis do not pose a significant threat to the MCBCP area, nor to the adjacent coastline. The estimated maximum wave height for a tsunami hitting MCBCP's shore is 6 feet. Combining such a wave with a maximum high tide and storm surge creates a wave run-up of 13 feet above the mean lower low water level.

Liquefaction

A major seismic event produced by one of the nearby regional faults is capable of significantly impacting the Base. High vibratory ground motion levels can be expected during such an event, ranging from 1/2 to 2/3 gravity. Such ground motion brings the possibility of liquefaction, which occurs wherever loose, unconsolidated material exists in the presence of sand lenses and high water tables (U.S. Department of Agriculture 2007). These conditions could be met in MCBCP's stream channel alluvium and coastal estuaries, but there are no known locations with high potential for liquefaction.

Liquefaction susceptibility is primarily a function of age, density, depth of sediment, and depth to groundwater. Generally, the liquefaction susceptibility decreases as the depth to groundwater increases because the normal effective stress acting on saturated sediment is greater. The surficial alluvium that occupies the drainages in the ROI is poorly consolidated and is considered to have a moderate potential for liquefaction. The liquefaction potential outside of the drainages in the ROI is considered very low, as it consists of relatively well-consolidated and dense materials (USMC 2007a).

Landslides

Although landslide areas are spread throughout MCBCP, they are particularly frequent within the San Mateo and Cristianitos watersheds, where their size ranges from 1 acre to 640 acres (U.S. Navy 1992). Tertiary sedimentary rocks are subject to sliding. The Monterey formation, more specifically, has experienced slides north and east of the Cristianitos fault. There are numerous slides of varying ages where the Capistrano formation is exposed in the sea cliffs southeast of the Cristianitos fault contact. This area of landslides is identified as a hazard by county planning agencies. The San Onofre Breccia has landslide potential in both the San Mateo formation and La Jolla Group where slopes are steepened or undercut during construction. In addition, Quaternary sedimentary rocks are also subject to sliding in and around Las Pulgas Canyon.

Soils

MCBCP contains a relatively diverse collection of soils, including five of San Diego County's eight major soil groups (as classified in the 1973 survey conducted by the Soil Conservation Service, U.S. Department of Agriculture, and other federal agencies). Soils on-Base range from moderately to excessively well drained, with particle sizes befitting loamy sands, clays, and sandy or silty loams. Poorly consolidated marine sediments cover most of the Base's coastal plain, while granitic soils, with lesser amounts of metasedimentary[9] and metavolcanic[10] soils, can be found farther inland.

Soil conditions are often responsible for restraining on-Base development, which usually consists of lightweight structures and isolated buildings at or below three stories. The 1973 Soil Conservation Service (SCS) soil survey rated the suitability of MCBCP's soils for development of such structures (Bowman 1973). The most important criteria affecting soil suitability are slope readings, erodibility, and shrink-swell conditions. In terms of their suitability for development, slopes of over 30 percent are designated as having poor suitability, slopes of 9 percent to 30 percent as having medium suitability, and slopes of 0 percent to 9 percent as having good suitability for development. Erodibility is determined by considering slope readings and soil texture. Shrink-swell potential predicts the level of shrinking a soil will experience as it dries out, and any swelling that will occur when it gets wet. A soil's shrink-swell potential is ultimately determined by the amount and type of clay it contains.

Affecting a soil's suitability for development to a lesser degree are its bedrock depth and hydrologic group. The bedrock depth of MCBCP varies from zero to over 5 feet. A soil's hydrologic group accounts for water infiltration rate and runoff potential.

Almost all MCBCP's soils are severely erodible, according to the U.S. Natural Resources Conservation Service, because of steepness, shallow depth to rock, shallow depth to a hardpan, or excessive silt in surface texture composition. Exceptions are soils of clay-textured types.

Infiltration rate, erodibility, and shrink-swell potential are the major soil properties of concern when considering construction activities. Where project areas are either paved or vegetated, the potential for soil erosion is reduced. While the underlying soils in these areas may be subject to erosion in their natural state, landscaping, storm water conveyance infrastructure, and the shallow slopes minimize the erosion potential. Conversely, portions of the proposed corridors cross through undeveloped areas or along routes that follow smaller back roads, which may contain more erodible soils, less vegetation, and steeper slopes. As a result, these areas are subject to natural erosion

[9] Metasedimentary soils are derived from rock originally laid down as sediment, buried beneath other strata, and metamorphosed by heat and pressure.
[10] Metavolcanic soils are derived from rock originally produced by a volcano, buried beneath other strata, and metamorphosed by heat and pressure.

processes (e.g., rainfall and wind) and few, if any, erosion controls are present due to their relatively undeveloped nature.

Prime Farmland

There are roughly 13,500 acres of land within MCBCP designated by SCS (now the Natural Resources Conservation Service) and the U.S. Department of Agriculture as “prime farmland.” This designation is given to soils whose characteristics make them both easily farmable and highly productive, while simultaneously making minimal contributions to soil loss. The Marine Corps’ policy on the protection of prime farmland is outlined in the Environmental Compliance Protection Manual, MCO P5090.2A at paragraph 11104.2e. MCBCP’s prime farmland is located near the coastline, adjacent to the Base’s northern and southernmost shores.

3.1.5 Existing Conditions – Proposed Project Areas

While geological conditions and soil types vary throughout the Base (as described above) and, therefore, along the proposed project linear pipeline corridors that traverse large portions of the Base, this section provides an overview of existing conditions in the areas where permanent aboveground facilities associated with each proposed project would be located.

Northern AWT and Associated Facilities (P-1044)

The Northern AWT Site 4 (P-1044 Alternatives 3 and 4) possesses two soil types: Salinas clay loam with slopes of 2 to 9 percent on the northern two-thirds, nearest Basilone Road, and Marina coarse loamy sand with slopes of 9 to 30 percent on the southern third, near San Onofre Creek. Elevation at the site is approximately 108 feet.

The Northern AWT Site 6 (P-1044 Alternatives 1 and 2; also included in Alternative 5) would be entirely located on Diablo clay with 2 to 9 percent slopes. This soil type exhibits medium to rapid runoff and moderate to high erosion potential. The elevation is ranges from 64 to 67 feet.

Connection of Northern and Southern Water Systems (P-1045)

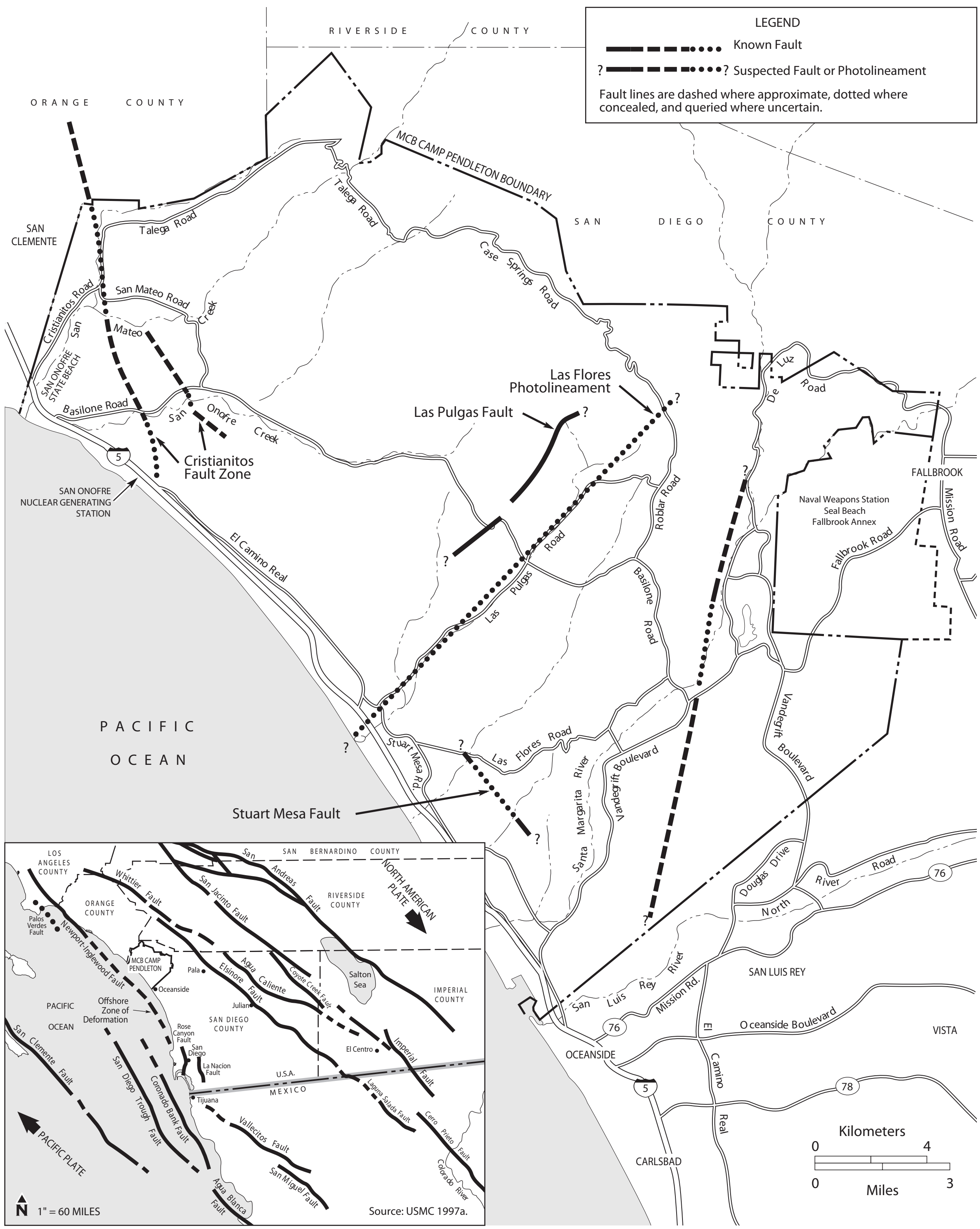
The proposed site for the pump station near Las Pulgas gate is entirely underlain by Diablo clay with 2 to 9 percent slopes, a soil type with slight erodibility. The elevation of the pump station site is in the range of 108 feet.

The proposed 4-million-gallon reservoir site is underlain by two soil types with severe erodibility: Olivenhain cobbly loam with 2 to 9 percent slopes on the northern and eastern two-thirds, and Olivenhain-Urban land complex also with 2 to 9 percent slopes on the southwestern third. The elevation at the proposed reservoir site ranges from 280 to 285 feet.

Era	Period	Epoch	Millions of Years Ago
Cenozoic	Quaternary	Holocene	0.01 - Present
		Pleistocene	0.01 - 1.8
	Tertiary	Pliocene	1.8 - 5.3
		Miocene	5.3 - 23.8
		Oligocene	23.8 - 33.7
		Eocene	33.7 - 54.8
		Paleocene	54.8 - 65.0
Mesozoic	Cretaceous		65 - 144
	Jurassic		144 - 206
	Triassic		206 - 248

Source: Idaho Museum of Natural History, 2009

Figure 3.1-1
Geologic Time Chart



Source: U.S. Navy 1992

Figure 3.1-2
Regional Faults in the Vicinity of the Proposed Action Area

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3.2 WATER QUALITY AND HYDROLOGY

3.2.1 Definition of Resource

Water resources on MCBCP consist of all ground, surface, and receiving waters. Surface waters include the Santa Margarita River, streams and drainages, ponds, lakes, and seasonal pools. Groundwater is subsurface water that is more or less permanently present at a certain depth. Receiving waters are the surface waters into which flow tributary drainages; ultimately, the Pacific Ocean is the receiving water for all drainages and runoff from MCBCP. A separate discussion of marine resources, which includes marine water quality issues, may be found in Section 3.13.

3.2.2 Regulatory Setting

A variety of governing laws and regulations serve to protect surface water quality and avoid violations of water quality compliance standards or WDRs. These mandates require implementation of a number of design, construction, and operational controls that address BMP requirements for proper runoff management and water quality treatment/protection. Applicable regulations and the associated agencies with regulatory authority and oversight are described below.

Safe Drinking Water Act (SDWA) of 1974

The Safe Drinking Water Act (SDWA) passed by Congress in 1974 requires the USEPA to develop minimum federal requirements for the Underground Injection Control Program (UIC) and other safeguards to protect public health by preventing injection wells from contaminating underground sources of drinking water. The UIC Program, sets regulations regarding the construction, operation, permitting and closure of injection wells that place fluids underground for storage or disposal. It also provides standards, technical assistance, and grants for state governments to regulate injection wells. While administered by the USEPA, some states have been delegated all or part of the responsibility of enforcing the UIC regulations. In California, the UIC Program is administered by the USEPA and the RWQCBs (BOR 2009; USEPA 2010).

Executive Order 11988, Floodplain Management

Executive Order (EO) 11988 directs all federal agencies to refrain from conducting, supporting, or allowing any activity that would significantly encroach into a floodplain unless it is the only practicable alternative. If the lead agency finds that the only practicable alternative requires siting in a floodplain, the agency shall either design or modify its action to minimize harm to or within the floodplain and circulate a notice explaining why the action is proposed to be located in a floodplain.

Executive Order 11990, Protection of Wetlands

EO 11990 is an overall wetlands policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. EO 11990 requires that when a construction project involves wetlands, a finding must be made by the federal agency that there is no practicable alternative to such construction, and that the proposed action includes all practicable measures to minimize impacts on wetlands resulting from such use. It requires federal agencies to follow avoidance, mitigation, and preservation procedures, with public input, before proposing new construction in wetlands, and generally requires:

- avoidance of wetlands,
- minimization of activities in wetlands, and
- coordination with USACE regarding wetlands mitigation.

Federal Antidegradation Policy

The federal antidegradation policy has been in existence since 1968. The policy protects existing uses, water quality, and national water resources. It directs states to adopt a statewide policy that includes the following primary provisions:

- Existing instream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, water quality shall be maintained and protected.

Clean Water Act

The federal CWA governs federal, state, and local regulations regarding the protection of water quality. Sections that are relevant to water quality and hydrology on the Base are summarized below.

CWA Section 303(d)

Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the U.S. As defined by the CWA, water quality standards consist of two elements:

- designated beneficial uses of water bodies, and
- criteria that protect the designated uses.

Under CWA Section 303(d), states, territories, and authorized tribes are required to develop a list of water bodies that are considered to be “impaired” from a water quality standpoint. Water bodies that appear on this list do not meet, or are not expected to meet, water quality standards even after the minimum required levels of pollution control technology have been implemented to reduce point sources of pollution. The law requires that respective jurisdictions (for example, RWQCBs) establish priority rankings for surface water bodies on the lists and develop action plans, referred to as Total Maximum Daily Loads, to improve water quality. The San Diego RWQCB publishes the list of water quality-limited segments in the San Diego region, including MCBCP (RWQCB 2009a).

CWA Section 401

Every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain State Water Quality Certification for the proposed activity and comply with state water quality standards prescribed in the certification. In California, these certifications are issued by SWRCB under the auspices of RWQCB. Most certifications are issued in connection with CWA Section 404 USACE permits for dredge and fill discharges, described below.

CWA Section 402

CWA Section 402 sets forth regulations that prohibit the discharge of pollutants into waters of the U.S. from any point source without obtaining an NPDES permit. SWRCB implements the NPDES and the State's water quality programs by regulating point-source discharges of wastewater and agricultural runoff to both land and surface waters to protect their beneficial uses. To comply with the CWA water quality regulations, the various RWQCBs in California (nine regions) require permits for discharging or proposing to discharge materials that could affect water quality. SWRCB and its RWQCBs administer the NPDES permit program.

Permitting the construction or modification of outfall structures, where the discharged effluent is authorized or otherwise complies with an NPDES permit, would also be governed under Nationwide Permit #7, requiring the permittee to submit a preconstruction notification to the district USACE engineer before commencing the activity.

The SWRCB/RWQCB also regulate discharges to, and the quality of, groundwater resources through the issuance of WDRs. WDRs are issued to discharges that specify limitations relative to the Water Quality Control Plan for the San Diego Basin (Basin Plan) (RWQCB 1994).

Although the NPDES program initially focused on point-source discharges of municipal and industrial wastewater that were assigned individual permits for specific outfalls, results of the Nationwide Urban Runoff Program identified contaminated storm water as one of the primary causes of water quality impairment. To regulate runoff-related (nonpoint-source) discharges, USEPA developed a variety of general NPDES permits for controlling industrial, construction, and municipal storm water discharges:

- <u>Industrial</u>. The *Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities* (Industrial General Permit; SWRCB Water Quality Order 97-03-DWQ) regulates industrial site storm water management. These regulations prohibit discharges of non-storm water to waters of the U.S. from a broad range of industrial activities, including mining, manufacturing, disposal, recycling, and transportation, unless such discharges comply with a site-specific NPDES permit. Storm water discharges from industrial facilities covered under this permit must also incorporate proper pollution prevention controls in accordance with the Industrial General Permit.
- <u>Construction</u>. Dischargers whose projects disturb 1 or more acres of soil, or less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under SWRCB Order

2009-0009-DWQ, the *General Permit for Storm Water Associated with Construction and Land Disturbance Activities* (Construction General Permit). Construction activity subject to this permit also includes linear underground/ overhead projects disturbing at least 1 acre. Any construction or demolition activities subject to this permit include, but are not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance equal to or greater than 1 acre.

LUP construction includes, but is not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, and associated ancillary facilities) and includes, but is not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations. As Order 2003-0007-DWQ previously regulated LUP construction activities, these projects are now regulated by Attachment A of Order 2009-0009-DWQ.

Stormwater discharges from dredge spoil placement that occur outside of USACE jurisdiction (upland sites) and that disturb 1 or more acres of land surface from construction activity are also covered by this General Permit. A construction site that includes a dredge and/or fill discharge to any water of the United States (e.g., wetland, channel, pond, or marine water) requires a CWA Section 404 permit from USACE and a CWA Section 401 Water Quality Certification from RWQCB or SWRCB.

- <u>Municipal</u>. Under Phase I of its storm water program, USEPA published NPDES permit application requirements for municipal storm water discharges for municipalities that own and operate separate storm drain systems serving populations of 100,000 or more, or which contribute significant pollutants to waters of the U.S. Under Phase II, small municipal separate storm sewer systems (MS4s) that are not permitted under the municipal Phase I regulations, and which are owned or operated by the United States (e.g., systems at military bases) are regulated under statewide general permit *Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems* (SWRCB Order 2003–0005–DWQ). This general permit regulates discharges of storm water from small MS4s, which identifies MCBCP as a “non-traditional small MS4 anticipated to be designated in the future” (WQO 2003–0005–DWQ, Attachment 3). The current draft of the new small MS4 permit designates MCBCP as a co-permittee. Once this draft permit becomes adopted (anticipated in 2012), MCBCP will be required to control and monitor runoff and discharges to receiving waters.

CWA Section 403

CWA Section 403 provides that point-source discharges to the territorial seas, contiguous zones, and oceans are subject to regulatory requirements in addition to the technology- or water quality-based requirements applicable to typical discharges. The requirements are intended to ensure that no unreasonable degradation of the marine environment will occur as a result of a discharge, and to ensure that sensitive ecological communities are protected. These requirements can include ambient monitoring programs designed to determine degradation of marine waters, alternative assessments designed to further evaluate the consequences of various disposal options, and pollution prevention techniques designed to further reduce the quantities of pollutants requiring disposal and thereby reduce the potential for harm to the marine environment. If CWA Section 403 requirements for protection of the ecological health of marine waters are not met, an NPDES permit will not be issued.

CWA Section 404

Section 404 of the CWA requires that any person conducting any activity that involves any discharge of dredged or fill material into waters of the U.S., including wetlands, obtain a permit. USACE is responsible for issuing permits for the placement of fill or discharge of material into waters of the U.S. required under CWA Sections 401 and 404. Structures that involve in-stream construction trigger the need for these permits and related environmental reviews by USACE.

Rivers and Harbors Act of 1899 (USACE) Section 10

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from USACE for the construction of any structure in or over any navigable water of the U.S. or for work outside the limits defined for navigable waters of the U.S. if the structure or work affects the course, location, or condition of the navigable water body. The law applies to any dredging or disposing of dredged materials, excavating, filling, rechanneling, or any other modifying of a navigable water of the U.S. It applies to all structures, including any infrastructure, permanent or semipermanent obstacle, or obstruction, including but not limited to wharfs, weirs, jetties, bank protection (e.g., riprap, revetment, bulkheads), mooring structures (e.g., pilings), navigation aids (e.g., buoys, dolphins), aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessels, tunnels, artificial canals, and boat ramps.

Activities regulated under Section 10 of the Rivers and Harbors Act generally are similar to those under Section 404 of the CWA, but the geographic extent of jurisdiction is more restricted, limited to identified navigable waters of the U.S.

3.2.3 Region of Influence

The ROI for water quality and hydrology includes those areas in which construction or operation of facilities associated with the proposed action alternatives would potentially affect surface or groundwater resources. The ROI for the proposed action is widespread, with elements of the two proposed projects in drainages including San Mateo Creek, San Onofre Creek, the coastal drainages of the Base's central coast, Aliso Creek, Las Pulgas Creek, French Creek, and the Santa Margarita River. For all drainages affected by the two projects, implementation of the proposed action alternatives would potentially affect coastal waters. Most water quality and hydrology effects of the proposed action would affect areas downstream from the project limits. Therefore, the ROI for water quality and hydrology extends upstream 400 feet from proposed areas of ground disturbance but extends downstream in any affected drainages to the Pacific Ocean, including nearshore ocean waters (which also contain the proposed SONGS outfall conduit). The ROIs for the two projects include surface water resources (including floodplains) and groundwater resources.

3.2.4 Existing Conditions – Basewide

Inland Surface Waters

Mountainous terrain divides MCBCP into distinct drainage areas. Approximately 67 percent of the Base lies within the San Juan Hydrologic Unit (HU). The Base also lies within the Santa Margarita and San Luis Rey HUs. These HUs are further divided into hydrologic areas (HAs) as illustrated in Figure 3.2-1 and described in Table 3.2-1. HUs are large drainage basins and HAs are smaller basins. The San Luis Rey HU on-Base is on the Base's southern boundary and is outside the proposed action's ROI.

The HUs within the boundaries of the Base are in coastal plains, coastal valleys, and mountainous areas. Surface waters in these areas include rivers, creeks, and lakes and are a valuable resource, performing a variety of functions.

The beneficial uses of surface waters within the San Diego County area are identified in the Basin Plan (RWQCB 1994) and are summarized for MCBCP below by HU. The purpose for designating the beneficial uses of water bodies is to develop and implement appropriate programs to protect water quality. Other water bodies, including freshwater marshes and vernal pools, are also a significant resource found throughout MCBCP. These other water bodies are discussed in detail in Section 3.3, Biological Resources.

San Juan Hydrologic Unit

The San Juan HU covers 496 square miles in San Diego, Orange, and Riverside counties. Approximately 150 square miles (30 percent) of this area is in northwest San Diego County, almost entirely within MCBCP. There are five HAs in the San Juan HU, of which two, the San Onofre and the San Mateo Canyon HAs, are partly on-Base.

The topography of the San Onofre and San Mateo Canyon HAs is varied, ranging from coastal plains in the western portion to the Santa Margarita Mountains, which rise approximately 3,000 feet above mean sea level (AMSL). These HAs are largely undeveloped. In addition to military Base training operations, major land uses within the San Onofre and San Mateo Canyon HAs on-Base include open space and developed cantonments.

Roughly 18,675 acres (approximately 22 percent) of the San Mateo Canyon HA are within MCBCP. The drainage includes San Mateo Creek and tributaries of Cristianitos and Talega creeks. San Mateo Creek drains to the Pacific Ocean at the northernmost coastal portion of the Base. Beneficial uses of these creeks identified in the Basin Plan (RWQCB 1994) include:

- Noncontact water recreation
- Warm freshwater habitat
- Wildlife habitat
- Habitat for rare, threatened, or endangered species

The San Onofre HA is situated almost entirely within MCBCP. Two primary stream systems, San Onofre Creek and Las Flores Creek, as well as many smaller drainages, occur within the San Onofre HA. All of these systems drain to the Pacific Ocean. Within the Base, beneficial uses of the surface waters within the San Onofre HA identified in the Basin Plan (RWQCB 1994) include:

- Agricultural supply
- Contact water recreation
- Noncontact water recreation
- Freshwater habitat
- Wildlife habitat
- Habitat for rare, threatened, or endangered species

Three small ponds are within the San Juan HU: Case Springs and Witman Pond in the San Onofre local watershed, and Pulgas Lake in the Las Flores local watershed (USMC 2007a). Beneficial uses have not been identified in the Basin Plan for these ponds.

Constituents of concern in the San Juan HU include coliform bacteria; nutrients; TDS; solvents; trace metals; and petroleum products due to urban runoff, agricultural runoff, and military operations (PCW 2006a). Past water quality monitoring has indicated that the region’s surface waters are high in TDS. The Pacific Ocean at the San Mateo Creek mouth (Trestles Beach) is listed as impaired for bacteria. Additionally, several waters associated with the watershed have been listed as impaired on the SWRCB CWA Section 303(d) list, but these are all outside the Base property and would not be affected by the proposed action.

<u>Santa Margarita Hydrologic Unit</u>

The Santa Margarita HU encompasses approximately 742 square miles in northern San Diego and southwestern Riverside counties. Only about 7 percent or 31,200 acres of this HU occur within MCBCP. Two HAs within this unit, the Ysidora and the DeLuz, occur on-Base. The proposed action would affect only the Ysidora HA.

The Ysidora HA drains into the Santa Margarita River, which is formed near the city of Temecula in Riverside County at the confluence of the Temecula and Murrieta creek systems. Once formed, most of the Santa Margarita River mainstream flows through unincorporated areas in San Diego County, including the community of Fallbrook and MCBCP, with most of the river outside the boundaries of the Base (PCW 2006b). However, the lower portion of the Santa Margarita River is listed on the CWA Section 303(d) list as impaired by enterococcus, fecal coliform, phosphorus, and total nitrogen as N (RWQCB 2010).

The outlet of the river is at the Santa Margarita Lagoon in the southern coastal portion of MCBCP. The Santa Margarita Lagoon is listed on the 303(d) list as impaired for nutrients (eutrophication). Beneficial uses of the Santa Margarita River identified in the Basin Plan (RWQCB 1994) include:

- Municipal and domestic supply
- Agricultural supply
- Industrial service supply (activities that do not depend on water quality; e.g., mining, cooling water supply, fire protection)
- Industrial process supply (activities that depend on water quality)
- Contact and noncontact recreational use
- Warm and cold freshwater habitat
- Wildlife habitat
- Habitat for rare, threatened, or endangered species

Lake O'Neill is situated in the upper portion of the Ysidora HA. This small lake was constructed originally in 1883 on Fallbrook Creek (a tributary) to store water for farm irrigation. Since it came into use for the Base, the lake's purpose has been primarily to supplement the water supply through groundwater recharge and secondarily to provide recreation. Lake O'Neill is outside the ROI for the proposed action.

Constituents of concern for surface waters within the Santa Margarita watershed include nitrate, sediment, and indicator bacteria from sources such as agriculture, orchards, livestock, domestic animals, septic systems, recycled water, and urban runoff.

Development during the past decade, including dramatic expansion of residential, commercial, and industrial areas in the upper part of the drainage, has produced more urban runoff and wastewater discharge. Excessive inputs of nutrients from a variety of sources including agriculture, nursery operations, municipal wastewater discharges, urban runoff, septic systems, and golf course operations have added to water quality degradation. Additionally, excessive sedimentation from development and agricultural areas is of concern in the watershed (PCW 2006b).

Within the Santa Margarita HU, De Luz Creek is on the 303(d) list for iron, manganese, nitrogen and sulfates. Upper Santa Margarita River (upstream of MCBCP) is listed for phosphorus and toxicity. Santa Margarita River Lagoon is listed for eutrophic conditions and is currently undergoing a TMDL.

Coastal Waters

MCBCP occupies approximately 17.5 miles of coastline. Coastal water resources along the Base include the Pacific Ocean, lagoons, creek mouths, estuaries, and the Del Mar Boat Basin. The quality of water along the Base's coastline, as with all waters on the Base, is not only affected by activities occurring on the Base but also by activities occurring farther up each of the three major HUs in numerous other jurisdictions. Information regarding the coastal waters on or adjacent to the Base is summarized below.

<u>Pacific Ocean</u>

To the west of MCBCP is the Pacific Ocean, where all watersheds occurring on the Base ultimately drain. Along this section of the Pacific coast, beneficial uses identified in the Basin Plan include:

- Industrial service supply
- Navigation
- Contact and noncontact water recreation
- Commercial and sport fishing
- Biological habitats of special significance
- Habitat for wildlife; marine ecosystems; and rare, threatened, or endangered species
- Migration of aquatic organisms
- Aquaculture
- Shellfish harvesting
- Spawning, reproduction, and/or early development of fishes

There are no ocean waters identified on the CWA Section 303(d) list of water quality limited segments along MCBCP's coastline. However, elevated levels of coliform bacteria continue to be a problem in ocean waters just north of the Base where northern basins of the San Juan HU drain. These locations include the Aliso, Laguna, Dana Point, Lower San Juan, and San Clemente basins.

<u>Estuaries/Creek Mouths/Lagoons</u>

Estuaries and coastal lagoons are areas at the mouths of streams and rivers where fresh and ocean waters commingle. Lagoons are salt or brackish waters that are separated from the deeper sea by a shallow or exposed sandbank or similar feature. Lagoons that are fed by freshwater streams are also called estuaries. Estuarine waters are considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of freshwater and seawater. These types of resources within the proposed action's ROI occur at the mouths of the San Mateo and San Onofre creeks, Las Flores Creek, and the Santa Margarita River.

San Mateo Creek and San Onofre Creek Mouths

The San Mateo Creek mouth is within the San Juan HU at the northernmost coastal portion of the Base. The Pacific Ocean at the San Mateo Creek mouth is listed as impaired for bacteria. The San Onofre Creek mouth is also located within the San Juan HU in the northern part of the Base. Beneficial uses of the creek mouths identified in the Basin Plan include:

- Contact and noncontact recreational use
- Habitat for marine ecosystems; wildlife; and rare, threatened, or endangered species
- Support of a habitat necessary for the migration of aquatic organisms
- Preservation of biological habitats of special significance (San Onofre Creek only)

Las Flores Lagoon

The Las Flores Lagoon is within the San Juan HU at the mouth of Las Flores Creek. Beneficial uses of the lagoon are not specified within the Basin Plan. The lagoon and associated marsh are designated "military base" in the County's General Plan and Zoning Ordinance and are within a Special Management Zone at MCBCP. Training activities are conducted in an environmentally sensitive manner.

Santa Margarita Lagoon

The Santa Margarita Lagoon is at the mouth of the Santa Margarita River. Beneficial uses of the lagoon identified in the Basin Plan include:

- Contact and noncontact recreational use
- Habitat for estuarine and marine ecosystems; wildlife; and rare, threatened, or endangered species

- Support of a habitat of special significance requiring preservation
- Support of a habitat necessary for the migration of aquatic organisms

The Santa Margarita Lagoon is listed on the CWA Section 303(d) list of impaired waters due to eutrophication (RWQCB 2010). Eutrophication is the enrichment of an ecosystem with chemical nutrients, typically compounds containing nitrogen, phosphorus, or both. High nutrient loading can result in enhanced growth of aquatic vegetation or phytoplankton (i.e., an algal bloom) that disrupts the normal function of the ecosystem, causing a variety of environmental problems. The Santa Margarita Lagoon is currently experiencing these impairments due to excessive nutrients from a variety of point and nonpoint sources including agriculture, nursery operations, municipal wastewater discharges, urban runoff, septic systems, and golf course operations (PCW 2006b).

Del Mar Boat Basin

The Del Mar Boat Basin is in the Santa Margarita HU just south of the Santa Margarita Lagoon. Beneficial uses of the boat basin identified in the Basin Plan include:

- Industrial service supply (activities that do not depend primarily on water quality)
- Navigation
- Contact and noncontact water recreation
- Commercial and sport fishing
- Biological habitats of special significance
- Habitat for wildlife; marine ecosystems; and rare, threatened, and endangered species
- Migration of aquatic organisms
- Shellfish harvesting
- Spawning, reproduction, and/or early development of fishes

Groundwater

Groundwater in hydrologic contact with the Pacific Ocean occurs in the alluvium in the stream valleys overlying fairly impervious rock units on MCBCP (U.S. Navy 1992). Groundwater is 1 to 2 feet below grade in the canyon floors and at least 45 feet or greater in the upland areas (CalEPA 2006). MCBCP derives groundwater from existing groundwater resources within its boundaries through a system of wells, water mains, booster pumps, and storage reservoirs in the Santa Margarita, Las Flores, San Onofre, and San Mateo basins. Groundwater aquifers supply nearly all the Base's domestic, agricultural, and industrial water needs. The wells in the alluvial valleys of the lower portions of the Santa Margarita HU are the principal source of water for the Base (U.S. Navy 1992). Currently, the only area on Base that is supplied with imported water is the San Mateo Point Housing Area, which purchases less than 100 acre-feet per year, or less than 1 percent of the Base total, from San Clemente (USMC 2007a).

Basins providing groundwater to MCBCP have been evaluated for their potential "safe yield" of water, which is the amount of groundwater that can be extracted without detrimental effects to the basin (Leedshill-Herkenhoff 1989). The safe yield amounts for each of the groundwater basins on MCBCP are provided in Table 3.2-2. Recharge of groundwater on the Base is accomplished by recycling high-quality sewage effluent into the alluvium, by withdrawal from Lake O'Neill, and by surface water percolation (U.S. Navy 1992).

Beneficial uses of groundwater within MCBCP specified in the Basin Plan include:

- Municipal and domestic supply
- Agricultural supply
- Industrial service supply
- Industrial process supply activities that depend primarily on water quality (Santa Margarita HU only)

Contamination potential in groundwater at MCBCP is high due to permeable soils and shallow groundwater, in addition to potential pollutant-generating activities both on-Base and in the upper watersheds. Since the Base is at the lowest portion of three major HUs, water quality on the Base is greatly affected by upstream users and is of significant concern since groundwater provides nearly all of the Base's water supply.

On-Base, industrial and other support operations generate hazardous wastes, including waste oils, contaminated fuels and other petroleum products, cleaning solvents, herbicides, and pesticides. Hazardous waste contamination has been detected in soil and groundwater on the Base. In 1989, MCBCP was placed by USEPA on the National Priorities List for cleanup of hazardous waste. Contamination is from solvents, metals, petroleum, and other wastes contributed by past waste handling and disposal practices on the Base. A cleanup program is currently in operation (http://cfpub.epa.gov/supercpad/cursites). In addition, the Base uses injection wells for wastewater disposal.

Since the Santa Margarita HU provides the majority of the Base's water supply, the quality of groundwater in this area is of particular concern. In the Santa Margarita HU, nutrient levels, particularly nitrogen, have increased in recent years due to intensive agricultural use of fertilizers in the upper watershed. Data from surface water quality monitoring stations also indicate increasing concentrations of magnesium and sulfate. Dramatic expansion of residential, commercial, and industrial development during the past decade in the upper part of the drainage has produced more urban runoff and wastewater discharge (PCW 2006b).

For the other major drainages on the Base, fewer sampling data are available. However, elevated constituents have been noted in groundwater in the San Juan HU including nitrates, TDS, iron, sodium, and *E. coli*, although there appear to be no long-term trends (PCW 2006b).

There is a perpetual potential for seawater intrusion into the Base water supply wells if the water extraction exceeds the safe yield of the individual basins. Frequent monitoring and extraction control of key wells appear to have helped prevent such contamination from occurring in recent years. Historically, however, the Ysidora Narrows well in the Santa Margarita River Basin showed evidence of seawater advance as far as 3 miles upstream by 1952 due to pumping in the basin (CDWR 1956).

By maintaining a 5-foot static water level at this critical well site, ongoing seawater intrusion has apparently been avoided. Increased chloride concentrations at this site and at a well in the San Onofre Creek Basin may have also been caused by increased pumping from lower-quality strata and decreased freshwater recharge (Leedshill-Herkenhoff 1989).

Salt-load imbalances in each of the groundwater basins were noted to have increased dramatically from 1964 to 1976 and were projected to increase in the Santa Margarita Basin due to further development upstream (PRC Engineering, Inc. 1983). However, a 2005 groundwater modeling study (Stetson Engineering 2005) evaluated the seawater boundary conditions and concluded that the future groundwater management scenarios (i.e., limited increase of groundwater pumping) within the San Mateo and San Onofre basins would not be affected by the threat of seawater intrusion. Throughout the simulation of future management scenarios, the freshwater level at the coast was always greater than that of the saltwater, indicating that saltwater was not migrating landward.

While certain water quality objectives set by the State of California through the San Diego RWQCB have sometimes been exceeded, the quality of MCBCP's drinking water generally meets or exceeds state and federal health-related drinking water standards (USMC 2007a). However, current drinking water has TDS concentrations that are in the upper limits of the national secondary standard for TDS and elevated TOC levels could violate the Disinfection Byproducts Rule for drinking water and Title 22 for recycling water. Even though drinking water standards may currently be met, there is a trend of deteriorating drinking water quality associated with the infrastructure to extract, refine, and deliver potable water to base facilities.

Precipitation and Floodplains

Table 3.2-3 summarizes available precipitation data from weather stations throughout the Base. The 27-year annual average precipitation measured at MCAS Camp Pendleton is 11.3 inches (NOAA 2009).

These records illustrate a significant variability in precipitation over the years. Over a period of 129 years, the Lake O'Neill weather station, at an elevation of approximately 110 feet, recorded a minimum of 4.5 inches of precipitation in 1960–61 and a maximum of 38.2 inches in 1992–93. Forty years of precipitation records from the Case Springs weather station, at an elevation of 2,300 feet, indicate a minimum of 6.1 inches of precipitation in 2001–02 and a maximum of 50.4 inches in 1968–69. Because of the extreme variability of precipitation and runoff, the surface area of river and creek systems, and the shallow groundwater table in surface water drainages, the potential for floods occurring on the Base is high.

Floodplains are defined as lowland and relatively flat areas adjoining inland and coastal waters that are subject to a 1 percent or greater chance of flooding in any given year. All military properties are exempt from Federal Emergency Management Agency (FEMA) regulations and, as a result, FEMA has not designated flood zones within MCBCP. However, a number of independent flood assessments have been conducted to identify flood potential on the Base, including several recently completed hydrologic and hydraulic studies of the major drainages. The Santa Margarita drainage study along with other studies of the Las Flores, Horno, Aliso, San Mateo, and San Onofre drainages determined the flow rate that would predict 100-year flood conditions for each of the major streams on-Base as identified in Table 3.2-4 (USMC 2007a).

In general, there are four major floodprone drainages on MCBCP. These include areas along the Santa Margarita River and the San Mateo, San Onofre, and Las Flores creeks. The 100-year floodplain for these drainages is illustrated in Figure 3.2-1.

Within the Santa Margarita HU, a flood evaluation completed in 1989 concluded that, under existing conditions, the 100-year flood would inundate almost all of the developed areas near the Santa Margarita River, except the existing Naval Hospital, Sewage Treatment Plant 3, and the Ranch House. This flood channel is approximately 1,000 feet wide (compared to a low-flow channel of less than 100 feet) and covers most of the valley floor where the river traverses the Base (Leedshill-Herkenhoff 1989). Severe channel-bed scour to a depth of at least 10 feet below the riverbed removed one of the Basilone Road bridge footings during a 21,200 cubic feet per second (cfs) flood in the winter of 1978 (Chang 1988). Before the January 1993 flood, it was predicted that the bridges at Basilone Road and Stuart Mesa Road would be overtopped by a 100-year flood at 100,000 cfs and that a nondamaging flood would have to be less than 11,000 cfs (Leedshill-Herkenhoff 1989). The 1993 flood of an estimated 45,000 cfs at Ysidora was approximately a 25-year flood event (based on the most recent flow frequency table). It destroyed the bridge at Basilone Road and damaged the Stuart Mesa Bridge.

Drinking water quality was in question as a result of the flood’s impact on the water supply wells within the floodplain, some of the STPs were flooded, and retention ponds were destroyed. Concern has been raised that more frequent and damaging flood events could be experienced on the Base because of the effects of increased upstream urbanization in the Santa Margarita HU.

During the summer months and periods of extreme drought, the frequency of extremely low flows in unregulated streams is particularly high throughout MCBCP. Though they are prone to flooding, it is not unusual for the San Mateo, San Onofre, and Las Flores creeks to be dry from July through October. Furthermore, historical data show that the Santa Margarita River fails to flow to the ocean approximately 25 percent of the time (Leedshill-Herkenhoff 1989).

3.2.5 Existing Conditions – Proposed Project Areas

Northern AWT and Associated Facilities (P-1044)

The eastern conveyance features common to all alternatives in the Basilone Road corridor would all be within the San Onofre Creek drainage, as would be all features east of the Basilone Road/I-5 interchange (see Figure 2.3.1-2). This interchange is roughly at the dividing line between the San Onofre HA and the San Mateo Canyon HA in the San Juan HU (Figure 3.2-1). San Onofre Creek passes under the freeway east of this interchange, along the west side of the Beach Club Road undercrossing of I-5. The common conveyance features that would extend north from the 51 Area (San Onofre) would all be in the San Mateo Creek drainage, with the proposed pipeline crossing San Mateo Creek at the 62 Area (San Mateo) (Figure 2.3.1-2). Receiving waters are the San Mateo and San Onofre creek mouths and ultimately the Pacific Ocean.

The Northern AWT and the conveyance features near it would be in the San Onofre Creek drainage (San Onofre HA), except for the SONGS outfall conduit, for all alternatives. The SONGS outfall conduit extends 3,200 feet into the Pacific Ocean; any work on it would be subject to regulation and permitting under the CWA and Rivers and Harbors Act. All alternatives would also have to cross San Onofre Creek to connect with the Basilone Road conveyance line. The Northern AWT site proposed for P-1044 Alternatives 3 and 4 (Site 4) would be partly in the floodplain of San Onofre Creek. The proposed Northern AWT site for P-1044 Alternatives 1 and 2 (Site 6), which is also included in Alternative 5, is above an approximately 30-foot high escarpment on the south side of San Onofre Creek and is not in the floodplain.

Connection of Northern and Southern Water Systems (P-1045)

The areas traversed by the north-south connecting pipelines are extensive and vary considerably between alternatives. All alternatives would connect to the proposed Northern AWT plant (Site 4 or 6) or to an existing water line in Basilone Road. The alternatives that would connect to Site 4 or to the existing water line in Basilone Road would include a crossing of San Onofre Creek near the Northern AWT plant. All would run south in El Camino Real and, for a short distance, in Stuart Mesa Road as far as Las Pulgas Road, and would have a pump station near the Las Pulgas gate. These components would be in the San Onofre HA of the San Juan HU and, west of Las Pulgas Road, would cross a number of relatively small coastal drainages. P-1045 Alternatives 1, 3, and 4, along with Alternative 5, would have a lateral segment extending up Las Pulgas Road to connect to the 43 Area (Las Pulgas). P-1045 Alternatives 1, 3, and 4, along with Alternative 5, would also continue south in Stuart Mesa Road to Vandegrift Boulevard, crossing the Santa Margarita River at the Stuart Mesa Bridge. This segment, still in the San Onofre HA, would cross Las Flores, Aliso, French, and Cockleburr creeks before entering the Ysidora HA of the Santa Margarita HU just east of the 31A Area (Edson Range).

From the Vandegrift Road/Stuart Mesa Road intersection, the pipelines for P-1045 Alternatives 1, 3, and 4, along with Alternative 5, would run northeasterly in Vandegrift Road for about 0.75 mile to an existing pump station, then uphill southeasterly to connect with existing reservoirs and the proposed 4-million-gallon reservoir north of the Wire Mountain 2 Housing Area and the Santa Margarita Housing Area. The reservoir area and associated pipelines to the new Naval Hospital Camp Pendleton and the 21 Area (Del Mar) are near the southern boundary of the Ysidora HA.

P-1045 Alternatives 1, 2, and 4 would connect to the reservoirs above Haybarn Canyon on the east side of Vandegrift Boulevard northeast of the 23 Area (MCAS Camp Pendleton) and 24 Area, but each alternative would reach the reservoirs by a different route. P-1045 Alternative 1 would extend from just west of the Stuart Mesa Bridge northeasterly, roughly paralleling the Santa Margarita River on the west to the 25 Area (Vado Del Rio) and then cross the Santa Margarita River to connect to the reservoirs above Haybarn Canyon. This segment would be entirely in the Ysidora HA of the Santa Margarita HU, and the route would cross numerous small tributaries to the Santa Margarita River.

P-1045 Alternative 4 would reach Haybarn Canyon by paralleling the Santa Margarita River on the east in Vandegrift Boulevard to approximately 0.9 mile south of the 22 Area (Chappo). There the pipeline would turn northeastward and follow a dirt road up to the ridge between the Santa Margarita HU and the San Luis Rey HU and follow this divide to the reservoirs above Haybarn Canyon. All segments west of the divide would be in the Ysidora HA of the Santa Margarita HU.

P-1045 Alternative 2 would extend south in El Camino Real and Stuart Mesa Road only as far as Las Pulgas Road, where it would turn, ascending along Las Pulgas Road where it would connect to the 43 Area (Las Pulgas), similar to the other alternatives. From that connection, P-1045 Alternative 2 would continue within Las Pulgas Road to Basilone Road in the 43 Area (Las Pulgas). Then it would follow Basilone Road southeasterly to just south of the 25 Area (Vado Del Rio), crossing from the San Onofre HA into the Ysidora HA of the Santa Margarita HU approximately 2.5 miles from the Las Pulgas Road/Basilone Road intersection. Still in the Ysidora HA, it would cross the Santa Margarita River to Haybarn Canyon to connect with the reservoirs above Haybarn Canyon.

Table 3.2-1
Hydrologic Unit Information on MCBCP

Hydrologic Unit	Hydrologic Areas	Basins[1] (local watersheds)	Total Acres of Hydrologic Area (approximate)	Acres On-Base (approximate)	Percent of Hydrologic Area within Base
San Juan	San Mateo Canyon	Talega Creek San Mateo Creek Cristianitos Creek	85,464	18,675	21.9
	San Onofre	San Onofre Creek Las Flores Creek Horno Creek Aliso Coastal Drainage French Cockleburr	65,474	65,208	99.6
Santa Margarita	Ysidora	Santa Margarita	27,962	21,469	76.8
	DeLuz	Santa Margarita DeLuz Creek Roblar Creek	72,967	10,517	14.4
San Luis Rey	Lower San Luis Rey	San Luis Rey	119,662	9,749	8.1

[1] Basin drainages as provided by MCBCP and presented in the 1992 Master Plan for MCBCP (U.S. Navy 1992).

Table 3.2-2
Safe Yield Amounts for Groundwater Basins Occurring within MCBCP

Groundwater Basin	Safe Yield Amount (Acre-Feet/Year)	Hydrologic Unit
Santa Margarita	16,000	Santa Margarita
Las Flores	600	San Juan
San Onofre/San Mateo	4,600	San Juan
Total	**21,200**	

Source: MCBCP Office of Water Resources (USMC 2007a)

Table 3.2-3
Precipitation Data from Base Weather Stations

Weather Station	Years of Record	Maximum Precipitation Year	Cumulative Amount in Inches	Minimum Precipitation Year	Cumulative Amount in Inches
Lake O'Neill	129	1992–1993	38.23	1960–1961	4.51
Case Springs	40	1968–1969	50.42	2001–2002	6.08
San Mateo	48	2004–2005	39.15	1960–1961	5.38
Cristianitos	23	1997–1998	33.75	2001–2002	4.87
Las Flores	21	2004–2005	20.54	2001–2002	3.46
Ammo Dump	3	2004–2005	29.78	2003–2004	7.51
Target Range 408	10	1997–1998	26.51	2001–2002	3.39
Talega	3	2004–2005	26.20	2003–2004	7.46

Source: USMC 2007a

Table 3.2-4
Flow Rate Predicting 100-Year Flood Conditions for
Major Drainages on MCBCP

Drainage	100-Year Flow in Cubic Feet/Second	Predictions by (Date)
Santa Margarita	64,000	WEST Consultants (2000)
Aliso	2,659	WEST Consultants (2004)
Las Flores	7,803	WEST Consultants (2004)
Horno	1,404	WEST Consultants (2004)
San Onofre	14,158	URS Corporation (2004)
San Mateo	56,697	URS Corporation (2004)

Source: USMC 2007a

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Source: MCBCP 2007, 2008; California Interagency Watershed Mapping Committee 2004.

2.5 1.25 0 2.5 Miles

Scale: 1 = 158,400; 1 inch = 2.5 mile(s)

Figure 3.2-1
Watersheds and Floodprone (100-year) Areas

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_3\Watersheds and Floodprone areas_ZeroDegNorth.mxd, 7/3/2012, johnsonaa

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3.3 BIOLOGICAL RESOURCES

This section describes the native and naturalized plants and animals that occur in the terrestrial and wetland habitats that coincide with or neighbor the two projects, and thus may be directly or indirectly affected by the proposed action. Marine resources that coincide with or neighbor the two projects and may be directly or indirectly affected by the proposed action are described in Section 3.14. Throughout this section, and for the project-specific impact analyses in Chapter 4, discussions of these resources are organized as follows: (1) plant communities and other cover types, (2) waters of the U.S., (3) federally listed and candidate plants, (4) nonfederally listed rare plants, (5) federally listed and candidate wildlife, (6) nonfederally listed rare wildlife, and (7) wildlife corridors. In this section, existing condition information portrayed in the text and tables includes resources located within or adjacent to the facility and corridor project limits for all action alternatives for the two projects included as part of the proposed action. The figures in this section that illustrate the spatial distribution of biological resources under existing conditions, however, focus on the combined project limits associated with all alternatives of the two projects included in the proposed action. The figures in Chapter 4 break out resource distribution for each of the projects and alternatives separately.

Information about the biological resources is based on existing data and project-specific biological surveys. Existing data include the MCBCP INRMP (USMC 2007a) and geographic information system (GIS) database, which provided Basewide information on the status, distribution, and known locations of sensitive biological resources within and surrounding the proposed action area. The GIS database is routinely updated with recent data on threatened and endangered species and their habitats.

3.3.1 Region of Influence and Survey Methods

To provide for an appropriate environmental analysis in Chapter 4, varying Biological Study Areas (BSAs) were established for biological resources that are of importance or that are protected under federal law or statute. For biological resources, the ROI is the BSA for each of the resources. For the linear utility component (i.e., pipeline) of the Northern AWT and associated facilities, and the connection of northern and southern water systems, the BSAs included a designated 125-foot project corridor and, for some biological resources, an additional survey buffer area on both sides of the project corridor as noted in Table 3.3-1. Most proposed facilities (e.g., pump stations) associated with each linear project component are within these project corridors. However, where the proposed limits of the nonlinear project components (e.g., the Northern AWT facility itself) extend beyond the utility corridors, then the project limits of the proposed facility and buffers of 100 feet and 400 feet were surveyed for biological resources as noted in Table 3.3-1.

No surveys were conducted outside the survey areas described above, or for resources not listed in Table 3.3-1. Resource-specific information for areas outside these survey areas, or for resources not listed in Table 3.3-1, is based on the GIS databases and other available information noted above. In particular, discussions and analyses in this document concerning the following species are based entirely on available Basewide data: tidewater goby (*Eucyclogobius newberryi*), southern California steelhead (*Oncorhynchus mykiss*), California least tern (*Sternula antillarum browni*), western snowy plover (*Charadrius nivosus nivosus*), light-footed clapper rail (*Rallus longirostris levipes*), arroyo toad (*Anaxyrus californicus*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*).

Detailed information regarding the survey methodologies used and Basewide data that were analyzed is provided in the biological assessment completed for the proposed action (AECOM 2012).

Plant Communities and Habitat Assessments

Plant communities along the proposed project corridors and adjacent 400-foot buffers were mapped in the field from November 2007 through June 2011, and several follow-up surveys were conducted during the spring of 2010 to clarify the classification of several temporarily ponded areas and to evaluate areas that were added to the project analysis.

Plant community mapping was conducted using digital mapping tools capable of displaying aerial ortho-photographs, topographic relief, and other digitized geographic data at any scale. Field surveys were assisted by Basewide vegetation community data provided in the form of digital GIS layers. Plant community classification follows Holland (1986) as modified by Oberbauer (2008). During plant community mapping a habitat suitability assessment for federally listed species was conducted.

Wetland Delineations

Jurisdictional delineation activities conducted during December 2008, January 2009, January 2010, June 2010, August through October 2010, and June 2011 applied both prefield survey analysis and field surveys to determine the potential presence (type, area, and extent) or absence of jurisdictional wetlands and waters of the U.S.

Before conducting the delineation fieldwork all previously mapped wetlands, waters, and riparian areas; riverine and nonriverine hydrological signatures, including regional climactic data (NOAA 2008); vegetative communities; the soil survey of San Diego County (Bowman 1973); and the national and local hydric soils lists (NRCS 2008; SCS 1992) were reviewed. Areas within the proposed action corridors or facility project limits that presented topographical configurations that could potentially contribute to wetland development, or that could suggest the potential or presence of wetlands at the time of the study, were identified. Available HEC-RAS 10- and 25-year flood data were also utilized for the major streams and tributaries that occurred within the proposed action project corridors and facility project limits as a supplemental indicator of the lateral limits of riverine wetland hydrology.

Once the presurvey investigations were completed, jurisdictional waters of the U.S. (including wetlands) were delineated pursuant to the latest procedural guidelines and criteria in the *Corps of Engineers Wetlands Delineation Manual* (Manual) (Environmental Laboratory 1987) and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (Regional Supplement) (Environmental Laboratory 2008). All waters of the U.S. were delineated to include those waters listed in 33 C.F.R. § 328.3 and were delineated to their jurisdictional limits as defined by 33 C.F.R. § 328.4.

Federally Listed and Rare Plant Surveys

Available Basewide data were analyzed for all rare plant species within and adjacent to the proposed action project corridors and facility project limits. As documented in the INRMP (USMC 2007a), three federally listed plant species are known to occur within MCBCP. Another seven federally listed plant species have potential to occur based on historical sightings or occurrences in the vicinity. Focused habitat assessments were conducted for the proposed action area and suitability for listed plant species was determined.

Inventory Guidelines have been established by the MCBCP Land Management Branch for one of these federally listed plant species, thread-leaved brodiaea. Protocol surveys for thread-leaved brodiaea were conducted between 29 April and 2 June 2008, between 27 April and 7 June 2009, between 4 May and 9 June 2010, and between May 2, 2011 and June 6, 2011. Surveys were conducted in suitable habitats associated with the proposed project areas per the Inventory Guidelines. This includes three repeat surveys spaced 2 weeks apart during the peak blooming period, as determined by Land Management Branch staff.

Focused surveys were conducted for the remaining federally listed plant species known to occur, or potentially occurring, on MCBCP and all other plant species considered rare by the California Native Plant Society (CNPS) that occur on MCBCP. Focused rare plant surveys were conducted in suitable habitat areas during optimal blooming periods in spring 2008, 2009, 2010, and 2011.

Supplemental surveys will be conducted in 2012 to evaluate project changes that occurred in June 2011. Within these new project areas, protocol surveys for thread-leaved brodiaea will need to be conducted.

Federally Listed and Rare Wildlife Surveys

Available Basewide data were analyzed for all federally listed wildlife species within and adjacent to the proposed project corridors and facility project limits. As documented in the INRMP (USMC 2007a), 13 federally listed wildlife species are known to occur within MCBCP. Focused wildlife habitat assessments were conducted for the proposed action area and suitability for listed wildlife species was determined.

Protocol surveys for vernal pool branchiopods (fairy shrimp) and coastal California gnatcatcher were conducted for all areas with suitable habitat according to current USFWS survey protocols (USFWS 1996, 1997a) and by individuals authorized under Section 10(a)(1)(A) Recovery Permits. Wet season fairy shrimp surveys took place from December to April in 2009, 2010, and 2011. Dry season sediment collection took place in spring of 2009, 2010, and 2011. Supplemental surveys were conducted in 2012 to evaluate project changes that occurred in June 2011. Laboratory analysis of fairy shrimp cysts collected during 2012 for the Wire Mountain area is still in process (analyses to be completed September 2012). Coastal California gnatcatcher protocol surveys were completed across multiple survey seasons from 2008 through 2011.

Focused surveys for Pacific pocket mouse and Stephens' kangaroo rat, including habitat suitability assessments and trapping surveys, were conducted by individuals authorized under Section 10(a)(1)(A) Recovery Permits. Pacific pocket mouse surveys took place in June 2009 and July 2010. Stephens' kangaroo rat surveys took place in December 2008, January through July 2009, November through December 2010, February 2011, and June 2011.

General wildlife surveys were conducted during habitat assessment surveys and, as appropriate during the protocol surveys, additional general wildlife observations were made. All wildlife species detected via evidence of scat, tracks, or direct observations were recorded.

3.3.2 Regulatory Setting

Several federal regulations and standards have been established to protect and conserve biological resources. Those applicable to the native and naturalized plant and animal resources that occur in the terrestrial and wetland habitats within or adjacent to the proposed projects are described below. Those applicable to marine resources are described in Section 3.14.

Federal Endangered Species Act[11]

Enacted in 1973, the federal ESA provides for the conservation of threatened and endangered species and their ecosystems. The ESA prohibits the "take" of threatened and endangered species except under certain circumstances and only with authorization from USFWS through a permit under Section 4(d), 7, or 10(a) of the ESA. Under the ESA, "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt to engage in any such conduct. Section 7 of the ESA outlines procedures for federal interagency cooperation to conserve federally listed species and designated critical habitat. The ESA mandates that all federal agencies participate in the conservation and recovery of listed threatened and endangered species and that each agency ensure that any action they authorize, fund, or carry out does not jeopardize the continued existence of a listed species or its critical habitat. Formal consultation under Section 7 of the ESA is required if a proposed project has the potential to affect federally listed species that have been detected within or adjacent to a proposed project site.

Migratory Bird Treaty Act[12]

Congress passed the MBTA in 1918 to prohibit the kill or transport of native migratory birds, or any part, nest, or egg of any such bird unless allowed by another regulation adopted in accordance with the MBTA. The prohibition applies to birds included in the respective international conventions between the United States and Great Britain, the United States and Mexico, the United States and Japan, and the United States and

[11] 16 U.S.C. §§ 1531–1544.
[12] 16 U.S.C. §§ 703–712.

Russia. No permit is issued under the MBTA; however, a proposed project must comply with measures that would avoid or minimize effects on migratory birds.

Bald and Golden Eagle Protection Act[13]

When first enacted in 1940, the Bald Eagle Protection Act prohibited the take, transport, or sale of bald eagles, their eggs, or any part of a bald eagle except where expressly allowed by the Secretary of Interior. In 1962, the Bald Eagle Protection Act was amended to extend the prohibitions to the golden eagle and became the Bald and Golden Eagle Protection Act (BGEPA). No permit is issued under the BGEPA; however, a proposed project must comply with measures that would avoid or minimize effects on golden eagles in a project area.

Executive Order (EO) 11990, Protection of Wetlands[14]

This EO is an overall wetlands policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. EO 11990 was described in Section 3.2.

Federal Water Pollution Control Act (Clean Water Act), 1972[15]

The Federal Water Pollution Control Act was first passed by Congress in 1948 and was later amended and became known as the CWA. The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. It gives USEPA the authority to implement pollution control programs, including setting wastewater standards for industry and water quality standards for contaminants in surface waters. The CWA was described in Section 3.2.

Sustainable Fisheries Act of 1996[16]

The Sustainable Fisheries Act of 1996 reauthorized and amended the Magnuson-Stevens Fishery Management and Conservation Act[17] by providing a number of new mandates for NMFS, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat (Rosenberg et al.

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[13] 16 U.S.C. § 668.
[14] EO 11990, 1977.
[15] 33 U.S.C. §§ 1251–1387.
[16] Pub. L. No. 104–297.
[17] 16 U.S.C. §§ 1801–1884.

2000). The councils, with assistance from NMFS, are required to delineate “essential fish habitat” (EFH) for all managed species. The Sustainable Fisheries Act defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Federal action agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH and respond in writing to NMFS recommendations.

Marine Mammal Protection Act[18]

The Marine Mammal Protection Act (MMPA) of 1972 establishes a federal responsibility for the protection and conservation of marine mammal species. The primary authority for implementing the act belongs to NMFS, a part of the National Oceanic and Atmospheric Administration. The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens in international waters, and the importation of marine mammals and marine mammal products into the United States. Take is defined to include the harassment, hunting, capture, killing, or collecting, or the attempt of such actions, of any marine mammal (NOAA 2010a).

Under the 1994 Amendments to the MMPA, harassment is statutorily defined as, any act of pursuit, torment, or annoyance which:

> *Level A Harassment* - has the potential to injure a marine mammal or marine mammal stock in the wild; or,
>
> *Level B Harassment* - has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (NOAA 2010a).

Coastal Zone Management Act

The CZMA of 1972 creates a broad program of land use management based on control by each coastal state, with a focus on protecting sensitive resources that occur within the coastal zone. The CZMA requires that all applicants for federal permits and federal

[18] 16 U.S.C. §§ 1361–1407.

agency project sponsors obtain proof of certification from the coastal state that the activity is consistent with the state's approved coastal program.

3.3.3 Plant Communities and Other Cover Types

Throughout the BSAs analyzed for vegetation mapping (proposed project areas and adjacent 400-foot buffers for all alternatives), 21 plant communities occur, including 15 riparian and aquatic communities and five upland communities (Figures 3.3-1a and 3.3-1b). In addition, two other land cover types occur within the BSAs (Figures 3.3-1a and 3.3-1b). A summary of the area of these plant communities and land cover types for each of the proposed alternatives is provided in Chapter 4. Descriptions of each of these plant communities and land cover types are provided below.

Riparian and Wetland Communities

Alkali Playa

This community type refers to nearly barren areas of alkaline soil and cracked mud, sometimes including a cover of low, grayish, microphyllous and succulent shrubs, such as Pacific pickleweed (*Sarcocornia pacifi*ca), alkali-heath (*Frankenia salina*), and western sea-purslane (*Sesuvium verrucosum*).

Beach

Beach habitat is the flat, sandy area along the immediate coastline that occurs between mean high tide and the foredune, or to the farthest inland reach of storm waves. This habitat is characterized by high exposure to salt spray and sand blast, and sandy substrate with a low organic content and water-holding capacity (Barbour and Johnson 1977). The beach habitat within the BSA is devoid of vegetation.

Disturbed Wetlands

Sites classified as disturbed wetlands generally have hydric soils and/or wetland indicator plant species, including nonnative plants. Disturbed wetlands are communities that are dominated by exotic wetland species. These species have invaded sites that had been previously disturbed or are periodically disturbed. This disturbance regime has resulted in the displacement of native wetland species and the subsequent colonization of these areas by exotics. Disturbed wetlands are often dominated by giant reed (*Arundo donax*) and tamarisk (*Tamarix* spp.). Culverts, most commonly found along roadsides, often support disturbed wetlands throughout MCBCP.

Coastal and Valley Freshwater Marsh

Coastal and valley freshwater marsh is a community dominated by perennial, emergent monocots that reach 4.3 to 6.6 feet in height. Uniform stands of bulrushes (*Scirpus* spp. and *Schoenoplectus* spp.) or cattails (*Typha* sp.) often characterize this habitat. Coastal and valley freshwater marsh occurs in wetlands that are permanently flooded by standing freshwater (Holland 1986).

Freshwater Seep

Freshwater seep is a wetland community dominated by perennial herbs, especially sedges and grasses. This habitat is seasonally to permanently moist and often occurs in shallow swales or seasonal streambeds. It differs from freshwater marsh in that it is usually low growing and is not perennially inundated with water. Freshwater seep may contain herbs such as great marsh evening-primrose (*Oenothera elata* ssp. *hirsutissima*), western ragweed (*Ambrosia psilostachya*), and blue-eyed grass (*Sisyrinchium bellum*); rushes (e.g., *Juncus dubious, J. mexicanus, J. xiphioides*); and grasses (e.g., *Muhlenbergia rigens, Bromus hordeaceus*, etc.).

Mulefat Scrub

Mulefat scrub is a riparian shrub community that is strongly dominated by mulefat (*Baccharis salicifolia*), often in association with several willow (*Salix* sp.) species. Mulefat-dominated scrub occurs along intermittent streams with a fairly coarse substrate and moderately deep water table. Understory vegetation is usually composed of nonnative, weedy species or is lacking altogether. This community is maintained by frequent flooding. In the absence of periodic flooding, this community may develop into cottonwood- or sycamore-dominated riparian communities (Holland 1986). Mulefat scrub is common in riverine systems within the proposed action area; representative stands occur along the majority of the intermittent streams found on MCBCP.

Nonvegetated Channel

Nonvegetated channels carry sufficient flows from storm events or from water diversions to exclude vegetation. Nonvegetated channels are generally dry washes, scoured channels, or small tributary streams that usually do not have a riparian component. They have some, but generally not a significant amount of, depositional sediment. These features are usually culverted under roadways, are confluence with larger riverine system, or abate into the landscape.

Open Water

This habitat type consists of any open water body including lakes, reservoirs, bays, flowing water within a river channel, and small ponds along stream courses. Open water bodies provide important habitat for a variety of aquatic organisms and waterfowl.

Riparian Scrub

Riparian scrub grows along creeks, rivers, and other bodies of water. Riparian scrub dominated by shrub species such as mulefat and arroyo willow (*Salix lasiolepis*) is defined further as mulefat scrub and southern willow scrub, respectively. Significant areas of riparian scrub on MCBCP are dominated almost exclusively by coyote bush (*Baccharis pilularis*) and are generally referred to simply as riparian scrub. Riparian scrub can be found along many of the creeks and rivers on MCBCP.

Southern Coastal Salt Marsh

Southern coastal salt marsh is a highly productive association of herbaceous and suffrutescent, salt-tolerant hydrophytes that form a moderate to dense cover and can reach a height of 3 feet. Most species are active in summer and dormant in winter (Holland 1986). Southern coastal salt marsh plants are distributed along distinct zones depending upon such environmental factors as frequency and length of tidal inundation, salinity levels, and nutrient status (MacDonald 1977). This association is usually stratified horizontally with cordgrass (*Spartina foliosa*) nearest the open water; Bigelow's pickleweed (*Salicornia bigelovii*), Pacific pickleweed, and American saltwort (*Batis maritima*) at mid-littoral levels; and a richer mixture of species, including sea-blite (*Suaeda* spp.) and alkali-heath (Holland 1986) at highest elevations. Other characteristic species include coastal salt-grass (*Distichlis spicata*), alkali-weed (*Cressa truxillensis*), and fleshy jaumea (*Jaumea carnosa*).

Southern Riparian Woodland

Southern riparian woodland is a tall, winter-deciduous riparian association with western sycamore as the indicator species; however, other riparian tree species, such as willow and cottonwood, can also be present. This association occupies broader drainages or floodplains of permanent streams and rarely forms closed canopies. Often it may appear as a stand of scattered trees within a matrix of willows, mulefat, Douglas mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica* ssp. *holosericea*), and other shrubby species. The understory component is composed primarily of forbs and nonnative grasses, with shrub species accounting for only a small portion of the cover. Southern riparian woodland is found along many of the larger streams on MCBCP.

Soft-Bottom Channel

Soft-bottom channels are larger, generally named, riverine systems with a riparian component. Channel bottoms are composed of dynamic fluvial sediments that are often nonvegetated. A lack of structural habitat due to the mobility of unconsolidated soft sediment is common.

Southern Willow Scrub

Southern willow scrub is dense, broad-leaved, winter-deciduous riparian thicket dominated by several species of willows in association with mulefat. Scattered individuals of cottonwood and western sycamore may exist as canopy emergents. This is an early seral community that requires periodic flooding for its maintenance (Holland 1986). In the absence of periodic flooding, this community could develop into a riparian woodland or forest. Southern willow scrub can be found along many of the creeks and rivers on MCBCP.

Sycamore Alder Riparian Woodland

Sycamore alder riparian woodland is tall, winter-deciduous, streamside woodland dominated by western sycamore and white alder (*Alnus rhombifolia*). These woodlands are commonly found along rocky stream beds that are subject to periodic high-intensity flooding. Vegetation associated with sycamore alder riparian woodland includes blue elderberry, Douglas mugwort (*Artemisia douglasiana*), scale-broom (*Lepidospartum squamatum*), poison oak (*Toxicodendron diversilobum*), and willows.

Vernal Pool

Vernal pools support a suite of obligate and facultative wetland as well as terrestrial plant species. In favorable rainfall years, vernal pools pond temporarily and support aquatic species such as pale spike-sedge (*Eleocharis macrostachya*) and American pillwort (*Pilularia americana*). Some species, such as San Diego button-celery

(*Eryngium aristulatum parishii*) and water-starwort (*Callitriche marginata*), tolerate both inundation and drying phases of the pool. This community may exist as isolated ephemeral wetlands or large complexes of pools within other surrounding plant communities such as native and nonnative grasslands and shrublands.

Upland Communities

Coast Live Oak Woodland

Coast live oak woodland community is well represented on MCBCP and can co-occur with Diegan coastal sage scrub, valley needlegrass grassland, and Engelmann oak woodland. Coast live oak woodland is an open to dense tree community with coast live oak as the dominant tree species. The shrub understory of this community is well developed in undisturbed sites and may include blue elderberry, laurel sumac (*Malosma laurina*), poison oak, and toyon (*Heteromeles arbutifolia*) (Beauchamp 1986; Holland 1986). An herbaceous stratum is usually present including miner's lettuce (*Claytonia perfoliata* var. *perfoliata*), chickweed (*Stellaria media*), and nonnative grasses. Representative stands of coast live oak woodland occur sporadically throughout the P-1044 project alternatives area.

Diegan Coastal Sage Scrub

Diegan coastal sage scrub is composed of soft-woody subshrubs less than 6 feet in height and is typically found on dry sites and steep, south-facing slopes of coastal southern California from Los Angeles into Baja California. This community has suffered severe losses due to urbanization and, as a result, provides habitat for many rare species. Approximately eight rare plant and 11 rare animal species occur in MCBCP coastal sage scrub (Zedler et al. 1997). Typical Diegan coastal sage scrub dominants include California sagebrush, flat-top buckwheat (*Eriogonum fasciculatum*), laurel sumac, black sage (*Salvia mellifera*), lemonadeberry (*Rhus integrifolia*), and California encelia (*Encelia californica*). Extensive stands of Diegan coastal sage scrub occur throughout all of MCBCP.

Eucalyptus Woodland

This community is dominated by several species of eucalyptus (*Eucalyptus* spp.). These introduced species produce large amounts of leaf and bark litter, the chemical composition of which may inhibit the establishment and growth of other species, especially natives, in the understory. Generally, these species were planted for aesthetic and horticultural purposes, but many species of eucalyptus have become naturalized and have been quite successful in invading riparian areas. Eucalyptus woodland in the proposed action area occurs in scattered patches in the P-1045 project area.

Nonnative Grassland

Nonnative grassland is characterized by a dense to sparse cover of annual grasses and forbs of Mediterranean origin, often with native and nonnative annual forbs (Holland 1986). This plant community generally occurs on fine-textured loam or clay soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall. Regionally, typical grasses in this community include ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), soft chess (*Bromus hordeaceus*), wild oats (*Avena* spp.), and rat-tail fescue (*Vulpia myuros*). Nonnative disturbance-related annuals such as filaree (*Erodium* spp.) and horseweed (*Conyza canadensis*) are common to this community. Though categorized as a nonnative plant community, nonnative grassland often supports the formerly dominant native grassland species, such as purple needlegrass (*Nassella pulchra*), tarweeds like graceful tarweed (*Holocarpha virgata* ssp. *elongata*, *Deinandra* spp.), California goldfields (*Lasthenia californica*), blue-eyed grass (*Sisyrinchium bellum*), padre's shooting star (*Dodecatheon clevelandii* ssp. *clevelandii*), common goldstar (*Bloomeria crocea* var. *crocea*) and Weed's mariposa lily (*Calochortus weedii* var. *weedii*). It also provides foraging habitat for raptors and may support other sensitive wildlife species. Extensive areas of nonnative grassland can be found throughout both of the project areas.

Valley Needlegrass Grassland

MCBCP has extensive areas of intact perennial grasslands, which compose a significant portion of the native grasslands left in coastal southern California. Valley needlegrass grassland is a community of annual and perennial herbs and grasses dominated by native perennial bunchgrasses such as purple needlegrass and nodding needlegrass (*Nassella cernua*). This association generally occurs on fine-textured clay soils that are moist or wet in winter, but very dry in summer. Shrubs are infrequent, probably due to the unstable clay soils. The degree of habitat quality in native grasslands such as valley needlegrass grassland varies greatly, depending on the history of grazing, cultivation, or other disturbance factors. Nonnative annual grasses such as bromes (*Bromus* spp.), wild oats, wild barley (*Hordeum* spp.), and rat-tail fescue commonly make up a significant portion of the cover on disturbed sites. Native and introduced herbs occur between the needlegrass, often actually exceeding the bunchgrass in cover (Holland 1986). Perennial herb species commonly found in this community include the rare Pendleton button-celery (*Eryngium pendeltonense*), blue-eyed grass, and bulb species such as the federally listed thread-leaved brodiaea (*Brodiaea filifolia*) and other native lilies (*Brodiaea* spp., *Calochortus* spp., and *Fritillaria* spp.). Native annual species found in this community include wildflowers such as graceful tarweed, San Diego tarplant (*Deinandra paniculata*), clarkias (*Clarkia* spp.), and fiddlenecks (*Amsinckia* spp.). Common nonnative annuals include filaree, sow-thistle (*Sonchus* spp.), and star-thistle (*Centaurea* spp.). Areas of valley needlegrass grassland can be found in the combined alternatives P-1044 and P-1045 project areas.

Other Land Cover Types

Disturbed Habitat

Disturbed habitat is any land that has been severely altered by activities such as grading, repeated clearing, intensive agriculture, or vehicular damage to an extent that eliminates future potential biological value of the land without active restoration. Native vegetation in such areas has been eliminated by past activities, and any existing species composition and site conditions are not characteristic of the disturbed phase of native plant associations. Disturbed habitat often has bare ground. Vegetation is generally sparse, when present, and typically includes nonnative weed species including Bermuda grass (*Cynodon dactylon*), short-pod mustard (*Hirschfeldia incana*), black mustard (*Brassica nigra*), Russian thistle (*Salsola tragus*), sweet fennel (*Foeniculum vulgare*), and horseweed, among others. Disturbed habitat occurs occasionally in both of the project areas.

Urban/Developed

Developed areas consist of buildings, pavement, roads, cultivated ornamental vegetation, or other features associated with urban, commercial, or industrial areas. These areas have limited or no value as habitat for native plant species without intensive restoration. Urban/developed land occurs throughout both of the project areas.

3.3.4 Waters of the U.S.

Within the delineation survey area, jurisdictional waters, composed of wetlands and “other waters” (e.g., open water, drainage features, and culverts), were delineated. The delineated wetlands and waters are composed of nine riparian and wetland habitats (including vernal pools) and four aquatic features (open water, nonvegetated channel, soft-bottom channel, and cement channel) (Figures 3.3-2a and 3.3-2b). A summary of the area and type of wetlands and waters relevant to the proposed alternatives is provided in Chapter 4. General descriptions of each of these wetlands and waters were provided above in Section 3.3.3.

The majority of wetlands delineated are directly associated with riparian areas of the major rivers and tributaries occurring within MCBCP. “Other waters” are overwhelmingly composed of portions of unvegetated channels and areas of open waters associated with the large rivers and streams occurring within MCBCP, and multiple drainage features spread out within the proposed action areas. These drainage features are both natural and artificial (e.g., intermittent tributaries, constructed softbottom channels, and cement culverts).

Another type of waters that occurs in portions of the Base is vernal pools. These seasonally ponded areas support characteristic annual plant species and invertebrates as described in Section 3.3.3. Vernal pools within the project boundaries have the potential to be considered jurisdictional by USACE if they are determined to have a hydrological and/or ecological connection to other jurisdictional waters. The determination of jurisdictional status will be verified by USACE as part of the Section 404 permitting process for the project.

3.3.5 Federally Listed Plants

Three federally listed plant species—thread-leaved brodiaea (*Brodiaea filifolia*), San Diego button-celery, and spreading navarretia (*Navarretia fossalis*)—are known to occur within MCBCP (USMC 2007a). One candidate plant species for federal listing, Brand’s phacelia (*Phacelia stellaris*), is also known to occur within MCBCP. Another seven federally listed plants have some potential to occur based on historical sightings or occurrences in the vicinity (Table 3.3-2). The federally listed plant species known to occur within MCBCP and their occurrence within or near the proposed action area (all alternatives combined) are described below and depicted in Figures 3.3-3a and 3.3-3b.

Thread-leaved Brodiaea

The federally listed threatened thread-leaved brodiaea is a spring-blooming (April–July) bulbous perennial. Thread-leaved brodiaea is largely restricted to north coastal San Diego County, southern Orange County, and the interior valley regions of Riverside County. Thread-leaved brodiaea is typically found in grasslands and coastal sage scrub habitats, and in uplands associated with vernal pools. On MCBCP, this species is also found on suitable soils in disturbed habitats in association with nonnative grasses and sweet fennel. Recent studies at MCBCP demonstrate that suitable soils for this species include Vertisols, Alfisols, Entisols, Mollisols, and inclusions of these soil series within areas mapped as other soil series (AMEC 2009).

Based upon project-specific surveys and Basewide data, thread-leaved brodiaea is known to occur within the combined alternatives P-1044 and P-1045 project areas*.* For P-1044, thread-leaved brodiaea is most common at Reservoir 62310 where 24 individuals are coincident with proposed facility upgrades; an additional 85 individuals are located in the 100-foot buffer at this site. Additional individuals are concentrated in several populations along Basilone Road where one thread-leaved brodiaea is known to be coincident with the P-1044 corridor and 487 are coincident with its 100-foot buffer.

For P-1045, 36 thread-leaved brodiaea individuals are coincident with the combined alternatives P-1045 corridor and its 102 individuals are located in the 100-foot buffer. Twenty-three of these are coincident with the 100-foot buffer at a TLS crossing of Las Flores Creek along Stuart Mesa Road.

San Diego Button-Celery

The federally listed endangered San Diego button-celery is a perennial herb with a persistent tap root that occurs in vernal pool habitats of southern California and northwestern Baja California, Mexico. The species ranges from the Santa Rosa Plateau (Riverside County) in the north to the mesas north of San Quintin in Baja California, Mexico. Population losses are primarily due to development, but also to fire, vehicle traffic, off-road activities, and grazing.

This species is not commonly found in vernal pools with extensive disturbance, as it does not survive under moderate or heavy impacts (USFWS 1998a).

On MCBCP, this species generally occurs south of the Santa Margarita River within the Wire Mountain vernal pool complex, and is known to occur within the 100 foot buffer of P-1045 along Wire Mountain Road (Figures 3.3-3a and 3.3-3b).

Spreading Navarretia

The federally listed threatened spreading navarretia is a low-growing, mostly spreading, annual herb that is found in vernal pool habitats of southern California and northwestern

Baja California, Mexico. The species ranges from the Santa Clarita region of Los Angeles County, east to the western lowlands of Riverside County, and south through coastal and foothill San Diego County to San Quentin, Baja California, Mexico. Fewer than 30 populations exist in the United States. Nearly 60 percent of these populations are concentrated in three locations: on Otay Mesa in southern San Diego County, along the San Jacinto River in western Riverside County, and near Hemet in Riverside County. In San Diego County, this species appears to be a vernal pool endemic, but in Riverside County, the species is found in vernal wetland plains near Hemet that are dominated by alkali grassland.

This species is known to occur in the southwestern portion of MCBCP, primarily in the MASS-3 and Wire Mountain vernal pool complexes, and is known to occur within the P-1045 project area in the Del Mar Area (POOL_02487) (Figures 3.3-3a and 3.3-3b).

Brand's Phacelia

Brand's phacelia is a candidate for federal listing. This species is a low-growing, spreading annual herb that is found along the south coast in coastal dunes and coastal scrub. The species ranges from southwestern Los Angeles County down to San Diego County and Baja, California. This species is almost extirpated in the United States and is apparently quite rare in Baja California. In San Diego County only three populations are known to be extant: at Border Field State Park, near Silver Strand State Beach, and on the north side of the mouth of the Santa Margarita River on the back dunes within MCBCP, but not within any of the proposed project areas (Reiser 2001; Figures 3.3-3a and 3.3-3b). There is a low potential for this species to occur along streambanks of the Santa Margarita; however, none were detected during focused rare plant surveys within this area.

3.3.6 Nonfederally Listed Rare Plants

In addition to the known federally listed plant species within MCBCP and the one federal candidate plant species, an additional 50 plant species that are considered rare by the CNPS occur on MCBCP. A list of these species, their general habitat affinities, and an explanation of their likelihood to occur within the proposed action project corridors or facility limits are presented in Appendix B.

Among these 50 nonlisted rare plant species that occur on MCBCP, six were detected within the two proposed project areas during vegetation mapping and rare plant surveys. These include Pendleton button-celery, sticky dudleya (*Dudleya viscida*), Blochman's dudleya (*Dudleya blochmaniae* ssp. *blochmaniae*), many-stemmed dudleya (*Dudleya multicaulis*), Palmer's grappling-hook (*Harpagonella palmeri*), California box thorn (*Lycium californicum*), and western dichondra (*Dichondra occidentalis*).

Among the rare plant species known to occur in the BSA, the Pendleton button-celery is the only one endemic to MCBCP and the surrounding area. For P-1044 Alternatives 2 and 4, four individuals are coincident with the 400-foot corridor buffer. For P-1045 Alternatives 1, 3, and 4, one individual is coincident with the corridor and 81 are coincident with the 400-foot buffer. Under these same project alternatives, one individual is coincident with the 400-foot buffer at TLS crossing sites of Aliso and Las Flores creeks.

3.3.7 Federally Listed Wildlife

There are 13 federally listed wildlife species that are known to occur within MCBCP. In addition, one candidate wildlife species for federal listing, western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), has been documented on MCBCP. These 13 federally listed wildlife species and the one candidate for federal listing, descriptions of their general habitat affinities, and explanations of their likelihood to occur within the BSA of the proposed action area are included in Table 3.3-3. USFWS has designated critical habitat for only one of these species, western snowy plover, on a 40-acre portion of the state park lease between San Onofre Creek and San Mateo Creek in the northern portion of the Base. This area of designated critical habitat does not coincide with the proposed action area.

Brief descriptions of the federally listed and candidate wildlife species that occur within or near the proposed action area are provided below; known locations are depicted in Figures 3.3-4a through 3.3-10b. A summary of the area of habitat occupied by federally listed wildlife species that is coincident with each proposed alternative is provided in Chapter 4.

Riverside and San Diego Fairy Shrimp

The San Diego fairy shrimp (*Branchinecta sandiegonensis*) and Riverside fairy shrimp (*Streptocephalus woottoni*) are small aquatic crustaceans restricted to vernal pool environments. San Diego fairy shrimp distribution occurs from Santa Barbara County south to northwestern Baja California, Mexico. San Diego fairy shrimp have been detected within vernal pools and ephemeral basins that range in depth from 2 to 12 inches (USFWS 2000). The San Diego fairy shrimp is also known to occur within ditches and road ruts able to support suitable conditions (USFWS 1997b). San Diego fairy shrimp are typically observable from January through March, after winter and spring rains. Outside of this period, the hatching period may be extended to begin earlier or end later if a longer season of rainfall provides more water or refilling of vernal pools. Simovich and Fugate (1992) found that San Diego fairy shrimp cysts could hatch in temperatures ranging from 50 degrees Fahrenheit (°F) to 59°F. Newly hatched fairy shrimp (nauplii) emerge and develop into adults between mid-December and early May (Eriksen and Belk 1999). Hatching requirements include an aquatic environment with a moderate pH level and low alkalinity and conductivity levels, which may be due to physiological requirements (Gonzalez et al. 1996). Nauplii mature within 10 to 20 days and may live for approximately 40 days (Hathaway and Simovich 1996), during which they mate and produce another generation of cysts. During the dry season, cysts are capable of withstanding extreme hot and cold temperatures and prolonged drying.

The Riverside fairy shrimp has a very restricted distribution. It has been detected in the vicinity of Temecula in Riverside County (Eng et al. 1990) and on Otay Mesa, MCBCP, and MCAS Miramar in San Diego County (Simovich and Fugate 1992). The Riverside fairy shrimp is associated with deeper ephemeral waters and typically occupies vernal pools and temporary ponds in which the water persists into April or May and reaches a minimum depth of 1 foot at filling (Eng et al. 1990). Outside of this period, the hatching period may be extended to begin earlier or end later with a longer season of rainfall, providing more water or refilling of vernal pools. The primary threat to both fairy shrimp species is urban and agricultural development of its habitat.

Both species have been found in San Diego County on mesa tops and in grassland, agricultural, coastal sage scrub, and chaparral habitats. Chaparral, coastal sage scrub, and grassland habitats are associated most commonly with San Diego hardpan and claypan basins, with suitable soil types to support vernal pools (Eriksen and Belk 1999).

On MCBCP, the San Diego fairy shrimp shares the same coastal strip distribution as the Riverside fairy shrimp (Figures 3.3-4a and 3.3-4b). However, within this limited range, especially in the southwestern part of the Base, the San Diego fairy shrimp occurs more often than either the nonlisted Lindahl's fairy shrimp (*Branchinecta lindahli*) or Riverside fairy shrimp. On the Base, San Diego fairy shrimp appears to be locally abundant in natural vernal pools and in human-made pools that have not been disturbed in several seasons (Moeur 1998). Based on survey experience on MCBCP, vernal pools of high natural quality tend to be occupied by San Diego fairy shrimp while more degraded pools have a greater likelihood of containing Lindahl's fairy shrimp (EDAW 2009). A recent study of the genetic distribution of Riverside fairy shrimp revealed that all genetic variability for the southern California are limited to San Diego County, specifically in Otay Mesa and on MCB Camp Pendleton (Lahiti et al. 2010).

On MCBCP, there are a total of 412 pools known to support San Diego fairy shrimp, and 154 pools known to support Riverside fairy shrimp (USMC 2009a). A majority of these pools occur within the Bravo 2, Oscar 1, Oscar 2, and Wire Mountain areas.

Tidewater Goby and Southern California Steelhead

The federally listed endangered tidewater goby is a small, nearly transparent fish with a mottled brownish upper surface and a sucker-like disk on the ventral side. The tidewater goby is endemic to California, inhabits coastal brackish water, and has an annual life cycle. It prefers shallow water and its lifecycle revolves around the annual hydrologic cycles between coastal lagoons and estuaries.

In San Diego County, the tidewater goby is known historically from eight sites on MCBCP and in Buena Vista Lagoon (1955 record) and Aqua Hedionda Lagoon (1940 record) (Figures 3.3-5a and 3.3-5b).

The federally endangered southern California steelhead is a fish that requires different aquatic habitats depending on its life cycle, beginning in freshwater streams, creeks, and rivers; moving to coast bays of the open ocean; then back to freshwater streams. It is a large fish that averages 20 to 30 inches, has a large mouth with developed teeth on both upper and lower jaws, and has small scales.

Southern California steelhead is known to use waterways on MCBCP as seasonal transit corridors into the Cleveland National Forest where they are known to spawn. In general, however, waterways on MCBCP lack suitable spawning habitat, but provide transit, growth, and staging habitat. The MCBCP-designated potential transit reach (San Mateo Creek) and other potential transit reaches (San Onofre Creek and Santa Margarita River) coincide with the project area (Figures 3.3-5a and 3.3-5b). A final recovery plan for southern California steelhead was issued by NMFS in January 2012 (NMFS 2011a). The plan identifies steelhead in San Mateo Creek and Santa Margarita River as Core 1, and in the San Onofre Creek as Core 2 populations. Core 1 populations are those identified as the highest priority for recovery actions based on a variety of factors, including the potential of the population in an unimpaired condition; the role of the population in meeting the spatial and/or redundancy viability criteria; the current condition of the population; the severity of the threats facing the population; the potential ecological or genetic diversity the watershed and population could provide to the species; and the capacity of the watershed and population to respond to recovery actions needed to abate those threats. Core 1 populations are the focus of the recovery implementation strategy. Core 2 populations also form part of the recovery implementation strategy and must meet recovery criteria. These populations are ranked slight lower than Core 1 populations for recovery priority (NMFS 2011a).

Historical data indicate that southern California steelhead is known from the San Mateo Creek and Santa Margarita River. A juvenile was observed in the upper part of San Mateo Creek on MCBCP in 1999, followed by the observations of 78 steelhead/rainbow trout between March and September of that year. However, by November 1999 only one juvenile was observed. In cooperation with NMFS and the California Department of Fish and Game (CDFG), monitoring of existing pools in San Mateo Creek began in the summer of 2001 throughout 2002 to assess the ability of southern California steelhead to survive in San Mateo Creek (USMC 2007a). This monitoring is ongoing. As of June 2005, no steelhead had been found to survive in existing pools in San Mateo Creek (USMC 2007a). In 2009, photographs of an *O. mykiss* specimen observed in the Santa Margarita River indicated physical features consistent with a juvenile *O. mykiss* undergoing smoltification (preparation for ocean existence), which is characteristic of steelhead. Subsequent genetic analysis of tissue taken from an *O. mykiss* caught in the Santa Margarita River positively identified the specimen to be of steelhead ancestry. This genetic finding, and observations by MCBCP and other specialists in this waterway indicate that a population of endangered steelhead resides in the Santa Margarita River Watershed (NOAA 2010b). The Santa Margarita River estuary is essential for growth and an entrance point for upstream migration of southern California steelhead. The presence of southern California steelhead in offshore coastal waters is unknown.

Arroyo Toad

The federally endangered arroyo toad is a small, dark-spotted toad of the family Bufonidae. Adult arroyo toads have a light-olive green or gray to tan back with dark spots and warty skin (Stebbins 2003). The underside is white or buff and without dark blotches or spots. A light colored, V-shaped stripe crosses the head and eyelids, and the anterior portion of the oval parotid glands (just behind the eyes) is pale. Adult males give an advertisement call during the breeding period, which is generally from late January or February to early July, although it can extend in some years, depending on weather conditions.

The arroyo toad is primarily endemic to the coastal plain and mountains of central and southern California and northwestern Baja California. These toads breed in stream channels and use stream terraces and surrounding uplands for foraging and wintering. Although the arroyo toad occurs principally along coastal drainages, it also has been recorded at several locations on the desert slopes of the Transverse and Peninsular mountain ranges south of the Santa Clara River in Los Angeles County. The elevation range for the arroyo toad extends from near sea level to about 8,000 feet AMSL. Within the central part of its range (where the Base occurs), arroyo toads occur at elevations of 1,000 to 4,600 feet. Arroyo toads are found in riparian habitats that rarely have closed canopies over the lower banks of the stream channel due to regular flood events. Heavily shaded pools are generally unsuitable for larval and juvenile arroyo toads because of lower water and soil temperatures and poor algal mat development. Toad riparian habitat requires episodic flooding to keep the low stream terraces relatively vegetation free and the soils friable enough for juvenile and adult toads to create burrows. Shallow pools (less than 12 inches deep) with clear water are favored by adults for breeding (USFWS 1999). Areas that are used by juveniles consist primarily of sand or fine gravel bars with varying amounts of large gravel or cobble and with adjacent stable sandy terraces and oak flats. The distance toads are found from the breeding sites depends on the topography and the extent of suitable habitat. The upland habitats typically used by toads include coastal sage scrub, chaparral, grassland, or oak woodland with substantial areas of fine sand, into which adult toads burrow. Arroyo toads have been detected in upland floodplain habitats near coastal areas of southern California, not just during times of breeding but throughout the year (Mitrovich et al. 2011). It is suggested by these recent studies that floodplains may be key to persistence of arroyo toads throughout the year.

Currently, the arroyo toad is known to occupy an estimated 25 percent of its previous occupied habitat within the United States (Brehme et al. 2004). On MCBCP, the arroyo toad occurs in three major watersheds: Santa Margarita, San Onofre, and San Mateo (Figures 3.3-6a and 3.3-6b). Increased population persistence is a trend known for the Santa Margarita watershed, while more temporary variability is more common in the ephemeral San Onofre and San Mateo watersheds (Brehme et al. 2009). Aestivation/ dispersal habitat is considered occupied within 0.6-mile of all occupied breeding locations throughout the Base. It is likely that some of the largest remaining populations of this species occur on MCBCP (Brehme et al. 2004).

California Least Tern, Western Snowy Plover, and Light-footed Clapper Rail

The federally listed endangered California least tern is a spring and summer migrant that breeds in San Diego County within sandy beaches, estuaries, and embayment habitats. The species forages along coastal, lagoon, nearshore waters, and estuary habitats. The California least tern forages and breeds along the MCBCP coast within appropriate habitat. California least tern has been documented breeding near the mouths of the Santa Margarita River, and North Beach, French, and Aliso creeks within MCBCP (Basewide GIS data) (Figure 3.3-7). This species was not detected within the proposed action area.

The federally listed threatened (Pacific coast population) western snowy plover breeds along the Pacific coast on barren and sparsely vegetated sandy beaches as well as lagoons, dune habitat, and salt-evaporation ponds. Western snowy plover has been documented to breed within MCBCP on Red Beach, White Beach, Beach Section F, Blue Beach, Del Mar Recreation Beach (occasionally nests on Beach Section H), Salt Flats, and occasionally Gold Beach (Sullivan 2011, Foster 2007, Evans 2009). The MCBCP breeding locations represent a major portion of the breeding population within San Diego County (Basewide GIS data) (Figure 3.3-7). This species was not detected within a proposed action area.

The federally listed endangered light-footed clapper rail is a nonmigratory species that breeds along coastal marshes, estuaries, and lagoons. The species forages along the intertidal zone and generally remains within its home marsh. Light-footed clapper rail has been documented in the Santa Margarita River mouth, Cockleburr Canyon mouth, and Las Flores Marsh within MCBCP (Basewide GIS data) (Figure 3.3-7). There are known occurrences of the light-footed clapper rail within the P-1045 corridor and buffer, along with suitable habitat.

Least Bell's Vireo and Southwestern Willow Flycatcher

The federally endangered least Bell's vireo is a spring and summer migrant that breeds in riparian habitat along drainages, creeks, streams, and washes throughout San Diego County. Suitable breeding habitat for the species consists of riparian habitat with a dense understory. The least Bell's vireo has been documented throughout MCBCP with strong concentrations around the major rivers and drainages, including the Santa Margarita River, San Mateo Creek, San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, DeLuz Creek, and numerous other creeks and drainages with appropriate willow-dominated habitats. Basewide GIS data indicate that this species occurs within the combined alternatives area for each of the projects included in the proposed action (Figures 3.3-8a and 3.3-8b).

The federally endangered southwestern willow flycatcher migrates into San Diego County in late spring and breeds within multilayered riparian habitat along rivers, streams, and drainages with water. Suitable breeding habitat includes a dense understory of riparian vegetation and a tall, closed canopy, with water nearby during some point in the breeding season. This species is known to nest in native, mixed, and nonnative vegetation, and occurs in low to mid-elevation areas that vary widely in structure, with average canopy ranging from 13 feet to 98 feet. Patch structure is generally characterized by trees of different size classes, although some sites are dominated by monotypic willow stands (Finch and Stoleson 2000). The southwestern willow flycatcher breeds within MCBCP along the Santa Margarita River, San Mateo Creek, San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, DeLuz Creek, and numerous other creeks and drainages with appropriate willow-dominated habitats. Basewide GIS data indicate that this species occurs within the combined alternatives area for each of the projects included in the proposed action (Figures 3.3-8a and 3.3-8b).

Western Yellow-billed Cuckoo

The western yellow-billed cuckoo, a federally listed candidate species, arrives in California in late June and breeds in large blocks of riparian habitat dominated by large, mature cottonwood and willow trees. Suitable habitat includes riparian vegetation with dense understory foliage. Breeding tends to coincide with a peak in large insect abundance.

The western yellow-billed cuckoo is a rare visitor to MCBCP. The Santa Margarita River represents the largest block of intact riparian vegetation suitable for western yellow-billed cuckoos to breed, although breeding has not been documented to date within MCBCP.

Coastal California Gnatcatcher

The federally threatened coastal California gnatcatcher is a local year-round resident found primarily in coastal sage scrub communities in southern California. Home range size requirements of the coastal California gnatcatcher vary with habitat quality. Documented home ranges have varied from approximately 6 to 45 acres in San Diego County (RECON 1987; ERCE 1990). The breeding season for the gnatcatcher generally extends from 15 February through 31 August. Gnatcatcher pairs will attempt several nests each year, each placed in a different location inside their breeding territory; most nest attempts are unsuccessful as they are generally preyed on by various predator species. Clutch size can range from one to five eggs, with three to four eggs most common. Gnatcatchers will remain paired through the nonbreeding season and generally expand their home range during this time.

The coastal California gnatcatcher prefers Diegan coastal sage scrub and Riversidian coastal sage scrub dominated by California sagebrush and California buckwheat, which are the primary plants used by this species when foraging for insects (RECON 1987; ERCE 1990). When nesting, the species usually avoids hills with dense, tall vegetation that has slopes greater than 25 percent. Gnatcatchers generally inhabit coastal sage scrub vegetation lower than 2,500 feet in elevation in Riverside County and generally lower than 1,500 feet in elevation along the coastal slope.

The coastal California gnatcatcher is known to occur widely across MCBCP. Representative populations of coastal California gnatcatcher occur within the proposed action area along Basilone and Stuart Mesa roads (Figures 3.3-9a and 3.3-9b).

Pacific Pocket Mouse and Stephens' Kangaroo Rat

The federally endangered Pacific pocket mouse inhabits low-growing coastal sage scrub plant communities with fine, well-drained, deep sandy substrate. The species is associated with habitat in proximity to the ocean and tends to occupy west-facing slopes.

Pacific pocket mouse occurrences on MCBCP are concentrated primarily within three areas: along the low-sloping hills within the Oscar One and Edson Range (Santa Margarita) training areas, within the hills east of the San Onofre 1 and San Onofre 2 housing areas (San Mateo South), and in the northeast corner of the Base between San Clemente Road and Cristianitos Road (San Mateo North) (USMC 2007a) (Figures 3.3-10a and 3.3-10b).

The federally endangered Stephens' kangaroo rat inhabits open ground with a low percentage of coastal sage scrub cover. Open dirt roads, habitat with low forb cover, firebreaks, and semidisturbed areas are favored habitat for the Stephens' kangaroo rat. The species can occur in high densities within appropriate open ground with low-growing forb cover. In general, well-drained areas with low-sloping and relatively flat ground are preferred.

Stephens' kangaroo rat occurs primarily within the eastern portion of MCBCP along Roblar and Basilone roads; within Ranges 409, 407, 408; and within the Juliett, Kilo 1, and Kilo 2 training areas (Figures 3.3-10a and 3.3-10b).

Marine Species

In the area of the SONGS outfall conduit, other species federally listed as threatened or endangered may include the green sea turtle, loggerhead sea turtle, olive (Pacific) sea turtle, and leatherback sea turtle. These species are discussed in Section 3.14, Marine Resources, of this EIS.

3.3.8 Nonfederally Listed Rare Wildlife

The proposed action area supports a variety of rare wildlife. Rare wildlife species include those species listed by CDFG and those that are covered under local Natural Community Conservation Plans, but not otherwise listed by USFWS. Nonlisted reptiles detected include the San Diego coast horned lizard (*Phrynosoma coronatum blainvillii*) and orange-throated whiptail (*Aspidoscelis hyperythra beldingi*). Numerous migratory bird species covered by the MBTA have been documented on MCBCP. Nonlisted rare bird species detected within the proposed action area during surveys include the golden eagle (*Aquila chrystaeos*), a species protected by the BGEPA, observed flying above.

Additional rare, nonlisted birds detected include the Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), coastal cactus wren (*Campylorhynchus brunneicappilus sandiegensis*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), grasshopper sparrow (*Ammodramus savannarum*), and loggerhead shrike (*Lanius ludovicianus*). Nesting and foraging habitat for these species is found in several of the proposed action areas.

3.3.9 Wildlife Corridors

In an urban context, a wildlife migration corridor can be defined as a linear landscape feature of sufficient width and buffer to allow wildlife movement between two patches of comparatively undisturbed habitat, or between a patch of habitat and some vital resources. Regional corridors are defined as those linking two or more large areas of natural open space, and local corridors are defined as those allowing resident wildlife to access critical resources (food, cover, and water) in a smaller area that might otherwise be isolated by urban development.

Wildlife migration corridors are essential in geographically diverse settings, and especially in urban settings, for the sustenance of healthy and genetically diverse wildlife communities. At a minimum, the corridors promote colonization of habitat and genetic variability by connecting fragments of like habitat, and they help sustain individual species distributed in and among habitat fragments. Habitat fragments, by definition, are separated by otherwise foreign or inhospitable habitats, such as urban or suburban tracts. Isolation of populations can have many harmful effects and may contribute significantly to local species extinction.

The proposed action area and the associated 400-foot buffer support a variety of undeveloped habitats available to wildlife for movement. MCBCP is known to support a multitude of invertebrate, amphibian, reptile, bird, and mammal species; thus, all open space areas within the proposed action area and 400-foot buffer are an important resource to wildlife for movement and dispersal.

Table 3.3-1
Resource-Specific Biological Study Areas

Resource Survey Type	Utility Corridors and Associated Facilities Project Limits	Adjacent Survey Buffers
Plant Community Mapping	X	400 feet
Federally Listed and Other Rare Plant Surveys[1]	X	-
Floral Assessments in Temporary Ponded Areas	X	-
Jurisdictional Wetland Delineations	X	-
General Wildlife Surveys	X	400 feet
Coastal California Gnatcatcher Protocol Surveys	X	400 feet[2]
Riverside and San Diego Fairy Shrimp Protocol Surveys	X	400 feet
Stephens' Kangaroo Rat Surveys	X	100 feet
Pacific Pocket Mouse Surveys	X	50 feet[3]

[1] Rare plant surveys include surveys for San Diego button-celery and spreading navarretia, protocol surveys for thread-leaved brodiaea, and general surveys for nonlisted rare species.
[2] Except where there are positive findings from earlier surveys or if the spacing between positive findings (i.e., occupied habitat polygons defined by individual sightings with a surrounding 150-meter [492-foot] buffer) of earlier surveys is less than 500 feet.
[3] Per direction of ES for July 2010 Pacific pocket mouse surveys, the extent of trapping included the project limits and 50-foot buffers on all sides, exclusive of known Pacific pocket mouse occurrence defined by 150-meter [492-foot] buffer around individual capture points.

Table 3.3-2
Federally Listed and Candidate Plant Species Present or with Potential to Occur within the Proposed Action Area and Adjacent Buffers (All Alternatives Combined)

Species name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 100-foot Buffers
San Diego thornmint *Acanthomintha ilicifolia*	Threatened Listed on 13 October 1998 (63 Federal Register 54975-54994).	On clay soils within chaparral, coastal scrub, valley and foothill grasslands, and vernal pools.	None. Nearest known occurrence is approximately 8 miles from MCBCP (Carlsbad, CA).	Not detected. Not expected to occur due to lack of appropriate habitat within the action areas.	Not detected. Not expected to occur due to lack of appropriate habitat within 100-foot buffers.
San Diego ambrosia *Ambrosia pumila*	Endangered Listed on 29 December 1999 (64 Federal Register 72993-73003).	Chaparral, coastal scrub, valley and foothill grasslands, and vernal pools (disturbed areas).	None. Nearest known occurrence is approximately 1.5 miles from MCBCP (SR-76).	Not detected. Not expected to occur due to lack of appropriate habitat within the action areas.	Not detected. Not expected to occur due to lack of appropriate habitat within 100-foot buffers.
Del Mar manzanita *Arctostaphylos glandulosa* ssp. *crassifolia*	Endangered Listed on 7 October 1996 (61 Federal Register 52370-52384).	Chaparral (maritime, sandy).	None. Nearest known occurrence is approximately 5 miles from MCBCP (Carlsbad, CA).	Not detected. Not expected to occur due to lack of appropriate habitat within the action areas.	Not detected. Not expected to occur due to lack of appropriate habitat within 100-foot buffers.
coastal dunes milk-vetch *Astragalus tener* var. *titi*	Endangered Listed on 12 August 1998 (63 Federal Register 43110-43116). Recovery plan issued (USFWS 2004).	Southern foredunes.	Historical occurrences in coastal dunes along north side of Santa Margarita River.	Not detected. Not expected to occur due to lack of appropriate habitat within the action areas.	Not detected. Not expected to occur due to lack of appropriate habitat within 100-foot buffers.
Encinitas baccharis *Baccharis vanessae*	Threatened Listed on 7 October 1996 (61 Federal Register 52370-52384).	Chaparral.	None. Nearest known occurrence is less than 1 mile from MCBCP (San Mateo Canyon Wilderness).	Not detected. Not expected to occur due to lack of appropriate habitat within the action areas.	Not detected. Not expected to occur due to lack of appropriate habitat within 100-foot buffers.

Species name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 100-foot Buffers
thread-leaved brodiaea *Brodiaea filifolia*	Threatened Listed on 13 October 1998 (63 Federal Register 54975-54994).	Native grassland, nonnative grassland, and vernal pools.	Occurs throughout MCBCP within appropriate habitat.	Detected. Known populations occur within P-1044 and P-1045.	Detected. Known populations occur within 100-foot buffer of P-1044 and P-1045.
bird's beak *Cordylanthus maritimus* ssp. *maritimus*	Endangered Listed on 28 September 1978 (43 Federal Register 44810-44811).	Southern foredunes, and southern coastal salt marsh/alkali playa.	None. Nearest known occurrence is approximately 20 miles from MCBCP (Newport Beach, CA).	Not detected. Not expected to occur due to lack of appropriate habitat within the action areas.	Not detected. Not expected to occur due to lack of appropriate habitat within 100-foot buffers.
San Diego button-celery *Eryngium aristulatum* var. *parishii*	Endangered Listed on 3 August 1993 (58 Federal Register 41391). Recovery plan issued (USFWS 1998a).	Vernal pools.	Known occurrences include Wire Mountain.	Not detected. Populations of this species occur in the Wire Mountain vernal pool complex within proximity, but outside of the P-1045 action areas.	Detected. Eleven vernal pools supporting San Diego button-celery are known to occur within the 100-foot buffer areas of P-1045 along Wire Mountain Road.
spreading navarretia *Navarretia fossalis*	Threatened Listed on 13 October 1998 (63 Federal Register 54975-54994). Recovery plan issued (USFWS 1998a).	Vernal pools, southern coastal salt marsh/alkali playa.	Known occurrences include Wire Mountain, MASS-3, and 21 Area (Del Mar).	Detected. One vernal pool supporting a spreading navarretia population occurs within the P-1045 action area in the 21 Area (Del Mar).	Detected. Five vernal pools supporting spreading navarretia are known to occur within the P-1045 100-foot buffers along Wire Mountain Road.
California Orcutt grass *Orcuttia californica*	Endangered Listed on 3 August 1993 (58 Federal Register 41384-41392). Recovery plan issued (USFWS 1998a).	Vernal pools.	None. Nearest known occurrence is approximately 6 miles from MCBCP (Santa Rosa Plateau).	Not detected. Not expected to occur due to lack of appropriate habitat within the action areas.	Not detected. Not expected to occur due to lack of appropriate habitat within 100-foot buffers.

Species name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 100-foot Buffers
Brand's phacelia *Phacelia stellaris*	Federal candidate species.	Costal dunes and coastal scrub.	Nearest known occurrence is in coastal dunes along north side of Santa Margarita River.	Not detected. Low potential to occur along streambanks of the Santa Margarita River.	Not detected. Low potential to occur along streambanks of the Santa Margarita River.

Table 3.3-3
Federally Listed and Candidate Wildlife Species Present or with Potential to Occur within the Proposed Action Area and Adjacent Buffers

Species Name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 400-foot Buffers
Riverside fairy shrimp *Streptocephalus wootoni*	Endangered. Listed on 16 July 1993 (58 Federal Register 41384). Listing status applies to entire species. Recovery plan issued (USFWS 1998b).	Restricted to deep vernal pools with long periods of inundation.	Known populations on MCBCP.	Detected. Found within suitable habitat in the proposed P-1045 action areas.	Detected. Found within suitable habitat in the buffer areas, primarily along Stuart Mesa Road in Oscar 2.
San Diego fairy shrimp *Branchinecta sandiegonensis*	Endangered. Listed on 3 February 1997 (62 Federal Register 4925). Listing status applies to entire species. Recovery plan issued (USFWS 1998a).	Restricted to vernal pools.	Known populations on MCBCP on Victor, Oscar One, Oscar Two, MASS-3, and Red Beach training areas, and Wire Mountain Housing Area (RECON 2001).	Detected. Found within suitable habitat in the proposed P-1044 and, P-1045 action areas.	Detected. Found within suitable habitat in the buffer areas, primarily along Stuart Mesa Road in Oscar 2.
tidewater goby *Eucyclogobius newberryi*	Endangered. Listed on 4 February 1994 (59 (24) Federal Register 5494). Listing status applies to entire species. Recovery plan issued (USFWS 2005).	Restricted to brackish water habitats in the upper portions of coastal lagoons along the California coast.	Known populations on MCBCP from seven of eight major drainages in 2007, excluding Santa Margarita Creek (RECON 2001). Historic occurrences in all eight drainages.	Not detected, but suitable habitat is present within the P-1044 project corridor in San Mateo Creek and within the P-1045 project corridor within the San Margarita River.	Detected. Found within suitable habitat in the buffer areas, primarily along San Onofre Lagoon.

Species Name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 400-foot Buffers
southern California steelhead *Oncorhynchus mykiss*	Endangered. Listed on 17 June 1998 (63 (116) Federal Register 32996). Listing status applies to entire population of this evolutionary significant unit. Recovery plan issued (NMFS 2011a).	Utilizes freshwater habitat during the initial first years of its life cycle, then moves on to marine waters for 2 to 3 years before returning to freshwater to spawn.	Population historically known within San Mateo Creek, San Onofre Creek and Santa Margarita River. Recent occurrences from San Mateo (USMC 2007a) and Santa Margarita River (NMFS 2011a). Recovery plan designates populations in these two water bodies as Core 1 and in San Onofre Creek as Core 2 (NMFS 2011a).	Not detected but has potential to occur within both project action areas where contiguous with San Mateo and San Onofre creeks, and the Santa Margarita River and estuary.	Not detected, but has potential to occur within buffer areas of both project action areas where contiguous with San Mateo and San Onofre creeks, and the Santa Margarita River and estuary.
arroyo toad *Anaxyrus californicus*	Endangered. Listed on 16 December 1994 (59 Federal Register 64866). Listing status applies to the entire population. Recovery plan issued (USFWS 1999).	Breeding areas are associated with gravelly or sandy washes, banks of streams and rivers, and arroyos. Nonbreeding plant communities include sage scrub, mixed chaparral, Joshua tree woodland, and sagebrush.	Known populations on MCBCP occur within the Santa Margarita, San Onofre, and San Mateo watersheds (Brehme et al. 2006). Aestivation/dispersal habitat is considered occupied within 0.6-mile of all occupied breeding locations throughout the Base.	Detected. Found within suitable habitat in the proposed P-1045 action areas.	Detected. Found within suitable habitat in the buffer areas of P-1045, primarily along San Mateo, San Onofre, and Santa Margarita drainages.

Species Name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 400-foot Buffers
California least tern *Sternula antillarum browni*	Endangered. Listed on 2 June 1970 (35 Federal Register 8491, 16047). Listing status applies to entire species. Recovery plan issued (USFWS 1985a).	Nests along sandy beaches close to estuaries and embayments.	Populations on MCBCP are known to occur on Red Beach, White Beach, North Beach, and Salt Flats (Foster 2008; Evans 2009).	Not detected and not expected to occur due to lack of suitable habitat within the proposed action areas.	Not detected and not expected to occur due to lack of suitable habitat within the buffer areas.
western snowy plover *Charadrius nivosus nivosus*	Threatened. Listed on 5 March 1993 (58 (42) Federal Register 12864). Listing status applies only to the Pacific coast population of this species. Recovery plan issued (USFWS 2007).	Habitat includes intertidal beaches (between mean low water and mean high tide), associated dune systems, and river estuaries.	Known populations on MCBCP occur on Red Beach, White Beach, Beach Section F, Blue Beach, Del Mar Recreation Beach (occasionally nests on Beach Section H) (Sullivan 2011), Salt Flats, and North Beach (Foster 2007).	Not detected and not expected to occur due to lack of suitable habitat within the proposed action areas.	Not detected and not expected to occur due to lack of suitable habitat within the buffer areas.
light-footed clapper rail *Rallus longirostris levipes*	Endangered. Listed on 13 October 1970 (35 Federal Register 16047). Listing status applies only to U.S. population. Recovery plan issued (USFWS 1985b).	Habitat includes southern coastal salt marshes, lagoons, and intertidal zones. Nests in dense stands of cordgrass and pickleweed.	Known occurrences on MCBCP from Santa Margarita Estuary, Cockleburr Canyon mouth, and Las Flores marsh.	Detected. Found within suitable habitat along the Santa Margarita drainage.	Detected. Found within suitable habitat along the Santa Margarita drainage.

Species Name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 400-foot Buffers
coastal California gnatcatcher *Polioptila californica californica*	Threatened. Listed on 25 March 1993 (58 Federal Register 16742). Listing status applies to the entire population of this subspecies. No recovery plan has been published for this subspecies.	Plant communities associated with the coastal California gnatcatcher consist of Diegan coastal sage scrub and Riversidian coastal sage scrub dominated by California sagebrush and flat-topped buckwheat.	Coastal California gnatcatcher occurrence is concentrated in three regions, including the northern (primarily the State Park), coastal (mainly in the Tango area), and southern (including the Oscar I, Lima, and Juliett areas) portions of the Base (Griffith 2008).	Detected. Found within suitable habitat in both proposed action areas.	Detected. Found within suitable habitat in the buffer areas of both proposed action areas.
least Bell's vireo *Vireo bellii pusillus*	Endangered. Listed on 2 May 1986 (51 Federal Register 16482). Listing status applies to the entire population. Draft recovery plan proposed by USFWS and circulated for review (USFWS 1998b).	Nesting is associated with riparian woodland and is most frequent in areas that combine an understory of dense young willows or mulefat, with a canopy of tall willows.	Least Bell's vireo nesting is concentrated along the Santa Margarita River but also occurs in association with riparian plant communities along other drainages, including San Onofre and Las Flores creeks (Rourke and Kus 2007).	Detected. Found within suitable habitat in both proposed action areas.	Detected. Found within suitable habitat in the buffer areas of both proposed action areas
southwestern willow flycatcher *Empidonax traillii extimus*	Endangered. Subspecies listed in 27 February 1995 (60 (38) Federal Register 10693). Listing status applies to entire population of this subspecies. Recovery plan	Suitable nesting habitat for this species consists of dense southern riparian woodland communities with willows, cottonwoods, and other deciduous shrubs. These areas	Consistent breeding records for southwestern willow flycatcher on MCBCP are limited to the Santa Margarita River. Distribution over the Base has been variable historically, and occurrences have been documented along San	Detected. Found within suitable habitat in both proposed action areas.	Detected. Found within suitable habitat in the buffer areas of P-1044 and P-1045.

Species Name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 400-foot Buffers
	adopted (USFWS 2002).	usually occur adjacent to streams, rivers, or other wetlands.	Onofre, San Mateo, and Aliso creeks (Kenwood and Kus 2007). A nest was documented in San Mateo Creek in 2007 and, for the past 3 years, there has been a territory and unpaired male in the San Mateo South ponds (Sullivan 2011).		
Pacific pocket mouse *Perognathus longimembris pacificus*	Endangered. Emergency listed on 3 February 1994 (59 Federal Register 5306). Listing status applies to entire population of this species. Recovery plan issued (USFWS 1998c).	Plant communities suitable for the Pacific pocket mouse consist of shrublands with firm, fine-grain, sandy substrates in the immediate vicinity of the ocean. These communities include coastal strand, coastal dunes, river alluvium, and coastal sage scrub growing on marine terraces.	Occurs in three locations: the Oscar 1 and Edson Range training areas; east of the San Onofre Housing Areas; and in the northeast corner of MCBCP, between the Base boundary with San Clemente Road and Cristianitos Road (SJM Biological Consultants 2003).	Detected. Found within suitable habitat in the proposed P-1044 action areas.	Detected. Found within suitable habitat in the buffer areas of P-1044 and P-1045.

Species Name	Federal Status	Habitat Affinities	Occurrence on MCBCP	Present or with Potential to Occur within Project Corridors, Facilities, and Project Limits	Present or with Potential to Occur within 400-foot Buffers
Stephens' kangaroo rat *Dipodomys stephensi*	Endangered. Listed on 30 September 1998 (53 (190) Federal Register 38465). Listing status applies to entire population of this species. Draft recovery plan issued (USFWS 1997c).	Suitable habitat consists of patches of disturbed grassland habitat with a high proportion of herbaceous annuals and sparse to no shrub cover, on gentle slopes with soil low in clay content.	Known populations on MCBCP primarily in the eastern portion of the Base around Roblar Road and Basilone Road.	Detected. Found within suitable habitat in the proposed P-1045 action areas.	Detected. Found within suitable habitat in the buffer areas of P-1045.
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	Candidate. Petition for listing on 25 July 2001 (66 (143) Federal Register 38611). Listing status applies to the subspecies. No draft recovery plan has been issued.	Habitat includes dense, mature stands of cottonwoods and willows with a multilayer canopy and dense understory.	Not known to breed on MCBCP, occasional and rare visitor.	Not detected and not expected to occur due to lack of suitable habitat within the proposed action areas.	Detected. Found within suitable habitat in the buffer areas along Santa Margarita River.

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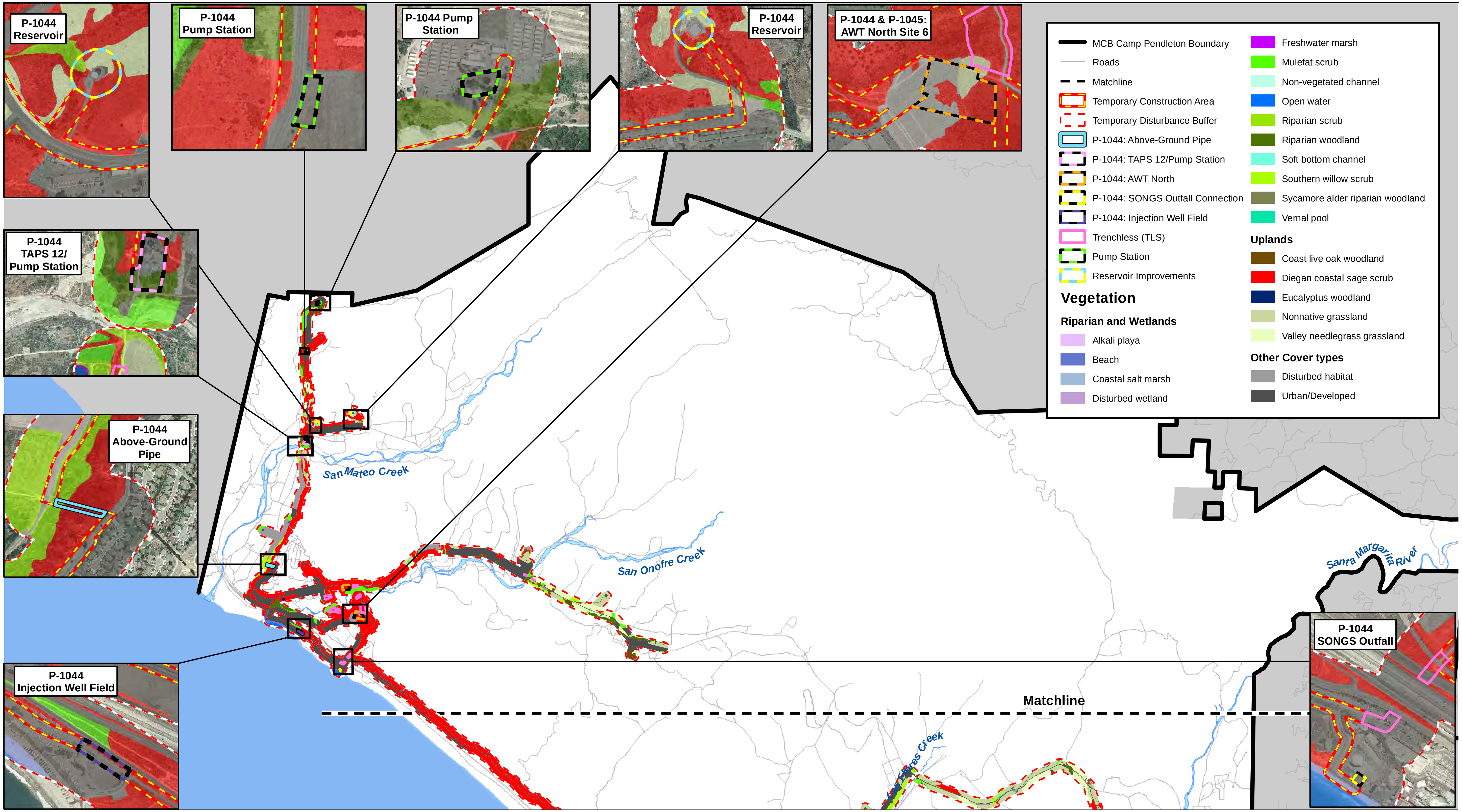

Source: MCBCP 2009

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 miles

Figure 3.3-1a
Plant Communities and Other Cover Types - North MCBCP

MCBCP BWI EIS

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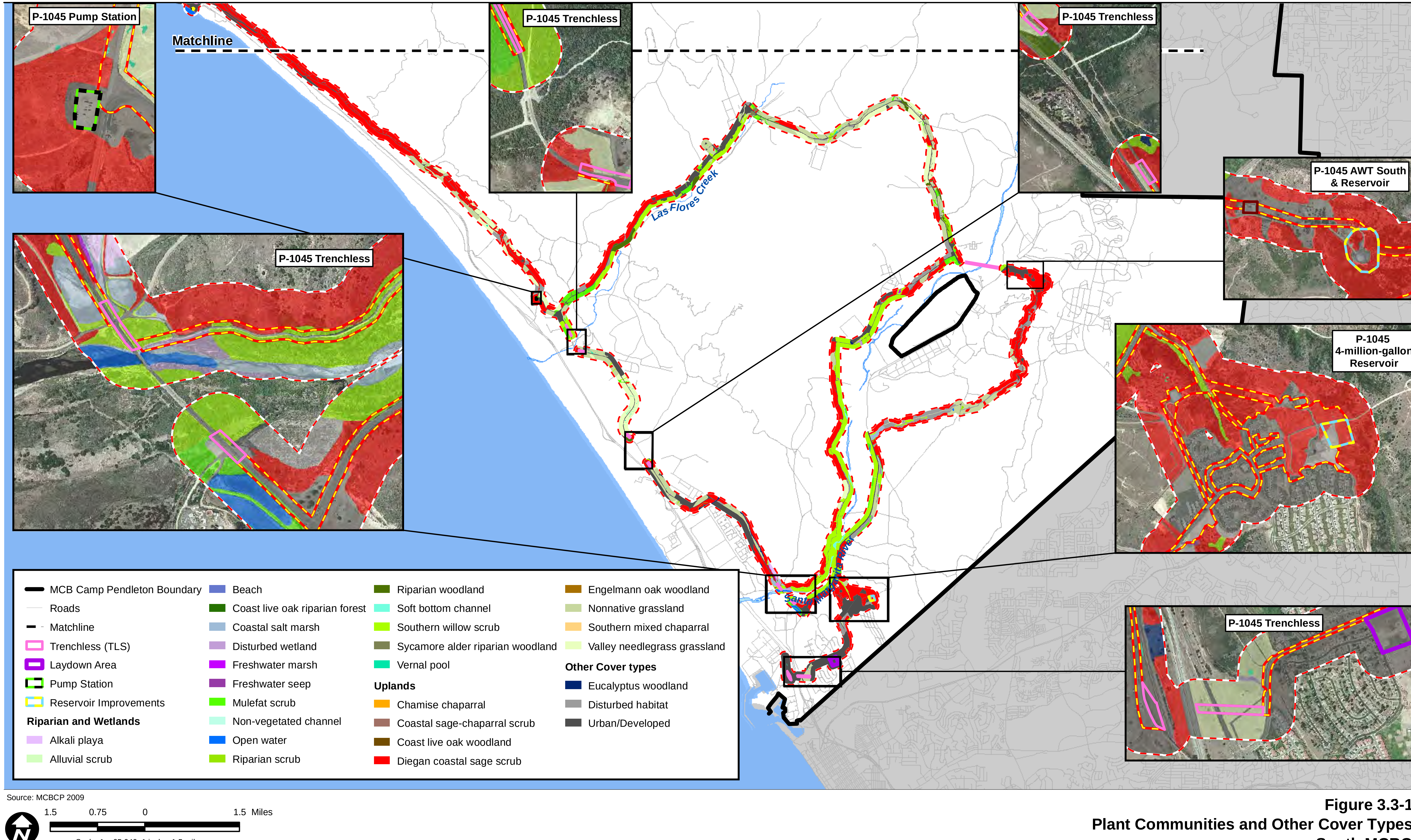

Source: MCBCP 2009

Figure 3.3-1b
Plant Communities and Other Cover Types - South MCBCP

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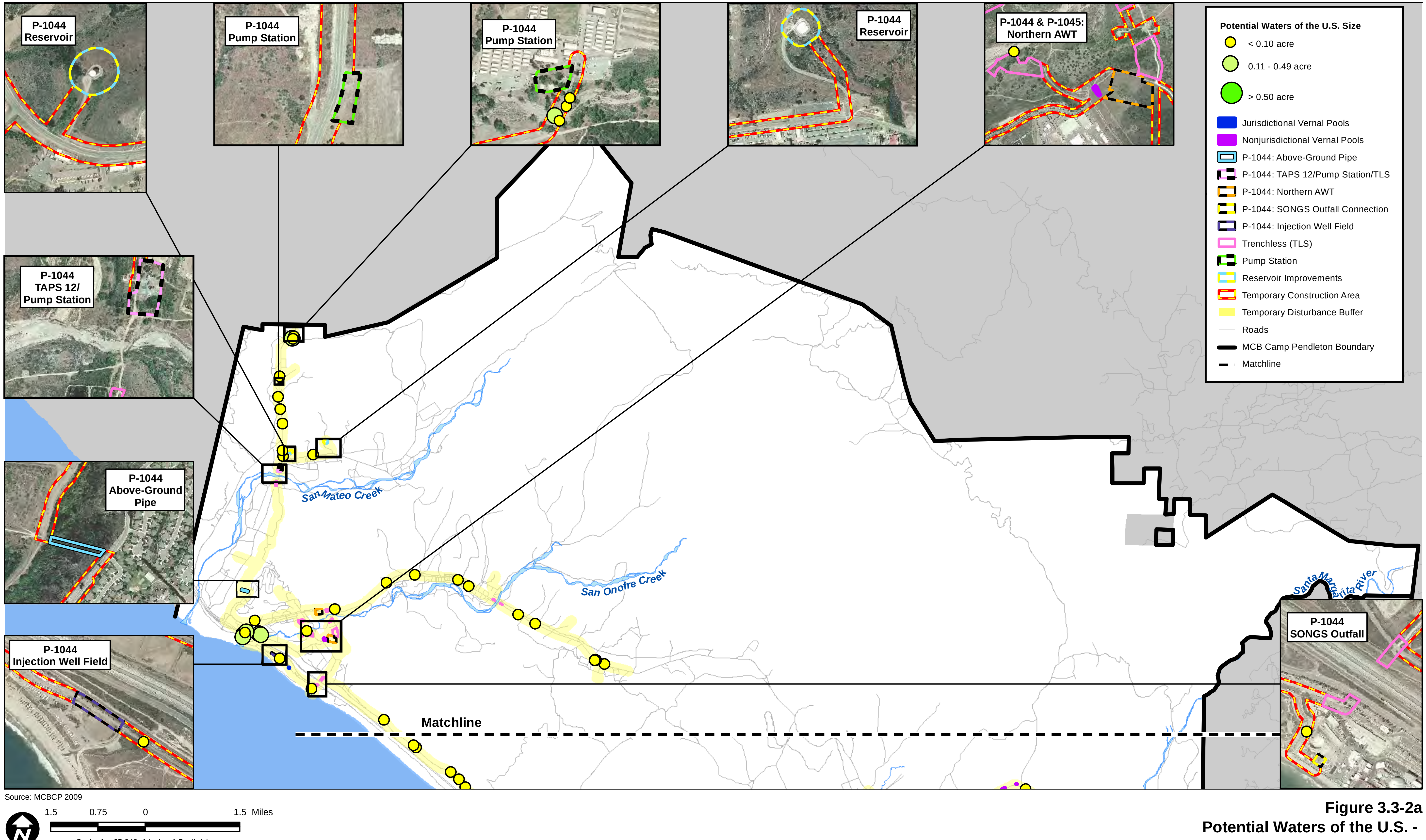

Figure 3.3-2a
Potential Waters of the U.S. - North MCBCP

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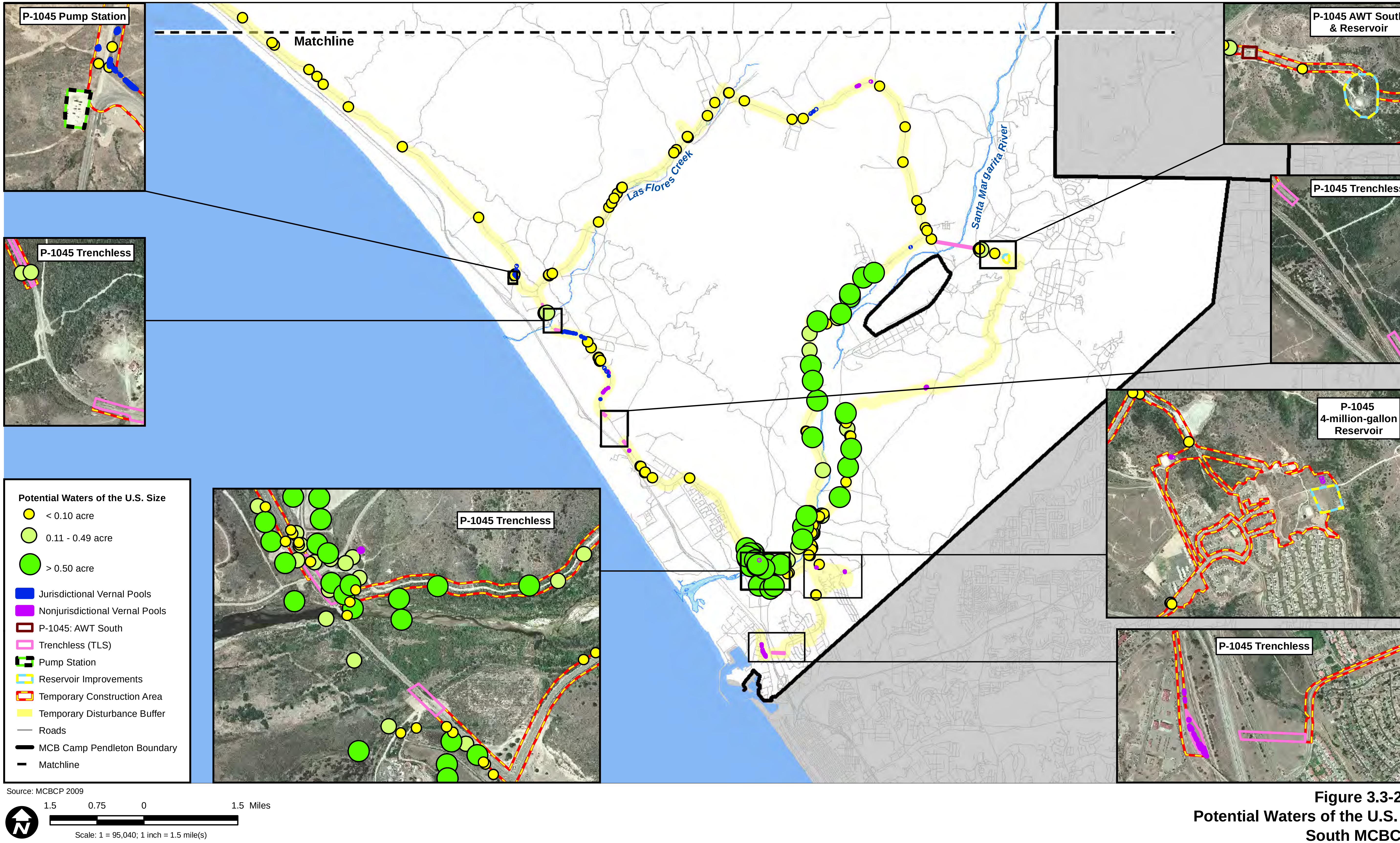

Source: MCBCP 2009

Figure 3.3-2b
Potential Waters of the U.S. - South MCBCP

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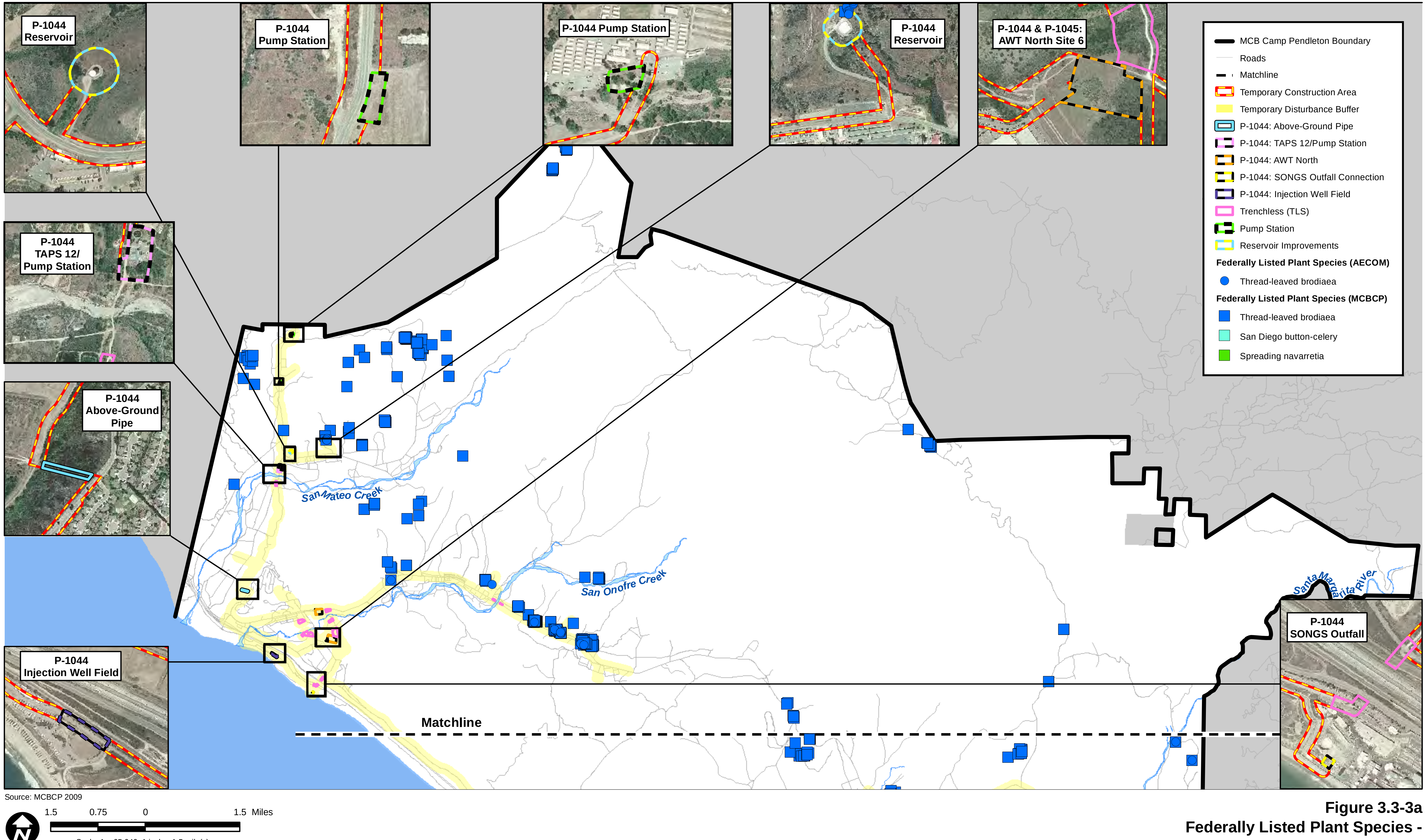

Figure 3.3-3a
Federally Listed Plant Species - North MCBCP

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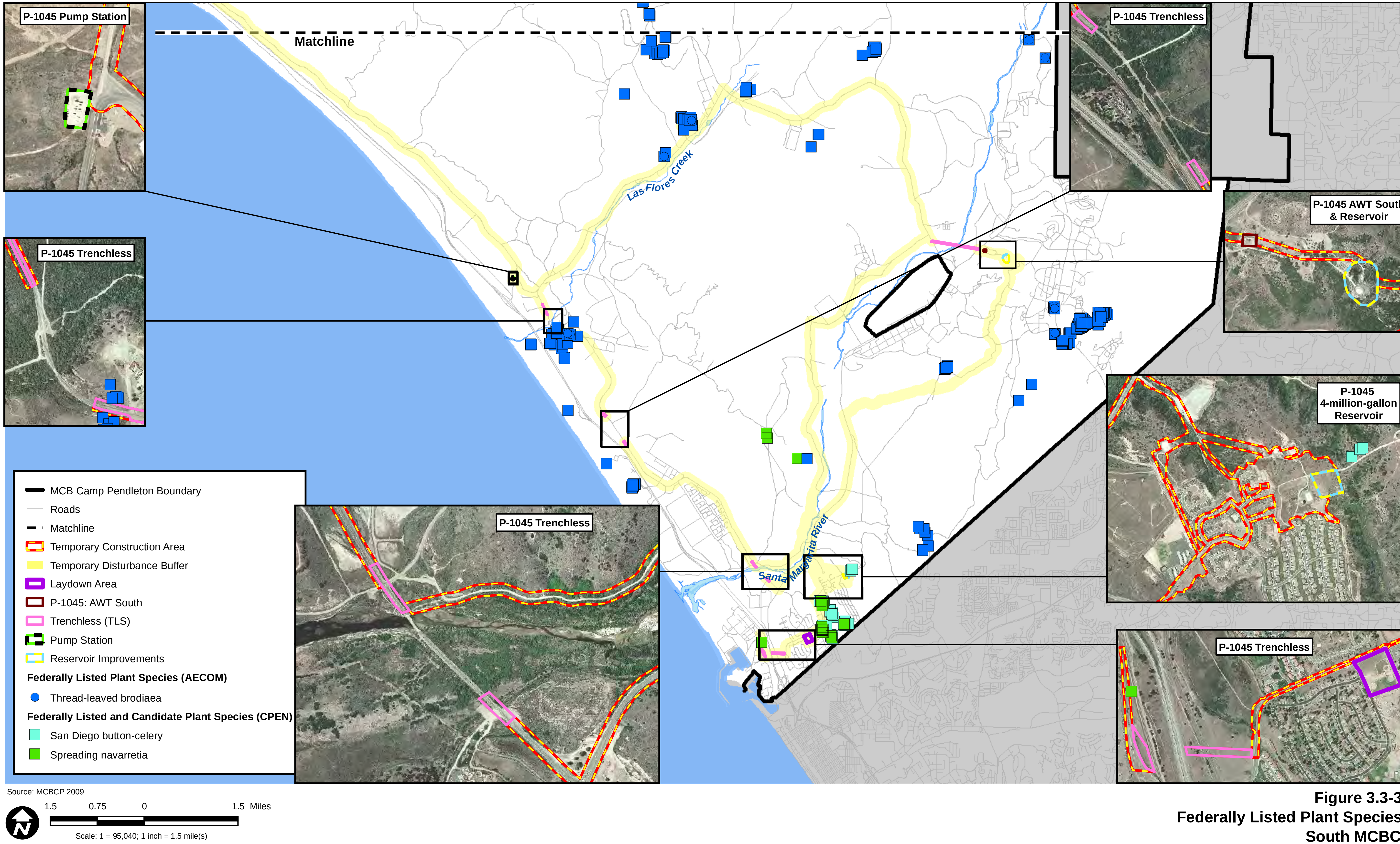

Figure 3.3-3b
Federally Listed Plant Species - South MCBCP

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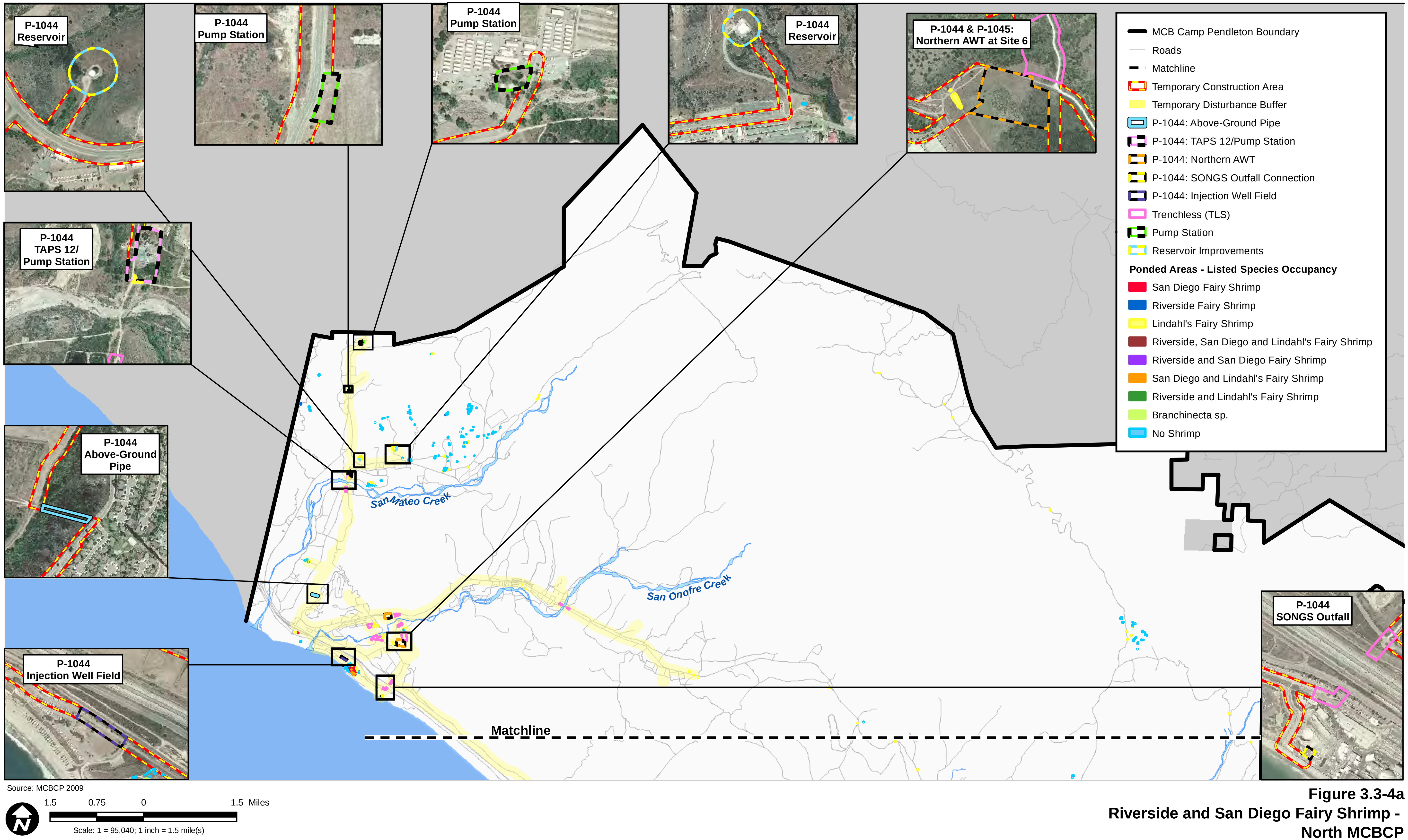

Source: MCBCP 2009

Figure 3.3-4a
Riverside and San Diego Fairy Shrimp - North MCBCP

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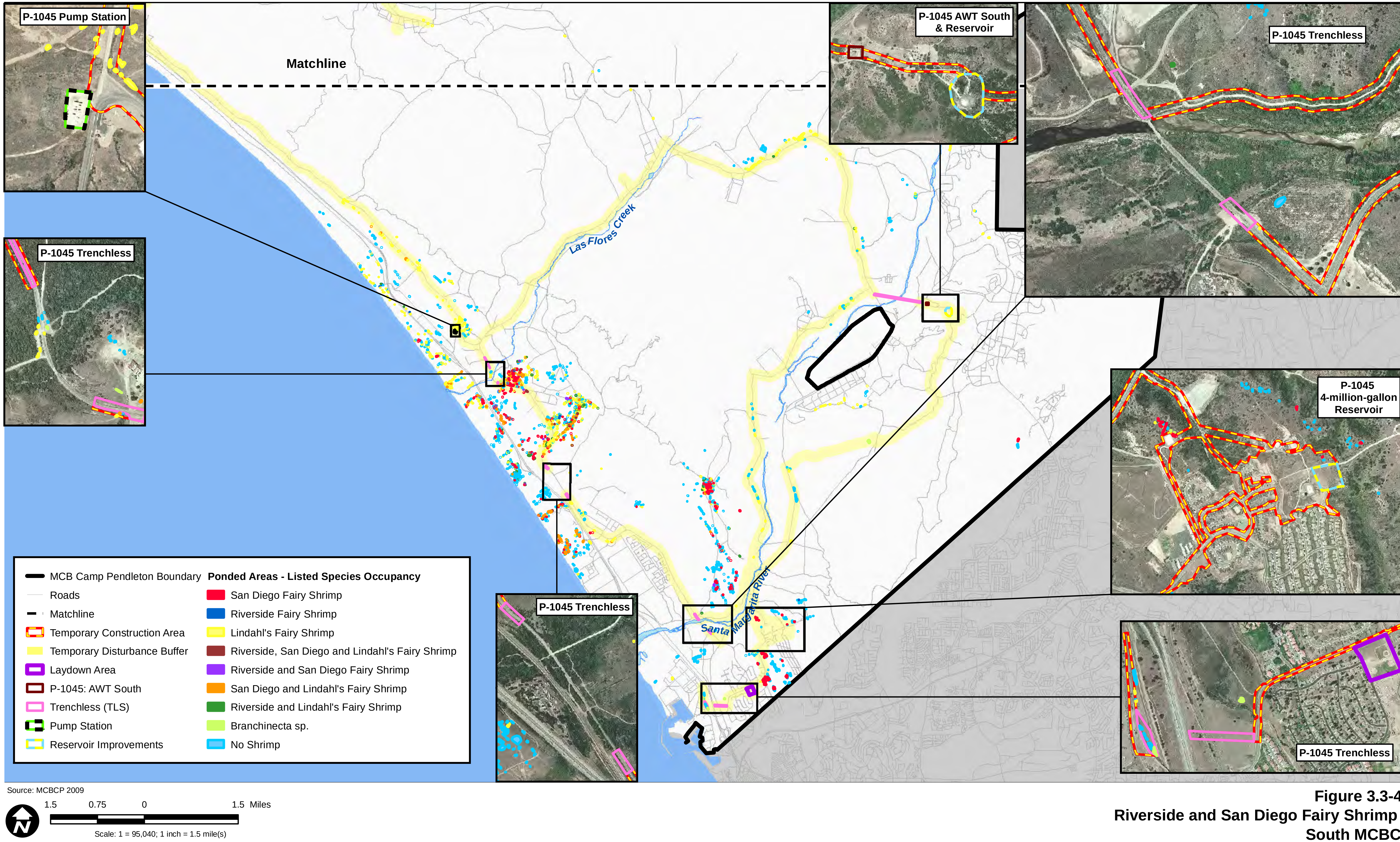

Figure 3.3-4b
Riverside and San Diego Fairy Shrimp - South MCBCP

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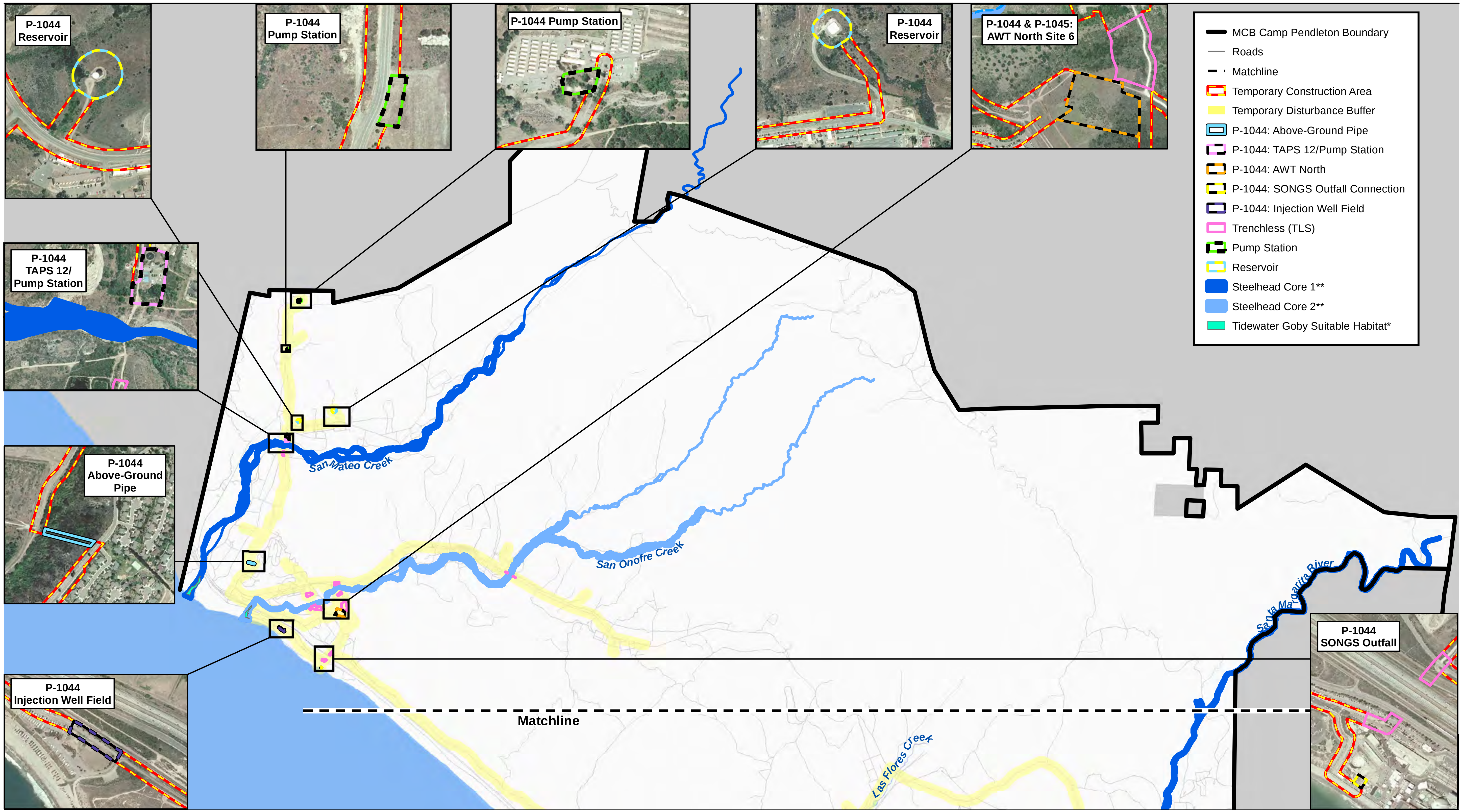

Source: *MCBCP 2009; **NMFS 2012

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 miles

Figure 3.3-5a
Southern California Steelhead and Tidewater Goby - North MCBCP

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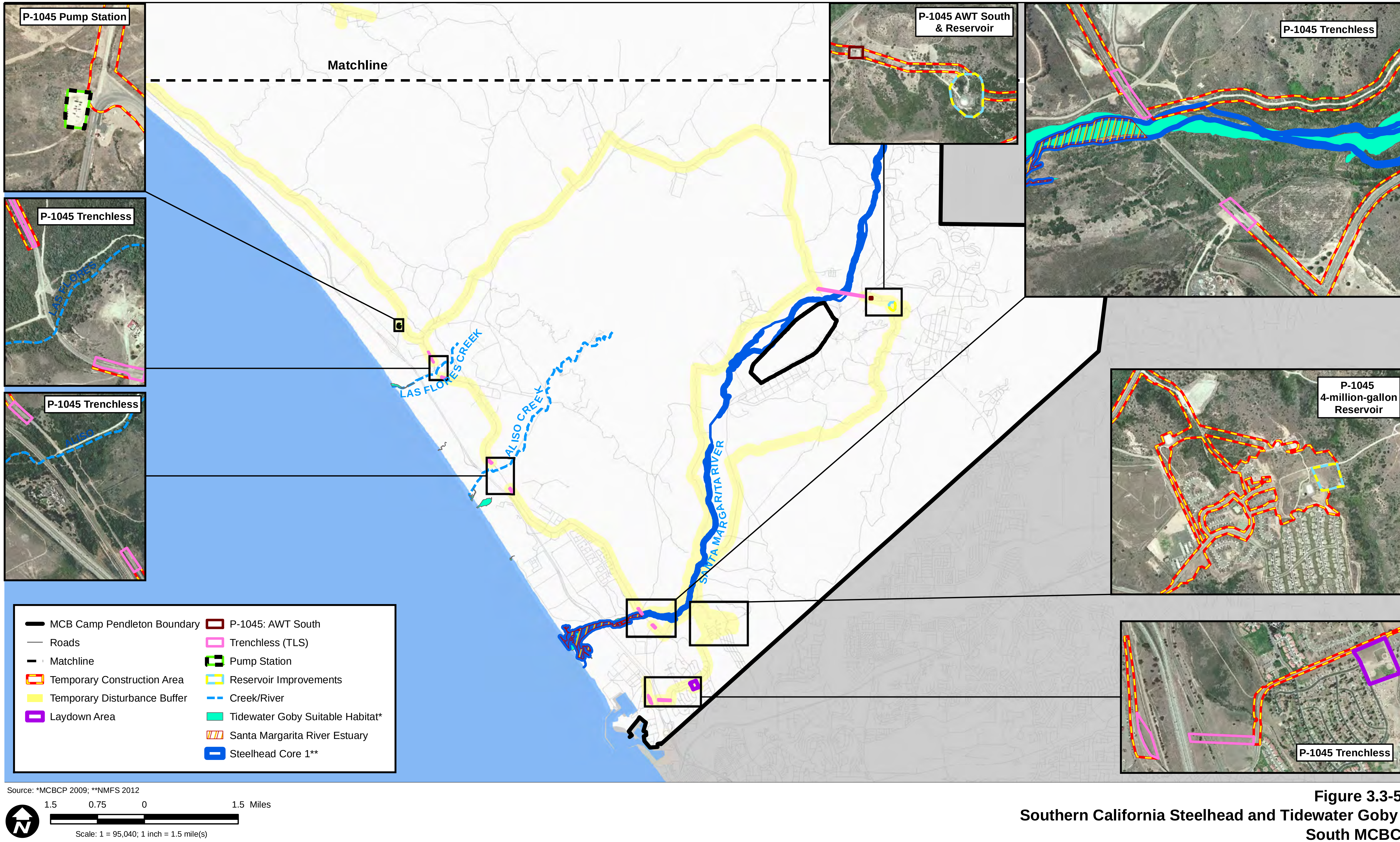

Figure 3.3-5b
Southern California Steelhead and Tidewater Goby - South MCBCP

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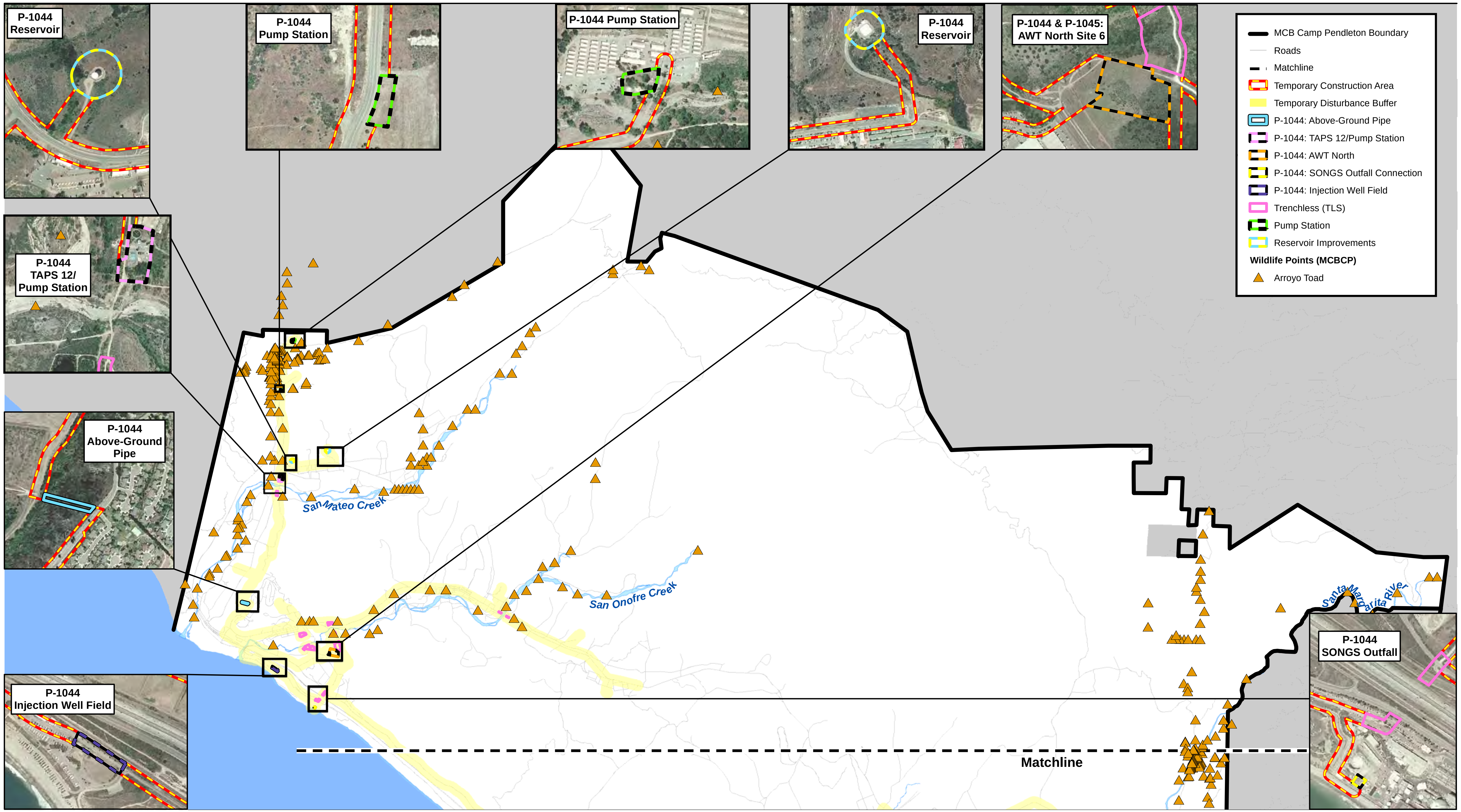

Source: MCBCP 2009

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 mile(s)

Figure 3.3-6a
Arroyo Toad -
North MCBCP

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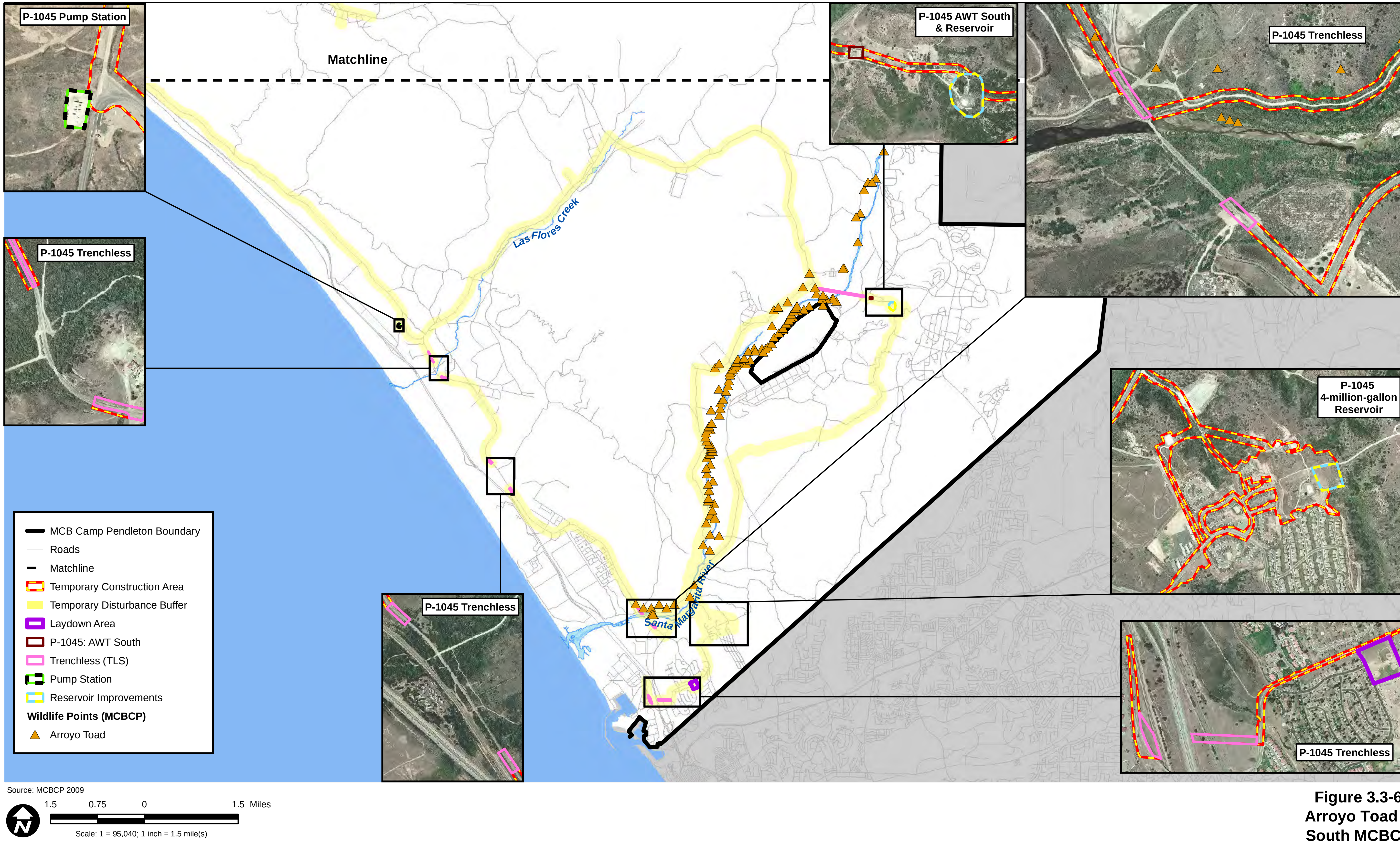

Figure 3.3-6b
Arroyo Toad - South MCBCP

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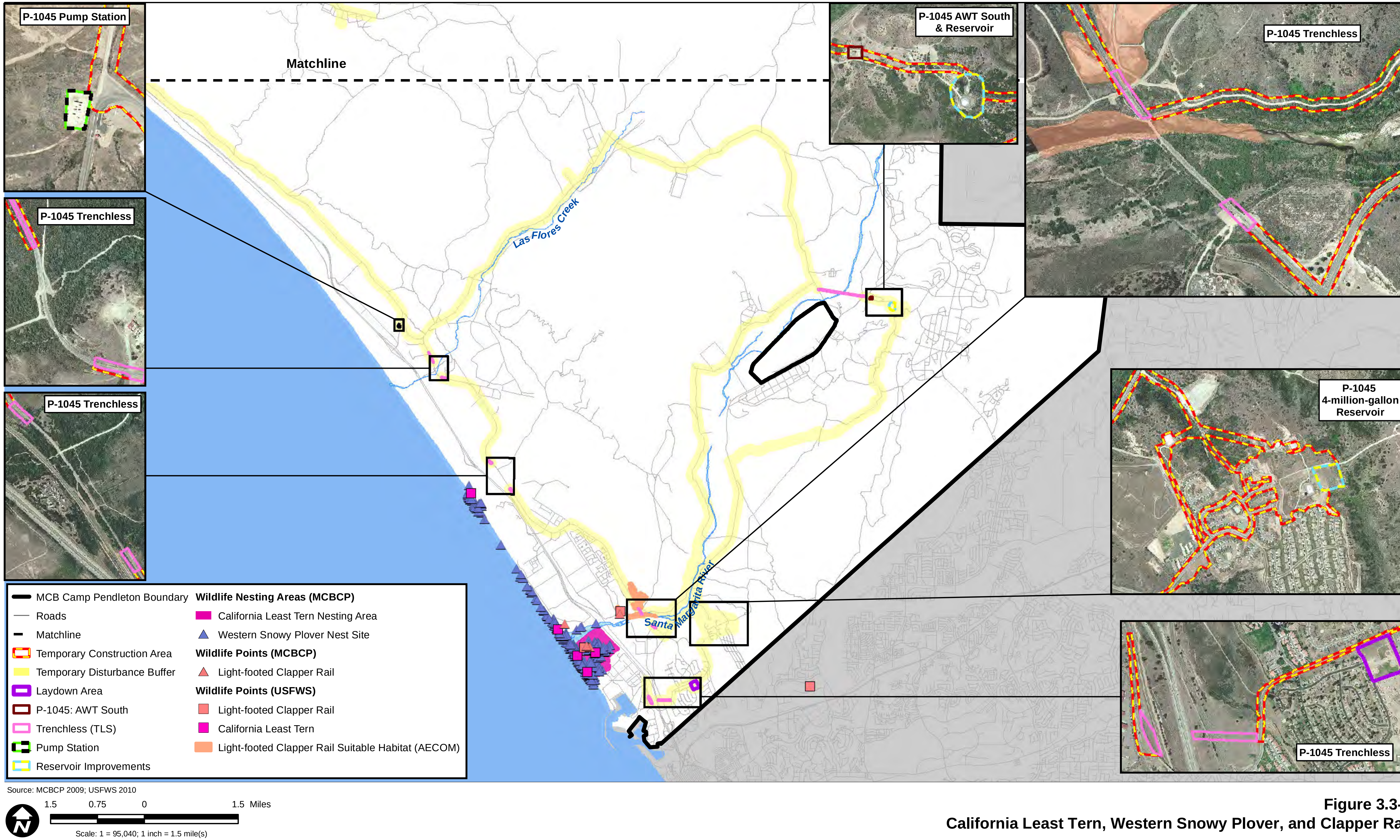

Figure 3.3-7
California Least Tern, Western Snowy Plover, and Clapper Rail

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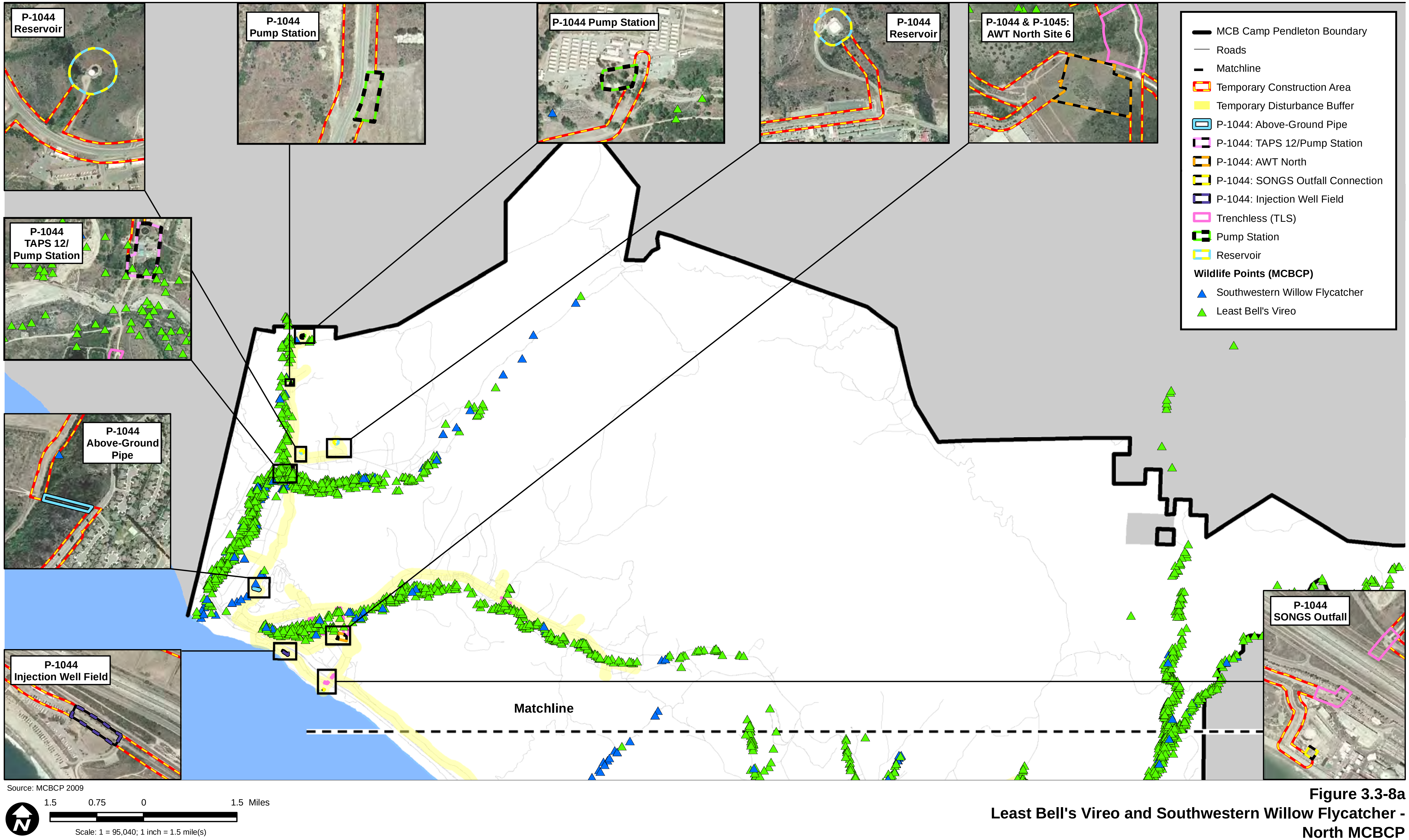

Figure 3.3-8a
Least Bell's Vireo and Southwestern Willow Flycatcher - North MCBCP

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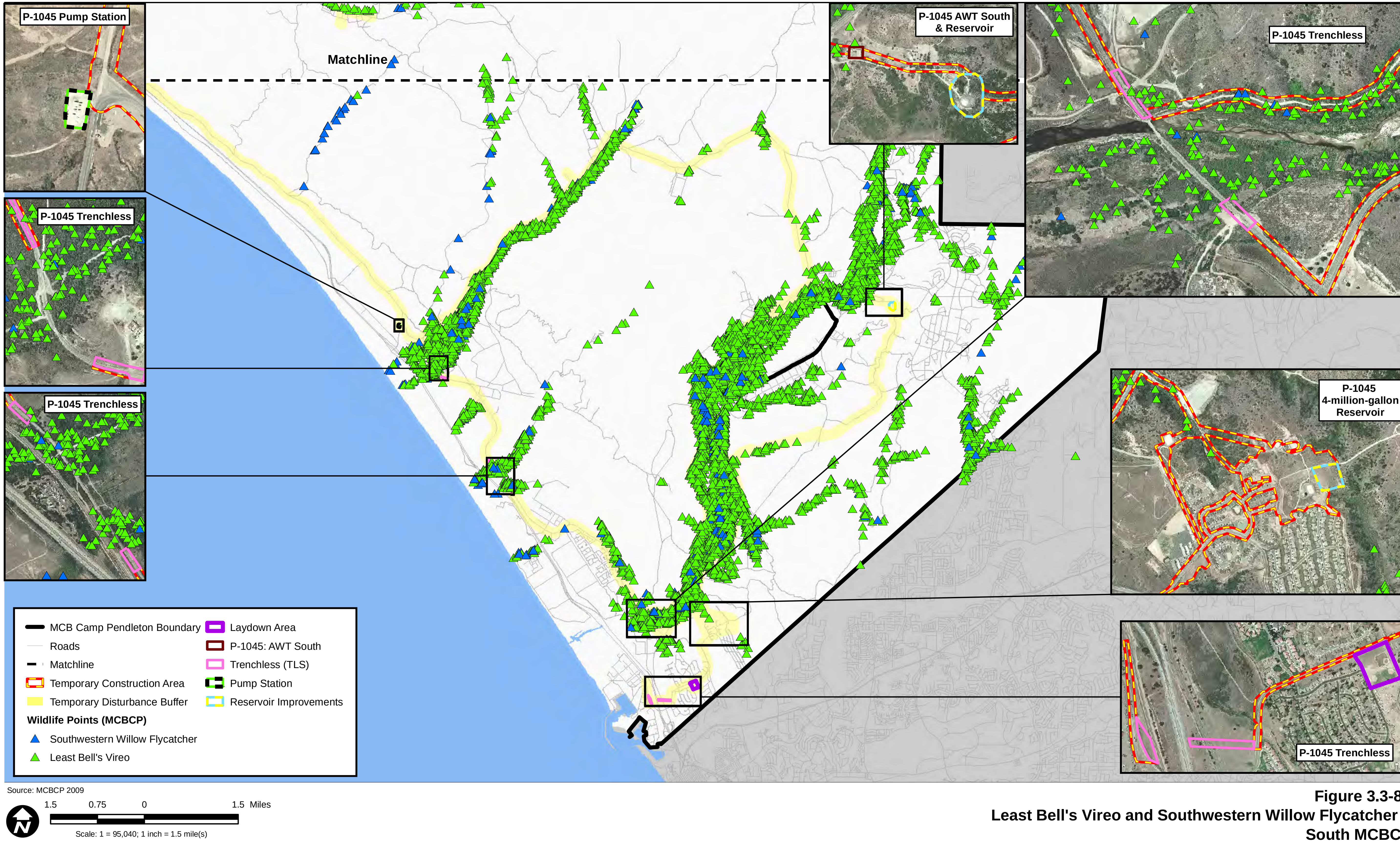

Figure 3.3-8b
Least Bell's Vireo and Southwestern Willow Flycatcher - South MCBCP

Path: \\ussdg2fp001.na.aecomnet.com\data\Projects\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_3\BIO\WLDF\LBV_SWFL_11x17South.mxd, 6/27/2012, calantask

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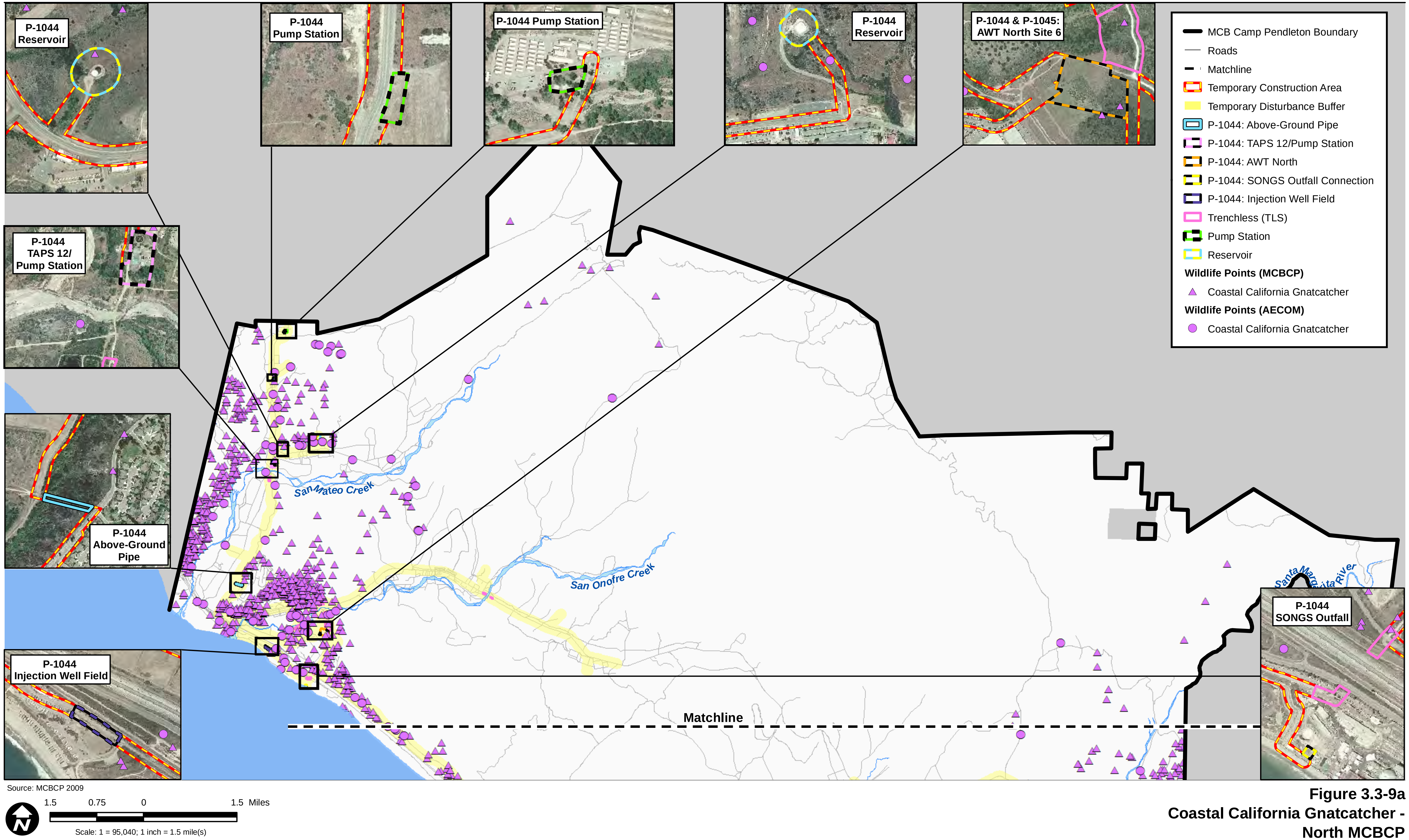

Figure 3.3-9a
Coastal California Gnatcatcher - North MCBCP

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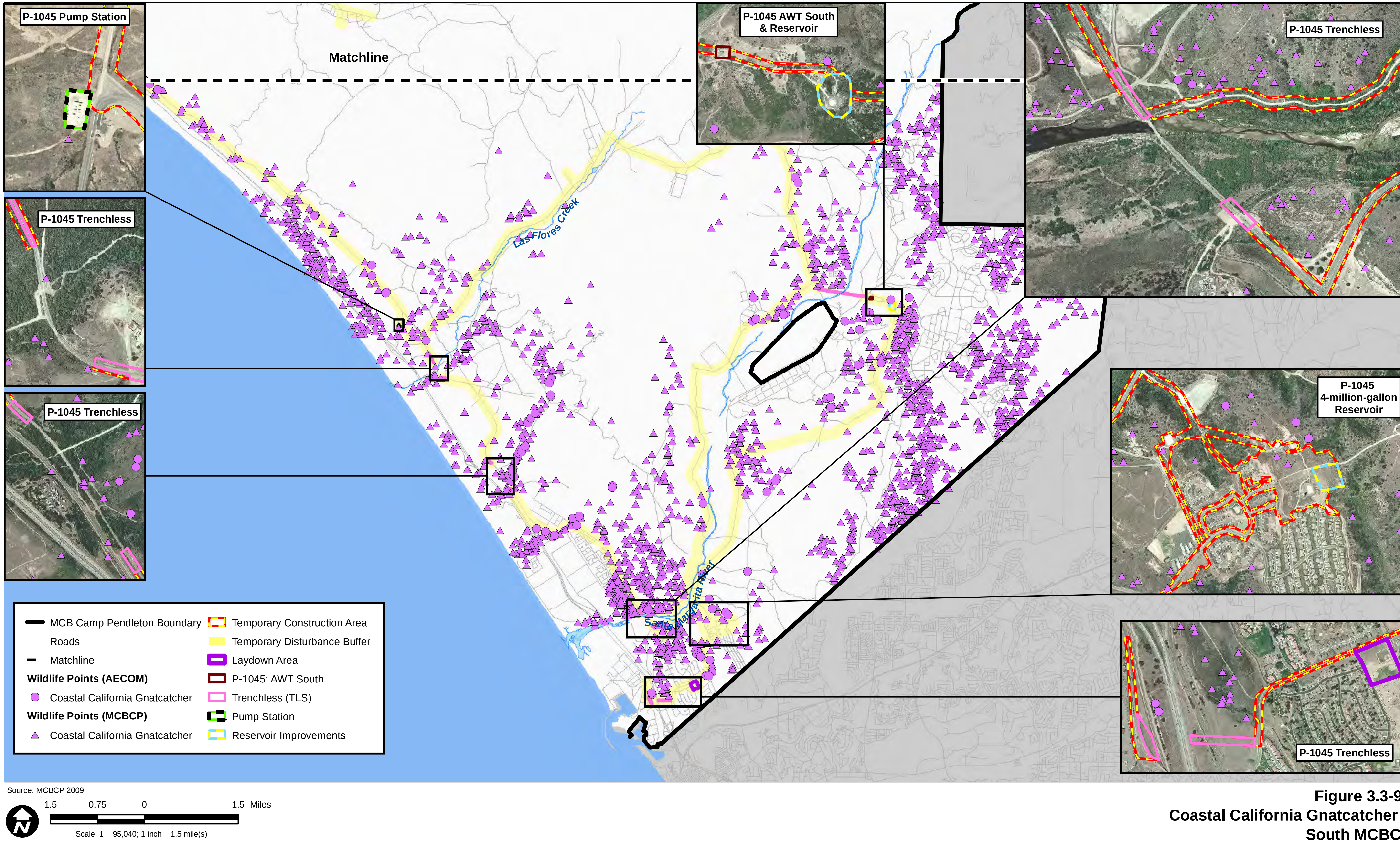

Figure 3.3-9b
Coastal California Gnatcatcher - South MCBCP

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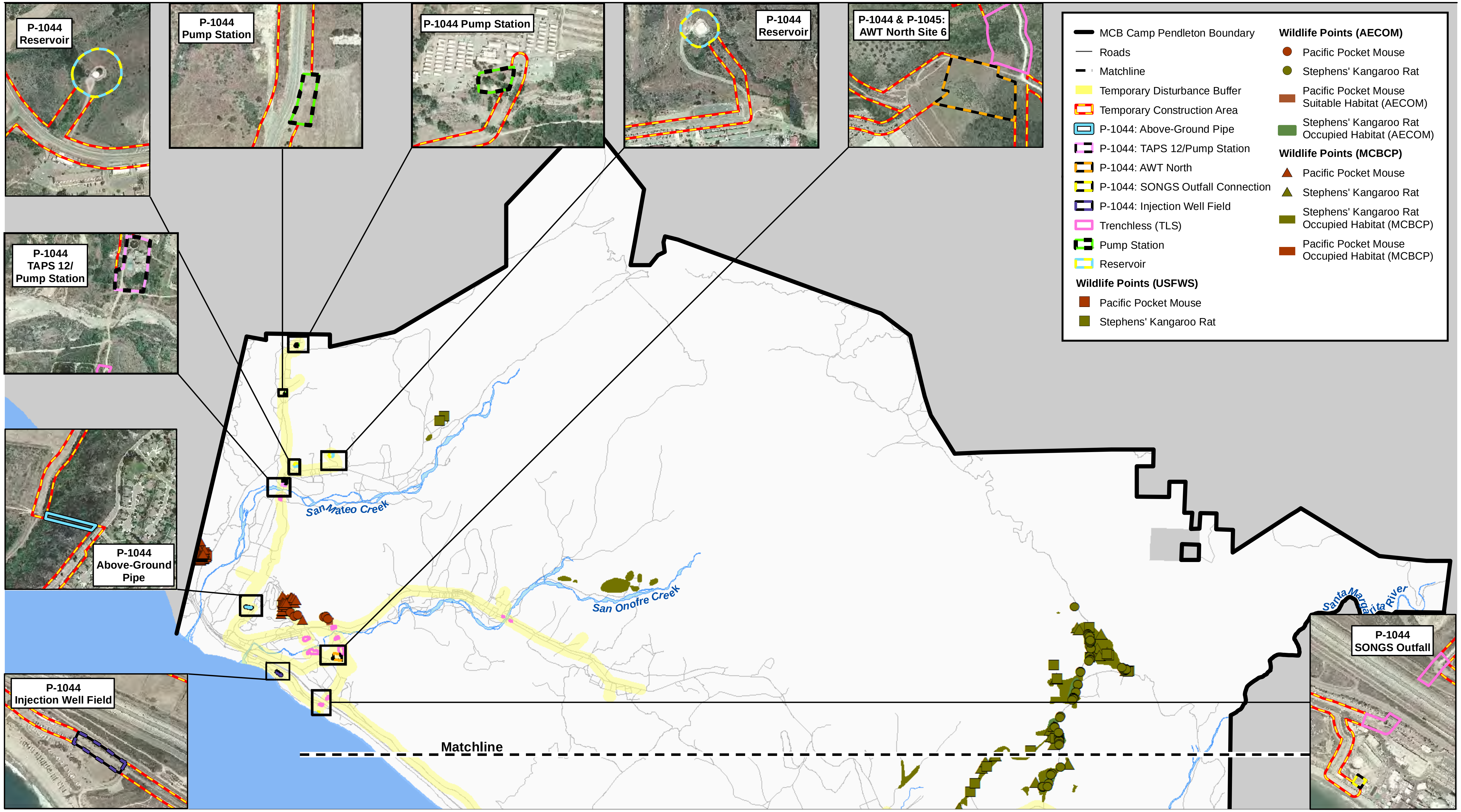

Source: MCBCP 2009; USFWS 2010

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 mile(s)

Figure 3.3-10a
Pacific Pocket Mouse and Stephens' Kangaroo Rat - North MCBCP

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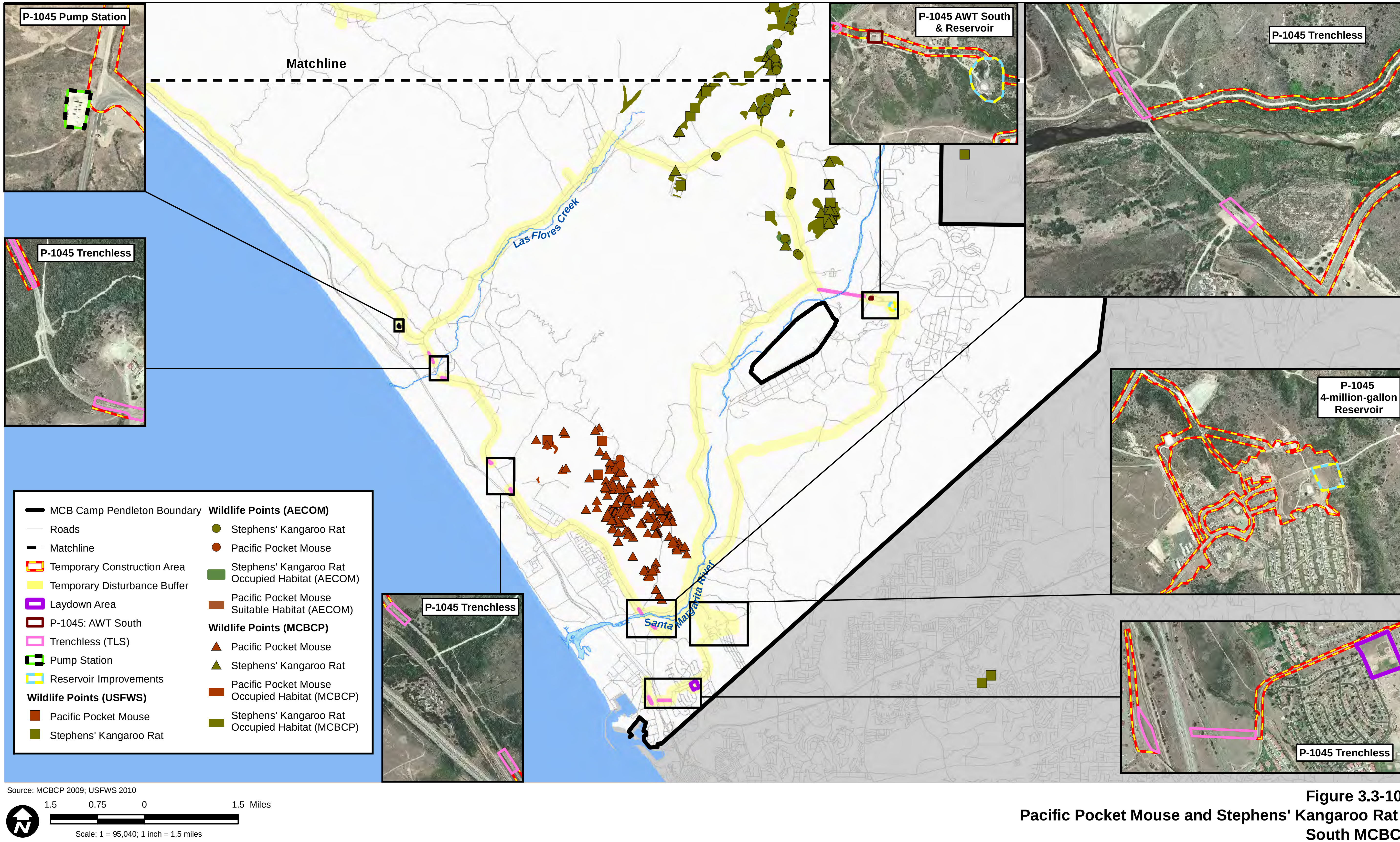

Figure 3.3-10b
Pacific Pocket Mouse and Stephens' Kangaroo Rat - South MCBCP

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3.4 CULTURAL RESOURCES

3.4.1 Definition of Resource

Cultural resources are prehistoric and historic sites, structures, districts, or other places with evidence of human activity that are considered significant to a community, culture, or ethnic group.

3.4.2 Regulatory Setting

Cultural resources are defined as any location or object of past human activity, occupation, or use as identified through inventory, historical documentation, or oral evidence. Cultural resources include archaeological sites, buildings or structures, and traditional native cultural property. Regulatory requirements concerning cultural resources on Federal property are contained, principally, in NEPA (42 U.S.C. §§ 4321 et seq.) and in Sections 106 and 110 of the NHPA, 16 U.S.C. §§ 470–470x-6. Section 106 is implemented through regulation 36 C.F.R. Part 800, which defines a historic property as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. Section 101(a)(I)(A) of the NHPA establishes the NRHP, which is implemented through regulation 36 C.F.R. Part 60. Other pertinent Federal regulations and requirements are embodied in the Archaeological and Historic Preservation Act of 1974, 16. U.S.C. §§ 469–469c-1, the Archaeological Resources Protection Act (ARPA) of 1979 (1994), 16 U.S.C. §§ 470aa–470mm, the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. §§ 3001 et seq.) as implemented through 43 C.F.R. Part 10, and the American Indian Religious Freedom Act Public Law No. 95-341, 92 Stat. 469 (and codified at 42 U.S.C. § 1996). The responsibilities of MCBCP under Section 110 of the NHPA are outlined in the MCBCP Integrated Cultural Resources Management Plan (ICRMP).

A building, structure, archaeological site, or other resource will be considered a historic property if it meets at least one of the following NRHP eligibility criteria (A through D):

A. Is associated with events that have made a significant contribution to the broad patterns of our history; or

B. Is associated with the lives of persons significant in our past; or

C. Embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Has yielded, or may be likely to yield, information important in prehistory or history.

Guidance is also provided by the following:

- MCO P5090.2A for Environmental Compliance and Protection.

Because this EIS will support consultation with the California SHPO under Section 106 of the NHPA, certain terms in this section are consistent with those used in Section 106 and differ from those used elsewhere in this document. Hence, in this section, individual constituent projects that are a part of the proposed action are referred to as "undertakings" and the term "site" is used to refer to cultural resources sites rather than project sites.

3.4.3 Region of Influence

The cultural resources ROI (hereinafter referred to in this section as areas of potential effects [APE], for compliance with NHPA standards) encompasses all areas that may be subject to physical disturbance from the proposed action alternatives, including facility and support structure sites, staging areas, temporary roads or parking areas, and conveyance line (raw water, potable water, and brine) corridors. For conveyance lines, a 125-foot-wide corridor along the utility line route is included in the APEs. For facilities sites and support structures, the APEs are the project limits of the project element.

3.4.4 Existing Conditions – Basewide

Prehistory and Ethnohistory

Current knowledge of the prehistory of MCBCP and its relationship to cultural developments throughout southern California is considered in detail elsewhere (Reddy and Byrd 1997) and is only summarized here. The sequence begins in the Paleoindian period (11,500–8,500 years before present [B.P.]), a time in which adaptations were formerly believed to have been focused on the hunting of large game but are now recognized to represent more generalized hunting and gathering, with considerable emphasis on marine resources (Erlandson 1994; Jones 1991). The following period, the Archaic (8,500–1,300 B.P.), is traditionally seen as encompassing both a coastal and an inland focus, with the coastal Archaic represented by the shell middens of the La Jolla complex and the inland Archaic represented by the Pauma complex. Coastal settlement is also seen as having been significantly affected by the stabilization of sea levels around 4,000 years ago that led to a general decline in the productivity of coastal ecosystems. Nevertheless, recent research on MCBCP has documented continued occupation along the coast well after this decline was in progress (Byrd 1996, 1998).

The Late Prehistoric period (1,300–200 B.P.) is marked by the appearance of small projectile points indicating the use of the bow and arrow, the common use of ceramics, and the replacement of inhumations with cremations, all characteristic of the San Luis Rey complex as defined by Meighan (1954). The San Luis Rey complex is divided temporally into San Luis Rey I and San Luis Rey II, with the latter distinguished mainly by the addition of ceramics. Along the coast of northern San Diego County, deposits containing significant amounts of *Donax gouldii* shell are now often assigned to the Late Prehistoric, based on a well-documented increase in the use of this resource at this time (e.g., Byrd and Reddy 1999). The inception of the San Luis Rey complex is suggested by True (1966; True et al. 1974) to mark the arrival of Takic speakers from regions farther inland. Waugh (1986) is in general agreement with True but suggests that the migration was probably sporadic and took place over a considerable period.

When the Spanish arrived in southern California, the area now known as MCBCP was occupied by Takic-speaking Native Americans known to the Spanish as the Luiseño, whose territory is thought to have composed some 1,500 square miles of coastal and interior southern California (White 1963). The Luiseño speak a language that is placed within the Cupan group of the Takic family of the Uto-Aztecan stock also known as Southern California Shoshonean (Kroeber 1925:574). Kroeber (1925) estimated a population of only about 5,000 precontact Luiseño. White (1963) and Shipek (1977) estimated that, at the time of Spanish contact, there were on the order of 50 Luiseño rancherias with an average population of some 200 people, for a total Luiseño population of about 10,000.

European History

Early History of MCBCP Area

The area that is now MCBCP was first entered by Europeans on 20 July 1769, as the members of the Portola expedition descended into the valley of the Santa Margarita River during their journey north to Monterey. Proceeding along an inland route, the expedition described native villages at Santa Margarita, Las Pulgas, and Cristianitos Canyon. The earliest permanent structures on MCBCP are described in an 1827 mission report as a small adobe at what is now the Santa Margarita Ranch House and a mission estancia at Las Flores (Reddy and Byrd 1997).

The original Mexican owners of the land that was to become MCBCP were Pio and Andres Pico, who acquired the Rancho San Onofre and Rancho Santa Margarita in 1841. Las Flores, which had been one of the few Indian pueblos established by the Mexican government, was acquired by the Pico brothers in 1844, thus creating the Rancho Santa Margarita y Las Flores. By 1862, the Picos had fallen into financial difficulties and sold part of the rancho to their brother-in-law, Juan Forster, to avoid losing it to creditors. Forster, after undertaking a number of improvements, died in 1882 and the ranch eventually was transferred to James C. Flood and Richard O'Neill. The O'Neill family held the property until it was acquired by the Marine Corps in 1942.

Military Development at MCBCP

Since its establishment in 1942, major development at MCBCP has supported its mission as an amphibious training facility. The history of this development is described in a Basewide inventory and evaluation of structures reported by JRP Historical Consulting Services (JRP 2000), which provides both a historic context for the military period and NRHP evaluations of individual structures. The JRP study identifies six major periods of construction as a thematic structure for the evaluations: World War II (1942–1945); post-World War II (1946–1949); Korean War (1950–1953), post-Korean War (1954–1962), the Vietnam era (1963–1975), and the end of the Cold War (1976–1989).

3.4.5 Existing Conditions – Proposed Project Areas

The cultural resources inventory in support of the Basewide Water Infrastructure undertaking was conducted from June through August 2010 (York 2010a). As noted in that study, archaeological investigations were previously completed for portions of P-1044 and P-1045 during the recent cultural resources inventories and evaluations for the Basewide Utility Infrastructure undertakings (York 2010b; York et al. 2010). Data from the previous assessments were included in the cultural resources report for the current undertakings. In total, the inventory identified 48 cultural resources within the APEs of the two projects (all alternatives combined), all of which are archaeological resources. Of the archaeological resources, all but three consist primarily of prehistoric materials (i.e., shell, flaked lithic tools, faunal material, etc.). The three historic archaeological resources include segments A/B and C of CA-SDI-14,006H (El Camino

Real) and Segment A of CA-SDI-14,005H (the California Southern railroad alignment). These resources and their associated undertakings are summarized in Table 3.4-1.

Of the 48 cultural resources within the APE, 22 have been evaluated as eligible for the NRHP, while 26 have been evaluated as ineligible.

Table 3.4-1
Cultural Resources within APEs[1]

Site CA-SDI-	Description	NRHP Status	References	P-1044[1]	P-1045[1]
812/H	Remains of estancia; Las Flores Adobe; prehistoric deposit	Listed	Schaefer 1992; Cagle et al. 1996; SAIC 1999; Foster and Woodman 2001; Hale and Becker 2006		X (1,2,3,4,5)
1074	Shell midden	Eligible	Byrd et al. 1995	X (1,2,3,4,5)	
1075	Shell midden	Ineligible[2]	Reddy 1997a	X (2,4)	
1313/14,791	Shell, artifact deposit	Eligible	York 2004	X (1,2,3,4,5)	
1316	Artifact scatter	Ineligible	York, Glenny, and Jow 2010	X (1,2,3,4,5)	
4416	Shell and artifact deposit	Eligible	Reddy 2003		X (1,2)
4417	Shell midden artifact scatter	Eligible	York, Glenny, and Jow 2010		X (1)
4426	Shell, artifact scatter	Eligible	Bull and Cheever 2002		X (1)
4538A/B	Shell, artifact deposit	Eligible	Byrd 1996		X (1,2,3,4,5)
8761/H[3]	Shell, artifact scatter	Ineligible	Pigniolo and Cleland 1996		X (1,3,4,5)
9561/H	Artifact scatter, historic walls	Eligible	York, Glenny, and Jow 2010	X (1,2,3,4,5)	
9566	Artifact scatter	Ineligible	Reddy 2000	X (1,2,3,4,5)	
10,731[3]	Shell deposit	Eligible	York 2003		X (1,3,4,5)
10,842	Shell, artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1,3,4,5)
12,202	Artifact scatter	Ineligible	Reddy 1997b	X (1,2,3,4,5)	
12,569	Shell and artifact scatter	Eligible[4]	York et al. 2011		X (4)
12,570	Artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1)
12,571	Artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1)

Site CA-SDI-	Description	NRHP Status	References	P-1044[1]	P-1045[1]
12,574	Shell and artifact scatter	Ineligible	Byrd et al. 1995	X (1,2,3,4,5)	
12,618	Artifact scatter	Ineligible[4]	York et al. 2011		X (1,4)
13,320	Shell, artifact scatter	Ineligible	Cheever and Harvey 2005		X (1,3,4,5)
13,321	Shell, artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1,3,4,5)
13,934	Shell, artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1)
13,936	Shell and artifact scatter	Eligible	York, Glenny, and Jow 2010		X (1)
13,937	Shell, artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1,2)
13,987[3]	Artifact scatter	Ineligible	Schroth, Phillips, and Gallegos 1996; Gallegos and Associates 1997; Berryman, Moffitt and Moffitt 2011		X (1,2)
14,005H, Segment A	Railroad alignment	Eligible	Phillips et al. 1997		X (1,3,4,5)
14,006H, Segments A/B	Travel route; El Camino Real	Ineligible	York, Glenny, and Jow 2010; York et al. 2010		X (1,4)
14,006H, Segment C	Travel route; El Camino Real	Eligible	York, Glenny, and Jow 2010		X (1,2,3,4,5)
14,007	Shell scatter	Eligible	York, Glenny, and Jow 2010		X (1)
14,170	Shell, artifact deposit	Eligible	York et al. 2001		X (4)
14,500[3]	Shell scatter	Ineligible	York 2003		X (1,3,4,5)
14,501[3]	Shell scatter	Ineligible	York 2003		X (1,3,4,5)
14,505	Shell, artifact scatter	Ineligible	Reddy 1999		X (1,2,3,4,5)
14,506	Shell, artifact scatter	Ineligible	Reddy 1999		X (1,2,3,4,5)
14,718	Artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1,2)
14,749	Shell midden	Eligible	York et al. 2001		X (4)
14,750	Shell, artifact deposit	Eligible	York et al. 2001		X (4)

Site CA-SDI-	Description	NRHP Status	References	P-1044[1]	P-1045[1]
14,751	Shell, artifact deposit	Eligible	York et al. 2001		X (4)
14,752	Shell, artifact deposit	Eligible	York et al. 2001		X (4)
15,558[3]	Shell scatter	Ineligible	York 2003		X (1,3,4,5)
15,913[3]	Shell and artifact scatter	Eligible	Huntley 2002	X (1,2,3,4,5)	
16,283	Shell, artifact scatter, burials	Eligible	Huntley and Byrd 2002; York, Glenny, and Jow 2010	X (1,2,3,4,5)	
19,379	Shell, artifact scatter	Ineligible	York, Glenny, and Jow 2010	X (1,2,3,4,5)	
19,381	Artifact scatter	Ineligible	York, Glenny, and Jow 2010	X (1,2,3,4,5)	
19,387	Shell and artifact scatter	Ineligible	York, Glenny, and Jow 2010		X (1)
19,392	Shell, artifact scatter	Eligible	York, Glenny, and Jow 2010		X (2)
19,495	Shell, artifact scatter	Ineligible	York 2010c		X (1,3,4,5)

[1] Table includes cultural resources within the APEs of all alternatives within each undertaking.

[2] Previous consultations between the MCB Camp Pendleton Cultural Resources Branch and the California SHPO have determined that while portions of CA-SDI-1075 south of Interstate 5 are eligible for the NRHP, all portions of the site that are north of Interstate 5 (including the area of the current APE) are ineligible for the NRHP. Interstate 5 would act as a physical barrier separating NRHP-eligible portions of the site from potential construction-related impacts.

[3] Site is slated for trenchless construction and no impacts are anticipated. If impacts would occur, a testing and evaluation program would be required. If the site is determined eligible for the NRHP, a mitigation program would be necessary.

[4] Evaluation pending SHPO concurrence.

3.5 LAND USE

3.5.1 Definition of Resource

Land use constitutes natural or human-modified conditions and activities at a particular location. Natural land uses include forests, mountains, rangelands, or other open space or undeveloped areas. Human-modified land uses include residential, commercial, industrial, transportation, recreation, communications, and utilities. On military installations, land use is often divided into operational and support functions. Land use is typically controlled by management plans, policies, regulations, and ordinances that can determine the type and extent of land use allowable in specific areas. Such controls are often intended to protect specifically designated or environmentally sensitive areas.

The overarching consideration associated with land use on MCBCP is the Base's mission, which is to "operate an amphibious training Base that promotes the combat readiness of operating forces by providing facilities, services, and support responsive to the needs of Marines, Sailors, and their families" (USMC 2007a). Land uses and land use compatibility on the Base are strongly related to effectiveness in accomplishing the mission.

3.5.2 Regulatory Setting

Marine Corps Base Camp Pendleton Master Plan

Long-range development of MCBCP is guided by the 2030 Base Master Plan (U.S. Navy 2011). The master plan describes existing land uses, developed areas, and natural and human-made conditions that constrain development. The goals of the plan are to accurately reflect current and projected mission requirements, provide land use policy guidelines to promote optimum future land uses, and provide guidance and recommendations for siting new facilities. The plan makes recommendations for improvements and modifications to the infrastructure, physical plant, and natural resources of MCBCP, and contains development guidelines for optimum utilization of land and airspace to support the Base mission.

The 2030 Base Master Plan emphasizes the need to maximize and preserve open space areas on the Base to accommodate weapons firing and impact areas and amphibious, ground, and aviation ranges and training areas. These are needed for MCBCP to meet its national security mission of providing a realistic environment in which to train Marines. The 2030 Master Plan shows broad categories of uses, dividing the Base into impact areas, developed areas, and training and maneuvering areas (Figure 3.5-1). Impact areas are mostly in the central part of MCBCP. Most of the rest of the Base is devoted to training and maneuvering areas. To avoid incompatible uses in these military operations and training areas, the Base Master Plan designates distinct and clearly defined areas containing personnel housing and "cantonments" where development is concentrated.

Cantonments are areas of the Base that generally contain concentrations of infrastructure, buildings, and other permanent structures. Some cantonments contain open space used for training, recreation, or other active uses, as well as other open space that may be undeveloped and not actively used. Similarly, designated training areas outside of cantonment areas may contain some buildings and infrastructure development.

Integrated Natural Resource Management Plan

The INRMP is intended to integrate natural resource conservation and management efforts in support of land use and military mission requirements and responsibilities at MCBCP and MCAS Camp Pendleton (USMC 2007a). The INRMP summarizes baseline information and agreements through which compliance with regulatory and planning processes is accomplished. The INRMP provides technical guidance for integrating natural resource management efforts into the MCBCP planning and decision-making processes to persons planning and/or preparing installation approvals, management actions, orders, instructions, guidelines, Standard Operating Procedures, and other plans. It is not, however, intended for use by military personnel operating in the field.

The INRMP governs the management of natural resources over a 5-year period (2007–2012) on MCBCP. The INRMP is planned to evolve as mission requirements, environmental and regulatory conditions, and natural resources management programs and initiatives evolve. This ongoing development, review, and implementation involves a cross section of land users and managers on-Base along with USFWS and CDFG. Results of this process and ongoing adaptive management are reflected in modifications to the INRMP.

Integrated Cultural Resource Management Plan

MCBCP has an ICRMP that guides the Base Cultural Resources Management Program (USMC 2005). The mission of the Cultural Resources Management Program is to support the training of Marines through responsive and proactive program management.

The ICRMP integrates the protection of cultural resources while enhancing and facilitating the base mission to train Marines. This has been accomplished through coordination and communication with a range of stakeholders, including base operators and facility managers, SHPO, Native American tribes, and the public. The Cultural Resources Management Program has survey coverage of all non-live fire impact areas on this 125,000-acre installation. A total of 90,000 acres of the Base have been surveyed and over 600 sites have been recorded. Through this program, the Cultural Resources Management Program has successfully removed the Las Flores Adobe Ranch House from the list of most threatened National Historic Landmarks and completed a historic structures report on the Santa Margarita Ranch House. The Base also works with 19 Native American Tribal Governments for NEPA, NHPA, and NAGPRA compliance.

Coastal Zone Management Act

Authority for land use regulation in the Coastal Zone in California under the CZMA is delegated to the CCC, and in most areas of the state is governed by Local Coastal Programs (LCPs) of the local land use jurisdictions. Federal lands, however, are excluded from state control, and there is no LCP applicable to MCBCP. Instead of issuing of a Coastal Development Permit for the proposed action, the Marine Corps would submit either a Coastal Consistency Determination or a Negative Determination, as appropriate, to the CCC for concurrence. The standard for CCC's review would be the Chapter 3 policies of the California Coastal Act. The policies applicable to the proposed action address protection of marine resources, biological productivity, water quality, environmentally sensitive habitats, and scenic and visual qualities. Oil and hazardous substances spills and overall minimization of adverse impacts are also addressed. Additional information on the CZMA is in Section 3.13, Coastal Zone Management.

3.5.3 Region of Influence

Widespread areas of the Base would be affected by the proposed action. The ROI for land use would differ according to the alternative for each of the two proposed projects. At its maximum extent, considering all alternatives, the ROI would include the San Mateo Creek valley from the 51 Area (San Onofre) to the 64 Area (Talega); the area between the SONGS main facility and Basilone Road; the area within about a mile east of I-5 for almost the north-south length of the Base; segments of Basilone Road from the 51 Area (San Onofre) to the 53 Area (Las Pulgas) and from the 53 Area to Vandegrift Boulevard; the lower Santa Margarita River valley from Stuart Mesa Road to the 25 Area (Vado Del Rio), including the Stuart Mesa Bridge, and the ridge forming the west rim of the river valley; and the upland areas southeast of Vandegrift Boulevard from Stuart Mesa Road and west of I-5 to the 21 Area (Del Mar), east of the 24 Area and 22 Area (Chappo) to Haybarn Canyon. This is the geographic area in which construction or operation of facilities associated with the proposed action and alternatives would occur and in which adjacent or nearby land uses could be potentially affected.

3.5.4 Existing Conditions – Basewide

Surrounding Land Uses

Excluding the Pacific Ocean to the west, MCBCP is bordered by San Diego, Riverside, and Orange counties. The northwestern border of MCBCP is adjacent to communities in Orange County, while the southern border is adjacent to communities in San Diego County. Civilian residential development borders MCBCP in both counties (U.S. Navy 1992).

A small portion of the Base in the 64 Area (Talega) is in Orange County. The rest of the Base is in San Diego County. San Clemente borders the northern boundary of MCBCP. San Clemente is completely built out along the Base boundary. Land uses in this part of the city, along I-5, include commercial uses as well as open space. Just beyond the I-5 corridor, most of the city is zoned for low-density residential use or open space. The Base maintains a cooperative relationship with San Clemente in providing public services such as mass transportation, schools, and recreation.

The Rancho San Clemente Specific Plan covers about half of the land adjacent to the MCBCP boundary. Rancho San Clemente consists of approximately 1,943 acres of land. The lands closest to the Base are zoned for open space and heavy industrial uses. The northeast Base boundary is adjacent to the Ranch Plan site, a 30-year planned development that consists of four residential communities, including Rancho Mission Viejo and Rolling Hills. Only a small portion of the Ranch Plan Planned Community project will border MCBCP. Rancho Mission Viejo is a 23,000-acre site, of which approximately 60 percent will be permanently maintained as open space. Rolling Hills will be farther away from the Base boundary.

The south boundary of the Base is adjacent to the city of Oceanside and is within San Diego County. The western portion of Oceanside, its downtown commercial district, has grown along with the development of MCBCP itself. Residential, commercial, and light industrial land uses are common in this area. Recent development in Oceanside, which consists mainly of housing, has shifted to the east on previously vacant land and now constitutes a large percentage of the common boundary with MCBCP. Some small areas of undeveloped land occur at the Base boundary and around Whelan Lake.

On the southeast, the unincorporated community of Fallbrook is adjacent to MCBCP. Land uses in Fallbrook are primarily rural and agricultural, with some small commercial areas. Part of the eastern boundary of MCBCP is shared with NWS Fallbrook, which features compatible military land uses. To the north, MCBCP shares part of its boundary with Cleveland National Forest, open space that is dedicated, like all national forests, to timber production, watershed protection, wildlife preservation, livestock grazing, mining, and recreation.

On-Base Land Use

A variety of land uses occur at MCBCP. The priority of MCBCP is to provide training, support facilities, and services to active duty and reserve military units as well as other federal, state, and local agencies (USMC 2007a).

Over 90 percent of MCBCP’s training land is undeveloped, and its 17 miles of beaches and coastal bluffs represent one of the few undeveloped stretches of coastline between the Mexican border and Los Angeles. Cantonments on MCBCP, where development is concentrated, are separated by relatively large undeveloped areas devoted principally to training activities. Development on MCBCP, not including roads or utility corridors, totals an estimated 9,800 acres of the 125,000-acre Base. Approximately 1,300 acres of land on MCBCP have, in recent years, been leased for farming, including 690 acres of row crops on both sides of I-5 at Stuart Mesa and approximately 610 acres of row crops north of the 51 Area (San Onofre). The agricultural lease in the northern area was terminated several years ago, and that land is now devoted to training. The lease for the agriculture fields east and west of I-5 at Stuart Mesa has expired, and that land is now planned for housing and for an expansion to MCTSSA, along with a potential site location for a desalination plant, and to support military training, respectively.

Several land uses on-Base support only one specific type of activity (e.g., family housing, agricultural, and impact areas), while most of the Base land use supports multiple activities. These include military training, Base infrastructure, mission support (including cantonment and recreational facilities), and real estate agreements and leases. The following sections discuss the predominate types of land uses on-Base.

Military Training

MCBCP's use of its more than 125,000 acres of land for training includes 31 training areas, five impact areas, more than 100 live-fire facilities, five amphibious assault landing beaches, and approximately 230 square miles of Special Use Airspace.

MCBCP is most heavily used by and primarily structured to support the I Marine Expeditionary Force. The Base also supports several specialized schools, a Headquarters and Support Battalion, a Security Battalion, an Amphibious Vehicle Test Branch, and a Reserve Support Unit. MCBCP's training ranges are heavily used, not only by active Marine and Navy units, but also by the Marine Corps Reserve; the Army National Guard; and federal, regional, and local law enforcement agencies.

Base Infrastructure and Mission Support

A variety of support activities and facilities support the military training at MCBCP. Support for Marines and their families includes housing, water, sewage service, solid waste disposal, medical and dental services, schools, child care, employment assistance, and recreation opportunities. These support functions are best utilized when they are in proximity to housing areas and areas where Marines live and train. This is a factor in maintaining quality of life for Marines and their dependents.

MCBCP's daily population of 70,000 includes military personnel, their families, civilian employees, and citizens of neighboring communities who conduct business on the Base. They include Department of Defense (DoD) employees, as well as employees of leaseholder entities, such as SONGS and California State Parks (USMC 2009b).

Real Estate Agreements and Leases

A number of long-term leases and easements are part of on-Base land uses. Base real estate agreements (e.g., leases, easements, assignments) cover approximately 5,000 acres of the Base (not inclusive of leased acreage within cantonment areas). These agreements include easements for public utilities and transit corridors; leases to the State of California (for parkland), public educational entities, and retail operators; for energy production (SONGS); and to agricultural operators for row crop production and seed collection.

Lessees are required to manage the natural and cultural resources on the lands leased for their use, consistent with and supportive of the objectives of the MCBCP INRMP and ICRMP (USMC 2005).

The following sections describe existing land uses for the project sites included in the proposed action as well as the land uses surrounding the sites.

3.5.5 Existing Conditions – Proposed Project Areas

Northern AWT and Associated Facilities (P-1044)

Advanced Water Treatment Plant

The proposed Northern AWT plant would be located east of the SONGS East Mesa facility in P-1044 Alternatives 1 and 2, as well as in Alternative 5, approximately 1,000 feet northeast of the facility, south of Basilone Road and San Onofre Creek (Figures 2.3.1-1 and 2.3.2-1); or in P-1044 Alternatives 3 and 4 adjacent to Basilone Road on the north side of San Onofre Creek, about 2,000 feet east of the San Onofre 2 Housing Area and the San Onofre 3 Housing Area (Figures 2.3.3-1 and 2.3.4-1). The Base Master Plan designates the area for training and maneuver. In either location, surrounding areas are undeveloped, and there are no other existing uses nearer than the housing areas and the SONGS East Mesa facility.

Pump Stations

Two existing pump stations are proposed for retrofitting within the 63 Area (Cristianitos) and 64 Area (Talega) cantonments. A third pump station retrofit is proposed at TAPS 12 in the 62 Area (San Mateo). All three cantonments are designated by the Base Master Plan as developed areas.

Injection Wells

The proposed injection wells would be located where El Camino Real crosses the existing San Onofre percolation ponds between San Onofre Creek and I-5 and where the inland access road crosses the MCBCP San Onofre Beach recreation area along the BNSF Railway right-of-way, west of Coast Road and northwest of the San Onofre Surf Beach area of San Onofre State Beach. The San Onofre percolation pond area is otherwise undeveloped and designated as a training and maneuver area. The proposed

MCBCP San Onofre Beach recreation area injection well field is currently open recreational space and maintained roadway shoulder area.

Conveyance Lines

These pipelines would all run through developed cantonment areas and through areas between cantonments designated for training and maneuvering in the Base Master Plan, except for the segments traversing developed portions of the 51 Area (San Onofre) and the SONGS East Mesa facility. All conveyance lines would also be installed in or adjacent to existing roads, except for an aboveground run of pipeline on a steep slope from Chaisson Road to the vicinity of the proposed Sierra 1 Training Area percolation ponds.

Ocean Outfall

The proposed connection to the SONGS outfall conduit would be west of I-5, either within the main SONGS facility approximately 900 feet west of the landmark cooling towers, onshore east of the SONGS seawall, or offshore beyond the surf line. The current land uses in this area include parking, storage, and support facilities for SONGS.

Reservoirs

The conveyance lines would connect to existing reservoirs east of the 63 Area (Cristianitos); north of the 62 Area (San Mateo), the 52 Area (School of Infantry), and the 53 Area (Horno); east of the San Onofre 1 Housing Area/north of the San Onofre 2 Housing Area; and south of the 53 Area (Figure 2.3.1-2). The proposed alternatives would include upgrades to the two reservoirs north of the 62 Area (San Mateo). All these reservoirs are in areas designated for training and maneuvering by the Base Master Plan.

Connection of Northern and Southern Water Systems (P-1045)

Conveyance Lines

In P-1045 Alternatives 1, 3, and 4, as well as in Alternative 5, the proposed north-south water conveyance line would extend from a connection at the proposed Northern AWT facility (P-1044) or a connection to an existing water line in Basilone Road southeast along El Camino Real to Stuart Mesa Road and continue along Stuart Mesa Road across the Santa Margarita River to the Stuart Mesa Road intersection with Vandegrift Boulevard, passing along the southwestern borders of the 41 Area (Las Flores) and the 31A Area (Edson Range). These three alternatives also include a line in Las Pulgas Road connecting to the 43 Area (Las Pulgas). The conveyance line routes would follow roads and pass through the developed areas of the 41 Area, the 31A Area (Edson Range), and the 43 Area (Las Pulgas); in all other segments, it would be in the area designated for training and maneuvering in the Base Master Plan.

P-1045 Alternative 2 would follow the same route to Las Pulgas Road, but instead of continuing south, it would run up Las Pulgas Road and through the 43 Area (Las Pulgas) to Basilone Road. It would then follow Basilone Road southeasterly to just south of the 25 Area (Vado Del Rio). From there it would continue by TLS construction to Haybarn Canyon just southeast of Vandegrift Boulevard, and with conventional trenching, connect to existing reservoirs on the ridge above Haybarn Canyon on the east. P-1045 Alternative 2 would pass through the developed area of the 43 Area (Las Pulgas) and along the western border of the 25 Area (Vado Del Rio); elsewhere, it would be in roads in areas designated in the Base Master Plan for training and maneuvering.

P-1045 Alternatives 1, 3, and 4 would differ in connections on the southern end, near Vandegrift Boulevard (with Alternative 5 incorporating P-1045 Alternative 3). These three alternatives would extend northeastward in Vandegrift Boulevard about 4,500 feet to an existing pump station and then turn southeasterly to connect with existing reservoirs and to the proposed 4-million-gallon reservoir north of the Wire Mountain 2 Housing Area and the Santa Margarita Housing Area, passing through areas designated for training and maneuvering in the Base Master Plan. Pipeline connections associated with the proposed 4-million-gallon reservoir would serve the new Naval Hospital Camp Pendleton and the 21 Area (Del Mar). The pipelines would be located in roads in these developed areas.

P-1045 Alternative 1 would differ from P-1045 Alternatives 3 and 4 by extending a pipeline northeasterly, roughly paralleling the west side of the Santa Margarita River, through the 33 Area (Margarita) to Basilone Road. The proposed line would follow Basilone Road to the locations just south of the 25 Area (Vado Del Rio), where TLS construction would extend the line beneath the river, and connecting to the Haybarn Canyon reservoirs, in the same way as P-1045 Alternative 2. Except where P-1045 Alternative 1 would pass through the developed 33 Area, it would be entirely within areas designated for training and maneuvering in the Base Master Plan.

P-1045 Alternative 3 (included in Alternative 5) would differ from P-1045 Alternatives 1, 2, and 4 because it would only connect to the existing reservoirs and new 4-million-gallon reservoir in the Wire Mountain area.

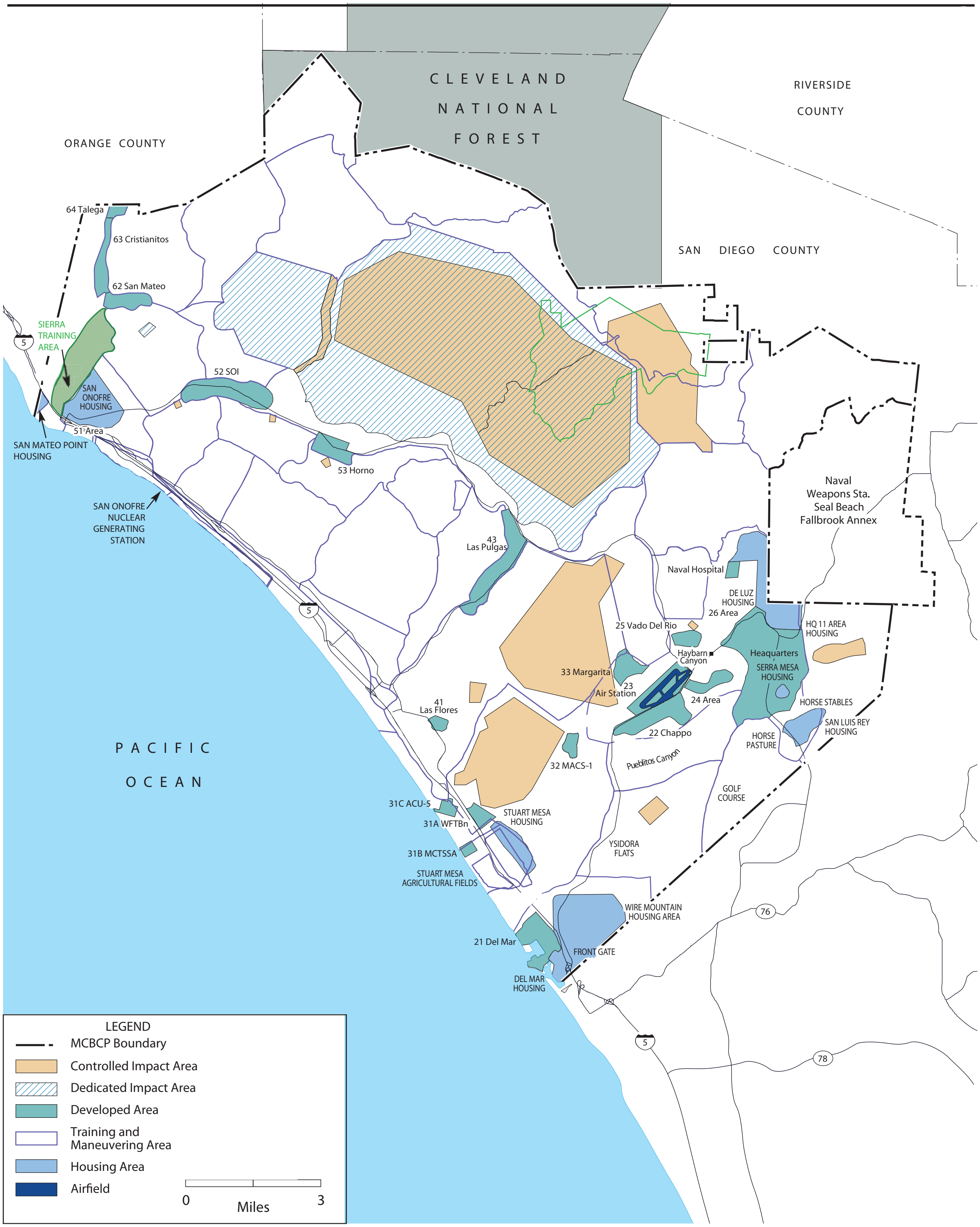
P-1045 Alternative 4 would continue in Vandegrift Boulevard past the connection to the Wire Mountain reservoirs to about three-quarters of a mile south of the 22 Area (Chappo). From there, it would extend easterly to the ridge between the 22 Area (Chappo) and 24 Area on the west and the Headquarters areas on the east and follow the ridge to connect to the Haybarn Canyon reservoirs. This entire route from the reservoirs to Haybarn Canyon would be in undeveloped Base Master Plan training and maneuvering areas.

Pump Stations

P-1045 Alternatives 1, 2, and 4 would include three pump stations. One pump station would be within the project limits of the proposed Northern AWT or at the Basilone Road existing pipeline connection in the north and one would be within the disturbed/developed area of the future AWT South in Haybarn Canyon. The land uses for both these areas would be utilities. A third pump station is proposed about midway between the new north and south pump stations on the west side of the intersection of Stuart Mesa Road and Las Pulgas Road. This is a designated training and maneuvering area in the Base Master Plan. The proposed site is an unpaved parking lot across Las Pulgas Road from the complex of buildings and parking lots at the Las Pulgas gate, just south of the intersection of Las Pulgas Road and El Camino Real. Areas north, west, and east of the site are undeveloped. Alternative 3 would include two pump stations as this alternative would not connect to, and therefore would not require the pump station at the future AWT South.

4-Million-Gallon Reservoir

P-1045 Alternatives 1, 3, and 4 would include the 4-million-gallon reservoir in the Wire Mountain area. This area includes other existing reservoirs and, although a designated training and maneuvering area in the Base Master Plan, it is immediately adjacent to the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area.



Source: NAVFAC 2004

Figure 3.5-1
Land Use at MCPCP

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3.6 VISUAL RESOURCES

3.6.1 Definition of Resource

Visual resources are defined as the natural and manufactured features that constitute an area's aesthetic qualities. These features form the overall impression, or viewscape character, that an observer receives of an area. Landforms, water surfaces, vegetation, and manufactured features are among the distinctive elements of an area's visual character.

Visual sensitivity to the aesthetic environment is dependent on viewer expectations, the types of activities in which people are engaged, and the distance and vantage point from which the project would be seen. Overall, higher degrees of visual sensitivity are correlated with areas where people live, engage in outdoor recreational pursuits, or participate in scenic or pleasure driving. Conversely, visual sensitivity is considered low to moderate in industrial or commercial areas where the scenic quality of the environment does not affect the value of the activity.

3.6.2 Regulatory Setting

Planning documents set forth goals, policies, and restrictions that relate to the visual environment. The applicable plan related to visual resources on MCBCP is the Base Exterior Architecture Plan (BEAP), which is directed toward the development of a functional and visually cohesive Base environment. The BEAP addresses specific design criteria or guidelines associated with the implementation of physical improvements on-Base, both current and future. These guidelines include land use, site planning, architecture, landscape, street and parking standards, signage, pedestrian circulation, lighting, site furniture, screens, walls, fences, utilities, and other important features that affect the function and visual quality of the Base environment (USMC 1995a).

In terms of architecture, the BEAP considers adherence to the following guidelines to result in a pleasing visual experience:

- Using appropriate architecture that respects the surrounding area;
- Providing a consistent visual image throughout each area through form, material, and color;
- Establishing timeless design through integration of old and new;

- Promoting functional buildings for today's requirements that support the primary mission of the Base; and
- Encouraging flexible building design to allow for tomorrow's mission.

3.6.3 Region of Influence

Widespread areas of the Base would be affected by the proposed action alternatives. The ROI for aesthetics and visual resources would differ according to the alternative for each project. At its maximum extent, considering all alternatives, the ROI would include the San Mateo Creek valley from the 51 Area (San Onofre) to the 64 Area (Talega); the area between the SONGS main facility and Basilone Road; the area within about a mile east of I-5 for almost the north-south length of the Base; segments of Basilone Road from 51 Area (San Onofre) to the 53 Area (Horno) and from the 53 Area (Horno) to Vandegrift Boulevard; the lower Santa Margarita River valley from Stuart Mesa Road to the 25 Area (Vado Del Rio), including the Stuart Mesa Bridge, and the ridge forming the west rim of the river valley; and the upland areas southeast of Vandegrift Boulevard from Stuart Mesa Road, east of the 24 Area and 22 Area (Chappo), to Haybarn Canyon. This area corresponds to the geographic area and viewsheds in which construction or operation of facilities associated with the proposed action alternatives would occur and, thus, existing visual resources would be potentially affected.

3.6.4 Existing Conditions – Basewide

MCBCP lies on the coastal plains and foothills at the southern end of the Santa Ana Mountains, within the Peninsular Range of southwestern California. The massive Peninsular Range extends south from the Los Angeles Basin to the tip of the Baja California Peninsula. The terrain of the Base is varied and includes sandy shores, seaside cliffs, coastal plains, rolling hills, canyons, and mountains rising to elevations of nearly 3,000 feet AMSL. Two major physiographic provinces occur on-Base: coastal plains, which rise steeply from the ocean inland into fairly level terraces, and the rolling foothills of the Santa Margarita Mountains. The break between these two provinces occurs generally along Basilone Road. Natural erosion over time has formed a series of southwest-trending stream valleys. Each stream has developed its own valley fill deposits, including an alluvial fan at its mouth near the Pacific Ocean. The marine terraces inland from the coast slope uniformly to the southwest, with slopes of 5 percent or less; slopes in the majority of the rest of the Base exceed 15 percent.

MCBCP has become, since World War II, the Marine Corps' leading readiness preparation facility on the west coast. It is the Marine Corps' prime amphibious warfare training base in the United States. The Base is strategically located between metropolitan San Diego and Orange County, fronts on 17 miles of beach, possesses widely varied terrain (over 125,000 acres), and includes restricted airspace. The length of the Base is traversed by I-5, which is eligible but not officially designated as a Scenic Highway under the California Scenic Highway System. Together, the Base's location and physical qualities present many areas of high visibility and public exposure. The visual setting of the Base is primarily vast undeveloped areas used for training with scattered cantonment, or development, areas. Public views of the Base are restricted to perimeter areas such as I-5 and the adjacent railroad, southern portions of San Clemente, northern portions of Oceanside, and western portions of the Cleveland National Forest. Because of the vast size and rugged topography of the Base, relatively small areas are visible from these vantage points, with I-5 offering the greatest exposure of the Base to the viewing public.

3.6.5 Existing Conditions – Proposed Project Areas

The existing visual setting for areas proposed for development is described below. The primary focus is on the visual setting of proposed project features that would be visible after construction. These include the Northern AWT facility, reservoir improvements, and pump stations. With the exception of the short aboveground pipeline segment from Chaisson Road to the Sierra 1 Training Area percolation ponds, all pipelines would be underground and would not be visible after construction is completed. The primary concern would be with direct public views from Base housing, cantonment, and recreation areas, the cities of San Clemente and Oceanside, from San Onofre State Beach, and from I-5 and the adjacent railroad.

Northern AWT and Associated Facilities (P-1044)

Advanced Water Treatment Plant

Two locations are proposed for the Northern AWT. P-1044 Alternatives 1 and 2, along with Alternative 5, would place the Northern AWT facility (Site 6) in an undeveloped area about 500 feet east of the SONGS East Mesa facility and about 2,200 feet south of Basilone Road. San Onofre Creek is between the site and Basilone Road, at a lower elevation, with an escarpment approximately 30 feet in height between the proposed site and the creek.

Two San Onofre housing areas (San Onofre 2 Housing Area and San Onofre 3 Housing Area) are approximately 3,000 feet to the northeast at Basilone Road. The site is over 2 miles east of the nearest San Clemente city limit and approximately 3,000 feet northeast of I-5. This area is not designated as a scenic area in the Base Master Plan nor is it near a designated scenic highway.

P-1044 Alternatives 3 and 4 would locate the Northern AWT facility (Site 4) south of and adjacent to Basilone Road approximately 2,200 feet north of the SONGS East Mesa facility at an elevation of about 65 feet, with San Onofre Creek nearby on the south. The area is undeveloped and is about 1,500 feet east of the nearest San Onofre housing areas (San Onofre 2 Housing Area and San Onofre 3 Housing Area) along Basilone Road. The site is over 2 miles from the nearest San Clemente city limit and approximately 4,000 feet northeast of I-5. It is not within a designated scenic area in the Base Master Plan and is not within sight of a designated scenic highway.

Injection Wells

The proposed injection wells would be located where El Camino Real crosses the existing San Onofre percolation ponds between San Onofre Creek and I-5 and where the inland access road crosses the MCBCP San Onofre Beach recreation area along the BNSF Railway right-of way, west of Coast Road and northwest of the San Onofre Surf Beach area of San Onofre State Beach. Both areas are undeveloped and relatively flat.

Aboveground Pipeline

A short segment of pipeline would be constructed aboveground. The segment would extend from Chaisson Road down a steep vegetated slope to the Sierra 1 Training Area percolation ponds. Chaisson Road is the northern boundary of one of the San Onofre housing developments (San Onofre 1 Housing Area). The Sierra 1 Training Area, formerly the San Mateo agriculture area, is undeveloped and extends from I-5 north to the 64 Area (San Mateo).

Ocean Outfall

The proposed ocean outfall connection would be within the main SONGS facility approximately 200 feet east of the ocean, over 1,000 feet south of the San Onofre Beach State Park, and approximately 1,000 feet west of I-5. The area is highly developed as part of the main SONGS facility with numerous support structures and parking areas. Vegetation in the area is limited to landscaping. The site is relatively flat with an elevation of 22 feet AMSL. The area, due to its location between I-5 and the ocean, is in the ocean-oriented viewshed of freeway travelers.

Another option for the outfall connection to the SONGS outfall conduit would be just seaward of the SONGS seawall. That area includes a walkway elevated above the beach, large-boulder riprap on the slope from the walkway to the beach, and the sandy beach. A third option would be to extend the line below ground into the ocean and connect to the SONGS outfall conduit beyond the surf line. From inland, work in those areas would not be visible inland because of the SONGS facility, but would be visible to beachgoers to the north and to boaters offshore.

Connection of Northern and Southern Water Systems (P-1045)

Las Pulgas Pump Station

This proposed new pump station would be included in any of the P-1045 action alternatives and would be constructed near the Las Pulgas gate in an unpaved parking area west of and adjacent to Las Pulgas Road at its intersection with El Camino Real. The site is about 800 feet northeast of the railroad and 1,600 feet northeast of I-5, at an elevation of approximately 100 feet AMSL. The relatively small Las Pulgas gate complex is across Las Pulgas Road to the east and contains a few buildings and paved parking areas. Areas on the north, south, and west of the proposed site are undeveloped. The site is not within a designated scenic area in the Base Master Plan and is not within sight of a designated scenic highway.

All alternatives would include a pump station as part of the facilities associated within the site of the proposed Northern AWT. Alternatives 1, 2, and 4 would also include a pump station constructed in a paved parking area that is part of the future AWT South site. The future AWT South, not a part of the proposed action, is in the floor of Haybarn Canyon, which is approximately 3,000 feet northeast of the Vandegrift Boulevard/Basilone Road intersection (U.S. Navy 2010e). The future AWT South site is about 350 feet southeast of and easily visible from Vandegrift Boulevard. The future AWT South site is not visible from any areas off-Base.

4-Million-Gallon Reservoir

The proposed reservoir would be constructed in the Wire Mountain area on a ridge top adjacent to existing water reservoirs. The area to the west and south feature military housing and the area to the north and east is undeveloped. The reservoir site, approximately 285 feet in elevation, is approximately 0.7 mile south of Vandegrift Boulevard and approximately 1 mile northwest of housing areas within the city of Oceanside. Both Vandegrift Boulevard and the Oceanside housing areas are at lower elevations (25 feet and 160 feet, respectively) without direct lines-of-sight to the reservoir area due to intervening terrain.

3.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.7.1 Definition of Resource

The term socioeconomics describes the basic attributes and resources associated with the human environment with particular emphasis on population, housing, employment, and personal income. Typically, substantial changes in these fundamental socioeconomic indicators may influence related variables such as the provision of community services and utilities, and the cost and availability of housing. On MCBCP, the interaction of these indicators and their effect on other social and economic aspects are influenced by the differences between military and civilian communities. Where important for the analysis, these differences are highlighted in this section and in the socioeconomic analysis in Chapter 4. Environmental justice refers to an equitable spatial distribution of burdens and benefits of a proposed action with respect to minority populations and low-income populations, as well as the provision of opportunities for meaningful involvement in the proposed action decision making process of all people regardless of race, color, national origin, or income.

3.7.2 Regulatory Setting

Under NEPA, “economic” and “social” effects are specific environmental consequences to be examined (40 C.F.R. §§ 1502.16 and 1508.8). EO 12898, Federal Action to Address Environmental Justice in Minority Population and Low-Income Populations, directs federal agencies “to make achieving environmental justice part of its mission by identifying and addressing…disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority population and low-income population in the [U.S.].” The aim of the EO is to prevent low-income and minority communities from being subjected to disproportionately adverse human health and environmental effects.

3.7.3 Region of Influence

U.S. Census data have been used in this section to provide a frame of reference for the analysis. As shown in Figure 3.7-1a, MCBCP is contained within a single census tract

(Tract 018700), which also includes NWS Fallbrook and MCAS Camp Pendleton.[19] Within this tract, areas of MCBCP are broken down into a total of 45 census blocks (numbered Blocks 9000 through 9044). Only 15 of these blocks have a population greater than zero (Figure 3.7-1a). The project limits/corridors of the three projects included in the proposed action overlap a total of nine of the 15 populated census blocks. An enlargement of the southeastern portion of the Base, where most of the census blocks are concentrated, is shown in Figure 3.7-1b. A range of socioeconomic indicators is presented for each of these blocks. As shown in the figure, some of these blocks, especially Block 9005, cover quite a large area, but they represent the finest-grained, consistent socioeconomic information available for areas near the project corridors. For comparison and completeness, similar data are presented for the other blocks with populations greater than zero on MCBCP.[20]

In two areas of MCBCP, a number of census blocks are aggregated into "Census Designated Places" (CDPs): Camp Pendleton North CDP (which contains populated Blocks 9019, 9024, and 9025) and Camp Pendleton South CDP (which contains populated Blocks 9032 and 9040).[21] CDPs are delineated by the U.S. Census Bureau as statistical counterparts for incorporated cities, towns, and villages and usually resemble incorporated places but lack a separate municipal government. The Camp Pendleton CDPs contain a relatively small proportion of the overall project limits or corridors, but some key socioeconomic indicators are available at the CDP level that are not available at the block level. As a result, the CDPs may serve as proxy communities for other areas close to project corridors elsewhere on the Base. As shown in Figure 3.7-1a, family housing areas and school areas on the Base are within the CDPs with two exceptions: (1) the Stuart Mesa housing and school areas to the northwest of Camp Pendleton South CDP (within Block 9015) and (2) the San Onofre housing and school areas and the San Mateo Point Housing Area in the northwest corner of the Base

[19] For the purposes of this socioeconomic and environmental justice analysis, demographic and economic data from NWS Fallbrook are included as part of MCBCP, due to their being lumped together in the U.S. Census tract data. NWS Fallbrook includes two blocks (Blocks 9021 and 9022), only one of which, Block 9021, is populated (36 residents in 2000). Census data from MCAS Camp Pendleton cannot be broken out separately from data for MCBCP. MCAS Camp Pendleton is partially within Block 9005 and partially within Block 9015, both of which also contain significant numbers of residents on MCBCP, and no population data are available at the sub-block level. As a result, MCAS Camp Pendleton data are necessarily included in the analysis of MCBCP data.

[20] The remaining 30 unpopulated blocks are not relevant to socioeconomic and environmental justice analysis and are therefore not further discussed in the text in this section nor specifically labeled in the figures in this section. Unpopulated Blocks 9010, 9011, 9012, 9016, 9018, 9033, and 9041 contain at least some portion of at least one of the three proposed projects or the build alternatives to the projects covered by this EIS.

[21] Camp Pendleton CDP North also contains unpopulated Blocks 9018, 9020, 9028, and 9029; Camp Pendleton CDP South also contains unpopulated Blocks 9033 and 9041.

(within Blocks 9005 and 9009, respectively). BEQ facilities are found at numerous locations within multiple census blocks throughout the Base, as shown in Figure 3.7-1a.

The nearest civilian communities to the proposed project limits and corridors are the city of San Clemente to the northwest of MCBCP, the city of Oceanside to the southeast of MCBCP, and the unincorporated San Diego County community of Fallbrook to the east of MCBCP (Figure 3.7-1a). Socioeconomic data from these communities are not presented separately in this section as it is considered unlikely that substantial, direct, project-related socioeconomic effects would be felt exclusively in these communities. Instead, information is presented for four reference areas: MCBCP, San Diego County (which contains virtually all of MCBCP), Orange County (which abuts much of the northwest portion of the Base and contains a small portion of the Base in and around the 64 Area [Talega][22]), and Riverside County (the latter two of which abut MCBCP). County level information is utilized as the relevant regional or general population for both socioeconomic and environmental justice comparative analysis.

The proposed projects covered by this EIS are being undertaken as a result of the need to upgrade water and roadway infrastructure system components to both meet existing demand and to accommodate future planned growth on the Base. As noted in Section 1.3.2, the service population and associated demand for utilities infrastructure services at MCBCP have grown in recent years and will continue to grow, based on a number of different factors. These include, but are not limited to, long-programmed new housing on the Base that will be built in the near future and the build-out of the Base Master Plan. The ongoing and planned growth was or is being analyzed in separate NEPA

[22] Approximately 104.7 acres of MCBCP are in Orange County. Of this area, about 76.2 acres are within the 64 Area (Talega) and about 28.5 acres are immediately outside of the 64 Area (Talega). In terms of residential structures, there are BEQs present in both the San Diego County and Orange County portions of the 64 Area (Talega). Those in San Diego County are physically within Tract 018700 and Block 9005. Those in Orange County are physically within Tract 032023 and Block 024. However, it appears that all persons in the 64 Area (Talega) were actually counted in the 2000 census as being in San Diego County, as Tract 032023 Block 024 had a reported population of zero. As a result, for population-related purposes of socioeconomic analysis, MCBCP is considered to be entirely within San Diego County.

documents.[23] It is not assumed that the infrastructure projects themselves would induce growth, but they would be constructed in the context of co-occurring growth, which would be felt both on-Base and off-Base.[24] Multiple communities in San Diego, Orange, and Riverside counties are within the military housing market area for MCBCP, as shown in Figure 3.7-2, so that an indirect increase in off-Base housing demand that would follow the projected growth on-Base would be felt in these counties. It is likely that San Diego County would be more substantially affected than the other counties, however, and that communities closer to the Base, particularly Oceanside, would be more affected by anticipated Base-related growth than communities farther away. Any increase in school demand associated with projected MCBCP-related population growth would be disproportionately borne by the city of Oceanside, not only because Oceanside would be the most likely site of off-Base housing for new personnel, but also because on-Base population increases leading to increased school demand would be disproportionately accommodated by the Oceanside Unified School District.

Economic and employment impacts related to the construction of the proposed projects would be largely felt in San Diego, Orange, and Riverside counties, with some spillover into Imperial, Los Angeles, and San Bernardino counties. This six-county area is utilized as a reference baseline only for construction phase economic impacts.

3.7.4 Existing Conditions – Basewide

Baseline Conditions

The following series of tables and accompanying text provides information on existing conditions for key socioeconomic indicators of population, housing, employment, and

[23] As noted in Section 1.3.2, ongoing growth was addressed in the environmental assessments for military family housing at San Mateo Point Phase 1 (U.S. Navy 1996), San Mateo Point Phase 2 (U.S. Navy 2008a), Western Wire Mountain (U.S. Navy 1998a), De Luz (U.S. Navy 1999), Wire Mountain Phase 1 and 2 (U.S. Navy 2002), San Onofre Mobile Home Park and South Mesa sites (U.S. Navy 2006), and Stuart Mesa Agricultural Field (U.S. Navy 2009a), and in the categorical exclusions for military family housing at Del Mar (U.S. Navy 2008b), San Luis Rey (U.S. Navy 2008c), Naval Hospital Camp Pendleton (U.S. Navy 2010a), and Main Exchange Mall Complex (U.S. Navy 2010b). Future growth is being addressed as part of the Programmatic Environmental Assessment for Grow the Force Permanent Bed-Down Facilities (U.S. Navy 2010c).

[24] Note: A portion of the forecast on-Base population growth, as well as USMC-related population growth off-Base, has been based upon the 2009-2011 GTF initiative. As of the 1st quarter of 2011, the USMC has been re-examining its force structure alignment, with the intent to reduce the size of the overall force, and better align force structure across the USMC with mission needs. The Force Structure Realignment Group (FSRG) results have not yet been published, so new projections of growth are not yet available to supplant existing growth projections, but FSRG results will likely have implications for the long-term growth at MCBCP.

personal income at the block, CDP, Basewide (Tract 018700), and county level. For the purposes of environmental justice analysis, population information is further broken down by race and ethnicity, and data on poverty levels are presented with the goal of identifying high minority or low-income populations in the vicinity of the project corridors, as compared to the general populations of San Diego, Orange, and Riverside counties. CEQ guidance suggests particular attention to minority populations that are greater than 50 percent of the total population of the reference geography and/or meaningfully greater than the proportion of minority or low-income population in the general population. Information on populations of minors is also presented in this section for use in subsequent analysis under EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (see Section 3.11.2), informally known as "environmental justice for children."

Table 3.7-1 displays information on total population, race, ethnicity, and minority status. As shown, three of the census blocks containing proposed project limits or corridors, Blocks 9008, 9015, and 9026, have minority population percentages that are both greater than 50 percent of the total population of each block and greater than the minority population percentage of San Diego, Orange, or Riverside counties.[25] One census block, Block 9032, has a greater minority population percentage than the San Diego County general population, but less than the general populations of Orange and Riverside counties.

Of the nine populated census blocks in Table 3.7-2 containing proposed project limits or corridors, four have populations that are 85 percent or greater male (compared to a Basewide population that is 71 percent male and San Diego, Orange, and Riverside county populations that are 50 percent male). In three of these cases (Blocks 9005, 9026, and 9027), this very high proportion of males is reflective of the military group housing units present in those blocks. In the fourth case (Block 9008); it is assumed that

[25] Block 9008 encompasses what was an agricultural out-lease area at the time of the 2000 census and had a population that was demographically very different from the rest of MCBCP (and assumed to be associated with agricultural and not military operations). Total minority status in this block was based on 100 percent of residents reporting being of "some other race" in census terminology (as opposed to white, black or African American, American Indian or Alaska Native, Asian, or Native Hawaiian and Other Pacific Islander) as well as 100 percent of the residents reporting being of Hispanic or Latino origin. Around 2007, the agricultural lease within this area was not renewed, and Operations and Training assumed control over the former agricultural fields. At present (2011) there are no occupied agricultural worker group housing units remaining within this census block.

the male-dominated demographics result from a skewed division of labor within a relatively transient agricultural workforce.[26]

Table 3.7-3 displays information on median age and population under the age of 18. Of the nine populated census blocks containing proposed project limits or corridors, all but one have populations with median ages between 20.0 and 22.1 years. Block 9008, associated with an active agricultural out-lease at the time of the census (that subsequently has not been renewed), had a population with a median age of 44.7 years. The population of MCBCP has a median age of 21.5 years, while general populations of San Diego, Orange, and Riverside counties range in median age from 33.1 to 33.3 years. Three of the blocks containing project limits or corridors have no resident minors and three have roughly half or less the percentage of minors seen in the general populations of San Diego, Orange, and Riverside counties. In contrast, three blocks containing project limits or corridors (Blocks 9015, 9019, and 9032) have substantially higher percentages of resident minors (36.1, 42.5 and 42.7 percent, respectively) than MCBCP (23.4 percent), due to the family housing mix within these blocks.

Table 3.7-4 displays information on population by housing type, which varies widely in proportional distribution within MCBCP. Among the nine populated blocks containing proposed project limits or corridors, the entire populations of three blocks (Blocks 9008, 9026, and 9027) live in group quarters housing, with the first being nonmilitary quarters[27] and the latter two being exclusively in military quarters. In three other blocks (Blocks 9015, 9019, and 9032), a very large majority (81, 87, and 97 percent of the population, respectively) lives in households. Not surprisingly, MCBCP has a much higher population in military group housing, and a correspondingly lower proportion in households, than the general populations of San Diego, Orange, and Riverside counties.

Table 3.7-5 displays information on labor force, employment, and unemployment at the CDP and larger geography levels as these types of data are not available at the block level. Unemployment rates are normally calculated only for civilians as individuals within

[26] As noted earlier, however, in the years after the 2000 census, the agricultural lease within Block 9008 was not renewed and at present there are no occupied agricultural worker group housing units within this area.

[27] As noted earlier, the population of Block 9008 was, at the time of the 2000 census, apparently exclusively associated with an agricultural out-lease in this area. Subsequently (around 2007), the agricultural lease within this area was not renewed and at present there are no occupied agricultural worker group housing units within this block.

the Armed Forces are, by definition, employed. Among civilians, the unemployment rate is about 5.6 percent for Camp Pendleton North CDP; approximately 6.4 percent for Camp Pendleton South CDP; about 7.7 percent for MCBCP as a whole; and approximately 5.9, 5.0, and 7.5 percent for San Diego, Orange, and Riverside counties, respectively. While the MCBCP unemployment figures are higher than those of the three counties, it is important to note that resident civilians make up less than 17 percent of the overall population of MCBCP (compared to about 94 percent of the overall population of San Diego County and well over 99 percent for Orange and Riverside counties), meaning that unemployment is much less of an issue for the overall population of MCBCP than it is for the overall population of San Diego, Orange, and Riverside counties. If unemployment calculations were adjusted to include individuals in the Armed Forces to provide a perspective of unemployment within the total labor force for a given area, the adjusted unemployment figure for MCBCP would be around 1 percent. When adjusted for gender, even more differences between the MCBCP population and the general population of the local counties are apparent. Within the civilian labor force of MCBCP, the unemployment rate for males is about 5 percent and for females is about 9 percent. If unemployment calculations were adjusted to include individuals in the Armed Forces, adjusted unemployment on MCBCP would be less than 0.3 percent for males and about 7 percent for females (reflecting, in part, the fact that civilian females make up approximately 79 percent of the total female labor force on MCBCP, while civilian males make up only about 5 percent of the total male labor force on the Base).

Table 3.7-6 displays information on per capita income and poverty status. Like employment data, information for these variables is not available at the census block level. As shown, the per capita income for residents of both Camp Pendleton CDPs, as well as for the residents of MCBCP as a whole, is substantially lower than the per capita income of residents in the general populations of San Diego, Orange, and Riverside counties. In contrast, however, a smaller percentage of the population of MCBCP is living below the poverty level than is the case for any of these counties. This seeming inconsistency apparently results from a much wider distribution of civilian incomes, both high and low, throughout the counties, with wealthier individuals skewing the per capita income higher than is the case for MCBCP. In contrast, incomes of individuals on MCBCP generally fall within a narrower range, resulting in both per capita income and poverty rates being lower than what is seen in the local counties.

In addition to the resident population of MCBCP, the Base contributes to the local economy by supporting a range of individuals rotating through the Base on a short-term basis as well as a number of family members and retirees in the area, as shown in

Table 3.7-7. In addition to these personnel, there are estimated to be a total of 585 officers, 3,641 enlisted personnel, and 305 civilian employees for a total of 4,531 persons working at MCAS Camp Pendleton (MCBCP Public Works Office, personal communication via e-mail, 4 April 2008).

Existing regional annual economic output and employment information for both a three-county area immediately adjacent to MCBCP (San Diego, Orange, and Riverside counties) and a larger six-county area (that includes the previous three counties, plus Imperial, Los Angeles, and San Bernardino counties) is summarized in Tables 3.7-8 and 3.7-9, respectively. The data in these tables are derived from an IMPLAN input-output model existing conditions data set, as the IMPLAN input-output model itself was used in the socioeconomic analysis sections of Chapter 4. While most economic impacts from project construction are expected to be felt in San Diego, Orange, and Riverside counties, the larger six-county region is meant to capture possible economic activity that may occur more widely in the region.

The construction industry in the three-county study area accounts for over $51 billion in output (6.9 percent of the total area economic output), and approximately 338,000 workers (7.0 percent of all area employment). The construction industry in the six-county study area accounts for over $92 billion (5.1 percent of the total area economic output), and approximately 610,000 workers (5.4 percent of all area employment).

Growth Projections

The population of MCBCP is projected to grow in future years with the construction of additional family and BEQ housing to meet current demand as well as the growth of the Marine Corps in general through the GTF initiative.[28] The combined forecast increases in uniformed personnel, their family members, and civilian personnel at MCBCP and MCAS Camp Pendleton total approximately 11,000 persons (U.S. Navy 2010c). This growth is already underway and will continue over the next few years. Consistent with residential patterns of existing personnel assigned to MCBCP and MCAS Camp Pendleton, it is assumed that a proportion of the new uniformed personnel and their

[28] As noted earlier, a portion of the forecast on-Base population growth, as well as USMC-related population growth off-Base, has been based upon the 2009-2011 GTF initiative. As of the 1st quarter of 2011, the USMC has been re-examining its force structure alignment, with the intent to reduce the size of the overall force, and better align force structure across the USMC with mission needs. The FSRG results have not yet been published, so new projections of growth are not yet available to supplant existing growth projections, but FSRG results will likely have implications for the long-term growth at MCBCP.

family members, and all of the new civilian employees, associated with the GTF initiative would live off-Base. Over the longer term, however, new housing currently being built, or planned to be built in the foreseeable future, will increase the proportion of uniformed personnel assigned to MCBCP (and their families) living on Base.

Population growth at MCBCP related to new housing construction will include children as well as adults. Table 3.7-10 provides estimates of the numbers of new family members of uniformed personnel assigned to MCBCP and MCAS Camp Pendleton, and categorizes the family members into adults and children. As shown, it is estimated that there would be approximately three times as many new child family members as adult family members of the GTF initiative affiliated personnel assigned to the Base and the Air Station (U.S. Navy 2010c).

As shown in Figure 3.7-3, there are a total of five schools; six child development centers, including one under construction; one children's center; three youth centers; and one community center on MCBCP. Family housing areas are shown in Figure 3.7-1a. The schools on MCBCP are all elementary schools, divided between two school districts. Mary Fay Pendleton Elementary School, the easternmost school on the Base located adjacent to the DeLuz Housing Area, and San Onofre Elementary School, the westernmost school on the Base located adjacent to the San Onofre 1 Housing Area, are a part of the Fallbrook Unified Elementary School District. Three schools in the southern part of the Base, Stuart Mesa Elementary School adjacent to the Stuart Mesa Housing Area; North Terrace Elementary School adjacent to the Wire Mountain 1, Wire Mountain 3, and Pacific View housing areas; and Santa Margarita Elementary School adjacent to the Santa Margarita Housing Area, are a part of the Oceanside Unified School District.[29]

Middle school- and high school-age students residing in the southern and eastern portions of the Base attend Jefferson Middle School and Oceanside High School, respectively, both of which are off-Base in Oceanside. Both of these schools are part of the Oceanside Unified School District and their attendance areas overlap the attendance areas of all of the elementary schools on MCBCP, except for San Onofre Elementary School, which serves kindergarten through eighth grade. High school students within the San Onofre Elementary school attendance area in the northwest part of the Base attend San Clemente High School in the city of San Clemente, which is

[29] Until 2004, when it was closed due to seismic safety concerns, San Rafael Elementary School, a part of the Oceanside Unified School District, also served the Wire Mountain housing area. This structure was subsequently damaged by fire and is no longer standing.

part of the Capistrano Unified School District. Enrollments by school for select schools in each district are shown in Table 3.7-11.

There are five accredited full-day child development centers on MCBCP: the Courteau Child Development Center in the 15 Area (Headquarters) near the Serra Mesa Housing Area); the San Luis Rey Child Development Center outside of any cantonment area near the San Luis Rey Housing Area; the Browne Child Development Center in the 20 Area, near the Pacific View and South Mesa 1 housing areas; the Stuart Mesa Child Development Center in the Stuart Mesa Housing Area; and the San Onofre Child Development Center in the 51 Area (San Onofre) near the San Onofre housing areas. A sixth child development center was recently completed (May 2011) on DeLuz Road near the DeLuz Housing Area, as shown in Figure 3.7-3. Hourly child care is also available at the Fisher Children's Center in the 16 Area (Headquarters).

The three youth centers on MCBCP are the DeLuz Youth Center in the DeLuz Housing Area, the Wire Mountain Youth Center in the South Mesa 1 Housing Area, and the San Onofre Youth Center on the San Onofre Elementary School area grounds, adjacent to the San Onofre 1 Housing Area. The Abby Reinke Community Center is located on Wire Mountain Road, adjacent to the Wire Mountain 1 Housing Area and the South Mesa 2 Housing Area.

For population, housing, and employment projections, socioeconomic data presented for San Diego County and local jurisdictions for 2008 were obtained from the San Diego Association of Governments (SANDAG).

In SANDAG data, the proposed project limits and corridors are within the North County West Major Statistical Area (MSA) and its encompassed Camp Pendleton Subregional Area (SRA) 43. The city of Oceanside, represented by Oceanside SRA 42, is also a part of the North County West MSA, and data from Oceanside are presented in this section as the community likely to experience the greatest increase in MCBCP-related population growth, although this growth would not be limited to Oceanside. Table 3.7-12 presents population characteristics, including the 2000 population from the U.S. Census Bureau, as well as projected populations for 2010, 2020, and 2030, and the percent change for these statistical areas. Population growth factors at the Base differ greatly from other surrounding jurisdictions, and it is unlikely that MCBCP-related increases are included in the SANDAG data.

As illustrated in Table 3.7-13, the number of housing units in the area is forecast to increase, mirroring the projected trends of population growth shown in Table 3.7-12.

These projections do not take into account the construction of new or planned military housing facilities on MCBCP. It is expected, however, that the housing areas currently under construction (the central portion of Del Mar, the west side of South Mesa, San Luis Ray, and San Onofre 3) or the several other housing projects currently in the planning stage, including the phased Private Public Venture (PPV) housing development in the Stuart Mesa area, will significantly reduce but not eliminate the existing housing deficit on the Base. It is estimated that up to 1,071 PPV homes will be built on-Base through FY 2012 (Marshall 2008).

The estimated total employment for San Diego County, North County West MSA, SRA 43, and SRA 42 is shown in Table 3.7-14. SRA 43, which includes MCBCP, is projected to have no increase in employment; however, the SANDAG figures apparently do not take into account anticipated MCBCP-related growth.

3.7.5 Existing Conditions – Proposed Project Areas

Individual census blocks located within the proposed project areas have been described above. Table 3.7-15 provides the location of proposed project alternatives by census block number.

Table 3.7-1
Population by Race, Ethnicity, and Minority Status, 2000

Area	Total Population	White	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino	Total Non-Minority	Total Minority	Percent Minority
Block 9005[1]	11,471	7,916	1,079	202	339	54	1,411	470	2,341	7,208	4,263	37.16%
Block 9008[1]	162	0	0	0	0	0	162	0	162	0	162	100.00%
Block 9015[1]	6,200	3,331	1,230	63	255	31	886	404	1,630	2,754	3,446	55.58%
Block 9019[1]	1,093	860	59	9	50	3	46	66	132	794	299	27.36%
Block 9025[1]	3,480	2,283	369	68	89	7	536	128	909	1,986	1,494	42.93%
Block 9026[1]	691	358	128	13	31	2	135	24	188	318	373	53.98%
Block 9027[1]	266	193	30	1	8	0	27	7	46	182	84	31.58%
Block 9032[1]	6,514	3,787	1,059	107	268	58	729	506	1,284	3,432	3,082	47.31%
Block 9040[1]	2,340	1,735	207	35	69	4	224	66	407	1,607	733	31.32%
Subtotal Project Blocks[2]	32,217	20,463	4,161	498	1,109	159	4,156	1,671	7,099	18,281	13,936	43.26%
Block 9003	6	6	0	0	0	0	0	0	0	6	0	0.00%
Block 9009	215	136	16	0	15	0	11	37	28	134	81	37.67%
Block 9013	42	23	9	0	0	0	9	1	9	23	19	45.24%
Block 9017	6	0	3	0	0	0	0	3	0	0	6	100.00%
Block 9021	36	35	1	0	0	0	0	0	0	35	1	2.78%
Block 9024	3,624	2,357	441	55	92	18	475	186	813	2,106	1,518	41.89%
Subtotal non-Project Blocks	3,929	2,557	470	55	107	18	495	227	850	2,304	1,625	41.36%
Camp Pendleton North CPD	8,197	5,500	869	132	231	28	1,057	380	1,854	4,886	3,311	40.39%
Camp Pendleton South CPD	8,854	5,522	1,266	142	337	62	953	572	1,691	5,039	3,815	43.09%
MCBCP	36,146	23,020	4,631	553	1,216	177	4,651	1,898	7,949	20,585	15,561	43.05%
San Diego County	2,813,833	1,871,839	161,480	24,337	249,802	13,561	360,847	131,967	750,965	1,548,833	1,265,000	44.96%
Orange County	2,846,289	1,844,652	47,649	19,906	386,785	8,938	421,208	117,151	875,579	1,458,978	1,387,311	48.74%
Riverside County	1,545,387	1,013,478	96,421	18,168	56,954	3,902	288,868	67,596	559,575	788,831	756,556	48.96%

[1]Denotes populated census blocks with at least one proposed project's limits or corridor within their boundaries; in addition to these blocks, table includes all other MCBCP census blocks with a population greater than zero.
[2] Subtotal includes only those census blocks with at least one proposed project within their boundaries.
Note: Hispanic or Latino may be of any race (and therefore race and ethnicity counts are not mutually exclusive); non-minority = White, non-Hispanic or Latino only.
Source: U.S. Census Bureau 2000 (Summary File [SF] 1)
Note: Block 9008 was an agricultural lease in 2000, but the lease was not renewed after 2007. No occupied agricultural worker housing remains in this block. Therefore, it will be dropped from further demographic analysis.

Table 3.7-2
Population by Gender, 2000

Area	Total Population	Total Population: Male	Total Population: Female	Percent Male	Percent Female
Block 9005[1]	11,471	9,750	1,721	85.00%	15.00%
Block 9008[1]	162	156	6	96.30%	3.70%
Block 9015[1]	6,200	3,627	2,573	58.50%	41.50%
Block 9019[1]	1,093	579	514	52.97%	47.03%
Block 9025[1]	3,480	2,577	903	74.05%	25.95%
Block 9026[1]	691	626	65	90.59%	9.41%
Block 9027[1]	266	248	18	93.23%	6.77%
Block 9032[1]	6,514	3,385	3,129	51.96%	48.04%
Block 9040[1]	2,340	1,934	406	82.65%	17.35%
Subtotal Project Blocks[2]	32,217	22,882	9,335	71.02%	28.98%
Block 9003	6	5	1	83.33%	16.67%
Block 9009	215	107	108	49.77%	50.23%
Block 9013	42	22	20	52.38%	47.62%
Block 9017	6	3	3	50.00%	50.00%
Block 9021	36	21	15	58.33%	41.67%
Block 9024	3,624	2,533	1,091	69.90%	30.10%
Subtotal non-Project Blocks	3,929	2,691	1,238	68.49%	31.51%
Camp Pendleton North CPD	8,197	5,689	2,508	69.40%	30.60%
Camp Pendleton South CPD	8,854	5,319	3,535	60.07%	39.93%
MCBCP	36,146	25,573	10,573	70.75%	29.25%
San Diego County	2,813,833	1,415,097	1,398,736	50.29%	49.71%
Orange County	2,846,289	1,416,045	1,430,244	49.75%	50.25%
Riverside County	1,545,387	769,384	776,003	49.79%	50.21%

[1] Denotes populated census blocks with at least one proposed project's limits or corridor within their boundaries; in addition to these blocks, table includes all other MCBCP census blocks with a population greater than zero.
[2] Subtotal includes only those census blocks with at least one proposed project within their boundaries.
Source: U.S. Census Bureau 2000 (SF1)

Table 3.7-3
Population Under 18 Years of Age, 2000

Area	Total Population	Median Age	Population 17 or under	Percent 17 or under
Block 9005[1]	11,471	21.5	1,380	12.03%
Block 9008[1]	162	44.7	0	0.00%
Block 9015[1]	6,200	21.8	2,237	36.08%
Block 9019[1]	1,093	21.6	465	42.54%
Block 9025[1]	3,480	21.4	371	10.66%
Block 9026[1]	691	21.3	0	0.00%
Block 9027[1]	266	20.0	0	0.00%
Block 9032[1]	6,514	22.1	2,780	42.68%
Block 9040[1]	2,340	21.5	303	12.95%
Subtotal Project Blocks[2]	32,217	NA	7,536	23.39%
Block 9003	6	28.5	2	33.33%
Block 9009	215	26.2	66	30.70%
Block 9013	42	22.5	20	47.62%
Block 9017	6	11.5	4	66.67%
Block 9021	36	27.5	8	22.22%
Block 9024	3,624	21.3	814	22.46%
Subtotal non-Project Blocks	3,929	NA	914	23.26%
Camp Pendleton North CPD	8,197	21.4	1,650	20.13%
Camp Pendleton South CPD	8,854	21.8	3,083	34.82%
MCBCP	36,146	21.5	8,450	23.38%
San Diego County	2,813,833	33.2	723,661	25.72%
Orange County	2,846,289	33.3	768,419	27.00%
Riverside County	1,545,387	33.1	468,691	30.33%

[1] Denotes populated census blocks with at least one proposed project's limits or corridor within their boundaries; in addition to these blocks, table includes all other MCBCP census blocks with a population greater than zero.
[2] Subtotal includes only those census blocks with at least one proposed project within their boundaries.
Source: U.S. Census Bureau 2000 (SF1)

Table 3.7-4
Population by Households and Group Quarters

Area	Total Population	Population in Households: Total	Percent in Households	Population in Noninstitutional Group Quarters: Total	Percent in Noninstitutional Group Quarters	Population in Noninstitutional Group Quarters: Military Quarters: Total	Percent in Noninstitutional Group Quarters: Military Quarters
Block 9005[1]	11,471	3,235	28.20%	8,236	71.80%	8,236	71.80%
Block 9008[1]	162	0	0.00%	162	100.00%	0	0.00%
Block 9015[1]	6,200	5,005	80.73%	1,195	19.27%	1,193	19.24%
Block 9019[1]	1,093	952	87.10%	140	12.81%	0	0.00%
Block 9025[1]	3,480	1,519	43.65%	1,929	55.43%	1,928	55.40%
Block 9026[1]	691	0	0.00%	691	100.00%	691	100.00%
Block 9027[1]	266	0	0.00%	266	100.00%	266	100.00%
Block 9032[1]	6,514	6,324	97.08%	190	2.92%	190	2.92%
Block 9040[1]	2,340	744	31.79%	1,596	68.21%	1,596	68.21%
Subtotal Project Blocks[2]	32,217	17,779	55.19%	14,405	44.71%	14,100	43.77%
Block 9003	6	6	100.00%	0	0.00%	0	0.00%
Block 9009	215	215	100.00%	0	0.00%	0	0.00%
Block 9013	42	42	100.00%	0	0.00%	0	0.00%
Block 9017	6	6	100.00%	0	0.00%	0	0.00%
Block 9021	36	30	83.33%	6	16.67%	6	16.67%
Block 9024	3,624	1,960	54.08%	1,664	45.92%	1,664	45.92%
Subtotal non-Project Blocks	3,929	2,259	57.50%	1,670	42.50%	1,670	42.50%
Camp Pendleton North CPD	8,197	4,431	54.06%	3,733	45.54%	3,592	43.82%
Camp Pendleton South CPD	8,854	7,068	79.83%	1,786	20.17%	1,786	20.17%
MCBCP	36,146	20,038	55.44%	16,075	44.47%	15,770	43.63%
San Diego County	2,813,833	2,716,820	96.55%	73,566	2.61%	41,326	1.47%
Orange County	2,846,289	2,803,924	98.51%	25,901	0.91%	35	< 0.01%
Riverside County	1,545,387	1,511,034	97.78%	12,406	0.80%	1	< 0.01%

[1] Denotes populated census blocks with at least one proposed project's limits or corridor within their boundaries; in addition to these blocks, table includes all other MCBCP census blocks with a population greater than zero.
[2] Subtotal includes only those census blocks with at least one proposed project within their boundaries.
Source: U.S. Census Bureau 2000 (SF1)

Table 3.7-5
Labor Force, Employment, and Unemployment, 2000

Area	Total Population over Age 16	In Labor Force						Total Not in Labor Force
		Total in Labor Force	In Armed Forces	Civilian	Employed	Unemployed	Unemployment Rate (Civilians Only)	
Camp Pendleton North CPD	6,722	6,031	5,015	1,016	959	57	5.61%	691
Camp Pendleton South CPD	5,720	4,537	3,323	1,214	1,136	78	6.43%	1,183
MCBCP	27,986	24,950	20,774	4,176	3,855	321	7.69%	3,036
San Diego County	2,165,034	1,407,152	87,635	1,319,517	1,241,258	78,259	5.93%	757,882
Orange County	2,153,952	1,411,901	2,004	1,409,897	1,338,838	71,059	5.04%	742,051
Riverside County	1,124,807	654,387	2,435	651,952	602,856	49,096	7.53%	470,420

Source: U.S. Census Bureau 2000 (SF3)

Table 3.7-6
Per Capita Income and Poverty Status, 1999

Area	Total Population	Per Capita Income	Persons for Whom Poverty Status Was Determined	Persons for Whom Poverty Status Was Determined Below Poverty Level	Percent of Persons for Whom Poverty Status Was Determined Below Poverty Level
Camp Pendleton North CPD	8,197	$13,085	4,322	421	9.74%
Camp Pendleton South CPD	8,854	$11,114	7,221	606	8.39%
MCBCP	36,146	$12,439	20,129	1,683	8.36%
San Diego County	2,813,833	$22,926	2,722,408	338,399	12.43%
Orange County	2,846,289	$25,826	2,803,533	289,475	10.33%
Riverside County	1,545,387	$18,689	1,511,153	214,084	14.17%

Source: U.S. Census Bureau 2000 (SF3)

Table 3.7-7
Summary of Baseloading, MCBCP, 2008

	Officers	Enlisted Personnel	Civilians	Total
Permanent Units	132	824	1,321	2,277
Students (Peak Loading)	60	6,299	1	6,360
Supported Units	2,570	29,203	4,048	35,821
Total	2,762	36,326	5,370	44,458
			Family Members	50,000
			Retirees	20,000

Source: MCBCP Public Works Office, personal communication via e-mail, 4 April 2008

Table 3.7-8
Annual Economic Output and Employment by Sector –
San Diego, Orange, and Riverside Counties (2008)

Industry Sector	Economic Output		Employment	
	$ millions	Percent	Jobs	Percent
Agriculture, Forestry, Fishing, and Hunting	$3,588	0.5%	32,988	0.7%
Mining	$1,242	0.2%	3,318	0.1%
Utilities	$15,559	2.1%	12,432	0.3%
Construction	$51,446	6.9%	337,572	7.0%
Manufacturing	$135,386	18.2%	341,197	7.1%
Wholesale Trade	$39,026	5.2%	181,370	3.8%
Retail Trade	$39,116	5.2%	488,360	10.2%
Transportation and Warehousing	$10,755	1.4%	86,583	1.8%
Information	$44,927	6.0%	89,139	1.9%
Finance and Insurance	$51,476	6.9%	226,444	4.7%
Real Estate and Rental	$102,951	13.8%	366,409	7.6%
Professional, Scientific, and Technical Services	$57,707	7.7%	391,226	8.1%
Management	$9,482	1.3%	48,580	1.0%
Administrative and Waste Services	$23,778	3.2%	369,193	7.7%
Educational Services	$4,464	0.6%	76,953	1.6%
Health and Social Services	$34,209	4.6%	342,697	7.1%
Arts, Entertainment, and Recreation	$12,256	1.6%	125,303	2.6%
Accommodation and Food Services	$24,418	3.3%	357,882	7.4%
Other	$19,513	2.6%	271,933	5.7%
Government	$64,451	8.6%	656,931	13.7%
Total	$745,750	100.0%	4,806,510	100.0%

Source: Minnesota IMPLAN Group 2011

Table 3.7-9
Annual Economic Output and Employment by Sector – San Diego, Orange, Riverside, Imperial, Los Angeles, and San Bernardino Counties (2008)

Industry Sector	Economic Output		Employment	
	$ millions	Percent	Jobs	Percent
Agriculture, Forestry, Fishing, and Hunting	$7,850	0.4%	59,069	0.5%
Mining	$8,697	0.5%	14,975	0.1%
Utilities	$31,705	1.7%	29,926	0.3%
Construction	$92,642	5.1%	610,158	5.4%
Manufacturing	$358,363	19.7%	858,357	7.6%
Wholesale Trade	$94,509	5.2%	493,501	4.3%
Retail Trade	$91,980	5.1%	1,132,121	10.0%
Transportation and Warehousing	$43,502	2.4%	325,556	2.9%
Information	$154,949	8.5%	368,602	3.2%
Finance and Insurance	$115,155	6.3%	485,909	4.3%
Real Estate and Rental	$225,259	12.4%	729,262	6.4%
Professional, Scientific, and Technical Services	$140,356	7.7%	936,634	8.3%
Management	$23,984	1.3%	110,862	1.0%
Administrative and Waste Services	$51,538	2.8%	799,005	7.0%
Educational Services	$13,905	0.8%	220,354	1.9%
Health and Social Services	$89,329	4.9%	916,303	8.1%
Arts, Entertainment, and Recreation	$36,319	2.0%	319,858	2.8%
Accommodation and Food Services	$52,207	2.9%	771,455	6.8%
Other	$48,290	2.7%	715,259	6.3%
Government	$139,840	7.7%	1,450,595	12.8%
Total	$1,820,380	100.0%	11,347,763	100.0%

Source: Minnesota IMPLAN Group 2011

Table 3.7-10
GTF Initiative Number of New Uniformed Personnel and Family Members Associated with MCBCP and MCAS Camp Pendleton

	Number of New Uniformed Personnel	Number of New Family Members (any age)[1]	Number of New Adult Family Members (spouses)[2]	Number of New Minor Family Members (children)[3]	Total New Uniformed Personnel and Family Members (any age)
MCBCP Officers	202	479	147	332	681
MCBCP Enlisted Personnel	2,790	5,156	1,238	3,919	7,946
MCBCP Subtotal	2,992	5,635	1,385	4,251	8,627
MCAS Camp Pendleton Officers	90	214	66	148	304
MCAS Camp Pendleton Enlisted Personnel	646	1,194	287	907	1,840
MCAS Camp Pendleton Subtotal	736	1,408	353	1,055	2,144
Total MCBCP and MCAS Camp Pendleton	3,728	7,043	1,738	5,306	10,771

[1] Calculated by multiplying number of new personnel by rank times average number of dependents by rank.
[2] Calculated by multiplying number of new personnel by rank times percent married by rank.
[3] Calculated by subtracting number of new adult dependents (spouses) from number of new dependents.

Table 3.7-11
School Enrollment by District (2008–2009)

Fallbrook Unified School District	**Number of Students**
Mary Fay Pendleton Elementary (K–6)	792
San Onofre Elementary (K–8)	608
Potter Junior High School (7–8)	953
Fallbrook High School (9–12)	2,941
Oceanside Unified School District	
Santa Margarita Elementary (K–5)	627
Stuart Mesa Elementary (K–5)	691
North Terrace Elementary (K–5)	570
Jefferson Middle School (6–8)	1,269
Oceanside High School (9–12)	2,581
Capistrano Unified School District	
San Clemente High School (9–12)	3,213

Source: California Department of Education 2009

Table 3.7-12
Estimated Population Growth for San Diego County, MCBCP, and Surrounding Area

	2000	2010	2020	2030	Percent Change 2000–2030
San Diego County	2,813,833	3,245,279	3,635,855	3,984,753	42%
North County West MSA	364,129	434,539	460,035	489,859	34%
SRA 43 – Pendleton	36,146	36,186	36,846	38,196	6%
SRA 42 – Oceanside	151,543	177,341	187,137	198,898	31%

Source: SANDAG 2008

Table 3.7-13
Estimated Total Housing Units for San Diego County, MCBCP, and Surrounding Area

	2000	2010	2020	2030	Percent Change 2000–2030
San Diego County	1,040,149	1,174,180	1,309,340	1,383,803	33%
North County West MSA	136,478	159,151	166,613	170,394	25%
SRA 43 – Pendleton	6,368	6,397	6,420	6,428	<1%
SRA 42 – Oceanside	55,191	62,420	68,442	66,314	20%

Source: SANDAG 2008

Table 3.7-14
Estimated Total Employment for San Diego County, MCBCP, and Surrounding Area

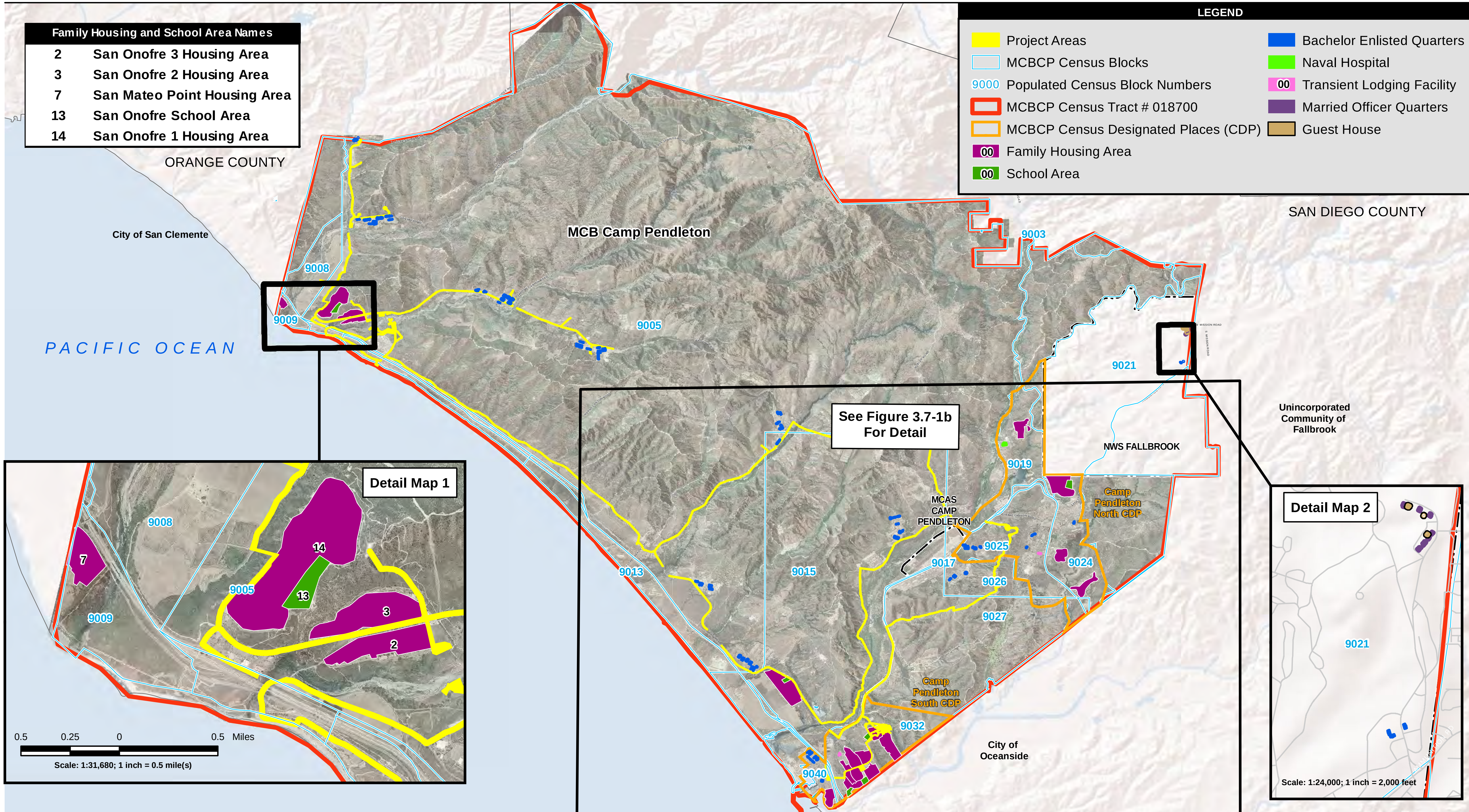
	2000	2010	2020	2030	Percent Change 2000–2030
San Diego County	1,384,673	1,573,742	1,741,033	1,913,682	38%
North County West MSA	168,763	181,615	202,478	220,103	30%
SRA 43 – Pendleton	40,093	40,095	40,095	40,095	0%
SRA 42 – Oceanside	36,840	42,524	51,797	66,962	82%

Source: SANDAG 2008

Table 3.7-15
Location of Proposed Projects, by Alternative, by Census Block Number

Project Number	Alternative Number	Census Blocks Containing Proposed Project Limits or Corridors (in Whole or in Part)															
		Populated Block Numbers									Unpopulated Block Numbers						
		9005	9008[1]	9015	9019[2]	9025[2]	9026	9027	9032[2]	9040	9010	9011	9012	9016	9018	9033	9041
P-1044	Alternative 1/ Alternative 5	X	X									X	X				
P-1044	Alternative 2	X	X								X		X				
P-1044	Alternative 3	X	X									X	X				
P-1044	Alternative 4	X	X								X		X				
P-1045	Alternative 1	X		X	X	X			X	X		X		X	X	X	X
P-1045	Alternative 2	X		X	X	X						X			X		
P-1045	Alternative 3/ Alternative 5	X		X					X	X		X		X		X	X
P-1045	Alternative 4	X		X	X	X	X	X	X	X		X		X	X	X	X

[1] Block 9008 was populated at the time of the 2000 census but is not populated at present (2011).
[2] Blocks 9019 and 9025 are part of Camp Pendleton CDP North; Block 9032 is a part of Camp Pendleton CDP South.



Source: MCBCP 2009; US Census 2000; ESRI 2010; SanGIS 2010; USGS 2000

2.5 1.25 0 2.5 Miles

Scale: 1 = 158,400; 1 inch = 2.5 mile(s)

Figure 3.7-1a
MCBCP
Census Boundaries, Housing Areas, School Areas, and Project Areas

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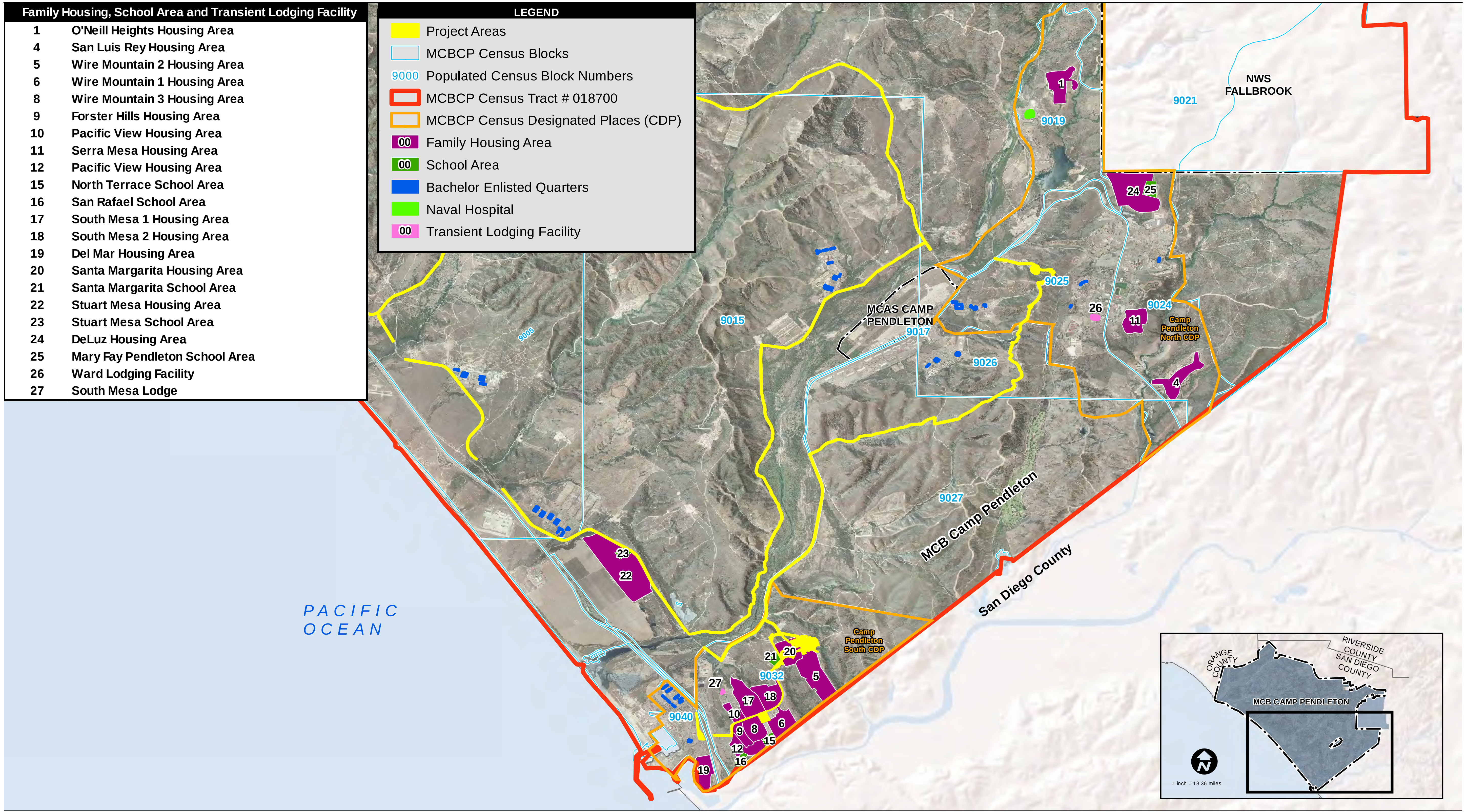

Source: MCBCP 2009; US Census 2000; ESRI 2010; SanGIS 2010; USGS 2000

7,000 3,500 0 7,000 Feet

Scale: 1 = 84,000; 1 inch = 7,000 feet

Figure 3.7-1b
MCBCP
Census Boundaries, Housing Areas, School Areas, and Project Areas

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Source: MCB Camp Pendleton 2008 Housing Market Analysis Update (USMC 2008)

0 6 12 24 Miles

Figure 3.7-2
MCBCP Housing Market Area

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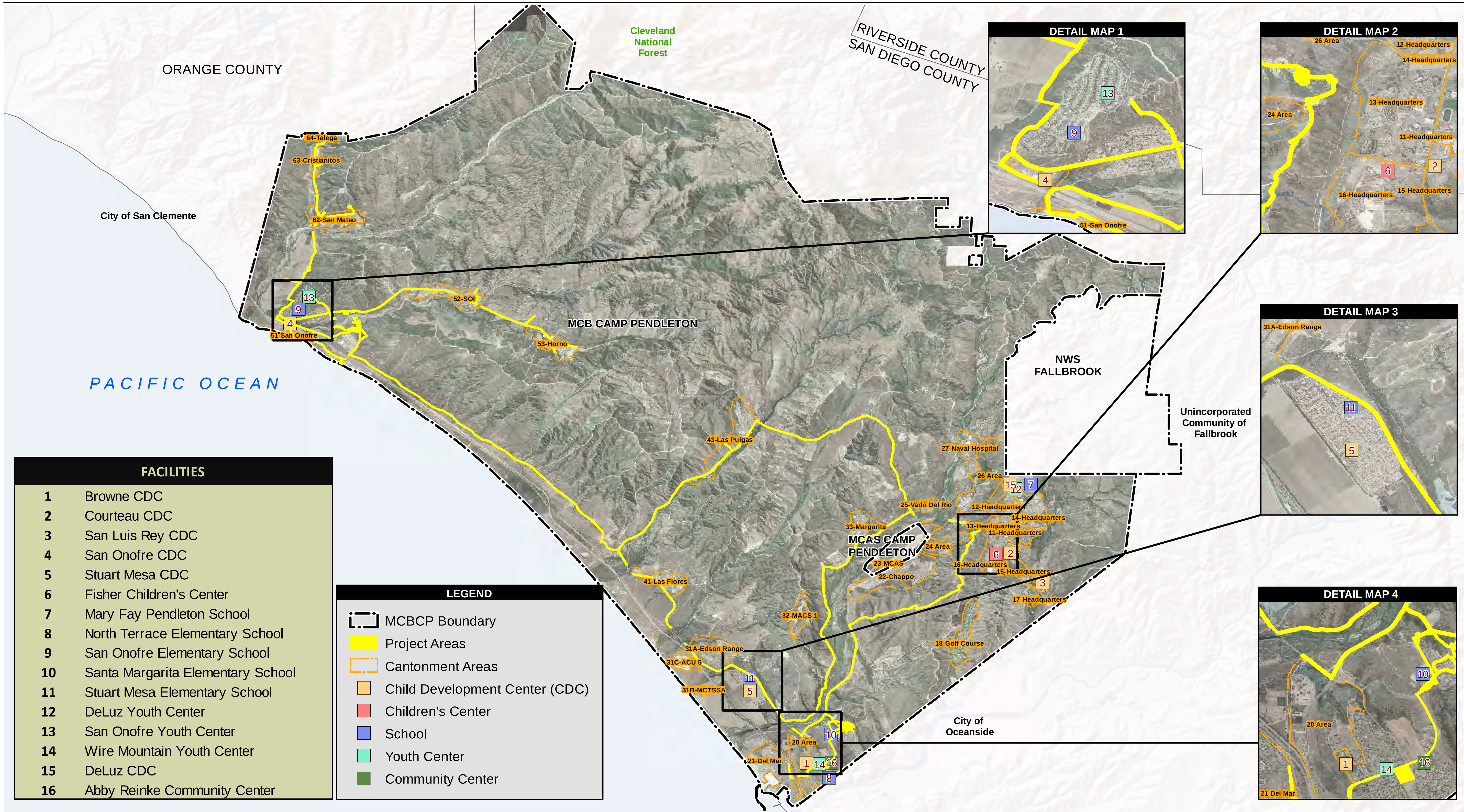

Source: ESRI 2008; MCB Camp Pendleton 2007

2.5 1.25 0 2.5 Miles

Scale: 1 = 158,400; 1 inch = 2.5 miles

Figure 3.7-3
MCBCP Schools, Child Development Centers, Children's Center, Youth Centers, Community Center, and Cantonment Areas

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_3\SchoolsChildDevCenters.mxd, 6/26/2012, johnsonaa

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3.8 TRAFFIC

3.8.1 Definition of Resource

A traffic analysis was prepared to determine the potential traffic-related impacts associated with the construction and operation of the projects included in the proposed action. The traffic analysis examines the roads and intersections in the vicinity of the proposed improvements, and determines the capacity of these facilities to accommodate project traffic. Where the project substantially contributes to future traffic congestion and traffic-related impacts, appropriate avoidance, minimization, and mitigation measures are identified in Chapter 4.

3.8.2 Regulatory Setting

Level of service (LOS) is a method used to rate the performance of streets, intersections, and other highway facilities. Developed by the Transportation Research Board and documented in various editions of the Highway Capacity Manual (TRB 2000) since 1950, LOS rates performance on a scale of A through F, with LOS A reflecting free-flowing conditions and LOS F representing heavily congested conditions. Table 3.8-1 describes the different levels of service.

The roadway segment analysis criteria used in this report varies based on the jurisdiction in which the roadway segment lies. The roadway segments analyzed in this study are located in unincorporated areas of San Diego County, the City of Oceanside, and MCBCP. Table 3.8-2 was developed by the County of San Diego and lists roadway classification and LOS criteria for roadways within unincorporated areas. For the purpose of calculating the volume-to-capacity (v/c) ratio, the volume listed under LOS E for each street classification is the capacity of the segment (and therefore the denominator of the calculation). Table 3.8-3 was developed by the City of Oceanside and lists roadway classification and LOS criteria for Oceanside roadways.

MCBCP classifies roadways into one of the following three types, according to their function:

- Arterial Highway (principal and minor)
- Collector Roadway (major and minor)
- Local Roadway

The classification of streets within the Base is based on *Camp Pendleton Traffic Engineering and Safety Study* (Gannett Fleming 2007). Since no LOS thresholds have been assigned to these classifications, County of San Diego thresholds for segments of similar characteristics were used. The following list indicates the County of San Diego thresholds that were used for the MCBCP classification:

- Minor Arterial Highway (Major Road)
- Major Collector Roadway (Collector)
- Minor Collector Roadway (Town Collector)
- Local Roadway (Rural Collector)

3.8.3 Region of Influence

The following study intersections were chosen for analysis based on their proximity to MCBCP access gates and anticipated construction traffic routes:

- Cristianitos Road and I-5 Southbound Ramps
- Cristianitos Road and I-5 Northbound Ramps
- Old Pacific Highway and I-5 Southbound Ramps
- Basilone Road and I-5 Northbound Ramps
- Las Pulgas Road and I-5 Southbound Ramps
- Las Pulgas Road and I-5 Northbound Ramps
- Las Pulgas Road and Stuart Mesa Road
- Harbor Drive and Santa Fe Avenue
- Harbor Drive and I-5 Southbound Ramps
- San Rafael Drive and Vandegrift Boulevard
- Wire Mountain Road and Vandegrift Boulevard
- San Jacinto Road and Vandegrift Boulevard
- Stuart Mesa Road and Vandegrift Boulevard
- College Boulevard and North River Road
- Papagallo Drive and Vandegrift Boulevard
- Ammunition Road and Mission Road

In addition, the ROI includes the roadway segments outside of each gate, as well as several roadway segments within MCBCP. The on-Base roadway segments were selected based on their proximity to anticipated proposed projects.

The off-Base roadway segments include:

- Cristianitos Road
    - State Beach Parking to Cristianitos Gate
    - I-5 Northbound Ramp to El Camino Real
- Basilone Road
    - I-5 Northbound Ramp to San Onofre Gate
- Las Pulgas Road
    - I-5 Northbound Ramp to Old Pacific Highway
- Santa Fe Avenue/Harbor Drive
    - Harbor Drive to Del Mar Gate
- Harbor Drive
    - Santa Fe Avenue to Camelo Drive
    - I-5 Southbound On-Ramp to I-5 Northbound Off-Ramp
- Capistrano Drive
    - West of San Rafael Drive
- San Rafael Drive
    - North of Sunset Drive
- Vandegrift Boulevard
    - San Rafael Drive to Oceanside Gate
    - Granite Place to Douglas Drive
    - Papagallo Drive to San Luis Rey Gate
- Mission Road
    - Ammunition Road to Aviation Road
- Ammunition Road
    - Alturas Road to Fallbrook Gate

The on-Base roadway segments include:

- Vandegrift Boulevard
    - Wire Mountain Road to Lemon Grove Road
    - Lemon Grove Road to Stuart Mesa Road
    - North of Stuart Mesa Road
    - East of Stagecoach Road
    - Basilone Road to Rattlesnake Canyon Road
    - 19th Street to 16th Street
    - 16th Street to 15th Street
    - 4th Street to Barnett Circle

- Stuart Mesa Road
  - Vandegrift Boulevard to MACS Road
  - MACS Road to Bloom Street
  - North of Edson Range
  - North of Aliso Canyon Road
- El Camino Real
  - Stuart Mesa Road to Las Pulgas Road
- Basilone Road
  - East of Sandpiper Avenue
  - Las Pulgas Road to Roblar Road
  - Stagecoach Road to Vandegrift Boulevard
- San Mateo Road
  - South of Cristianitos Road
  - East of 8th Street
- A Street
  - Vandegrift Boulevard to I-5 Bridge
- Wire Mountain Road
  - East of Vandegrift Boulevard
- Ash Road
  - East of Vandegrift Boulevard
- MACS Road
  - East of Stuart Mesa Road
- Stagecoach Road
  - Margarita Camp Access to Basilone Road
- San Jacinto Road
  - North of Wire Mountain Road
- 16th Street
  - A Street to Vandegrift Boulevard
- 19th Street
  - Marine Drive to Ham Road
- Las Pulgas Road
  - West of C Street

3.8.4 Existing Conditions – Basewide

Seven military gates control access to MCBCP. Four of the gates (Oceanside, Las Pulgas, San Onofre, and Cristianitos) are located near I-5, which runs along the west side of MCBCP. The other three gates (Del Mar, San Luis Rey, and Fallbrook) are on the southern portion of MCBCP boundaries, with access provided via local roadways and SR-76. Within MCBCP, the roadway network consists mostly of arterials and collectors designed to move vehicles across Base. There are a few isolated areas on Base that have a network of local streets utilized for residential and commercial access.

3.8.5 Existing Conditions – Proposed Project Areas

Roadway Conditions

Minor Arterial Highways

- Vandegrift Boulevard is a four-lane roadway with a painted median or a two-way left-turn lane, except for a portion north of Rattlesnake Canyon Road. The posted speed limit varies from 35 to 55 miles per hour (mph). Vandegrift Boulevard serves as the primary through street in the southern portion of MCBCP and provides access to and from the Base via the Oceanside and San Luis Rey gates.
- Basilone Road has either two or three lanes, with the third lane being provided in the uphill direction in the sections that traverse steep terrain, and a posted speed limit varying from 25 to 50 mph, depending on the proximity to facilities. It has double-yellow centerline striping. Basilone Road serves as a primary road connecting the southern and northern parts of MCBCP and provides access to and from the Base via the San Onofre gate.
- 16th Street has four lanes with a two-way left-turn lane or a painted median between A Street and Vandegrift Boulevard with a posted speed limit of 35 mph. On the east side of Vandegrift Boulevard, 16th Street has two lanes and the posted speed limit is 25 mph. It provides local access to and from the Headquarters Areas of MCBCP.
- 19th Street has two lanes with double-yellow centerline striping and a posted speed limit of 35 mph from Vandegrift Boulevard to Marine Drive and 45 mph from Marine Drive to the Fallbrook gate. This roadway provides access between the Fallbrook gate and Vandegrift Boulevard.
- Las Pulgas Road provides two lanes separated by a double-yellow centerline, with a posted speed limit of 50 mph over the segment analyzed. Las Pulgas Road serves as the primary east/west road in the central portion of MCBCP and provides access to and from the Las Pulgas gate.

Major Collectors

- Stuart Mesa Road primarily has two lanes, with small sections seeing three lanes (two uphill lanes) or four lanes (near Stuart Mesa Quarters). This roadway has double-yellow centerline striping. The posted speed limit varies from 45 to 50 mph. It serves as a connection road from the southern portion to the central portion of MCBCP, and provides access to multiple facilities. Stuart Mesa Road becomes El Camino Real north of Aliso Canyon Road.
- El Camino Real has two lanes separated by double-yellow centerline striping between Stuart Mesa Road and Las Pulgas Road. The posted speed limit is 50 mph. It serves as a connection road from the northern portion to the central portion of MCBCP and provides access to multiple facilities. El Camino Real becomes Stuart Mesa Road south of Aliso Canyon Road.
- San Mateo Road has two lanes with double-yellow centerline striping. Passing is allowed on portions of the roadway. The posted speed limit in developed areas is 25 mph. San Mateo Road provides access to a majority of the areas in the northern portion.
- A Street has two lanes with double-yellow centerline striping and a posted speed limit of 35 mph on the bridge over I-5. It provides access to the Del Mar Beach area.

Minor Collectors

- MACS Road has two lanes with double-yellow centerline striping and a posted speed limit of 35 mph near Stuart Mesa Road. It provides local access to the MASS-3 Area.
- Stagecoach Road has two lanes with double-yellow centerline striping and a posted speed limit of 45 mph. It provides access to and from areas in the central portion of MCBCP.

The existing intersection geometrics of the 16 study area intersections are shown in Figure 3.8-1. The existing off-Base roadway geometrics are shown in Figure 3.8-2 and the existing on-Base roadway geometrics are shown in Figure 3.8-3.

Traffic Volumes

Existing turning movement volumes at each of the study intersections along the majority of ROI roadways were provided by National Data & Surveying Services, with data collection completed in 2007 and 2009. At locations where 2009 counts were available, those counts were used. The remaining locations used counts from 2007. Traffic counts along six on-Base segments (two on Vandegrift Boulevard, two on Stuart Mesa Road, one on Basilone Road, and one on San Mateo Road) and at the intersection of San Jacinto Road and Vandegrift Boulevard were obtained from the *Camp Pendleton Traffic Engineering and Safety Study* (Gannett Fleming 2007).

Existing peak-hour turning movement volumes and average daily traffic volumes on off-Base and on-Base roadway segments are provided in Appendix C.

Intersection Analysis

An analysis of existing conditions at each of the study intersections indicates that all but six of the study intersections currently function at an acceptable LOS D or better. These six intersections are:

- Old Pacific Highway and I-5 Southbound Ramps
- Basilone Road and I-5 Northbound Ramps
- Las Pulgas Road and I-5 Southbound Ramps
- Harbor Drive and Santa Fe Avenue
- Harbor Drive and I-5 Southbound Ramps
- Stuart Mesa Road and Vandegrift Boulevard

The results of the intersection analysis are contained in Table 3.8-4.

Roadway Segment Analysis

Table 3.8-5 displays the roadway segment analysis for off-Base roadway segments under existing conditions. As shown in the table, all but three roadway segments would function at an acceptable LOS C or better. These three roadway segments are:

- Cristianitos Road
    - State Beach Parking to Cristianitos Gate
- Basilone Road
    - I-5 Northbound Ramps to San Onofre Gate
- Ammunition Road
    - Alturas Road to Fallbrook Gate

Table 3.8-6 displays the roadway segment analysis for on-Base roadway segments under existing conditions. Based on the LOS thresholds assumed for these segments, all but two segments function at an acceptable LOS D or better. These two segments are:

- Stuart Mesa Road
    - Vandegrift Boulevard to MACS Road
- Basilone Road
    - Stagecoach Road to Vandegrift Boulevard

3.8.6 <u>Future Baseline Conditions: 2013</u>

The 2013 Baseline roadway network is assumed to have the following improvements compared to the existing conditions:

- The Las Pulgas gate would be converted to inbound traffic only for the morning peak, increasing the number of lanes of entry from two to four. For the rest of the day and in the afternoon peak, operations would allow both inbound and outbound traffic.

The lane configuration geometry and traffic control of all other study roadway segments and intersections are assumed to be the same as existing conditions.

Traffic Volumes

To determine the 2013 Baseline traffic volumes, traffic from reasonably foreseeable cumulative projects was added to existing volumes. There are five cumulative projects identified for the 2013 Baseline:

1. Grow the Force
2. Mall Exchange Complex
3. Naval Hospital Camp Pendleton
4. Basewide Utility Infrastructure
5. PPV Military Housing, Stuart Mesa (Phases 6 and 7)

Traffic from these cumulative projects (see Appendix C) was added to both peak-hour turning movement volumes and daily roadway segment volumes. The number of trips assumed for each of the cumulative projects is provided below, and was derived based on traffic study information for each respective project:

1. Grow the Force: An initiative that is forecast to increase the number of uniformed personnel, family members of uniformed personnel, and civilian employees associated with MCBCP by nearly 11,000. There are 70 permanent projects included in the GTF effort, including residential, operations, training, and infrastructure facilities. Of these 70 projects, 31 are mostly new quarters or rehabilitation of existing quarters for existing functions and personnel and received categorical exclusions in NEPA review. Of the other 39 projects, 18 are anticipated to be under construction during 2013. The construction traffic is assumed to generate 2,585 daily trips, with 647 trips in the morning peak (all inbound) and 647 trips in the afternoon peak (all outbound) during 2013.
2. Mall Exchange Complex: A 150,000-square-foot retail, 5,500-square-foot restaurant, and 15,000-square-foot specialty retail center development to be located near the Main gate. The Exchange Complex was completed and opened in May 2012. Because this project was occupied after traffic counts were completed, its estimated traffic is assumed to generate 3,095 daily trips, with 102 trips in the morning peak (62 inbound, 40 outbound) and 257 trips in the afternoon peak (130 inbound, 127 outbound). Pass-by trips and trip credits from the existing exchange were taken into consideration when calculating new trips added to the roadway network.
3. Naval Hospital Camp Pendleton: A 511,000-square-foot hospital located near the Main gate. The new Naval Hospital would be under construction during 2013. Construction traffic is assumed to generate 1,900 daily trips, with 305 trips in the morning peak (275 inbound, 30 outbound) and 275 trips in the afternoon peak (all outbound).
4. Basewide Utility Infrastructure: Six utility improvement projects are planned as part of a Basewide utility upgrade program. The construction traffic is assumed

to generate 2,110 daily trips, with 529 trips in the morning peak (all inbound) and 529 trips in the afternoon peak (all outbound) during 2013.

5. PPV Military Family Housing, Stuart Mesa (Phases 6 and 7): Completed by 2013, 537 of a projected 1,248 multi-family dwelling units located west of Stuart Mesa Road, between Phillips Street and MACS Road. The 537 dwelling units operational in 2013 are assumed to generate 3,924 daily trips, with 275 trips in the morning peak (82 inbound, 193 outbound) and 353 trips in the afternoon peak (212 inbound, 141 outbound).

The 2013 Baseline peak-hour turning movement volumes and average daily roadway segment volumes at off-Base and on-Base roadway segments are provided in Appendix C.

Intersection Analysis

An analysis of 2013 Baseline conditions at each of the study intersections indicates that seven intersections would function at an acceptable LOS, and nine would be characterized by congested LOS E or worse conditions. These nine intersections are as follows:

- Old Pacific Highway and I-5 Southbound Ramps
- Basilone Road and I-5 Northbound Ramps
- Las Pulgas Road and I-5 Southbound Ramps
- Las Pulgas Road and I-5 Northbound Ramps
- Las Pulgas Road and Stuart Mesa Road
- Harbor Drive and Santa Fe Avenue
- Harbor Drive and I-5 Southbound Ramps
- Wire Mountain Road and Vandegrift Boulevard
- Stuart Mesa Road and Vandegrift Boulevard

Six of these locations would also fail to meet an acceptable LOS during existing conditions. The intersection of Las Pulgas Road with I-5 Northbound Ramps would drop to LOS F in the morning peak with the addition of cumulative project traffic anticipated in 2014. The intersections of Las Pulgas Road with Stuart Mesa Road, and Wire Mountain Road with Vandegrift Boulevard would each drop to LOS F in the afternoon peak with the addition of cumulative project traffic anticipated in 2014. The results of the intersection analysis are contained in Table 3.8-7.

Roadway Segment Analysis

Table 3.8-8 displays the roadway segment analysis for off-Base roadway segments under 2013 Baseline conditions. As shown in the table, all but four roadway segments would function at an acceptable LOS C or better. These four segments are the following:

- Cristianitos Road
  - State Beach Parking to Cristianitos Gate
- Basilone Road
  - I-5 Northbound Ramps to San Onofre Gate
- Harbor Drive
  - I-5 Southbound Ramps to I-5 Northbound Ramps
- Ammunition Road
  - Alturas Road to Fallbrook Gate

Three of these segments also would fail to meet an acceptable LOS during existing conditions. The segment on Harbor Drive between the I-5 ramps would drop to LOS D with the addition of cumulative project traffic anticipated in 2013.

Table 3.8-9 displays the roadway segment analysis for on-Base roadway segments under 2013 Baseline conditions. Based on the LOS thresholds assumed for these segments, all but four on-Base segments would function at an acceptable LOS D or better:

- Vandegrift Boulevard
  - Lemon Grove Road to Stuart Mesa Road
- Stuart Mesa Road
  - Vandegrift Boulevard to MACS Road
  - MACS Road to Bloom Street
- Basilone Road
  - Stagecoach Road to Vandegrift Boulevard

Two of these segments also failed to meet an acceptable LOS during existing conditions. The segment on Vandegrift Boulevard from Lemon Grove Road to Stuart Mesa Road and the segment on Stuart Mesa Road from MACS Road to Bloom Street each would drop to LOS E with the addition of cumulative project traffic anticipated in 2013.

3.8.7 Future Baseline Conditions: 2014

The 2014 Baseline roadway network is assumed to have the following improvements compared to the existing conditions:

- The Las Pulgas gate would be converted to inbound traffic only for the morning peak, increasing the number of lanes of entry from two to four. For the rest of the day and in the afternoon peak, operations would allow both inbound and outbound traffic.

The lane configuration geometry, and traffic control of all other study roadway segments and intersections are assumed to be the same as existing conditions.

Traffic Volumes

To determine the 2014 Baseline traffic volumes, traffic from reasonably foreseeable cumulative projects was added to existing volumes. There are five cumulative projects identified for the 2014 Baseline:

1. Grow the Force
2. Mall Exchange Complex
3. Naval Hospital Camp Pendleton
4. Basewide Utility Infrastructure
5. PPV Military Housing, Stuart Mesa (Phases 6 and 7)

Traffic from these cumulative projects was added to both peak-hour turning movement volumes and daily roadway segment volumes. The number of trips assumed for each of the cumulative projects is provided below, and was derived based on traffic study information for each respective project:

1. Grow the Force: Five of the 39 projects are anticipated to be under construction during 2014. The construction traffic is assumed to generate 932 daily trips, with 233 trips in the morning peak (all inbound) and 233 trips in the afternoon peak (all outbound) during 2014.
2. Mall Exchange Complex: The Exchange Complex was completed and opened in May 2012. Because this project was occupied after traffic counts were completed, its estimated traffic is assumed to generate 3,095 daily trips, with 102 trips in the morning peak (62 inbound, 40 outbound) and 257 trips in the

afternoon peak (130 inbound, 127 outbound). Pass-by trips and trip credits from the existing exchange were taken into consideration when calculating new trips added to the roadway network.

3. Naval Hospital Camp Pendleton: The new Naval Hospital would be constructed and in operation by 2014. The project traffic is assumed to generate 8,435 new daily trips, with 515 new trips in the morning peak (321 inbound, 194 outbound) and 452 new trips in the afternoon peak (226 inbound, 226 outbound). Trip credits for the existing hospital were taken into consideration when calculating new trips added to the roadway network.

4. Basewide Utility Infrastructure: The construction traffic is assumed to generate 1,222 daily trips, with 306 trips in the morning peak (all inbound) and 306 trips in the afternoon peak (all outbound) during 2014.

5. PPV Military Family Housing, Stuart Mesa (Phases 6 and 7): Phases 6 and 7 of the project would be open in 2014. The 537 dwelling units operational in 2014 are assumed to generate 3,924 daily trips, with 275 trips in the morning peak (82 inbound, 193 outbound) and 353 trips in the afternoon peak (212 inbound, 141 outbound).

The 2014 Baseline peak-hour turning movement volumes and average daily roadway segment volumes at off-Base and on-Base roadway segments are provided in Appendix C.

Intersection Analysis

An analysis of 2014 Baseline conditions at each of the study intersections indicates that all but eight of the study intersections would function at an acceptable LOS D or better. These eight intersections are:

- Old Pacific Highway and I-5 Southbound Ramps
- Basilone Road and I-5 Northbound Ramps
- Las Pulgas Road and I-5 Southbound Ramps
- Las Pulgas Road and I-5 Northbound Ramps
- Las Pulgas Road and Stuart Mesa Road
- Harbor Drive and Santa Fe Avenue
- Harbor Drive and I-5 Southbound Ramps
- Stuart Mesa Road and Vandegrift Boulevard

Six of these locations also failed to meet an acceptable LOS during existing conditions. The intersection of Las Pulgas Road with I-5 Northbound Ramps would drop to LOS E in the morning peak and the intersections of Las Pulgas Road with Stuart Mesa Road would drop to LOS F in the afternoon peak with the addition of cumulative project traffic anticipated in 2014. The results of the intersection analysis are contained in Table 3.8-10.

Roadway Segment Analysis

Table 3.8-11 displays the roadway segment analysis for off-Base roadway segments under 2014 Baseline conditions. As shown in the table, all but four roadway segments would function at an acceptable LOS C or better. These four segments are:

- Cristianitos Road
    - State Beach Parking to Cristianitos Gate
- Basilone Road
    - I-5 Northbound Ramps to San Onofre Gate
- Harbor Drive
    - I-5 Southbound Ramps to I-5 Northbound Ramps
- Ammunition Road
    - Alturas Road to Fallbrook Gate

Three of these segments also fail to meet an acceptable LOS during existing conditions. The segment on Harbor Drive between the I-5 ramps would drop to LOS D with the addition of cumulative project traffic anticipated in 2014.

Table 3.8-12 displays the roadway segment analysis for on-Base roadway segments under 2014 Baseline conditions. Based on the LOS thresholds assumed for these segments, all but six on-Base segments would function at an acceptable LOS D or better. These six segments are:

- Vandegrift Boulevard
    - Wire Mountain Road to Lemon Grove Road
    - Lemon Grove Road to Stuart Mesa Road
    - Basilone Road to Rattlesnake Canyon Road
- Stuart Mesa Road
    - Vandegrift Boulevard to MACS Road
    - MACS Road to Bloom Street

- Basilone Road
    - Stagecoach Road to Vandegrift Boulevard

Two of these segments also fail to meet an acceptable LOS during existing conditions. The other four segments would drop to LOS E or F with the addition of cumulative project traffic anticipated in 2014.

Table 3.8-1
LOS Criteria

LOS	Description
A	Free-flow operations. Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.
B	Reasonably free-flow, and free-flow speeds are maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high.
C	Speeds are at or near the free-flow speed for the segment. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver.
D	Speeds begin to decline slightly with increased flows, and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels.
E	Operations at capacity. Operations at this level are volatile, because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver within the traffic stream. The level of physical and psychological comfort afforded the driver is poor.
F	Breakdown in vehicular flow.

Source: Transportation Research Board 2000 (Highway Capacity Manual)

Table 3.8-2
County of San Diego Roadway Segment
Capacity and Level of Service

Road			Level of Service (LOS)				
Class	**Lanes**	**X-Section[1]**	**A**	**B**	**C**	**D**	**E**
Expressway	6	126/146	36,000	54,000	70,000	86,000	108,000
Prime Arterial	6	102/122	22,200	37,000	44,600	50,000	57,000
Major Road	4	78/98	14,800	24,700	29,600	33,400	37,000
Collector	4	64/84	13,700	22,800	27,400	30,800	34,200
Town Collector	2	54/74	3,000	6,000	9,500	13,500	19,000
Light Collector	2	40/60	1,900	4,100	7,100	10,900	16,200
Rural Collector	2	40/84	1,900	4,100	7,100	10,900	16,200
Rural Light Collector	2	40/60	1,900	4,100	7,100	10,900	16,200
Recreational Highway	2	40/100	1,900	4,100	7,100	10,900	16,200
Rural Mountain Road	2	40/100	1,900	4,100	7,100	10,900	16,200
Residential Collector	2	40/60	-	-	4,500	-	-
Residential Road	2	36/56	-	-	1,500	-	-
Residential Cul-de-sac or Loop road	2	32/52	-	-	200	-	-

[1] XXX/XXX = curb-to-curb width (feet)/right-of-way width (feet): based on the County of San Diego Public Road Standards.
Note: The volumes and the average daily level of service listed above are only intended as a general planning guideline. LOS is not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. LOS normally applies to roads carrying through traffic between major trip generators and attractors.
Source: County of San Diego 1999, Public Road Standards, Table 1 (page 9)

Table 3.8-3
City of Oceanside Roadway Segment
Capacity and Level of Service

Road			Level of Service (LOS)				
Class	**Lanes**	**X-Section[1]**	**A**	**B**	**C**	**D**	**E**
Prime Arterial		104/124*	36,000	42,000	48,000	54,000	60,000
Major Arterial	6	104/124*	30,000	35,000	40,000	45,000	50,000
	5	92/112*	27,000	31,500	36,000	40,500	45,000
	4	80/100*	24,000	28,000	32,000	36,000	40,000
Secondary		64/84*	15,000	17,500	20,000	22,500	25,000
Collector		40/60	5,250	6,125	7,000	7,875	8,750
Industrial		50/72	6,000	7,000	8,000	9,000	10,000
Local Street		40/60	**	**	1,200	**	**
		36/56	**	**	500	**	**

[1] XXX/XXX = curb-to-curb width (feet)/right-of-way width (feet): based on the County of San Diego Public Road Standards.
* Additional right-of-way at intersection shall be required to accommodate dual left-turn lanes as necessary.
** LOS is not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. LOS normally applies to roads carrying through traffic between major trip generators and attractors.
Note: The average daily vehicle trips are general and are calculated based upon the 1985 Highway Capacity Manual.
Source: City of Oceanside Circulation Element, Table C-2, LOS for Various Street Classifications and Traffic Volumes (2002)

Table 3.8-4
Existing Conditions –
Peak-Hour Intersection LOS Summary

Intersection		Traffic Control	Peak Hour	Existing	
				Delay [1]	LOS [2]
1	Cristianitos Rd & I-5 SB Ramps	One-Way Stop	AM	13.0	B
			PM	14.4	B
2	Cristianitos Rd & I-5 NB Ramps	One-Way Stop	AM	12.8	B
			PM	13.8	B
3	Old Pacific Hwy & I-5 SB Ramps	One-Way Stop	AM	45.6	**E**
			PM	133.3	**F**
4	Basilone Rd & I-5 NB Ramps	One-Way Stop	AM	73.8	**F**
			PM	ECL	**F**
5	Las Pulgas Rd & I-5 SB Ramps	One-Way Stop	AM	10.0	B
			PM	53.5	**F**
6	Las Pulgas Rd & I-5 NB Ramps	One-Way Stop	AM	13.8	B
			PM	15.6	C
7	Las Pulgas Rd & Stuart Mesa Rd	One-Way Stop	AM	12.5	B
			PM	22.8	C
8	Harbor Dr & Santa Fe Ave	Two-Way Stop	AM	12.1	B
			PM	ECL	**F**
9	Harbor Dr & I-5 SB Ramps	Signalized	AM	22.8	C
			PM	ECL	**F**
10	San Rafael Dr & Vandegrift Blvd	Signalized	AM	8.5	A
			PM	12.0	B
11	Wire Mountain Rd & Vandegrift Blvd	Signalized	AM	22.9	C
			PM	38.5	D
12	San Jacinto Rd & Vandegrift Blvd	Signalized	AM	5.9	A
			PM	19.1	B
13	Stuart Mesa Rd & Vandegrift Blvd	Signalized	AM	36.8	D
			PM	77.7	**E**
14	College Blvd & N River Rd	Signalized	AM	18.5	B
			PM	26.0	C
15	Papagallo Dr & Vandegrift Blvd	Signalized	AM	5.6	A
			PM	2.8	A
16	Ammunition Rd & Mission Rd	Signalized	AM	27.4	C
			PM	31.2	C

[1] Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At one-way or two-way stop-controlled intersections, delay refers to the worst movement.
[2] LOS calculations are based on the methodology outlined in the 2000 Highway Capacity Manual and performed using Synchro 6.0.
ECL = Exceeds Calculable Limit. Reported when delay exceeds 180 seconds.
Note: **Bold** values indicate intersections operating at LOS E or F.

Table 3.8-5
Existing Conditions –
Roadway Segment LOS Summary (Off-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT	V/C Ratio[2]	LOS
Cristianitos Road					
State Beach Prkg to Cristianitos Gate	2-Lane Light Collector	16,200	7,942[3]	0.490	**D**
I-5 NB ramp to El Camino Real	2-Lane Light Collector	16,200	4,681[3]	0.289	C
Basilone Road					
I-5 NB ramp to San Onofre Gate	2-Lane Light Collector	16,200	8,979[3]	0.554	**D**
Las Pulgas Road					
I-5 NB ramps to Old Pacific Hwy	2-Lane Light Collector	16,200	5,140[4]	0.317	C
Santa Fe Avenue/Harbor Drive					
Harbor Dr to Del Mar Gate	2-Lane Light Collector	16,200	3,603[4]	0.222	B
Harbor Drive					
Santa Fe Ave to Camelo Dr	3-Lane Secondary	32,500	9,300[4]	0.286	A
I-5 SB on-ramp to I-5 NB off-ramp	3-Lane Secondary	32,500	23,527[4]	0.724	C
Capistrano Drive					
West of San Rafael Dr	Collector	8,750	1,842[4]	0.211	A
San Rafael Drive					
North of Sunset Dr	Collector	8,750	2,517[4]	0.288	A
Vandegrift Boulevard					
San Rafael Dr to Oceanside Gate	6-Lane Major Arterial	50,000	32,094[4]	0.642	B
Granite Pl to Douglas Dr	4-Lane Major Arterial	40,000	19,561[3]	0.489	A
Papagallo Dr to San Luis Rey Gate	5-Lane Major Arterial	45,000	17,691[3]	0.393	A
Mission Road					
Ammunition Rd to Aviation Rd	4-Lane Collector	34,200	24,186[3]	0.707	C
Ammunition Road					
Alturas Rd to Fallbrook Gate	2-Lane Town Collector	19,000	14,544[3]	0.765	**E**

[1] Existing roads street classification is based on the City of Oceanside General Plan Circulation Element, dated June 2002, County of San Diego General Plan Circulation Element, dated 7 November 2006, and field observations.
[2] The v/c ratio is calculated by dividing the average daily traffic (ADT) volume by each respective roadway segment's capacity.
[3] ADT volumes for the roadway segments were provided by National Data & Surveying Services and measured in November 2007.
[4] ADT volumes for the roadway segments were provided by National Data & Surveying Services and measured in May 2009.
Note: **Bold** values indicate roadway segments operating at LOS D, E, or F.

Table 3.8-6
Existing Conditions –
Roadway Segment LOS Summary (On-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Vandegrift Boulevard					
Wire Mountain Rd to Lemon Grove Rd	4-Lane Minor Arterial Highway	37,000	26,959[4]	0.729	C
Lemon Grove Rd to Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	27,140[4]	0.734	C
North of Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	22,028[4]	0.595	B
East of Stagecoach Rd	4-Lane Minor Arterial Highway	37,000	21,124	0.571	B
Basilone Rd to Rattlesnake Cyn Rd	4-Lane Minor Arterial Highway	37,000	30,351	0.820	D
19th St to 16th St	4-Lane Minor Arterial Highway	37,000	11,399	0.308	A
16th St to 15th St	4-Lane Minor Arterial Highway	37,000	23,499	0.635	B
4th St to Barnett Circle	4-Lane Minor Arterial Highway	37,000	18,618	0.503	B
Stuart Mesa Road					
Vandegrift Blvd to MACS Rd	2-Lane Major Collector Roadway	19,000	13,585[4]	0.715	**E**
MACS Rd to Bloom St	2-Lane Major Collector Roadway	19,000	10,189	0.536	D
North of Edson Range	2-Lane Major Collector Roadway	19,000	4,686	0.247	B
North of Aliso Canyon Rd	2-Lane Major Collector Roadway	19,000	6,975	0.367	C
El Camino Real					
Stuart Mesa Rd to Las Pulgas Rd	2-Lane Major Collector Roadway	19,000	4,504	0.237	B
Basilone Road					
East of Sandpiper Ave	2-Lane Minor Arterial Highway	19,000	7,741	0.407	C
Las Pulgas Rd to Roblar Rd	2-Lane Minor Arterial Highway	19,000	9,575	0.504	D
Stagecoach Rd to Vandegrift Blvd	2-Lane Minor Arterial Highway	19,000	13,620	0.717	**E**
San Mateo Road					
South of Cristianitos Rd	2-Lane Major Collector Roadway	19,000	5,007	0.264	B
East of 8th St	2-Lane Major Collector Roadway	19,000	3,387	0.178	B
A Street					
Vandegrift Blvd to I-5 Bridge	2-Lane Major Collector Roadway	19,000	12,540[4]	0.660	D
Wire Mountain Road					
East of Vandegrift Blvd	4-Lane Major Collector Roadway	34,200	10,175[4]	0.298	A
Ash Road					
East of Vandegrift Blvd	2-Lane Minor Collector Roadway	16,200	6,485[4]	0.400	C
MACS Road					
East of Stuart Mesa Rd	2-Lane Minor Collector Roadway	16,200	995	0.061	A
Stagecoach Road					
Margarita Camp Access to Basilone Rd	2-Lane Minor Collector Roadway	16,200	4,679	0.289	C
San Jacinto Road					
North of Wire Mountain Rd	2-Lane Local Roadway	16,200	2,992[4]	0.185	B
16th Street					
A St to Vandegrift Blvd	4-Lane Minor Arterial Highway	37,000	18,882	0.510	B
19th Street					
Marine Dr to Ham Rd	2-Lane Minor Arterial Highway	19,000	9,058	0.477	C
Las Pulgas Road					
West of C St	2-Lane Minor Arterial Highway	19,000	5,648	0.297	B

[1] Existing roads street classification is based on *Camp Pendleton Traffic Engineering and Safety Study* (Gannett Fleming 2007).
[2] Average daily traffic (ADT) volumes for the roadway segments were provided by National Data & Surveying Services and measured in November 2007 except where noted.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
[4] ADT volumes for the roadway segments were provided by National Data & Surveying Services and measured in May 2009.
Note: **Bold** values indicate roadway segments operating at LOS E or F.

Table 3.8-7
2013 Baseline Conditions –
Peak-Hour Intersection LOS Summary

Intersection		Traffic Control	Peak Hour	2013 No Action	
				Delay[1]	LOS[2]
1	Cristianitos Rd & I-5 SB Ramps	One-Way Stop	AM	13.0	B
			PM	14.4	B
2	Cristianitos Rd & I-5 NB Ramps	One-Way Stop	AM	12.8	B
			PM	13.8	B
3	Old Pacific Hwy & I-5 SB Ramps	One-Way Stop	AM	83.2	**F**
			PM	ECL	**F**
4	Basilone Rd & I-5 NB Ramps	One-Way Stop	AM	113.0	**F**
			PM	ECL	**F**
5	Las Pulgas Rd & I-5 SB Ramps	One-Way Stop	AM	12.7	B
			PM	ECL	**F**
6	Las Pulgas Rd & I-5 NB Ramps	One-Way Stop	AM	97.7	**F**
			PM	26.0	C
7	Las Pulgas Rd & Stuart Mesa Rd	One-Way Stop	AM	24.1	C
			PM	ECL	**F**
8	Harbor Dr & Santa Fe Ave	Two-Way Stop	AM	12.1	B
			PM	ECL	**F**
9	Harbor Dr & I-5 SB Ramps	Signalized	AM	23.9	C
			PM	ECL	**F**
10	San Rafael Dr & Vandegrift Blvd	Signalized	AM	9.4	A
			PM	31.0	C
11	Wire Mountain Rd & Vandegrift Blvd	Signalized	AM	27.1	C
			PM	84.9	**E**
12	Commissary/Exchange & Vandegrift Blvd	Signalized	AM	12.9	B
			PM	44.4	D
13	Stuart Mesa Rd & Vandegrift Blvd	Signalized	AM	56.2	D
			PM	172.2	**F**
14	College Blvd & N River Rd	Signalized	AM	18.8	B
			PM	26.1	C
15	Papagallo Dr & Vandegrift Blvd	Signalized	AM	5.8	A
			PM	2.8	A
16	Ammunition Rd & Mission Rd	Signalized	AM	27.5	C
			PM	32.0	C

[1] Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At one-way or two-way stop-controlled intersections, delay refers to the worst movement.
[2] LOS calculations are based on the methodology outlined in the 2000 Highway Capacity Manual and performed using Synchro 6.0.
ECL = Exceeds Calculable Limit. Reported when delay exceeds 180 seconds.
Note: **Bold** values indicate intersections operating at LOS E or F.

Table 3.8-8
2013 Baseline Conditions –
Roadway Segment LOS Summary (Off-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Cristianitos Road					
State Beach Prkg to Cristianitos Gate	2-Lane Light Collector	16,200	7,942	0.490	**D**
I-5 NB ramp to El Camino Real	2-Lane Light Collector	16,200	4,681	0.289	C
Basilone Road					
I-5 NB ramp to San Onofre Gate	2-Lane Light Collector	16,200	9,489	0.586	**D**
Las Pulgas Road					
I-5 NB ramps to Old Pacific Hwy	2-Lane Light Collector	16,200	6,613	0.408	C
Santa Fe Avenue/Harbor Drive					
Harbor Dr to Del Mar Gate	2-Lane Light Collector	16,200	4397	0.271	C
Harbor Drive					
Santa Fe Ave to Camelo Dr	3-Lane Secondary	32,500	10,155	0.312	A
I-5 SB on-ramp to I-5 NB off-ramp	3-Lane Secondary	32,500	26,200	0.806	**D**
Capistrano Drive					
West of San Rafael Dr	Collector	8,750	2,097	0.240	A
San Rafael Drive					
North of Sunset Dr	Collector	8,750	2,772	0.317	A
Vandegrift Boulevard					
San Rafael Dr to Oceanside Gate	6-Lane Major Arterial	50,000	38,256	0.765	C
Granite Pl to Douglas Dr	4-Lane Major Arterial	40,000	19,941	0.499	A
Papagallo Dr to San Luis Rey Gate	5-Lane Major Arterial	45,000	18,102	0.402	A
Mission Road					
Ammunition Rd to Aviation Rd	4-Lane Collector	34,200	24,279	0.710	C
Ammunition Road					
Alturas Rd to Fallbrook Gate	2-Lane Town Collector	19,000	14,732	0.775	**E**

[1] The roadway classification is the same as for Table 3.8-5, Existing Conditions.
[2] The average daily traffic (ADT) is calculated by adding cumulative project ADT traffic to Existing Conditions ADT volumes.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS D, E, or F.

Table 3.8-9
2013 Baseline Conditions –
Roadway Segment LOS Summary (On-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Vandegrift Boulevard					
Wire Mountain Rd to Lemon Grove Rd	4-Lane Minor Arterial Highway	37,000	32,523	0.879	D
Lemon Grove Rd to Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	33,512	0.906	**E**
North of Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	24,610	0.665	B
East of Stagecoach Rd	4-Lane Minor Arterial Highway	37,000	23,509	0.635	B
Basilone Rd to Rattlesnake Cyn Rd	4-Lane Minor Arterial Highway	37,000	31,639	0.855	D
19th St to 16th St	4-Lane Minor Arterial Highway	37,000	12,406	0.335	A
16th St to 15th St	4-Lane Minor Arterial Highway	37,000	23,907	0.646	B
4th St to Barnett Circle	4-Lane Minor Arterial Highway	37,000	18,800	0.508	B
Stuart Mesa Road					
Vandegrift Blvd to MACS Rd	2-Lane Major Collector Roadway	19,000	19,535	1.028	**F**
MACS Rd to Bloom St	2-Lane Major Collector Roadway	19,000	14,249	0.750	**E**
North of Edson Range	2-Lane Major Collector Roadway	19,000	6,058	0.319	C
North of Aliso Canyon Rd	2-Lane Major Collector Roadway	19,000	8,495	0.447	C
El Camino Real					
Stuart Mesa Rd to Las Pulgas Rd	2-Lane Major Collector Roadway	19,000	5,977	0.315	B
Basilone Road					
East of Sandpiper Ave	2-Lane Minor Arterial Highway	19,000	8,282	0.436	C
Las Pulgas Rd to Roblar Rd	2-Lane Minor Arterial Highway	19,000	10,011	0.527	D
Stagecoach Rd to Vandegrift Blvd	2-Lane Minor Arterial Highway	19,000	14,243	0.750	**E**
San Mateo Road					
South of Cristianitos Rd	2-Lane Major Collector Roadway	19,000	5,038	0.265	B
East of 8th St	2-Lane Major Collector Roadway	19,000	4,088	0.215	B
A Street					
Vandegrift Blvd to I-5 Bridge	2-Lane Major Collector Roadway	19,000	13,246	0.697	D
Wire Mountain Road					
East of Vandegrift Blvd	4-Lane Major Collector Roadway	34,200	12,323	0.360	A
Ash Road					
East of Vandegrift Blvd	2-Lane Minor Collector Roadway	16,200	6,872	0.424	C
MACS Road					
East of Stuart Mesa Rd	2-Lane Minor Collector Roadway	16,200	2,715	0.168	B
Stagecoach Road					
Margarita Camp Access to Basilone Rd	2-Lane Minor Collector Roadway	16,200	5,061	0.312	C
San Jacinto Road					
North of Wire Mountain Rd	2-Lane Local Roadway	16,200	2,992	0.185	B
16th Street					
A St to Vandegrift Blvd	4-Lane Minor Arterial Highway	37,000	19,377	0.524	B
19th Street					
Marine Dr to Ham Rd	2-Lane Minor Arterial Highway	19,000	9,240	0.486	C
Las Pulgas Road					
West of C St	2-Lane Minor Arterial Highway	19,000	6,533	0.344	C

[1] The roadway classification is the same as for Table 3.8-6, Existing Conditions.
[2] The average daily traffic (ADT) is calculated by adding cumulative project ADT traffic to Existing Conditions ADT volumes.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS E or F.

Table 3.8-10
2014 Baseline Conditions –
Peak-Hour Intersection LOS Summary

Intersection		Traffic Control	Peak Hour	2014 No Action	
				Delay[1]	**LOS[2]**
1	Cristianitos Rd & I-5 SB Ramps	One-Way Stop	AM	13.0	B
			PM	14.4	B
2	Cristianitos Rd & I-5 NB Ramps	One-Way Stop	AM	12.8	B
			PM	13.8	B
3	Old Pacific Hwy & I-5 SB Ramps	One-Way Stop	AM	48.0	**E**
			PM	146.8	**F**
4	Basilone Rd & I-5 NB Ramps	One-Way Stop	AM	76.9	**F**
			PM	ECL	**F**
5	Las Pulgas Rd & I-5 SB Ramps	One-Way Stop	AM	11.7	B
			PM	ECL	**F**
6	Las Pulgas Rd & I-5 NB Ramps	One-Way Stop	AM	41.1	**E**
			PM	22.4	C
7	Las Pulgas Rd & Stuart Mesa Rd	One-Way Stop	AM	19.8	C
			PM	133.7	**F**
8	Harbor Dr & Santa Fe Ave	Two-Way Stop	AM	12.2	B
			PM	ECL	**F**
9	Harbor Dr & I-5 SB Ramps	Signalized	AM	23.8	C
			PM	ECL	**F**
10	San Rafael Dr & Vandegrift Blvd	Signalized	AM	8.6	A
			PM	16.1	B
11	Wire Mountain Rd & Vandegrift Blvd	Signalized	AM	24.7	C
			PM	49.1	D
12	Commissary/Exchange & Vandegrift Blvd	Signalized	AM	10.7	B
			PM	35.8	D
13	Stuart Mesa Rd & Vandegrift Blvd	Signalized	AM	44.9	D
			PM	150.6	**F**
14	College Blvd & N River Rd	Signalized	AM	18.6	B
			PM	25.8	C
15	Papagallo Dr & Vandegrift Blvd	Signalized	AM	5.7	A
			PM	3.0	A
16	Ammunition Rd & Mission Rd	Signalized	AM	27.9	C
			PM	31.8	C

[1] Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At one-way or two-way stop-controlled intersections, delay refers to the worst movement.
[2] LOS calculations are based on the methodology outlined in the 2000 Highway Capacity Manual and performed using Synchro 6.0.
ECL = Exceeds Calculable Limit. Reported when delay exceeds 180 seconds.
Note: **Bold** values indicate intersections operating at LOS E or F.

Table 3.8-11
2014 Baseline Conditions –
Roadway Segment LOS Summary (Off-Base)

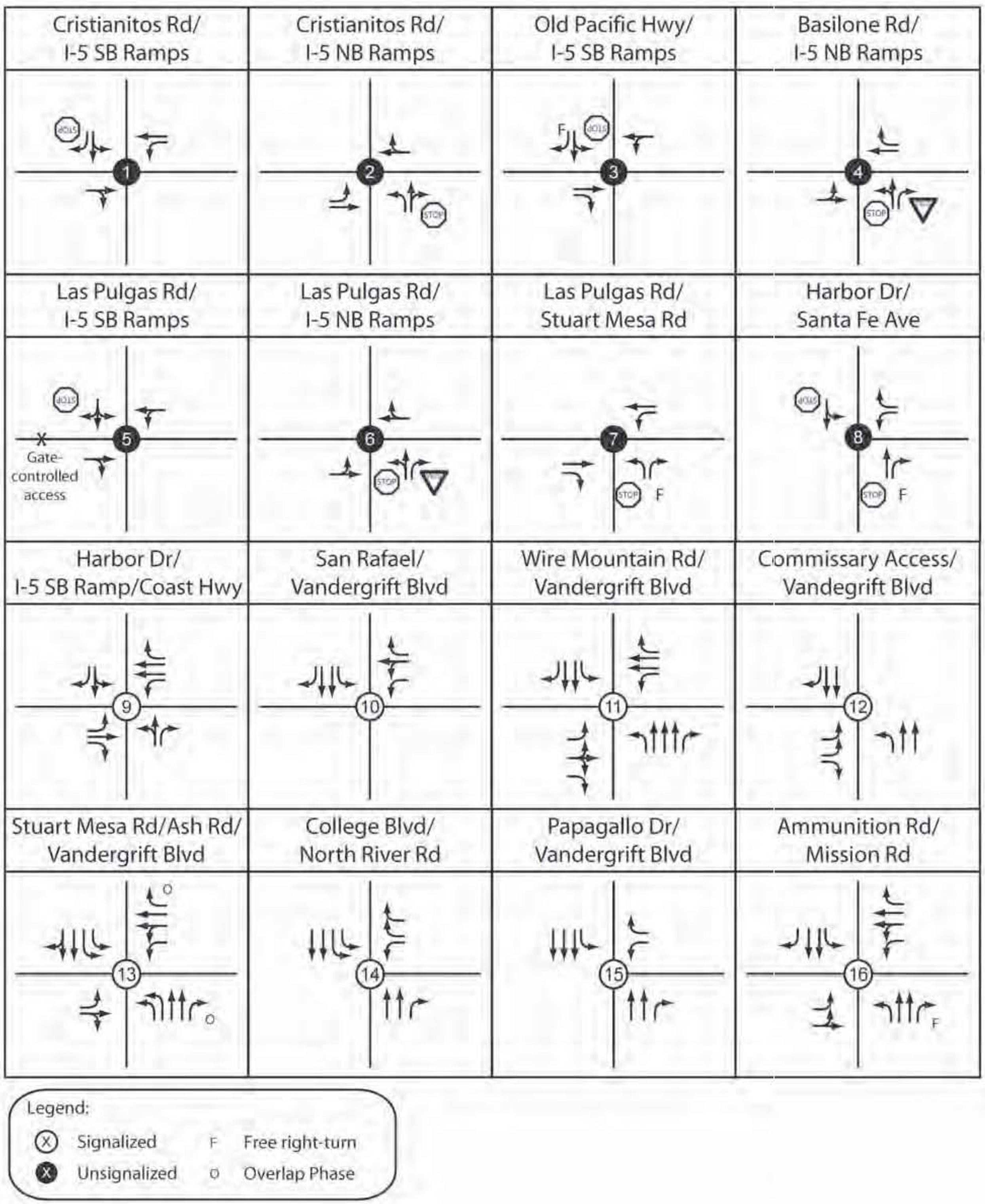
Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Cristianitos Road					
State Beach Prkg to Cristianitos Gate	2-Lane Light Collector	16,200	8,026	0.495	**D**
I-5 NB ramp to El Camino Real	2-Lane Light Collector	16,200	4,765	0.294	C
Basilone Road					
I-5 NB ramp to San Onofre Gate	2-Lane Light Collector	16,200	9,074	0.560	**D**
Las Pulgas Road					
I-5 NB ramps to Old Pacific Hwy	2-Lane Light Collector	16,200	6,456	0.399	C
Santa Fe Avenue/Harbor Drive					
Harbor Dr to Del Mar Gate	2-Lane Light Collector	16,200	3,631	0.224	B
Harbor Drive					
Santa Fe Ave to Camelo Dr	3-Lane Secondary	32,500	9,455	0.291	A
I-5 SB on-ramp to I-5 NB off-ramp	3-Lane Secondary	32,500	26,489	0.815	**D**
Capistrano Drive					
West of San Rafael Dr	Collector	8,750	2,058	0.235	A
San Rafael Drive					
North of Sunset	Collector	8,750	2,733	0.312	A
Vandegrift Boulevard					
San Rafael Dr to Oceanside Gate	6-Lane Major Arterial	50,000	39,215	0.784	C
Granite Pl to Douglas Dr	4-Lane Major Arterial	40,000	20,354	0.509	A
Papagallo Dr to San Luis Rey Gate	5-Lane Major Arterial	45,000	18,581	0.413	A
Mission Road					
Ammunition Rd to Aviation Rd	4-Lane Collector	34,200	24,581	0.719	C
Ammunition Road					
Alturas Rd to Fallbrook Gate	2-Lane Town Collector	19,000	15,335	0.807	**E**

[1] The roadway classification is the same as for Table 3.8-5, Existing Conditions.
[2] The average daily traffic (ADT) is calculated by adding cumulative project ADT traffic to Existing Conditions ADT volumes.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS D, E, or F.

Table 3.8-12
2014 Baseline Conditions –
Roadway Segment LOS Summary (On-Base)

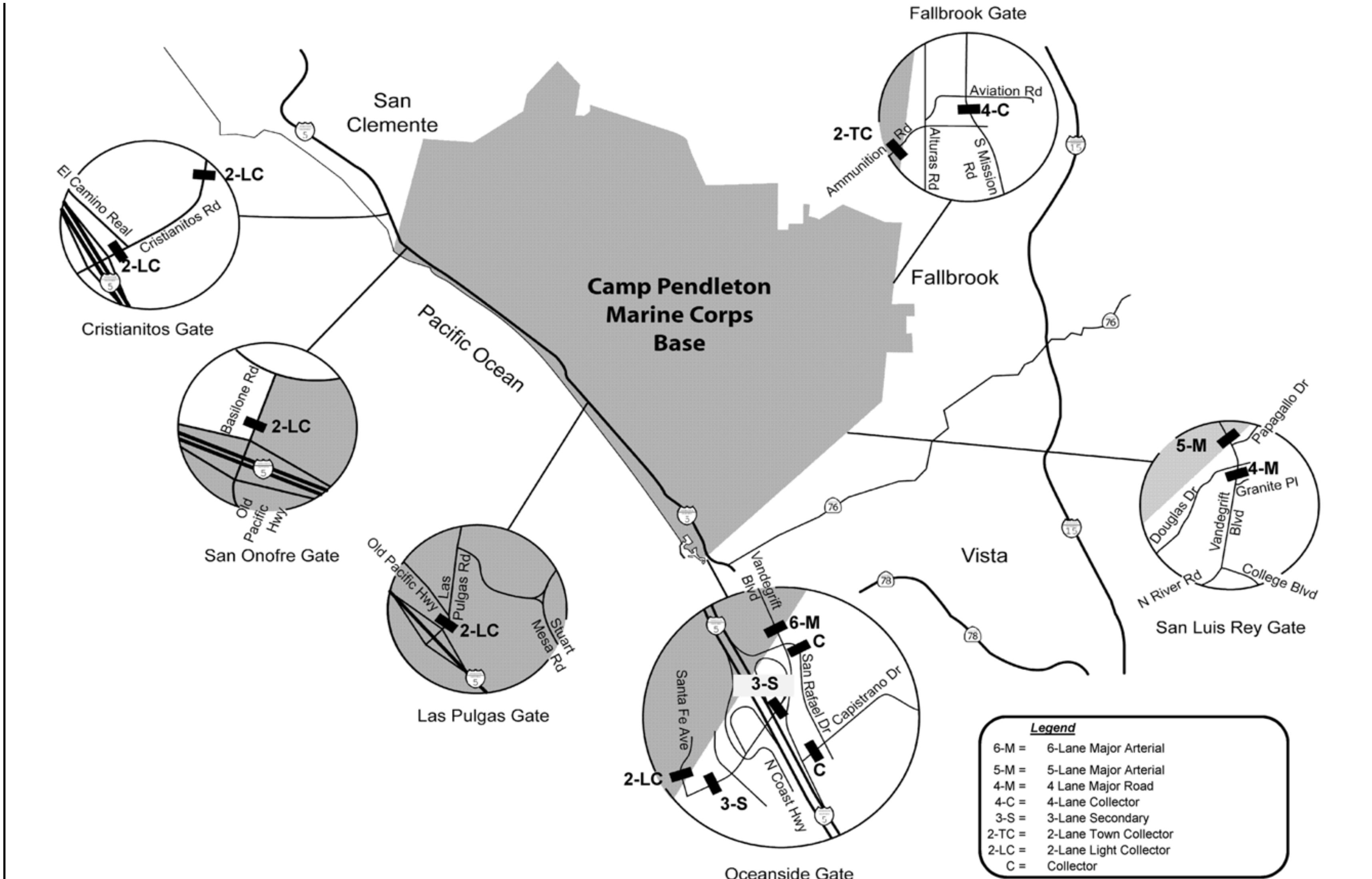
Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Vandegrift Boulevard					
Wire Mountain Rd to Lemon Grove Rd	4-Lane Minor Arterial Highway	37,000	34,555	0.934	**E**
Lemon Grove Rd to Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	35,767	0.967	**E**
North of Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	27,531	0.744	C
East of Stagecoach Rd	4-Lane Minor Arterial Highway	37,000	26,008	0.703	C
Basilone Rd to Rattlesnake Cyn Rd	4-Lane Minor Arterial Highway	37,000	33,682	0.910	**E**
19th St to 16th St	4-Lane Minor Arterial Highway	37,000	13,000	0.351	A
16th St to 15th St	4-Lane Minor Arterial Highway	37,000	24,464	0.661	B
4th St to Barnett Circle	4-Lane Minor Arterial Highway	37,000	19,261	0.521	B
Stuart Mesa Road					
Vandegrift Blvd to MACS Rd	2-Lane Major Collector Roadway	19,000	19,295	1.016	**F**
MACS Rd to Bloom St	2-Lane Major Collector Roadway	19,000	14,671	0.772	**E**
North of Edson Range	2-Lane Major Collector Roadway	19,000	6,480	0.341	C
North of Aliso Canyon Rd	2-Lane Major Collector Roadway	19,000	8,893	0.468	C
El Camino Real					
Stuart Mesa Rd to Las Pulgas Rd	2-Lane Major Collector Roadway	19,000	5,820	0.306	B
Basilone Road					
East of Sandpiper Ave	2-Lane Minor Arterial Highway	19,000	7,867	0.414	C
Las Pulgas Rd to Roblar Rd	2-Lane Minor Arterial Highway	19,000	10,274	0.541	D
Stagecoach Rd to Vandegrift Blvd	2-Lane Minor Arterial Highway	19,000	14,715	0.774	**E**
San Mateo Road					
South of Cristianitos Rd	2-Lane Major Collector Roadway	19,000	5,122	0.270	B
East of 8th St	2-Lane Major Collector Roadway	19,000	3,961	0.208	B
A Street					
Vandegrift Blvd to I-5 Bridge	2-Lane Major Collector Roadway	19,000	13,246	0.697	D
Wire Mountain Road					
East of Vandegrift Blvd	4-Lane Major Collector Roadway	34,200	11,267	0.329	A
Ash Road					
East of Vandegrift Blvd	2-Lane Minor Collector Roadway	16,200	6,602	0.408	C
MACS Road					
East of Stuart Mesa Rd	2-Lane Minor Collector Roadway	16,200	2,217	0.137	B
Stagecoach Road					
Margarita Camp Access to Basilone Rd	2-Lane Minor Collector Roadway	16,200	5,270	0.325	C
San Jacinto Road					
North of Wire Mountain Rd	2-Lane Local Roadway	16,200	2,992	0.185	B
16th Street					
A St to Vandegrift Blvd	4-Lane Minor Arterial Highway	37,000	20,674	0.559	B
19th Street					
Marine Dr to Ham Rd	2-Lane Minor Arterial Highway	19,000	9,898	0.521	D
Las Pulgas Road					
West of C St	2-Lane Minor Arterial Highway	19,000	6,955	0.366	C

1 The roadway classification is the same as for Table 3.8-6, Existing Conditions.
2 The average daily traffic (ADT) is calculated by adding cumulative project ADT traffic to Existing Conditions ADT volumes.
3 The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS E or F.



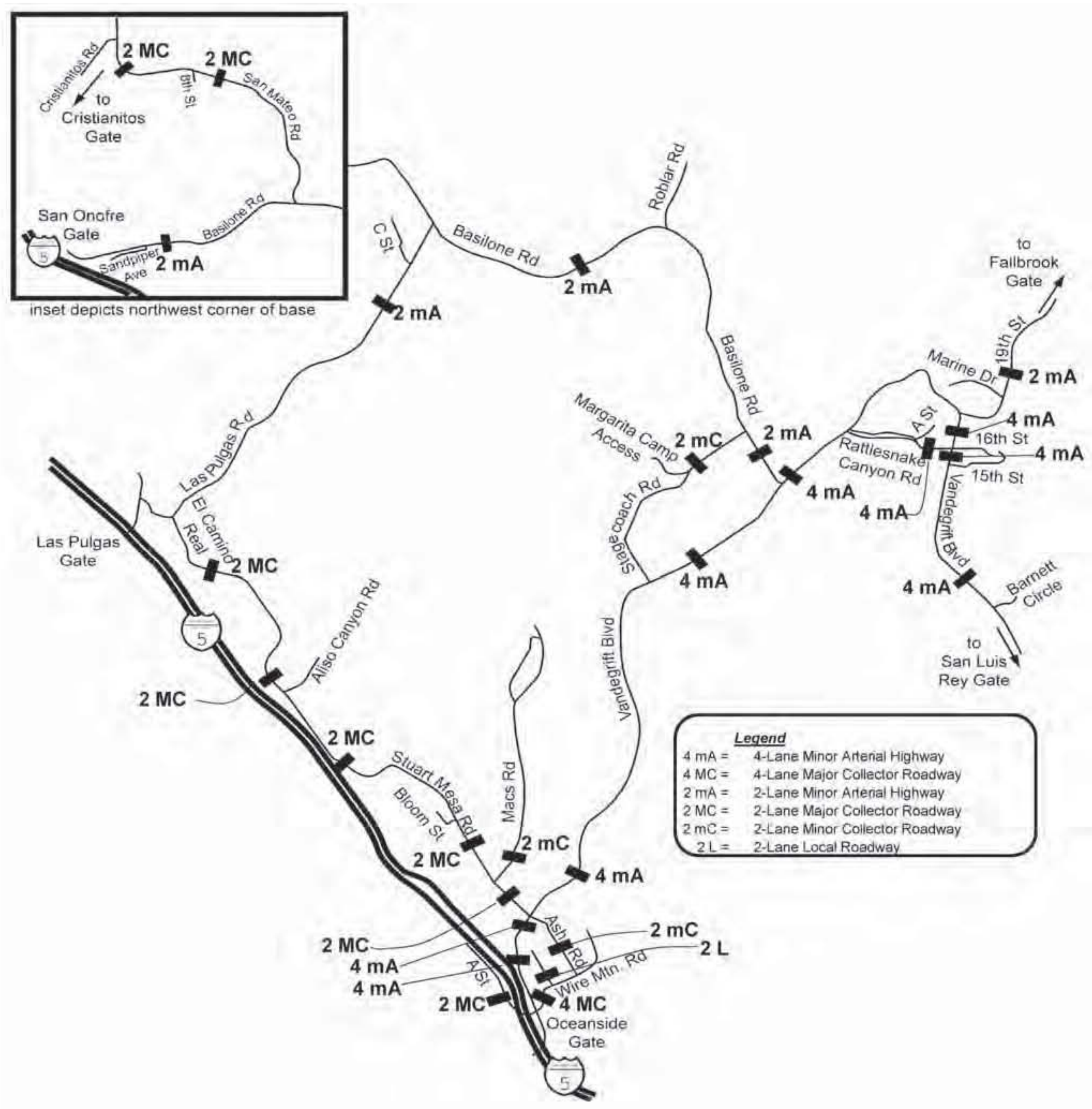
Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 3.8-1
Existing Intersection Geometrics



Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 3.8-2
Existing Off-Base Road Segment Geometrics



Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 3.8-3
Existing On-Base Road Segment Geometrics

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3.9 AIR QUALITY

3.9.1 Definition of Resource

Air quality is defined as a measurement of pollutants in the air, and the health and safety aspect to humans. Air pollutants are any substances, natural or artificial, capable of being airborne, that in high enough concentration, harm humans, other animals, vegetation, or materials. Sources of pollution include the combustion of fossil fuels in transportation sources, and residential, industrial, and commercial facilities; and the generation and disturbance of particulate matter and soil. In the presence of sunlight, air pollutants can undergo or trigger chemical reactions to form by-product pollutants such as ozone and smog. When air pollutants accumulate in high enough concentrations, human health and the environment can be harmed. Additionally, natural processes and human activities produce greenhouse gases, which absorb and emit thermal infrared radiation. This, in turn, affects air temperature and, in high enough concentrations, increases in greenhouse gases can result in climate change on a global scale.

3.9.2 Regulatory Setting

Federal Standards

National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS) were established by the federal CAA of 1970 (as amended in 1977 and 1990). NAAQS represent the maximum levels of air pollution considered safe to protect public health and welfare from known or anticipated effects of air pollution. Initially, NAAQS were established for six criteria pollutants of concern: ozone (O_3); carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead (Pb); and particulate matter (PM). A criteria pollutant is any air pollutant for which there is an established NAAQS. More recently, PM was divided into two separate standards: inhalable particulates, equal to or smaller than 10 microns in diameter (PM_{10}); and fine particulates, equal to or smaller than 2.5 microns in diameter ($PM_{2.5}$). Pb is considered in the demolition of older facilities (constructed pre-1980s) that may contain lead-based paint (LBP). Table 3.9-1 contains the current NAAQS for the criteria air pollutants. Hydrogen sulfide (H_2S), sulfates (SO_4), visibility reducing particles, and vinyl chloride are not addressed in this analysis as negligible to no emissions of these pollutants would be generated by the proposed projects.

Ozone

O_3 is a colorless, odorless gas at certain concentrations and primarily exists in the upper atmosphere (stratosphere) as the ozone layer, and in the lower atmosphere (troposphere) as a pollutant. O_3 is a principal cause of lung and eye irritation in the urban environment. O_3 is the principal component of smog, which is formed in the troposphere through a series of reactions involving volatile organic compounds (VOCs) and oxides of nitrogen (NO_X) in the presence of sunlight. Therefore, VOCs and NO_X are precursors of O_3. NO_X includes various combinations of nitrogen and oxygen, including nitric oxide (NO), NO_2, and nitrogen trioxide (NO_3). VOCs and NO_X emissions are both considered critical in O_3 formation. Control strategies for O_3 have focused on reducing these emissions from vehicles, industrial processes using solvents and coatings, and consumer products. Significant O_3 concentrations are normally produced only in the summer, when atmospheric inversions are greatest and temperatures are high.

Carbon Monoxide

CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Overall, CO emissions are decreasing because of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973. CO concentrations are typically higher in the winter; therefore, California has required the use of oxygenated gasoline in the winter months to reduce CO emissions.

Nitrogen Dioxide

NO_2 is a gas and a product of the combustion of fossil fuels generated from vehicles and stationary sources, such as power plants and boilers. NO_2 can cause lung damage. As noted above, NO_2 is a type of NO_X and is a principal contributor to O_3 and smog production.

Sulfur Dioxide

SO_2 is a gas and the product of the combustion of fossil fuels, with the primary source being power plants and heavy industry that utilize coal or oil as fuel. SO_2 is also a product of diesel engine emissions. The human health effects of SO_2 include lung disease and breathing problems for asthmatics. SO_2 in the atmosphere contributes to the formation of acid rain.

Lead

Pb is a highly toxic metal that may cause a range of human health effects. Pb anti-knock additives in gasoline represent a major source of Pb emissions to the atmosphere. However, Pb emissions have significantly decreased due to the near elimination of leaded gasoline use. LBP, banned or limited by USEPA in the 1980s, is a health hazard when deteriorating (peeling, chipping, or cracking) or altered (scraped, sanded, or heated), generating lead dust.

Particulate Matter

PM is a complex mixture of extremely small particles and liquid droplets. PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Natural sources of particulates include windblown dust and ocean spray. Some particles are emitted directly into the atmosphere. Others, referred to as secondary particles, result from gases that are transformed into particles through physical and chemical processes in the atmosphere.

The size of PM is directly linked to the potential for causing health problems. USEPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Health studies have shown a significant association between exposure to PM and premature death. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and irregular heartbeat (USEPA 2007). Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. USEPA groups PM into two categories, coarse PM (or PM_{10}) and fine PM (or $PM_{2.5}$), as described below.

PM_{10}, or inhalable coarse particles such as those found near roadways and dusty industries, are smaller than 10 micrometers in diameter. Sources of coarse particles include crushing or grinding operations, and dust from paved or unpaved roads. Control of PM_{10} is primarily achieved through the control of dust at construction and industrial sites, the cleaning of paved roads, and the wetting or paving of frequently used unpaved roads.

$PM_{2.5}$ includes the subgroup of finer particles, such as those found in smoke and haze, with an aerodynamic diameter of 2.5 microns or smaller. These finer $PM_{2.5}$ particles pose an increased health risk because they can deposit deep in the lung and contain substances that are particularly harmful to human health. Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. $PM_{2.5}$ is the major cause of reduced visibility (haze) in California. Control of $PM_{2.5}$ is primarily achieved through the regulation of emission sources; these regulations include USEPA's Clean Air Interstate Rule and Clean Air Visibility Rule for stationary sources, the 2004 Clean Air Nonroad Diesel Rule, the Tier 2 Vehicle Emission Standards, and Gasoline Sulfur Program; or the California Air Resources Board (CARB) Goods Movement Reduction Plan, and Air Toxic Control Measures.

Attainment Status

When an area is in violation of NAAQS for a criteria pollutant, the federal CAA requires that the area be designated as nonattainment for the pollutant violated. Specific geographic areas or air basins are designated by USEPA as either "attainment" or "nonattainment" areas for each criteria pollutant based on area air quality monitoring data exceeding NAAQS.

MCBCP is located almost entirely within the San Diego Air Basin (SDAB), with a small portion of the northwest corner of the Base located within the Orange County portion of the South Coast Air Basin (SCAB). SDAB is coincident with all of San Diego County; and SCAB encompasses all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties.

SDAB is designated as a federal nonattainment area for 8-hour O_3 based on current violations of O_3 NAAQS; and SCAB is designated as a federal nonattainment area for 8-hour O_3, PM_{10}, and $PM_{2.5}$ (USEPA 2009a).

The CAA requires each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce NAAQS throughout the state. SIP documents are developed on a pollutant-by-pollutant basis whenever one or more NAAQS are being violated. In California, local air pollution control districts have the primary responsibility for developing and adopting the regional elements of the California SIP.

If an area is redesignated by USEPA from nonattainment to attainment, the CAA requires a revision to the SIP, called a maintenance plan, to demonstrate how the air quality standard will be maintained for at least 10 years. The SDAB and SCAB were redesignated by USEPA from nonattainment to attainment for CO and are currently under CO attainment/maintenance plans.

General Conformity

The 1990 Amendment to CAA Section 176 requires USEPA to promulgate rules to ensure that federal actions conform to the appropriate SIP. These rules, known as the General Conformity Rule (40 C.F.R. §§ 51.850–51.860 and 93.150–93.160), require any federal agency, responsible for an action in a federal nonattainment or attainment/maintenance area, to demonstrate conformity to the applicable SIP, by either determining that the action is exempt from the General Conformity Rule requirements, or subject to a formal conformity determination.

The Marine Corps provides policy and procedures for compliance with the General Conformity Rule in MCO P5090.2A, *Environmental Compliance and Protection Manual*, Chapters 6 and 12 (USMC 2009c).

Actions would be exempt, and thus conform to the SIP, if an applicability analysis shows that the total direct and indirect emissions of nonattainment or attainment /maintenance pollutants from project construction and operation activities would be less than specified emission rate thresholds, known as *de minimis* levels. If not determined exempt, a formal air quality conformity analysis would be required to determine conformity. A Record of Non-Applicability (RONA) is prepared to document compliance of the proposed action. A RONA is a memorandum required by U.S. Navy policy that reflects the determination of an authorized official that a formal conformity analysis/determination is not required for a proposed action (U.S. Navy 2007).

The proposed action sites are located primarily within SDAB, which is a federal nonattainment area for 8-hour O_3, and an attainment/maintenance area for CO. Therefore, the General Conformity Rule is applicable for emissions of CO and for O_3 precursors VOCs and NO_X for the proposed projects in SDAB. These proposed projects would include construction equipment and vehicle sources that would emit CO, VOCs, and NO_X. The applicable General Conformity *de minimis* thresholds for the proposed projects in SDAB are shown in Table 3.9-2.

Some minor portions of the proposed projects (the terminus of water pipelines), located in the northwest corner of the Base, are within the southwest corner of the Orange County portion of SCAB, which is a federal attainment/maintenance area for CO, and a nonattainment area for 8-hour O_3, PM_{10}, and $PM_{2.5}$. Therefore, the General Conformity Rule is applicable for emissions of CO, O_3 precursors VOCs and NO_X, and PM_{10}, and $PM_{2.5}$ for the portion of the proposed projects extending into SCAB. The applicable General Conformity *de minimis* thresholds in SCAB are the same in SDAB for CO; however, the SCAB thresholds for VOCs and NO_X are more stringent than in SDAB. PM_{10} and $PM_{2.5}$ *de minimis* thresholds are applicable for projects in SCAB. The applicable General Conformity *de minimis* thresholds for the proposed projects in SCAB are shown in Table 3.9-3.

Localized Carbon Monoxide

In addition to regional CO emissions, localized CO emissions can be of concern. Vehicle traffic emissions can cause localized CO impacts. Severe vehicle congestion at major signalized intersections can generate elevated CO levels, called “hotspots,” that can be hazardous to human receptors adjacent to the intersection. Severe vehicle congestion is determined by level of service (LOS) analysis for roadways and intersections. Localized CO impacts are typically of concern at signalized intersections of unacceptable LOS, according to the Transportation Project-level Carbon Monoxide Protocol (CO Protocol) (UCD ITS 1997).

Toxic Air Contaminants

Air quality regulations also focus on localized hazardous air pollutants, which are also called toxic air contaminants (TACs). For those TACs that may cause cancer, in general, there is no minimum concentration that does not present some risk (i.e., there is no threshold level below which adverse health impacts may not be expected to occur). This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and ambient standards have been established (i.e., NAAQS).

USEPA and CARB have ongoing programs to identify and regulate TACs. Among the many substances identified as TACs are asbestos, Pb, and diesel exhaust particulates. The regulation of TACs is generally through statutes and rules that require the use of the maximum or best available control technology (MACT or BACT) to limit TAC emissions.

MACT/BACT for asbestos and Pb have been identified for many years and there are established rules and procedures to prevent dispersion and inhalation of these substances. Asbestos is a naturally occurring mineral used up until the mid-1980s in building materials for thermal and acoustical insulation and fire resistance until a partial ban by USEPA in 1989. Pb, which has a NAAQS, was used in paint for housing up until 1978 when LBP was banned by USEPA for use in housing. Asbestos and Pb, when disturbed during building demolition, can become airborne as inhalable health hazard pollutants and therefore require abatement before demolition.

Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a TAC by CARB in 1998. The control of diesel PM emissions is a very active current concern of regulatory agencies at all levels. According to the 2006 California Almanac of Emissions and Air Quality (CARB 2006), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. The composition of diesel PM emissions from diesel-fueled engines varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Federal and state efforts to reduce diesel PM emissions have focused on the use of improved fuels, adding particulate filters to engines, and requiring the production of new-technology engines that emit fewer exhaust particulates.

Greenhouse Gases/Climate Change

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The accumulation of GHGs in the atmosphere regulates the earth's temperature. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHGs.

Climate change associated with global warming is predicted to produce negative environmental, economic, and social consequences across the globe. Recent observed changes include shrinking glaciers, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges (IPCC 2007). Predictions of long-term negative environmental impacts due to global warming include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack. In California, predictions of these effects include exacerbation of air quality problems; a reduction in municipal water supply from the Sierra Nevada snowpack; a rise in sea level that would displace coastal businesses and residences; damage to marine and terrestrial ecosystems; and an increase in the incidence of infectious diseases, asthma, and other human health problems (CalEPA 2006).

Aside from water vapor, a naturally occurring GHG that accounts for the largest percentage of the greenhouse effect, the most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide. Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride. Each GHG is assigned a global warming potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of 1. For example, CH_4 has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. To simplify analyses, total GHG emissions from a source are often expressed as a CO_2 equivalent (CO_2e). The CO_2e is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs.

Federal agencies are, on a national scale, addressing emissions of GHGs by reductions mandated in federal laws and EOs, most recently, EO 13423 and further expanded by EO 13514. Several states have promulgated laws as a means to reduce statewide levels of GHG emissions. In particular, the California Global Warming Solutions Act of 2006 directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020. In addition, groups of states (such as the Western Climate Initiative) have formed regionally based collectives to jointly address GHG pollutants.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EO 13423 and the Energy Policy Act of 2005, the DoN and Marine Corps have implemented a number of renewable energy projects (NAVFAC SW 2006). The types of projects currently in operation within the Naval Facilities Engineering Command, Southwest (NAVFAC SW) region include thermal and photovoltaic solar systems, geothermal power plants, and wind generators. The military also purchases one-half of the biodiesel fuel sold in California. The DoN continues to promote and install new renewable energy projects within the NAVFAC SW region.

The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, the impact of proposed GHG emissions to climate change is discussed in the context of cumulative impacts in Chapter 5 of this EIS. Appendix D presents estimates of GHG emissions

Odor

Odor is considered an air quality issue, either at the local level (e.g., odor from water treatment) or at the regional level (e.g., smoke from wildfires). Odor is an air quality consideration for NEPA projects.

Regional Standards

Regional air quality is typically defined by geographical areas or air basins. All of San Diego County, containing the large majority of MCBCP, is located within SDAB. Orange County, containing a small portion of MCBCP, is in SCAB.

In SDAB, APCD is the agency responsible for protecting public health and welfare through the administration of federal and state air quality laws and policies. The corresponding agency for SCAB is the South Coast Air Quality Management District (SCAQMD). These air districts monitor air pollution, prepare and implement their portion of the SIP, and promulgate Rules and Regulations. The SIP for each air district includes strategies and tactics to be used to attain and maintain acceptable air quality in each jurisdiction including establishing annual air emission budgets for the area. In SDAB, this list of strategies is contained in the Regional Air Quality Strategy, while in SCAB, they are contained in the Air Quality Management Plan. The Rules and Regulations for each district include procedures and requirements to control the emission of pollutants and prevent significant adverse impacts.

San Diego APCD and SCAQMD regulations require permits for any equipment that emits or controls air contaminants before construction, installation, or operation (e.g., Authority to construct or Permit to Operate). San Diego APCD and SCAQMD are responsible for review of permit applications and the approval and issuance of these permits in their respective air districts.

3.9.3 Region of Influence

The ROI for air quality analysis is the combined area of SDAB and SCAB. Localized air quality may be defined by air quality monitoring stations on or in proximity to the Base.

3.9.4 Existing Conditions – Basewide

Existing air quality conditions on-Base are defined regionally.

Climate, Topography, and Meteorology

Climate, topography, and meteorology influence regional and local ambient air quality. Southern California is characterized as a semiarid climate, although it contains three distinct zones of rainfall with coinciding floristic patterns. The region's climatic zones may be roughly defined as being coincident with its broad geographic and topographic regions of coast, mountain, and desert. Subregions within these regions consist of coastal valleys lying below the mountains, separated from the ocean shore by plateaus and low hills behind the coastline. MCBCP is characterized by coastal plain, coastal valley, and mountainous terrain (U.S. Navy 2000).

The coastal plain is characterized by a mild temperature range of 35 to 90 degrees Fahrenheit (°F). The coastal valleys have a wider range from 30 to 100°F, while the mountains have a range of 25 to 80°F (U.S. Navy 2000). Seasonal rainfall along the coast is about 10 inches in the coastal San Diego County area, and rainfall in the mountains averages 20 to 40 inches, depending on slope and elevation. Most precipitation occurs between November and March, but wide variations take place in monthly and seasonal totals (U.S. Navy 2000).

The general region lies in the semipermanent, high-pressure zone of the eastern Pacific (the Pacific High), resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The typical daily wind pattern is a light to moderate westerly onshore sea breeze during the daytime, giving way to light offshore breezes during the night. The Pacific High maintains clear skies for much of the year and drives the dominant onshore circulation. During fall, the region often experiences dry, warm easterly winds, locally referred to as Santa Ana winds, which raise temperatures and lower humidity, often to less than 20 percent (U.S. Navy 2000).

A dominant characteristic of spring and summer is night and early morning cloudiness, locally known as the marine layer. Low clouds form regularly, frequently extending inland over the coastal foothills and valleys. These clouds usually dissipate during the morning, and afternoons are generally clear. Fog occurs along the southern California coast an average of 29 days a year (U.S. Navy 2000).

A common atmospheric condition known as a temperature inversion affects air quality in SDAB and SCAB. During a temperature inversion, air temperatures get warmer rather than cooler with increasing height. The Pacific High helps create two types of temperature inversions—subsidence and radiation—that contribute to the degradation of local air quality. Subsidence inversions occur during the warmer months (May through October) as descending air associated with the Pacific High comes into contact with cool marine air. The boundary between the layers of air represents a temperature inversion that traps pollutants below it. The inversion layer is approximately 2,000 feet AMSL during the months of May through October. During the winter months (November through April), the inversion layer is approximately 3,000 feet AMSL. Inversion layers are important elements of local air quality because they inhibit the dispersion of pollutants, thus resulting in a temporary degradation of air quality. Radiation inversions typically develop on winter nights with low wind speeds, when air near the ground cools by radiation and the air aloft remains warm. A shallow inversion layer that can trap pollutants is formed between the two layers.

Regional Air Quality

The SDAB currently meets federal standards for all criteria pollutants except O_3. USEPA designated SDAB as a “basic” nonattainment area for the 8-hour O_3 standard; “basic” is the least severe of the six degrees of O_3 nonattainment. APCD submitted an 8-hour O_3 attainment plan to CARB in 2007 for inclusion into the SIP that demonstrates how the 8-hour O_3 standard will be attained by 2009 (APCD 2007). The attainment plan was approved by CARB on 24 May 2007 and subsequently submitted to USEPA for approval (pending). The SDAB is designated as an attainment/maintenance area for CO under a federal CO maintenance plan following its 1998 redesignation from CO nonattainment to attainment (USEPA 2009a). The SDAB currently meets California standards of all criteria pollutants except for O_3, PM_{10}, and $PM_{2.5}$. The SDAB is designated as a “serious” state O_3 nonattainment area, and a state nonattainment area for PM_{10} and $PM_{2.5}$ (CARB 2007).

The Orange County portion of SCAB is currently classified as a federal “extreme” nonattainment area for $O_{3,}$ a “serious” nonattainment area for PM_{10}, a nonattainment area for $PM_{2.5}$, and a CO maintenance area. The SCAB is designated as a state attainment area for CO. The entire SCAB currently meets federal and California standards for NO_2, SO_2, and Pb and, therefore, is classified as an attainment area for these pollutants (USEPA 2009a; CARB 2007).

Local Ambient Air Quality

Ambient air pollutant concentrations are measured at 10 air quality monitoring stations in SDAB operated by APCD. The monitoring station closest to the project sites is the MCBCP monitoring station, which monitors O_3 and NO_2. Since the MCBCP station does not monitor all criteria pollutants, monitoring data for CO and PM_{10} were taken from the next closest monitoring station, the Escondido-East Valley Parkway monitoring station. Located at 600 East Valley Parkway in the city of Escondido, approximately 19 miles southeast of the MCBCP monitoring station, the Escondido-East Valley Parkway station monitors O_3, CO, NO_2, $PM_{2.5}$, and PM_{10}.

The MCBCP monitoring station is primarily influenced by Base operations and aircraft operations at MCAS Camp Pendleton. The Escondido-East Valley Parkway monitoring station is primarily influenced by downtown Escondido land uses and may not be completely representative of MCBCP; however, CO, $PM_{2.5}$, and PM_{10} data from the Escondido Station are provided since the MCBCP station does not monitor for these criteria pollutants.

Table 3.9-4 summarizes the maximum concentrations and standards exceedances of O_3, CO, NO_2, $PM_{2.5}$, and PM_{10} recorded at the monitoring stations during the most recent 5 years of available data (2004 through 2008).

As shown in Table 3.9-4, there were no exceedances of the NAAQS in 2005 and 2006. Between 2004 and 2008, the federal 1-hour O_3 standard was not exceeded but the federal 8-hour O_3 standard was exceeded in 2004 and 2008. The federal 1- and 8-hour CO standards and the federal 24-hour PM_{10} standard were not exceeded. The federal 24-hour $PM_{2.5}$ standard was exceeded once in 2004 and 2008, and 11 times in 2007.

Pollution Sources

<u>Regional Sources</u>

The most significant regional sources of PM_{10} and $PM_{2.5}$ are construction, demolition, and dust from vehicle use on paved and unpaved roads. Coarser particles are directly emitted from activities that disturb the soil, including entrained dust from travel on paved and unpaved roads, construction, mining, and agricultural operations. Other sources include windblown dust, pollen, salts, brake dust, and tire wear. Combustion sources such as vehicles, diesel engines, and industrial facilities also emit PM_{10} and $PM_{2.5}$.

The most significant regional sources of O_3, NO_2, and CO are automobiles and other on-road vehicles. O_3 is formed by the reaction of VOCs and NO_X, which are combustion products from gas and diesel engines. Other important sources of VOCs are paints, coatings, and process solvents.

Local Sources

The Base generates PM and exhaust emissions from construction and operational activities. PM becomes airborne from vehicle travel on paved and unpaved roads; training exercises, including amphibious, convoy, and vehicular operations; and landscaping, maintenance, and construction activities. Exhaust emissions of O_3, NO_2, and CO are generated by vehicle traffic on-Base; aircraft operations at MCAS Camp Pendleton; weapons firing; maintenance, landscaping, and construction equipment and vehicles; and small stationary sources. The segment of I-5 on the Base is a major source of vehicular pollutant emissions. The Base has the potential to generate odor locally at its wastewater and water treatment facilities.

3.9.5 Existing Conditions – Proposed Project Areas

Existing air quality conditions at specific locations on-Base are not monitored or regulated. Air quality on-Base is affected by local and regional air pollution sources, transported by climate and weather. There are no known existing air quality resource issues of a localized nature of note within the proposed project areas.

Table 3.9-1
National Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]	
		Primary[2]	Secondary[3]
Ozone (O_3)[4]	1-Hour	-	Same as Primary Standard
	8-Hour	0.075 ppm	
Carbon Monoxide (CO)	8-Hour	9.0 ppm	None
	1-Hour	35 ppm	
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm	Same as Primary Standard
	1-Hour	-	
Sulfur Dioxide (SO_2)	Annual Average	0.03 ppm	-
	24-Hour	0.14 ppm	-
	3-Hour	-	0.5 ppm
	1-Hour	0.075 ppm	-
Suspended Particulate Matter (PM_{10})[5]	24-Hour	150 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	Revoked	
Fine Particulate Matter ($PM_{2.5}$)[6]	24-Hour	35 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	15 µg/m^3	
Lead (Pb)	30-Day Average	-	-
	Calendar Quarter	1.5 µg/m^3	Same as Primary Standard

[1] NAAQS (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the USEPA for further clarification and current federal policies.
[2] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
[3] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
[4] On 15 June 2005, the 1-hour ozone standard was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (those areas do not yet have an effective date for their 8-hour designations). Additional information on federal ozone standards is available at http://www.epa.gov/oar/oaqps/greenbk/index.html.
[5] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the USEPA revoked the annual PM_{10} standard on 17 December 2006.
[6] Effective 17 December 2006, the USEPA lowered the $PM_{2.5}$ 24-hour standard from 65 µg/m^3 to 35 µg/m^3.
ppm = parts per million; µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter
Source: CARB 2008; USEPA 2009b.

Table 3.9-2
General Conformity *de minimis* Thresholds for Projects in SDAB

Pollutant	Emission Threshold (tons/year)
CO	100[1]
NO_X	100[2]
VOCs	100[2]

[1] Attainment/maintenance area for CO.
[2] Basic nonattainment area for 8-hour O_3 precursors: NO_X and VOCs.
Source: 40 C.F.R. § 93

Table 3.9-3
General Conformity *de minimis* Thresholds
for Projects in SCAB

Pollutant	Emission Threshold (tons/year)
CO	100[1]
NO_X	10[2]
VOCs	10[2]
PM_{10}	70[3]
$PM_{2.5}$	100[4]

[1] Attainment/maintenance area for CO.
[2] Extreme nonattainment area for 8-hour O_3 precursors: NO_X and VOCs.
[3] Serious nonattainment area for PM_{10}.
[4] Nonattainment area for $PM_{2.5}$.
Source: 40 C.F.R. § 93

Table 3.9-4
Ambient Air Quality Summary, MCBCP and Escondido-East Valley Parkway Monitoring Stations

Pollutant	Averaging Time	CAAQS	NAAQS	Maximum Concentrations[a]					Number of Days Exceeding Federal Standard[b]					Number of Days Exceeding California Standard[b]				
				2004	2005	2006	2007	2008	2004	2005	2006	2007	2008	2004	2005	2006	2007	2008
Ozone	1 hour	0.09 ppm	none	0.110	0.090	0.086	0.083	0.082	0	0	0	0	0	4	0	0	0	0
	8 hour	0.07 ppm	0.08 ppm	0.095	0.074	0.073	0.074	0.076	2	0	0	0	2	12	2	5	4	3
Carbon Monoxide*	1 hour	20 ppm	35 ppm	5.3	5.9	5.7	5.2	-	0	0	0	0	0	0	0	0	0	0
	8 hours	9.0 ppm	9 ppm	3.61	3.10	3.61	3.95	2.81	0	0	0	0	0	0	0	0	0	0
Nitrogen Dioxide	1 hour	0.18 ppm	None	0.099	0.077	0.081	0.068	0.085	NA	NA	NA	NA	NA	0	0	0	0	0
	Annual	0.030 ppm	0.053 ppm	0.012	0.012	0.011	0.010	0.010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PM_{10}*	24 hours	50 μg/m^3	150 μg/m^3	57	42	51	68	82	0	0	0	0	0	1	0	1	1	1
	Annual/AAM[c]	20 μg/m^3	revoked	27.5	23.9	24.1	26.9	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
$PM_{2.5}$*	24 hours	none	35 μg/m^3	67.3	43.1	40.6	126.2	38.6	1	0	0	11	1	NA	NA	NA	NA	NA
	Annual/AAM	12 μg/m^3	15 μg/m^3	14.1	-	11.5	13.3	38.1	NA	-	NA	NA	NA	NA	NA	NA	NA	NA

"*" = Data were taken from Escondido-East Valley Parkway monitoring station.
"–" = data not available
"NA" = not applicable
[a] Concentration units for O_3, CO, and NO_2 are in parts per million (ppm). Concentration units for PM_{10} are in micrograms per cubic meter (μg/m^3).
[b] For annual standards, a value of 1 indicates that the standard has been exceeded. Exceedances are based on the standard at the time of measurement.
[c] Annual arithmetic mean (AAM)
Source: CARB 2009; APCD 2008

3.10 NOISE

3.10.1 Definition of Resource

Noise is generally defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in the extreme, hearing impairment.

Noise levels are measured as decibels (dB) on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would not double the noise level, but instead the noise level would increase by 3 dB.

The human ear is not equally sensitive to all frequencies within the sound spectrum. Sound can be characterized as the "A weighted" sound level (dBA), which gives greater weight to the frequencies audible to the human ear by filtering out noise frequencies not audible to the human ear. Human judgments of the relative loudness or annoyance of a sound correlate well with the dBA levels; therefore, the dBA scale is used for measurements and standards involving the human perception of noise. Noise levels from aircraft and small arms firing are measured in dBA.

Impulse noise (high amplitude noise resulting from armor, artillery, and demolition activities) is measured in C-weighted decibels (dBC), which measures more low frequency noise components than the dBA scale. The dBC scale is considered to better represent community response to impulse noise, as low frequency noise components can cause buildings and windows to rattle and shake.

Human perception of noise is not linear and, therefore, has no simple correlation with acoustical energy (e.g., two noise sources do not sound twice as loud as one source). It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease; that a change of 5 dBA is readily perceptible; and that an increase (decrease) of 10 dBA sounds twice (half) as loud (Caltrans 1998). Table 3.10-1 provides common indoor and outdoor activities and the corresponding sound levels to demonstrate human perception of the correlation of noise with acoustical energy.

In addition to instantaneous noise levels, the occurrence or magnitude of noise over time is also important for noise assessment. Average noise levels over a period of time are usually expressed as dBA $L_{eq(x)}$, the equivalent noise level for that period (x). For example, $L_{eq(3)}$ would be a 3-hour average; when no period is specified (L_{eq}), a 1-hour average $L_{eq(1)}$ is assumed.

The time of day is also an important factor in noise assessment, as noise levels that may be acceptable during the day may interfere with evening activities (between 7:00 p.m. and 10:00 p.m.) or sleep activities during night hours (between 10:00 p.m. and 7:00 a.m.). Therefore, there are 24-hour average noise level descriptors that add noise “penalties” to noise levels during the evening and night periods. The community noise equivalent level (CNEL) is a descriptor of the cumulative 24-hour community noise exposure with 5 and 10 dBA added to evening and night sound levels. The Day/Night Average Sound Level (L_{dn}) is similar to CNEL, except the evening period is considered as part of the daytime period.

Noise levels naturally attenuate with distance between source and receiver, assuming no intervening topography or structures, at a rate of 6 dBA per doubling of distance over hard site surfaces (e.g., streets and parking lots), and a rate of 7.5 dBA per doubling of distance for soft site surfaces (e.g., open space with vegetation).

3.10.2 Regulatory Setting

Navy and Marine Corps Standards

The Navy and Marine Corps provide the following guidance for reducing environmental noise and establishing noise compatibility criteria for land uses at Marine Corps installations including air, range, and range air installations at MCBCP.

Marine Corps Order P5090.2A, Marine Corps Environmental Compliance and Protection Manual

MCO P5090.2A provides guidance and instruction to installations enabling them to meet stringent environmental legislation by regulatory agencies at the federal, state, and local level. Chapter 13 of the manual establishes Marine Corps policy and responsibilities for compliance with statutory requirements for reducing environmental noise at Marine Corps installations.

Naval Facilities Engineering Command P-970, Planning in the Noise Environment

NAVFAC P-970 is the environmental guidance document for MCBCP, except for areas within the influence of MCAS Camp Pendleton that are subject to MCO 11010.16

(below). NAVFAC P-970 provides noise compatibility criteria for various land uses. Exterior sound levels up to 65 dBA CNEL are determined compatible with land uses such as residences, transient lodging, classrooms, and medical facilities; appropriate noise mitigation is required if between 65 and 75 dBA CNEL. Exterior sound levels exceeding 75 dBA CNEL are incompatible with these types of land uses (U.S. Navy 1978).

MCO 11010.16, Air Installation Compatible Use Zones Program

MCO 11010.16 recommends land uses that would be compatible with noise levels associated with military airfield operations (USMC 2008). The area of MCBCP that includes or is in the area of noise influence from MCAS Camp Pendleton would be subject to MCO 11010.16 (USMC 2008). The DoD established the Air Installation Compatible Use Zones (AICUZ) program to effectively plan for land use compatibility surrounding military air installations including promoting compatible development in high noise exposure areas. The AICUZ program recommends land uses that will be compatible with noise levels, accident potential, and flight clearance requirements associated with military airfield operations.

The AICUZ program provides noise impact zones delineated by contours that radiate out from the airfield runway, which for MCAS Camp Pendleton range from 75 to 60 dBA CNEL based on a maximum of 176,200 annual operations. The primary noise generators are aircraft approaches and departures to the MCAS runway. Acceptable land uses and minimum building sound level requirements have been established by MCO 11010.16 for areas outside of the 70 dBA CNEL contour. Residential areas and professional services buildings are considered compatible where the L_{dn} (i.e., CNEL) is less than 65 and 70 dBA, respectively.

MCO 3550.11, Range Air Installations Compatible Use Zone Program

In 1998, the Navy instituted the Range Air Installations Compatible Use Zones (RAICUZ) Program to protect public health, safety, and welfare, and to prevent encroachment from degrading the operational capability of air-to-ground ranges (U.S. Navy 1998b). The RAICUZ program includes range safety and noise analyses, and provides compatible land use recommendations.

Range Compatible Use Zone Study

Because MCBCP operates both air-to-ground and ground combat training ranges, the RAICUZ program concept has been expanded to the Base Range Compatible Use Zone (RCUZ) study, which encompasses the entire range complex at the Base (USMC 2007b). In the early 1990s, a range noise study and an RCUZ study were prepared for MCBCP (USMC 1993). In 2007, the RCUZ study was updated and addressed range and training activities only. Flight activity associated with MCAS Camp Pendleton is addressed separately under the AICUZ program.

DoD noise models were used to calculate and plot noise exposure levels and zones from operations at the Base. RCUZ noise exposure zones (I, II, and III) were developed to quantify and depict the noise environment associated with range activities for aircraft, small arms, and large caliber weapons (Table 3.10-2). Noise Zones I through III represent areas of minimal to severe noise impacts.

RCUZ zones are used for land use planning to prevent conflicts with noise sensitive land uses such as housing, schools, and hospitals. Land use compatibility becomes a potential concern in Noise Zones II and III. The proposed development areas are located within Noise Zone I for all range activities.

Local Standards

For activities in proximity to the Base boundary, city and county noise regulations for the surrounding jurisdictions are considered to ensure that Base projects would be consistent with city and county policies and goals. The Base boundary is adjacent to San Diego and Orange counties, the cities of Oceanside and San Clemente, and the unincorporated community of Fallbrook. None of the proposed action project areas are located in close enough proximity to the Base boundary for project noise impacts to noise sensitive receptors off-Base to be an issue of concern.

3.10.3 Region of Influence

Due to the widespread areas of MCBCP traversed by proposed project corridors, the ROI for noise would include a relatively large area within the Base, including all immediate and surrounding areas that would be subject to construction and operation noise. The immediate areas would include the project limits for the proposed facilities and support structures and the conveyance line (water pipeline) corridors. Also included in the noise ROI would be areas surrounding the project limits and corridors that would experience increased noise levels.

3.10.4 Existing Conditions – Basewide

Noise Sources

The predominant noise sources at MCBCP are aircraft operations, explosive detonations and small arms fire at ranges, amphibious vehicles operating on the beaches and in designated training areas, rail operations, and vehicle traffic. Aircraft operations on-Base are generated from MCAS Camp Pendleton. Rail operations on-Base include the BNSF Railway (formerly known as the Burlington Northern and Santa Fe Railway) along the I-5 corridor and the MCBCP rail line on-Base. Train traffic includes passenger service operated regionally under Amtrak and locally under Metrolink, and BNSF Railway freight service. Vehicle traffic on-Base includes primary Base roadways with access to various Base gates, including Vandegrift Boulevard, Basilone Road, 19th Street, and Las Pulgas Road. In addition, off-Base traffic on I-5 through the western perimeter of the Base is a substantial noise source.

Sensitive Noise Receptors

Sensitive noise receptors are generally considered persons who occupy areas where noise is an important attribute of the environment for activities that require quiet, including sleeping, convalescing, and studying. These areas include residential dwellings, mobile homes, hotels/motels, hospitals, nursing homes, educational facilities, and libraries. Sensitive noise receptors on MCBCP include residential dwellings (i.e., single-family housing areas, BEQs, and the South Mesa and Ward lodging facilities), child-oriented facilities and grounds (i.e., schools, child care development centers, youth centers), and Naval Hospital Camp Pendleton (existing and new).

Protected wildlife (special status species) and their habitat may also be considered noise sensitive receptors, especially during breeding season. The occurrence of special status species on MCBCP is addressed in Section 3.4 of this EIS.

3.10.5 Existing Conditions – Proposed Project Areas

The existing noise setting for each of the proposed project limits or corridors includes noise sources, observations, and short-term (5-minute) ambient noise measurements in proximity of sensitive noise receptors, as discussed in the following subsections.

The sensitive noise receptors in proximity to the project sites are identified for each proposed project by area and are generally adjacent to roadways and in proximity to other buildings, facilities, and activities. The predominant noise sources experienced at these receptors are vehicle traffic on nearby area roadways and parking lots, aircraft flyovers, and activities within their surrounding developed area.

Short-term, averaged noise measurements were taken near representative noise sensitive receptors along the water pipeline routes and facilities, primarily within the developed cantonment areas and housing areas. The measurements were taken to describe the general ambient noise environment near sensitive receptors in the vicinity of the proposed project limits or corridor routes. The noise measurements and observations were recorded on Thursday, 15 January and Tuesday, 20 January 2009, between 8:30 am and 4:00 pm. They represent ambient noise levels at these locations at the time of the measurements, which would vary widely depending on location, time of day, day of week, and human activities including vehicular traffic. Existing ambient noise levels at representative noise sensitive receptors are provided in Table 3.10-3.

Northern AWT and Associated Facilities (P-1044)

P-1044 All Alternatives

The noise sensitive receptors in proximity to all of the P-1044 alternatives are in developed cantonment areas or developed housing areas. Cantonment areas are the 64 Area (Talega) and 63 Area (Cristianitos) along Cristianitos Road; 62 Area (San Mateo) along San Mateo Road; and 52 Area (School of Infantry), 53 Area (Horno), and 51 Area (San Onofre) along Basilone Road. The proposed Northern AWT would be along or near Basilone Road east of the San Onofre 2 Housing Area and the San Onofre 3 Housing Area, and west of the 52 Area (School of Infantry). Pipeline routes for all P-1044 alternatives would run adjacent to housing units in the San Onofre 1, San Onofre 2, and San Onofre 3 housing areas.

64 Area (Talega)

The 64 Area (Talega) is a remote cantonment area near the northwestern portion of the Base boundary adjacent to Orange County. There are no nearby receptors outside of the Base boundary in proximity to the proposed utility corridor; however, the corridor along Cristianitos Road passes near a BEQ in the northern portion of the 64 Area (Talega). An ambient noise measurement recorded at this location was approximately 56 dBA L_{eq}.

63 Area (Cristianitos)

The 63 Area (Cristianitos) is a remote cantonment area just south of the 64 Area (Talega) along Cristianitos Road. There are no sensitive receptors along the P-1044 corridor through this area. An ambient noise measurement recorded at this location is approximately 47 dBA L_{eq}.

62 Area (San Mateo)

The 62 Area (San Mateo) is a cantonment area along San Mateo Road south of the 63 Area (Cristianitos) and northwest of the 52 Area (School of Infantry). Receptors along the P-1044 corridor in the 62 Area (San Mateo) include two BEQs. Ambient noise measurements of approximately 54 and 56 dBA L_{eq}, respectively, were recorded at each BEQ (Buildings 620521 and 62553).

51 Area (San Onofre)

The 51 Area (San Onofre) is a cantonment area in the northwestern section of the Base between the Pacific Ocean and Basilone Road. Sensitive receptors along the P-1044 corridor in the 51 Area (San Onofre) include the San Onofre Child Development Center.

52 Area (School of Infantry)

The 52 Area (School of Infantry) is a cantonment area in the central section of the Base along Basilone Road between the San Onofre 2 and San Onofre 3 housing areas and 53 Area (Horno). The sensitive receptors along the P-1044 corridor in the 52 Area (School of Infantry) include several BEQs. An ambient noise measurement of approximately 55 dBA L_{eq} was taken in a location central to the BEQs next to the YMCA Recreation Center.

53 Area (Horno)

The 53 Area (Horno) is a cantonment area east of the 52 Area (School of Infantry) on Basilone Road. Sensitive receptors along the corridor in the 52 Area (School of Infantry) include several BEQs. An ambient noise measurement of approximately 60 dBA L_{eq} was taken in proximity to the BEQs in the parking lot of Building 53523 south of Basilone Road.

P-1044 Alternatives 1 and 3, and Alternative 5

The noise sensitive receptors unique to Alternatives 1 and 3 of P-1044 are the San Onofre housing areas (and, therefore, Alternative 5, which includes P-1044 Alternative 1).

San Onofre Housing Areas

The San Onofre 1, San Onofre 2, and San Onofre 3 housing areas are near the western border of the Base just east of I-5. Sensitive receptors along Basilone Road and Chaisson Road in these areas are the San Onofre School and housing units. The school area is approximately 0.2 mile from both Basilone Road and Chaisson Road. An ambient noise measurement of approximately 55 dBA L_{eq} was recorded approximately 100 feet from Basilone Road on Morgan Street in proximity to the school area.

P-1044 Alternatives 2 and 4

There are no noise sensitive receptors unique to P-1044 Alternatives 2 and 4. P-1044 Alternative 2 and 4 pipeline routes are adjacent to fewer housing units in the San Onofre 2 and San Onofre 3 housing areas. Unlike P-1044 Alternatives 1 and 3, no pipeline routes would run along Basilone Road between these two housing areas (but both housing areas would still have pipeline routes immediately adjacent to housing units on their eastern edges).

Connection of Northern and Southern Water Systems (P-1045)

P-1045 All Alternatives

The noise sensitive receptors in proximity to all of the P-1045 alternatives are in the San Onofre housing areas. For all P-1045 alternatives, the northernmost portion of the project limits would come within approximately 0.25 mile of housing units in the San Onofre 2 Housing Area and the San Onofre 3 Housing Area.

P-1045 Alternatives 1, 3, and 4 (plus Alternative 5)

The noise sensitive receptors common to the P-1045 Alternatives 1, 3, and 5 (and, therefore, Alternative 5, which includes P-1045 Alternative 3) are in multiple developed cantonment areas and/or military family housing areas.

Family Housing Areas and Child-Oriented Facilities

Linear features of P-1045 Alternative 1, 3, and 4 would be near (within 0.25 mile of) 11 family housing areas (Stuart Mesa, Del Mar, Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, Santa Margarita, Wire Mountain 1, Wire Mountain 2, and Wire Mountain 3 housing areas) and two school areas (Stuart Mesa and Santa Margarita elementary schools). Along Stuart Mesa Road, the corridor is immediately adjacent to multiple homes in the Stuart Mesa Housing Area and the playground within the Stuart Mesa School Area. Along Wire Mountain Road, the corridor is immediately adjacent to multiple homes in the Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, and Wire Mountain 3 housing areas, along with Santa Margarita School and the Abby Reinke Community Center. Where the corridor approaches the proposed new 4-million-gallon reservoir along multiple streets east of the intersection of Wire Mountain Road and Carnes Road, it runs immediately adjacent to multiple homes in the Santa Margarita and Wire Mountain 2 housing areas.

Construction of P-1045 Alternative 1, 3, and 5 common nonlinear features would not occur near any housing areas, school areas, or other child-oriented facilities, with the exception of potential reservoir improvements and new reservoir construction near the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area. An ambient noise measurement of approximately 52 dBA L_{eq} was recorded at the South Mesa 2 Housing Area.

43 Area (Las Pulgas)

The 43 Area (Las Pulgas) is in the central portion of the Base along Las Pulgas Road as it intersects Basilone Road and continues westward. The noise sensitive receptors along the P-1045 corridor within this area include BEQs, the closest of which is approximately 0.25 mile from the common project corridor. Two ambient noise measurements were taken within the BEQ areas: one approximately 65 feet from Las Pulgas Road next to Building 43258 and one approximately 700 feet from Las Pulgas Road at the corner of Gillespie and 2nd Streets. The recorded noise levels were approximately 63 and 53 dBA L_{eq}, respectively.

41 Area (Las Flores)

The 41 Area (Las Flores) is in the southeastern portion of the Base along Stuart Mesa Road where it intersects with Flores Court. The noise sensitive receptors along the P-1045 corridor within the 41 Area (Las Flores) include seven BEQs, ranging from 250 to 1,200 feet from Stuart Mesa Road. The I-5 and railroad corridor is approximately 3,300 feet southeast of 41 Area (Las Flores).

31A Area (Edson Range)

The 31A Area (Edson Range) is in the southeastern portion of the Base along Stuart Mesa Road where it intersects with Flores Court. The noise sensitive receptors along the P-1045 corridor within the 31A Area (Edson Range) include seven BEQs, ranging from 250 to 1,200 feet from Stuart Mesa Road.

20 Area

The 20 Area is just east of the Main gate near I-5 off Wire Mountain Road. The noise sensitive receptors within the 20 Area are the Browne Child Development Center near the Pacific View and South Mesa 1 Housing Area, approximately 250 yards from the common project corridors, and the South Mesa Lodge, approximately 0.4 mile from the common project corridors.

P-1045 Alternatives 1, 2, and 4

24 Area

The 24 Area is just east of MCAS Camp Pendleton, across Vandegrift Boulevard. The noise sensitive receptors within the 24 Area are multiple BEQs, but none of these are closer than approximately 0.5 mile from the common project corridors for P-1044 Alternatives 1, 2, and 4.

P-1045 Alternative 1

The noise sensitive receptors unique to the P-1045 Alternative 1 are in a developed portion of the 33 Area (Margarita).

33 Area (Margarita)

The 33 Area (Margarita) is in the central-eastern portion of the Base, approximately 2,500 feet northwest of the 23 Area (MCAS Camp Pendleton). The noise sensitive receptors along the P-1045 corridor adjacent to and southwest of the 33 Area (Margarita) include a BEQs, the closest of which is approximately 70 yards from the corridor that runs along Stagecoach Road.

P-1045 Alternative 2

The noise sensitive receptors unique to P-1045 Alternative 2 are in a developed portion of the 43 Area (Las Pulgas). While Alternatives 1, 3, and 4 come within approximately 0.25 mile of one BEQ in this cantonment area, the Alternative 2 pipeline route would be immediately adjacent to two BEQs and within 0.25 mile of several others in the 43 Area (Las Pulgas).

P-1045 Alternative 3

There are no noise sensitive receptors unique to the P-1045 Alternative 3 (included in Alternative 5).

P-1045 Alternative 4

There are no noise sensitive receptors unique to the P-1045 Alternative 4. While Alternative 4 does come closer to BEQs in the 22 Area (Chappo) than other P-1045 project corridors, the closest of these BEQs is more than 0.5 mile from the corridor route as it runs along a ridgeline above the 22 Area (Chappo) to the west.

Table 3.10-1
Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 1,000 feet	--100--	
Gas Lawn Mower at 3 feet	--90--	
Diesel Truck at 50 feet,		Food Blender at 3 feet
at 50 mph	--80--	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
Gas Lawn Mower at 100 feet	--70--	Vacuum Cleaner at 10 feet
Commercial Area		
Heavy Traffic at 300 feet	--60--	Normal Speech at 3 feet
		Large Business Office
Quiet Urban Daytime	--50--	Dishwasher in Next Room
		Theater, Large Conference Room
Quiet Urban Nighttime	--40--	Background
Quiet Suburban Nighttime	--30--	Library
		Bedroom at Night, Concert Hall
Quiet Rural Nighttime	--20--	Background
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans 1998

Table 3.10-2
RCUZ Noise Exposure Zones

	Noise Zone		
	I	II	III
Percent of Population Highly Annoyed	<15%	15-39%	>39%
CNEL dBA (Continuous Noise)	<65 dBA	65-75	>75 dBA
CNEL dBC (Impulsive Noise)	<62 dBC	62-70 dBC	>70 dBC

Source: Wyle 2006

Table 3.10-3
Existing Ambient Noise Levels at
Representative Noise Sensitive Receptors

Cantonment Area	Noise Levels (dBA L_{eq})
64 Area (Talega)	56
63 Area (Cristianitos)	47
62 Area (San Mateo) Location #1	54
62 Area (San Mateo) Location #2	56
52 Area (School of Infantry)	55
53 Area (Horno)	60
San Onofre Housing Area	55
20 Area	52
43 Area (Las Pulgas) Location #1	63
43 Area (Las Pulgas) Location #2	53

Note: See text for detailed monitoring locations.
Source: AECOM field measurements, 15 and 20 January 2009, between 0830 and 1600 hours

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3.11 PUBLIC HEALTH AND SAFETY

3.11.1 Definition of Resource

This section focuses on hazardous substances, hazardous wastes, or hazardous materials that pose a potential hazard to human health and safety or to the environment, and, as a consequence of the physical or chemical properties, quantity, and concentration, are of great concern at any military facility. Hazardous waste has special characteristics of ignitability, corrosiveness, reactivity, and toxicity; exposure to such waste may increase mortality rates or cause serious illness.

Issues associated with hazardous material and waste typically center around USTs; ASTs; and the storage, transport, and use of pesticides, fuels, petroleum, oils, paints, and lubricants. When such resources are improperly used, they can threaten the health and well-being of wildlife species, botanical habitats, air, soil, water resources, and humans.

3.11.2 Regulatory Setting

Different hazardous substances, waste, and materials are regulated in a variety of ways. This section describes the regulatory setting for general hazardous waste materials, explosives-related issues, pesticides, asbestos, LBP, polychlorinated biphenyls (PCBs), USTs, ASTs, Resource Conservation and Recovery Act (RCRA) facilities assessment sites, and Installation Restoration (IR) program sites.

Issues specific to environmental health and safety risks to children, including the relevant regulatory setting, are discussed separately in Section 3.11.6.

General Hazardous Waste Materials

Hazardous waste management at MCBCP adheres to RCRA regulations and is guided by MCO P5090.2, *Environmental Compliance Manual and Protection Plan* and the 5090.7 *Hazardous Waste Management Base Order*. These plans establish policies, assign responsibilities, and provide guidance for proper management of hazardous waste.

MCBCP is regulated as a large quantity generator of hazardous waste. Currently, 54 hazardous waste accumulation sites are on MCBCP. The RCRA Division Hazardous Waste Branch manages hazardous waste for the Base. The 54 sites do not require a

RCRA permit or a State Hazardous Waste permit, but they do require a County of San Diego Department of Health permit, which the Base has (Williams 2008). According to state regulation, hazardous waste can be stored on-site at the 53 hazardous waste accumulation sites for no longer than 90 days. The 53 hazardous waste accumulation sites are 60-day permitted hazardous waste sites. The Base has developed a program requiring all hazardous waste to be removed from all hazardous waste accumulation sites within 60 days of the wastes being generated (Williams 2008). This ensures that the hazardous waste will not stay on-site longer than regulations allow.

Household hazardous materials (e.g., paints, household cleaners, E-waste) may be used and stored within MCBCP. E-waste that is generated within MCBCP is turned in to the local housing office or the local Defense Reutilization and Marketing Office (DRMO).

Training Areas, Impact Areas, Live-Fire Facilities, and Explosive Safety Quantity Distance Arcs

Military munitions may also meet the definition of hazardous waste and are regulated within the Military Munitions Rule, 40 C.F.R. Part 266, Subpart M. Military munitions that are found to be abandoned with intent to discard at the Base are regulated under the RCRA regulations as federally regulated hazardous waste. The explosives safety management, implementation, and oversight of the Marine Corps Ammunition and Explosives Safety Program are guided by MCO P8020.10B *Marine Corps Ammunition and Explosives Safety Program*; DoD 6055.0-STD *DOD Ammunition and Explosives Safety Standards*; OPNAVINST 8020.14/MCO P8020.11 *Department of the Navy Explosives Safety Policy Manual,* Engineer Pamphlet 75-1-2 *Munitions and Explosives of Concern Support During Hazardous, Toxic, and Radioactive Waste and Construction Activities*; and OPNAVINST 8020.15A/NOSSAINST 8020.15/MCO 8020.13 *Explosives Safety Review, Oversight, Verification of Response Actions Involving Military Munitions*.

MCBCP has assigned Explosive Safety Quantity Distance (ESQD) arcs throughout the Base to protect humans from possible sabotage or accidental detonation of explosives and ammunition. Areas that have the potential for exposure to radar and high-energy electromagnetic emissions that are above the maximum power density constitute a hazard. In addition, Accident Potential Zones (APZs) were assigned by the Base according to the AICUZ program. APZs are used to identify those areas that are in the range of potential aircraft-related accidents (DoD 2008).

Pesticides

The registration and use of pesticides are regulated under the Federal Insecticide, Fungicide and Rodenticide Act of 1972, as amended, 7 U.S.C. §§ 136–136y. Pesticide management activities are subject to federal regulations contained in 40 C.F.R. §§ 162, 166, 170 and 171 (1998) and California regulations are contained in C.C.R. Title 3, §§ 6000–6920 (1998). Pesticides have been particularly used in agricultural applications on the Base.

Aboveground Storage Tanks

ASTs are regulated under several state and federal mandates. USEPA regulates ASTs under the amended Clean Water Act of 1972, National Contingency Plan, RCRA, and Superfund Amendments and Reauthorization Act (SARA) of 1986. In the State of California, the California Health and Safety Code, Chapter 6.67, Division 20, Section 25270, provides the regulatory framework for ASTs. In April 1991, Senate Bill 1050 was added to Section 25270 of the code. The Public Resources Code, Section 3106, also provides regulatory guidance for ASTs.

RCRA Facility Assessment Sites

RCRA, an amendment to the Solid Waste Disposal Act, was enacted in 1976. RCRA Hazardous and Solid Waste Amendments of 1984 were enacted largely in response to citizen concerns that existing methods of hazardous waste disposal, particularly land disposal of wastes, were not safe. RCRA also addresses the problem of leaking UST (LUST) sites by requiring tank notification, tank standards, reporting and record keeping requirements for existing tanks, and corrective action when necessary, as well as compliance and enforcement program development.

Underground Storage Tanks

UST sites in California are regulated under C.C.R. Title 23, which was established to protect waters of the state from discharges of hazardous substances from USTs. These regulations establish construction standards for new USTs; monitoring standards for new and existing USTs; procedures for unauthorized release reporting; repair, upgrade, and closure requirements for existing USTs; and remedial action requirements. Federal regulations concerning USTs are contained in 40 C.F.R. Parts 280 and 281, where information like general operating requirements, release detection, out of service UST systems and closure, purpose, general requirements and scope, general provisions, and others can be found.

Installation Restoration Program

On 15 November 1989, USEPA placed MCBCP on the National Priorities List as a result of past hazardous material handling and disposal practices. This action was taken pursuant to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, as amended by SARA. After the listing, the Department of Defense (DoD) implemented the IR Program to identify the locations and contents of toxic and hazardous material disposal and spill sites and to eliminate the hazards to public health in an environmentally responsible manner. The IR Program serves to manage the investigation and restoration of contaminated sites on military grounds. The purpose of the IR Program is to recuperate the beneficial uses of the property through an established process that identifies and characterizes contaminated sites and facilities, and contains, removes, and disposes of existing contamination. The program is administered in accordance with CERCLA, as amended by SARA.

The Navy's IR Program for environmental investigation and cleanup at MCBCP is being conducted with cooperation and oversight from the USEPA, California Environmental Protection Agency, DTSC, and RWQCB. The primary goal of the IR Program is to protect the environment and specifically human health for all those who live, work, and visit MCBCP.

Polychlorinated Biphenyls

The Toxic Substances Control Act became law on 11 October 1976. The Act authorized USEPA to secure information on all new and existing chemical substances, as well as to control any substances that were determined to cause unreasonable risk to public health or the environment. Current PCB regulations can be found at 40 C.F.R. Part 761. PCBs have been used in a wide variety of materials, including electrical equipment such as transformers.

Asbestos

Asbestos is regulated by USEPA with the authority promulgated by the Occupational Safety and Health Administration (29 U.S.C. §§ 669 et seq.). Emissions of asbestos fibers to ambient air are regulated under Section 112 of the CAA. Asbestos is a mineral fiber that can cause cancer or asbestosis when inhaled; it has the potential to pollute air and water. USEPA has banned the use of asbestos in manufacturing or construction; however, asbestos-containing materials may be present in Base buildings constructed before 1973 based on the type of insulation materials that were used at the time. For all renovations and demolitions, regardless of the presence of asbestos, a Notification of Intent must be submitted to APCD and an asbestos permit acquired from APCD if required.

Lead-Based Paint

On 28 October 1992, Congress passed the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. §§ 4851–4856, commonly called Title X). This act regulates the use and disposal of LBP at federal facilities. Federal agencies are required to comply with all applicable federal, state, interstate, and local laws relating to LBP activities and hazards. An LBP survey has not been performed on any Base buildings; however, it is assumed that LBP may be present in Base buildings constructed before 1992 based on the type of building materials that were used at the time.

3.11.3 Region of Influence

Due to the widespread areas of the Base traversed by proposed project corridors, the ROI for the public health and safety environmental health would be similarly widespread. This area corresponds to the geographic area in which construction and operation of facilities associated with the proposed action alternatives would occur and, thus, existing safety and environmental health would potentially be affected.

3.11.4 Existing Conditions – Basewide

Hazardous materials such as petroleum products have been used at MCBCP during operations related to ground vehicle maintenance (e.g., fluid changes, filter changes, and minor painting), facilities maintenance (e.g., structural maintenance, pesticide treatment, and utility maintenance), and aircraft maintenance (e.g., corrosion control, fuel cell maintenance, and engine maintenance). Hazardous materials used at MCBCP include antifreeze, petroleum products, oils, lubricants, fuels, oil filters, scrap metals, pesticides, cleaning solvents, respirator filter cartridges, sealants, adhesives, paints, and flammable solids. MCBCP generates and disposes of a large variety of hazardous wastes with the most prevalent being waste oil, petroleum products, spent caustics, cleaning solvents, E-waste, and asbestos.

In addition to these types of potential risks to public health and safety that could be present on a range of different types of properties, including civilian industrial or commercial sites, MCBCP also has a number of military-specific potential risks to public health and safety. These include the use of live-fire ranges and dedicated impact areas where weapons systems of numerous types and sizes are used in conjunction with both aviation and ground training operations. Also present within MCBCP is MCAS Camp Pendleton and its associated APZs and ammunition/ordnance storage areas.

3.11.5 Existing Conditions – Proposed Project Areas

General Hazardous Waste Materials

None of the 54 hazardous waste accumulation sites on MCBCP occur within the proposed project limits or corridors.

Training Areas, Impact Areas, and Live-fire Facilities

MCBCP uses more than 125,000 acres of land including 31 training areas, five impact areas, more than 100 live-fire facilities, and five amphibious assault landing beaches for its military training activities (USMC 2007a).

The MCBCP inland training areas consist of nearly 114,000 acres of live-fire ranges, impact areas, and training areas. MCBCP's 31 training areas and ranges are designed to facilitate all phases of combat readiness training—from individual basic warrior (small arms) training to larger company/battalion-sized training operations (USMC 2007a).

The impact areas cover approximately 33,200 acres of MCBCP. These impact areas on MCBCP are classified as either dud-producing or non-dud-producing. Dud-producing impact areas contain most of the live-fire ranges on-Base and are bordered on all sides by safety zones and the remaining maneuver and training ranges. Access to dud-producing impact areas is tightly controlled by the Base for safety reasons. Non-dud-producing impact areas support training activities that utilize small arms firing and the use of non-dud-producing ordnance in live-fire exercises (USMC 2007a).

In addition, training operations at MCBCP that involve the use of live fire are restricted to impact areas (described above), established ranges, Artillery Firing Areas, Mortar Positions, Mortar Firing Areas (MFAs), and Live Fire and Maneuver (LFAM) Areas. The Base currently operates nearly 100 established ranges, 53 Artillery Firing Areas, seven Mortar Positions, 11 MFAs, and 12 LFAM areas (USMC 2007a).

A total of eight project corridors have military training areas, impact areas, and/or live-fire facilities within a portion of their project corridor. These sites are listed in Table 3.11-1.

Explosive Safety Quantity Distance Arcs, Electromagnetic Radiation, and Accident Potential Zones

ESQD arcs have been established throughout the Base to protect humans from possible sabotage or accidental detonation of explosives and ammunition. Areas that have the potential for exposure to radar and high-energy electromagnetic emissions that are above the maximum power density constitute a hazard. In addition, APZs were assigned by the Base according to the AICUZ program. APZs are used to identify those areas that are in the range of potential aircraft-related accidents (DoD 2008). No project corridors cross any ESQD arcs (MCBCP 2007).

Pesticides

Pesticides have been used at three agricultural outlease sites on-Base in the recent past: the East, West and North Agricultural Lease Sites. These sites are undeveloped and have been farmed for over 50 years (TEC 2003). Active agricultural activities no longer take place at MCBCP. Agricultural leases were typically for 5 years. In accordance with the Soil and Water Resources Conservation Act of 1977 (16 U.S.C. §§ 2001–2009), each agricultural outlease had a Soil and Water Conservation Plan specifying practices and projects to be performed by the lessee as part of the contract. Conservation measures included erosion control, irrigation system upgrades, pest management, fire prevention, debris removal, road damage prevention, and access policies. Each plan included agricultural and pest management practices that were consistent with state and federal regulatory requirements and the overall goals of the Base.

Typical pesticides included Bravo Weatherstik (fungicide), Neemix (neem bean, organic-based pesticide), Asana (pesticide), Thiolux (sulfur-based fungicide), Admire (insecticide), Trilogy (a second pesticide made from the neem bean), Javeline (insecticide), Ridomil Gold, Agrimek, Quadris, Activator 90, Success, Danitol, Tanos, Vydate, Pyrellin, Courier, and Kelthane. Use of certain pesticide products depends on the pests needing control; however, Bravo Weatherstik and Neemix are the predominant pesticides used. An Environmental Baseline Survey conducted in 2003 identified all three agricultural outlease sites as areas where release, disposal, and/or migration of hazardous substances had occurred (TEC 2003). In 2009, no further action was issued as a result of a site investigation and cleanup action for legally applied pesticides at the Stuart Mesa East Agricultural Field (RWQCB 2009c).

The East and West Agricultural Lease parcels are on the east and west sides of I-5, approximately 2 miles north of the MCBCP main gate (TEC 2003). These parcels are no longer actively farmed. None of the proposed action project limits or corridors would overlap with areas that were a part of the East or West Agricultural Lease parcels.

The third site where pesticides were used until relatively recently is the North Agricultural Lease Site (i.e., the Sierra 1 Training Area). This site is east of I-5, about 0.6 mile from the city of San Clemente and the northern boundary of MCBCP (TEC 2003). The P-1044 alternative project corridors extend along the eastern boundary of this site, which is no longer used for agricultural purposes. The site is composed of 486 acres and was used for agricultural production as well as utility, administrative, repair, chemical, and equipment storage facilities. Pesticides were stored in a locked area along with the hazardous waste (TEC 2003).

A Human Health Risk Assessment (HHRA) for the Sierra 1 Training Area was completed in October 2008 (EAR 2008). The purpose of this HHRA was to present the results of recent field investigations and assess the potential risks to future human receptors at the site. Recent investigations were conducted by the U.S. Navy to characterize the pesticides that may be in the soils at the Sierra 1 Training Area site. The HHRA evaluated potential exposures to pesticides in soils across the entire Sierra 1 Training Area by heavy equipment trainees. The HHRA indicated that assumed exposures to organochlorine pesticides in soils result in noncarcinogenic hazards below the benchmark level of concern. These risk and hazard estimates are acceptable under current DTSC and USEPA guidance and do not require further action, i.e., no remedial action or land use controls are required (EAR 2008).

Aboveground Storage Tanks

There are eight ASTs located within or less than 10 feet away from the proposed project sites or corridors (Figures 3.11-1a and 3.11-1b). Table 3.11-2 lists the ASTs that were identified in the vicinity of the proposed sites or less than 10 feet away from the nearest project (MCBCP 2007). Each of these is discussed individually.

- AST 20816 was identified within the P-1045 Alternative 1, Alternative 3/Alternative 5, and Alternative 4 project corridors (MCBCP 2007). AST 20816 is an emergency generator with a double-wall, 100-gallon belly (integral) tank (Winterbourne 2010).

- AST 31520-1 was identified within the P-1045 Alternative 1, Alternative 3/Alternative 5, and Alternative 4 project corridors (MCBCP 2007). AST 31520-1 is a 550-gallon tank and stores diesel fuel for an emergency generator (Winterbourne 2008).
- AST 31523-P was identified within the P-1045 Alternative 1, Alternative 3/Alternative 5, and Alternative 4 project corridors (MCBCP 2007). AST 31523-P is a propane tank (Winterbourne 2010).
- AST 41611 was identified 10 feet northwest of P-1045 Alternative 1, Alternative 2, Alternative 3/Alternative 5, and Alternative 4 project corridors (MCBCP 2007). AST 41611 is a 500-gallon tank and stores diesel fuel for an emergency generator (Winterbourne 2008).
- AST 52021 was identified within the P-1044 and P-1045 Alternative 1, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007), as well as within Alternative 5 corridors. AST 52021 is a 250-gallon tank and stores diesel fuel for an emergency generator (Winterbourne 2008).
- AST 52410 was identified within the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). AST 52410 is a 250-gallon tank and stores diesel fuel for an emergency generator (Winterbourne 2008).
- AST 52710 was identified within the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). AST 52710 is a 250-gallon tank and stores diesel for an emergency generator (Winterbourne 2008).
- AST 61513 was identified within the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). AST 61513 is an emergency generator with a double-wall, 500-gallon diesel tank (Winterbourne 2010).

RCRA Facility Assessment Sites

MCBCP has multiple petroleum-based sites undergoing active remediation, pending remediation, pending closure (no further action based upon completed remedial actions), or for which site closure is complete. The Remediation Branch manages two distinct categories of cleanup sites: RFA sites and UST sites. The RFA study conducted site inspections at 257 suspected contaminated sites throughout MCBCP. There were 107 sites that require further investigation and possible cleanup actions, while 150 sites were recommended as “no further action.” Seven RFA sites were closed by RWQCB based upon completed remedial activities (USMC 2007a).

There are 14 RFA sites located within or less than 50 feet away from the proposed project sites/corridors (Figures 3.11-1a and 3.11-1b). Table 3.11-3 lists the RFA sites that were identified in the vicinity of the proposed sites or less than 50 feet away from the nearest project (MCBCP 2007). Each of these is discussed individually.

- RFA 168/B1 was identified 24 feet southeast of the P-1045 alternative project corridors (MCBCP 2007). The site is currently a fire station and is paved. The flammable storage shed in the petroleum, oil, and lubricant (POL) area is no longer present and was replaced by a larger building. Spills around the flammable storage shed have been reported in the past. Boring B1 was located in the POL storage area/flammable storage shed; the contamination found at the site was total petroleum hydrocarbon (TPH). The TPH contamination was shallow, less than 2 feet below ground surface (bgs). The site’s contamination will not reach surface water, groundwater, or deep aquifers because it is shallow and limited in extent. The nearest water well is 10,560 feet to the southwest. The source of petroleum hydrocarbon contamination has been stopped and POLs are now stored in upgraded facilities (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).
- RFA 170/B1 was identified 11 feet northwest of the P-1045 Alternative 2 project corridor (MCBCP 2007). The site was a gas station with an AST (43201) that had secondary containment. Site 43201 was closed on 10 October 2002. Boring B1 was located near Building 43215; the contamination found at the site was TPH. The TPH contamination was shallow (less than 2 feet bgs) and limited in extent. During 1999, excavation-impacted soil was removed from the former AST area as well as current site redevelopment activities. The source of petroleum hydrocarbons contamination has been eliminated as the site is no longer a gas station and no fuel AST is located on-site (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).
- RFA 176/B1 was identified within the P-1045 Alternative 2 project corridor. RFA 176/B2 was identified 32 feet southeast of the P-1045 Alternative 2 project corridor (MCBCP 2007). RFA 176/B1 and 176/B2 are both under RFA Site 176. RFA 176 is a gasoline station that previously performed vehicle maintenance and

includes one waste oil UST. The contaminants found at the site are benzene, toluene, ethylbenzene, xylenes (BTEX); methylene chloride; acetone; and butylbenzylphthalate. Soil and groundwater contamination was extensively assessed and remediated during a 10-year period under the UST program. The former waste oil UST (176/B1) was closed under the UST program (RWQCB Case No. 9UT2962) in August 2006. The source of petroleum hydrocarbons contamination has been stopped as the waste oil UST was removed and the site no longer contains a waste oil UST (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

- RFA 185/B1 was identified 14 feet north of the P-1044 Alternative 1 and Alternative 3 project corridors (MCBCP 2007). The site is currently an effluent pumping station. The site contains a diesel fuel AST that supplies an emergency generator. Boring B1 was advanced in the location of the former diesel AST; the contamination found at the site was TPH. The TPH contamination was shallow (less than 2 feet bgs). Site redevelopment activities have been performed, including the demolition of Building 51051 and construction and paving activities, resulting in removal of shallow site contamination. A new Building 51056 and new parking lot occupies the site. Detections of acetone and toluene from the 13 to 15 feet bgs were minor and at concentrations below environmental screening levels (ESLs). The site's contamination at 13 to 15 bgs will not reach surface water, groundwater, or deep aquifers because concentrations are below ESLs. The nearest water well is 5,280 feet to the east. The source of petroleum hydrocarbon contamination has been stopped and the AST removed (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

- RFA 192/B1 was identified 24 feet south of the P-1044 alternative project corridors (MCBCP 2007). The site has been redeveloped into a new gasoline filling station. Buildings 520167 and 520167 have been erected and the site has been paved with asphalt. The site was a gas station with an adjacent AST. Boring B1 was advanced in the location of the former fuel dispenser; the contamination found at the site was TPH at a concentration of 7,600 mg/kg. The TPH contamination was shallow (less than 2 feet bgs) and limited in extent. Site redevelopment activities have been performed, resulting in removal of the shallow site contamination. The site's contamination will not reach surface water, groundwater, or deep aquifers because it is shallow and limited in extent. The nearest water well is more 5,280 feet to the west. The source of petroleum hydrocarbon contamination has been stopped (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

- RFA 199/B2 was identified on a portion of the P-1044 alternative project corridors (MCBCP 2007). The site is currently a water booster station. A former diesel AST was located 25 feet east of Building 52710. The former AST was replaced and installed at the northeast corner of the building. A former gasoline UST was east of the building and used for the emergency backup pumps. The former UST was closed with no further action under the UST program (RWQCB Case #: 9UT2197) on 4 January 2007. Boring B2 was advanced near the current AST location; the contamination found at the site was TPH, ethylbenzene, and xylene. Impacts to soil at B2 are due to the former gasoline UST and the diesel AST. The impacted soil is shallow and limited to less than 6 feet bgs. The site's contamination will not reach surface water, groundwater, or deep aquifers because it is shallow and limited in extent. Groundwater at the site is present at 45 feet bgs and the nearest water well is 15,840 feet to the southwest (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

- RFA 218/B2 was identified 49 feet south of the P-1044 alternative project corridors (MCBCP 2007). The site is currently used by the 2nd Battalion 1st Marines. This site is a former motor transport lot, including a waste oil UST, a lube rack, and former POL storage area. The former UST was closed with no further action under the UST program (RWQCB Case #: 9UT2848) on 3 January 2007. Boring B2 was advanced at the location of the concrete lube rack; the contamination found at the site was TPH and semi-volatile organic compounds (SVOCs). The impacted soil is limited to less than 10 feet bgs. The site's contamination will not reach surface water, groundwater, or deep aquifers because it is shallow and limited in extent. The South Fork of the San Onofre Creek is located over 10,560 feet to the west and the nearest water well is located more than 26,400 feet to the west. The source of contamination has been stopped as the site is no longer a maintenance facility (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

- RFA 220/B2 was identified on a portion of the P-1044 alternative project corridors (MCBCP 2007). Building 61511 is a well and pump house. No evidence of the AST or secondary containment remains. Two ASTs are present on-site with sodium hydroxide and phosphoric acid for water treatment. Another AST is located on the southeast part of the site on a concrete pad. Boring B2 was advanced on the north side of Building 61511; the contamination found at the site was TPH and benzo(a)pyrene. The impacted soil is limited to less than 2 feet bgs. The site's contamination will not reach surface water, groundwater, or deep aquifers because it is shallow and limited to less than 2 feet bgs. Groundwater at the site is present at 12 to 13 feet bgs (Zec 2008). Limited site investigation was recommended by the RWQCB because benzo(a)pyrene was detected at concentrations exceeding ESLs (RWQCB 2009b).

- RFA 221/B1 was identified on a portion of the P-1044 alternative project corridors (MCBCP 2007). The site is a water booster station and surrounding land is leased for agriculture. The site contained a former UST that was closed with no further action under the UST program (RWQCB Case #: 9UT3020) on 2 November 1999. Boring B1 was advanced in the location of the north corner of Building 61514; the contamination found at the site was TPH. The contamination at B1 was limited to less than 6 feet bgs; however, it was excavated as part of the UST remediation effort. The site's contamination will not reach surface water, groundwater, or deep aquifers because it has been removed. Groundwater at the site is present at 12 to 13 feet bgs (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).
- RFA 225/B4 and 225/B3 were identified inside the P-1044 alternative project corridors (MCBCP 2007). RFA 225/B4 and 225/B3 are both under RFA Site 225. The site is a maintenance shop for lawn and building maintenance equipment. The contaminants detected were related to petroleum hydrocarbons. The impacted soil is limited to less than 10 feet bgs. The site's contamination will not reach surface water, groundwater, or deep aquifers because it is shallow and limited in extent. Groundwater at the site is present at 60 feet bgs and the nearest water well is 1,400 feet to the southwest (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).
- RFA 236/B1 was identified 16 feet northeast of the P-1044 alternative project corridors (MCBCP 2007). The site is used for Deployment Processing Command. The contaminant found at the site was TPH. The source of contamination has been stopped as the AST has been removed. Impacted soil is limited to less than 2 feet bgs. No BTEX detections were reported. Site contamination will not reach water wells or deep aquifers because it is shallow and limited in extent. Groundwater occurs at a depth of about 28 feet bgs. The nearest water well is more than 2 miles to the south (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).
- RFA 278/B1 was identified 9 feet northwest of the P-1045 alternative project corridors (MCBCP 2007). This site is an office/storage area that includes the former location of an AST; only a concrete pad remains. The contaminants found at the site were TPH at borings B1 and B2. Site contamination will not reach surface water, water wells, or deep aquifers because it is shallow and limited in extent. Although groundwater at the site is shallow (about 12 feet bgs), site

contamination is limited to less than 6 feet bgs. The source of petroleum hydrocarbon contamination has been eliminated as the AST was removed (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

- RFA 279/B1 was identified 3 feet northwest of the P-1045 alternative project corridors (MCBCP 2007). The site is an office/storage area that includes the former location of an AST; only a concrete pad remains. The contaminants found at the site were TPH at boring B1. Impacted soil at the site is minimal and limited in extent to less than 6 feet bgs. The source of petroleum hydrocarbon contamination has been eliminated as the AST was removed (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

- RFA 280/B2 was identified 29 feet south of the P-1044 alternative project corridors (MCBCP 2007). The site currently contains water pipes in barracks and maintenance area. The fire department reported pumping waste oil when purging the water lines. Boring B2 was advanced at the east of Building 52333; the contamination found at the site was TPH. The impacted soil is limited to less than 6 feet bgs. The site's contamination will not reach surface water, groundwater, or deep aquifers because it is shallow and limited in extent. Groundwater at the site is under confined conditions at approximately 40 feet bgs and the nearest water well is located more than 10,560 feet to the southwest. The source of petroleum hydrocarbon contamination has been stopped as waste oil is no longer present (Zec 2008). No further action was granted by the RWQCB (RWQCB 2009b).

Underground Storage Tank Sites

The UST cleanup program was initiated to meet federal and state requirements that stipulated any unmodified UST installed before 1988 in California must be upgraded with secondary leak protection, replaced, or removed by 22 December 1998. MCBCP met this requirement with a mass tank removal operation. By the end of 1998, 580 USTs from 454 locations were removed. There were 266 USTs that failed integrity testing and released contamination into the subsurface environment, requiring future remedial activities. Currently, there are 218 sites that are "closed, with no further action required," while 48 sites remain "open" (35 sites are still under the UST Program and 13 sites were transferred to the UST/CERCLA Program. The open sites are undergoing monitoring and/or remedial activities (USMC 2007a).

There are four open LUST sites and 10 (operational) active USTs throughout MCBCP within 500 feet of the proposed alternatives (Figures 3.11-1a and 3.11-1b; Table 3.11-4). Additionally, there are 54 inactive USTs within 500 feet of the proposed project alternative limits or corridors, 11 of which are within the proposed project limits or corridors. The inactive USTs are closed, with no further action required and, unless they are in a project's limits or corridor (rather than just in a buffer outside of the project limits or corridor), are not discussed further in this section. The USTs in active use are annually inspected by the San Diego County Hazardous Materials Division UST Monitoring System. No tank leakage, spill, or significant risk to groundwater and surrounding soils contamination caused by the 10 active USTs has been identified to date.

There were four LUST sites identified that were less than 500 feet away from the nearest project corridor (MCBCP 2007). The open LUST sites are currently undergoing remedial activities. Remedial alternatives may include, but are not limited to, the following either individually or in combination:

- Soil excavation and/or dewatering of source areas
- Soil vapor extraction
- Groundwater extraction and aboveground treatment
- Flow-through remediation cells/in-situ bioremediation
- Free product removal
- In-situ air sparging
- Soil vapor extraction/dual phase extraction

The four LUST sites, 10 (operational) active USTs, and 11 inactive USTs are discussed below.

- UST Site 43201 was identified within a portion of the P-1045 Alternative 2 project corridors. UST Site 43201 is an inactive site (MCBCP 2007).
- UST Site 43260 was identified 14 feet northwest of the P-1045 Alternative 2 project corridor (MCBCP 2007). Former UST Site 43260 is located adjacent to Building 43260, a small boiler house in the 43 Area of MCBCP. Building 43260 is located near two large barracks (Buildings 43258 and 43259) and an asphalt-paved parking area located immediately to the west of Las Pulgas Road. Before removal, an 8,000-gallon, fiberglass UST was used to store diesel to fuel the barracks' heating boilers (Building 43260). The UST was removed in 1994. Several phases of site assessment indicated that VOCs, TPH-gasoline (TPH-g), and TPH-diesel (TPH-d) are present in the soil and groundwater. A recommended remedial action using in-situ biosparging system was developed in a Corrective Action Plan (CAP) for the site, and a biosparging system was

subsequently constructed in accordance with the CAP in 2003. The RWQCB approved in an e-mail dated 19 May 2008 to remove VOCs, TPH-g, and polynuclear aromatic hydrocarbons (PAHs) from the sampling matrix. Groundwater at the site was reported at 10 to 20 feet bgs and flows south. In the October 2009 sampling event, concentrations of TPH-d were detected in groundwater samples. The highest concentration of hydrocarbons is located near the former tank cavity. On 21 October 2009, an interim in-situ chemical oxidation (ISCO) system was developed for the former tank cavity area to reduce the residual hydrocarbon concentrations upgradient of the biosparge system. This treatment is expected to reduce total contaminant mass flux to groundwater and reduce the TPH-d on the biosparge system, thereby allowing it to function more efficiently. It was anticipated that the injections would be completed before the end of December 2009. Routine quarterly groundwater and semiannual reporting will continue at UST Site 43260 (SES-TECH 2009a).

- USTs 43286-3 and 43286-4 were identified within a portion of the P-1045 Alternative 2 project corridor (MCBCP 2007). The gasoline tanks are currently active and in good condition (RORE 2009).
- USTs 51091-6, 51091-7, 51091-8, and 51091-9 were identified approximately 32 feet, 38 feet, 45 feet, and 56 feet south, respectively, of the P-1044 Alternative 1 and Alternative 3 project corridors (MCBCP 2007). USTs 51091-6, 51091-7, and 51091-8 are active gasoline tanks. UST 51091-9 is an active diesel tank. All the tanks are in good condition (RORE 2009).
- USTs 520167-1 and 520167-2 were identified 5 feet and 7 feet south, respectively, of the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). USTs 520167-1 and 520167-2 are active diesel tanks and are in good condition (RORE 2009).
- UST Sites 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536 were identified within a portion of the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors. All the UST sites are currently inactive (MCBCP 2007).
- UST Site 53435 was identified 472 feet southwest of the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). Former UST Site 53435 is located in the 53 Area of MCBCP, adjacent to Basilone Road. Before removal, a 950-gallon, steel UST was used to store diesel fuel. The UST was removed in 1998. The former tank cavity is located immediately north of Building 53435, which is situated between Buildings

53434 and 53420. Groundwater at the site was reported at approximately 25 feet bgs and flows northwest (SES-TECH 2009b). Results from the April 2008 sampling event indicated that TPH-d and PAHs were present in the wells. Concentrations of TPH-d increased in the former tank cavity area. Since the in situ remediation (biosparging) had not worked as well as expected, it was proposed that soil excavation around the former tank cavity be completed to remove as much contamination as practical (SES-TECH 2008). During 28 September and 21 October 2009, an interim remedial action was completed. The removal consisted of approximately 400 cubic yards of diesel-impacted soil from the former UST tank area at an approximate depth of 31 to 34 feet bgs. The soil excavation removed a relatively significant amount of diesel-impacted soil from the vadose zone and up to 6 feet below groundwater from the tank cavity area. It was recommended that quarterly groundwater sampling continue at the site until it can be demonstrated that the contaminant concentrations in the groundwater plume are stable to decreasing. After it can be shown that the groundwater plume is stable to decreasing, closure with no further action will be requested (SES-TECH 2009b).

- UST Site 53524 was identified 484 feet south of the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). Site 53524 contained five 1,500-gallon USTs next to former buildings 53524, 53525, 53526, 53527, and 53530. The exact contents of the tanks are not known but were likely diesel oil for heating purpose. The five tanks were removed on 7 April 1986. In February and March 1986, some soils samples were taken at places close to the tanks, and soil contamination by total recoverable petroleum hydrocarbons was found for tanks 53524 and 53570. Since the tanks were removed, the site has undergone extensive restoration. The former buildings 53524, 53525, 53526, 53527, and 53530 were demolished. The site is currently used as a parking lot. Additional site investigations were performed for site 53524 in 1991 and 1995, respectively. Soil contamination by petroleum hydrocarbons was not observed (RWQCB 2009d).

- USTs 62507-3 and 62507-4 were identified 44 feet and 35 feet west, respectively, of the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). The gasoline tanks are currently active and in good condition (RORE 2009).

- UST Site 62507 was identified on a portion of the P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 project corridors (MCBCP 2007). Site 62507 is within the northwest portion of MCBCP in the 62

Area (San Mateo) on San Mateo Road, approximately 100 feet north of the intersection of San Mateo Road and Cristianitos Road. The site is a gasoline fueling station for Marine Corps personnel and is currently under active soil and groundwater remediation through an air sparging and soil vapor extraction (AS/SVE) system. The highest contamination in soil was around the former tank cavity and was typically detected from 35 to 55 feet bgs. Groundwater at the site is generally encountered at 23 to 53 feet bgs and flows southerly. An interim ISCO system was installed to remediate methyl tert-butyl ether in groundwater. Groundwater at the site has been continuously monitored to delineate extent of the groundwater contamination and to evaluate the performance of the AS/SVE and ISCO systems. Results from the April 2009 groundwater sampling event indicate that the center of remaining TPH-g and related BTEX contamination plume is located approximately 125 feet to the north of the former tank activity. In addition, to the routine monitoring activities, the ISCO treatment process was recommended to continue at UST Site 62507 (SES-TECH 2009c).

Installation Restoration Areas

Sixty-four sites were identified for investigation and/or remediation under the IR Program at MCBCP as sites where the disposal or discharge of hazardous waste may have resulted in potential environmental contamination (USMC 2007a). MCBCP has grouped its 64 locations in five Operable Units (OUs) based on similarities, such as the types of environmental issues, selected cleanup methods, and/or geographic location (USMC 2007a). IR Records of Decisions have been signed for OU-1, 2, and 3. IR Program activities are ongoing for OU-4 and OU-5 sites and five additional sites that have not been incorporated into an OU. Currently, there are no active sites for OU-1 and OU-2 (BRG 2006). 19 IR sites required remedial action, and the remaining 45 sites were closed and required no further action.

There were 14 IR sites identified within 1,000 feet of the proposed action sites/corridors. Among them, four are active sites (1D, 7, 30, and 33) and 10 are inactive IR sites (1C, 1F, 1I-2, 2C, 2D, 9, 20, 32, 34, and 36). Table 3.11-5 identifies each IR site and its status (MCBCP 2007). Each active IR site is discussed individually.

- IR Site 1D (20 Area Refuse Burning Ground) was identified on a portion of the P-1045 Alternative 1, Alternative 3/Alternative 5, and Alternative 4 corridors (MCBCP 2007). IR Site 1D is a refuse burning area approximately 23 acres in size in the 20 Area north of the intersection of Vandegrift Boulevard and Stuart Mesa Road. The site is within the floodplain of the Santa Margarita River, which is subject to flooding during peak rainfall events. IR Site 1D is one of nine areas used from 1942 through the early 1970s to burn refuse generated by Base operations. The Base refuse burning areas were closed between the late 1960s and 1970s. IR Site 1D was closed, covered with native soil, and allowed to revert to natural vegetation. Visual inspection in 1984 revealed no evidence of environmental contamination. However, the cover material has since eroded and refuse has been exposed. Areas of stressed vegetation and stained soil have also been observed (Battelle 2009).

Multiple remedial investigations and feasibility studies to refine the cost estimates and reevaluate the remedial options were performed. Soil samples were analyzed for metals including antimony, arsenic, chromium, copper, iron, lead, and zinc, which were detected above their remediation goals. SVOCs were detected above their residential soil preliminary remedial goals. Groundwater at IR Site 1D ranges from 6 to 10 feet bgs and flows northwest toward the Santa Margarita River. Human health and ecological risk assessments were conducted for Site 1D. The assessments concluded that the remedy for soil at Site 1D will be protective of human health and the environment in the long term due to unrestricted land use. In the interim, the site is protective because exposure pathways that could result in unacceptable risks are being managed by preventing access to the site for the general population and by the requirements of the Health and Safety Plan for the environmental workers (Battelle 2009).

A remedial action began at the site in October 2007. Excavation was performed and, as of January 2009, over 60,000 tons of soil have been excavated from Site 1D. Approximately 183 feet northwest of the P-1045 Alternative 1, Alternative 3/Alternative 5, and Alternative 4 corridors, excavation uncovered groundwater impacted by pesticides and solvents in the area where soil containing trichloroethene (TCE) and pesticides were discovered during the remediation in early 2008. Approximately 12,000 gallons of groundwater have been removed from the excavation into Baker tanks. A work plan has been forwarded to the regulatory agencies describing the proposed treatment method for the groundwater. The DoN proposed to continue to extract groundwater from a 100-foot trench based on the results of a hydropunch investigation. An IR Record of Decision amendment to address groundwater is being developed (Battelle 2009).

- IR Site 7 was identified approximately 278 feet southeast of the P-1045 Alternative 1, Alternative 3/Alternative 5, and Alternative 4 corridors (MCBCP 2007). IR Site 7, Box Canyon Landfill, is located near the southwestern corner of the Base in the 20 Area, east of Vandegrift Boulevard and less than 1 mile northeast of Stuart Mesa Road. The inactive landfill covers an area of approximately 28 acres. The site began Class III landfill operations in May 1974 and ended operations in 1984. Typical wastes accepted for landfill reportedly included household and construction refuse. The site also reportedly received dry-cleaning sludges, contaminated soil and dumpster waste-containing fuels, POLs, solvents, thinners, strippers, epoxies, sealants, paint wastes, and chemical cleaners (Battelle 2009).

In 1996, IR Site 7 was designated a corrective action management unit (CAMU) for purposes of consolidating remediation wastes from various MCBCP IR sites. IR Site 7 contains wastes (approximately 406,000 tons of treated [stabilized] and untreated soil) from two CERCLA removal actions conducted in 1996 at IR Sites 3 and 6 (CAMU 1) and a CERCLA remedial action conducted in 1999 at IR Sites 1A, 1E, 1F, and 2A (CAMU 2). In general, CAMU 1 contains pesticide-impacted soil and CAMU 2 contains metal-impacted soil (Battelle 2009).

Engineered cap was recommended in the OU-3 Record of Decision for long-term protection of groundwater in the vicinity of Site 7 (Battelle 2009). This remedy required containment of the wastes, elimination of exposure pathways, and long-term monitoring and maintenance of the containment system. The final remedy and associated land use control requirements for IR Site 7 were issued under the ROD for OU-3 in January 1999. The site began closure construction in July 2001. A closure cover was completed, the site was revegetated, the permanent perimeter fence was installed, and post-closure monitoring activities were initiated in February 2003. According to the last Five-Year Review, the remedial action at OU-3 IR Site 7 was found to be protective of human health and the environment because potential exposure pathways that could result in unacceptable risks were being controlled and monitored (Battelle 2009).

- IR Site 30 (also known as Small Arms Firing Range Soil Area) was identified approximately 695 feet southwest of the P-1045 Alternative 1, Alternative 3/Alternative 5, and Alternative 4 corridors (MCBCP 2007). IR Site 30 is approximately 1,300 feet west of the intersection of Stuart Mesa Road and MACS Road. The Santa Margarita River is south of the site. Site 30 consists of soil fill material near an unpaved road west of Stuart Mesa Road. The soil contains bullets and bullet fragments from the small arms firing range. The soil fill material was transported from firing ranges during the mid- to late 1960s and possibly into the 1970s (NAVFAC SW 2007).

The contaminants of concern at Site 30 are antimony, arsenic, chromium, cobalt, copper, and lead. Three hydropunch samples were collected and analyzed for metals. It was determined that no action was required for groundwater. The OU-3 Remedial Investigation/Feasibility Study concluded that a potential threat exists to human health under a residential scenario. Excavation activities for Site 30 were conducted in 2008 and human health risk goals were met (NAVFAC SW 2007). Site closure has been recommended for Site 30 (Battelle 2009).

- IR Site 33 (south of 52 Area [School of Infantry]) was identified within P-1044 Alternative 1/Alternative 5, Alternative 2, Alternative 3, and Alternative 4 (MCBCP 2007). The site is approximately 900 feet northeast of the intersection of Basilone Road and San Juan Road. IR Site 33 consists of the area south of Building 520452 where solvents are present in site groundwater, likely originating from a gun-cleaning area. The gun-cleaning area consists of a concrete pad surrounded by a block wall, with a surface drainage outlet on the south end of the pad. Several solvent spills have been historically reported at IR Site 33. One UST, used to store diesel fuel near Building 52652, has been removed from an area south of the site (Battelle 2009).

Field soil-gas survey results indicated the presence of primarily TCE at Site 33. Highest concentrations were detected immediately north of the monitoring well cluster (33MW-12A/12-B and 33MW-05), near the probable source area. In 1998, soil samples were analyzed for metals, chromium (VI), VOCs (subsurface soils only), and SVOCs. VOCs were detected in the soil vapor samples. Soil samples indicated the presence of primarily tetrachloroethene (PCE) and toluene (Battelle 2009).

A site investigation was conducted at the location of the former UST near Building 52651 in 1998. The extent of petroleum hydrocarbons in soil was determined to be limited to an area approximately 25 feet west-southwest and 15 feet south-southeast of the former UST. The extent of petroleum hydrocarbons in groundwater was within a 5-foot radius of the former UST. Groundwater flows generally south to southeast and is from 7 to 23 feet bgs. In 2003, detected concentrations of PCE in both the shallow and deep zones were above the maximum contaminant level. A risk assessment was performed as part of the Remedial Investigation; however, the site had not been adequately characterized (Battelle 2009). The Removal Action Work Plan and removal action are funded for FY 2010. The removal action will address impacts to both soil and groundwater.

PCBs, Asbestos, and LBP

Based on the date of construction of the existing facilities on the proposed project sites and the paint commonly used at that time, it is assumed that LBP may be present within existing facilities associated with the project corridors. An LBP survey has not been performed on any Base buildings. In addition, it is assumed that asbestos-containing materials may be present within existing facilities associated with the proposed project due to the typical pipe and insulation materials used at the time of construction of the existing facilities.

PCBs have been used in a wide variety of materials, including electrical equipment such as transformers, and it is possible that PCB-containing materials may be present within existing facilities associated with the proposed projects.

3.11.6 Environmental Health and Safety Risks to Children

Regulatory Setting

EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, directs federal agencies to “make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children, and to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.” Under the definitions provided in EO 13045, covered regulatory actions include those that may be “economically significant” (under EO 12866) and “concern an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children.”

Region of Influence Demographics

Population age breakdown information on the nine blocks (with population greater than zero) that contain one or more proposed project sites is presented in Table 3.11-6, with additional age breakdown percentage information for those blocks presented in Table 3.11-7. As shown in Table 3.11-6, for all nine project site blocks combined, the proportion of children in the population is close to that of MCBCP as a whole (22 versus 23 percent) and is roughly similar to the analogous figure for San Diego County as a whole (26 percent), but there is a wide range in distribution of child populations within these blocks. Three of the blocks (Blocks 9008, 9026, and 9027) have no residents 17 years of age or under. In three of the blocks (Blocks 9015, 9019, and 9032), children make up a much higher proportion of the population (ranging from 36 to 43 percent) than is the case for MCBCP as a whole or San Diego County as a whole. In the three other blocks (Blocks 9005, 9025, and 9040) children represent between 11 and 13 percent of the population, roughly half or less of the analogous figures for MCBCP or San Diego County.

Table 3.11-7 provides an at-a-glance contrast between the age distributions of children in the blocks that contain proposed projects, other blocks and areas of MCBCP, and San Diego County as a whole. As shown, for all geographies within MCBCP, progressively younger age groups consistently make up progressively larger percentages of the total population of children. This pattern is not seen for the county, where the percent distribution of children is relatively flat among the under 5 years, 5 to 9 years, and 10 to 14 years categories. This distinction is consistent with the interpretation that military families are typically younger, on the whole, than average families in the general population. Among the six blocks that both contain proposed projects and have any resident children, three have proportionally more children 5 years and under than does the county, three have proportionally more children 5 to 9 years than does the county, two have proportionally more children 10 to 14 years than does the county, and none has proportionally more children 15 to 17 years than does the county. Child-oriented facilities on MCBCP are described in Section 3.7.3, and the specific distribution of child-oriented facilities on MCBCP in relation to project areas included in the proposed action is described in Section 3.7.4.

Table 3.11-1
Military Training Areas, Impact Areas and Live-Fire Facilities within Proposed Action Project Sites/Corridors

Name	Within Project Site/Corridor
Range 207 Military Range Area	P-1044 Alternatives 1, 2, 3, and 4
Range 14 Artillery Firing Area	P-1045 Alternatives 1, 2, 3, and 4
Range D704 Live Fire and Maneuver	P-1045 Alternatives 1, 2, 3, and 4
Range 15 Artillery Firing Area	P-1045 Alternatives 1, 2, 3, and 4
Firing Line 103	P-1045 Alternative 1
X-Ray Impact Area	P-1045 Alternative 1
Range 102 Military Range Area	P-1045 Alternative 1
Range 103 Military Range Area	P-1045 Alternative 1
Range 104b Military Range Area	P-1045 Alternative 1
Range 16 Artillery Firing Area	P-1045 Alternatives 2, 3, and 4
Fire 116 Complex Firing Line Area	P-1045 Alternative 2
Range 116A KD Rifle Military Range Area	P-1045 Alternative 2
Range 19 Artillery Firing Area	P-1045 Alternative 2
Range 117A Military Range Area	P-1045 Alternative 2
Range D700 Live Fire and Maneuver	P-1045 Alternative 2
Range RSOP 25	P-1045 Alternative 2
Range 503 Firing Line	P-1045 Alternative 3
Range 505 Firing Line	P-1045 Alternative 3
Dudded Impact Area-1/503 Hand Grenade Range	P-1045 Alternative 3
Non-Dudded Impact Area/Edson Range Impact Area	P-1045 Alternative 3
Range FMSS Facility	P-1045 Alternative 4

Table 3.11-2
AST Sites within 10 feet of Proposed Action Project Sites/Corridors

AST No.	Status	Within Project Site/Corridor	Within 10-foot Buffer of Project Site/Corridor
20816	Unknown	P-1045 Alternatives 1, 3, and 4 Alternative 5	
31520-1	Active	P-1045 Alternatives 1, 3, and 4 Alternative 5	
31523-P	Unknown	P-1045 Alternatives 1, 3, and 4 Alternative 5	
41611	Active		P-1045 Alternatives 1, 2, 3, and 4 Alternative 5
52021	Active	P-1044, P-1045 Alternatives 1, 2, 3, and 4 Alternative 5	
52410	Active	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
52710	Active	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
61513	Unknown	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	

Table 3.11-3
RFA Sites within 50 feet of Proposed Action Project Sites/Corridors[1]

RFA Site No./ Soil Boring ID	Status	Within Project Site/Corridor	Within 50-foot Buffer of Project Site/Corridor
RFA 168/B1	No Further Action		P-1045 Alternatives 1, 2, 3, and 4 Alternative 5
RFA 170/B1	No Further Action		P-1045 Alternative 2
RFA 176/B1, B2	No Further Action	P-1045 Alternative 2 (RFA 176/B1 only)	P-1045 Alternative 2 (RFA 176/B2 only)
RFA 185/B1	No Further Action		P-1044 Alternatives 1 and 3 Alternative 5
RFA 192/B1	No Further Action		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5
RFA 199/B2	No Further Action	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
RFA 218/B2	No Further Action		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5
RFA 220/B2	Limited Site Investigation	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
RFA 221/B1	No Further Action	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
RFA 225/B3, B4	No Further Action	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
RFA 236/B1	No Further Action		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5
RFA 278/B1	No Further Action		P-1045 Alternatives 1, 2, 3, and 4 Alternative 5
RFA 279/B1	No Further Action		P-1045 Alternatives 1, 2, 3, and 4 Alternative 5
RFA 280/B2	No Further Action		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5

[1] Closed RFA sites are not included in this table or considered in subsequent analysis.

Table 3.11-4
Active (Operational) USTs and Ongoing LUSTs within 500 feet of Proposed Action Project Sites/Corridors[1]

UST No.	Status	Within Project Site/Corridor	Within 200-foot Buffer of Project Site/Corridor	Within 200-500 foot Buffer of Project Site/Corridor
Site 43260	Ongoing LUST		P-1045 Alternative 2	
43286-3	Active	P-1045 Alternative 2		
43286-4	Active	P-1045 Alternative 2		
51091-6	Active		P-1044 Alternatives 1 and 3 Alternative 5	
51091-7	Active		P-1044 Alternatives 1 and 3 Alternative 5	
51091-8	Active		P-1044 Alternatives 1 and 3 Alternative 5	
51091-9	Active		P-1044 Alternatives 1 and 3 Alternative 5	
520167-1	Active		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
520167-2	Active		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
Site 53435	Ongoing LUST			P-1044 Alternatives 1, 2, 3, and 4 Alternative 5
Site 53524	Ongoing LUST			P-1044 Alternatives 1, 2, 3, and 4 Alternative 5
Site 62507	Ongoing LUST	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
62507-3	Active		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
62507-4	Active		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
43201	Inactive	P-1045 Alternative 2		
520400	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
52291	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
52651	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		

UST No.	Status	Within Project Site/Corridor	Within 200-foot Buffer of Project Site/Corridor	Within 200-500 foot Buffer of Project Site/Corridor
52710	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
62420	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
62435	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
62436	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
62520	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
62535	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
62536	Inactive	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		

[1] Inactive UST sites included in the above table are limited to those located within project site boundaries.

Table 3.11-5
IR Sites within 1,000 feet of Proposed Action Sites/Corridors

IR Site No.	Status[1]	Within Project Site/Corridor	Within 500-foot Buffer of Project Site/Corridor	Within 500–1,000 feet of Project Site/Corridor
1C	Closed			P-1045 Alternatives 1 and 4
1D	Open	P-1045 Alternatives 1, 3, and 4 Alternative 5		
1F	Closed		P-1045 Alternative 2	
1I-2	Closed		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
2C	Closed			P-1045 Alternative 1
2D	Closed		P-1045 Alternative 2	
7	Open		P-1045 Alternatives 1, 3, and 4 Alternative 5	
9	Closed			P-1045 Alternatives 1, 3, and 4 Alternative 5
20	Closed		P-1045 Alternative 2	
30	Open			P-1045 Alternatives 1, 3, and 4 Alternative 5
32	Closed		P-1045 Alternatives 1, 3, and 4 Alternative 5	
33	Open	P-1044 Alternatives 1, 2, 3, and 4 Alternative 5		
34	Closed		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	
36	Closed		P-1044 Alternatives 1, 2, 3, and 4 Alternative 5	

[1] Closed IR sites included in the table are limited to those within the 500 foot buffer of the project site/corridor.

Table 3.11-6
Age Breakdown by Area, 2000

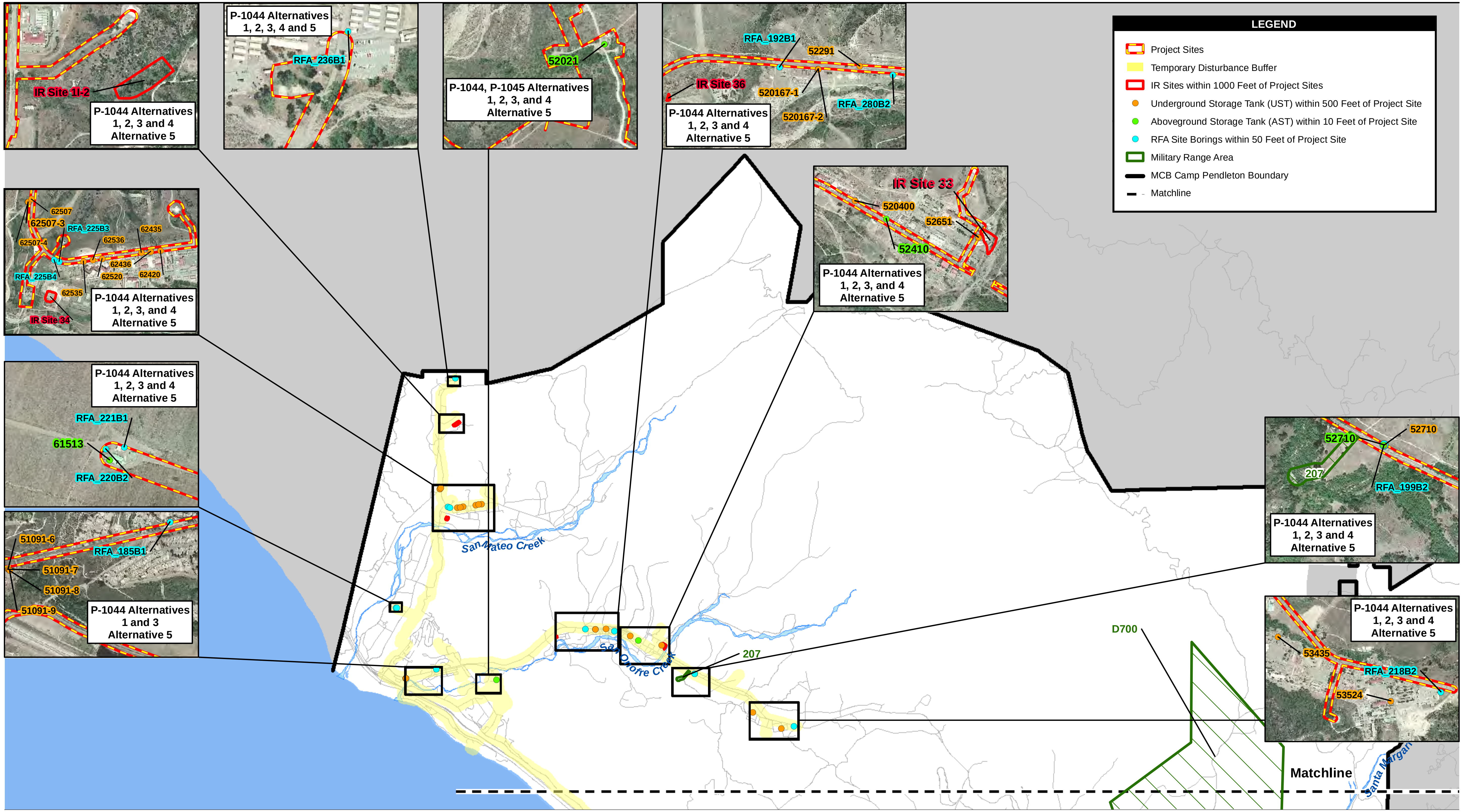
Area	Total Population	Total Population: Under 5 Years	Total Population: 5 to 9 Years	Total Population: 10 to 14 Years	Total Population: 15 to 17 Years	Total Population: 17 Years or Under	Percent Population: 17 Years or Under
Block 9005[1]	11,471	591	410	267	112	1,380	12.03%
Block 9008[1]	162	0	0	0	0	0	0.00%
Block 9015[1]	6,200	1,114	679	334	110	2,237	36.08%
Block 9019[1]	1,093	201	145	83	36	465	42.54%
Block 9025[1]	3,480	332	20	4	15	371	10.66%
Block 9026[1]	691	0	0	0	0	0	0.00%
Block 9027[1]	266	0	0	0	0	0	0.00%
Block 9032[1]	6,514	1,338	781	508	153	2,780	42.68%
Block 9040[1]	2,340	157	80	51	15	303	12.95%
Subtotal GTF Blocks[2]	33,537	3,753	2,115	1,247	441	7,536	22.47%
Block 9003	6	0	1	1	0	2	33.33%
Block 9009	215	38	18	8	2	66	30.70%
Block 9013	42	12	8	0	0	20	47.62%
Block 9017	6	1	1	2	0	4	66.67%
Block 9021	36	1	4	2	1	8	22.22%
Block 9024	3,624	445	198	127	44	814	22.46%
Subtotal non-GTF Blocks	3,929	497	230	140	47	914	23.26%
MCBCP	36,146	4,230	2,345	1,387	488	8,450	23.38%
Camp Pendleton North CPD	8,197	978	363	214	95	1,650	20.13%
Camp Pendleton South CPD	8,854	1,495	861	559	168	3,083	34.82%
San Diego County	2,813,833	198,621	212,829	199,669	112,542	723,661	25.72%

[1] Denotes populated census blocks with at least one proposed project's limits or corridor within their boundaries; in addition to these blocks, table includes all other MCBCP census blocks with a population greater than zero.
[2] Subtotal includes only those census blocks with at least one proposed project within their boundaries.
Source: U.S. Census Bureau 2000 (SF1)
Note: Block 9008 was an agricultural lease in 2000, but the lease was not renewed after 2007. No occupied agricultural worker housing remains in this block; therefore, it will be dropped from further demographic analysis.

Table 3.11-7
Age Breakdown by Area (Percent), 2000

Area	Total Population	Total Population: Under 5 Years	Total Population: 5 to 9 Years	Total Population: 10 to 14 Years	Total Population: 15 to 17 Years	Total Population: 17 Years or Under
Block 9005[1]	100%	5.15%	3.57%	2.33%	0.98%	12.03%
Block 9008[1]	100%	0.00%	0.00%	0.00%	0.00%	0.00%
Block 9015[1]	100%	17.97%	10.95%	5.39%	1.77%	36.08%
Block 9019[1]	100%	18.39%	13.27%	7.59%	3.29%	42.54%
Block 9025[1]	100%	9.54%	0.57%	0.11%	0.43%	10.66%
Block 9026[1]	100%	0.00%	0.00%	0.00%	0.00%	0.00%
Block 9027[1]	100%	0.00%	0.00%	0.00%	0.00%	0.00%
Block 9032[1]	100%	20.54%	11.99%	7.80%	2.35%	42.68%
Block 9040[1]	100%	6.71%	3.42%	2.18%	0.64%	12.95%
Subtotal GTF Blocks[2]	100%	11.97%	6.81%	4.00%	1.43%	22.47%
Block 9003	100%	0.00%	16.67%	16.67%	0.00%	33.33%
Block 9009	100%	17.67%	8.37%	3.72%	0.93%	30.70%
Block 9013	100%	28.57%	19.05%	0.00%	0.00%	47.62%
Block 9017	100%	16.67%	16.67%	33.33%	0.00%	66.67%
Block 9021	100%	2.78%	11.11%	5.56%	2.78%	22.22%
Block 9024	100%	12.28%	5.46%	3.50%	1.21%	22.46%
Subtotal non-GTF Blocks	100%	12.65%	5.85%	3.56%	1.20%	23.26%
MCBCP	100%	11.70%	6.49%	3.84%	1.35%	23.38%
Camp Pendleton North CPD	100%	11.93%	4.43%	2.61%	1.16%	20.13%
Camp Pendleton South CPD	100%	16.89%	9.72%	6.31%	1.90%	34.82%
San Diego County	100%	7.06%	7.56%	7.10%	4.00%	25.72%

[1] Denotes populated census blocks with at least one proposed project's limits or corridor within their boundaries; in addition to these blocks, table includes all other MCBCP census blocks with a population greater than zero.
[2] Subtotal includes only those census blocks with at least one proposed project within their boundaries.
Source: U.S. Census Bureau 2000 (SF1)
Note: Block 9008 was an agricultural lease in 2000, but the lease was not renewed after 2007. No occupied agricultural worker housing remains in this block; therefore, it will be dropped from further demographic analysis.



Source: MCBCP 2009

1.5 0.75 0 1.5 Miles

Scale: 1 = 95,040; 1 inch = 1.5 miles

Figure 3.11-1a
Public Heath and Safety - North MCBCP

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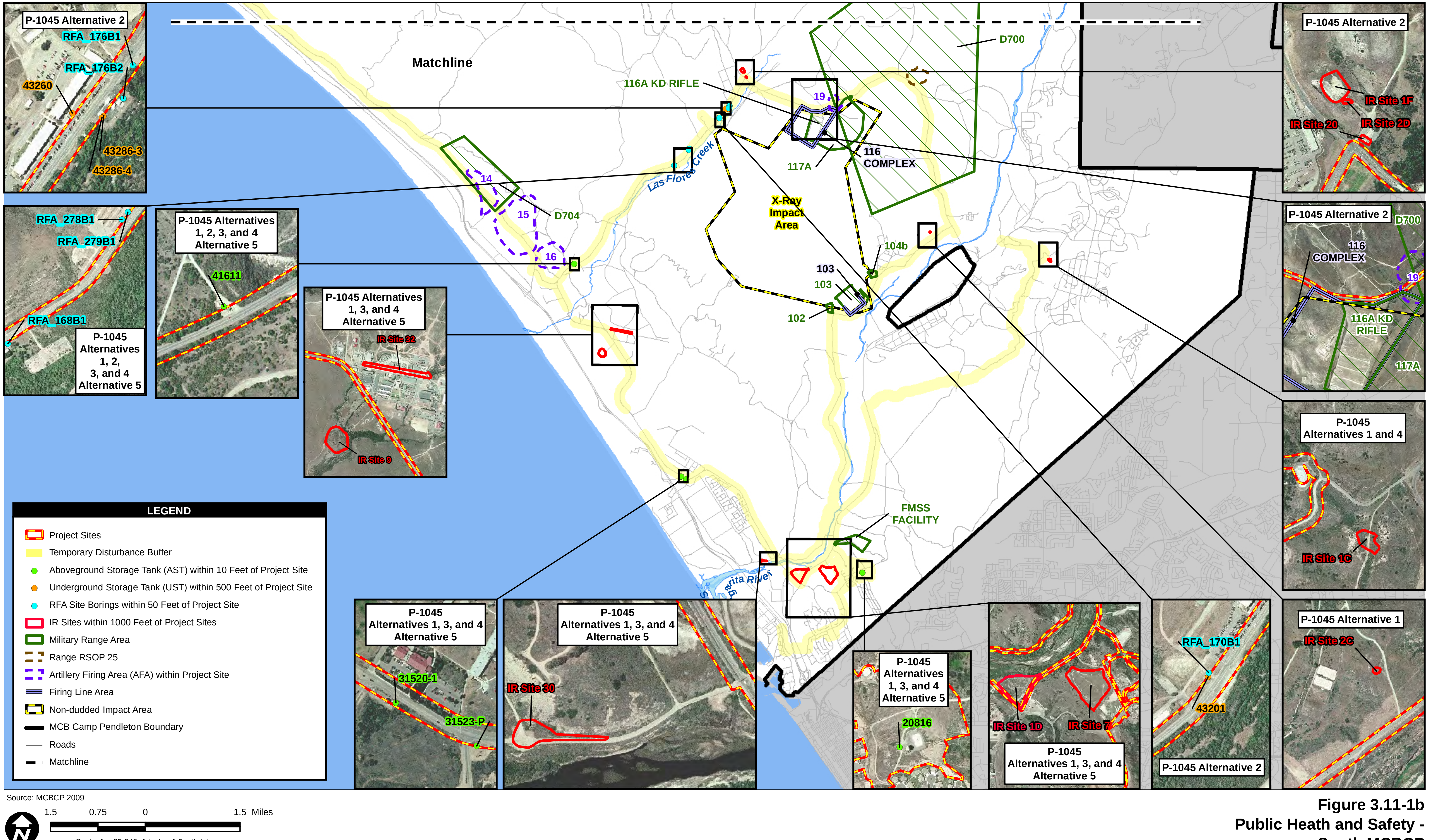

Figure 3.11-1b
Public Heath and Safety - South MCBCP

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3.12 SERVICES AND UTILITIES

3.12.1 Definition of Resource

Services provided to all developed areas on-Base are fire protection, police protection, and solid waste disposal. Utilities serving MCBCP are wastewater, potable water, natural gas, electricity, and communications. Each of these services and utilities is considered to consist of the physical facilities and personnel needed to serve users on MCBCP.

3.12.2 Regulatory Setting

As MCBCP is under federal control, service and utility provision differs substantially in most cases from the provision of similar services in adjacent communities. Details vary by type of service or utility and these are described in the individual sections below.

3.12.3 Region of Influence

The areas of the Base traversed by proposed action features are widespread, but once constructed, the underground facilities would generate little or no demand on utilities and services. The ROI for infrastructure and utilities would therefore be confined to aboveground structures; these would include the Northern AWT; a pump station near El Camino Real in the area near Las Pulgas gate; improvements to reservoirs near the 62 Area (San Mateo), 63 Area (Cristianitos), 52 Area (School of Infantry), 53 Area (Horno), the Wire Mountain 2 Housing Area and the Santa Margarita Housing Area, and Haybarn Canyon; and a new 4-million-gallon reservoir near the Wire Mountain Housing Area. The pump station and reservoirs would be served by electrical utilities, at a minimum, but would require minimal or no services such as fire protection, police protection, solid waste disposal, and wastewater collection. The Northern AWT, as the only facility continuously occupied by maintenance and operations personnel, would require a full range of services and utilities.

3.12.4 Existing Conditions – Basewide

Police Protection

Law enforcement on MCBCP is the responsibility of the Provost Marshal Office (PMO). The MCBCP PMO provides Basewide internal security, as well as a security patrol for the perimeter of the Base. The PMO oversees traffic control and enforcement (including traffic accidents) and crime prevention (including operation of the Criminal Investigation Division), and provides law enforcement services to all Base, Fleet Marine Force, and tenant organizations associated with MCBCP.

A designated area commander from each development area is in charge of guards and security at critical areas throughout the Base. There are 60 to 75 military police on duty at any given time in a 24-hour period, including the desk team, gate sentries, and 17 to 20 mobile units. All on-Base patrol districts are shown in Figure 3.12-1. Recently, the military police have been augmented by blending the total police force with civil-service police officers. The staffing goal by the end of FY 2012 is to have two-thirds civilian police officers installation-wide. This concept, implemented and mandated by Headquarters Marine Corps, is intended to free up active-duty Marines to assist in the conflicts abroad in the operating forces. In addition, the Naval Criminal Investigation Service (NCIS) maintains several offices on the Base. NCIS agents investigate serious crimes that may be committed on-Base.

Fire Protection

The Camp Pendleton Fire Department currently operates from 10 fire stations on the Base (Figure 3.12-1). MCBCP has a minimum requirement of four personnel on duty at each station in any 24-hour period. Every emergency response entails the deployment of two engines, a truck company (with 50-foot ladder), one rescue squad, and one chief officer. This is accomplished by a tri-station response program, as each station has one engine or truck company and there are two rescue squads, one for the southern portion of the Base at Station 1 in the 22 Area (Chappo) and one for the northern portion of the Base at Station 7 in the 52 Area (School of Infantry). The Fire Department is staffed by 135 personnel, all of whom are Emergency Medical Technicians and provide emergency medical service Basewide (Wilkerson 2009).

Solid Waste Disposal

MCBCP operates a Qualified Recycling Program for cardboard, paper, aluminum and plastic bottles and cans, glass bottles and jars, and scrap metals. This also includes detergent and shampoo bottles, metal food cans and cereal/food boxes. Recycling of government property such as scrap metal, appliances, rubber, canvas, and steel is conducted through DRMO, including electronic waste. The Base contracts for disposal of biosolids (wastewater sludge) off-Base.

There are two sanitary landfills on MCBCP: the San Onofre landfill and Las Pulgas landfill. Both landfills are indicated in Figure 3.12-1. In 2009, solid waste deposited in the Las Pulgas landfill totaled about 31,580 tons, with about 1,017 tons deposited in the San Onofre landfill (Vajda, personal communication via e-mail, 7 January 2010). These numbers do not include construction waste, hazardous waste, or wastewater sludge. Solid waste collection is handled by Waste Management, a private firm that contracts with the MCBCP Facilities Maintenance Department (FMD). Landfill operations are handled by Base personnel.

The San Onofre landfill is open 2 days a week. The Joint Technical Document for San Onofre Landfill prepared by CH2MHill for MCBCP estimates conservatively that the San Onofre landfill has a remaining life of 45 years from December 2008, assuming a waste-to-soil ratio of 2.5:1, an increased disposal rate of 100 tons per day, and operations 104 days per year (CH2MHill 2009a). The Las Pulgas landfill typically operates 5 days per week. The Joint Technical Document for Las Pulgas Landfill conservatively estimates that the Las Pulgas landfill has a remaining life of 37 years from November 2008, assuming a waste-to-soil ratio of 2:1, an increased disposal rate of 400 tons per day, and operations 250 days per year (CH2MHill 2009b). If an alternative daily cover, such as tarp, is used at the Las Pulgas landfill, the life of the landfill would be increased.

Wastewater

Wastewater facilities within MCBCP are owned by AC/S, Facilities. Southern Region Tertiary Treatment Plant (SRTTP) and the reclaimed water conveyance are operated by CDM, a private firm, under a “design-build-operate-maintain” contract. STPs 9, 11, and 12 and the sanitary sewer collection system are maintained and operated by FMD. MCBCP collects, treats, and disposes of treated wastewater through a system of STPs, pump stations, and conveyance lines. Wastewater treatment has typically been secondary, but since 2006 the SRTTP in the 20 Area performs tertiary treatment on sewage from the southern part of the Base. The SRTTP has a capacity of 5.0 mgd and replaced STPs 1, 2, 3, 8, and 13. Expansion of the SRTTP’s capacity to 7.5 mgd has been proposed as a project in the Grow the Force Permanent Bed-down Facilities program for which environmental review is complete. Current average demand is estimated at 2.2 to 2.5 mgd and is projected to be 4.7 mgd by 2013.

Wastewater from the 43 Area (Las Pulgas) is treated at STP 9 on Las Pulgas Road approximately 2 miles southwest of Basilone Road. STP 9, which is independent of the northern and southern wastewater treatment systems on the Base, has a current capacity of 0.7 mgd. No STP 9 expansions are planned.

The northern part of the Base is served by STPs 11 and 12 and was formerly served by STP 10, now out of service. STPs 11 and 12 are secondary treatment plants. However, as part of the Basewide Utilities Infrastructure program, a new NRTTP (P-1043) with a design capacity of 5.0 mgd is replacing STPs 11 and 12.

The SRTTP and NRTTP would be fed by a system of gravity mains, pump stations, and force mains to transport sewage to the treatment plants. After treatment, about 1.5 mgd of the effluent from SRTTP goes into reclaimed water, with the remainder (about 1.0 mgd) being transferred to the city of Oceanside. The effluent from STP 9 is injected into the ground in the vicinity of Red Beach. Effluent from STPs 11 and 12 is currently discharged into percolation ponds. Effluent from the NRTTP will likely be reused and/or discharged into percolation ponds.

Potable Water

The water facilities within MCBCP are owned and operated by FMD. The potable water supply in the northern part of the Base originates entirely from groundwater resources within MCBCP boundaries. Currently, the water wells in the San Mateo and San Onofre basins, which will supply water to the Northern AWT, produce raw water for the northern region of MCBCP that includes the 53 Area (Horno), 52 Area (School of Infantry), 62 Area (San Mateo), 63 Area (Cristianitos), 64 Area (Talega), 51 Area (San Onofre), San Onofre housing areas, and San Onofre Recreational Beach. In the northern portion of the Base there is nearly 40,000 linear feet (LF) of water piping that dates back to the 1960s and is deteriorating, requiring frequent repairs. This water system consists of wells, water mains, booster pumps, and storage reservoirs but does not provide redundancy/backup. Due to the existing water infrastructure's lack of redundancy/backup and its continued deteriorating conditions, portions of the Base have experienced more frequent interruptions to water delivery system services. In addition, wildfires in recent years have also damaged system components (i.e., pump stations, pipes, etc.), resulting in service interruptions. As this system continues to age and as the demand continues to increase, the frequency of the interruptions will also increase, resulting in a greater impact on the mission. Repair and maintenance of this system are becoming more frequent and more expensive.

Also, current water treatment does not meet more stringent secondary drinking water standards for TDS and may not meet the pending Stage 2 Disinfectant Byproducts Rule of the SDWA as TOC is not removed from the well water. Water from the wells in the San Mateo and San Onofre basins exceeds the SDWA's secondary standard (500 milligrams per liter [mg/L]) for TDS. The wells produce mildly aggressive water, which causes leaching from the conveyance system and also results in the wastewater sludge containing high levels of copper. As a result, some of the sludge from the wastewater plants is classified as hazardous waste by the State of California and imposes special disposal costs on MCBCP.

The southern water system includes two water treatment plants designed to remove iron and manganese from the water from Santa Margarita groundwater basin. Each plant has a designed treatment capacity of not less than 6,000 gallons per minute (gpm) and not less than 4,500 gpm when any single treatment component is offline.

Currently, the northern and southern water systems are not connected. Because the water systems of these two regions are not connected, maintenance is performed incrementally, and no backup system exists in the event of failure. At present, water cannot be distributed from one system to the other in times of emergency and peak demand. Further, development served by the Las Flores well field and distribution system needs to be tied to a larger water system because of the eventual planned shutdown of wells tapping the Las Flores aquifer due to water quality issues.

Natural Gas

Two regional energy pipelines run through MCBCP. These transport lines move gas and petroleum products from the refineries in Long Beach to a distribution center in San Diego. The Southern California Gas Company line is approximately 12 inches in diameter and runs through MCBCP along the coastline following the railroad easement. The other line, a 10-inch San Diego Pipeline Company petroleum product line, enters MCBCP in the 64 Area (Talega), follows Basilone Road, and exits the Base on the western part of the border with Oceanside.

MCBCP purchases natural gas from SDG&E and the gas is distributed throughout MCBCP via various gas mains. The primary source of gas for MCBCP is the 12-inch line in the railroad easement roughly parallel to I-5, but Wire Mountain area housing receives natural gas through two gas lines from Oceanside, and another line from Oceanside feeds the Headquarters area.

One of the projects (P-1099) that is part of the Basewide Utilities Infrastructure program will significantly upgrade the natural gas distribution system on the southern part of the Base. In addition, P-1099 will extend a gas line from the 43 Area (Las Pulgas) to the 25 Area (Vado del Rio), providing a connection between the northern and southern Base gas distribution systems.

Electricity

SDG&E currently provides approximately 60 percent of the Base's electrical power through a 69-kilovolt (kV) substation in Haybarn Canyon near the junction of Basilone Road and Vandegrift Boulevard. The remaining 40 percent is supplied through a number of other substations or switch gear in various cantonments. Substations are necessary where the feed from SDG&E differs in voltage from the Base distribution system it supplies, such as 69kV to 12kV or 12kV to 4.16kV. Switch gear is installed where the feed voltage and distribution voltage are the same. Aside from limited on-Base sources like solar panels, all electrical power to the Base is supplied by SDG&E.

Two projects (P-1048 and P-1094) in the Basewide Utilities Infrastructure program will upgrade the current aging electrical system. P-1048 will provide 69kV power distribution between the southern and northern parts of the Base. P-1094 will replace the 4.16kV distribution system with a 12kV system, construct four new 69kV to 12kV substations, provide needed redundancy and backup, provide new 12kV circuits to the 21 Area (Del Mar) and 31A Area (Edson Range), and replace circuits supplying power to the southern part of the Base.

Communications

The Base Communications/Electronic Office manages communications and electronics support for MCBCP. The office operates and maintains the government-owned telephone, radio, closed circuit television, teletype, public addresses, and other communications systems. The existing fiber-optic cable system has reached bandwidth saturation. The existing MCBCP "duct bank" intracamp communication systems are now outdated and undersized. The duct bank system consists of a series of concrete-encased conduits and manholes, where splices provide both the fiber-optic cable and telephone cable to individual buildings. The intracamp systems have both an insufficient number of open conduits available for new communications cables and an insufficient number of fiber-optic strands and telephone cable pairs to sustain currently planned growth. One of the projects (P-1093) in the Basewide Utilities Infrastructure program will upgrade the current aging communications system. That project is planned to meet the requirements for a reliable and redundant communications network, providing both intercamp and intracamp fiber-optic cable and telephone cable connectivity.

3.12.5 Existing Conditions – Proposed Project Areas

Northern AWT and Associated Facilities (P-1044)

Either of the proposed alternative Northern AWT sites, Site 4 or Site 6, would be served by Police District PMO 1-8. For both, the nearest fire stations are Station 7 in the 52 Area (School of Infantry) and Station 8 in the 63 Area (Cristianitos).

Connection of Northern and Southern Water Systems (P-1045)

The only new aboveground structure site would be the pump station near Las Pulgas gate. The site is in Police District PMO 1-7. The nearest fire stations include Station 10 in the 41 Area (Las Flores) and Station 6 at the western edge of the 43 Area (Las Pulgas).

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Source: ESRI 2010; MCBCP 2009

2.5 1.25 0 2.5 Miles

Scale: 1:158,400; 1 inch = 2.5 miles

Figure 3.12-1
Police Districts, Fire Stations, and Landfills

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3.13 COASTAL ZONE MANAGEMENT

3.13.1 Definition of Resource

Coastal zone management refers to the consistency of a project with the CZMA, which defines the coastal zone. At MCBCP, the coastal zone includes the Pacific Ocean from the mean high tide line to 3 miles out to sea. Actions that take place outside the coastal zone may indirectly affect it; for instance, sedimentation from ground disturbance inland may travel downstream to affect coastal waters and organisms.

3.13.2 Regulatory Setting

Coastal Zone Management Act

The CZMA declares that it will be the national policy to:

> (1) preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations; and (2) encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological values.

Programs should provide for "the protection of natural resources, including wetlands, flood plains, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife and their habitat, within the coastal zone."

Through the CZMA of 1972, as amended, coastal states are provided the authority to evaluate projects conducted, funded, or permitted by the federal government. Under the CZMA, any federal project or activity affecting the coastal zone must be consistent to the maximum extent practicable with the provisions of federally approved state coastal plans. The CCC developed the California Coastal Management Program (CCMP) pursuant to the requirements of the CZMA. The CCC is responsible for reviewing proposed federal and federally authorized activities affecting the state's coastal resources to assess the activities' consistency with the federally approved CCMP.

None of MCBCP inland from the mean high tide line is a part of the coastal zone, as federal lands are excluded by the CZMA from the coastal zone. The Marine Corps, however, is required to review proposed actions to identify those actions that affect any land or water use or natural resource of the coastal zone. For all activities affecting the coastal zone, preparation of a Coastal Consistency Determination (CCD) is required.

3.13.3 Region of Influence

The ROI for coastal zone management would include the areas where construction and operation of facilities associated with the proposed action alternatives would occur and could potentially affect coastal resources. While only effects associated with the modification and reuse of the former SONGS cooling water intake conduit (outfall conduit) (including construction, maintenance, and the discharge of brine) would directly affect the MCBCP coastal zone, many elements of the proposed action have the potential to affect streams that ultimately drain into the ocean. Because the proposed action involves almost all MCBCP drainages except the San Luis Rey River drainage on the southern part of the Base, there is a potential for the proposed action to indirectly affect coastal zone resources along nearly the entire MCBCP coastline.

3.13.4 Existing Conditions – Basewide

Coastal Waters

MCBCP has approximately 17 miles of coastline. Coastal water resources along the Base include the Pacific Ocean, creek mouths, lagoons and estuaries, and the Del Mar Boat Basin. The quality of water along the Base's coastline, as with all waters on the Base, is not only affected by activities occurring on the Base but also by activities occurring farther up each of the three major HUs in numerous other jurisdictions. Information regarding the coastal waters in or adjoining the Base was previously summarized in the Water Quality and Hydrology discussion, Section 3.2.4.

Of the two projects in the proposed action, only P-1044 would have features or activities in the coastal zone, with all alternatives connecting to the former SONGS outfall conduit. The entire length of the conduit is in the coastal zone. While no other feature of the proposed action is in the coastal zone, the project limits included in the proposed action cross drainages that directly or ultimately discharge into coastal zone waters.

Existing conditions in marine waters that could be affected by the proposed use of the SONGS outfall conduit for Northern AWT brine discharge are discussed in Section 3.14, Marine Resources.

3.13.5 Existing Conditions – Proposed Project Areas

Of the two projects in the proposed action, only P-1044 would have features or activities in the coastal zone, with all alternatives connecting to the SONGS outfall conduit. The entire length of the conduit is in the coastal zone. While no other feature of the proposed action is in the coastal zone, the project limits included in the proposed action cross drainages that directly or ultimately discharge into coastal zone waters. These drainages and areas of effect are discussed in Section 3.2, Water Quality and Hydrology. Existing conditions in the marine environment are discussed in Section 3.14, Marine Resources.

SONGS Outfall Conduit

SCE is the owner and operator of SONGS. Currently, all onshore components of SONGS Unit 1 at MCBCP are being decommissioned. Under an agreement with the California State Lands Commission, which allows SCE to use the offshore area for cooling water conduits, SCE is required to remove the offshore conduits in their entirety once the power plant has been retired.

SCE has proposed to leave the conduits in place by removing the vertical structures at the termini of the offshore cooling water conduits to eliminate their risk as navigation hazards; retaining the buried conduits in a safe configuration that would prevent entry by humans and marine mammals; installing a plug of concrete in the onshore portions of the conduits; and terminating the lease agreement and entering into a new Lease Termination/Abandonment Agreement. SCE maintains that abandoning the conduits in place would cause less disturbance to the marine environment than removing them and would allow their reuse for some potential future project.

SCE prepared an Environmental Impact Report for the disposition of the conduits by modifying them and leaving them in place. The draft Environmental Impact Report was circulated for public review but was never certified, since SCE halted processing of the document. Information in this EIS regarding the SONGS outfall conduits has been taken from that Environmental Impact Report (SCE 2005).

The SONGS outfall conduit is in the MCBCP coastal zone and is one of the paired cooling water intake and discharge conduits for the SONGS Unit 1. The SONGS conduits are constructed of 12-foot-diameter, steel-reinforced concrete pipe. The parallel offshore conduits are 20 feet apart, with the longer intake conduit located to the north of the discharge conduit. The intake conduit extends horizontally southwest of

SONGS Unit 1 approximately 3,200 feet and the discharge conduit extends approximately 2,600 feet. The offshore portion of each conduit is buried beneath the ocean bottom and is covered with approximately 4 feet of sand, with the conduits following the local ocean bottom profile.

A terminal structure is at the west end of both the intake and discharge conduits. The terminal structures rest on separate foundations that extend approximately 30 feet beneath the ocean bottom and are surrounded by 4 feet of rock cover at the ocean floor. The ocean at the intake terminus is approximately 27 feet deep, and the intake structure rises vertically to approximately 16 feet above the ocean floor, or approximately 11 feet below the surface of the ocean. Its outside horizontal dimensions are 20 by 27.5 feet. Because the intake structure creates a potential navigational hazard, a buoy above the structure marks the location for boaters.

The intake conduit includes five manhole risers spaced every 500 feet. The manhole risers extend between 1 and 5 feet above the seafloor, and there are no marker buoys for the risers. A Navy diver reconnaissance of the conduit in 2009 found that two of the manhole risers are damaged, allowing sediment and debris to enter the conduit (U.S. Navy 2009b).

3.14 MARINE RESOURCES

3.14.1 Definition of Resource

Marine resources consist of oceanic organisms and habitats. In this section, they will be treated as the resources that may be directly affected by the proposed construction of the brine pipeline and discharge of brine through the SONGS outfall conduit. This area would extend approximately 750 feet beyond outfall conduit structure and the brine diffuser.

3.14.2 Regulatory Setting

Several federal regulations and standards have been established to protect and conserve marine resources. Those applicable to the resources that may be directly affected by the proposed brine pipeline and discharge of brine include the Sustainable Fisheries Act of 1996, described in Section 3.3.2, and the regulation described below.

Marine Mammal Protection Act[30]

The Marine Mammal Protection Act (MMPA) of 1972 establishes a federal responsibility for the protection and conservation of marine mammal species. The primary authority for implementing the act belongs to NMFS, a part of the National Oceanic and Atmospheric Administration. The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens in international waters, and the importation of marine mammals and marine mammal products into the United States. Take is defined to include the harassment, hunting, capture, killing, or collecting, or the attempt of such actions, of any marine mammal (NOAA 2010a). Under the 1994 Amendments to the MMPA, harassment is statutorily defined as, any act of pursuit, torment, or annoyance which:

Level A Harassment - has the potential to injure a marine mammal or marine mammal stock in the wild; or,

Level B Harassment - has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not

[30] 16 U.S.C. §§ 1361–1407.

have the potential to injure a marine mammal or marine mammal stock in the wild (NOAA 2010a).In addition to the CZMA discussed in Section 3.13.2, the State of California has enacted the following regulations pertaining to marine resources.

Magnuson-Stevens Fishery Conservation and Management Act

The Sustainable Fisheries Act of 1996 (P.L. 104–297) reauthorized and amended the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801) by providing a number of new mandates for NMFS, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The councils, with assistance from the NMFS, are required to delineate "essential fish habitat" (EFH) for all managed species. The Act defines EFH as "… those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Federal action agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH and respond in writing to NMFS recommendations.

2005 Water Quality Control Plan for Ocean Waters of California

The *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) was created by SWRCB to protect "the quality of the ocean waters for use and enjoyment by the people of the State" (SWRCB 2005). The provisions of the Ocean Plan apply to both point source and nonpoint source discharges to the ocean waters of California. The Ocean Plan sets forth water quality objectives and effluent limitations for the oceans of the State. These objectives, as they apply to use of the SONGS outfall conduit, are:

Physical Characteristics

- Floating particulates and grease and oil shall not be visible.
- The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.
- Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.
- The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.

Chemical Characteristics

- The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste materials.
- The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
- The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.
- The concentration of substances set forth in Ocean Plan Chapter II, Table B, in marine sediments shall not be increased to levels that would degrade indigenous biota.
- The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life.
- Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.
- Numerical Water Quality Objectives specified in Ocean Plan Table B shall not be exceeded.

Biological Characteristics

- Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.
- The natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption shall not be altered.
- The concentration of organic materials in fish, shellfish, or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.

Water Quality Control Plan for the Control of Temperatures in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of the State of California

The *Water Quality Control Plan for the Control of Temperatures in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of the State of California* (Thermal

Plan) is intended to minimize the effect of thermal discharges into water bodies in California (SWRCB 1998). Provisions of the Thermal Plan applicable to the proposed discharge of brine through the SONGS outfall conduit are described below.

General

Limitations shall be imposed in individual cases if necessary for the protection of specific beneficial uses and areas of special biological significance. When additional limitations are established, the extent of surface heat dispersion will be delineated by a calculated 1.5°F isotherm that encloses an appropriate dispersion area. The extent of the dispersion area shall be as follows:

- Minimized to achieve dispersion through the vertical water column rather than at the surface or in shallow water.
- Defined by the Regional Board for each existing and proposed discharge after receipt of a report prepared in accordance with the implementation section of this plan.

In addition:

- The cumulative effects of elevated temperature waste discharges shall not cause temperatures to be increased except as provided in specific water quality objectives contained herein.
- Areas of special biological significance shall be designated by the State Board after public hearing by the Regional Board and review of its recommendations.
- Regional Boards may, in accordance with Section 316(a) of the Federal Water Pollution Control Act of 1972, and subsequent federal regulations including 40 C.F.R. 122, grant an exception to Specific Water Quality Objectives in this Plan. Before becoming effective, such exceptions and alternative less stringent requirements must receive the concurrence of the State Board.
- Natural water temperature will be compared with waste discharge temperature by near-simultaneous measurements accurate to within 1°F. In lieu of near-simultaneous measurements, measurements may be made under calculated conditions of constant waste discharge and receiving water characteristics.

Coastal Waters

- Elevated temperature wastes shall be discharged to the open ocean away from the shoreline to achieve dispersion through the vertical water column.
- Elevated temperature wastes shall be discharged a sufficient distance from areas of special biological significance to ensure the maintenance of natural temperature in these areas.
- The maximum temperature of thermal waste discharges shall not exceed the natural temperature of receiving waters by more than 20°F.
- The discharge of elevated temperature wastes shall not result in increases in the natural water temperature exceeding 4°F at (a) the shoreline, (b) the surface of any ocean substrate, or (c) the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation shall be maintained at least 50 percent of the duration of any complete tidal cycle.
- Additional limitations shall be imposed when necessary to ensure protection of beneficial uses.

3.14.3 Region of Influence and Survey Methods

The ROI for marine resources that could be affected by use of the SONGS outfall conduit by proposed P-1044 consists of the areas from the ocean floor to the ocean surface, including any areas that might be disturbed by construction, such as excavation and demolition of existing elements of the SONGS outfall conduit. In this EIS, these are considered the areas of direct influence. Plumes of brine, sediment, and other materials could be conveyed outside this zone of direct influence. While these areas depend on a number of variables such as currents, winds, wave action, and the constituents of the plumes, the areas potentially affected are also included in the ROI.

Information about the marine resources is based on existing data in the MCBCP INRMP (USMC 2007a) and an assessment of the marine resources in the ROI presented in Appendix E. No surveys were conducted inside the ROI. In particular, discussions and analyses in this document concerning marine resources are based entirely on available Basewide data and the report presented in Appendix E: federally listed marine wildlife species, marine mammals protected under the MMPA, and fish species and EFH managed under the Sustainable Fisheries Act of 1996.

3.14.4 Existing Conditions

The SONGS outfall conduit is described in Section 3.13.5. The sections below characterize the physical conditions of the marine environment.

Oceanography

The conduit is located within the oceanographic region known as the Southern California Bight (SCB). The SCB covers approximately 30,116 square miles, extending from Point Conception past the Mexican border, and encompassing the Channel Islands east of the mainland. The primary currents in this region are the California Current, which flows southerly along the western portion of the bight, and the Southern California Countercurrent, which generally flows northerly along the southern California coastline. These currents combine to form a counterclockwise rotating gyre. Despite the northerly flow of the Southern California Countercurrent, longshore currents in the project area generally flow in a southerly direction (Dailey et al. 1993).

The SCB is defined as a transitional zone between warm and cold water habitats, and multiple valuable biological resources are present in this region. Abundance and distribution of organisms within the SCB vary seasonally. Upwelling during the spring and summer months brings nutrient-rich waters to the area, allowing for increased productivity (Dailey et al. 1993).

Bathymetry

The Unit 1 outfall conduit extends 3,200 feet perpendicular to the shoreline in a northeast-southwest alignment, approximately 33° from true North. The majority of the seabed in the area of the conduit consists of sand and shell fragments with an estimated mean sediment grain size diameter of about 0.02 inch (equivalent to medium sand) (Elwany 2000). Depth contours are fairly regular and parallel to the coast, with larger variations in the surfzone area (approximately 12-foot depth), presumably due to exposure of hard bottom (the San Mateo Formation) (Elwany 2000). Bathymetry ranges from a 1:11 (vertical to horizontal) beach slope at mean sea level to an average of 1:60 at the 12-foot contour, and approximately 1:100 beyond the 12-foot depth contour to the end of the conduit (Gerwick 2003).

Waves

Data provided by two wave buoys at Dana Point and Oceanside (CA096 and CA045, respectively) were evaluated to characterize the wave climate in the vicinity of San Onofre as part of the potential disposition of the Unit 1 conduits (Gerwick 2003). Based on this data and the analysis provided, the wave climate offshore of SONGS, the Dana Point wave climate is dominated by waves from the west and south/south-southwest directions because it is largely sheltered from west-southwest and southwest wave fronts by Santa Catalina and San Clemente islands. The Oceanside wave climate is open to westerly wavefronts but is sheltered from south-approaching waves because they tend to refract and break on the shore between San Diego and Oceanside. The San Onofre area is partly sheltered from westerly and southwesterly waves by Santa Catalina Island and San Clemente Island.

Being situated between these two wave measurement locations, typical significant wave heights between 2 and 5 feet with periods of 4 to 12 seconds (90 percent of waves) could be expected at San Onofre (Gerwick 2003), which is consistent with earlier findings in the SONGS area (Elwany 2000).

Currents and Littoral Transport

Waves arriving at oblique beach angles generate longshore currents in the surf zone due to dissipation of wave-breaking energy. As waves break, the oscillating water motion induces turbulence on the seabed. Based on the season and the magnitude of wave action, longshore currents can carry suspended sand and seabed sediment along the coast and deposit it in areas of calmer waters. Considering the wave climate characteristic to the site, an estimate of the typical width of the surf zone is approximately 150 600 feet (Gerwick 2003). The depth of closure, which is the maximum depth at which sediment transport takes place, was estimated to be approximately 21 feet, corresponding to an approximate distance of 1,970 to 2,140 feet from the shore or approximately 1,000 feet inshore from the end of the SONGS Unit 1 outfall conduit (i.e., the intake pipeline). Based on these findings, the seaward terminus of the SONGS Unit 1 outfall conduit and the site of the proposed brine diffuser are outside the active nearshore zone, where the combined action of breaking waves and the wave-driven longshore current would be able to mobilize and deposit sediment into the construction-related excavations on the seabed (Gerwick 2003). Beyond the surf zone, sediment transport and backfilling of benthic excavations would still occur but at a lower rate by offshore ocean currents.

Ocean Currents

To assess current forces in the vicinity of San Onofre for the SONGS Unit 1 disposition, ocean current measurements from the NOAA Buoy in the Santa Barbara Basin (approximately 170 miles west northwest of San Onofre), were evaluated. This buoy does not occur in the project vicinity, and available data on ocean currents are limited to a few buoys along the California shoreline. Since the configuration of the shoreline and islands was similar to that found at San Onofre, and the magnitude of the current velocities is believed to be comparable for the two sites (Gerwick 2003), measurements from this buoy are used. At this location, typical surface currents reach velocities of 0.3 to 0.4 nautical miles per hour (knots), whereas current speed near the seabed reaches approximately 0.2 knots. Maximum surface velocities can reach roughly 1.5 knots, with a depth-averaged mean annual current velocity of approximately 0.22 knots (Gerwick 2003).

Based on this information, the effects of the ocean currents and offshore wave climate at the end of the Unit 1 outfall conduit, sediment transport and backfilling of construction-related seafloor excavations would occur but at a lower rate than for the nearshore zone (Gerwick 2003).

Water Quality

SCE monitors water quality offshore of SONGS as part of its NPDES permit, which includes the documentation and assessment of thermal, water quality, and biological quality conditions in the vicinity of the SONGS Unit 2 and Unit 3 diffuser systems. In 2009, surface temperatures were close to 59°F in the winter and approximately 70°F in the summer, whereas temperature at the 33-foot (10-meter) depth ranged from approximately 57°F in the winter to 64°F in the summer (SCE/MBC 2010). The 2009 salinity values ranged from approximately 33.5 to 34 parts per thousand; surface dissolved oxygen ranged between 7.4 mg/L (summer/fall) and 8.3 mg/L (spring); and pH values were fairly constant, ranging from 7.99 to 8.06 (SCE/MBC 2010).

Biology

Intertidal and Subtidal Habitats

Intertidal habitat in the vicinity of SONGS is nonexistent due to sandy beachfront conditions throughout the area. The majority of the seafloor within the marine ROI consists of subtidal soft-bottom habitat, primarily made up of fine-grained sediment

(Brown and Caldwell 2012). Because this habitat is typically exposed to wave surge and currents, the bottom is unstable and shifts frequently. These unfavorable biological habitat conditions result in low productivity, and relatively low abundance and diversity of species. Macroinvertebrates, such as worms and crustaceans, are generally the most common organisms in soft-bottom habitat. Subtidal soft-bottom habitats are generally not considered sensitive.

A small portion of the seafloor within the project area is subtidal hard-bottom substrate, consisting of rocks and rocky outcrop (Brown and Caldwell 2012). A portion of this habitat is man-made, including the Unit 1 intake and discharge conduits, the vertical conduit intake structure, and surrounding riprap. Hard-bottom habitats can support a large abundance and diversity of species, and are therefore highly productive (Dailey et al. 1993) and are considered more sensitive than soft-bottom habitats. Multiple species of brown and red algae colonize the hard-bottom substrate in the project area, and sponges, hydroids, worms, bivalves, gastropods, octopus, sea urchins, and crustaceans are common. The project area does not currently support any giant kelp (*Macrocystis pyrifera*) communities, primarily because it is close to shore in waters too shallow to support a kelp canopy. Individual giant kelp plants have been observed in the area, but they are uncommon. There are kelp forests in the vicinity of the project area, south of the SONGS Unit 3 conduits (SCE 2005; SCE and MBC 2010). A large number of fish and invertebrate species inhabit hard-bottom substrates, using them as cover, breeding, and foraging habitat.

Coastal Waters

Multiple fish species important to California commercial and recreational fisheries have been observed in the coastal waters of the marine ROI, which includes EFH for coastal pelagic species (Pacific sardine, Pacific mackerel, northern anchovy, jack mackerel, and market squid) and Pacific coast groundfish (flatfishes, rockfishes, a few sharks, skates, and chimaeras). A variety of marine mammal species, protected under the MMPA, also occur (California sea lion, harbor seals, bottlenose dolphins, common dolphins, and migratory gray whales). See Appendix E for additional details on the existing marine resources within the ROI.

Federally Listed Species

The four federally listed species of sea turtle and two federally listed species of birds in Table 3.14-1 have been observed or have the potential to occur in the ROI.

Table 3.14-1
Federally Listed Species in the ROI

Species	Federal Status
Fish	
Southern California steelhead (*Onchorhynchus mykiss*)	Endangered
Reptiles	
Green Sea Turtle (*Chelonia mydas*)	Endangered
Loggerhead Sea Turtle (*Caretta caretta*)	Endangered
Olive Ridley Sea Turtle (*Lepidochelys olivacea*)	Endangered
Leatherback Sea Turtle (*Dermochelys coriacea*)	Endangered
Birds	
Western Snowy Plover (*Charadrius nivosus nivosus*)	Threatened
California Least Tern (*Sternula antillarum browni*)	Endangered
Mammals	
Blue Whale (*Balaenoptera musculus*)	Endangered
Fin Whale (*Balaenoptera physalus*)	Endangered
Humpback Whale (*Megaptera novaeangliae*)	Endangered
Sei Whale (*Balaenoptera borealis borealis*)	Endangered
Sperm Whale (*Physeter macrocephalus*)	Endangered
Guadalupe Fur Seal (*Arctocephalus townsendi*)	Threatened

The California least tern, western snowy plover, and southern California steelhead are described in Section 3.3, Biological Resources, of this EIS. The Marine Corps is also in consultation with USFWS for ESA-listed estuarine, avian, and terrestrial species that have the potential to occur within the proposed action area. These species are covered under a separate BA and will not be discussed in this section (3.14).

Threats to all four species of sea turtles include harvest of eggs and adults (historically, although the practice continues in some areas of the world), incidental capture in fishing gear, and disease. Threats in the marine environment include ingestion of debris (tar balls, plastic bags, plastic pellets, balloons, and lost or abandoned fishing gear) and contamination (from coastal runoff, marina and dock construction, dredging, aquaculture, oil and gas exploration and extraction, and increased underwater noise and boat traffic). In terrestrial nesting habitats, threats include loss or degradation of the habitat, beach armoring, and invasive nonnative vegetation (NMFS 2011b).

<u>Green Sea Turtle</u>

Adult green sea turtles are unique among sea turtles in that they are herbivorous, feeding primarily on seagrasses and algae. Adults weigh 300 to 350 pounds and are about 3 feet long. Green sea turtles are globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30° north and 30° south. Nesting occurs in more than 80 countries throughout the year (although not throughout the year at each specific location). Green sea turtles are thought to inhabit coastal areas of more than 140 countries. In the eastern North Pacific, green turtles have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego south. Breeding populations of green sea turtles occurring along the Pacific coast of Mexico were listed as endangered under the ESA on 28 July 1978 (NMFS 1978). One green sea turtle was impinged in SCE conduits in 2009, none were affected in 2008, and two were impinged in 2007 but returned alive due to SONGS mitigation efforts (UCSB 2012). However, since waters in the project area are generally cooler than temperatures preferred by this species, and suitable habitats for foraging and resting, such as kelp beds, are not present, this species is not expected to transit coastal waters coincidental with P-1044.

Loggerhead Sea Turtle

Loggerhead sea turtles were named for their relatively large heads, which support powerful jaws and enable them to feed on hard-shelled prey, such as whelks and conch. Adults weigh about 250 pounds and are about 3 feet long, on average. Loggerhead sea turtles are circumglobal, occurring throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. They are the most abundant species of sea turtle found in U.S. coastal waters. In the eastern Pacific, loggerheads have been reported as far north as Alaska and as far south as Chile. In the U.S., occasional sightings are reported from the coasts of Washington and Oregon, but California sightings are rare, with most sightings being of juveniles that have crossed the Pacific Ocean after hatching on beaches in Japan (Stebbins 2003). The North Pacific Ocean distinct population segment (DPS) of the loggerhead sea turtle was listed under the ESA on 22 September 2011 as endangered (NMFS 2011c). Individuals of this DPS occur in the SCB (Appendix E), but none have been known to breed or come ashore on MCBCP (USMC 2007a) and there are no known populations of this species in the region. As a result, this species is not expected to occur in or transit coastal waters coincidental with P-1044.

Olive Ridley Sea Turtle

Olive ridley sea turtles are considered the most abundant sea turtles in the world, with an estimated 800,000 nesting females annually. They are relatively small, with adult females weighing about 100 pounds and ranging from 22 to 31 inches in length. They feed on algae, lobster, crabs, tunicates, mollusks, shrimp, and fish. Olive ridley sea turtles are globally distributed in the tropical regions of the South Atlantic, Pacific, and

Indian Oceans. Olive ridleys are mainly pelagic (open ocean) sea turtles, but have been known to inhabit coastal areas, including bays and estuaries. Olive ridley sea turtles mostly breed annually and make an annual migration from pelagic foraging, to coastal breeding and nesting grounds, and back to pelagic foraging. The olive ridley sea turtle was listed under the ESA on 28 July 1978. Breeding populations in the Pacific coast of Mexico are listed as endangered (NFMS 1978). Although an individual of this population was impinged in SCE conduits in 2009 (SCE and MBC 2010), this species is not expected to transit coastal waters coincidental with P-1044.

Leatherback Sea Turtle

Leatherback sea turtles are the largest turtle—and the largest living reptile—in the world. Adults may weigh 2,000 pounds and be 6.5 feet long. Their diet is mainly soft-bodied animals, such as jellyfish and salps. Leatherbacks are commonly considered pelagic turtles, but they also forage in coastal waters. In fact, leatherbacks are the most migratory and wide ranging of sea turtle species. They can dive deeper than 3,900 feet and can tolerate colder water temperatures than other sea turtles. Leatherback sea turtle nesting grounds are located around the world, with the largest remaining nesting assemblages found on the coasts of northern South America and western Africa. After nesting, females migrate from tropical waters to more temperate latitudes, which support high densities of jellyfish prey in the summer. The Pacific Ocean leatherback sea turtle population is generally smaller than that in the Atlantic Ocean. Leatherback sea turtles were listed in 1970 as endangered under the ESA (USFWS 1970). They have been observed in the SCB, migrating off the coast. Many sightings of leatherbacks in California waters have occurred from whale-watching boats (California Herps 2011).

Blue Whale

Blue whale is the largest living animal known on Earth. Adults in the Antarctic can reach 108 feet in length and weigh more than 330,000 pounds. Blue whale is a baleen (toothless) whale that, off the coast of southern California, feeds almost exclusively on krill (Croll et al. 1998; Fiedler et al. 1998). Although blue whales inhabit and migrate through waters offshore of MCBCP (USMC 2007a), they generally remain where there is strong seasonal upwelling and elevated productivity in proximity to regions of steep topographic relief off the continental shelf break (Irvine and Mate 2007). There is a single stranding record for this species on MCBCP from October 2002 (NAVFAC 2010). During summer. the mean density of blue whales in the area is evaluated at 0.000110 individuals per square kilometer ($km^{2)}$. During winter. the density of blue whales in the area is evaluated at 0.000114 individuals per km^2. This species is not expected to occur in or transit coastal waters in the P-1044 ROI.

Fin Whale

Fin whales are the second largest whale species, with a maximum length of approximately 85 feet for those occurring in the Southern Hemisphere. Adults weigh between 80,000 and 160,000 pounds. Fin whales are baleen whales that consume krill, schooling fish, and squid by lunging into schools of prey with their mouths open (Jefferson et al. 2008). Although fin whales are known to occur in the continental shelf, slope, and oceanic waters off of MCBCP (USMC 2007a), they generally remain where populations of prey are most plentiful and not necessarily near the coastal waters coincidental with P-1044. There are two fin whale stranding records on MCBCP, from February 1897 and August 2001, and a single offshore sighting record in October 2009 (NAVFAC 2010). During summer, the mean density of fin whales in the area is evaluated at 0.000049 individuals per km^2. During winter, the density of fin whales in the area is evaluated at 0.000185 individuals per km^2.

Humpback Whale

Humpback whales are known for their long pectoral fins, which can be up to 15 feet long. These fins give them increased maneuverability and can be used to slow down or go backward. Adult humpback whales reach lengths of up to 60 feet. Humpback whales are baleen whales that consume krill, plankton, and small fish (Clapham and Mead 1999; Jefferson et al. 2008). Although humpback whales are known to feed in the nearshore waters and along the continental shelves offshore of MCBCP (USMC 2007a), during the proposed project implementation period (April through September), they generally remain farther offshore than the projected coastal region of impact for the project area. This species has not been documented along or in nearshore areas of MCBCP (NAVFAC 2010). During summer, the mean density of humpback whales in the area is evaluated at 0.000009 individuals per km^2. During winter, the density of humpback whales in the area is evaluated at 0.001207 individuals per km^2. This species is not expected to occur in coastal waters in the P-1044 ROI.

Sperm Whale

Sperm whales are the largest of the odontocetes (toothed whales) and males are considerably larger than females. Adult males reach about 52 feet and may weigh as much as 90,000 pounds; females grow to about 36 feet and weigh 30,000 pounds.

Sperm whales eat primarily large squid but will also eat sharks, skates, and fish. An average dive for a sperm whale is 35 minutes; however, they have been known to remain submerged for over an hour and reach depths over 3,280 feet. Although sperm whales are expected to occur in the waters offshore of MCBCP (USMC 2007a), they generally remain in the open ocean. Based on habitat associations and the preference of sperm whales to inhabit deeper waters, occurrence in the region of influence for the project is not expected. There is a single stranding record of this species on MCBCP from December 1972 (NAVFAC 2010). During summer, the mean density of sperm whales in the area is evaluated at 0.000004 individuals per km^2; during winter, the density of sperm whales in the area is evaluated at 0.003375 individuals per km^2. This species is not expected to occur in or transit coastal waters coincidental with P-1044.

Guadalupe Fur Seal

Guadalupe fur seals are members of the “eared seal” family. Males are larger than females and reach average lengths of about 7 feet and weights of about 400 pounds. The latest population assessment for this species, from a 1993 study, indicates a population of about 7,408, primarily in Mexico (Gallo 1994). In the U.S., the species is known to inhabit California sea lion rookeries in the Channel Islands (Stewart et al. 1987). Guadalupe fur seal has not been documented along or in nearshore areas of MCBCP (NAVFAC 2010), and the known U.S. population occurs on the Channel Islands. Although strandings and sightings have been made as far north as Sonoma Coast State Beach north of San Francisco (Hanni et al. 1997; Aurioles-Gamboa and Hernadez-Camacho 1999), this species is not expected to occur in or transit the P-1044 ROI.

CHAPTER 4.0
ENVIRONMENTAL CONSEQUENCES

4.1 ALTERNATIVE 1

4.1.1 Geology and Soils

4.1.1.1 Both MILCONs (Alternative 1)

Methodology

Structure locations and pipeline routes were examined and compared to existing geological and geotechnical information to identify potential geological hazards. Standard construction practices and regulatory requirements were reviewed to determine applicability.

Impacts

Seismicity

MCBCP is not underlain by any active or potentially active faults. Active faults located within 60 miles of MCBCP could result in strong seismically induced ground motion and associated ground shaking. All new structures included in the proposed action would be designed and constructed to comply with the seismic design criteria identified in the Uniform Building Code, the NAVFAC P-355 Seismic Design Manual, and the criteria identified in the latest design specifications of the Structural Engineering Association of California. TLS construction and well drilling could result in fractured geologic formations due to the drilling, especially in coarse deposits like cobbles and gravel. Unstable overlying stratum could also collapse during drilling. Geotechnical studies would be conducted for areas affected by the proposed action, and all facilities, including injection well fields, the reservoir, and TLS construction areas, would be built pursuant to the applicable engineering requirements, including seismic safety standards and earthquake protection, and would follow the recommendations set forth in the geotechnical evaluation. Therefore, potential adverse effects to the public from seismic ground shaking associated with the proposed project are considered less than significant.

Soil Erosion

The majority of the soils where projects would be located have a moderate to severe erosion potential. Construction would be completed in compliance with the geotechnical recommendations incorporated into project design and a project-specific NPDES General Construction Permit. As part of the permit, a SWPPP would incorporate measures as recommended in the standard, site-specific geotechnical report for the proposed construction. In addition, the MCBCP Soil Erosion Management Practice Handbook (USMC 2000), the INRMP (USMC 2007a), and BMPs as summarized in Section 2.5 would be implemented before and during the rainy season to maximize the effectiveness of erosion and sediment control measures. Both temporary and permanent erosion and sediment controls would be employed in accordance with the SWPPP prepared and designed specifically for the construction sites. All pipelines would be properly bedded and backfill would be compacted to 90 to 95 percent relative compaction. After backfilling, disturbed areas would be revegetated or repaved as appropriate. Once implemented, these control measures would be monitored and maintained to ensure their effectiveness. With successful implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design, no significant impacts to soils would occur during construction.

After completion of construction, the projects included in the proposed action would incorporate standard erosion control measures to minimize potential erosion from the sites during postconstruction use and maintenance. These erosion control measures and sediment control actions (e.g., planting native vegetation, installing appropriately sized storm water drainage infrastructure) would be designed and constructed on a site-specific basis to minimize erosion potential at each location. As a result of continued compliance with established plans and policies, and continued implementation of erosion control measures as summarized in Section 2.5, potential impacts associated with operation and maintenance of the proposed facilities would not be significant.

Landslides

Primary landslide areas on MCBCP are located within the San Mateo and Cristianitos watersheds, in the sea cliffs southeast of the Cristianitos fault contact, and in and around Las Pulgas Canyon. No aboveground features of the proposed action would be located in areas prone to landslides, all construction would be conducted in accordance with a site-specific geotechnical study, and pipelines would either not be routed through areas known to be subject to landslides or would implement remedial measures recommended in a preconstruction geotechnical study.

Topography

P-1044 and P-1045 would involve limited changes to existing topography; aboveground structures such as pump stations and the reservoir would be sited in previously developed areas within or adjacent to cantonments, and the Site 6 Northern AWT facility would be constructed on relatively level ground. Grading would be completed in accordance with Uniform Building Code Chapter 70 specifications. None of the proposed projects would significantly impact the existing topography.

With the incorporation of the construction and conservation measures discussed in Section 2.5, no significant impacts would occur to geology and soils.

Mitigation

No mitigation measures are proposed.

4.1.2 Water Quality and Hydrology

Water quality and hydrology are covered in this section; please see Section 4.1.3 for related impacts to biological resources and Section 4.1.14 for related impacts to marine resources.

4.1.2.1 Both MILCONs (Alternative 1)

Methodology

Most structure locations and pipeline routes were visited in the field and all were examined on recent aerial photographs. Wetland, riparian, and watercourse studies for the proposed action were consulted. Regulatory requirements and standard construction practices were reviewed to determine applicability. Existing studies related to the SONGS Unit 1 ocean intake and discharge conduits were reviewed, especially the final EIR for the disposition of the SONGS Unit 1 conduits (SCE 2005) and a recent preliminary engineering study evaluating offshore plume dispersion modeling (Brown and Caldwell 2012).

Impacts

Water quality and hydrology could be affected where alignments cross streams, encounter groundwater or floodplains, or fail to properly control runoff from the construction site during or upon completion of construction. At streambed crossings, both MILCON alternatives have the potential to impact surface waters should BMPs or project designs be insufficient or not compliant with applicable permits and/or regulations. For the most part, these potential impacts are associated with temporary construction activities that can result in erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues. However, site designs would provide long-term stability to the streambed or other associated drainage features. The 2010 303(d) impaired waterbodies list shows the Pacific Ocean at the mouth of San Mateo Creek is impaired for bacteria and the Santa Margarita River is impaired for only phosphorus (likely attributed to storm water runoff); therefore, significant construction impacts and operational postconstruction impacts would not be expected relative to this impairment. Upstream sources of phosphorus (e.g., agriculture, recreational, and residential turf management, etc.) would be more likely sources of phosphorus exacerbation than would the proposed action.

Except for the Northern AWT site in Alternatives 3 and 4, discussed below, construction effects on water quality and hydrology, and floodplains would be temporary and would not be significant provided there was successful compliance with the requirements specified in Section 2.5.1 and the regulations for protecting water quality described in Section 3.2.2. Given satisfactory implementation of these requirements and regulations, the potential for construction and operational impacts to water quality and hydrology would be reduced to a less than significant level.

Potential water quality and hydrology, and flood-related impacts would be mitigated through compliance with regulatory permit requirements from a variety of resource agencies. Flood control, spill prevention and control, hazardous materials storage, and other measures also would be addressed through compliance with standard building codes, plumbing codes, military specification requirements, and environmental permit stipulations. Accordingly, a variety of design safeguards and structural/nonstructural BMP requirements would be required and implemented before and during construction, continuing through the postconstruction operational phase. These would include the implementation of project-specific SWPPPs containing BMPs relative to site-specific needs and conditions.

As evaluated and analyzed in a three-dimensional groundwater flow modeling report of the San Mateo and San Onofre basins (Stetson Engineering 2005), these groundwater basins provide valuable potable water to the Base's northern water system for the San Mateo, San Onofre, Cristianitos, Talega, and Horno service areas. The two aquifers that supply groundwater (younger alluvium and the San Mateo Formation) have historically produced 2,090 acre-feet per year (1961 through 2002), of which 1,440 acre-feet per year were used for Base supply and 650 acre-feet per year were used by agriculture. The modeling of the proposed action and its various alternatives showed that under either sustained basin yield pumping or conjunctive use using surface water from the Santa Margarita River, the Base can increase the groundwater yield from both the San Mateo and San Onofre basins above historical levels. For each of the future management scenarios, the model indicated that no seawater intrusion occurred at any time during the simulation period and that an adaptive management plan would maximize the available water supply from the two basins while protecting biological resources (Stetson Engineering 2005).

A subsequent 2007 technical memorandum prepared for the Santa Margarita River CUP (Stetson Engineering 2007) showed that groundwater yield is optimized by maximizing recharge to the Camp Pendleton aquifers when winter surface water is available. It further states that surface water diverted through the proposed Santa

Margarita River CUP project facilities are managed to replenish aquifer storage using groundwater recharge ponds and streambed infiltration, while maintaining environmental demands throughout the riparian corridor. As recommended by this memorandum, developing an Adaptive Management Plan would serve to optimize the yield of the Santa Margarita River CUP while protecting environmental concerns, particularly those within riparian corridors.

Mitigation

No mitigation measures are proposed.

4.1.2.2 P-1044 Alternative 1

Impacts

Pipeline construction would generally include trenching, staging of construction materials and equipment, construction of facilities, and backfilling. Pipeline trenching mostly would occur in previously disturbed areas of the shoulder/pavement, but could involve disturbance anywhere within the 125-foot-long pipeline corridor. Backfilling and restoration (repaving or revegetation) would promptly follow pipeline installation. One run of aboveground pipeline would be constructed on the steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds.

The Northern AWT would be constructed in an upland area south of San Onofre Creek (Figure 2.3.1-1). Potable and raw water pipelines would connect the Northern AWT with the conveyance lines along Basilone Road by TLS construction beneath San Onofre Creek. Brine discharge lines for both injection wells would be in paved streets or upland areas and would not directly affect water quality and hydrology. The water quality effects of connection to the SONGS outfall conduit are discussed in Section 4.1.14, Marine Resources.

Before TLS construction begins at San Mateo Creek or San Onofre Creek, a hydrogeologic evaluation would be required to investigate geologic formations, groundwater depths, and the distance and depth of drilling. Installing the pipeline beneath the creeks would avoid direct impacts to the creek beds and associated downstream water quality.

Discharge methods for P-1044 RO process brine effluent are as follows:

- Subsurface disposal (deep injection wells along El Camino Real as it crosses the San Onofre percolation ponds east of I-5 and in the MCBCP San Onofre Beach recreation area west of I-5), and
- Ocean disposal through the SONGS outfall conduit.

Overall, potential impacts to water quality and hydrology (i.e., jurisdictional waters and wetland areas identified in Section 4.1.3) and flood protection from the construction and operation of P-1044 would include the following:

Construction

- Off-site sediment transport, pollutant exposure, and chemical/petroleum product spillage from equipment/material staging and laydown areas as well as activities related to aboveground pipeline construction, injection well construction, well development, and TLS operations.
- Stream or creek bank damage from TLS construction, occurring on both sides of a watercourse, including residues or releases from bentonite handling, spoils management, and hazardous liquids.
- Short-term and temporary impacts to groundwater quality from the construction of deep injection wellfields in the two proposed areas (along El Camino Real as it crosses the San Onofre percolation ponds and in the MCBCP San Onofre Beach recreation area). Licensed groundwater drilling contractors would be used, necessary permit authorization would be obtained, and wells would be purged immediately after construction. Impacts to water quality and hydrology would be negligible.
- Marine water quality impacts from modifying the SONGS outfall conduit for suitable discharge and dilution of disposed brine solution would occur from multiple benthic disturbances during construction. Impacts associated with the brine line installation would be dependent on the ultimate construction methods used for modifying the SONGS outfall conduit and terminus to install a brine diffuser, or from the two options for connecting the brine discharge pipeline to the outfall conduit west of the SONGS seawall. Based on proposed preliminary engineering considerations to date (Brown and Caldwell 2012) as well as earlier decommissioning approaches for the SONGS Unit 1 conduits (Gerwick 2003), the following construction impacts would be expected:

- Impacts could include temporary increased turbidity, decreased light transmittance, and release of sediment constituents into the water column. These effects could result from the construction of the brine diffuser and cleaning of intrusive material from the conduit. Such activities would temporarily disturb the fine sands (and likely silts) of the benthic environment, causing sediment suspension and inducing localized turbidity plumes from silt that could remain in suspension for many hours or days before settling. These plumes of lighter particulates could therefore be transported farther down current into areas beyond the construction zone.

- Sediment fallout and turbidity plume transport from potential construction-related dredging operations would be dependent on the presence and magnitude of longshore currents, the grain size distribution of the excavated sediment, and the drop height above the seabed. Based on an analysis of currents and littoral transport for the potential disposition of the SONGS Unit 1 outfall conduit (Gerwick 2003), sediment plume dispersal characteristics were estimated relative to the anticipated construction-related seabed excavation necessary. This analysis assumed that excavations would employ a closed-cap dredge bucket, sediment would have an average grain size diameter of 0.02 inch, current velocity would average 1 knot, and dredged sediment would be dropped from a height of 10 feet above the seafloor. This analysis showed that sediment would settle at a rate of 0.23 feet/second, meeting the seafloor within 44.1 seconds, which equated to a horizontal settling distance of 63.8 feet from the point of release (Gerwick 2003). The results showed that turbidity plume transport could be greatly reduced by minimizing the drop height during dredged material side casting.

- The rate of natural backfilling of the seabed excavations would be dependent on the seasonal littoral transport forcing mechanisms along the seabed and the size of the excavations. The initial rates of backfilling would increase with increasing current velocities and with decreasing water depth. Areas in the surf zone may require redredging due to the high energy associated with wave action and seabed movement. Areas farther offshore would take longer to backfill than those closer to, or in, the nearshore (surf) zone where littoral transport is focused.

- Based on standard practice for marine pipeline construction, side casting of dredged seafloor sediment would be expected for burying the new brine discharge diffuser system (whether reburied with dredged sediment or covered with an armor rock blanket). As described above, previous analyses of oceanographic and seafloor conditions were assessed in anticipation of decommissioning the Unit 1 outfall conduit. This analysis (Gerwick 2003) indicates that excavation around the Unit 1 outfall conduit, which is located at and beyond the seaward limit of the surf zone, would be expected to refill within 1 to 2 years (Gerwick 2003). This estimate is based on the average wave/current climate and the sediment dredging characteristics described above. The actual rates of backfilling would depend on the meteorologic and oceanographic climate conditions that occur during and following construction, as well as the construction methods themselves (e.g., if excavations are mechanically backfilled after construction). Calm weather and ocean activity would lengthen backfilling timescales, whereas the occurrence of storms would contribute to a considerable increase of the infill rates.

- Increased turbidity outside the immediate project area caused by construction could reduce light transmission through the water column and affect surrounding aquatic resources (kelp and other primary producers that rely on sunlight). These effects would be dependent on construction practices, seasonal timing, and spoils handling/management on the seafloor.

- Potential pollutant discharges (hydraulic oils or other contaminants) from shipborne systems on deck areas of vessels used during installation, modification, and maintenance of the outfall. Sufficient planning and preparation of countermeasures would be required to preempt impacts that could be associated with an accidental release or spill. Spill prevention and management countermeasures planning would be developed by contractors to minimize the potential for unanticipated release of pollutants due to inclement weather or rough sea conditions.

- Multiple seabed disruptions from vessel anchoring during reconnaissance, dredging, and construction activities could also potentially result in impacts. Support vessels, barges, or pipe-laying sled vehicles would require a variety of anchoring needs. Multiple mooring arrangements in multiple-point anchorages would be expected, including the possibility of beach anchoring. Anchoring protocols and plans would be developed to minimize benthic damage from deploying, utilizing, and recovering anchorages. An anchoring plan would serve to establish anchor zones to avoid or minimize turbidity and biological impacts, avoid hard rock resources and kelp beds, and avoid impacts to recreational or commercial boaters.

Differential geographic positioning system (DGPS) equipment with submeter accuracy would be employed to accurately locate anchoring positions. All bathymetric and geophysical survey data, and diver verification would be preprogrammed into this DGPS system before work begins.

Anchoring impacts would be minimized by lowering the initial anchor of each anchor set to the seafloor at the predesignated anchor location. Once the first anchor is lowered, a support vessel may "fly" other anchors to the predesignated anchor locations specified via a crown line. The anchor would be lowered by the crown line into place at the predesignated site during deployment and raised vertically by the crown line when the anchors are "weighed" (lifted off of the seafloor). Flying anchors to and from location eliminates unnecessary anchor wire contact with the seafloor. Dragging anchors across the seabed would be prohibited.

  - Exposure and potential pollutant discharges from equipment/material staging and laydown areas at the shoreline and/or nearby coastal areas further inland that discharge runoff to the ocean.

- Flood-related damage and downstream water quality impacts if construction occurs within floodplain limits during the wet season (October–May).

Final diffuser designs would be evaluated relative to ocean current regimes and local tide and wave climates to understand dilution and dispersion of the brine discharge field. Grain size analyses and other physical and chemical sediment qualities would also assess water column suspension time and potential re-entrainment of sediment constituents. However, based on early modeling results (Brown and Caldwell 2012) using the latest version of the USEPA-endorsed CORMIX model, the proposed six-port diffuser system would create a brine discharge plume with a thickness of approximately 6 to 8 feet in the water column and would rise to the surface due to a lighter brine density than the ambient seawater. The surface field would spread away from the point of discharge and become dispersed and further diluted by wind, wave, and tidal action. Although not confirmed through detailed quantitative modeling, the discharge plume at the surface could approximate a hundred feet or more along its longest axis. The calculated initial dilution achieved by the preliminary design meets Ocean Plan standards for brine constituents when using a 30 percent safety factor (maximum condition) for brine constituents.

The brine discharge diffuser system would comply with regulatory permit requirements for dilution and receiving water concentrations that are yet to be developed and specified in regulatory permits. Current analysis (Brown and Caldwell 2012) demonstrates that the brine discharge diffuser system would comply with California Ocean Plan limitations for brine effluent constituents, which conformed to RWQCB guidance received during the analysis development. As part of developing the final designs such that these impacts could be quantified, the following steps would be anticipated:

- Collect receiving water data around the outfall area and at control (background) locations. This would include bathymetry for the proposed diffuser area.
- Determine the source of soluble and particulate copper (e.g., possible leaching from system-related bronze or brass fittings, bearings or seals).
- Conduct a bench scale test to establish the treatability of the copper, if the copper cannot be removed from the supply system.
    - Discuss preliminary modeling results with the RWQCB to identify specific requirements that should be incorporated into contract bidding documents.

<u>Operation</u>

- Increased runoff volume and peak discharge from additional impervious surfaces (e.g., rooftops, parking areas, service and access roads, driveways, and other hardscapes).
- Greater velocity and scour potential at runoff discharge points.
- Ruptures, leaks, and maintenance residues.
- Water quality impacts to surface waters from pipe ruptures, well-head blowoffs, or similar facility or equipment failures.
- Marine water quality impacts from the disposal of brine solution via the SONGS outfall conduit. At this writing, the assessment of the SONGS outfall conduit and vertical conduit terminal structure as a disposal outfall has included conceptual design and fundamental plume dilution modeling. A terminal diffuser structure has been evaluated for potential marine water quality impacts relative to brine

discharge chemistry and compliance with California Ocean Plan limitations (SWRCB 2009a). The present level of analysis indicates that a six-port diffuser approximately 3,350 feet offshore would provide a dilution ratio of 95:1 (ocean water:brine) and thereby reduce copper concentration to below the California Ocean Plan limitation (Brown and Caldwell 2012). Based upon available data regarding possible brine constituents, copper concentration was the limiting constituent for meeting Ocean Plan Table B limitations. Other brine constituents would be further reduced below Ocean Plan limits based upon the dilution required to meet copper limits. The results of this early analysis indicate that:

- Brine effluent would meet Ocean Plan limits for oil and grease, suspended solids, settleable solids, turbidity, and pH (Ocean Plan Table A) before ocean discharge.
- Brine would be discharged through a diffuser system that would lie on a rock blanket and be covered with armor rock or be installed in a dredged trench and covered with armor rock.
- Discharged brine would be less dense than the surrounding receiving waters and manifest itself as a surfacing plume.
- The discharge plume thickness would occupy one-fourth to one-third of the water column depth of 29 feet above the diffuser system. The diameter of the plume at initial dilution, the point at which the plume ceases to rise and spread horizontally, has not been assessed.
- Thermal impacts to receiving waters may occur; brine temperature at the Northern AWT is estimated to be 60.1°F. Specific Water Quality Objective 3.B.(4) of the California Thermal Plan (SWRCB 2009b) states that the discharge of elevated temperature wastes shall not increase the natural water temperature by more than 4°F at:
    - the shoreline,
    - the surface of any ocean substrate, or
    - the ocean surface beyond 1,000 feet from the discharge system; and that
    - the sea surface temperature shall be maintained over at least 50 percent of any complete tidal cycle.

  Relative to these thermal limitations, additional modeling would be necessary to assess temperature gradients associated with the discharge plume and the potential impacts to surrounding aquatic resources. The ocean surface temperature in the vicinity of SONGS ranges from approximately 59°F in winter to 68°F in late summer (USST 2009).

Although site-specific information on the effects of using the SONGS outfall conduit has been reviewed, additional evaluation is needed to precisely assess potential environmental impacts. This environmental analysis is based on project engineering and preliminary design conducted to date. Relative to 40 C.F.R. 1502.22 (Incomplete or Unavailable Information), the data and information supplied on water quality impacts (chemical, thermal, physical) are not precise but are sufficiently accurate to support the EIS programmatic analysis. As final project designs develop and are completed, they would address all applicable federal and state requirements for environmental protection compliance. Although analyzed programmatically in this EIS, use of SONGS is not part of the preferred alternative at this time. Environmental issues that require closer study include, but are not limited to:

- Subsequent dilution of ocean discharge induced by waves, wind, and currents. Although Brown and Caldwell (2009) recognized that subsequent dilution would continue within surface waters, these dynamics were not included in the modeling assessment to account for seasonal oceanographic conditions (e.g., stratified and unstratified water columns, seasonal current regimes, sea level rise).
- Potential re-entrainment of adjacent benthic sediments from the outfall diffuser discharge turbulence.
- Ocean diffuser outfall inspection and necessary maintenance.

In addition to the ocean outfall discharge, up to eight brine injection wells would discharge approximately 330 to 750 feet below the ground surface. (The number of wells would be contingent on the geologic conditions of the accepting formation and may require three to five wells.) Although the injection location west of I-5 would be situated within the ocean (saltwater) side of the coastal seawater/freshwater interface, the point of injection would be below the approximate 330-foot interface depth to protect groundwater resources.

Injection at the proposed depth and location means mixing would occur within the saltwater side of the seawater/freshwater interface, augmenting the coastal seawater barrier to ensure that there would be no negative impacts to beneficial uses of groundwater in the San Onofre Basin. Furthermore, a beneficial effect on fresh groundwater resources in the basin would be expected from the injected brine producing an increased head towards the ocean on the landward side of the saltwater-freshwater interface (Stetson Engineering 2011).

Groundwater modeling indicated that the injected brine would mix with surrounding groundwater and migrate upward due to its buoyancy until reaching density equilibrium with the surrounding saline groundwater, follow the prevailing flow toward the Pacific Ocean, and fully mix with seawater in the San Mateo Formation aquifer before reaching the seafloor (Stetson Engineering 2011).

To avoid hydraulic fracturing of the aquifer, wellhead injection pressure would be designed to zero psi (Stetson Engineering 2011). In addition, a series of upgradient and downgradient monitoring wells would be used to continuously monitor the saltwater/freshwater interface in the San Mateo Formation aquifer. Subterranean injection and ocean disposal of brine would be closely regulated by USACE and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Refer to Section 4.1.2 for a discussion of geology and soils impacts.

In general, potential water quality and hydrology, and flood-related impacts from the land-based portions of the proposed action would be mitigated through compliance with regulatory permit requirements from a number of resource agencies. Flood control, spill prevention and control, hazardous materials storage, and other measures also would be addressed through compliance with standard building codes, plumbing codes, military specification requirements, and environmental permit stipulations. Accordingly, a variety of design safeguards and structural/nonstructural BMP requirements would be required and implemented before and during construction, continuing through the post-construction operational phase. These would include the implementation of a project-specific SWPPP that incorporates a variety of BMPs relative to site-specific needs and conditions, as well as environmental permit requirements from the regulatory agencies discussed in Section 3.2. Operation and maintenance procedures and inspection protocols also would be integrated to address proper operation, maintenance, and spill or damage protection for the deep-well brine injection system and the ocean outfall line and diffuser system.

In addition, resource agencies would require monitoring and reporting programs to gauge and monitor potential environmental impacts associated with the continual operation of the proposed action. A suitable comprehensive monitoring and reporting program would be implemented to evaluate water quality conditions, among other parameters, in the surrounding marine environment in accordance with NPDES permits and other similar WDRs governed by the state. Areas of potential impact (the zone of initial dilution) as well as up current control stations would need to be sampled and evaluated on a suitable time scale to gauge potential impacts and allow reasonable response times to correct significant adverse water quality impacts. Within these response times, the monitoring and reporting program would need to integrate the ability to adjust and modify additional protection (i.e., BMPs) to reduce impacts.

Based on the available design and construction information, and provided there is successful compliance with the special conservation and construction measures described in Section 2.5 and the applicable regulations in Section 3.2, it is unlikely significant impacts to water quality and hydrology would occur.

Mitigation

No mitigation measures are required.

4.1.2.3 P-1045 Alternative 1

Impacts

In general, underground construction of potable water pipelines and AVR valves for P-1045 Alternative 1 would involve trenching, staging of construction materials and equipment, pipeline installation, and backfilling, mostly within previously disturbed areas of the shoulder/pavement. Disturbance of undeveloped areas would not be expected on either side of the 125-foot pipeline corridor. Backfilling would directly follow the installation of utilities.

TLS construction would be used for installing pipelines underground beneath San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, I-5, and the Santa Margarita River. The Santa Margarita River would be crossed in two places, at the existing Stuart Mesa Bridge site and between the 25 Area (Vado Del Rio) and Haybarn Canyon. TLS construction is a more favorable method than trenching to cross drainages because it results in fewer environmental impacts, particularly to hydrology and water quality. However, temporary construction impacts related to TLS construction would occur on both sides of each watercourse. Because Aliso Canyon drainage and French Creek are relatively close to each other, only three bore sites would be needed to cross both creeks (two outer pits and one center pit between both creeks). TLS operations would include construction of a boring pit on approximately 0.25 acre, spoils management, equipment parking and maneuver, material laydown, and potential dewatering practices. Each bore site would have drill rigs, equipment for reaming and pulling drilling bits, drilling lubricant (bentonite) storage, and spoils containment areas. Before any construction activities, an engineering report/plan would be required for determining required depths, and soil or rock formations to minimize the potential for drilling fluid releases into fractured geological formations that could lead to releases into the overlying streambed and/or underlying aquifer resources.

Three new pump stations are proposed, one within the project limits of the Northern AWT, one within a developed parking lot of the future AWT South, and a third in a disturbed area at the intersection of Las Pulgas Road and El Camino Real. The future AWT South itself is not part of this proposed action. A new 4-million-gallon reservoir is also proposed in the area of several existing reservoirs in the Wire Mountain area southeast of Vandegrift Boulevard.

Overall, potential impacts to water quality and hydrology (i.e., jurisdictional waters and wetland areas identified in Section 4.1.3) and flood protection from the construction and operation of P-1045 Alternative 1 would include the following:

<u>Construction</u>

- Off-site sediment transport, pollutant exposure, and chemical or petroleum product spillage.
- Stream or creek bank damage from TLS operations, occurring on both sides of a given watercourse, including residues or releases from bentonite handling, spoils management, and hazardous liquids.
- Flood-related damage and downstream water quality impacts if construction occurs within floodplains during the wet season (October–May).

<u>Operation</u>

- Increased runoff volume and peak discharge from additional impervious surfaces (e.g., rooftops, reservoir, parking areas, service roads, driveways, and other hardscapes).
- Greater velocity and scour potential at discharge points.
- Ruptures, leaks, AVR bleed-off residues, and maintenance residues.

- Water quality impacts to surface waters from pipe ruptures, well-head blowoffs, or similar facility and equipment failures.

In general, potential water quality and hydrology, and flood-related impacts from the proposed action would be mitigated through compliance with regulatory permit requirements from a variety of resource agencies. The planned shutdown of the wells tapping the Las Flores aquifer would not have an impact on the Las Flores estuary or any related species. The Las Flores well system has been in use for over 50 years without any noticeable effect on the estuary. Shutting down these wells would stop the drawdown of the aquifer and would not negatively impact the estuary. In addition, flood control, spill prevention and control, hazardous materials storage, and other measures also would be addressed through compliance with standard building codes, plumbing codes, military specification requirements, and environmental permit stipulations. Accordingly, a variety of design safeguards and structural/nonstructural BMP requirements would be required and implemented before and during construction, continuing through the postconstruction operational phase. These would include the implementation of a project-specific SWPPP that incorporates a variety of BMPs relative to site-specific needs and conditions, as well as resource agency permit requirements discussed in Section 3.2. Operation and maintenance procedures and inspection protocols would be integrated to address proper operation, maintenance, and spill or damage protection.

Construction and operation of P-1045 Alternative 1 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5 and the applicable regulations in Section 3.2.

<u>Mitigation</u>

No mitigation measures are required.

4.1.3 Biological Resources

Biological resources are covered in this section; please see Section 4.1.2 for related impacts to water quality and hydrology and Section 4.1.14 for related impacts to marine resources.

4.1.3.1 Both MILCONs (Alternative 1)

Impacts

This section describes the potential direct and indirect impacts on biological resources that would result from construction and operation of Alternative 1. Especially relevant to significance determination is the effect and severity of the impact on regulated or otherwise protected biological resources, specifically jurisdictional waters, federally listed (threatened or endangered) species and the habitats they occupy, and migratory birds covered under the MBTA. Biological impacts are defined as follows.

- *Direct impacts* are caused by the action and occur at the same time and place as the action, e.g., removal of vegetation by grading or direct mortality of species. Direct impacts may be either *temporary* (reversible: e.g., alteration, disturbance, or destruction that can be restored) or *permanent* (irreversible: e.g., alteration, disturbance, or destruction that cannot or would not be restored).
- *Indirect impacts* occur later in time or are farther removed in distance but are still reasonably foreseeable and attributable to project-related activities.

This EIS analyzes both construction and operation impacts to biological resources associated with the proposed action. Impacts are discussed for the development project limits and corresponding 100-foot and 400-foot buffer areas, as relevant to the resource.

Impacts that would result from construction and operation of the MILCONs associated with Alternative 1 include the following:

- Permanent direct impacts were analyzed for development and operation of new facilities for either of the two utility projects (e.g., pump stations), maintenance access roads, and for the permanent features within the project limits. Additionally, permanent direct impacts were analyzed for federally listed thread-leaved brodiaea, spreading navarretia, and fairy shrimp habitat (i.e., vernal pools and temporary ponded areas) for proposed construction of the pipelines for the two water utilities, since trenching and refilling a vernal pool may have irreversible ecological consequences.

- Temporary direct impacts were analyzed for the proposed construction of pipelines for the two water utilities. In addition, the use of TLS construction, where it would coincide (completely or partially) with utility corridors, would also result in temporary direct impacts. All feasible restoration of areas disturbed by TLS sites, the temporary work area for the utility installation would be conducted, i.e., areas disturbed by trenching would be backfilled and native areas would be restored. As noted in Section 2.1, technologies would be employed to minimize ground disturbance and resource impacts. Therefore, actual temporary impacts within the 125-foot-wide utility corridors analyzed herein represent the worst-case scenario of temporary impacts that could occur for each utility project. Anticipated impacts would be approximately 60 feet wide or approximately 48 percent of the 125-foot corridor.

- Impacts from the utility corridors, TLS sites, and temporary work areas are considered temporary and would undergo restoration for all biological resources except for federally listed plant species and federally listed fairy shrimp species. Direct impacts within the corridors and all other direct impacts to federally listed plants and fairy shrimp species are considered a permanent impact.

Potential temporary indirect impacts caused by project construction (e.g., construction-generated fugitive dust and construction-related erosion, runoff, and sedimentation) are evaluated quantitatively for habitats occupied by San Diego and Riverside fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, Stephens' kangaroo rat, and migratory birds covered under the MBTA up to 400 feet from the project area. Similar potential temporary indirect impacts caused by project construction are evaluated for plant communities and other cover types, jurisdictional waters, and habitats occupied by federally listed and other rare plant species up to 100 feet from the proposed facilities. Finally, potential temporary indirect impacts caused by construction-related erosion, runoff, and sedimentation are evaluated for designated and potential transit reaches of southern California steelhead up to 400 feet from the project area. Where relevant to the impact assessment for the resource, impacts at distances greater than those noted above are evaluated qualitatively.

Potential permanent indirect impacts caused by project operations (e.g., the introduction of invasive pest species into newly disturbed areas that spread into adjacent undisturbed areas) are evaluated for the above resources as relevant. Existing barriers within adjacent buffer areas are considered in the analyses of both temporary and permanent indirect impacts. Changes in the hydrological regime may impact habitats and vegetation communities supporting listed species by preventing water access to plants and/or potential flooding that would destroy breeding pools for arroyo toads and/or tidewater goby or nests of light-footed clapper rail.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

Increased groundwater pumping for P-1044 could result in potential impacts to biological resources. A 2007 technical memorandum prepared for the Santa Margarita River CUP (Stetson Engineering 2007) quantifies and describes the available groundwater in both the San Mateo and San Onofre Basins through the development of a groundwater model that accurately simulates the seawater boundary conditions. The study concluded that the future groundwater management scenarios (i.e., limited increase of groundwater pumping) within the San Mateo and San Onofre basins would not be impacted by the threat of seawater intrusion, and that implementation of an adaptive management plan would maximize the available water supply from the two basins and at the same time protect the biological resources. The adaptive management measures are addressed in Section 2.5.1. See Section 4.1.2.1 for additional discussion about potential impacts to groundwater from the proposed action.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of Alternative 1 and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources.

The total impacts to biological resources associated with Alternative 1 are presented below. In all cases, the total area of impacts associated with each project is presented separately, and those totals are summed across both projects. However, in areas common to both projects, impacts would not happen anew in overlapping areas if the projects were implemented simultaneously. Therefore, the totals that are summed across the projects represent the greatest disturbance possible, which would occur if the projects took place at a different time in every overlap area.

As previously noted, analyzing impacts within utility corridors for the full 125-foot width represents the worst-case scenario of temporary impacts that could occur. The anticipated temporary impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the maximum (100 percent) and the anticipated (48 percent) impact scenarios for comparison. The direct impacts that would arise from trenching within project corridors to install the proposed water pipelines would be considered temporary for habitats that can be restored after construction activities are complete. Temporary, direct impacts may also arise from construction-generated fugitive dust; noise; increased human presence; and construction-related erosion, runoff, and sedimentation into plant communities. Direct impacts from these construction-related activities would be considered temporary wherever the impacts would end with cessation of project construction. However, direct impacts to some resources, e.g., occupied San Diego and Riverside fairy shrimp habitat (vernal pool basins) and occupied thread-leaved brodiaea habitat, may or may not be reversible as construction impacts within the corridor could result in the permanent alteration of physical characteristics critical to the species, compared to the preconstruction condition. Therefore, as discussed previously, all proposed trenching-related corridor impacts to occupied San Diego and Riverside fairy shrimp habitat and occupied thread-leaved brodiaea habitat are analyzed as permanent impacts herein.

For the maintenance access roads, and the utility facilities, such as the reservoirs and pump stations, permanent impacts were assessed at 100 percent for both maximum and anticipated scenarios.

A thorough discussion of effects to listed species is provided in the BA for the proposed action (AECOM 2012). USFWS issued a Final Biological Opinion for this action on 15 August 2012.

Additional impacts to biological resources may occur as a result of habitat restoration. At this time, these impacts are not quantifiable. Additional impacts to regulated biological resources would be analyzed after finalization and approval of habitat restoration plans as submitted to ES; USFWS; and USACE.

<u>Mitigation</u>

Mitigation measures that would be required are summarized in Table 4.1.3.1-2. The project-specific relevance of these measures is presented in the following sections.

If acreage is needed for mitigation of impacts to federally listed species or habitats, any on-Base mitigation should not interfere with the Base's training mission. Any such interference would be avoided through consultation between ES and Base Operations and Training, as explained in Section 4.1.5.1.

Plant Communities

Impacts

The total permanent and temporary direct impacts to plant communities from development of Alternative 1 are presented in Table 4.1.3.1-3. As noted above, in all cases the temporary impacts represent the worst-case scenario that could occur to biological resources because technologies would be employed to minimize resource impacts within the 125-foot-wide utility corridors. The maximum versus anticipated direct impacts to plant communities associated with Alternative 1 are summarized for riparian and upland habitat types for each project in Table 4.1.3.1-4. Further details about direct impacts associated with project-specific facilities, and potential indirect impacts that could occur in the adjoining 100- and 400-foot buffer areas, are presented in subsequent sections of this EIS.

Only the permanent and temporary impacts to plant communities (grasslands, scrublands, and woodlands) that coincide with regulated waters (e.g., riparian wetlands or nonvegetated channels regulated under Section 404 of the CWA) or that are occupied by, or support, federally listed or covered species (i.e., ESA and/or MBTA) would be considered significant. Potential total impacts to these regulated/covered resources are discussed in the following subsections.

Mitigation

Mitigation required for unavoidable impacts to plant communities (grasslands, scrublands, and woodlands) that are regulated or otherwise covered by federal statutes (i.e., waters regulated under the CWA and habitats for species listed under the ESA or covered under the MBTA) are discussed in the following subsections.

Waters of the U.S.

Impacts

Development of Alternative 1 would result in permanent and temporary direct impacts to jurisdictional waters, including wetlands, as summarized in Table 4.1.3.1-5. All direct impacts to jurisdictional waters would be considered significant. As previously noted, however, in all cases the temporary impacts represent the worst-case scenario that could occur to jurisdictional waters because technologies would be employed to minimize impacts within the 125-foot-wide utility corridors. The maximum versus anticipated direct impacts to wetlands and other waters associated with Alternative 1 are summarized for each project in Table 4.1.3.1-6. Additional project-specific details about potential direct impacts to jurisdictional waters are presented in subsequent sections of this EIS. The CWA Section 404(b)(1) Guidelines require USACE to determine that the project is the least environmentally damaging practicable alternative for the proposed unavoidable impacts to jurisdictional waters. Therefore, as project designs are finalized, attempts to avoid and minimize impacts to jurisdictional waters (wetlands and nonwetland waters) to the greatest extent practicable would be undertaken. Impacts to jurisdictional waters would require permits from USACE and RWQCB.

The determination of whether the utility projects may be permitted under USACE's Nationwide Permit (NWP) program, or whether specific individual permits will be required, would be determined formally as part of the CWA Section 404 permit process. To qualify for a NWP, the proposed action and the associated unavoidable impacts to jurisdictional waters based on final project designs must satisfy all terms and conditions of the specific NWP, as well as all general conditions and any relevant regional conditions of the NWP program. One of the regional conditions published by the USACE Los Angeles District indicates that individual permits are required for all discharges of fill material into jurisdictional vernal pools (USACE Special Public Notice 18 May 2007).

Based on data collected during formal wetland delineations for Alternative 1, potential jurisdictional vernal pools were delineated within the proposed impact areas for MILCONs P-1044 and P-1045 (the jurisdictional status of all delineated waters is not considered final until the USACE has completed a jurisdictional determination). Therefore, if, based on final project design it is determined that impacting a jurisdictional vernal pool is unavoidable, then an Individual Permit would be required for these MILCONs. However, if the discharge of fill material into jurisdictional vernal pools can be avoided, then these MILCONs may qualify for authorization under NWP 12 (Utility Line Activities), pending USACE's review of pre-construction notification materials. It should be noted that the District Engineer may exercise "discretionary authority" for any activity that is determined to have a more than minimal individual or cumulative significant effect on the environment or may be contrary to public interest and thus require an Individual Permit (33 CFR 330.2 [g]). Therefore, as noted above, the determination of whether MILCONs P-1044 and P-1045 may be permitted under NWPs or require individual permits would be determined formally as part of the CWA Section 404 permit process.

After submittal of a complete application package to USACE, the timeframe to obtain formal verification or authorization under the NWP program is approximately 90 days or under an individual permit it is approximately 12 months.

Mitigation

Mitigation for unavoidable impacts to jurisdictional waters is summarized in measure J1 in Table 4.1.3.1-2. Based on mitigation ratios of 2:1 for permanent impacts to wetlands, 1:1 for permanent impacts to other waters, and 1:1 for all temporary wetlands and waters impacts, the mitigation for waters of the U.S. that could be required for development of Alternative 1 is summarized in Table 4.1.3.1-7. Mitigation ratios across wetland types (e.g., coastal and valley freshwater marsh versus southern riparian woodland) must be finalized with USACE and RWQCB via the permitting process; some types may require more than a 2:1 ratio for permanent impacts.

As noted in Section 2.5.2, unavoidable impacts to waters of the U.S. would require mitigation consistent with the final rule for Compensatory Mitigation for Losses to Aquatic Resources that was issued by USACE and USEPA. This would include the preparation of a detailed mitigation plan prepared collaboratively with ES and reviewed and approved by USACE and RWQCB before resource impact. If the unavoidable impacts to jurisdictional waters support federally listed species, then input from USFWS would also be required. The mitigation plan would describe on-site, off-site, and as needed, off-Base mitigation. For all habitat restoration that is proposed, this plan would include details regarding site preparation (e.g., grading), planting specifications, and irrigation design, as well as maintenance and monitoring procedures. The plan would also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria, and a strategy for long-term mitigation site management. A portion of the mitigation obligations may be satisfied by participating in a fee-based mitigation program (e.g., a wetland mitigation bank) in which case, long-term management for such mitigation would be covered under the terms of the formal banking agreement or by purchasing appropriate mitigation credits from a regulatory approved bank.

Federally Listed Plants

Impacts

All direct impacts to federally listed plants within the project limits, including the water utility corridors, are considered permanent impacts. Indirect impacts are evaluated for occurrences of federally listed plants within the 100-foot buffer zone. Two federally listed plant species, thread-leaved brodiaea and spreading navarretia, may be directly impacted by implementation of Alternative 1. Acreage and number of vernal pool basins associated with these species that may potentially be impacted are noted in Table 4.1.3.1-8. The maximum versus anticipated impacts to federally listed plant species from Alternative 1 are summarized in Table 4.1.3.1-9. As previously noted, trenching impacts within the corridor would be considered permanent within thread-leaved brodiaea-occupied habitat and vernal pool plant species habitat, but temporary for all other plant habitat. One additional listed plant species, San Diego button-celery, is not known to occur in the project limits but does occur in the 100-foot buffer areas. Vernal pools supporting both San Diego button-celery and spreading navarretia are known to occur within the 100-foot buffer of P-1045 along Wire Mountain Road. However, every effort would be made to avoid impacts to vernal pool habitat as described in Section 2.5.2 and measure P2 in Table 4.1.3.1-2.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed plant species. Mitigation for unavoidable impacts to federally listed plant species is summarized in measures P1 and P2 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed plant species from development of Alternative 1 is noted in Table 4.1.3.1-10. Species-specific mitigation ratios required for the project must be finalized with USFWS.

Nonfederally Listed Rare Plants

Impacts

Habitat supporting various nonfederally listed rare plant species occurs throughout Alternative 1. Rare plant species detected during project surveys that may potentially be impacted include, but may not be limited to, Pendleton button-celery, sticky dudleya, Blochman's dudleya, many-stemmed dudleya, Palmer's grappling-hook, San Diego tarplant, coast wallflower, California box thorn, and western dichondra. One location of Pendleton button-celery would be directly impacted by the P-1045 project within the corridor. Eight locations of Pendleton button-celery could be indirectly impacted within the 100-foot buffer. Impacts to this species would be reduced to a level below significance through conservation measures identified in Section 2.5.2. In particular, impacts to this species would be avoided or minimized through worker environmental protection briefings, markers or fencing, biological monitoring, erosion and sedimentation prevention, and restoration of areas temporarily impacted, as determined necessary by the project biologist. With implementation of these and other measures identified in Section 2.5.2, none of the impacts that would occur to nonfederally listed rare plant species from development of Alternative 1 were considered significant and are therefore not discussed further in the project-specific sections of this EIS.

Mitigation

Implementation of measures as discussed in Section 2.5.2 would avoid and minimize potential impacts to nonfederally listed rare plant species. Unavoidable impacts to the nonfederally listed rare plants as a result of Alternative 1 do not warrant additional project-specific mitigation measures.

Federally Listed Wildlife

Impacts

A total of nine federally listed wildlife species may be directly impacted by implementation of Alternative 1. These species are the Riverside fairy shrimp, San Diego fairy shrimp, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Acreages of habitat occupied by these species that may potentially be directly impacted and could require mitigation are provided in Table 4.1.3.1-8. These acreages are broken down according to plant community classifications and type of impact (temporary versus permanent). Impacts within the P-1044 and P-1045 facilities are assessed as permanent direct impacts. Impacts within the 125-foot-wide utility corridors represent the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the worst-case (100 percent) and the anticipated (48 percent) impact scenarios for comparison. As previously noted, trenching impacts within the corridor would be considered permanent within habitat occupied by Riverside fairy shrimp and San Diego fairy shrimp, but temporary for all other wildlife habitat. The maximum and anticipated direct impacts to federally listed species associated with Alternative 1 are provided in Table 4.1.3.1-9. Indirect impacts associated with the buffer are not quantified in this section, but are discussed in more detail in project specific discussions included within Sections 4.1.3.2 to 4.1.3.5.

A discussion of potential impacts specific to each federally listed wildlife species that may be impacted by Alternative 1 is provided below. The discussion of each species is organized by (1) permanent direct impacts associated with the maintenance access corridor and facilities; (2) permanent and temporary direct impacts associated with the corridor; and (3) permanent and temporary indirect impacts associated with the buffers associated with the facilities and corridor.

Riverside and San Diego Fairy Shrimp

Facilities – Direct impacts to basins occupied by Riverside and San Diego fairy shrimp within the facilities or temporary work areas would occur as a result of direct damage or destruction of pools occupied by these species or direct injury or mortality of Riverside or San Diego fairy shrimp cysts. Based on findings regarding Riverside fairy shrimp genetic surveys in 2010, populations of this species on MCBCP should be protected to preserve the genetic diversity of this species (Lahiti et al. 2010). Construction activities within the facilities could result in the permanent alteration of basins, compared to preconstruction conditions. Permanent alteration of basins may thus affect genetic diversity of shrimp species. Thus, direct impacts to fairy shrimp within the facilities are analyzed as permanent impacts herein and would be considered significant.

Corridor – Direct impacts to basins occupied by Riverside or San Diego fairy shrimp within the corridor would occur as a result of direct damage or destruction of pools occupied by these species or direct injury or mortality of Riverside or San Diego fairy shrimp cysts. These impacts may or may not be reversible through post-construction habitat restoration. Construction impacts within the corridor could result in the permanent alteration of basins, compared to preconstruction conditions. Thus, direct impacts to fairy shrimp within the corridor are analyzed as permanent impacts herein and would be considered significant. Impacts to basins would be compensated for according to measures outlined in Section 2.5.2.

Temporary direct impacts to basins occupied by the Riverside or San Diego fairy shrimp within the corridor that are not permanently directly impacted by the corridor may occur as a result of altered hydrology, reduced water quality, and habitat fragmentation. However, the proposed action includes BMPs and conservation measures outlined in Section 2.5.2 to prevent sedimentation and contaminants from entering pools surrounding construction activities; thus, these impacts are considered to be minimal and not likely to occur. Through habitat restoration, these temporary direct impacts to fairy shrimp would not be considered significant.

BUFFER – Permanent and temporary indirect impacts to habitat occupied by the Riverside or San Diego fairy shrimp within the buffer may occur as a result of altered hydrology, reduced water quality, and habitat fragmentation. Additionally, the presence of an expanded roadway may lead to increased instances of vehicles to drive off pavement into adjacent native areas, thereby further impacting adjacent basins occupied by listed shrimp species by compacting native upland habitat, compacting vernal pool watersheds, or changing the natural micro-topography. Changes in the natural micro-topography of vernal pools as a result of construction would alter the natural hydrological regime and may result in increased runoff, erosion, sedimentation, and contamination into vernal pools. The hydrology of vernal pools is supported by both surface flows within a pool's topographic watershed (e.g., the surface area in which water drains into a vernal pool) and subsurface flows that may extend beyond the surface watershed. Surface and subsurface lateral flows between vernal pools and the surrounding uplands influence the onset and level of inundation, and the seasonal drying of pools (Hanes and Stromber 1998). Modifications to the hydrology of vernal pools can also alter the distribution of other vernal pool flora and fauna that are influenced by the length and frequency of water inundation (Bauder 2000). Altering the timing and duration of ponding could negatively impact the ability of Riverside or San Diego fairy shrimp to grow and reproduce because their phenology is dependent on such factors (Hathaway and Simovich 1996). However, the proposed action includes BMPs and conservation measures outlined in Section 2.5.2 to prevent sedimentation and contaminants from entering pools surrounding construction activities; thus, these impacts are considered to be minimal and not likely to occur. Through habitat restoration, these permanent and temporary direct impacts to Riverside or San Diego fairy shrimp would not be considered significant.

Tidewater Goby and Southern California steelhead

FACILITIES – Permanent direct impacts to tidewater goby and southern California steelhead would not occur.

CORRIDOR – Temporary direct impacts to tidewater goby and southern California steelhead habitat within the corridor could result from changes in water quality due to construction-related fugitive dust, sedimentation, and siltation in adjacent creeks. Siltation and sedimentation into breeding pools can asphyxiate eggs and larvae, reducing oxygen intake and feeding, and result in a general decline in species health (USFWS 1999). These factors can lead to disease, decreased growth and reproduction, and/or death. However, conservation measures as described in Section 2.5.2 would avoid or minimize these impacts to below a level of significance. Thus, temporary direct impacts to tidewater goby or southern California steelhead would not be considered significant.

BUFFER – Indirect impacts to tidewater goby and southern California steelhead within the buffer could result from changes in water quality due to construction-related fugitive dust, sedimentation, and siltation in adjacent creeks. Siltation and sedimentation into breeding pools can asphyxiate eggs and larvae, reducing oxygen intake and feeding, and result in a general decline in species health. These factors can lead to disease, decreased growth and reproduction, and/or death. However, conservation measures as described in Section 2.5.2 would avoid or minimize these impacts to below a level of significance.

Arroyo Toad

FACILITIES – Permanent direct impacts to arroyo toads would not occur. Increased impervious surface area from development could increase the magnitude and duration of water flow, thus contributing to modifications of channel morphology and riparian habitat. These changes may change ephemeral systems into perennial systems and create deeper incised channels with faster water flow, thereby reducing availability of shallow pools for arroyo toad breeding and increasing persistence of non-native aquatic predators (Brehme et al. 2009). These potential significant effects would be infrequent and overall are expected to have a negligible effect. Measures described in Section 2.5.2 would further reduce the potential for impacts.

CORRIDOR – Direct impacts to arroyo toad within the corridor would be similar to those discussed previously for facilities, except that all impacts as a result of vegetation clearing would be considered temporary. Riparian habitat would be restored according to the Riparian BO. Through habitat restoration, temporary direct impacts to this species would not be significant.

BUFFER – Indirect impacts to arroyo toad within the buffer could result from changes in water quality due to construction-related fugitive dust, sedimentation, and siltation in adjacent creeks. Siltation and sedimentation into breeding pools can asphyxiate eggs and larvae, reducing oxygen intake and feeding, and a result in a general decline in species health (USFWS 1999). These factors can lead to disease, decreased growth and reproduction, and/or death. However, conservation measures as described in Section 2.5.2 would avoid or minimize these impacts to below a level of significance.

Light-footed Clapper Rail

FACILITIES – Permanent direct impacts would not occur to light-footed clapper rail habitat.

CORRIDOR – Temporary direct impacts to clapper rails may occur as a result of construction activities (if construction occurs during the breeding season), including increased noise and lighting. Increased noise levels to clapper rail may result in decreased productivity and delayed production. Also, habitat may be exposed to increased lighting, which may lead to increased predation, disorientation, startling birds, and disruption of inter-specific interactions. However, a no-construction buffer would be established and/or noise attenuation measures would be implemented to minimize potential disturbance resulting from noise. Also, very little, if any, construction work would occur at night adjacent to riparian habitat, and any lighting associated with the projects would be shielded and directed away from adjacent open space. Therefore, minimal impacts as a result of construction-related noise and light are not expected to be significant, and habitat currently occupied is expected to continue to be used by clapper rails. All impacts as a result of vegetation clearing would be considered temporary. Riparian habitat would be restored according to the Riparian BO. Through habitat restoration, temporary direct impacts to clapper rail would not be significant.

BUFFER – Temporary indirect impacts to adjacent occupied clapper rail habitat may occur. Temporary indirect impacts within the buffer would occur from construction-generated fugitive dust accumulation on surrounding vegetation, and erosion, runoff, and sedimentation in plant communities supporting this species. However, implementation of the measures proposed in Section 2.5.2 would make these impacts less than significant. Thus, these temporary direct impacts to this species would not be significant.

Coastal California Gnatcatcher, Least Bell's Vireo, Southwestern Willow Flycatcher

FACILITIES – Permanent direct impacts may occur to the coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher where suitable habitat occurs within the facilities footprint. Although construction-related vegetation clearing would occur outside of the breeding/management seasons for gnatcatcher, vireo, and flycatcher to the maximum extent feasible, it is possible that construction may occur during the breeding season. In this case, there is a potential for gnatcatcher, vireo, and/or flycatcher adults, eggs, or nestlings to be injured or killed if habitat is cleared during the breeding season. In this case, preconstruction surveys would be conducted during the breeding season before construction to determine the presence of nests or territories, and ES would coordinate with USFWS to implement appropriate avoidance and minimization measures to avoid impacts. Gnatcatcher, vireo, and flycatcher breeding habitat clearance, nevertheless, results in loss of breeding habitat for these species; thus, permanent direct impacts would be considered significant. These impacts would be compensated for in accordance with the Riparian BO (MCBCP 1995). Similarly, permanent direct impacts resulting from removal of gnatcatcher habitat would be compensated at a 2:1 ratio as determined by ES.

CORRIDOR – Direct impacts to coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher within the corridor would be similar to those discussed previously for facilities, except that all impacts as a result of vegetation clearing would be considered temporary. Riparian habitat would be restored according to the Riparian BO (for vireo and flycatcher), and coastal sage scrub would be compensated at a 1:1 ratio for gnatcatcher. Through habitat restoration, temporary direct impacts to these species would not be significant.

Additional temporary direct impacts to gnatcatchers, vireo, and flycatchers within the corridor may occur as a result of construction activities (if construction occurs during the breeding season), including increased noise and lighting. Increased noise levels to these bird species may result in decreased productivity and delayed production. Also, habitat may be exposed to increased lighting, which may lead to increased predation, disorientation, startling birds, and disruption of inter-specific interactions (Longcore and Rich 2004). However, a no-construction buffer would be established and/or noise attenuation measures would be implemented to minimize potential disturbance resulting from noise. Also, very little, if any, construction work would occur at night adjacent to riparian habitat, and the lighting associated with the projects would be shielded and directed away from adjacent open space. Therefore, minimal impacts as a result of construction-related noise and light are not expected, and habitat currently occupied is expected to continue to be used by gnatcatchers, vireos, and flycatchers. Through measures described in Section 2.5.2, temporary direct impacts to these listed bird species would not be significant.

BUFFER – As mentioned previously, additional permanent indirect impacts to least Bell's vireo and flycatcher may occur as a result of loss of breeding habitat. Vireo pairs usually return to the same breeding territory each year (Rourke and Kus 2007), so removal of a portion of a vireo's territory would force that pair to expand their existing territory or establish a new territory. The same may occur for gnatcatcher and flycatcher. Based on the presence of these listed birds throughout suitable habitat on the Base, displaced vireos, gnatcatchers, and flycatchers are likely to compete with resident listed birds. If displaced birds cannot find suitable habitat to forage and shelter in, it is anticipated that they would be more vulnerable to predation and otherwise may die or be injured. Vireos and gnatcatchers that successfully establish territories in adjacent habitat may result in decreased productivity due to reduced availability of foraging and breeding habitat and increased territorial interactions.

However, areas of habitat that would be impacted as a result of construction of would generally occur along long, narrow (relative to the width of riparian habitat [for vireos and flycatchers] in most impacted drainages and coastal sage scrub [for gnatcatchers]) construction corridors that would impact strips of habitat but leave the majority of habitat intact. Long term, the majority of project-related impacts are expected to be temporary, as habitat would be restored to preconstruction conditions, consistent with the Riparian BO (MCBCP 1995) and compensation efforts for gnatcatcher; thus, these impacted areas would once again be suitable vireo or gnatcatcher habitat. Additionally, because large numbers of vireo pairs would be breeding in the adjacent intact riparian habitat (and gnatcatchers in adjacent sage scrub habitat), these temporary impacts are not anticipated to result in any increase in vulnerability of the impacted populations to extirpation, and restored habitat would be reoccupied as soon as it is mature enough to support breeding. While the proposed action may result in crowding and lowered reproduction, or fewer vireo and gnatcatcher pairs, overall, it is anticipated that the temporarily impacted habitat would support a similar number of pairs relative to preconstruction conditions. Displacement impacts may be less of an issue for southwestern willow flycatcher, as relatively fewer flycatchers are known to breed in fewer locations on the Base. These indirect impacts to these listed bird species would not be significant.

Pacific Pocket Mouse

FACILITIES – Pacific pocket mouse microhabitat and suitable habitat occurs within the facilities. While only direct impacts to occupied Pacific pocket mouse habitat would be considered significant (and no occupied habitat is currently known to occur within the facilities), there is a potential for Pacific pocket mouse to occur within these suitable habitat areas. Thus, preconstruction surveys to determine the presence of pocket mouse within the facilities would be required. If pocket mouse occurs within facilities, construction activities are expected to kill Pacific pocket mouse in the area of impact by crushing pocket mouse in their burrows during earth-disturbing activities, such as trenching or grading, and by collapsing burrows by driving over them with equipment. It is likely that Pacific pocket mouse in the facilities would suffer from injury, death, or, at a minimum, be harmed by the loss of some portion of their primary breeding, feeding, and/or sheltering habitat. Conservation measures as discussed in Section 2.5.2 would minimize these potential impacts. While these measures may prevent a majority of pocket mouse from being injured, some individuals may potentially escape detection and be killed or injured. However, as there is currently no occupied Pacific pocket mouse habitat known to occur within the facilities, the proposed action is not expected to significantly impact pocket mouse, as mentioned previously.

CORRIDOR – Microhabitat and suitable habitat for Pacific pocket mouse occurs within the corridor, and impacts would be temporary. These impacts would not be considered significant. Temporary direct impacts to Pacific pocket mouse within the corridor would be considered significant if impacts to occupied Pacific pocket mouse habitat occur. These direct impacts would be considered the same as those described for facilities, except that these impacts are considered significant.

BUFFER – Permanent indirect impacts to occupied Pacific pocket mouse within the buffer may occur. Pacific pocket mouse whose home range includes a substantial portion of the impact area but are not killed as a result of construction activity would likely experience high mortality rates as a result of increased predation and territorial interactions with resident Pacific pocket mouse. The monthly survival rate of healthy adult beach mice (*Peromyscus poliontus allophrys*) in Florida that were translocated into already occupied habitat was about 15 percent compared to a monthly survival rate of about 52 percent for resident mice (Van Zant and Wooten 2003). These impacts would be considered significant. However, implementation of measures as described in Section 2.5.2 would reduce impacts to below a level of significance. Thus, indirect impacts to Pacific pocket mouse would not be significant.

Temporary indirect impacts to adjacent occupied Pacific pocket mouse habitat may occur. Pacific pocket mouse is nocturnal species, and the alteration of natural light patterns (e.g., the introduction of artificial night lighting) can attract predators and/or increase predator effectiveness. However, construction activities would not occur at night, and no permanent lighting would be installed in or adjacent to pocket mouse or habitat, avoiding significant impacts of construction-related nighttime lighting. Also, noise and vibrations associated with the use of construction equipment have the potential to disrupt Pacific pocket mouse above ground or within their burrows, and alter their normal behavior. All construction activities would occur during the day in areas occupied by Pacific pocket mouse and, when they are underground in their burrows. Some level of increased noise and vibration is likely to reach pocket mouse within their burrows; however, most noise and vibration should be substantially attenuated by transmission through the soil and are unlikely to substantially disturb pocket mouse cause pocket mouse to abandon the surrounding area. Therefore, these temporary indirect impacts of noise and light are expected to be insignificant.

Additional temporary indirect impacts to all of these listed wildlife species within the buffer would occur from construction-generated fugitive dust accumulation on surrounding vegetation, and erosion, runoff, and sedimentation in plant communities supporting this species. However, implementation of the measures proposed in Section 2.5.2 would make these impacts less than significant. Thus, these temporary direct impacts to these species would not be significant.

As mentioned previously, additional impacts to these federally listed wildlife species may occur as a result of habitat restoration. However, effects as a result of habitat restoration are not included in this EIS.

<u>Mitigation</u>

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of Alternative 1 is noted in Table 4.1.3.1-10. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Nonfederally Listed Rare Wildlife

<u>Impacts</u>

Habitat supporting various nonfederally listed rare wildlife species occurs throughout Alternative 1; thus, potential impacts to rare wildlife species may occur. Wildlife species detected during project surveys that may potentially be impacted include (but are not limited to) the San Diego coast horned lizard and various migratory bird species. Implementation of avoidance, minimization, and compensation measures described in Section 2.5.2 would reduce impacts below a level of significance. Thus, none of the impacts that would occur to nonfederally listed rare wildlife species from development of Alternative 1 were considered significant and are therefore not discussed further in the project-specific sections of this EIS.

Mitigation

Implementation of measures as discussed in Section 2.5.2 would avoid and minimize potential impacts to nonfederally listed rare wildlife. Additionally, mitigation for unavoidable impacts to nonfederally listed rare avian species as a result of Alternative 1 is summarized in measure W10 in Table 4.1.3.1-2.

Wildlife Corridors

Impacts

Potential impacts to wildlife corridors may occur as a result of implementation of Alternative 1. Areas designated for construction of permanent features (i.e., facilities) would be completely developed; thus, any undeveloped areas within these sites available to wildlife for movement would be permanently impacted. However, these sites are relatively small in size and are surrounded by open space. Because of this, alternate routes for wildlife would be readily available and no wildlife corridors would be compromised; thus, any potential impact to wildlife movement as a result of development of the associated facilities would not be considered significant.

Temporary direct impacts to wildlife corridors within Alternative 1 could occur as a result of increased noise levels, nighttime lighting, dust, and human encroachment on habitat. A majority of the corridors within Alternative 1 are developed; thus, temporary direct impacts to wildlife movement are expected to be minimal and insignificant.

The 400-foot buffer associated with Alternative 1 is mostly undeveloped and functions as part of the local and regional wildlife corridors available for movement across MCBCP. Indirect impacts to wildlife corridors could occur as a result of encroachment, as well as increased noise levels, nighttime lighting, dust, and human disturbance in native habitats.

Mitigation

Implementation of measures as discussed in Section 2.5.2 and mitigation measures W1 through W10 as detailed in Table 4.1.3.1-2 would reduce all indirect impacts to below a level of significance.

Table 4.1.3.1-1
Resource Impact Model for Federally Listed Species

Species	**DIRECT IMPACT** **Project Impacts** **within Project Area** *<u>Temporary</u>: Reversible impacts within project corridors, e.g., trenching for underground utility placement that is refilled and restored.* *<u>Permanent</u>: Irreversible construction impacts, e.g., structures: pump stations and reservoir upgrades.*	**INDIRECT IMPACT** **Project-Induced Impacts** **outside of Project Area** *<u>Temporary</u>: Construction-associated activities and impacts that impact adjacent resources, e.g., noise, dust, and human encroachment.* *<u>Permanent</u>: Operational-associated impacts that impact adjacent resources, e.g., increased human activities or altered hydrological conditions.*
Thread-leaved Brodiaea	Impacts to occupied habitat (defined as individuals plus a 23-foot [7-meter] buffer) of the species within the proposed project limits.	Impacts to occupied habitat within 100-foot buffer adjacent to project area, or to individuals at greater distances where an indirect effect is reasonably expected to occur.
San Diego Button-celery and Spreading Navarretia	Impacts to occupied habitat (defined as vernal pool/pond/rut with species present) within the proposed facility sites and corridors or the surrounding microwatersheds (use 50-foot buffer where microwatershed has not been defined and evaluate microwatershed continuity on a case-by-case basis).	Impacts to occupied habitat or surrounding microwatershed (use 50-foot buffer where microwatershed has not been defined) within 100-foot buffer adjacent to project area, or to occupied habitat at greater distances where an indirect effect is reasonably expected to occur.
Riverside and San Diego Fairy Shrimp	Impacts to occupied habitat (defined as vernal pool/pond/rut with species present) within the proposed facility sites and corridors or the surrounding microwatersheds (use 50-foot buffer where microwatershed has not been defined and evaluate microwatershed continuity on a case-by-case basis).	Impacts to occupied habitat or surrounding microwatershed (use 50-foot buffer where microwatershed has not been defined) within 400-foot buffer adjacent to project area, or on occupied habitat at greater distances where an indirect effect is reasonably expected to occur.
Southern California steelhead	Impacts to designated or potential transit reaches within project area.	Impacts to designated or potential transit reaches within 400-foot buffer adjacent to project area and transit reaches downstream from project activities at any distance where an indirect effect is reasonably expected to occur.
Tidewater Goby	Impacts to suitable habitat (defined as occupied estuary and neighboring upstream area as designated by MCBCP) within project area.	Impacts to suitable habitat within 400-foot buffer adjacent to project area or downstream from project activities at any distance where an indirect effect is reasonably expected to occur.
Arroyo Toad	Impacts to occupied <u>riparian</u> habitat (defined as an individual + the entire extent of contiguous suitable riparian habitat) within the proposed facility sites and corridors. Impacts to occupied <u>upland</u> habitat (defined as 0.6-mile upland buffer adjacent to occupied riparian habitat within the proposed facility sites and corridors.	Impacts to occupied habitat within 400-foot buffer adjacent to project area or downstream from project activities at any distance where an indirect effect is reasonably expected to occur.

Species	**DIRECT IMPACT** **Project Impacts** **within Project Area** *Temporary: Reversible impacts within project corridors, e.g., trenching for underground utility placement that is refilled and restored.* *Permanent: Irreversible construction impacts, e.g., structures: pump stations and reservoir upgrades.*	**INDIRECT IMPACT** **Project-Induced Impacts** **outside of Project Area** *Temporary: Construction-associated activities and impacts that impact adjacent resources, e.g., noise, dust, and human encroachment.* *Permanent: Operational-associated impacts that impact adjacent resources, e.g., increased human activities or altered hydrological conditions.*
Least Bell's Vireo and Southwestern Willow Flycatcher	Impacts to occupied habitat (defined as individual + entire extent of contiguous suitable riparian habitat) within project area.	Impacts to occupied habitat (defined as an individual + the entire extent of contiguous suitable riparian habitat) within 400-foot buffer adjacent to project area.
Coastal California Gnatcatcher	Impacts to occupied habitat (defined as an individual + all Diegan coastal sage scrub within a 500-foot buffer + spaces between any neighboring buffers of less than 500 feet) within the project area.	Impacts to occupied habitat (defined as an individual + all Diegan coastal sage scrub within a 500-foot buffer + spaces between any neighboring buffers of less than 500 feet) within the 400-foot site buffers, during the management season.
Pacific Pocket Mouse	Impacts to occupied habitat (defined as individuals + a 492-foot [150-meter] buffer) within the project area.	Impacts to occupied habitat (defined as individuals + a 492-foot [150-meter] buffer) within the 400-foot site buffers.
Stephens' Kangaroo Rat	Impacts to occupied habitat (defined as individuals + the entire extent of trace, low-, moderate-, and high-density occupied habitat, as determined by a qualified biologist) within the project area.	Impacts to occupied habitat (defined as individuals + the entire extent of trace, low-, moderate-, and high-density occupied habitat as determined by a qualified biologist) within the 400-foot site buffers.

Table 4.1.3.1-2
General Mitigation Measures[1] for Impacts to Biological Resources

	Mitigation Measures
	Jurisdictional Waters of the U.S.
J1	Unavoidable impacts to jurisdictional wetlands (including jurisdictional vernal pools) and other waters would require mitigation. The compensation ratio for jurisdictional wetlands is generally a minimum of 2:1 for the permanent loss of acreage to provide for no net loss of wetlands. A minimum compensation ratio of 1:1 would be required for the temporary loss of acreage and for permanent and temporary loss of nonwetland waters. The development of a mitigation and monitoring plan is a requirement of CWA Sections 401 and 404 permit applications for activities that would discharge dredge or fill materials into jurisdictional waters. This plan should include details regarding site appropriateness, preparation (e.g., grading), recontouring, planting specifications (including seed mixes and plant palettes), and irrigation design (if determined necessary), as well as maintenance and monitoring procedures (including monitoring period and reporting). The plan should also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria.
	Federally Listed Plants and Nonfederally Listed Rare Plants
P1	Unavoidable direct permanent impacts to occupied thread-leaved brodiaea habitat would be offset through enhancement of occupied thread-leaved brodiaea habitat elsewhere on MCBCP. The compensation ratio is 2:1 for the permanent loss of occupied thread-leaved brodiaea habitat. Enhancement would be achieved through a multi-year effort to control invasive alien plants within occupied thread-leaved brodiaea habitat. Before project activities that would impact thread-leaved brodiaea habitat, a thread-leaved brodiaea habitat enhancement plan would be prepared and submitted to ES and USFWS for review and approval. Any reduction of impacts to thread-leaved brodiaea habitat achieved as a result of avoiding brodiaea during the design or implementation phases of the project would proportionately reduce the amount of enhancement implemented.
P2	Mitigation for San Diego button-celery or spreading navarretia would require project modification measures to avoid all feasible direct impacts to the highly restricted vernal pool habitat that these species depend on. Although complete avoidance is expected, in the event that avoidance of direct impacts to spreading navarretia or San Diego button-celery is not feasible, the unavoidable impacts to habitat occupied by San Diego button-celery or spreading navarretia would include enhancement of degraded pools (e.g., exotics control), habitat restoration, and creation of more occupied pools (e.g., via translocation of seed inoculum to existing unoccupied pools). The compensation ratio is 2:1 for the permanent loss of occupied basins or ponds and the associated microwatershed, and a minimum of 1:1 for the temporary loss of acreage.
	Federally Listed Wildlife and Avian Species Covered under MBTA
W1	Mitigation for temporary and/or permanent direct and indirect impacts to San Diego or Riverside fairy shrimp, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher from construction- and/or operation-generated dust, erosion, runoff, and sedimentation within or into habitats supporting these species includes implementation of location-specific measures as determined through consultation with USFWS.
W2	Mitigation for unavoidable direct effects to riparian habitat, regardless of occupation by arroyo toad (breeding), least Bell's vireo, and southwestern willow flycatcher, would require compensation as addressed in the Riparian BO. Compensation may include habitat enhancement (i.e., exotic plant removal) at a ratio ranging from 1:1 to 2:1 depending on the vegetation type being impacted.
W3	Direct impacts to sensitive upland habitats (e.g., coastal sage scrub and other habitats surrounded by coastal sage scrub) occupied by the coastal California gnatcatcher would be compensated through upland habitat enhancement or restoration at a 2:1 ratio to increase gnatcatcher-suitable habitats as a result of a permanent loss of acreage, and a minimum of 1:1 for the temporary loss of acreage.
W4	Mitigation for unavoidable direct impacts to habitat occupied by light-footed clapper rail, although not covered under the Riparian BO, would be expected to require compensation similar to those species covered under the Riparian BO. Compensation is expected to include creation of

	Mitigation Measures
	replacement habitat, potentially at a ratio of 2:1. Temporary direct impacts to habitat occupied by light-footed clapper rail may be compensated for at a ratio of 1:1 by restoring the temporarily impacted area with native vegetation following construction. However, required mitigation measures will be determined through consultation with USFWS.
W5	Permanent impacts to occupied arroyo toad upland habitat may be offset by restoring upland habitat at a site on MCBCP that is mutually agreed to by ES and USFWS (restoration would be conducted at a 2:1 ratio). Temporary impacts to occupied aestivation/dispersal habitat would undergo appropriate restoration actions (e.g., recontouring, planting, weeding) upon completion of project activities. However, required mitigation measures will be determined through consultation with USFWS.
W6	Mitigation for indirect impacts to coastal California gnatcatcher would include noise attenuation measures if construction noise levels exceed preconstruction ambient noise levels within nesting territories during the management season. The project biologist would have the ability to halt the project, if necessary, to avoid impacts to California gnatcatcher.
W7	Mitigation for indirect impacts to least Bell's vireo and southwestern willow flycatcher would include noise attenuation measures if construction levels exceed preconstruction ambient noise levels within nesting territories during the management season. The project biologist would have the ability to halt the project, if necessary, to avoid impacts to these species.
W8	Mitigation for San Diego or Riverside fairy shrimp would require project modification measures to avoid all feasible direct impacts to the highly restricted vernal pool habitat that these species depend on. Unavoidable impacts to habitat occupied by San Diego or Riverside fairy shrimp would include the following measures: (1) determine the vernal pool- (or pond-) specific microwatershed to accurately evaluate complete impacts; (2) prepare a species and habitat mitigation plan for review and approval by USFWS; (3) salvage organic litter and topsoil with cysts from habitat areas before construction; and (4) enhance degraded habitat, restore habitat, or create new habitat (e.g., translocation of salvaged topsoil and cysts to existing unoccupied habitat) in areas approved by A/C, ES at a minimum 2:1 ratio.
W9	Direct impacts to upland habitats (e.g., native grassland, nonnative grassland) occupied by the Stephens' kangaroo rat or Pacific pocket mouse would be mitigated as determined through consultation with USFWS. Mitigation for Stephens' kangaroo rat is expected to include upland habitat creation, restoration, or enhancement at a 2:1 ratio to compensate for permanent loss of acreage, and a minimum 1:1 ratio for the temporary loss of acreage. Mitigation for Pacific pocket mouse is expected to require project modification measures to avoid all feasible impacts to this highly restricted species. Mitigation for Pacific pocket mouse would require implementation of location-specific avoidance and minimization measures as determined through consultation with USFWS. In the event that avoidance of direct impacts to Pacific pocket mouse is not feasible, required mitigation would be determined through consultation with USFWS.
W10	For work that must be performed during the avian nesting season, potential direct and indirect impacts to nesting migratory birds would be mitigated by performing preconstruction nest surveys and avoiding any active nests to the maximum extent practicable.

[1] These measures correspond to resource-specific mitigation measures beginning in Section 4.1.3.1.

Table 4.1.3.1-3
Potential Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 1 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 1	P-1045 – Alternative 1	Total[2]
Permanent	**42.35**	**23.79**	**67.89**
Riparian and Wetlands	1.58	0.05	1.63
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Disturbed Wetland	-	-	0.05
Mulefat Scrub	0.06	0.01	0.07
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.31	0.03	0.34
Vernal Pool	-	-	-
Uplands	13.49	8.01	21.59
Coast Live Oak Woodland	0.15	-	0.15
Diegan Coastal Sage Scrub	10.39	7.57	17.96
Eucalyptus Woodland	-	0.01	0.01
Nonnative Grassland	1.46	0.37	1.83
Valley Needlegrass Grassland	1.49	0.05	1.63
Other Cover Types	27.28	15.74	44.64
Disturbed Habitat	3.52	1.30	4.82
Urban/Developed	23.75	14.44	39.82
Temporary	**284.33**	**505.11**	**787.72**
Riparian and Wetlands	11.26	74.22	85.48
Alkali Playa	-	0.01	0.01
Beach	0.45	-	0.45
Coastal and Valley Freshwater Marsh	-	0.09	0.09
Disturbed Wetland	-	1.96	1.96
Freshwater Seep	-	0.11	0.11
Mulefat Scrub	2.96	8.79	11.75
Nonvegetated Channel	-	0.01	0.01
Open Water	0.42	0.02	0.44
Riparian Scrub	0.05	0.38	0.43
Southern Coastal Salt Marsh	-	0.76	0.76
Southern Riparian Woodland	2.85	3.04	5.89
Southern Willow Scrub	4.52	58.68	63.2
Vernal Pool	0.01	0.38	0.39
Uplands	122.69	215.11	337.71
Coast Live Oak Woodland	3.34	-	3.34
Diegan Coastal Sage Scrub	91.68	167.27	258.95
Eucalyptus Woodland	-	0.42	0.42
Nonnative Grassland	14.53	30.39	44.92
Valley Needlegrass Grassland	13.13	17.03	30.07

Plant Communities and Other Cover Types	P-1044 – Alternative 1	P-1045 – Alternative 1	Total[2]
Other Cover Types	150.38	215.78	366.16
Disturbed Habitat	29.35	14.69	44.04
Urban/Developed	121.03	201.10	322.13
Total[2]	**326.68**	**528.90**	**855.58**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.

Table 4.1.3.1-4
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 1 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 1		P-1045 – Alternative 1		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**42.35**	**42.35**	**23.79**	**23.79**	**66.14**	**66.14**
Riparian and Wetlands	1.58	1.58	0.05	0.05	1.63	1.63
Uplands	13.49	13.49	8.01	8.01	21.5	21.5
Other Cover Types	27.28	27.28	15.74	15.74	43.02	43.02
Temporary	**284.33**	**151.09**	**505.11**	**248.38**	**789.44**	**399.47**
Riparian and Wetlands	11.26	5.94	74.22	35.86	85.48	41.8
Uplands	122.69	70.46	215.11	104.51	337.8	174.97
Other Cover Types	150.38	74.69	215.78	108.00	366.16	182.69
Total[2]	**326.68**	**193.44**	**528.90**	**272.17**	**855.58**	**465.61**

[1] The table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) maximum impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts).
[2] Numbers may not sum exactly due to rounding.

Table 4.1.3.1-5
Potential Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 1 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 1	P-1045 – Alternative 1	Total[2]
Permanent	**0.07**	**0.03**	**0.1**
Wetland[3]	<0.005	-	<0.005
Southern Riparian Woodland	<0.005	-	<0.005
Other Waters[4]	0.07 (190)	0.03 (233)	0.10
Nonvegetated Channel	0.07 (190)	0.03 (233)	0.10
Temporary	**1.13**	**28.66**	**29.79**
Wetland[3]	0.57	28.05	28.62
Coastal and Valley Freshwater Marsh	-	0.19	0.19
Disturbed Wetland	-	0.37	0.37
Freshwater Seep	-	0.08	0.08
Mulefat Scrub	0.07	1.70	1.77
Southern Coastal Salt Marsh	-	2.87	2.87
Southern Riparian Woodland	0.49	-	0.49
Southern Willow Scrub	-	22.40	22.4
Vernal Pool	0.01	0.44	0.45
Other Waters[4]	0.57 (3,214)	0.61 (4,056)	1.18
Alkali Playa	-	0.05	0.05
Disturbed Wetland	0.07 (762)	<0.005 (75)	0.07
Fresh Water	-	0.07	0.07
Nonvegetated Channel	0.50 (2,452)	0.49 (3,981)	0.99
Total[2]	**0.57 (3,214)**	**28.68**	**29.25**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.
[3] Differences in the acreages presented in the above table that summarizes the area of jurisdictional wetlands within project boundaries vs. acreages presented in the previous two tables that summarize the area of riparian and other wetland vegetation communities within project boundaries are attributable to the different methodologies used for vegetation mapping vs. delineating jurisdictional wetlands.
[4] Linear distance (feet) impacts are provided in parentheses.

Table 4.1.3.1-6
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 1 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 1		P-1045 – Alternative 1		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**0.07**	**0.07**	**0.03**	**0.03**	**0.10**	**0.10**
Wetland	<0.005	<0.005	-	-	<0.005	<0.005
Other Waters[3]	0.07 (190)	0.07 (190)	0.03 (233)	0.03 (233)	0.10	0.10
Temporary	**1.13**	**0.55**	**28.66**	**13.96**	**29.79**	**14.51**
Wetland	0.57	0.27	28.05	13.65	28.62	13.92
Other Waters[3]	0.57 (3,214)	0.27 (3,214)	0.61 (4,056)	0.32 (4,056)	1.18	0.59
Total[2]	**1.21**	**0.62**	**28.68**	**13.99**	**29.89**	**14.61**

[1] This table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.
[3] Linear distance (feet) impacts are provided in parentheses.

Table 4.1.3.1-7
Mitigation for Permanent and Temporary Direct Impacts to Waters of the U.S. – Alternative 1 (acres)

Jurisdictional Waters	Mitigation Ratio	Potential Impacts[1]	Potential Mitigation[2,3]
Permanent	**-**	**-**	**0.11**
Wetland	2:1	<0.005	0.01
Other Waters	1:1	0.10	0.10
Temporary	**-**	**-**	**14.51**
Wetland	1:1	13.92	13.92
Other Waters	1:1	0.59	0.59
Total	**-**	**-**	**14.62**

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.
[2] All temporary impacts to non-Waters of the U.S. will be restored in kind, on site at a 1:1 ratio. Because of the temporary nature of the impacts associated with installation of the communication lines, the plan will focus on the restoration of a variety of native habitats *in situ* after construction has been completed. A habitat mitigation plan for all temporary impacts to Waters of the U.S. will be developed in compliance with the CWA 404 mitigation regulations. All temporary impacts to WUS will be restored in kind, on site at a 1:1 ratio. Combine this plan to permanent impacts HMP.
[3] In compliance with CWA Section 404 permit process, a habitat mitigation plan detailing the mitigation measures for permanent impacts to wetlands and nonwetland Waters of the U.S., including jurisdictional vernal pools, must be prepared before impacts occurring.

Table 4.1.3.1-8
Potential Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 1 (acres)[1]

Species	P-1044 – Alternative 1	P-1045 – Alternative 1	Total[3]
Thread-leaved Brodiaea	0.92	0.08	0.99
Permanent	0.92	0.08	0.99
Riverside Fairy Shrimp	-	19 basins	20 basins
Permanent	-	19 basins	20 basins
San Diego Fairy Shrimp	30 basins	66 basins	96 basins
Permanent	30 basins	66 basins	96 basins
Branchinecta spp.	3 basins	21 basins	24 basins
Permanent	3 basins	21 basins	24 basins
Southern California steelhead	-	0.42	0.42
Temporary	-	0.42	0.42
Open Water	-	0.42	0.42
Tidewater Goby	-	0.13	0.13
Temporary	-	0.13	0.13
Open Water	-	0.02	0.02
Southern Coastal Salt Marsh	-	0.11	0.11
Arroyo Toad (Aestivation/Dispersal)	25.63	11.16	36.79
Permanent	0.96	-	0.96
Coast Live Oak Woodland	0.09	-	0.09
Diegan Coastal Sage Scrub	0.64	-	0.64
Nonnative Grassland	0.02	-	0.02
Valley Needlegrass Grassland	0.20	-	0.20
Temporary	24.67	11.16	35.83
Coast Live Oak Woodland	0.85	-	0.85
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Diegan Coastal Sage Scrub	16.19	9.05	25.24
Disturbed Habitat	-	0.13	0.13
Mulefat Scrub	-	0.77	0.77
Nonnative Grassland	4.64	0.54	5.18
Southern Willow Scrub	-	0.67	0.67
Valley Needlegrass Grassland	2.98	-	2.98
Arroyo Toad (Breeding)	5.48	34.04	40.87
Permanent	0.41	-	0.41
Southern Riparian Woodland	0.29	-	0.29
Southern Willow Scrub	0.12	-	0.12
Temporary	5.07	34.04	39.11
Disturbed Wetland	-	0.89	0.89
Mulefat Scrub	0.59	1.52	2.11
Nonnative Grassland	-	1.34	1.34
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	1.15	-	1.15

Species	P-1044 – Alternative 1	P-1045 – Alternative 1	Total[3]
Southern Willow Scrub	3.28	31.63	34.91
Light-Footed Clapper Rail	-	0.58	0.58
Temporary	-	0.58	0.58
Disturbed Wetland	-	0.02	0.02
Open Water	-	0.02	0.02
Southern Coastal Salt Marsh	-	0.44	0.44
Southern Willow Scrub	-	0.10	0.10
Coastal California Gnatcatcher	87.40	136.09	223.49
Permanent	9.41	5.79	15.20
Diegan Coastal Sage Scrub	9.41	5.79	15.20
Temporary	77.99	130.30	208.29
Diegan Coastal Sage Scrub	77.99	130.30	208.29
Least Bell's Vireo	8.60	67.00	75.60
Permanent	1.32	0.04	1.36
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.12	0.03	0.15
Temporary	7.28	66.96	74.24
Coastal and Valley Freshwater Marsh	-	0.02	0.02
Disturbed Wetland	-	1.96	1.96
Mulefat Scrub	0.66	6.71	7.37
Open Water	-	<0.005	<0.005
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	2.85	2.65	5.50
Southern Willow Scrub	3.72	55.62	59.34
Southwestern Willow Flycatcher	6.82	53.83	60.65
Permanent	0.22	0.04	0.26
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	0.10	<0.005	0.10
Southern Willow Scrub	0.12	0.03	0.15
Temporary	6.60	53.79	60.39
Disturbed Wetland	-	0.89	0.89
Mulefat Scrub	0.66	4.48	5.14
Southern Riparian Woodland	2.69	2.65	5.34
Southern Willow Scrub	3.25	45.77	49.02
Pacific Pocket Mouse (Occupied Habitat)[2]	5.98	-	5.98
Temporary	5.98	-	5.98
Diegan Coastal Sage Scrub	5.98	-	5.98
Pacific Pocket Mouse (Microhabitat)[2]	1.86	7.96	9.82
Permanent	<0.005	<0.005	<0.005
Diegan Coastal Sage Scrub	<0.005	-	<0.005
Disturbed Habitat	-	<0.005	<0.005

Species	P-1044 – Alternative 1	P-1045 – Alternative 1	Total[3]
Temporary	1.86	7.96	9.82
Diegan Coastal Sage Scrub	1.81	6.41	8.22
Disturbed Habitat	-	0.86	0.86
Eucalyptus Woodland	-	0.01	0.01
Mulefat Scrub	0.05	0.05	0.10
Nonnative Grassland	-	0.63	1.00
Vernal Pool	-	<0.005	<0.005
Pacific Pocket Mouse (Suitable Habitat)[2]	5.28	26.02	35.03
Permanent	0.09	2.65	2.74
Diegan Coastal Sage Scrub	0.09	1.37	1.45
Disturbed Habitat	-	1.28	1.28
Nonnative Grassland	-	0.01	0.01
Temporary	5.19	23.37	33.29
Diegan Coastal Sage Scrub	5.09	18.10	26.17
Disturbed Habitat	0.06	2.67	2.73
Eucalyptus Woodland	-	0.05	0.80
Mulefat Scrub	0.02	0.02	0.04
Nonnative Grassland	-	0.61	0.61
Riparian Scrub	-	0.27	0.27
Southern Riparian Woodland	0.02	-	0.02
Southern Willow Scrub	-	1.64	1.65

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 project corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.

[2] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

[3] Numbers may not sum exactly due to rounding. Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for P-1044 and P-1045 are not provided.

Table 4.1.3.1-9
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 1 (acres)[1]

Species	P-1044 – Alternative 1		P-1045 – Alternative 1		Total Maximum Impacts	Total Anticipated Impacts
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Thread-leaved Brodiaea[2]	0.92	0.51	0.08	0.01	1.00	0.52
Riverside Fairy Shrimp[2]	-	-	19 basins	2 basins	19 basins	2 basins
San Diego Fairy Shrimp[2]	30 basins	14 basins	66 basins	11 basins	96 basins	25 basins
Branchinecta spp.[2]	3 basins	1 basin	21 basins	6 basins	24 basins	7 basins
Southern California steelhead	-	-	0.42	0.20	0.42	0.20
Tidewater Goby	-	-	0.13	0.06	0.13	0.06
Arroyo Toad (Aestivation/Dispersal)	25.63	12.88	11.16	5.68	36.79	18.56
Arroyo Toad (Breeding)	5.48	2.86	35.39	17.24	40.87	20.10
Light-footed Clapper Rail	-	-	0.58	0.33	0.58	0.33
Coastal California Gnatcatcher	87.40	57.66	136.09	72.86	223.49	130.52
Least Bell's Vireo	8.60	5.35	67.00	32.53	75.60	37.88
Southwestern Willow Flycatcher	6.82	3.91	53.83	26.16	60.65	30.07
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	2.87	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[3]	1.86	1.04	7.96	3.97	9.82	5.01
Pacific Pocket Mouse (Suitable Habitat)[3]	5.28	3.19	26.02	14.48	31.30	17.67

[1] Table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48%) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for both MILCONs are not provided.

[2] While impacts within the construction corridor are considered temporary and reversible for most resources, all direct impacts to these species and their habitats are considered permanent.

[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.1.3.1-10
Mitigation for Federally Listed Species
– Alternative 1 (acres)[1]

Species	Mitigation Ratio	P-1044 – Alternative 1	Potential Mitigation	P-1045 – Alternative 1	Potential Mitigation	Total Potential Mitigation[7,8]
Plants						
Thread-leaved Brodiaea						
Permanent Impacts	2:1	0.51	1.02	0.01	0.02	1.04
Wildlife						
Riverside Fairy Shrimp						
Permanent Impacts	2:1[2]			2 basins	4 basins	4 basins
San Diego Fairy Shrimp						
Permanent Impacts	2:1[2]	14 basins	28 basins	11 basins	22 basins	50 basins
Southern California steelhead						
Temporary Impacts	1:1[3]	-	-	0.20	0.20	0.20
Tidewater Goby						
Temporary Impacts	1:1[3]	-	-	0.06	0.06	0.06
Arroyo Toad (Aestivation/ Dispersal)						
Permanent Impacts	0.5:1[4]	0.96	0.48	-	-	0.48
Temporary Impacts	1:1[3]	12.50	12.50	5.68	5.68	18.18
Arroyo Toad (Breeding)						
Permanent Impacts	2:1[4]	0.41	0.82	-	-	0.82
Temporary Impacts	1:1[4]	2.45	2.45	17.24	17.24	19.69
Light-footed Clapper Rail						
Temporary Impacts	1:1[3]	-	-	0.33	0.33	0.33
Coastal California Gnatcatcher						
Permanent Impacts	2:1	9.41	18.82	5.79	11.58	30.40
Temporary Impacts	1:1[3]	48.25	48.25	67.07	67.07	115.32
Least Bell's Vireo						
Permanent Impacts	2:1[4]	1.32	2.64	0.04	0.08	2.72
Temporary Impacts	1:1[4]	4.03	4.03	32.53	32.53	36.56
Southwestern Willow Flycatcher						
Permanent Impacts	2:1[4]	0.22	0.44	0.04	0.08	0.52
Temporary Impacts	1:1[4]	3.69	3.69	26.13	26.13	29.82
Pacific Pocket Mouse (Occupied Habitat)[5]						
Temporary Impacts	1:1[3,6]	2.87	2.87	-	-	2.87

Species	Mitigation Ratio	P-1044 – Alternative 1	Potential Mitigation	P-1045 – Alternative 1	Potential Mitigation	Total Potential Mitigation[7,8]
Pacific Pocket Mouse (Microhabitat) [5]						
Permanent Impacts	0:1[6]	<0.005	0.0	-	-	0.0
Temporary Impacts	1:1[3,6]	1.04	1.04	3.97	3.97	5.01
Pacific Pocket Mouse (Suitable Habitat) [5]						
Permanent Impacts	0:1[6]	0.09	0.0	2.64	0.0	0.0
Temporary Impacts	1:1[3,6]	3.10	3.10	11.82	11.82	14.92

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.

[2] Impacts noted for *Branchinecta* spp. in the above impact table are not included in this mitigation summary. Findings from the 2011/2012 protocol surveys and USFWS consultation will determine whether additional mitigation for listed fairy shrimp species would be required.

[3] Areas temporarily impacted by construction activities would be restored in-place (1:1) to native vegetation following construction.

[4] Mitigation for impacts to arroyo toad (aestivation) would be fulfilled through restoration of riparian vegetation at a 0.5:1 ratio as noted above. Alternatively, MCBCP may restore upland habitat at a ratio of 2:1. Per the Riparian BO (USFWS 1995), mitigation for impacts to arroyo toad (breeding), least Bell's vireo, and southwestern willow flycatcher would be fulfilled through mitigation of anticipated project impacts to riparian habitat (Table 4.1.3.1-4) regardless of occupation by a sensitive species, as discussed in Table 4.1.3.1-2.

[5] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

[6] In addition to in-place restoration, MCBCP would provide additional compensation for areas of suitable, but unoccupied habitat for Pacific pocket mouse that are temporarily impacted by construction activities. As stated in the FBO, the MCBCP would contribute to the San Diego Zoological Society's effort to establish a captive Pacific pocket mouse population and reintroduce this species to locations within their former distribution. Alternatively, MCBCP may restore Pacific pocket mouse habitat outside the project footprint; however, if that alternative is pursued then consultation with USFWS would need to be re-initiated. No mitigation is required to compensate for the unavoidable permanent impacts to unoccupied, but suitable Pacific pocket mouse habitat. As noted in the FBO, the USFWS determined that such impacts are not anticipated to substantially affect the availability of habitat that is likely to be used by this species.

[7] Numbers may not sum exactly due to rounding.

[8] Where applicable, permanent impacts to listed species riparian habitat will be offset by restoring riparian habitat in the Lower Santa Margarita River. Permanent impacts to the coastal California gnatcatcher habitat (coastal sage scrub or thread-leaved brodiaea would be offset at a 2:1 ratio through restoration of habitat in the Lima Coastal Sage Scrub Restoration site within the Lima Training Area, and vernal pool mitigation should take place in the San Onofre State Park Lease Area Vernal Pool Mesa site, or other available sites as determined by ES Land Management Branch and USFWS.

4.1.3.2 P-1044 Alternative 1

Impacts of the construction of P-1044 are discussed only for the project limits and corresponding 100-foot and 400-foot buffer areas as described below.

The proposed construction of the P-1044 Alternative 1 facilities are evaluated for permanent direct impacts to protected native habitats (e.g., potential jurisdictional waters or habitats occupied by federally listed species or migratory birds covered under the MBTA within the entire facility areas).

The proposed construction of the water pipelines is evaluated for temporary direct impacts to the entire 125-foot pipeline corridor. Fully coincident with this corridor are P-1044 TLS sites, construction and use of which would result in only temporary direct impacts. It is intended that all feasible restoration of areas disturbed by TLS construction and pipeline installation would be conducted (i.e., areas disturbed by trenching would be backfilled and native areas would be restored).

Potential temporary indirect impacts caused by project construction (e.g., construction-generated fugitive dust; unauthorized trespass; and construction-related erosion, runoff, and sedimentation) are evaluated for habitats occupied by federally listed wildlife and migratory birds covered under the MBTA up to 400 feet from the proposed action area. Similarly, potential temporary indirect impacts caused by project construction are evaluated for plant communities and other cover types, jurisdictional waters, and habitats occupied by other rare plant species up to 100 feet from the proposed facilities. Finally, potential temporary indirect impacts caused by construction (e.g., related erosion, runoff, and sedimentation) are evaluated for designated or potential transit reaches of southern California steelhead up to 400 feet from the proposed action area (greater distances are evaluated qualitatively).

Potential permanent indirect impacts caused by project operations (e.g., the introduction of invasive pest species into newly disturbed areas that spread into adjacent undisturbed areas) are evaluated for the above resources as relevant. Existing barriers within adjacent buffer areas are considered in the analyses of both temporary and permanent indirect impacts.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1044 Alternative 1 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.1.3.2-1, 4.1.3.2-2, and 4.1.3.2-3, respectively.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1044 Alternative 1 facilities would result in permanent direct impacts to plant communities and other cover types (Table 4.1.3.2-1). These impacts include riparian habitats within the reservoir upgrades and TAPS 12/Pump Station/TLS site, and coastal sage scrub impacts within the Northern AWT Site 6 and reservoir upgrades, as well as valley needlegrass grassland within the reservoir upgrades sites. Development within the project corridor, which includes the area of the P-1044 TLS site, would result in temporary direct impacts to plant communities and other cover types (Table 4.1.3.2-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, or vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under the CWA or occupied by federally listed species would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 1 could cause indirect impacts to native riparian and upland plant communities that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.1.3.2-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

Mitigation

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

Impacts

Direct Impacts

The project limits of the proposed action have been constrained to avoid and minimize permanent and temporary direct impacts to jurisdictional waters (including wetlands) that were identified via formal delineation. Development of the P-1044 Alternative 1 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of southern riparian woodland and nonvegetated channel (Table 4.1.3.2-4). Development of the TLS sites and project corridor would result in temporary direct impacts to jurisdictional waters and wetlands in the form of nonvegetated channel, disturbed wetland, mulefat scrub, and southern riparian woodland habitat (Table 4.1.3.2-5).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and the Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 1 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.1.3.2-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be indirectly impacted by the project temporarily or permanently as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measure J1, which would compensate for impacts to jurisdictional waters, including wetlands, is discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Plants

<u>Impacts</u>

Potential impacts to federally listed plant species and habitat associated with development of P-1044 Alternative 1 are depicted in Figure 4.1.3.2-1 and Figures 4.1.3.2-4 through 4.1.3.2-12 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.1.3.2-6 and 4.1.3.2-7.

Direct Impacts

Approximately 0.12 acre of thread-leaved brodiaea occupied habitat are known to occur within one of the P-1044 Alternative 1 project facility sites and would be directly impacted by development (Table 4.1.3.2-6). This occupied habitat is located northeast of Reservoir 62310. Approximately 0.80 acre of thread-leaved brodiaea occupied habitat is known to occur within the P-1044 Alternative 1 project corridor and may also be directly impacted by the proposed action (Table 4.1.3.2-6). Direct impacts to thread-leaved brodiaea may be minimized following implementation of avoidance, minimization, and compensation measures described in the mitigation section below. Any direct impact to this species is considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 1.28 acres of thread-leaved brodiaea occupied habitat are known to occur within the 100-foot buffer of the proposed action area (Table 4.1.3.2-7). Indirect impacts to this species would be minimized following implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

<u>Mitigation</u>

Mitigation measures P1 and P2 would compensate for impacts to federally listed plant species as discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Wildlife

<u>Impacts</u>

Seven federally listed wildlife species, San Diego fairy shrimp, southern California steelhead, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be impacted by P-1044 Alternative 1. Occupied and/or suitable habitat for federally listed wildlife species relevant to P-1044 is depicted in Figures 4.1.3.2-4 through 4.1.3.2-12. A breakdown of occupied and/or suitable habitat according to vegetation type is provided in Table 4.1.3.1-8. USFWS issued a Final Biological Opinion for this action on 15 August 2012.

Construction of the brine outfall line for P-1044 Alternative 1 would not significantly impact the green sea turtle, loggerhead sea turtle, olive (Pacific) sea turtle, and leatherback sea turtle, as discussed in Section 4.1.14 of this EIS and in Appendix E.

Direct Impacts

P-1044 Facilities – Habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher occurs within the proposed P-1044 facilities; thus, these species may be permanently, directly impacted. Habitat occupied by these species that would be permanently, directly impacted is quantified in Table 4.1.3.2-8. Additionally, Pacific pocket mouse microhabitat and suitable habitat occur within the P-1044 facilities. Impacts to pocket mouse would not be considered significant as no occupied habitat occurs. Potential permanent direct impacts to wildlife species are depicted in Figures 4.1.3.2-4 through 4.1.3.2-12.

A thorough discussion of specific types of permanent direct impacts to these species is provided in Section 4.1.3.1.

P-1044 Corridor – Habitat occupied by and/or suitable for listed wildlife within the P-1044 corridor would be temporarily, directly impacted. Temporary direct impacts would occur to those four species discussed above, in addition to the San Diego fairy shrimp, and Pacific pocket mouse. Additionally, basins occupied by an unidentifiable *Branchinecta* sp. occur within the P-1044 corridor; these basins are currently being analyzed. Impacts to Lindahl's fairy shrimp would not be considered significant at this species does not have a sensitive status. Pacific pocket mouse-occupied habitat, microhabitat, and suitable habitat occur within the P-1044 corridor; however, all direct impacts only to occupied Pacific pocket mouse habitat would be considered significant, regardless of whether impacts are temporary. Habitat occupied by and/or suitable for these species that would be temporarily, directly impacted is quantified in Table 4.1.3.2-9.

A thorough discussion of specific types of permanent and temporary, direct impacts to these species is provided in Section 4.1.3.1.

Indirect Impacts

Six federally listed wildlife species may be indirectly impacted by construction of P-1044 Alternative 1. Habitat occupied by southern California steelhead, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse occurs within the 400-foot buffer of the P-1044 facilities and corridor. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.1.3.2-10.

A thorough discussion of specific types of permanent and temporary, indirect impacts to these species is provided in Section 4.1.3.1.

Indirect impacts to nesting shorebirds such as California least tern and western snowy plover within the beach habitat coincident with the brine discharge pipeline area at the SONGS outfall conduit were assessed for P-1044. However, it was determined that suitable habitat for these bird species does not occur in this area due to constant disturbance from ocean waves and the high tide associated with this area. Thus, no indirect impacts to tern or plover would occur from P-1044.

<u>Mitigation</u>

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1044 Alternative 1 is noted in Table 4.1.3.1-10. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.1.3.2-1
Permanent Direct Impacts to Plant Communities and Cover Types
Associated with P-1044 Alternative 1 Facilities (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Maintenance Access	Northern AWT Site 6	Paving of El Camino Real	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	Total[1]
Riparian and Wetlands	**0.12**	**0.19**	**-**	**-**	**-**	**-**	**0.07**	**0.11**	**-**	**1.10**	**1.58**
Mulefat Scrub	-	0.06	-	-	-	-	-	-	-	-	0.06
Southern Riparian Woodland	-	0.10	-	-	-	-	-	-	-	1.10	1.20
Southern Willow Scrub	0.12	0.02	-	-	-	-	0.07	0.11	-	-	0.31
Uplands	**0.58**	**2.37**	**5.28**	**2.39**	**-**	**-**	**1.48**	**1.22**	**-**	**0.18**	**13.49**
Coast Live Oak Woodland	-	0.15	-	-	-	-	-	-	-	-	0.15
Diegan Coastal Sage Scrub	0.58	1.32	4.10	2.39	-	-	1.01	0.80	-	0.18	10.39
Nonnative Grassland	-	0.29	1.17	-	-	-	-	-	-	-	1.46
Valley Needlegrass Grassland	-	0.60	-	-	-	-	0.47	0.42	-	-	1.49
Other Cover Types	**-**	**16.35**	**3.13**	**2.56**	**0.25**	**1.18**	**1.06**	**0.29**	**0.23**	**2.23**	**27.28**
Disturbed Habitat	-	0.03	3.13	-	-	-	0.37	-	-	-	3.52
Urban/Developed	-	16.32	-	2.56	0.25	1.18	0.69	0.29	0.23	2.23	23.75
Total[1]	**0.70**	**18.90**	**8.40**	**4.95**	**0.25**	**1.18**	**2.61**	**1.62**	**0.23**	**3.50**	**42.35**

[1] Numbers may not sum exactly due to rounding.

Table 4.1.3.2-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1044 Alternative 1 Corridor (acres)

Plant Communities and Other Cover Types	TLS Sites	Injection Wells	RWL Connection	Corridor[1]	
				Maximum Impacts (100%)	Anticipated Impacts (48%)
Riparian and Wetlands	**1.03**	**-**	**-**	**10.23**	**4.91**
Beach	-	-	-	0.45	0.22
Mulefat Scrub	0.07	-	-	2.90	1.39
Open Water	-	-	-	0.42	0.20
Riparian Scrub	-	-	-	0.05	0.03
Southern Riparian Woodland	0.93	-	-	1.92	0.92
Southern Willow Scrub	0.03	-	-	4.48	2.15
Vernal Pool	-	-	-	0.01	<0.005
Uplands	**16.43**	**0.45**	**5.37**	**100.44**	**48.21**
Coast Live Oak Woodland	-	-	-	3.34	1.60
Diegan Coastal Sage Scrub	15.14	0.45	5.37	70.72	33.95
Nonnative Grassland	1.06	-	-	13.47	6.47
Valley Needlegrass Grassland	0.23	-	-	12.91	6.20
Other Cover Types	**2.82**	**1.20**	**0.80**	**145.55**	**69.86**
Disturbed Habitat	0.35	-	-	29.00	13.92
Urban/Developed	2.47	1.20	0.80	116.55	55.94
Total[2]	**20.28**	**1.65**	**6.17**	**256.22**	**122.99**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.1.3.2-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1044 Alternative 1 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Northern AWT Site 6	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
Riparian and Wetlands	**0.57**	**-**	**-**	**0.06**	**0.01**	**0.26**	**0.05**	**1.71**	**5.36**	**0.30**	**-**	**31.55**	**39.88**
Beach	-	-	-	-	-	-	0.05	-	-	-	-	0.28	0.32
Mulefat Scrub	-	-	-	-	-	-	-	0.16	2.86	0.30	-	11.27	14.60
Open Water	-	-	-	-	-	-	-	-	-	-	-	1.29	1.29
Riparian Scrub	-	-	-	-	-	-	-	-	-	-	-	0.14	0.14
Southern Riparian Woodland	-	-	-	0.06	-	-	-	1.55	1.50	-	-	9.16	12.27
Southern Willow Scrub	0.57	-	-	-	0.01	0.26	-	-	1.00	-	-	9.13	10.97
Vernal Pool	-	-	-	-	-	-	-	-	-	-	-	0.28	0.28
Uplands	**1.97**	**1.77**	**0.19**	**-**	**2.87**	**2.34**	**-**	**1.23**	**17.03**	**0.64**	**5.54**	**215.95**	**249.52**
Coast Live Oak Woodland	-	-	-	-	-	-	-	-	0.06	-	-	8.12	8.17
Diegan Coastal Sage Scrub	1.97	1.51	0.19	-	1.98	1.49	-	1.23	14.97	0.64	5.54	151.93	181.44
Eucalyptus Woodland	-	-	-	-	-	-	-	-	-	-	-	0.31	0.31
Nonnative Grassland	-	0.27	-	-	0.25	-	-	-	1.19	-	-	24.94	26.65
Valley Needlegrass Grassland	-	-	-	-	0.64	0.85	-	-	0.81	-	-	30.66	32.95
Other Cover Types	**0.14**	**1.48**	**0.82**	**1.79**	**0.33**	**-**	**1.13**	**0.83**	**5.70**	**2.72**	**0.18**	**179.01**	**194.12**
Disturbed Habitat	0.01	1.48	-	-	0.09	-	-	-	0.03	-	-	43.49	45.11
Urban/Developed	0.13	-	0.82	1.79	0.24	-	1.13	0.83	5.67	2.72	0.18	135.52	149.01
Total[1]	**2.68**	**3.26**	**1.01**	**1.85**	**3.20**	**2.60**	**1.18**	**3.77**	**28.09**	**3.66**	**5.71**	**426.51**	**483.51**

[1] Numbers may not sum exactly due to rounding.

Table 4.1.3.2-4
Permanent Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 1 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Wetland	**<0.005**
Southern Riparian Woodland	<0.005
Other Waters[1]	**0.07 (190)**
Nonvegetated Channel	0.07 (190)
Total[2]	**0.07**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.1.3.2-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 1 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridor[1]	
		Maximum Impacts (100%)	Anticipated Impacts (48%)
Wetland	**<0.005**	**0.56**	**0.27**
Mulefat Scrub	<0.005	0.07	0.03
Southern Riparian Woodland	-	0.49	0.23
Other Waters[2]	**-**	**0.57 (3,214)**	**0.27 (3,214)**
Disturbed Wetland	-	0.07 (762)	0.03 (762)
Nonvegetated Channel	-	0.50 (2,452)	0.24 (2,452)
Total[3]	**<0.005**	**1.11**	**0.53**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.1.3.2-6
Permanent Direct Impacts to Federally Listed Plants
Associated with P-1044 Alternative 1 Facilities (acres)

Habitat Occupied by:	Facilities	Corridor
Thread-leaved Brodiaea	0.12 acre	0.80 acre
San Diego Button-celery	0 basins	0 basins
Spreading Navarretia	0 basins	0 basins

Table 4.1.3.2-7
Potential Indirect Impacts to Federally Listed Plants within 100 Feet of P-1044 Alternative 1 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	1.28 acre
San Diego Button-celery	0 basins
Spreading Navarretia	0 basins

Table 4.1.3.2-8
Permanent Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 1 Facilities (acres)

Listed Wildlife Species	Above Ground Pipeline	Maintenance Access	Northern AWT Site 6	Paving of El Camino Real	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/ Pump Station/ TLS Site	Total[1]
Arroyo Toad (Aestivation/ Dispersal)	0.58	0.38	-	-	-	-	-	0.96
Arroyo Toad (Breeding)	0.12	0.09		-	-	-	0.20	0.41
Coastal California Gnatcatcher	0.21	0.73	4.10	2.39	1.01	0.80	0.18	9.41
Least Bell's Vireo	0.12	0.10	-	-	-	-	1.10	1.32
Southwestern Willow Flycatcher	0.12	0.10	-	-	-	-	-	0.22
Pacific Pocket Mouse (Microhabitat)[2]	-	<0.005	-	-	-	-	-	<0.005
Pacific Pocket Mouse (Suitable Habitat)[2]	-	0.09	-	-	-	-	-	0.09
Total[1]	**1.15**	**1.48**	**4.10**	**2.39**	**1.01**	**0.80**	**1.48**	**12.41**

[1] Numbers may not sum exactly due to rounding.
[2] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.1.3.2-9
Permanent[1] and Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 1 Corridor (acres)

Listed Wildlife Species	TLS Sites	Injection Wells	RWL Connection	Corridor[2,3]	
				Maximum Impacts (100%)	Anticipated Impacts (48%)
San Diego Fairy Shrimp	-	-	-	30 basins[4]	14 basins
Branchinecta spp.	-	-	-	3 basins[5]	1 basin
Arroyo Toad (Aestivation/Dispersal)	1.27	-	-	23.40	11.23
Arroyo Toad (Breeding)	0.03	-	-	5.04	2.42
Coastal California Gnatcatcher	15.14	0.28	5.37	57.20	27.46
Least Bell's Vireo	1.03	-	-	6.25	3.00
Southwestern Willow Flycatcher	1.00	-	-	5.60	2.69
Pacific Pocket Mouse (Occupied Habitat)[6]	-	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[6]	0.28	-	-	1.58	0.76
Pacific Pocket Mouse (Suitable Habitat)[6]	1.17	-	-	4.02	1.93

[1] Impacts to fairy shrimp species are considered irreversible and permanent; for all other species listed in this table, impacts are considered temporary.
[2] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[3] Numbers may not sum exactly due to rounding.
[4] San Diego fairy shrimp were detected in basins with the following ID numbers: 799, 802, 803, 810, 811, 812, 814, 817, 827, 833, 837, 840, 1169, 1170, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 2797, 2798, 2799, 2800, 2801, and 2802.
[5] *Branchinecta* spp. fairy shrimp were detected in basins with the following ID numbers: 801, 816, and 848.
[6] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.1.3.2-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1044 Alternative 1 Facilities and Corridor (acres)

Listed Wildlife Species	Aboveground Pipeline	Northern AWT Site 6	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/Pump Station/TLS Site	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
Southern California steelhead[2]	-	-	-	-	-	-	1.64	3.88	-	0.13	5.59	11.24
Arroyo Toad (Aestivation/Dispersal)	9.04	-	3.48	1.02	-	-	3.43	17.76	-	-	235.75	270.48
Arroyo Toad (Breeding)	4.06	-	0.94	5.25	-	-	12.11	6.65	-	-	71.03	100.04
Coastal California Gnatcatcher	4.13	17.76	8.37		13.67	12.41	5.76	100.39	7.04	12.27	540.29	722.09
Least Bell's Vireo	4.06	-	0.94	5.25	-	-	13.40	47.55	-	0.83	159.02	231.05
Southwestern Willow Flycatcher	4.06	-	0.94	5.25	-	-	-	27.09	-	0.83	105.46	143.63
Pacific Pocket Mouse (Occupied Habitat)[3]	-	-	-	-	-	-	-	1.87	-	-	55.09	56.96
Pacific Pocket Mouse (Microhabitat)[3]	-	-	-	-	-	-	-	2.82	-	-	4.71	7.54
Pacific Pocket Mouse (Suitable Habitat)[3]	-	-	-	-	-	-	-	11.35	-	-	73.86	85.21

[1] Numbers may not sum exactly due to rounding.
[2] Indirect impacts to Southern California steelhead occur in both San Mateo and San Onofre Creeks.
[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

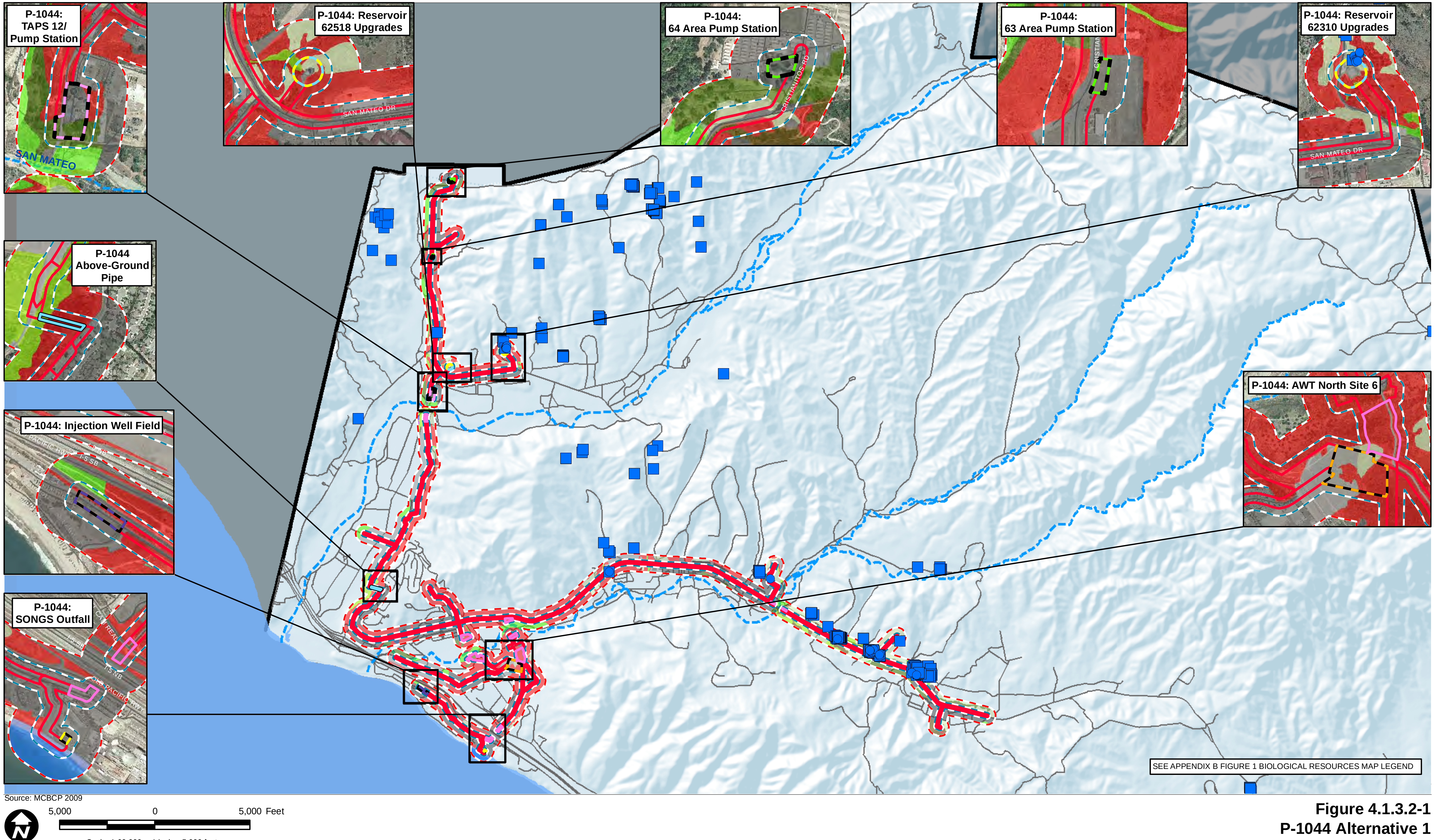

Figure 4.1.3.2-1
P-1044 Alternative 1
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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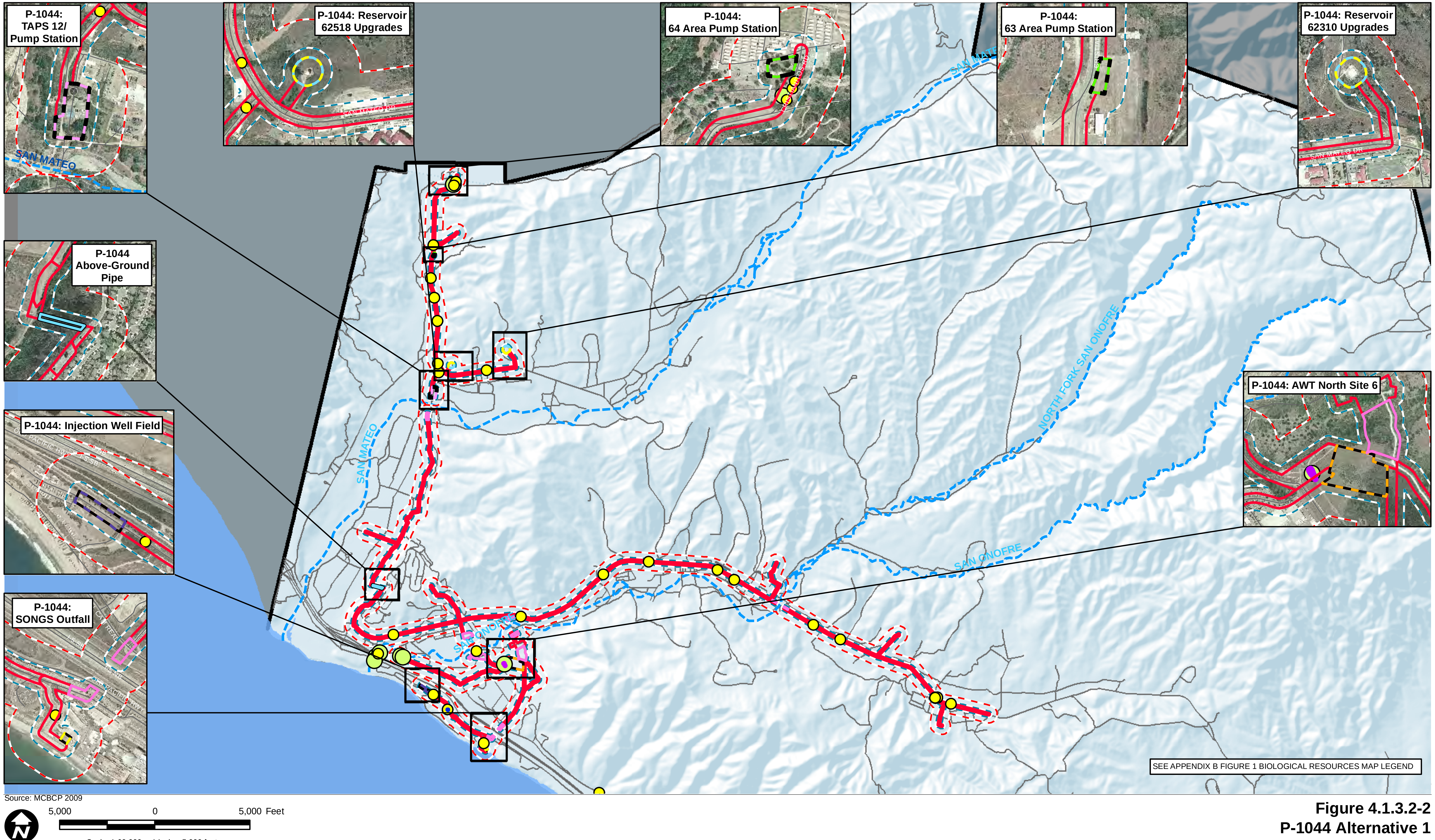

Figure 4.1.3.2-2
P-1044 Alternative 1
Potential Effects to Jurisdictional Waters of the U.S.

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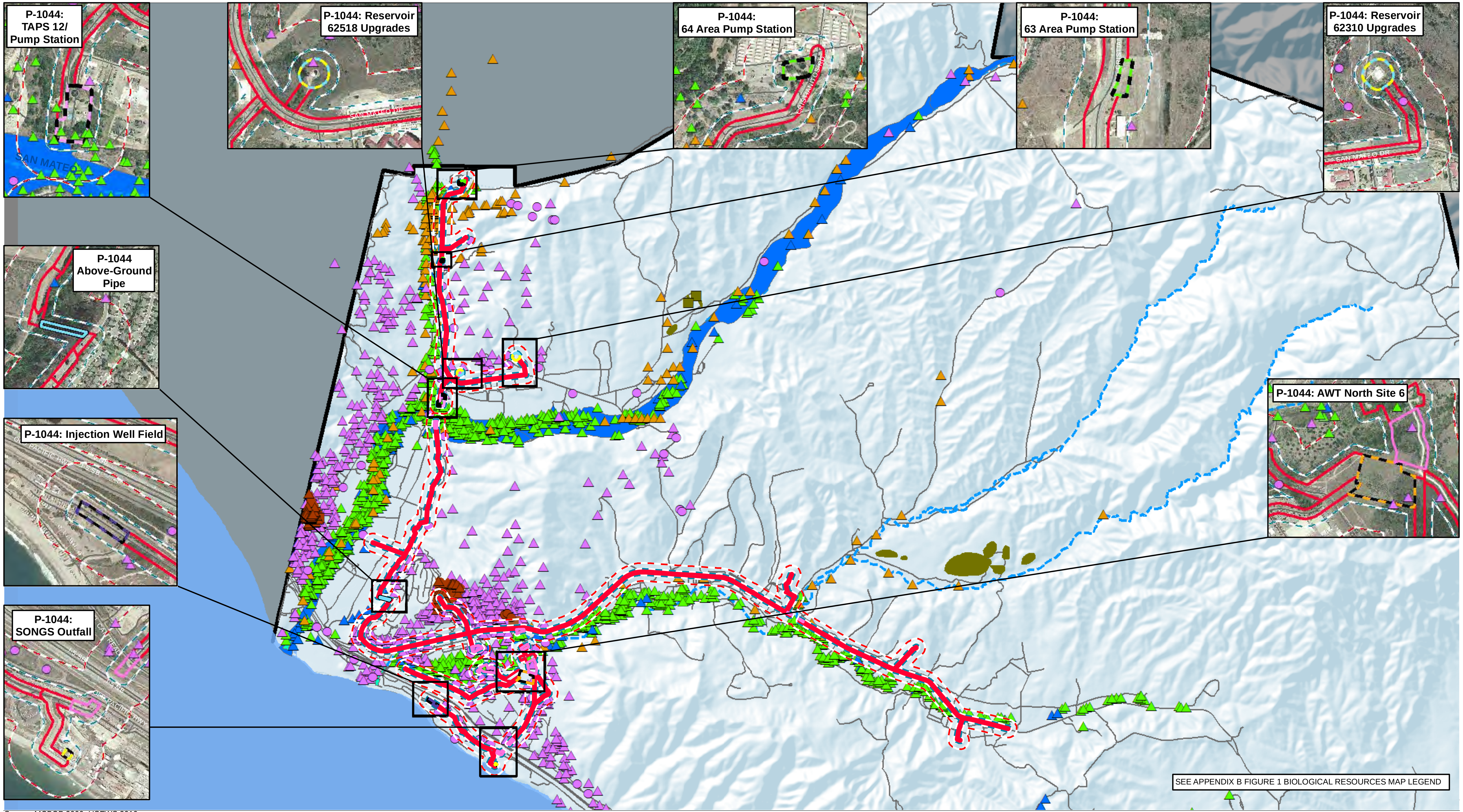

Source: MCBCP 2009; USFWS 2010

5,000 0 5,000 Feet

Scale 1:60,000; 1 inch = 5,000 feet

Figure 4.1.3.2-3
P-1044 Alternative 1
Potential Effects to Listed Wildlife Species

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MCBCP BWI EIS

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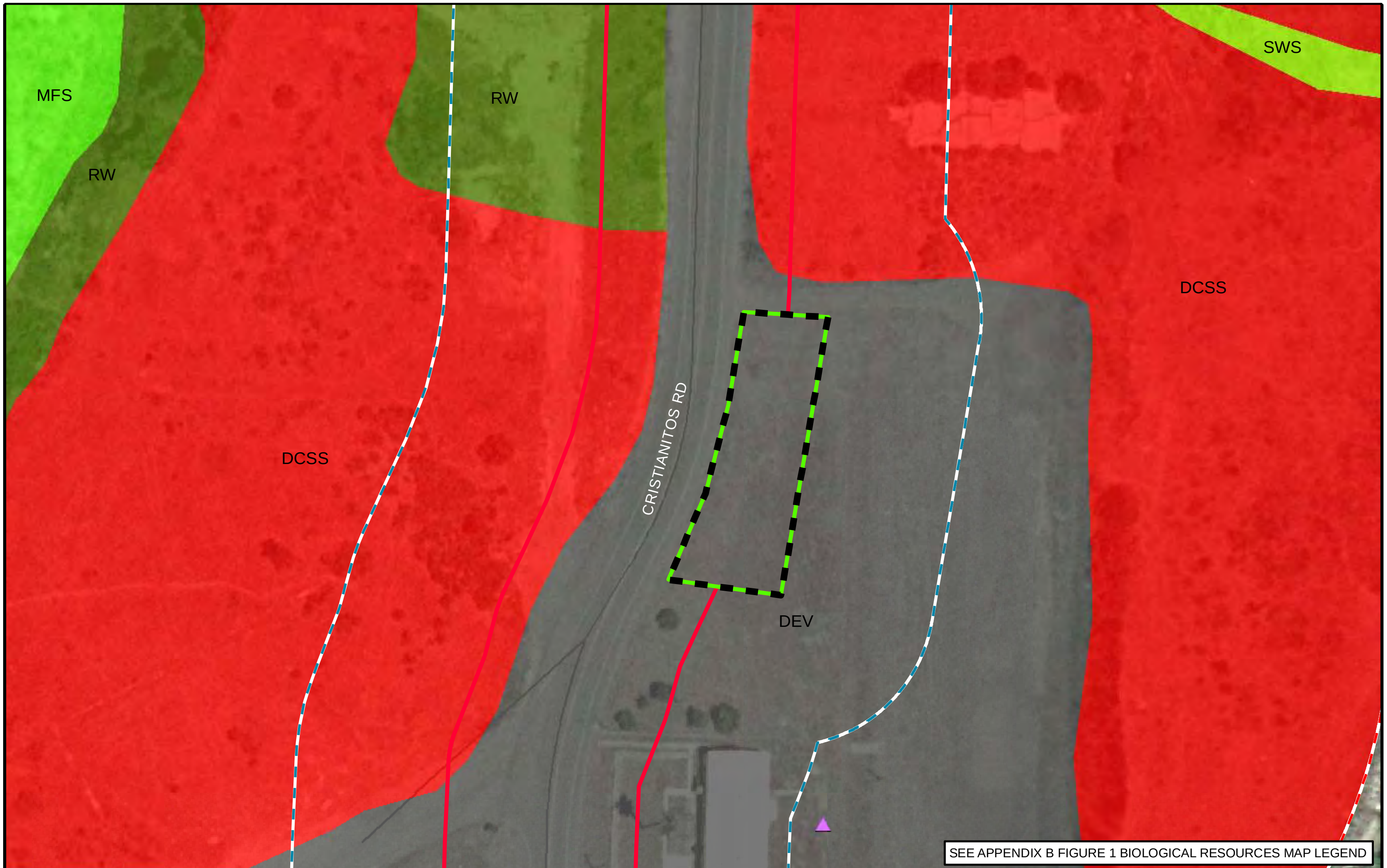

Source: MCBCP 2009; USFWS 2010

Figure 4.1.3.2-4
P-1044 Alternative 1
63 Area Pump Station

MCBCP BWI EIS

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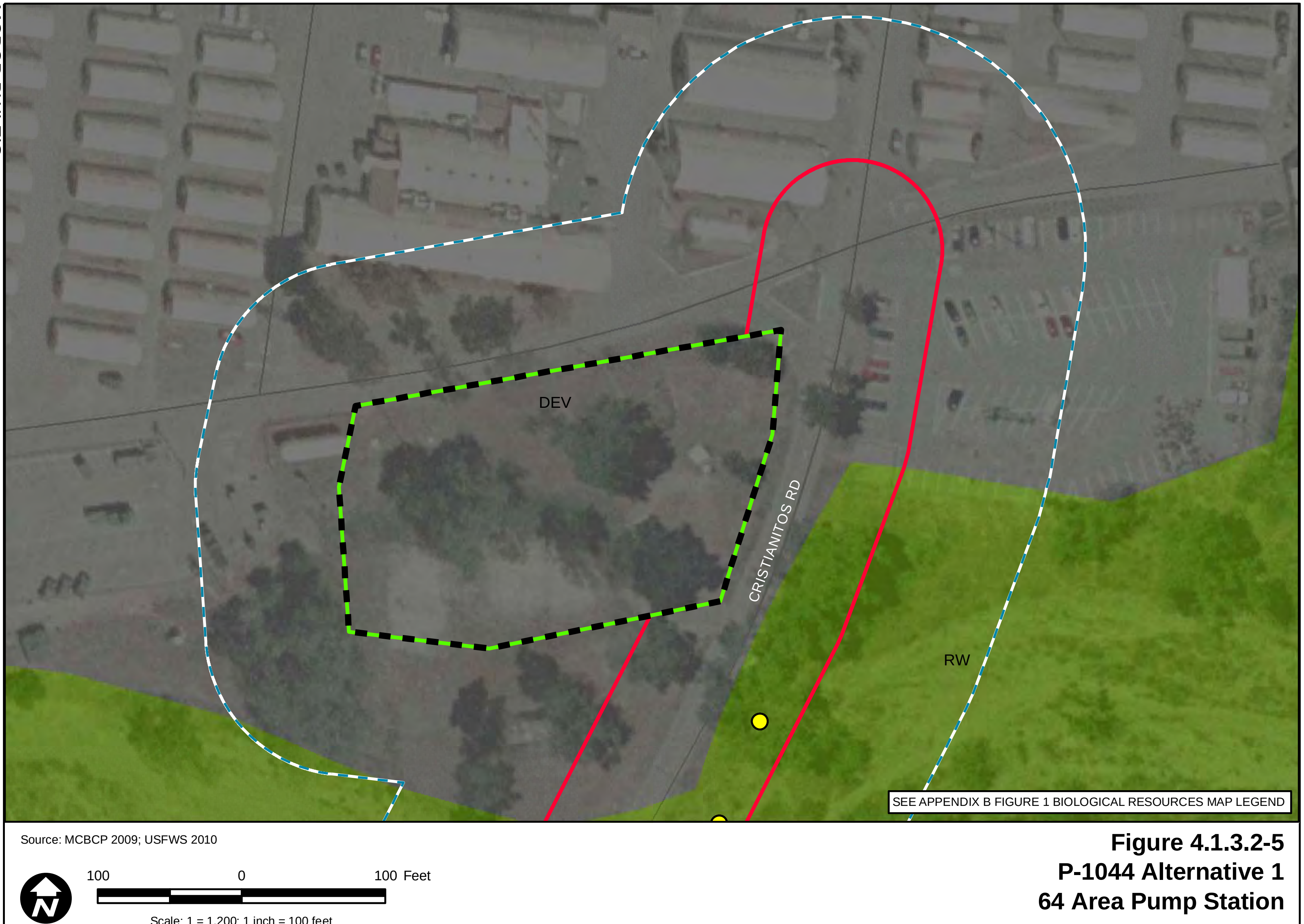

Source: MCBCP 2009; USFWS 2010

Figure 4.1.3.2-5
P-1044 Alternative 1
64 Area Pump Station

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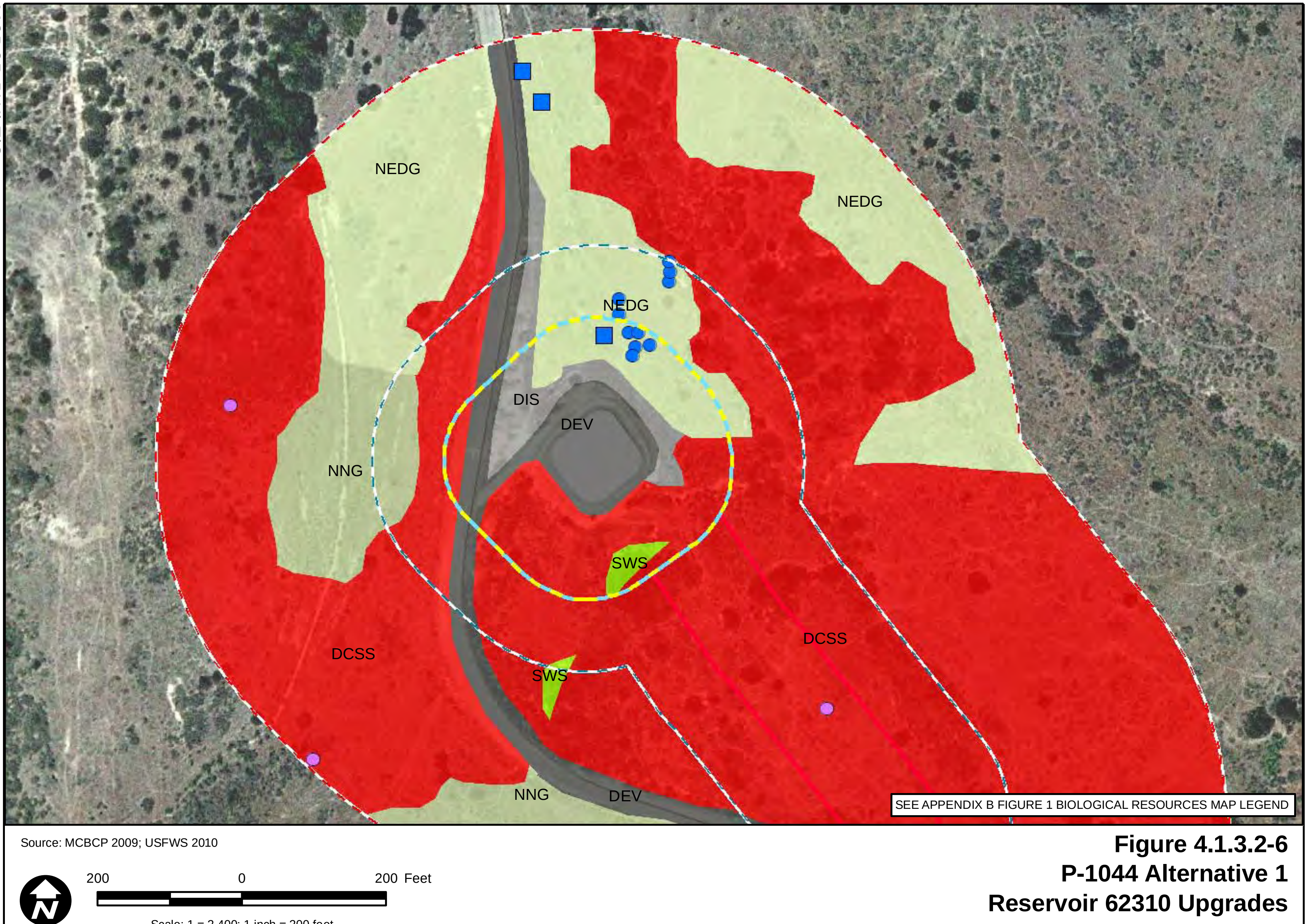

Source: MCBCP 2009; USFWS 2010

Figure 4.1.3.2-6
P-1044 Alternative 1
Reservoir 62310 Upgrades

MCBCP BWI EIS

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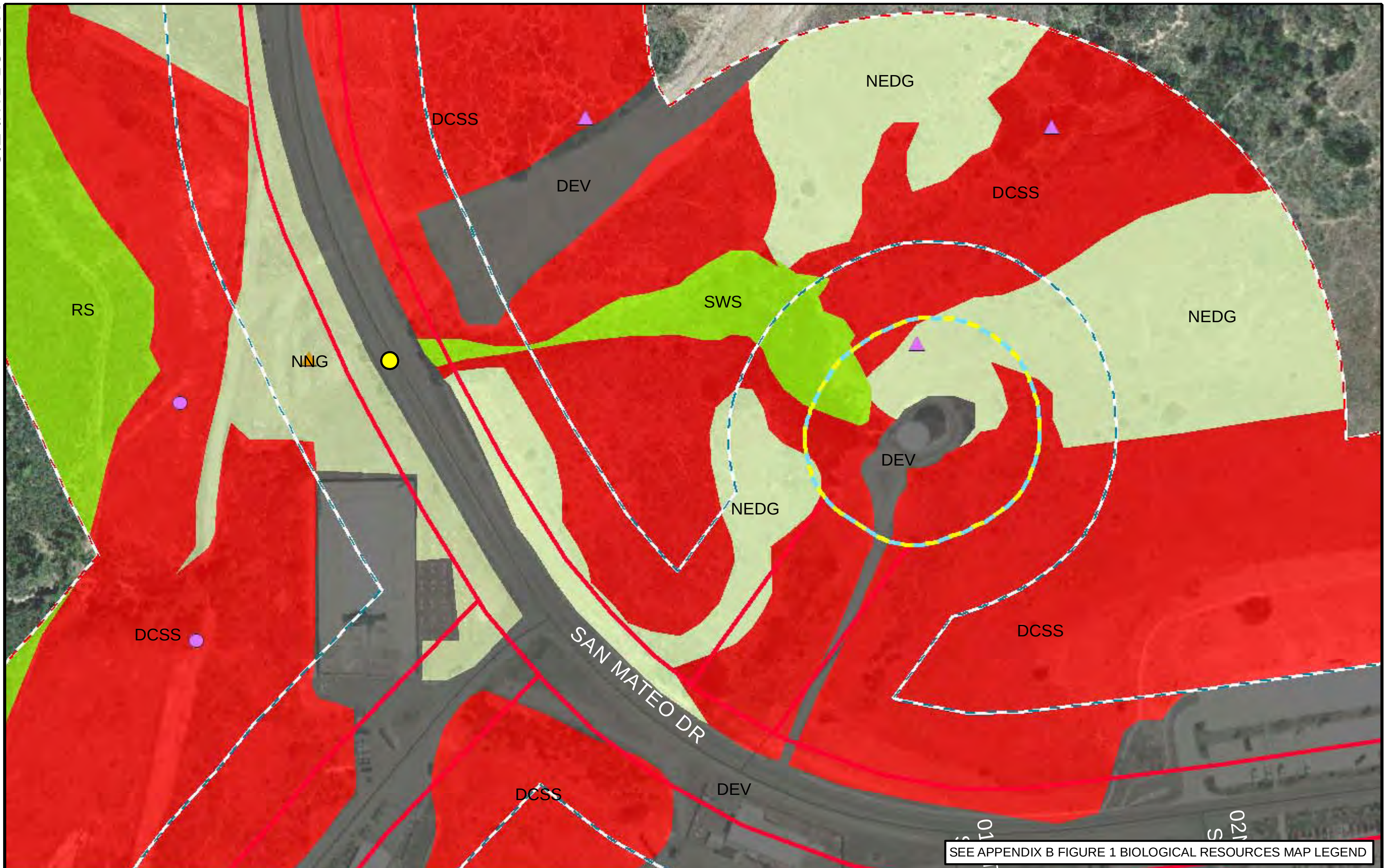

Source: MCBCP 2009; USFWS 2010

200 0 200 Feet

Scale: 1 = 2,400; 1 inch = 200 feet

Figure 4.1.3.2-7
P-1044 Alternative 1
Reservoir 62518 Upgrades

MCBCP BWI EIS

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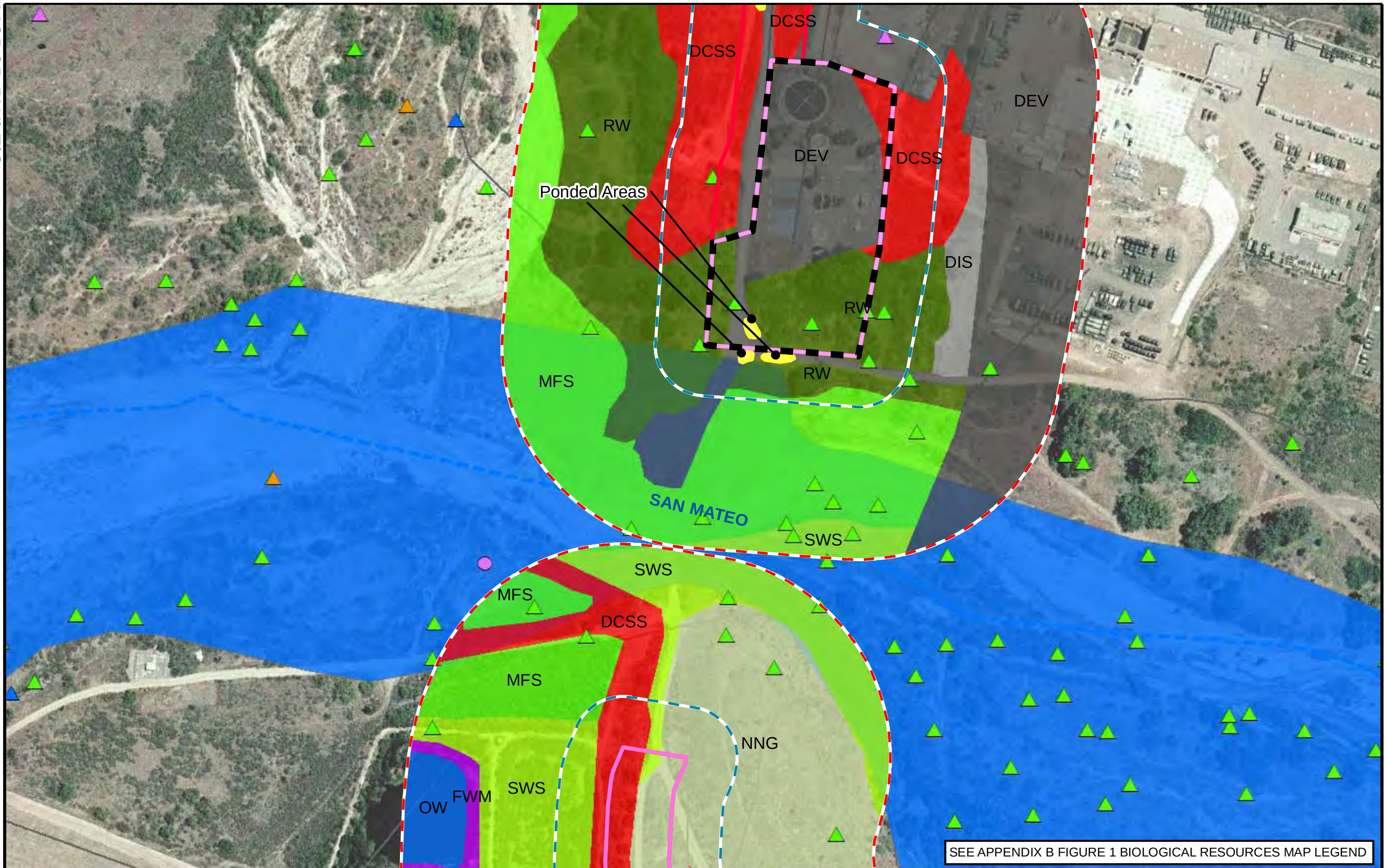


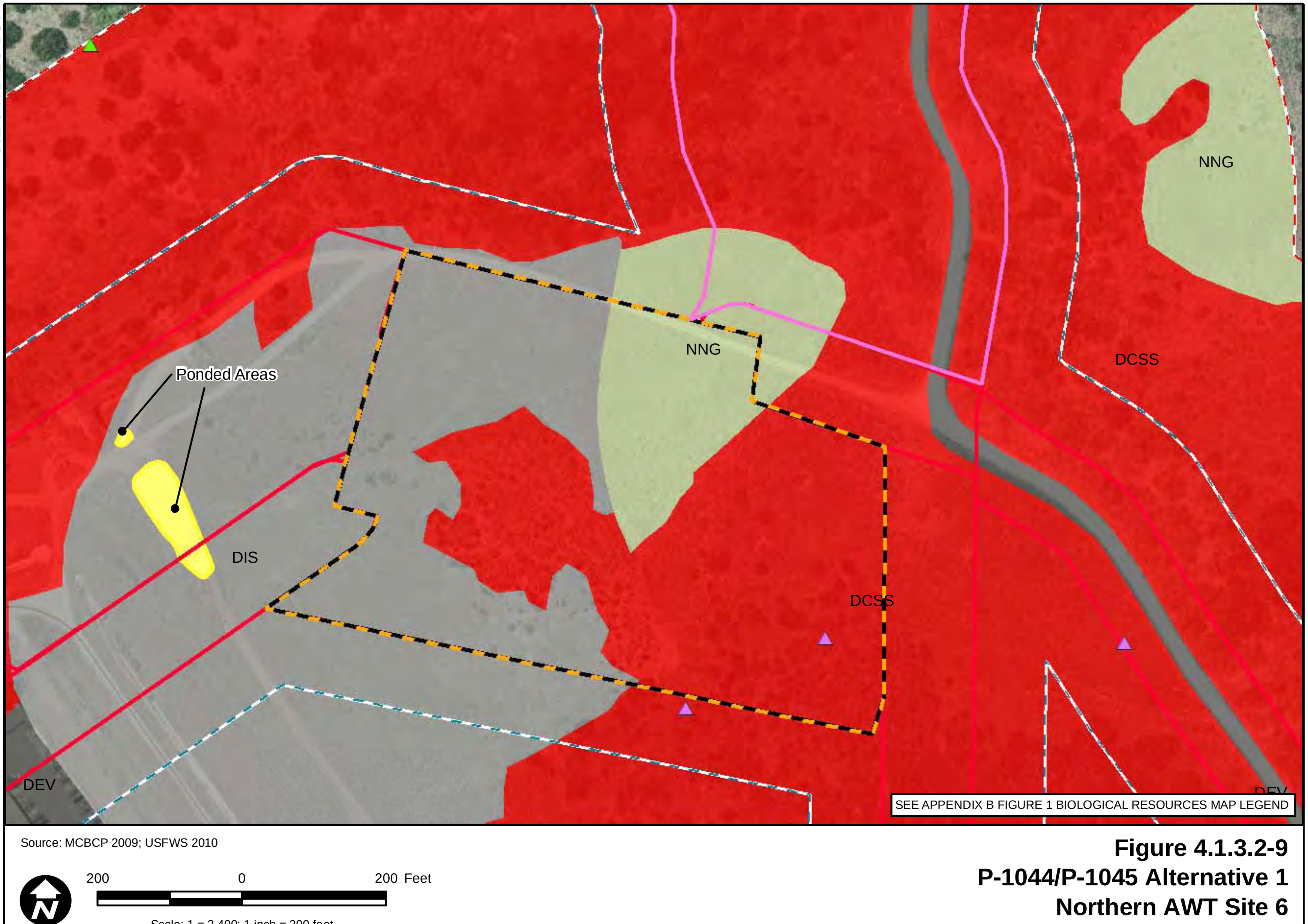
Source: MCBCP 2009; USFWS 2010

300 0 300 Feet

Scale: 1 = 3,600; 1 inch = 300 feet

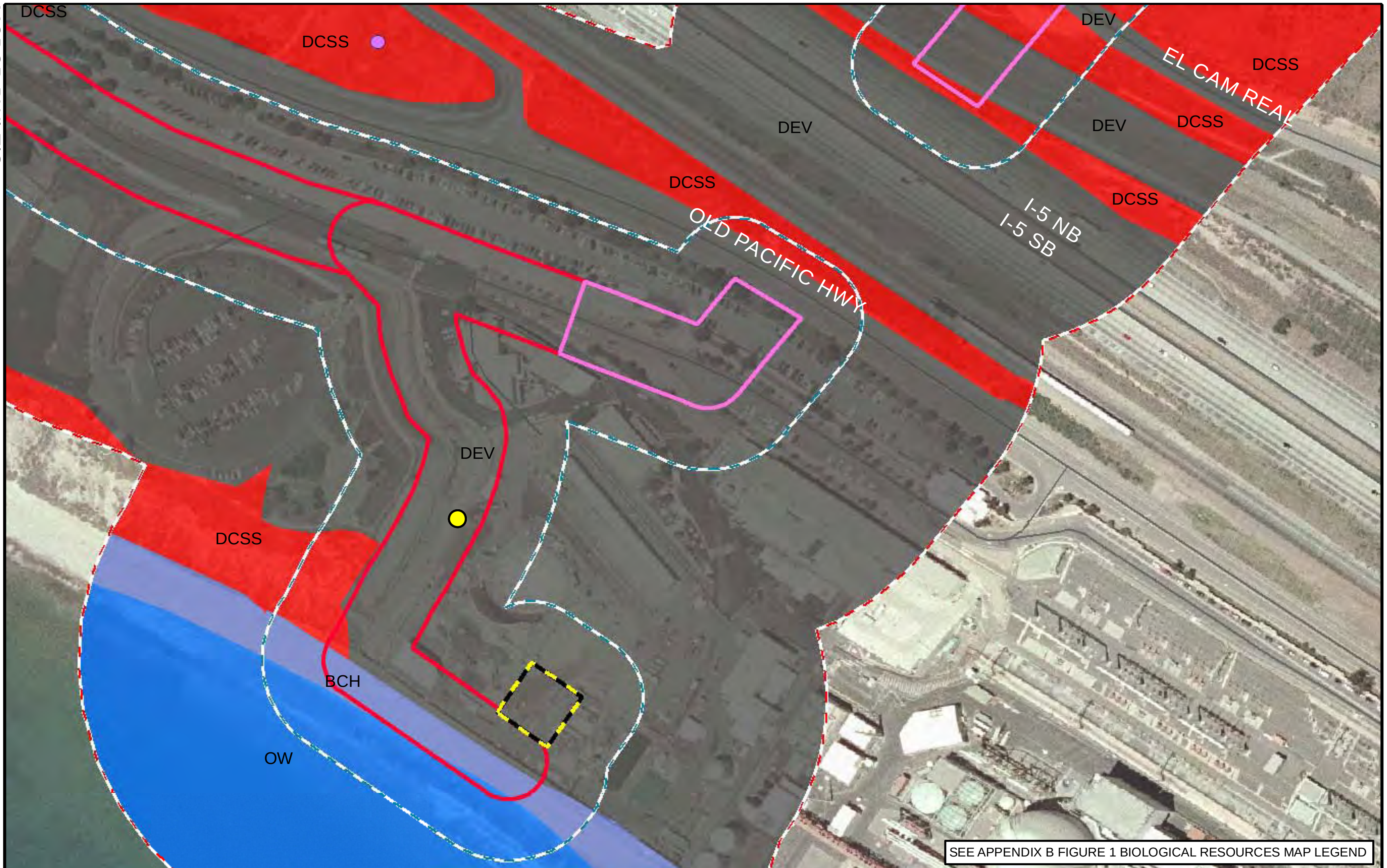
Figure 4.1.3.2-8
P-1044 Alternative 1
TAPS 12

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_4\P-1044_OPT1_Prop_AWT_NorthSite6.mxd, 8/31/2011, augeltop



Source: MCBCP 2009; USFWS 2010

Figure 4.1.3.2-9
P-1044/P-1045 Alternative 1
Northern AWT Site 6



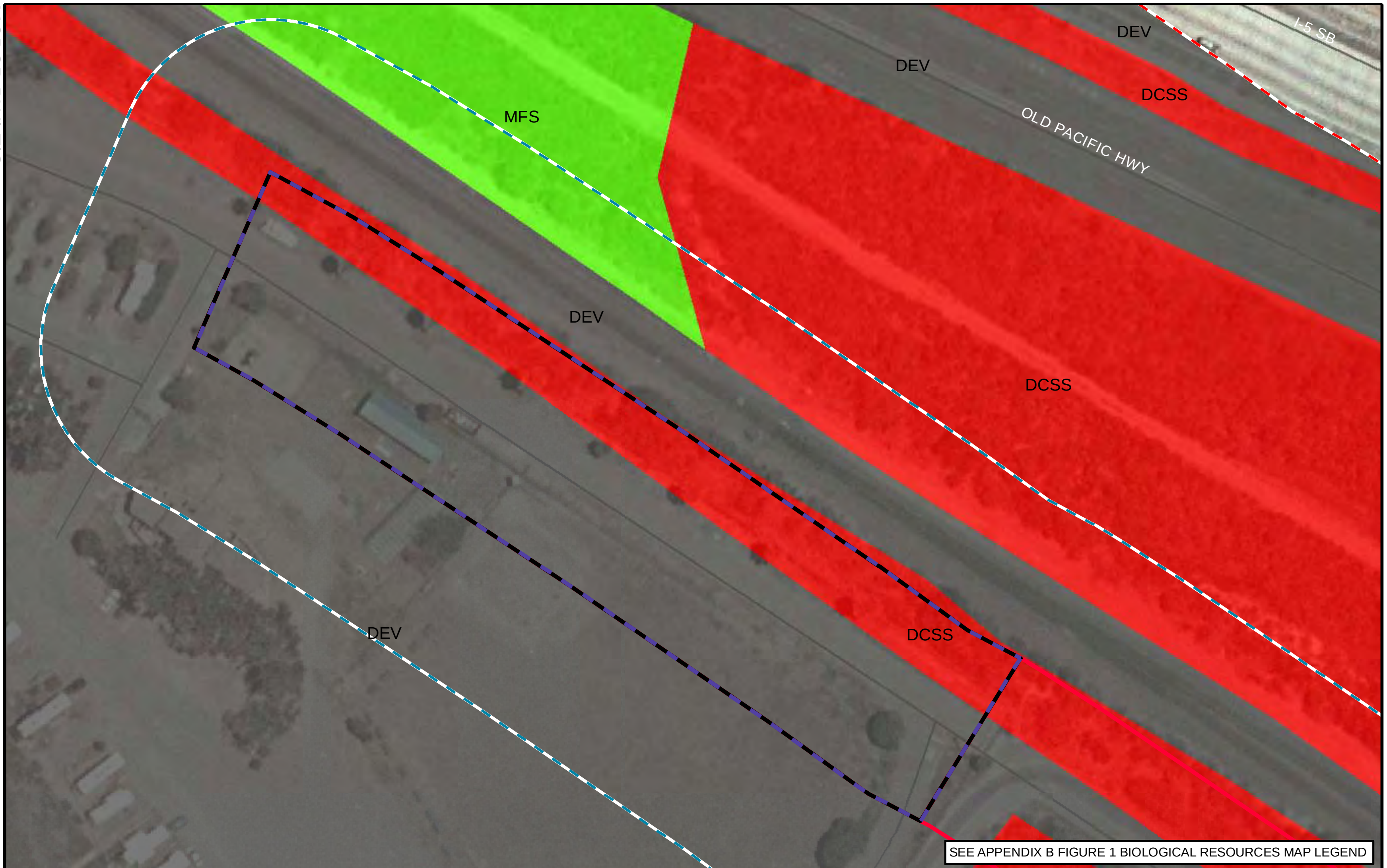
Source: MCBCP 2009; USFWS 2010

250 0 250 Feet

Scale: 1 = 3,000; 1 inch = 250 feet

Figure 4.1.3.2-10
P-1044 Alternative 1
SONGS Outfall

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_4\P-1044_OPT1_Prop_InjectionWellField.mxd, 8/31/2011, johnsonaa



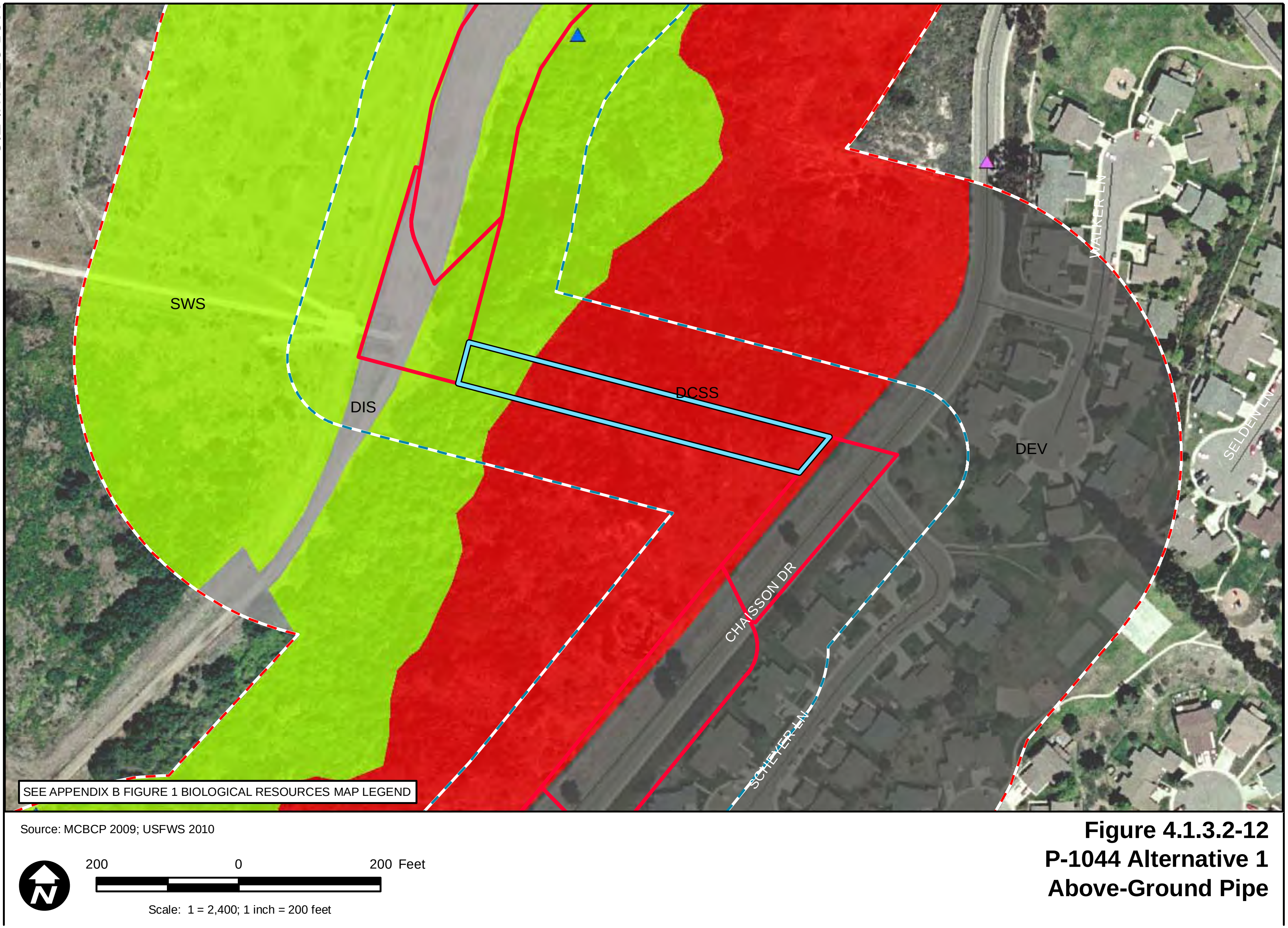
Source: MCBCP 2009; USFWS 2010

100 0 100 Feet

Scale: 1 = 1,200; 1 inch = 100 feet

Figure 4.1.3.2-11
P-1044 Alternative 1
Injection Well Field

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_4\P-1044_OPT1_Prop_AboveGroundPipe.mxd, 11/4/2011, AugelloP



Source: MCBCP 2009; USFWS 2010

Figure 4.1.3.2-12
P-1044 Alternative 1
Above-Ground Pipe

4.1.3.3 P-1045 Alternative 1

Permanent and temporary direct and indirect impacts for P-1045 Alternative 1 would be similar to those discussed above for P-1044 Alternative 1. See Section 4.1.3.1 for a general discussion of these potential project effects to plant communities and other cover types, jurisdictional waters, habitats occupied by federally listed and other rare species, and migratory birds covered under the MBTA.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1045 Alternative 1 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.1.3.3-1, 4.1.3.3-2, and 4.1.3.3-3, respectively.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1045 Alternative 1 facilities would result in permanent direct impacts to riparian and upland native plant communities and other cover types (Table 4.1.3.3-1). Development within the project corridor would result in temporary direct impacts to predominately coastal sage scrub, southern willow scrub, and developed land with smaller amounts of numerous other plant communities and cover types (Table 4.1.3.3-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, or vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under the CWA or occupied by federally listed species

would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 Alternative 1 could cause indirect impacts to plant communities and other cover types that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.1.3.3-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

<u>Impacts</u>

Direct Impacts

Development of the P-1045 Alternative 1 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of vernal pools and nonvegetated channel (Table 4.1.3.3-4). Development of the project corridor would result in temporary direct impacts to jurisdictional waters and wetlands, primarily in the form of southern willow scrub with lesser amounts of mulefat scrub, southern coastal salt marsh, disturbed wetland, nonvegetated channel, coastal and valley freshwater marsh, freshwater seep, and freshwater habitat, respectively (Table 4.1.3.3-5).

Construction along the corridor also has the potential to impact vernal pools that coincide with the project area, and those individual pools may be considered jurisdictional by USACE (determination is pending final reviews by ES and USACE).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 Alternative 1 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.1.3.3-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be temporarily or permanently, indirectly impacted by the project as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

Mitigation

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measures that would compensate for impacts to jurisdictional waters, including wetlands, are discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Plants

Impacts

Potential impacts to federally listed plant species and habitat associated with development of P-1045 Alternative 1 are depicted in Figure 4.1.3.3-1 and Figures 4.1.3.3-4 through 4.1.3.3-12 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.1.3.3-6 and 4.1.3.3-7.

Direct Impacts

Approximately 0.08 acre of thread-leaved brodiaea occupied habitat and one vernal pool basin occupied by spreading navarretia are known to occur within the P-1045 Alternative 1 project corridor and would be directly impacted by development (Table 4.1.3.3-6). No construction activities or work would occur within a 50-foot setback buffer of this pool occupied by spreading navarretia; thus, no permanent direct impacts to this species would occur. Direct impacts to thread-leaved brodiaea may be minimized or avoided following implementation of avoidance, minimization, and compensation measures referenced in the mitigation section below. Any direct impacts to these species are considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 0.40 acre of thread-leaved brodiaea occupied habitat, 11 vernal pool basins occupied by San Diego button-celery, and five vernal pool basins occupied by spreading navarretia are known to occur within the 100-foot buffer of the proposed action area (Table 4.1.3.3-7). Indirect impacts to these species would be minimized by implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

Mitigation

Mitigation measures that would compensate for direct and indirect impacts to federally listed plant species, are discussed in Section 4.1.3.1.

Federally Listed Wildlife

Impacts

Ten federally listed wildlife species, the Riverside fairy shrimp, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be impacted by P-1045 Alternative 1. Locations of these species relevant to P-1045 are depicted in Figure 4.1.3.3-3. Occupied and/or suitable habitat for federally listed wildlife species is depicted in Figures 4.1.3.3-4 through 4.1.3.3-12 (see legend for Chapter 4 figures in Appendix B). A breakdown of occupied and/or suitable habitat for these species (with the exception of Riverside and San Diego fairy shrimp) according to vegetation type is provided in Table 4.1.3.1-8.

Direct Impacts

P-1045 Facilities – Four listed wildlife species, the coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be directly impacted by the proposed construction of facilities for P-1045.
It is assumed all habitat occupied by listed species within P-1045 facilities would be permanently, directly impacted. Permanent direct impacts are summarized in Table 4.1.3.3-8. Potential permanent direct impacts to wildlife species are depicted in Figures 4.1.3.3-4 through 4.1.3.3-12.

A thorough discussion of specific types of permanent direct impacts to these species is provided in Section 4.1.3.1.

P-1045 Corridor – Habitat occupied by and/or suitable for listed wildlife within the P-1045 corridor would be temporarily, directly impacted. Temporary direct impacts would occur to 10 federally listed wildlife species: Riverside fairy shrimp, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Additionally, eight basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1045 corridor; these basins are currently being analyzed and may be determined to be San Diego or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. Habitat occupied by and/or suitable for these species that would be temporarily, directly impacted is quantified in Table 4.1.3.3-9. Pacific pocket mouse microhabitat and suitable habitat also occur within the P-1045 corridor; however, impacts to habitat would not be considered significant since it is not occupied.

A thorough discussion of specific types of permanent and temporary, direct impacts to these species is provided in Section 4.1.3.1.

Indirect Impacts

Ten federally listed wildlife species may be indirectly impacted by construction of P-1045 Alternative 1. Habitat occupied by the Riverside and San Diego fairy shrimp, southern California steelhead. tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse occurs within the 400-foot buffer of the P-1045 facilities and corridor. Additionally, basins occupied by an unidentifiable *Branchinecta* sp. occur within this buffer; these basins are currently being analyzed. Upon completion of this analysis it may be determined that these basins are occupied by San Diego or Lindahl's fairy shrimp. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.1.3.3-10.

A thorough discussion of specific types of permanent and temporary, indirect impacts to these species is provided in Section 4.1.3.1.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1045 Alternative 1 is noted in Table 4.1.3.1-10. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.1.3.3-1
Permanent Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 1 Facilities (acres)

Plant Communities and Other Cover Types	Pump Station at Future AWT South	Maintenance Access	New Reservoir	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	Total[1]
Riparian and Wetlands	**-**	**0.05**	**-**	**-**	**-**	**0.05**
Coastal and Valley Freshwater Marsh	-	<0.005	-	-	-	<0.005
Mulefat Scrub	-	0.01	-	-	-	0.01
Southern Riparian Woodland	-	<0.005	-	-	-	<0.005
Southern Willow Scrub	-	0.03	-	-	-	0.03
Uplands	**-**	**0.95**	**2.15**	**<0.005**	**4.90**	**8.01**
Diegan Coastal Sage Scrub	-	0.52	2.15	<0.005	4.90	7.57
Eucalyptus Woodland	-	0.01	-	-	-	0.01
Nonnative Grassland	-	0.37	-	-	-	0.37
Valley Needlegrass Grassland	-	0.05	-	-	-	0.14
Other Cover Types	**0.91**	**11.04**	**1.28**	**0.52**	**1.99**	**15.74**
Disturbed Habitat	-	0.02	1.27	-	-	1.30
Urban/Developed	0.91	11.02	<0.005	0.52	1.99	16.07
Total[1]	**0.91**	**12.04**	**3.43**	**0.52**	**6.90**	**23.79**

[1] Numbers may not sum exactly due to rounding.

Table 4.1.3.3-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 1 Corridor (acres)

Plant Communities and Other Cover Types	Laydown Area	TLS Sites	Corridors[1] (outside 1.75-mile section)		Corridors[1] (within 1.75-mile section)	
			Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Riparian and Wetlands	**-**	**1.00**	**72.47**	**34.78**	**0.75**	**0.07**
Alkali Playa	-	-	0.01	<0.005	-	-
Coastal and Valley Freshwater Marsh	-	-	0.09	0.04	-	-
Disturbed Wetland	-	-	1.96	0.94	-	-
Freshwater Seep	-	-	0.11	0.05	-	-
Mulefat Scrub	-	0.14	8.47	4.07	0.18	0.02
Nonvegetated Channel	-	-	0.01	0.01	-	-
Open Water	-	-	0.02	0.01	-	-
Riparian Scrub	-	-	0.38	0.18	-	-
Southern Coastal Salt Marsh	-	0.04	0.71	0.34	-	-
Southern Riparian Woodland	-	-	3.04	1.46	-	-
Southern Willow Scrub	-	0.82	57.55	27.62	0.31	0.03
Vernal Pool	-	-	0.12	0.06	0.26	0.03
Uplands	**-**	**12.78**	**188.15**	**90.31**	**14.17**	**1.42**
Diegan Coastal Sage Scrub	-	9.30	157.97	75.83	0.07	0.01
Eucalyptus Woodland	-	-	0.42	0.20	-	-
Nonnative Grassland	-	2.96	27.43	13.16	4.49	0.45
Valley Needlegrass Grassland	-	0.52	16.42	7.88	9.61	0.96
Other Cover Types	**7.42**	**9.77**	**186.73**	**89.63**	**11.87**	**1.19**
Disturbed Habitat	-	0.13	14.56	6.99	-	-
Urban/Developed	7.42	9.64	182.41	87.56	11.87	1.19
Total[2]	**7.42**	**23.55**	**447.35**	**214.73**	**26.79**	**2.68**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.1.3.3-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1045 Alternative 1 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Pump Station at Future AWT South	New Reservoir	Pulgas Gate Area Pump Station	Laydown Area	Reservoir 24174 Upgrades	TLS Sites	Corridor	Total[1]
Riparian and Wetlands	**-**	**-**	**-**	**-**	**-**	**10.28**	**165.73**	**176.01**
Alkali Playa	-	-	-	-	-	-	0.16	0.16
Coastal and Valley Freshwater Marsh	-	-	-	-	-	-	1.81	1.81
Disturbed Wetland	-	-	-	-	-	<0.005	2.03	2.04
Freshwater Seep	-	-	-	-	-	-	0.20	0.20
Mulefat Scrub	-	-	-	-	-	3.81	18.74	22.55
Nonvegetated Channel	-	-	-	-	-	-	0.12	0.12
Open Water	-	-	-	-	-	0.35	1.91	2.25
Riparian Scrub	-	-	-	-	-	-	0.90	0.90
Soft Bottom Channel	-	-	-	-	-	-	0.01	0.01
Southern Coastal Salt Marsh	-	-	-	-	-	0.77	2.99	3.76
Southern Riparian Woodland	-	-	-	-	-	0.31	8.58	8.88
Southern Willow Scrub	-	-	-	-	-	4.99	126.68	131.68
Vernal Pool	-	-	-	-	-	0.04	1.61	1.66
Uplands	**0.41**	**1.79**	**0.99**	**-**	**4.11**	**21.05**	**427.98**	**456.30**
Diegan Coastal Sage Scrub	0.41	1.77	0.99	-	4.11	13.31	308.19	328.78
Eucalyptus Woodland	-	-	-	-	-	-	2.19	2.19
Nonnative Grassland	-	-	-	-	-	5.92	72.25	78.17
Valley Needlegrass Grassland	-	-	-	-	-	1.81	45.35	47.16
Other Cover Types	**1.55**	**0.08**	**0.74**	**3.92**	**0.51**	**11.15**	**157.65**	**175.61**
Disturbed Habitat	-	0.02	-	-	-	0.51	26.08	26.61
Urban/Developed	1.55	0.06	0.74	3.92	0.51	10.64	131.57	149.00
Total[1]	**1.96**	**1.85**	**1.73**	**3.92**	**4.63**	**42.47**	**751.39**	**807.95**

[1] Numbers may not sum exactly due to rounding.

Table 4.1.3.3-4
Permanent Direct Impacts to Waters of the U.S.
Associated with P-1045 Alternative 1 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Other Waters[1]	**0.03 (233)**
Nonvegetated Channel	0.03 (233)
Total[2]	**0.03**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.1.3.3-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1045 Alternative 1 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridors[1] (outside 1.75-mile section)		Corridors[1] (within 1.75-mile section)	
		Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Wetland	**0.63**	**27.05**	**12.99**	**0.37**	**0.04**
Coastal and Valley Freshwater Marsh	-	0.19	0.09	-	-
Disturbed Wetland	<0.005	2.87	1.38	-	-
Freshwater Seep	-	0.37	0.18	-	-
Mulefat Scrub	-	0.04	0.02	0.03	<0.005
Southern Coastal Salt Marsh	0.62	1.02	0.49	0.06	0.01
Southern Willow Scrub	<0.005	22.40	10.75	-	-
Vernal Pool	-	0.16	0.08	0.28	0.03
Other Waters[2]	**0.05**	**0.53 (4,056)**	**0.26**	**0.03**	**<0.005**
Alkali Playa	-	0.05	0.02	-	-
Disturbed Wetland	<0.005	<0.005 (75)	<0.005	-	-
Fresh Water	-	0.07	0.03	-	-
Nonvegetated Channel	0.05	0.41 (3,981)	0.20	0.03	<0.005
Total[3]	**0.68**	**27.58**	**13.25**	**0.40**	**0.04**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.1.3.3-6
Permanent Direct Impacts to Federally Listed Plants
Associated with P-1045 Alternative 1

Habitat Occupied by:	Facilities	Corridors (outside 1.75-mile section)	Corridors (within 1.75-mile section)	Total
Thread-leaved Brodiaea	0 acres	0 acres	0.08 acre	0.08 acre
San Diego Button-celery	0 basins	0 basins	0 basins	0 basins
Spreading Navarretia	0 basins	0 basins	0 basins	0 basins

Table 4.1.3.3-7
Potential Indirect Impacts to Federally Listed Plants within
100 Feet of P-1045 Alternative 1 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	0.40 acre
San Diego Button-celery	11 basins
Spreading Navarretia	5 basins

Table 4.1.3.3-8
Permanent Direct Impacts to Federally Listed Wildlife
Associated with P-1045 Alternative 1 Facilities (acres)

Listed Wildlife Species	Maintenance Access	New Reservoir	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	Total Facility Permanent Impacts[1]
Coastal California Gnatcatcher	0.27	2.15	<0.005	3.36	5.79
Least Bell's Vireo	0.04	-	-	-	0.04
Southwestern Willow Flycatcher	0.04	-	-	-	0.04
Pacific Pocket Mouse (Microhabitat)[2]	<0.005	-	-	-	<0.005
Pacific Pocket Mouse (Suitable Habitat)[2]	0.01	2.64	-	-	2.65
Total[1]	**0.36**	**4.79**	**<0.005**	**3.36**	**8.52**

[1] Numbers may not sum exactly due to rounding.
[2] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.1.3.3-9
Permanent[1] and Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1045 Alternative 1 Corridor (acres)

Listed Wildlife Species	TLS Sites	Corridors[2,3] (outside 1.75-mile section)		Corridors[2,3] (within 1.75-mile section)	
		Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Riverside Fairy Shrimp	-	-	-	19 basins	2 basins
San Diego Fairy Shrimp	1 basin	8 basins	4 basins	57 basins	6 basins
Branchinecta spp.	-	9 basins	4 basins	12 basins	1 basin
Southern California steelhead[4]	-	0.42	0.20	-	-
Tidewater Goby	-	0.13	0.06	-	-
Arroyo Toad (Aestivation/Dispersal)	0.62	10.54	5.06	-	-
Arroyo Toad (Breeding)	0.49	34.90	16.75	-	-
Light-Footed Clapper Rail	0.10	0.48	0.23	-	-
Coastal California Gnatcatcher	8.71	121.59	31.67	-	-
Least Bell's Vireo	0.80	65.97	31.76	0.19	0.02
Southwestern Willow Flycatcher	0.59	53.21	25.54	-	-
Pacific Pocket Mouse (Microhabitat)[5]	0.28	7.67	3.68	-	-
Pacific Pocket Mouse (Suitable Habitat)[5]	1.17	22.19	10.65	-	-

[1] Impacts to fairy shrimp species are considered irreversible and permanent; for all other species listed in this table, impacts are considered temporary.
[2] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[3] Numbers may not sum exactly due to rounding.
[4] Temporary impacts to Southern California steelhead occur in both Santa Margarita and San Onofre Creeks.
[5] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.1.3.3-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1045 Alternative 1 Facilities and Corridor (acres)

Listed Wildlife Species	Pump Station at Future AWT South	New Reservoir	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	TLS Sites	Corridor	Total[1]
Riverside Fairy Shrimp	-	-	-	-	-	8 basins[2]	8 basins
San Diego Fairy Shrimp	-	1 basin	-	-	-	118 basins[3]	119 basins
Branchinecta spp.	-	1 basin	-	-	3 basins[4]	15 basins[4]	18 basins
Southern California steelhead[5]	-	-	-	-	4.20	11.80	16.00
Tidewater Goby	-	-	-	-	4.28	9.91	14.19
Arroyo Toad (Aestivation/Dispersal)	-	-	-	-	20.64	158.12	178.76
Arroyo Toad (Breeding)	-	-	-	-	27.88	402.08	429.96
Light-Footed Clapper Rail	-	-	-	-	10.79	18.10	28.89
Coastal California Gnatcatcher	0.75	14.03	10.57	17.96	97.43	1092.25	1233.00
Least Bell's Vireo	-	-	-	-	83.48	724.45	807.94
Southwestern Willow Flycatcher	-	-	-	-	73.25	618.94	692.20
Pacific Pocket Mouse (Occupied Habitat)[6]	-	-	-	-	1.87	6.44	8.31
Pacific Pocket Mouse (Microhabitat)[6]	-	0.03	-	-	3.29	16.55	19.87
Pacific Pocket Mouse (Suitable Habitat)[6]	-	2.33	-	-	11.03	179.08	192.44

[1] Numbers may not sum exactly due to rounding.
[2] Riverside fairy shrimp were found in basins with the following ID numbers: 2286, 2289, 2516, 2658, 2668, and 2803.
[3] San Diego fairy shrimp were found in basins with the following ID numbers: 71, 79, 89, 97, 106, 197, 198, 438, 676, 706, 713, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1112, 1120, 1121, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1132, 1365, 1539, 1566, 1934, 1936, 1938, 2044, 2483, 2487, 2490, 2495, 2514, 2516, 2596, 2598, 2602, 2606, 2617, 2619, 2621, 2622, 2623, 2624, 2625, 2626, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2638, 2640, 2641, 2645, 2649, 2652, 2658, 2661, 2666, 2667, 2668, 2670, 2673, 2674, 2677, 2681, 2919, and 2920.
[4] *Branchinecta* spp. fairy shrimp were found in basins with the following ID numbers: 2, 104, 108, 444, 519, 523, 1602, 1632, 2827, 2832, 2919, and 2920.
[5] Indirect impacts to Southern California steelhead occur in both Santa Margarita and San Onofre Creeks.
[6] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

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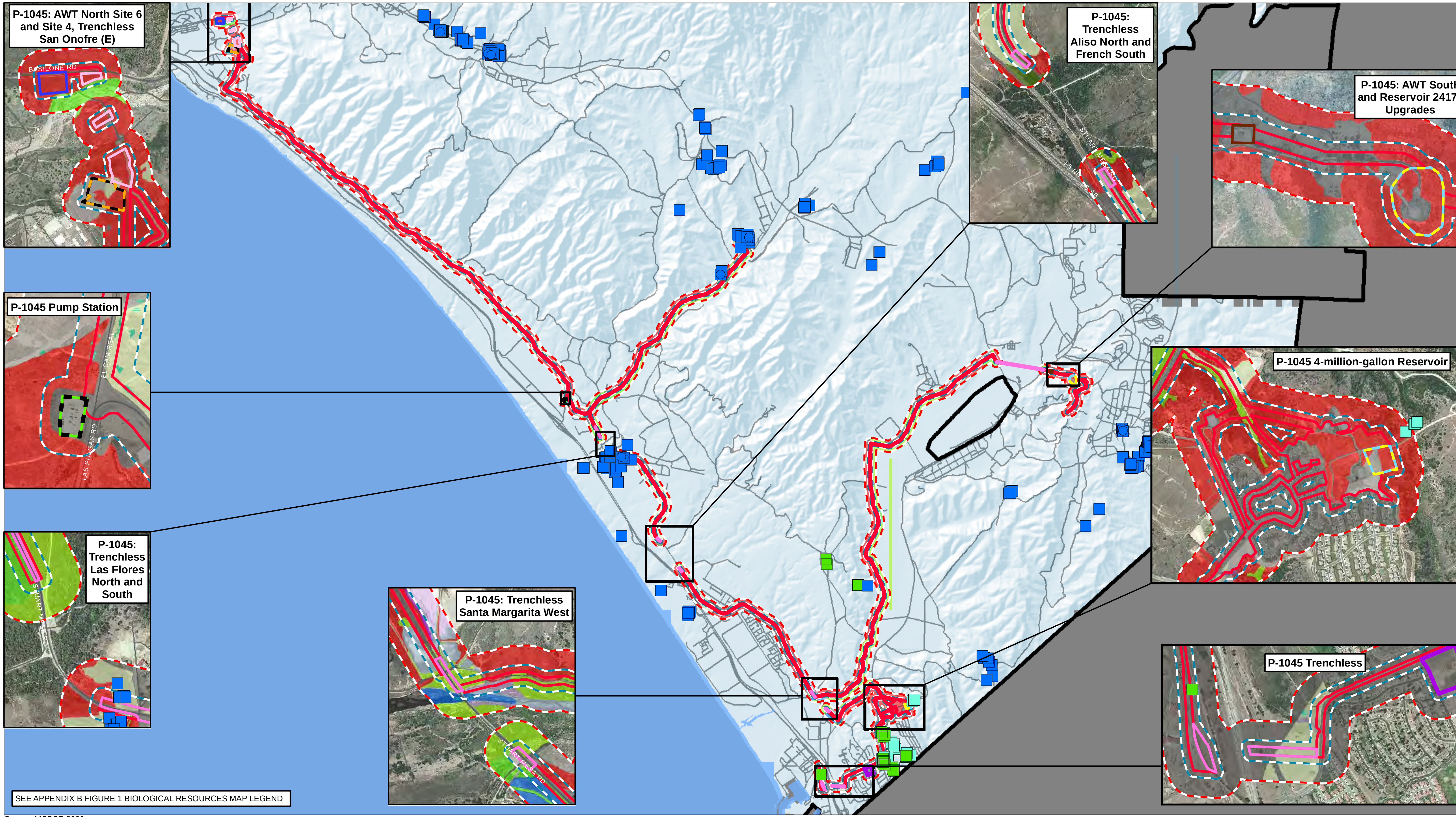

Source: MCBCP 2009

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Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.1.3.3-1
P-1045 Alternative 1
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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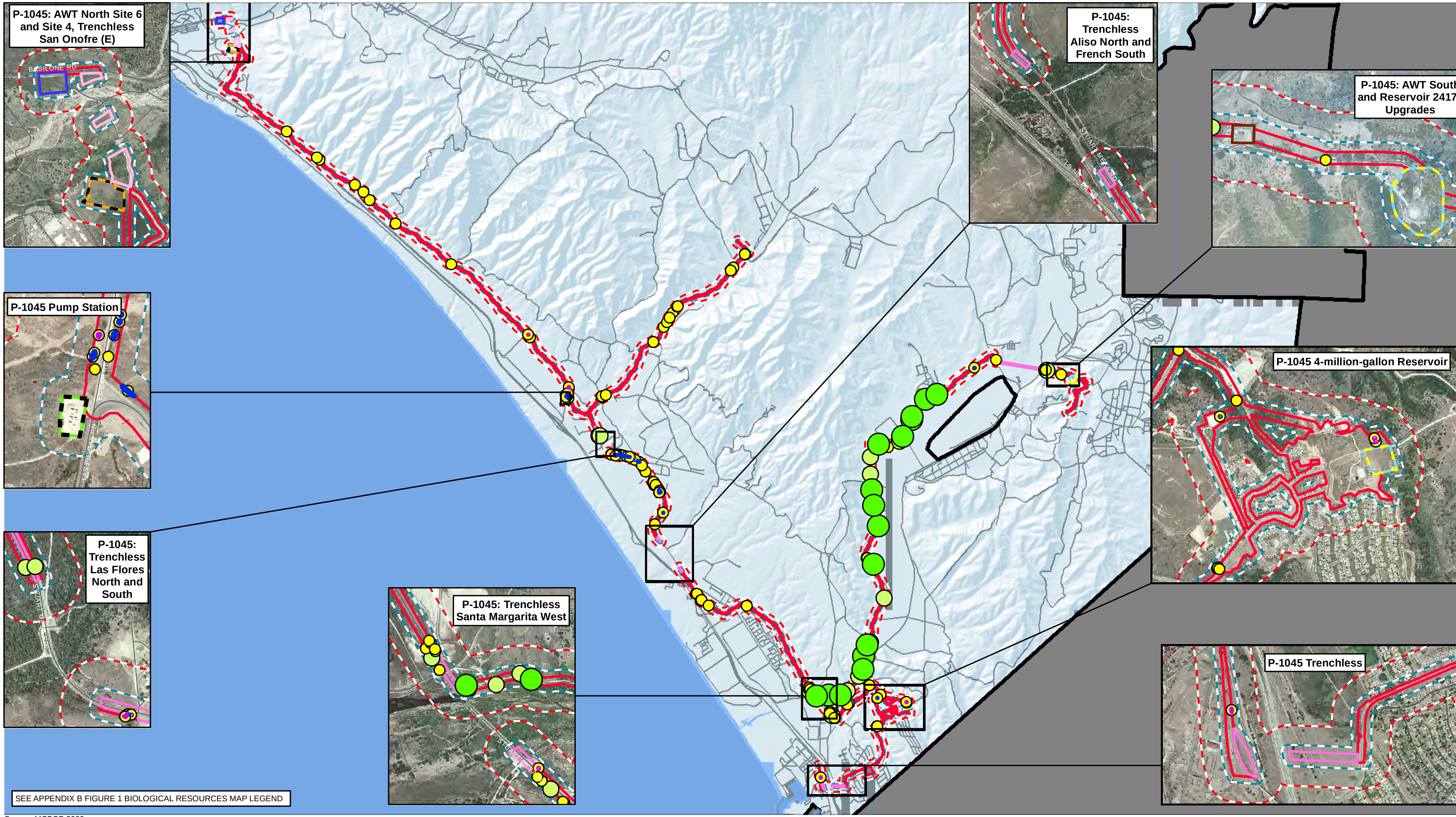

Source: MCBCP 2009

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Figure 4.1.3.3-2
P-1045 Alternative 1
Potential Effects to Jurisdictional Waters of the U.S.

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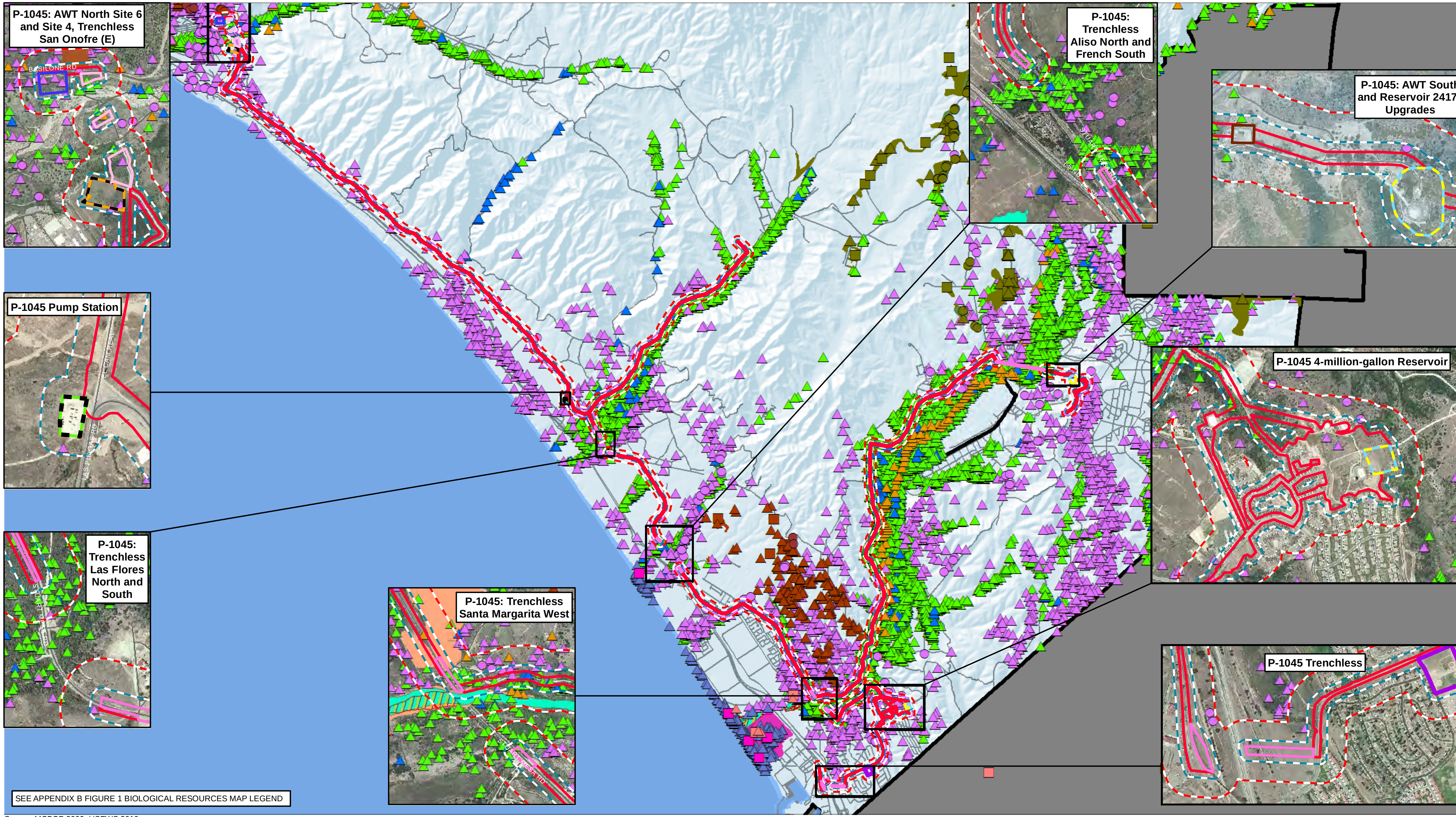

Source: MCBCP 2009; USFWS 2010

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Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.1.3.3-3
P-1045 Alternative 1
Potential Effects to Listed Wildlife Species

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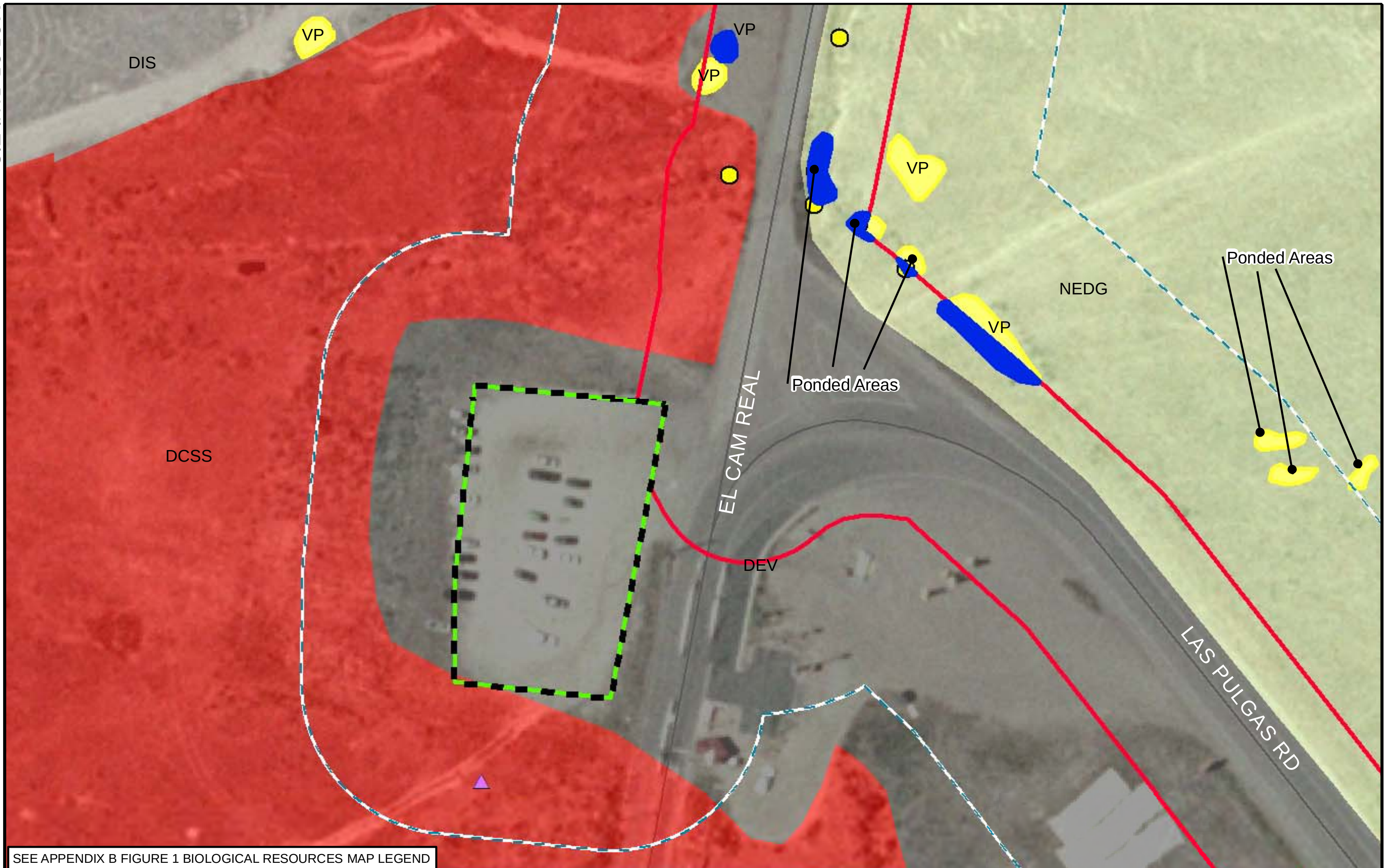

Source: MCBCP 2009; USFWS 2010

100 0 100 Feet

Scale: 1 = 1,200; 1 inch = 100 feet

Figure 4.1.3.3-4
P-1045 Alternative 1
Pump Station

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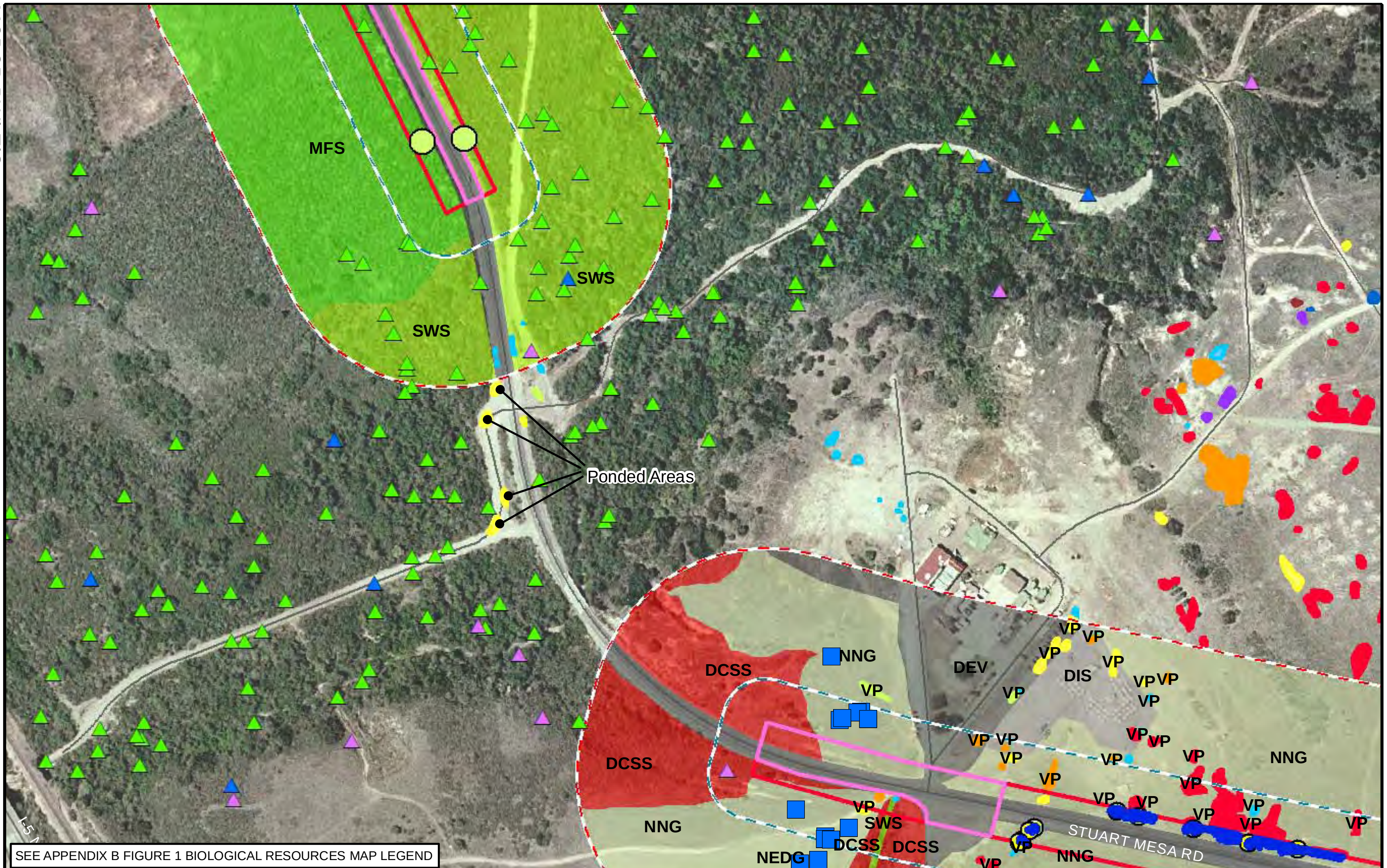

Source: MCBCP 2009; USFWS 2010

350 0 350 Feet

Scale: 1 = 4,200; 1 inch = 350 feet

Figure 4.1.3.3-5
P-1045 Alternative 1
Trenchless (TLS) -
Las Flores North and South

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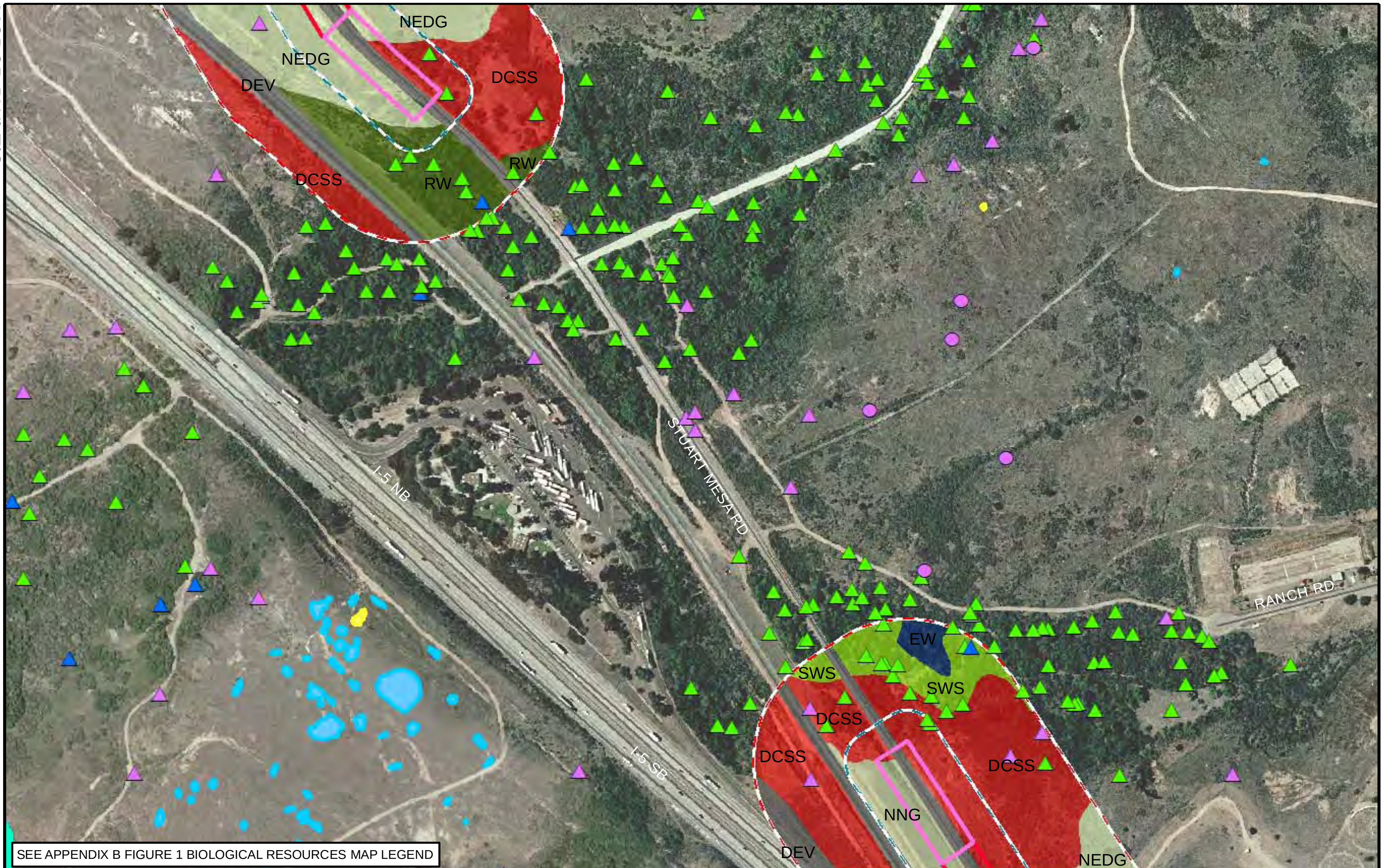

Source: MCBCP 2009; USFWS 2010

500 0 500 Feet

Scale: 1 = 6,000; 1 inch = 500 feet

Figure 4.1.3.3-6
P-1045 Alternative 1
Trenchless (TLS) -
Aliso-North and French-South

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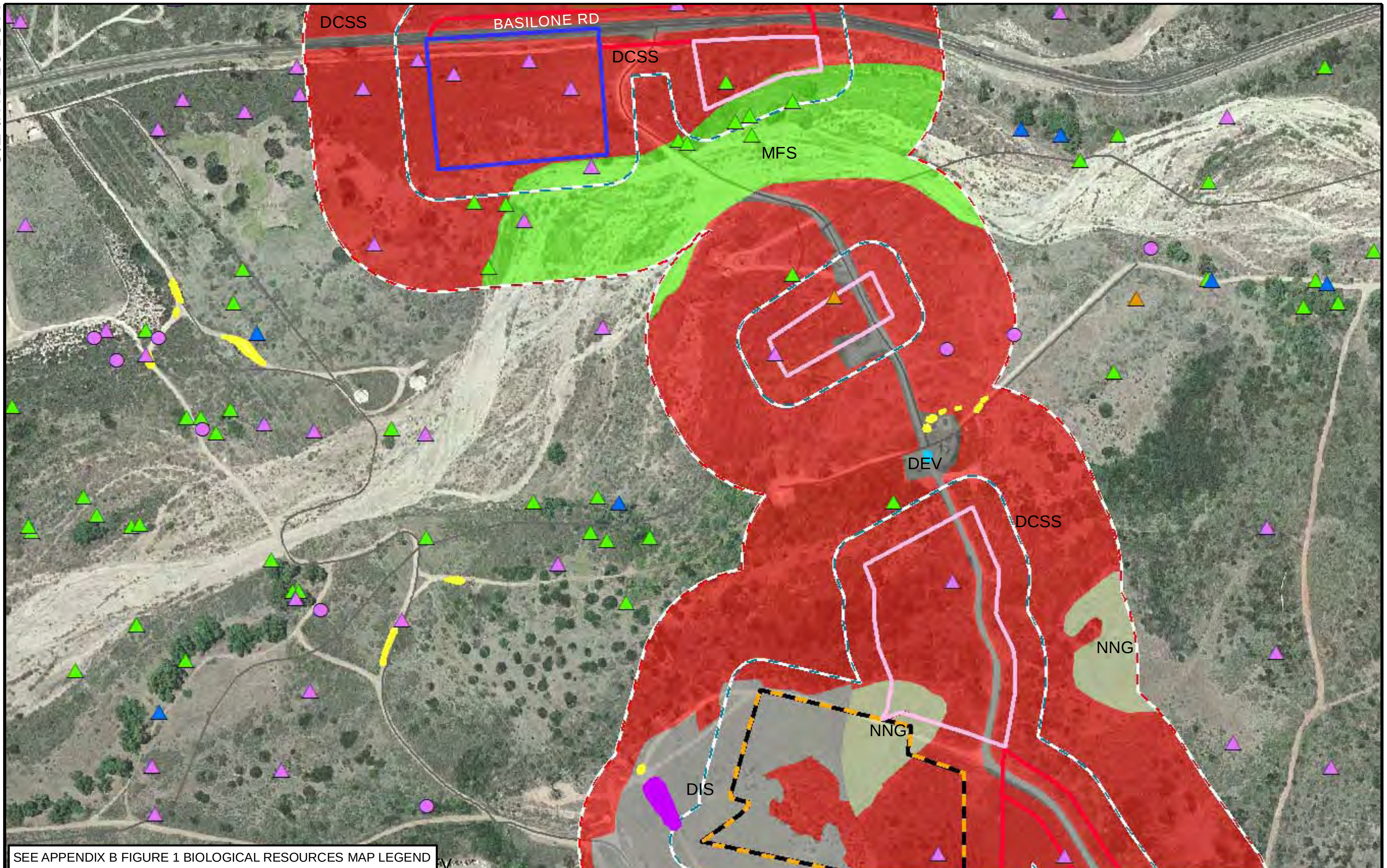

Source: MCBCP 2009; USFWS 2010

500 0 500 Feet

Scale: 1 = 6,000; 1 inch = 500 feet

Figure 4.1.3.3-7
P-1045 Alternative 1
Northern AWT at Site 4 and Site 6 and Trenchless (TLS) - San Onofre East

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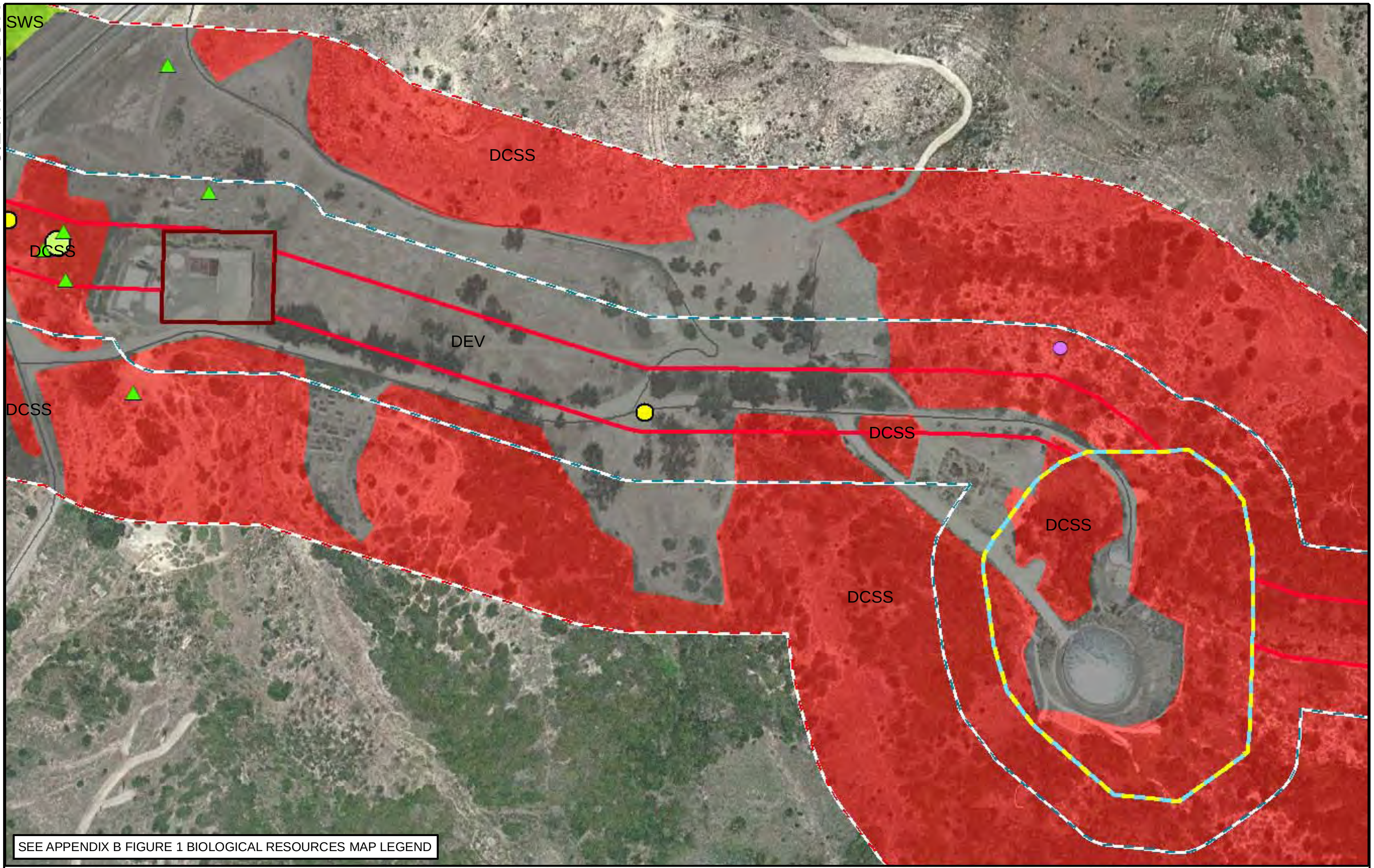

Source: MCBCP 2009; USFWS 2010

300 0 300 Feet

Scale: 1 = 3,600; 1 inch = 300 feet

Figure 4.1.3.3-8
P-1045 Alternative 1
AWT South and
Reservoir 24174 Upgrades

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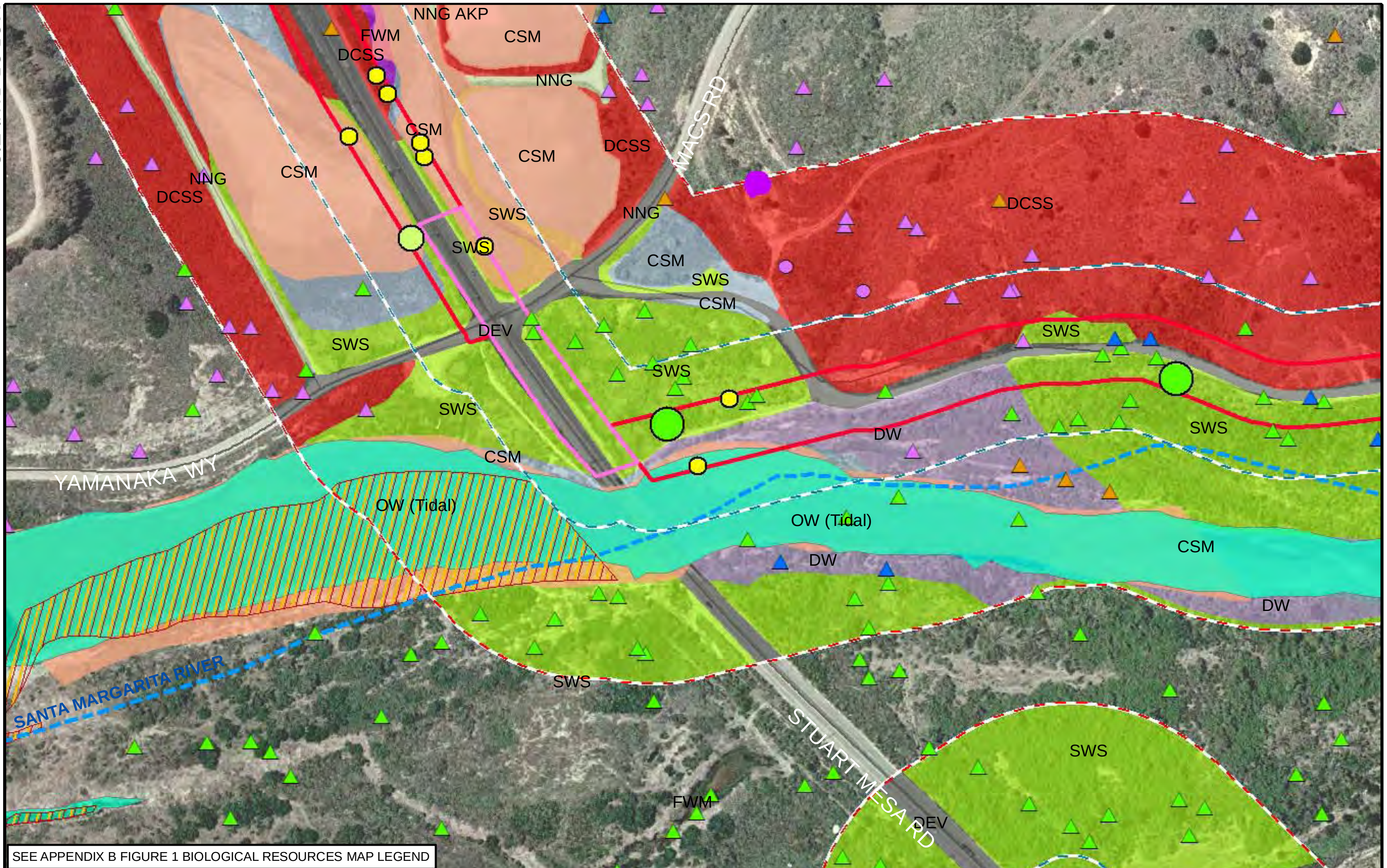

Source: MCBCP 2009; USFWS 2010

300 0 300 Feet

Scale: 1 = 3,600; 1 inch = 300 feet

Figure 4.1.3.3-9
P-1045 Alternative 1
Trenchless (TLS) - Santa Margarita West

MCBCP BWI EIS

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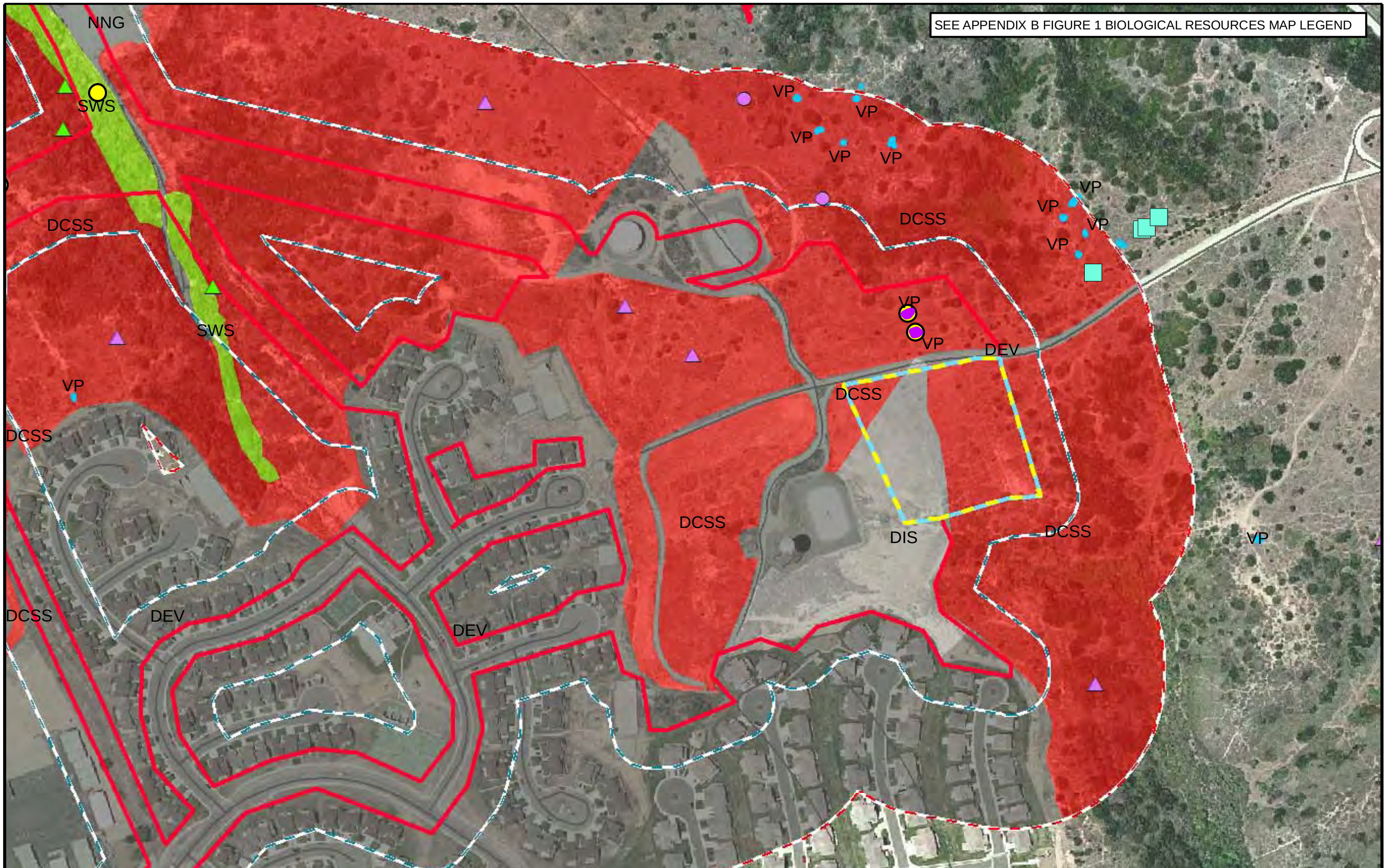

Source: MCBCP 2009; USFWS 2010

400 0 400 Feet

Scale 1:4,800; 1 inch = 400 feet

Figure 4.1.3.3-10
P-1045 Alternative 1
4-million-gallon Reservoir

MCBCP BWI EIS

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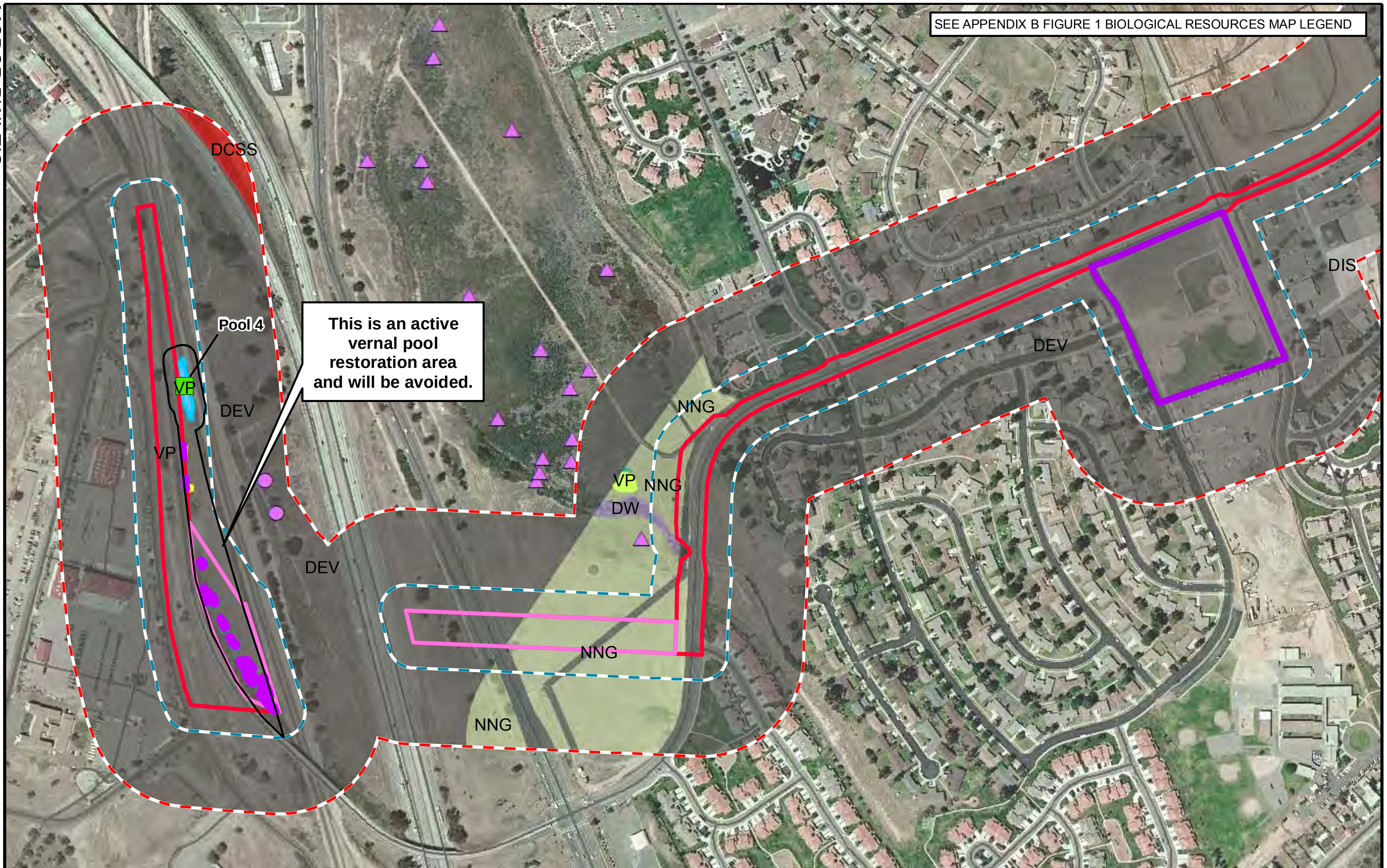


Source: MCBCP 2009; USFWS 2010

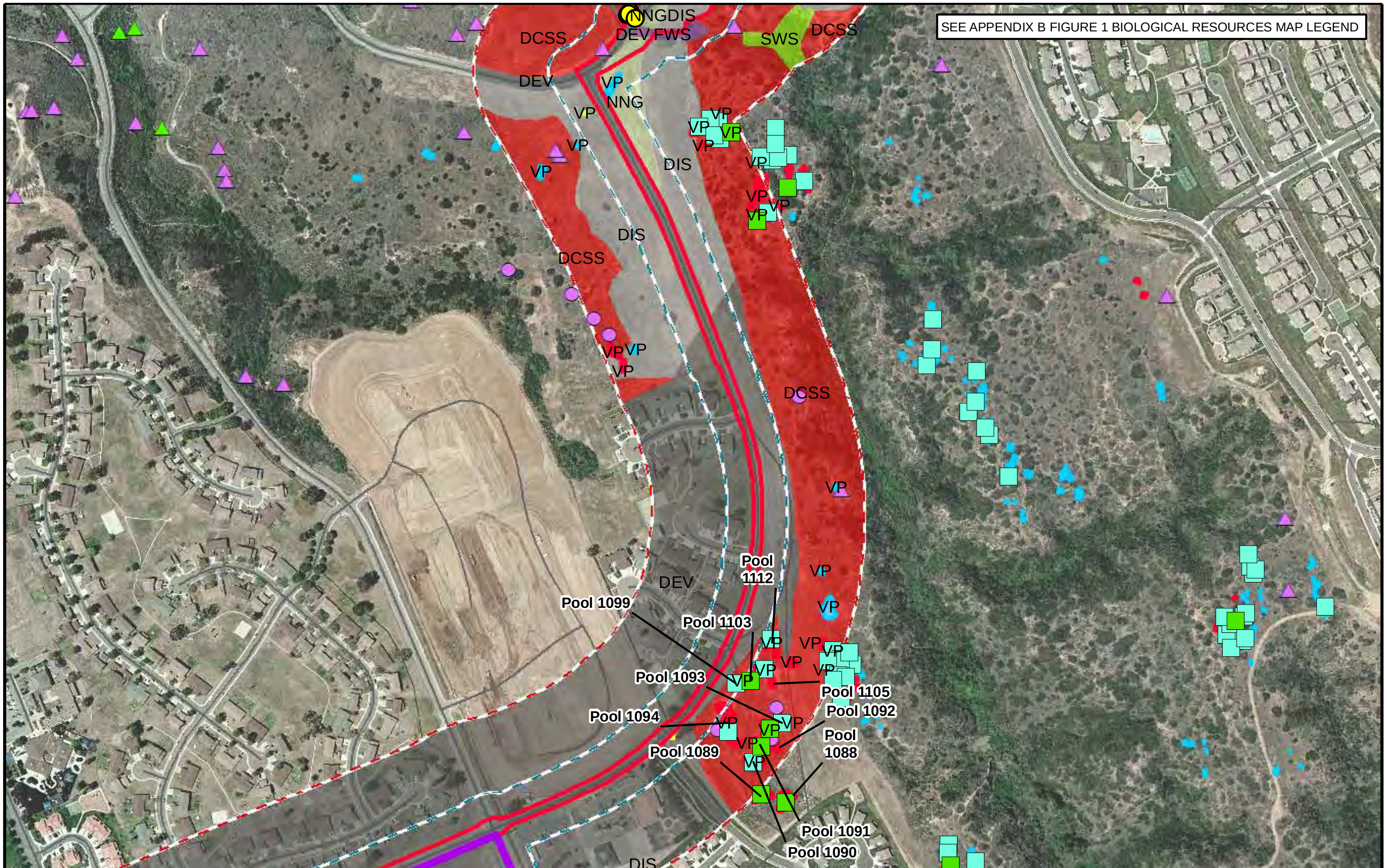
600 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 4.1.3.3-11
P-1045 Alternative 1
Trenchless Right-of-Way Crossing

MCBCP BWI EIS

Path: P:\2009\09080431 MCBCP MILCONs 3P EIS\6.0 GIS\6.3 Layout\EIS\Chapter_4\P-1045_OPT1_NAFO_ButtonCelery_Closeup.mxd, 7/5/2012, johnsonaa



Source: MCBCP 2009; USFWS 2010

600 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 4.1.3.3-12
P-1045 Alternative 1
Wire Mountain Area

4.1.3.4 No Action Alternative

Impacts

Under the No Action Alternative, Alternative 1 of P-1044 and P-1045 would not be constructed and no ground-disturbing activities would occur. Baseline conditions (as described in Section 3.3, Biological Resources) would remain unchanged and no significant impacts to biological resources would occur as a result of implementation of the No Action Alternative.

Mitigation

No mitigation measures are proposed.

4.1.4 Cultural Resources

4.1.4.1 Both MILCONs (Alternative 1)

Cultural resources identified within the APE for Alternative 1 are summarized in Table 4.1.4-1. A total of 40 resources are identified, of which 25 are ineligible for the NRHP and 15 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites resulting from Alternative 1 would not be significant.

Table 4.1.4-1
Cultural Resources within Alternative 1 APE

NRHP Status	P-1044	P-1045	Total
Eligible/Listed	5	10	15
Ineligible	6	19	25
Total	**11**	**29**	**40**

Impacts

Because most of the historic properties within the APE of Alternative 1 consist of prehistoric archaeological deposits, most impacts would result from physical destruction or alteration of historic properties that are eligible under NRHP criterion D. Under Section 106 these undertakings would have an adverse effect on eligible or listed historic properties (as defined under Section 106 regulations). Properties that are eligible under NRHP criteria A, B, or C could also be subject to visual or audible impacts if activities related to Alternative 1 diminish the integrity of their settings.

Mitigation

Section 2.5.3 identifies measures to be employed to avoid or minimize impacts to cultural resources during construction. Potential impacts to undiscovered buried resources would be addressed through construction monitoring by a qualified archaeologist, with monitoring of construction in all portions of the APE(s) with a potential for buried cultural deposits. To the extent possible, the construction of all facilities associated with Alternative 1 would be designed to avoid impacts to NRHP-eligible properties. Ineligible sites would be avoided to the extent practicable with engineering constraints. MCBCP, SHPO, and other consulting parties have developed a Programmatic Agreement (PA) that records the terms and conditions agreed upon to resolve adverse effects resulting from the undertakings. If avoidance is not feasible, MCBCP would implement a Historic Properties Treatment Plan (HPTP) for the affected resources. The HPTP would include a historic context and research design; specific treatments for each affected property, including archaeological data recovery; documentation of character-defining elements that would be affected by construction, as well as in-kind replacement of such elements that are removed during construction; and archaeological and Native American monitoring of all ground-disturbing areas with potential for buried cultural deposits. Human remains have previously been recovered from some of the sites within the undertakings APE. Any Native American human remains, funerary objects, sacred objects, and items of cultural patrimony would be treated per NAGPRA requirements. Other recovered cultural materials would be curated at the San Diego Archaeological Center. The PA was signed by SHPO on 7 August 2012.

4.1.4.2 P-1044 Alternative 1

Impacts

P-1044 Alternative 1 would result in impacts to five cultural resources that have been determined eligible for the NRHP. All five of these resources are prehistoric archaeological sites and include CA-SDI-1074, CA-SDI-1313/14,791, CA-SDI-9561/H, CA-SDI-15,913, and CA-SDI-16,283. While all five of these sites are eligible under NRHP criterion D, CA-SDI-16,283 may be considered under criterion C as well due to its possible association with the Juaneño village of *Panhe* and because human remains have been discovered at this location (York, Glenny, and Jow 2010). Under NHPA Section 106, implementation of P-1044 Alternative 1 would have an adverse effect on eligible or listed historic properties (as defined under Section 106 regulations).

Mitigation

Mitigation of impacts to cultural properties resulting from P-1044 Alternative 1 would be as described in Section 4.1.4.1.

4.1.4.3 P-1045 Alternative 1

Impacts

P-1045 Alternative 1 would result in impacts to 10 cultural resources that have been determined eligible for or are listed in the NRHP. These include seven prehistoric archaeological sites (CA-SDI-4416, -4426, -4538A/B, 10,731, -12,570, -12,571, and -13,936); two historic travel routes (CA-SDI-14,005H and CA-SDI-14,006H); and

CA-SDI-812/H, an NRHP-listed site that contains both archaeological and historic structural elements.

CA-SDI-812/H includes the remains of the 1823 Las Flores *estancia* and the 1863–1864 Las Flores Adobe, as well as an extensive cultural deposit dating to the Late Prehistoric period. The remains of the *estancia* were placed in the NRHP under criterion A and, in 1993, the Las Flores Adobe was also placed in the NRHP, along with the surrounding prehistoric deposits. The Las Flores Adobe has also been designated a National Historic Landmark. Only the adobe, and not the surrounding prehistoric deposits, was included in the National Historic Landmark designation. Impacts to CA-SDI-812/H from P-1045 Alternative 1 would result from the installation of the conveyance lines along Basilone Road and El Camino Real, and would be limited to the prehistoric deposits.

The two historic travel routes within the APE of P-1045 Alternative 1 include Segment A of CA-SDI-14,005H, the alignment of the California Southern railroad, and Segment C of CA-SDI-14,006H, the early 20th-century route of El Camino Real. Impacts to CA-SDI-14,005/H from P-1045 Alternative 1 would be minimal because the tracks have been removed within the APE. CA-SDI-14,006H would also potentially be impacted by the undertaking. Specific impacts to this resource are contingent on the final placement of the construction corridor within the APE.

<u>Mitigation</u>

Mitigation of impacts to archaeological resources resulting from P-1045 Alternative 1 would be as described in Section 4.1.4.1.

4.1.5 Land Use

4.1.5.1 Both MILCONs (Alternative 1)

Methodology

All structure locations and pipeline routes were visited in the field and all were examined on recent aerial photographs. Regulatory requirements and standard construction practices were reviewed to determine applicability. Existing documents related to land use on MCBCP were reviewed, including the Base 2030 Master Plan (U.S. Navy 2011) and analyses originally performed for the Final Basewide Utilities Infrastructure EIS (U.S. Navy 2010d).

Impacts

P-1044 and P-1045 differ greatly in the geographic areas that would be affected. In the few instances where the areas affected overlap, at least one of the projects would emplace underground pipelines only. Other than these instances, different areas are affected by each of the MILCONs (all alternatives). In the areas of overlap, the proposed uses would be compatible with each other. P-1044 and P-1045 are infrastructure proposals of a kind that are generally considered compatible with and supportive of all other land uses. No significant land use impacts would result from the implementation of P-1044 or P-1045.

Mitigation

No mitigation measures are proposed.

4.1.5.2 P-1044 Alternative 1

Impacts

Advanced Water Treatment Facility

Construction of the Northern AWT facility as proposed in Alternative 1 would construct a new facility in an undeveloped area. The proposed Northern AWT facility would be compatible with all MCBCP planning policies and surrounding land uses. No land use conflicts would occur with the Base's training mission from implementation of P-1044. The closest San Onofre housing area (the San Onofre 3 Housing Area) is approximately

0.5 mile to the northwest and is separated from the site by undeveloped land and San Onofre Creek. The SONGS East Mesa facility is within a few hundred feet on the southwest and is a similar industrial/utility use, so the Northern AWT facility would not introduce an unusual or incompatible land use to the general area. The proposed construction and operation of P-1044 would be consistent with MCBCP planning policies and guidelines because optimum land use has been taken into consideration in project planning, and no productive use would be displaced. All components associated with P-1044 would be sited in accordance with established land use plans and development guidelines addressing safety, functionality, environmental protection zones, and the INRMP and ICRMP. Therefore, no significant impacts to land use would occur.

Pump Stations

Three existing pump stations would be retrofitted to better serve the proposed improvements. The retrofitted pump stations would occur at the TAPS 12 site, in the 63 Area (Cristianitos), and in the 64 Area (Talega). The pump stations would be approximately 0.25 acre and would not interfere or be incompatible with future land uses, since they already exist in developed cantonment areas. Therefore, no significant impacts to land uses would occur.

Conveyance Lines

Land use along the conveyance lines would not change, and no other productive use in the routes would be displaced. Since the pipelines would be underground, except on the steep slope from Chaisson Road to the vicinity of the Sierra 1 Training Area percolation ponds, no incompatible land uses would be introduced by the placement or operation of the proposed pipelines. The proposed aboveground pipeline between Chaisson Road and the Sierra 1 Training Area percolation ponds would construct a permanent structure in an undeveloped area. Although this pipeline would change the use of a small linear segment of this area, the overall land use impact would not be significant. The aboveground pipeline would not interfere or impede operations and training because of its location on a steep vegetated slope. While construction of new pipelines could temporarily disrupt access to adjacent buildings, streets, and training areas, the disruption would be minimized by the short duration of construction and the use of signage and alternative routes to maintain access, as appropriate. Therefore, no significant impacts to land uses would occur.

Maintenance Access Corridor

The maintenance access corridor would be located adjacent to existing major Base roadways. In addition to providing maintenance access, these corridors would also enhance Base recreation by providing additional bicycle and jogging lane segments and connections. The maintenance access corridor would have a beneficial land use impact.

Ocean Outfall

All alternatives would include the connections necessary to discharge brine solution generated by the RO operation at the Northern AWT plant through the former SONGS outfall conduit. The conduit was used by SONGS up to 2005 and was being prepared for decommissioning. No other productive land uses would be displaced by the pipeline connecting the Northern AWT plant to the outfall. Within SONGS, the connection route would be in streets or paved areas, and SONGS functionality would not be affected. The discharge pipeline for optional connection to the SONGS outfall conduit west of the seawall either onshore or offshore would be under the ground or the ocean surface and would not affect adjacent or nearby land uses. Since ocean outfall disposal would involve reuse of the existing outfall undersea pipeline, and the connection to the Northern AWT plant would be by way of an underground pipeline, no significant impacts to land uses would occur.

Injection Wells

Brine would also be discharged into deep injection wells. For all alternatives, the proposed injection wells would be located where El Camino Real crosses the existing San Onofre percolation ponds between San Onofre Creek and I-5 and where the inland access road crosses the MCBCP San Onofre Beach recreation area along the BNSF Railway right-of-way, west of Coast Road and northwest of the San Onofre Surf Beach area of San Onofre State Beach. The aboveground facilities would consist of the wellheads and an access road. Since these areas are already being used for the percolation ponds in one case or are constrained by a railroad right-of-way and existing nearby recreational development in the other, options for other land uses in these locations are limited. Construction and operation of a well field in these areas would be compatible with the existing uses, and no significant land use impacts would result.

<u>Mitigation</u>

No mitigation measures are proposed.

4.1.5.3 P-1045 Alternative 1

<u>Impacts</u>

Conveyance Lines

Land use along the north-south water conveyance lines would not change under P-1045 Alternative 1. No incompatible land uses would be introduced as a result of the proposed pipeline placement or operation, since pipelines would be underground and no existing uses would be displaced. While construction of new pipelines could temporarily disrupt access to adjacent buildings, streets, and training areas, the disruption would be minimized by the short-term duration of construction and the use of signage and alternative routes to maintain access as appropriate. Therefore, no significant impacts to land uses would occur.

Maintenance Access Corridor

Similar to P-1044, the maintenance access corridor would provide maintenance access and additional bicycle and jogging lane segments and connections. The maintenance access corridor would have a beneficial land use impact.

4-Million-Gallon Reservoir

The proposed reservoir would be located on a ridge top with several existing reservoirs. The reservoir site is designated Training and Maneuvering Area and is immediately adjacent to designated housing areas. The Training and Maneuvering Area would be slightly reduced due to the construction of the reservoir; however, with the existing reservoirs and the adjacent housing, it is anticipated that operations and training would not be significantly affected. The proposed land use would be consistent with existing land uses and no significant impacts to land uses would occur.

Pump Stations

Under P-1045 Alternative 1, three pump stations would be included to move water between the northern and southern water systems. One pump station would be within the project limits of the Northern AWT (P-1044), and one pump station would be adjacent to the future AWT South in an existing disturbed/parking area. The future AWT South itself is not a part of this proposed action. The third pump station would be in a disturbed area near the intersection of Las Pulgas Road and El Camino Real. Each pump station would generally include a pump station structure and appurtenances shielded by a 6-foot-high block wall with a 20-foot buffer area surrounded by cyclone fencing. The pump stations at the Northern AWT and future AWT South plants would be similar to other equipment at those plants and would not interfere or be incompatible with existing or future land uses. The Las Pulgas pump station would be in an unpaved parking area across the street from the Las Pulgas gate complex, which is developed with buildings and pavement. No significant impacts to land uses would occur.

Air Vacuum Release Valves

AVR valves would be located every 0.3 mile along the pipeline route. The AVR valves would be approximately 2 feet square and 3 feet in height. Where pipeline routes follow roadways, the AVRs would be installed within the roadway shoulder and would require a 25-foot by 25-foot excavation and work area. Next to roads, the valves would be protected by a yellow bollard about 3 feet high. The AVR valves would not interfere or be incompatible with existing or future land uses. No significant impacts to land uses would occur.

Mitigation

No mitigation measures are proposed.

4.1.6 Visual Resources

4.1.6.1 Both MILCONs (Alternative 1)

Methodology

This visual evaluation is based on field visits to most structure locations and pipeline routes, on examination of recent aerial photographs of all structure locations and pipeline routes, and on review of topographic maps. Primary visual importance is assigned to direct public views of the proposed facilities from Base locations and the cities of San Clemente and Oceanside, from offshore within the coastal zone and more distant coastal areas, and from the public transportation corridor near the coast that traverses the Base and includes I-5 and the adjacent railroad. I-5 is not officially designated by the state of California as a scenic highway but is eligible for such designation (Caltrans 2010). Changes in visual aspects during construction are recognized and considered, but since those changes would be temporary, the principal focus is on postconstruction appearance of the proposed facilities.

Impacts

The proposed MILCONs would affect a widespread area of the Base, but permanent visual effects would be limited to aboveground structures. Pipeline construction would present an appearance typical of a construction zone, with heavy vehicles and equipment, spoils and material storage, and worker activity. The effect would be temporary overall and of even shorter duration in any one area. The visual effect would be adverse but not significant. Visual effects of other facilities would be specific to each of the alternatives and are considered in the following sections.

Mitigation

No mitigation measures are proposed.

4.1.6.2 P-1044 Alternative 1

Impacts

Construction of pipelines would be as described in Section 4.1.6.1. Most construction would not be visible from off-Base, except for the segment from the west side of the SONGS East Mesa facility to the proposed injection well field in the San Onofre percolation ponds area, which could be seen by northbound travelers on I-5 and the segment to the proposed injection wells along the inland access road within the MCBCP San Onofre Beach recreation area west of I-5, which could likely be seen by southbound travelers on I-5. TLS construction for the brine line to pass under I-5 would require boring pits on both sides of the freeway that would be visible to freeway travelers. The pits would be the scene of construction activity, heavy equipment, materials storage, and ground disturbance.

The proposed Northern AWT facility would be on a fairly level site above an escarpment about 30 feet high on the south side of San Onofre Creek. The SONGS East Mesa facility is interposed between the site and the freeway and railroad corridor to the south and west, and so would not be visible from the transportation corridor. It would be visible on-Base to travelers on Basilone Road and residents of the San Onofre 2 Housing Area and the San Onofre 3 Housing Area, but would be against the background of the SONGS East Mesa facility, an industrial development similar in appearance to a water treatment facility.

Some pipeline construction in the vicinity of the Northern AWT facility and SONGS East Mesa facility could be visible to northbound freeway and railroad viewers. The pipeline southwest of the freeway to the outfall connection would be within the main SONGS facility; construction in that area would not be remarkable. If the connection to the SONGS facility is made west of the SONGS seawall either onshore or offshore, construction could be visible to beachgoers or to boaters offshore. In any case, construction would be temporary.

The segment of aboveground pipeline from Chaisson Road to the Sierra 1 Training Area percolation ponds would be approximately 750 feet in length. The pipeline would be constructed on standards in an area approximately 60 feet in width down a slope, changing in elevation from 180 feet at Chaisson Road to approximately 40 feet at the edge of the percolation ponds. Although within 100 feet or so of the homes behind Chaisson Road, the aboveground pipeline would not be readily visible since it would be sloping away from the homes. The aboveground pipeline would be visible to vehicles traveling on I-5 south and to homes in southern San Clemente. These views would be approximately 3,550 feet and 5,200 feet away, respectively. Due to the small scale of the pipeline and the distance to sensitive viewers, this is not considered a significant visual impact.

The proposed action would not impact the scenic and visual qualities of coastal areas in the immediate or surrounding area. None of the proposed facilities would be visible to offshore viewers. Implementation of the proposed alternative would not impact coastal visual resources.

The injection well field areas are proposed along El Camino Real in the San Onofre percolation ponds area east of I-5 and along the inland access roadway in the MCBCP San Onofre Beach recreation area west of I-5. The proposed wells and associated piping would be underground and some minor support facilities would be on the surface, but these facilities would be small in size and close to ground level, and would not be visually significant.

Implementation of P-1044 Alternative 1 would not substantially change the existing landform or introduce structures that are of larger size, scale, and bulk than nearby developed areas. The facilities would not block or obstruct existing views of scenic areas for sensitive viewers. No significant visual impacts would result.

Mitigation

No mitigation measures are proposed.

4.1.6.3 P-1045 Alternative 1

Impacts

Construction of the P-1045 pipeline would be as described in Section 4.1.6.1 and would not result in significant visual impacts during construction or upon completion of construction. The pump stations at the Northern AWT and the future AWT South would be within the AWT complexes and would not add significantly to the visual aspects of those facilities.

The pump station near Las Pulgas gate would be a new structure on a site that is disturbed and used for parking but has no structures on it. It is across the street from the Las Pulgas gate complex of buildings and hardscapes and would not be visually intrusive in that setting. The Las Pulgas gate complex is not particularly prominent in views from I-5 or the railroad and the pump station would not constitute an element significantly different in size, bulk, scale, or location. No significant visual impacts would result from this alternative.

The proposed 4-million-gallon reservoir would be constructed in the Wire Mountain area adjacent to existing water reservoirs. The new reservoir would be larger than the existing reservoirs. The reservoir would be adjacent to the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area to the west and south. At least some of the units in these housing areas would have direct views of the reservoir. This would be an adverse but not significant visual impact. The reservoir site is approximately 0.7 mile south of Vandegrift Boulevard and approximately 1 mile northwest of housing areas within the City of Oceanside. Vandegrift Boulevard is located at an elevation of approximately 25 feet and the Oceanside housing areas are at an elevation of approximately 160 feet. Travelers on Vandegrift Boulevard and viewers from the Oceanside housing areas do not have direct lines-of-sight to the reservoir area due to intervening terrain. The new reservoir would not constitute an element significantly different in size, bulk, scale, or location than currently exists in the area. No significant visual impacts would result from this alternative.

Mitigation

No mitigation measures are proposed.

4.1.7 Socioeconomics and Environmental Justice

4.1.7.1 Both MILCONs (Alternative 1)

Methodology

For the purposes of this socioeconomic assessment, employment and economic outputs that would be generated during construction and operation were compared with the socioeconomic resources of the three-county and six-county study areas described in Section 3.7. To quantify proposed action-related outputs, the IMPLAN economic modeling tool was utilized.

IMPLAN uses region-specific input/output accounts by industry to estimate primary and secondary impacts of economic stimuli. Both primary and secondary impacts can occur in the form of employment, income, output, and taxes. Secondary impacts also include (1) indirect impacts that occur due to the purchase of goods and services by firms involved with proposed action construction and operation, and (2) induced impacts, which result from associated household spending.

The multipliers for the impact analyses were derived by editing the specific industry data for the study area in the IMPLAN input/output relationships to represent the direct economic impacts associated with the proposed action (e.g., estimated annual construction cost and annual operation cost). IMPLAN sector 36, "Construction of other new non-residential structures," is the IMPLAN sector recommended by the software to correspond most closely to the proposed action alternatives. The secondary impact analysis relies specifically on the use of Social Accounting Matrices (SAM) multipliers in the induced impact quantification, as SAM multipliers account for social security and income tax leakage, institutional savings, and commuting. All figures are in 2008 dollars.

Impacts

Construction

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

For all work included in Alternative 1, the design and construction work on the project features would be by civilian contracting firms that would largely draw their employees from a labor pool within San Diego, Orange, and Riverside counties, and also from Los Angeles, San Bernardino, and Imperial counties. Given the nature of the construction and that the project sites are on a military base, no increase in population would occur from workers relocating to MCBCP, and no increase in demand for on-Base housing would occur. Most of the construction work would be performed by workers residing within commuting distance of MCBCP, such that off-Base demand for temporary construction worker housing would be minimal. Some incidental construction-related employment opportunities may arise for military dependents, but the socioeconomic impact of these opportunities would be negligible.

Total funding for both MILCONs included in the proposed action is estimated to be $246 million, with funding running from FY 2012 through FY 2013. As shown in Table 4.1.7-1, total funding varies considerably from year to year. Fiscal year of funding, however, differs from calendar year of project expenditures. Expenditures by calendar year, based on estimated start dates and estimated duration of construction by project, are shown in Table 4.1.7-2. For the purposes of economic modeling, it was assumed that (1) all funding would be spent on construction, (2) construction schedules would be as illustrated in Table 4.1.7-2, and (3) monthly construction expenditures would remain even across all months of the construction period. As both the level of funding and the timing of construction are subject to revision, the purpose of the modeling is to facilitate an order-of-magnitude economic output and employment impact assessment rather than an exact projection of economic output and employment levels.

Summaries of the modeling of the economic activity related to construction for the three-county and six-county regions are presented in Tables 4.1.7-3 and 4.1.7-4, respectively. These results combine direct, indirect, and induced economic output and employment results to give an overall economic output and employment figure by region for each construction year. Existing regional economic output and employment baseline information by sector is also provided to allow a comparison of impacts to existing conditions. Details of direct, indirect, and induced economic output and employment by sector by year for the three-county and six-county regions are provided in Appendix F, Socioeconomic Employment and Economic Output Impact Tables.

As shown, economic output for the three-county region would peak at about $143 million per year over the course of construction, and employment would peak at about 869 jobs per year. The majority of the total proposed action-related economic output in each year would consist of direct output from the construction sector, and the majority of total employment would consist of direct employment in the construction industry. For the six-county region, economic output would peak at about $240 million (an increase of about $97 million over the three-county region) during both construction expenditure years (2013 and 2014) and employment would peak at approximately 1,362 jobs (an increase of about 493 jobs over the three-county region) for 2013 and 2014. Some highly localized economic activity would likely occur with small-scale purchases of goods and services by construction companies and their workers, resulting in a minor beneficial impact to the on-Base economy.

LOCALIZED SOCIOECONOMIC IMPACTS

Localized, temporary socioeconomic impacts could potentially accrue due to the proximity of sensitive receptors (such as family housing areas, school areas, child-oriented facilities, hospitals, and BEQs, among others) to the construction corridors for linear project components or the project limits of other project facilities. These localized socioeconomic impacts could result from construction noise, a temporary degradation of air quality, or a decrease in traffic level of service and/or accessibility. A description of sensitive receptors closest to each of the project corridors and facilities project limits is presented in the following discussions of project alternatives.

Facility Operation

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

At present, employment related to operations of on-Base utilities infrastructure facilities involves a limited number of both federal civilian employees and private sector contractor personnel, but specific employment figures are not available (U.S. Navy 2010d). While some new long-term employment could be created through the additional labor demand brought about by operation of the new portions of the water distribution system, the number of new employees would likely be minimal. It is expected that initial employment at the new facilities would be dominated by contractor personnel, but that over time these positions would come to be occupied predominantly by regular (federal civilian) employees.

LOCALIZED SOCIOECONOMIC IMPACTS

No localized socioeconomic impacts would be anticipated from the postconstruction operation of any of the proposed action MILCONs in Alternative 1. Project linear features would be underground and would have no adverse effects on sensitive receptors. Aboveground facilities would not be near enough to sensitive receptors to cause adverse effects. Whether aboveground or underground, completed MILCON project alternatives in Alternative 1 would not have any socioeconomic impact.

Environmental Justice

When the proposed action projects included in Alternative 1 are considered as a group, project linear corridor and facilities project limits would be located within seven different populated census blocks on MCBCP (Blocks 9005, 9008, 9015, 9019, 9025, 9032, and 9040). These blocks have a combined population of 31,260 persons, which is 86.5 percent of the total population of MCBCP. For this group of blocks combined, total minority population is 43.1 percent, the same as the total minority population of MCBCP as a whole, and less than the minority percentage of San Diego, Orange, and Riverside counties. As a result, the area affected by Alternative 1 would not have a minority population of concern with respect to environmental justice. In terms of low-income status (as defined by percentage of persons living below poverty), statistics are not available for the Alternative 1 blocks specifically. For MCBCP as a whole, however, approximately 8.4 percent of the population was below poverty level as of the 2000 census, a lower figure than was the case in San Diego, Orange, and Riverside counties, which ranged between 10.3 and 14.2 percent. As a result, the project area is not considered to have a low-income population of concern with respect to environmental justice issues. Further, no significant socioeconomic or other directly relevant environmental impacts are anticipated for Alternative 1, and there is no indication that any disproportionately high and adverse impacts would occur that would accrue to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.1.7.2 P-1044 Alternative 1

Impacts

Total cost for P-1044 Alternative 1 is estimated to be $101 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $64.0 million per year, and employment output would be approximately 405 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $107.2 million per year, and employment output would be approximately 609 jobs per year. The number of new employees for project operations would likely be minimal.

Localized, temporary socioeconomic impacts could occur due to the proximity of potentially sensitive receptors (such as housing area residences, schools, other child-oriented facilities, or BEQs) near temporary linear construction corridors or permanent facility construction and operation sites. These localized socioeconomic impacts could result from noise, a temporary degradation of air quality, or a decrease in traffic level of service and/or accessibility during construction or adverse operating characteristics, if any, once the project is constructed.

Linear features of P-1044 Alternative 1 would be adjacent to three family housing areas. Along Basilone Road, the corridor passes within 15 to 20 yards of residences in the San Onofre 2 Housing Area and the San Onofre 3 Housing Area, and abuts multiple homes in the San Onofre 1 Housing Area as it runs along Chaisson Road.

The San Onofre Elementary School is in this same general area and is less than 0.25 mile (about 300 yards) from both the Basilone Road and Chaisson Road corridors. The San Onofre Youth Center is approximately 440 yards away from the Chaisson Road corridor, while the San Onofre Child Development Center is approximately 90 yards from the Basilone Road corridor.

BEQs are in immediate proximity to project corridors in four different cantonment areas. Along Basilone Road, BEQs abut the project corridor in the 52 Area (School of Infantry) and are less than 30 yards from the project corridor in the 53 Area (Horno). Along San Mateo Drive, BEQs in the 62 Area (San Mateo) are located less than 10 yards from the project corridor, while in the 63 Area (Cristianitos), BEQs are located approximately 40 yards from the proposed pump station/project corridor along Cristianitos Road.

Construction of P-1044 nonlinear features would not occur within immediate proximity to any of the family housing, school, or cantonment areas, with the exception of the pump station in the 63 Area (Cristianitos). The Northern AWT facility Site 6 project limits are approximately 1,000 yards from the closest potentially sensitive receptors in the San Onofre 2 Housing Area. The SONGS outfall conduit construction would not be close to any sensitive receptors either.[31]

For the construction of linear project features, impacts would be minimized by the short duration of construction activity in any one place, as it is assumed that construction would occur at an average rate of 200 LF of pipe placement per day, depending on

[31] An anchoring plan would be required for the construction of the brine line within the SONGS outfall conduit. This plan would address commercial fishing and recreation issues.

location. Potential noise impacts would be minimized through a number of construction practices, which include no construction during nighttime hours, described in Section 4.1.10. There would be impacts to traffic flow and disruption of access to facilities, as much of this work would occur adjacent to or within roadbeds, but these impacts would be minimized through a variety of measures detailed in the traffic analyses of this EIS. Impacts to air quality, including those associated with fugitive dust, would be minimized through a variety of BMPs as described in the air quality analysis of this EIS. No significant impacts are anticipated.

One of the two census blocks potentially directly affected by this alternative had minority population percentages higher than MCBCP or the counties in the surrounding region at the time of the 2000 census, but this census block has no population at present, following the discontinuation of the northern agricultural area lease. There is no indication that any disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.

<u>Mitigation</u>

No mitigation measures are proposed.

4.1.7.3 P-1045 Alternative 1

<u>Impacts</u>

Total cost for P-1045 Alternative 1 is estimated to be $125 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $79.2 million per year, and employment output would be approximately 464 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $132.6 million per year, and employment output would be approximately 753 jobs per year. The number of new employees for project operations would likely be minimal. No socioeconomic impacts would be anticipated from the postconstruction operation.

Localized, temporary socioeconomic impacts could occur due to the proximity of sensitive receptors (such as family housing and school areas or BEQs) near linear feature construction corridors. These localized socioeconomic impacts could result from construction noise, a temporary degradation of air quality, or a decrease in traffic level of service and/or accessibility.

Linear features of P-1045 Alternative 1 would be near (within 0.25 mile of) 11 family housing areas (Stuart Mesa, Del Mar, Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, Santa Margarita, Wire Mountain 1, Wire Mountain 2, and Wire Mountain 3 housing areas) and two school areas (Stuart Mesa and Santa Margarita elementary schools). Along Stuart Mesa Road, the corridor is adjacent to multiple homes in the Stuart Mesa Housing Area and the playground within the Stuart Mesa School Area. Along Wire Mountain Road, the corridor is adjacent to multiple homes in the Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, and Wire Mountain 3 housing areas, as well as the Abby Reinke Community Center. Where the corridor approaches the proposed new 4-million-gallon reservoir along multiple streets east of the intersection of Wire Mountain Road and Carnes Road, it runs adjacent to the Santa Margarita School and multiple homes in the Santa Margarita and Wire Mountain 2 housing areas.

Several BEQs are located near the corridors of P-1045 Alternative 1. The corridor along El Camino Real comes within approximately 70 yards of BEQs in the 41 Area (Las Pulgas) and the 31A Area (Edson Range), while the corridor along Stagecoach Road comes within a similar distance from BEQs in the 33 Area (Margarita).

Construction of P-1045 Alternative 1 nonlinear features would not occur near any housing areas, school areas, other child-oriented facilities, or BEQs, with the exception of potential reservoir improvements and new reservoir construction near the Santa Margarita Housing Area and the Wire Mountain 2 Housing Area.

For the construction of linear project features, impacts would be minimized by the short duration of construction activity in any one place, as it is assumed that construction would occur at an average rate of 200 LF of pipe placement per day, depending on location. Potential noise impacts would be minimized through a number of construction practices, which include no construction during nighttime hours, described in Section 4.1.10. There would be impacts to traffic flow and disruption of access to facilities, as much of this work would occur adjacent to or within roadbeds, but these impacts would be minimized through a variety of measures detailed in the traffic analyses of this EIS. Impacts to air quality, including those associated with fugitive dust, would be minimized through a variety of BMPs as described in the air quality analysis of this EIS. No significant impacts are anticipated.

Of the six census blocks potentially directly affected by this alternative, two had a minority population percentage greater than 50 percent (and higher than that of MCBCP and the counties in the surrounding region) at the time of the 2000 census, while another had a minority population percentage higher than MCBCP and San Diego county, but lower than either Orange or Riverside counties. There is no indication, however, that any disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

Table 4.1.7-1
Funding by Fiscal Year: P-1044 and P-1045
($ Millions) – Alternative 1

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$101	$0	$101
FY 2012	$0	$145	$145
All Years	**$101**	**$145**	**$246**

Note: All Years total may vary from sum of FY subtotals due to rounding.

Table 4.1.7-2
Construction Schedule and Expenditures
by Project, Month, and Year – Alternative 1

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.21	$50.5	$50.5	$101
P-1045	April 2013	18	$8.06	$72.5	$72.5	$145
Total				**$123.0**	**$123.0**	**$246**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table 4.1.7-3
Alternative 1 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside Counties Region

	Economic Output ($ millions)			Employment (number of FTEs)		
Industry Sector	**Existing 3-County Output**	**2013 Total Project Impact**	**2014 Total Project Impact**	**Existing 3-County Employment**	**2013 Total Project Impact**	**2014 Total Project Impact**
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.3	$0.3	32,988	2.0	2.0
Mining	$1,241.7	$0.2	$0.2	3,318	0.8	0.8
Utilities	$15,558.8	$0.9	$0.9	12,432	0.6	0.6
Construction	$51,446.2	$90.8	$90.8	337,572	542.5	542.5
Manufacturing	$135,386.5	$7.5	$7.5	341,197	19.6	19.6
Wholesale Trade	$39,026.3	$3.4	$3.4	181,370	14.8	14.8
Retail Trade	$39,116.0	$4.4	$4.4	488,360	51.6	51.6
Transportation and Warehousing	$10,754.6	$0.8	$0.8	86,583	6.3	6.3
Information	$44,927.0	$2.6	$2.6	89,139	4.7	4.7
Finance and Insurance	$51,476.1	$4.3	$4.3	226,444	17.1	17.1
Real Estate and Rental	$102,950.6	$8.1	$8.1	366,409	19.9	19.9
Professional, Scientific, and Technical Services	$57,707.5	$8.8	$8.8	391,226	59.6	59.6
Management	$9,482.5	$0.5	$0.5	48,580	2.4	2.4
Administrative and Waste Services	$23,778.3	$1.8	$1.8	369,193	26.6	26.6
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.8	6.8
Health and Social Services	$34,208.9	$3.2	$3.2	342,697	30.5	30.5
Arts, Entertainment, and Recreation	$12,255.8	$0.8	$0.8	125,303	8.0	8.0
Accommodation and Food Services	$24,417.9	$1.5	$1.5	357,882	24.2	24.2
Other	$19,513.1	$2.4	$2.4	271,933	27.6	27.6
Government	$64,451.0	$0.7	$0.7	656,931	3.3	3.3
Total	**$745,750.4**	**$143.2**	**$143.2**	**4,806,509**	**868.8**	**868.8**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

Table 4.1.7-4
Alternative 1 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside-Los Angeles-San Bernardino-Imperial Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 6-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 6-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$7,850.5	$0.5	$0.5	59,069	2.5	2.5
Mining	$8,697.3	$1.5	$1.5	14,975	2.8	2.8
Utilities	$31,705.3	$1.8	$1.8	29,926	1.6	1.6
Construction	$92,642.0	$112.6	$112.6	610,158	639.7	639.7
Manufacturing	$358,362.8	$26.9	$26.9	858,357	55.6	55.6
Wholesale Trade	$94,509.4	$7.0	$7.0	493,501	34.6	34.6
Retail Trade	$91,980.4	$8.7	$8.7	1,132,121	100.9	100.9
Transportation and Warehousing	$43,502.0	$3.9	$3.9	325,556	27.4	27.4
Information	$154,948.9	$7.4	$7.4	368,602	13.4	13.4
Finance and Insurance	$115,155.1	$10.1	$10.1	485,909	39.8	39.8
Real Estate and Rental	$225,259.1	$16.8	$16.8	729,263	40.8	40.8
Professional, Scientific, and Technical Services	$140,355.6	$17.0	$17.0	936,634	110.8	110.8
Management	$23,983.7	$1.4	$1.4	110,862	6.5	6.5
Administrative and Waste Services	$51,537.5	$4.0	$4.0	799,005	60.4	60.4
Educational Services	$13,904.6	$1.0	$1.0	220,354	16.3	16.3
Health and Social Services	$89,328.8	$7.4	$7.4	916,303	71.8	71.8
Arts, Entertainment, and Recreation	$36,319.5	$1.6	$1.6	319,858	15.9	15.9
Accommodation and Food Services	$52,206.9	$3.5	$3.5	771,455	54.8	54.8
Other	$48,290.5	$5.0	$5.0	715,259	57.4	57.4
Government	$139,840.0	$1.7	$1.7	1,450,595	8.5	8.5
Total	**$1,820,379.9**	**$239.8**	**$239.8**	**11,347,763**	**1,361.5**	**1,361.5**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

4.1.8 Traffic

Traffic generated by the proposed action would come primarily from construction activities. Most of the operational traffic generated daily or weekly would be associated with workers and delivery to the Northern AWT. Pump stations would generate occasional, but probably not daily, traffic. The stations do not require manual operation to run, and would be monitored and maintained as necessary. The rest of the facilities being proposed would only generate traffic for occasional maintenance and not have any regular traffic attraction. Thus, operational traffic associated with the proposed action would be minimal and not expected to occur during peak periods, having a negligible effect on traffic patterns on- or off-Base. Therefore, only construction traffic is analyzed in Chapter 4, and operational traffic would be considered to have no traffic impacts for any of the alternatives.

4.1.8.1 Methodology (Alternative 1)

Assumptions

Traffic impacts were evaluated based on the combined construction-related traffic of the projects included in the proposed action constructed in any given year at MCBCP. Therefore, analysis of traffic impacts was performed on a yearly basis. The years of construction for each project were assumed to start on the calendar year following the end of the fiscal year that the project is scheduled to receive funding (except for P-1044, an FY 2012 project scheduled to begin in January 2013) and last for the estimated construction duration.

The proposed action analysis is compared to the No Action Alternative to determine traffic impacts, as described below:

- *Proposed Action Construction Traffic:* Under this analysis, the temporary traffic impacts related to the construction of the proposed projects have been evaluated. Projects would be constructed in 2013 and 2014.
- *No Action Alternative:* Under the No Action Alternative, no construction would occur and MCBCP would remain the same as existing conditions. However, traffic from other currently planned or reasonably foreseeable projects has been added as background traffic to project baseline conditions in 2013 and 2014. These analyses were included in Chapter 3.8.

To determine the project's impacts, San Diego Traffic Engineers' Council (SANTEC)/ Institute of Transportation Engineers (ITE) guidelines have been used at all locations. SANTEC/ITE has developed acceptable threshold standards to determine the significance of project impacts to intersections and arterial segments. At intersections, the measurement of effectiveness (MOE) is based on allowable increases in delay. Along roadway segments, the MOE is based on a decrease of v/c ratio during the peak-hour.

At intersections that are expected to operate at LOS E or F with the project, the allowable increase in delay is 2 seconds. If vehicle trips from a project cause the delay at an intersection to increase by more than the allowable threshold, this would be considered a significant project traffic impact that requires mitigation. For roadway segments that are forecasted to operate at LOS D, E or F, an increase of the v/c ratio greater than 0.02 would be considered a significant project traffic impact that requires mitigation per SANTEC/ITE. For on-Base roadway segments, if a location is projected to operate at LOS D then it is deemed acceptable with no impacts. This is a slight variance from the SANTEC/ITE significance criteria that is applied to on-Base facilities only.

Table 4.1.8-1 shows the criteria for determining levels of significance at intersections and roadway segments for SANTEC/ITE.

Table 4.1.8-1
Significance Criteria

Facility	Measurement of Effectiveness (MOE)	Significance Threshold [1]
Intersection	Seconds of delay	>2.0 seconds at LOS E or F
Roadway Segments	Volume to capacity ratio	>0.02 increase at LOS D, E or F

[1] Significance threshold applies only when the type of facility operates at LOS E or F for intersection or LOS D, E, or F for roadway segments. For on-Base roadway segments, LOS D is deemed acceptable.

Trip Generation

This study analyzes the addition of construction traffic associated with the proposed projects to the study area. Construction generates a varying amount of traffic each day, depending on the work to be done. For example, installing the water lines for P-1044 would produce different construction traffic than construction of the pump stations or Northern AWT for P-1044. Estimates were made to determine the number of working days that would be required to complete each of the projects, and the corresponding average number of workers and trucks required each day to complete the project in the anticipated timeline. To determine the amount of construction traffic associated with each project, the following assumptions were made:

- Number of truck trips: An average of two trips per truck (one inbound, one outbound)
- Number of worker trips: An average of three trips per worker
- Daily trips: The sum of truck and worker trips, assuming a passenger equivalent factor of 2.5 for converting truck trips to vehicle trips
- Peak-hour trips: 25 percent of daily trips in peak-hour
- All AM peak-hour trips are inbound
- All PM peak-hour trips are outbound
- All construction traffic in each respective year assumed to occur at the same time

Estimates indicate that 60 workers and 25 trucks would be required on an average day for P-1044. This results in 305 daily trips with 77 in each peak hour, as shown below:

- (60 workers) x (3 daily trips per worker) = 180 daily trips from workers
- (25 trucks) x (2.5 passenger car equivalents per truck) x (2 trips per truck) = 125 daily trips from trucks
- (180 worker daily trips) + (125 truck daily trips) = 305 daily trips
- (305 daily trips) x (25% per peak hour) = 77 peak-hour trips

As with P-1044, estimates indicate that 60 workers and 25 trucks would be required on an average day for P-1045. This results in 305 daily trips, with 77 in each peak hour (see above for calculations).

Table 4.1.8-2 summarizes the trips generated by the proposed projects in each respective year. As shown in the table, construction traffic would be the same for each of the 2 years. In both 2013 and 2014, 610 daily trips and 154 peak-hour trips would be generated.

Table 4.1.8-2
Alternative 1 Projects by Year

Year	Project Number	Trucks/Day	Workers/Day	Daily Trips	Peak-Hour Trips
2013	P-1044	25	60	305	77
	P-1045	25	60	305	77
	Total	**50**	**120**	**610**	**154**
2014	P-1044	25	60	305	77
	P-1045	25	60	305	77
	Total	**50**	**120**	**610**	**154**

\# Trucks: Average of 2 trips per truck (one inbound, one outbound)
\# Workers: Average of 3 trips per truck (one inbound, one outbound)
Daily Trips = (# Trucks x passenger car equivalent factor of 2.5 x # trips per truck) + (# Workers x # trips per worker)
Peak-Hour Trips = Daily Trips x 0.25 (assume 25% in each of AM and PM peak-hours)
All AM peak-hour trips are inbound; all PM peak-hour trips are outbound.

Trip Distribution and Assignment

Trips from each project were distributed to the roadway network based on assumed travel patterns consistent with other studies performed at MCBCP. Vehicles were routed to the nearest gate dependent on the location of the project area. At southern MCBCP gates, the majority of trips were assumed to originate/end at points south. At northern MCBCP gates, the trips were split between origins/end-points to the north and to the south. Assumptions were made to estimate where the construction traffic would originate/end the majority of the time for P-1044 and P-1045, which would have continuously moving construction areas.

The trip distribution assumed for each project was multiplied by the trip generation for each respective project to determine the trip assignment. Since both P-1044 and P-1045 would be under construction during 2013 and 2014, the trip assignment would be the same for both years.

- The total trip assignment for the projects is shown in Figure 4.1.8-1 (study intersections), Figure 4.1.8-2 (off-Base roadway segments), and Figure 4.1.8-3 (on-Base roadway segments).

The analysis provided in this section assumes that construction in each year would occur concurrently. If construction were to be spaced out throughout the year, then the intersections and roadway segments would improve in operations and the results would be more similar to the no action condition in each year.

Roadway Network

The proposed action conditions roadway network and intersection geometrics are assumed to be the same as baseline conditions.

Traffic Volumes

To obtain traffic volumes with the proposed action, the trips associated with the scheduled construction of the proposed action projects each year were added to no action volumes of that year. P-1044 and P-1045 are both scheduled to be under construction during 2013 and 2014.

Figure 4.1.8-4 shows the forecast 2013 proposed action peak-hour turning movement volumes at the study intersections. Figures 4.1.8-5 and 4.1.8-6 show the forecast 2013 proposed action average daily roadway segment volumes at the off-Base and on-Base study area roadway segments, respectively.

Figure 4.1.8-7 shows the forecast 2014 proposed action peak-hour turning movement volumes at the study intersections. Figures 4.1.8-8 and 4.1.8-9 show the forecast 2014 proposed action average daily roadway segment volumes at the off-Base and on-Base study area roadway segments, respectively.

4.1.8.2 Impacts (Alternative 1)

<u>2013 Analysis</u>

Intersection Analysis

An analysis of 2013 proposed action conditions at each of the study intersections indicates that all but nine of the study intersections would operate at an acceptable LOS while the proposed action projects are being constructed. These nine intersections are:

- **Old Pacific Highway and I-5 Southbound Ramps**
- **Basilone Road and I-5 Northbound Ramps**
- **Las Pulgas Road and I-5 Southbound Ramps**
- **Las Pulgas Road and I-5 Northbound Ramps**
- **Las Pulgas Road and Stuart Mesa Road**
- Harbor Drive and Santa Fe Avenue/Harbor Drive
- Harbor Drive and I-5 Southbound Ramps
- Wire Mountain Road and Vandegrift Boulevard
- Stuart Mesa Road and Vandegrift Boulevard

Five of the nine intersections would be impacted by the proposed action and are shown in **bold** in the list above. These temporary construction impacts would not be expected to occur every day because of varying construction activity schedules. The remaining four intersections would remain the same as 2013 Baseline conditions. The results of the intersection analysis are contained in Table 4.1.8-3.

Roadway Segment Analysis

Table 4.1.8-4 displays the roadway segment analysis for off-Base roadway segments with 2013 proposed action conditions. As shown in the table, all but four off-Base roadway segments would function at an acceptable LOS C or better with the addition of construction traffic. Each of these segments would function similar to 2013 Baseline conditions and would not be considered an impact. Table 4.1.8-5 displays the roadway segment analysis for on-Base roadway segments under 2013 proposed action conditions. Based on the LOS thresholds assumed for these segments, all but four on-Base segments would function at an acceptable LOS D or better with the addition of construction traffic. Each of the four segments would operate similar to 2013 Baseline conditions. No traffic would be added to any of these four segments from the proposed action in 2013; therefore, these adverse LOS conditions would not be considered an impact from the proposed action.

2014 Analysis

Intersection Analysis

An analysis of 2014 proposed action conditions at each of the study intersections indicates that all but eight of the study intersections would operate at an acceptable LOS while the proposed action projects are being constructed. These eight intersections are:

- **Old Pacific Highway and I-5 Southbound Ramps**
- **Basilone Road and I-5 Northbound Ramps**
- **Las Pulgas Road and I-5 Southbound Ramps**
- **Las Pulgas Road and I-5 Northbound Ramps**
- **Las Pulgas Road and Stuart Mesa Road**
- Harbor Drive and Santa Fe Avenue/Harbor Drive
- Harbor Drive and I-5 Southbound Ramps
- Stuart Mesa Road and Vandegrift Boulevard

Five of the eight intersections would be impacted by the proposed action, and are shown in **bold** in the list above. These temporary construction impacts would not be expected to occur every day because of varying construction activity schedules. The other three intersections would remain the same as 2014 Baseline conditions. The results of the intersection analysis are contained in Table 4.1.8-6.

Roadway Segment Analysis

Table 4.1.8-7 displays the roadway segment analysis for off-Base roadway segments with 2014 proposed action conditions. As shown in the table, all but four off-Base roadway segments would function at an acceptable LOS C or better with the addition of construction traffic. Each of these segments would function similar to 2013 Baseline conditions and would not be considered an impact.

Table 4.1.8-8 displays the roadway segment analysis for on-Base roadway segments under 2014 proposed action conditions. Based on the LOS thresholds assumed for these segments, all but five on-Base segments would function at an acceptable LOS D or better with the addition of construction traffic. Each of the five segments would operate similar to 2014 Baseline conditions. No traffic would be added to any of these five segments from the proposed action in 2014; therefore, these adverse LOS conditions would not be considered an impact from the proposed action.

4.1.8.3 Mitigation (Alternative 1)

The proposed action would generate temporary construction traffic while each project is being constructed. The combination of construction traffic for multiple projects occurring simultaneously would create temporary impacts at several intersections and roadway segments, as previously identified. Because these identified impacts would be temporary and would shift to other locations based on the location of construction activity, physical improvements at the impacted locations are not necessary or recommended. Instead, a construction management plan would be developed and implemented to minimize the number and duration of impacts occurring simultaneously. The impacted locations would be targeted to use the management plan approach to avoid extra delays from construction. This plan may include the following features:

- Encouraging ridesharing by construction workers
- Consideration of staggered work hours to avoid all workers arriving at the same time, especially during peak hours
- Scheduling truck deliveries or equipment hauling during off-peak times
- Minimizing the number of projects occurring simultaneously in proximity to each other

Table 4.1.8-3
2013 Alternative 1 Proposed Action Conditions –
Peak-Hour Intersection LOS Summary

Intersection		Traffic Control	Peak Hour	2013 Action	
				Delay[1]	LOS[2]
1	Cristianitos Rd & I-5 SB Ramps	One-Way Stop	AM	13.0	B
			PM	14.4	B
2	Cristianitos Rd & I-5 NB Ramps	One-Way Stop	AM	12.8	B
			PM	13.8	B
3	Old Pacific Hwy & I-5 SB Ramps	One-Way Stop	AM	120.6	**F**
			PM	ECL	**F**
4	Basilone Rd & I-5 NB Ramps	One-Way Stop	AM	142.7	**F**
			PM	ECL	**F**
5	Las Pulgas Rd & I-5 SB Ramps	One-Way Stop	AM	13.4	B
			PM	ECL	**F**
6	Las Pulgas Rd & I-5 NB Ramps	One-Way Stop	AM	152.2	**F**
			PM	28.6	D
7	Las Pulgas Rd & Stuart Mesa Rd	One-Way Stop	AM	28.2	D
			PM	ECL	**F**
8	Harbor Dr & Santa Fe Ave	Two-Way Stop	AM	12.1	B
			PM	ECL	**F**
9	Harbor Dr & I-5 SB Ramps	Signalized	AM	23.9	C
			PM	ECL	**F**
10	San Rafael Dr & Vandegrift Blvd	Signalized	AM	9.4	A
			PM	31.0	C
11	Wire Mountain Rd & Vandegrift Blvd	Signalized	AM	27.1	C
			PM	84.9	**F**
12	San Jacinto Rd & Vandegrift Blvd	Signalized	AM	12.9	B
			PM	44.4	D
13	Stuart Mesa Rd & Vandegrift Blvd	Signalized	AM	56.2	**E**
			PM	172.2	**F**
14	College Blvd & N River Rd	Signalized	AM	18.8	B
			PM	26.1	C
15	Papagallo Dr & Vandegrift Blvd	Signalized	AM	5.8	A
			PM	2.9	A
16	Ammunition Rd & Mission Rd	Signalized	AM	27.5	C
			PM	32.0	C

[1] Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At a two-way stop-controlled intersection, delay refers to the worst movement.
[2] LOS calculations are based on the methodology outlined in the 2000 Highway Capacity Manual and performed using Synchro 6.0.
ECL = Exceeds Calculable Limit. Reported when delay exceeds 180 seconds.
Note: **Bold** values indicate intersections operating at LOS E or F.

Table 4.1.8-4
2013 Alternative 1 Proposed Action Conditions – Roadway Segment LOS Summary (Off-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Cristianitos Road					
State Beach Prkg to Cristianitos Gate	2-Lane Light Collector	16,200	7,942	0.490	**D**
I-5 NB Ramps to El Camino Real	2-Lane Light Collector	16,200	4,681	0.289	C
Basilone Road					
I-5 NB Ramps to San Onofre Gate	2-Lane Light Collector	16,200	9,794	0.605	**D**
Las Pulgas Road					
I-5 NB Ramps to Old Pacific Hwy	2-Lane Light Collector	16,200	6,918	0.427	C
Santa Fe Avenue/Harbor Drive					
Harbor Dr to Del Mar Gate	2-Lane Light Collector	16,200	4,397	0.271	C
Harbor Drive					
Santa Fe Ave to Camelo Dr	3-Lane Secondary	32,500	10,155	0.312	A
I-5 SB On-ramp to I-5 NB Off-ramp	3-Lane Secondary	32,500	26,200	0.806	**D**
Capistrano Drive					
West of San Rafael Dr	Collector	8,750	2,097	0.240	A
San Rafael Drive					
North of Sunset	Collector	8,750	2,772	0.317	A
Vandegrift Boulevard					
San Rafael Dr to Oceanside Gate	6-Lane Major Arterial	50,000	38,256	0.765	C
Granite Pl to Douglas Dr	4-Lane Major Arterial	40,000	19,941	0.499	A
Papagallo Dr to San Luis Rey Gate	5-Lane Major Arterial	45,000	18,102	0.402	A
Mission Road					
Ammunition Rd to Aviation Rd	4-Lane Collector	34,200	24,279	0.710	C
Ammunition Road					
Alturas Rd to Fallbrook Gate	2-Lane Town Collector	19,000	14,732	0.775	**E**

[1] The classifications of existing roadways are based on the City of Oceanside General Plan Circulation Element dated June 2002, County of San Diego General Plan Circulation Element dated 7 November 2006, and field observations.
[2] ADT volumes for the roadway segments are the sum of 2013 Baseline conditions and construction traffic associated with the permanent projects occurring during 2013.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS D, E, or F.

Table 4.1.8-5
2013 Alternative 1 Proposed Action Conditions –
Roadway Segment LOS Summary (On-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Vandegrift Boulevard					
Wire Mountain Rd to Lemon Grove Rd	4-Lane Minor Arterial Highway	37,000	32,523	0.879	D
Lemon Grove Rd to Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	33,512	0.906	**E**
North of Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	24,610	0.665	B
East of Stagecoach Rd	4-Lane Minor Arterial Highway	37,000	23,509	0.635	B
Basilone Rd to Rattlesnake Cyn Rd	4-Lane Minor Arterial Highway	37,000	31,639	0.855	D
19th St to 16th St	4-Lane Minor Arterial Highway	37,000	12,406	0.335	A
16th St to 15th St	4-Lane Minor Arterial Highway	37,000	23,907	0.646	B
4th St to Barnett Circle	4-Lane Minor Arterial Highway	37,000	18,800	0.508	B
Stuart Mesa Road					
Vandegrift Blvd to MACS Rd	2-Lane Major Collector Roadway	19,000	19,535	1.028	**F**
MACS Rd to Bloom St	2-Lane Major Collector Roadway	19,000	14,249	0.750	**E**
North of Edson Range	2-Lane Major Collector Roadway	19,000	6,058	0.319	C
North of Aliso Canyon Rd	2-Lane Major Collector Roadway	19,000	8,541	0.450	C
El Camino Real					
Stuart Mesa Rd to Las Pulgas Rd	2-Lane Major Collector Roadway	19,000	6,282	0.331	C
Basilone Road					
East of Sandpiper Ave	2-Lane Minor Arterial Highway	19,000	8,587	0.452	C
Las Pulgas Rd to Roblar Rd	2-Lane Minor Arterial Highway	19,000	10,011	0.527	D
Stagecoach Rd to Vandegrift Blvd	2-Lane Minor Arterial Highway	19,000	14,243	0.750	**E**
San Mateo Road					
South of Cristianitos Rd	2-Lane Major Collector Roadway	19,000	5,038	0.265	B
East of 8th St	2-Lane Major Collector Roadway	19,000	4,393	0.231	B
A Street					
Vandegrift Blvd to I-5 Bridge	2-Lane Major Collector Roadway	19,000	13,246	0.697	D
Wire Mountain Road					
East of Vandegrift Blvd	4-Lane Major Collector Roadway	34,200	12,323	0.360	A
Ash Road					
East of Vandegrift Blvd	2-Lane Minor Collector Roadway	16,200	6,872	0.424	C
MACS Road					
East of Stuart Mesa Rd	2-Lane Minor Collector Roadway	16,200	2,715	0.168	B
Stagecoach Road					
Margarita Camp Access to Basilone Rd	2-Lane Minor Collector Roadway	16,200	5,061	0.312	C
San Jacinto Road					
North of Wire Mountain Rd	2-Lane Local Roadway	16,200	2,992	0.185	B
16th Street					
A St to Vandegrift Blvd	4-Lane Minor Arterial Highway	37,000	19,377	0.524	B
19th Street					
Marine Dr to Ham Rd	2-Lane Minor Arterial Highway	19,000	9,240	0.486	C
Las Pulgas Road					
West of C St	2-Lane Minor Arterial Highway	19,000	6,533	0.344	C

[1] The classifications of existing roadways are based on *Camp Pendleton Traffic Engineering and Safety Study* (Gannett Fleming 2007).
[2] ADT volumes for the roadway segments are the sum of 2013 Baseline conditions and construction traffic associated with the permanent projects occurring during 2013.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS E or F.

Table 4.1.8-6
2014 Alternative 1 Proposed Action Conditions –
Peak-Hour Intersection LOS Summary

Intersection		Traffic Control	Peak Hour	2014 Action	
				Delay[1]	LOS[2]
1	Cristianitos Rd & I-5 SB Ramps	One-Way Stop	AM	13.0	B
			PM	14.4	B
2	Cristianitos Rd & I-5 NB Ramps	One-Way Stop	AM	12.8	B
			PM	13.8	B
3	Old Pacific Hwy & I-5 SB Ramps	One-Way Stop	AM	68.9	**F**
			PM	ECL	**F**
4	Basilone Rd & I-5 NB Ramps	One-Way Stop	AM	100.0	**F**
			PM	ECL	**F**
5	Las Pulgas Rd & I-5 SB Ramps	One-Way Stop	AM	12.2	B
			PM	ECL	**F**
6	Las Pulgas Rd & I-5 NB Ramps	One-Way Stop	AM	68.4	**F**
			PM	24.5	C
7	Las Pulgas Rd & Stuart Mesa Rd	One-Way Stop	AM	22.6	C
			PM	ECL	**F**
8	Harbor Dr & Santa Fe Ave	Two-Way Stop	AM	12.2	B
			PM	ECL	**F**
9	Harbor Dr & I-5 SB Ramps	Signalized	AM	23.8	C
			PM	ECL	**F**
10	San Rafael Dr & Vandegrift Blvd	Signalized	AM	8.6	A
			PM	16.1	B
11	Wire Mountain Rd & Vandegrift Blvd	Signalized	AM	24.7	C
			PM	49.1	D
12	San Jacinto Rd & Vandegrift Blvd	Signalized	AM	10.7	B
			PM	35.8	D
13	Stuart Mesa Rd & Vandegrift Blvd	Signalized	AM	44.9	D
			PM	150.6	**F**
14	College Blvd & N River Rd	Signalized	AM	18.6	B
			PM	25.8	C
15	Papagallo Dr & Vandegrift Blvd	Signalized	AM	5.7	A
			PM	3.0	A
16	Ammunition Rd & Mission Rd	Signalized	AM	27.9	C
			PM	31.8	C

[1] Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At a two-way stop-controlled intersection, delay refers to the worst movement.
[2] LOS calculations are based on the methodology outlined in the 2000 Highway Capacity Manual and performed using Synchro 6.0.
ECL = Exceeds Calculable Limit. Reported when delay exceeds 180 seconds.
Note: **Bold** values indicate intersections operating at LOS E or F.

Table 4.1.8-7
2014 Alternative 1 Proposed Action Conditions –
Roadway Segment LOS Summary (Off-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Cristianitos Road					
State Beach Prkg to Cristianitos Gate	2-Lane Light Collector	16,200	8,026	0.495	**D**
I-5 NB Ramps to El Camino Real	2-Lane Light Collector	16,200	4,765	0.294	C
Basilone Road					
I-5 NB Ramps to San Onofre Gate	2-Lane Light Collector	16,200	9,379	0.579	**D**
Las Pulgas Road					
I-5 NB Ramps to Old Pacific Hwy	2-Lane Light Collector	16,200	6,761	0.417	C
Santa Fe Avenue/Harbor Drive					
Harbor Dr to Del Mar Gate	2-Lane Light Collector	16,200	3,631	0.224	B
Harbor Drive					
Santa Fe Ave to Camelo Dr	3-Lane Secondary	32,500	9,455	0.291	A
I-5 SB On-ramp to I-5 NB Off-ramp	3-Lane Secondary	32,500	26,489	0.815	**D**
Capistrano Drive					
West of San Rafael Dr	Collector	8,750	2,058	0.235	A
San Rafael Drive					
North of Sunset	Collector	8,750	2,733	0.312	A
Vandegrift Boulevard					
San Rafael Dr to Oceanside Gate	6-Lane Major Arterial	50,000	39,215	0.784	C
Granite Pl to Douglas Dr	4-Lane Major Arterial	40,000	20,354	0.509	A
Papagallo Dr to San Luis Rey Gate	5-Lane Major Arterial	45,000	18,581	0.413	A
Mission Road					
Ammunition Rd to Aviation Rd	4-Lane Collector	34,200	24,581	0.719	C
Ammunition Road					
Alturas Rd to Fallbrook Gate	2-Lane Town Collector	19,000	15,335	0.807	**E**

[1] The classifications for existing roadways are the same as for Table 4.1.8-4, 2013 Alternative 1 Proposed Action Conditions.
[2] ADT volumes for the roadway segments are the sum of 2014 Baseline conditions and construction traffic associated with the permanent projects occurring during 2014.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS D, E, or F.

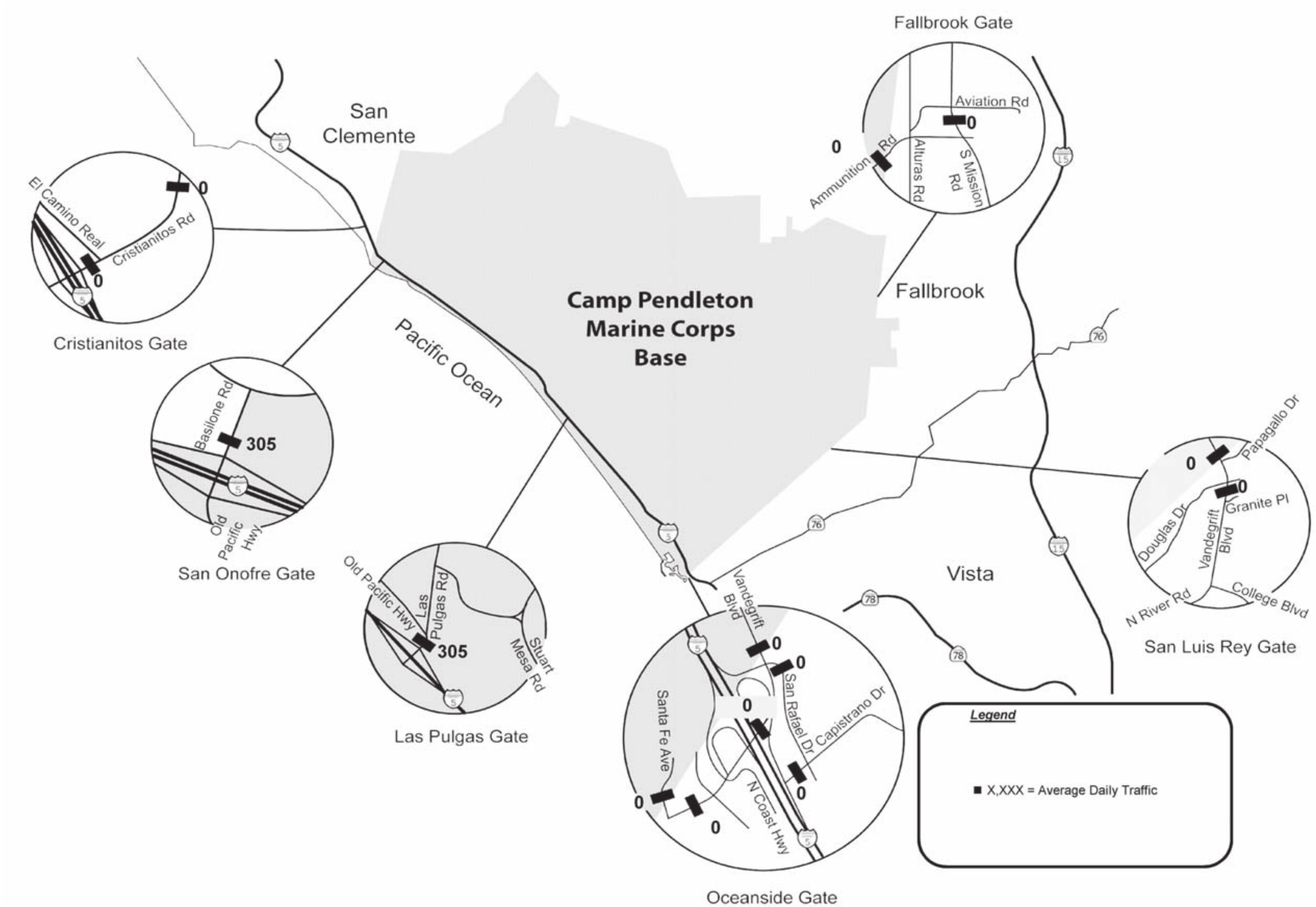
Table 4.1.8-8
2014 Alternative 1 Proposed Action Conditions – Roadway Segment LOS Summary (On-Base)

Roadway Segment	Roadway Classification[1]	LOS E Capacity	ADT[2]	V/C Ratio[3]	LOS
Vandegrift Boulevard					
Wire Mountain Rd to Lemon Grove Rd	4-Lane Minor Arterial Highway	37,000	34,555	0.934	**E**
Lemon Grove Rd to Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	35,767	0.967	**E**
North of Stuart Mesa Rd	4-Lane Minor Arterial Highway	37,000	27,531	0.744	C
East of Stagecoach Rd	4-Lane Minor Arterial Highway	37,000	26,008	0.703	C
Basilone Rd to Rattlesnake Cyn Rd	4-Lane Minor Arterial Highway	37,000	33,682	0.910	**E**
19th St to 16th St	4-Lane Minor Arterial Highway	37,000	13,000	0.351	A
16th St to 15th St	4-Lane Minor Arterial Highway	37,000	24,464	0.661	B
4th St to Barnett Circle	4-Lane Minor Arterial Highway	37,000	19,261	0.521	B
Stuart Mesa Road					
Vandegrift Blvd to MACS Rd	2-Lane Major Collector Roadway	19,000	19,295		
MACS Rd to Bloom St	2-Lane Major Collector Roadway	19,000	14,671	0.772	**E**
North of Edson Range	2-Lane Major Collector Roadway	19,000	6,480	0.341	C
North of Aliso Canyon Rd	2-Lane Major Collector Roadway	19,000	8,939	0.470	C
El Camino Real					
Stuart Mesa Rd to Las Pulgas Rd	2-Lane Major Collector Roadway	19,000	6,125	0.322	C
Basilone Road					
East of Sandpiper Ave	2-Lane Minor Arterial Highway	19,000	8,172	0.430	C
Las Pulgas Rd to Roblar Rd	2-Lane Minor Arterial Highway	19,000	10,274	0.541	D
Stagecoach Rd to Vandegrift Blvd	2-Lane Minor Arterial Highway	19,000	14,715	0.774	**E**
San Mateo Road					
South of Cristianitos Rd	2-Lane Major Collector Roadway	19,000	5,122	0.270	B
East of 8th St	2-Lane Major Collector Roadway	19,000	4,266	0.225	B
A Street					
Vandegrift Blvd to I-5 Bridge	2-Lane Major Collector Roadway	19,000	13,246	0.697	D
Wire Mountain Road					
East of Vandegrift Blvd	4-Lane Major Collector Roadway	34,200	11,267	0.329	A
Ash Road					
East of Vandegrift Blvd	2-Lane Minor Collector Roadway	16,200	6,602	0.408	C
MACS Road					
East of Stuart Mesa Rd	2-Lane Minor Collector Roadway	16,200	2,217	0.137	B
Stagecoach Road					
Margarita Camp Access to Basilone Rd	2-Lane Minor Collector Roadway	16,200	5,270	0.325	C
San Jacinto Road					
North of Wire Mountain Rd	2-Lane Local Roadway	16,200	2,992	0.185	B
16th Street					
A St to Vandegrift Blvd	4-Lane Minor Arterial Highway	37,000	20,674	0.559	B
19th Street					
Marine Dr to Ham Rd	2-Lane Minor Arterial Highway	19,000	9,898	0.521	D
Las Pulgas Road					
West of C St	2-Lane Minor Arterial Highway	19,000	6,955	0.366	C

[1] The classifications for existing roadways are the same as for Table 4.1.8-5, 2013 Alternative 1 Proposed Action Conditions.
[2] ADT volumes for the roadway segments are the sum of 2014 Baseline conditions and construction traffic associated with the permanent projects occurring during 2014.
[3] The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
Note: **Bold** values indicate roadway segments operating at LOS E or F.

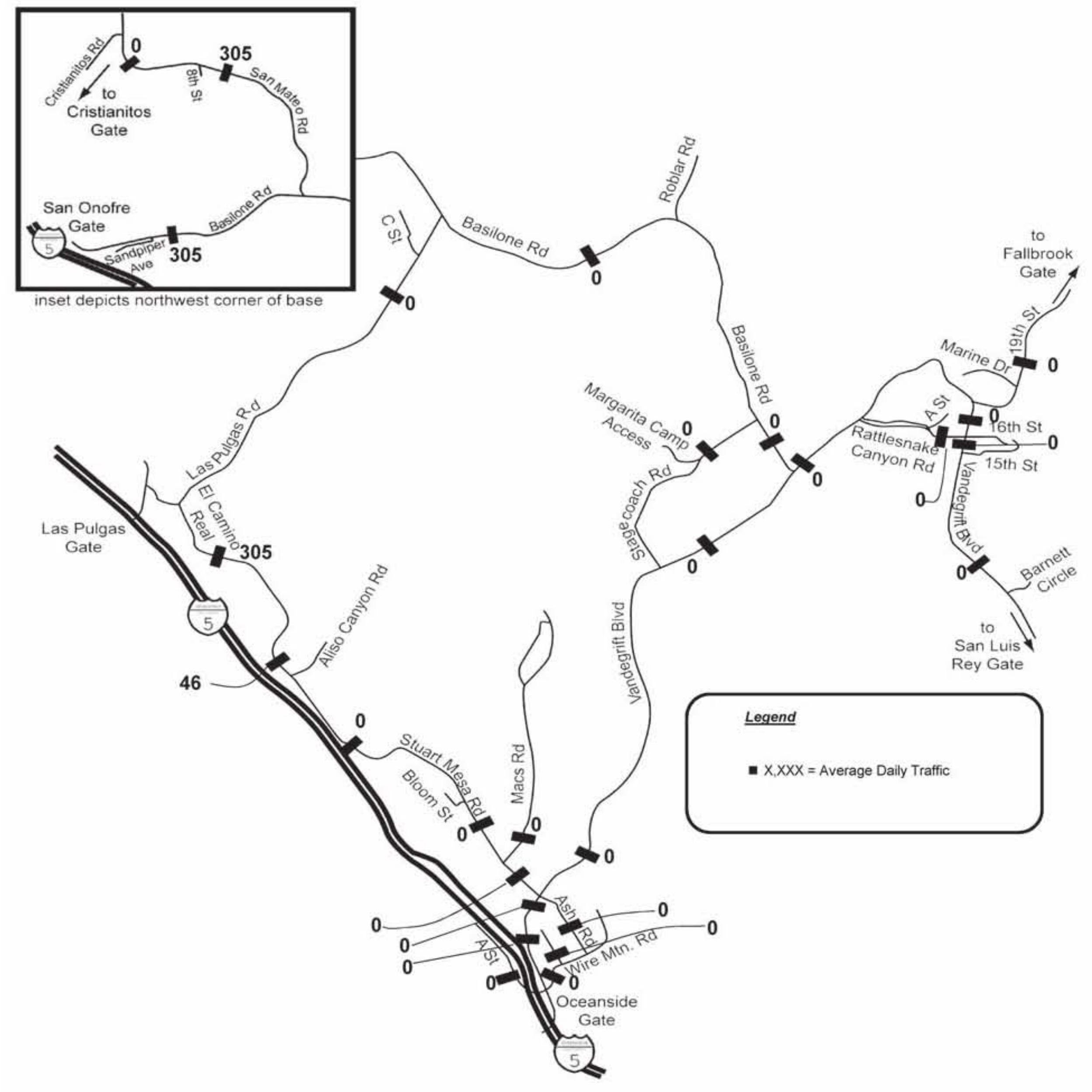
Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-1
Alternative 1 Project Trip Assignment – Study Intersections



Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-2
Alternative 1 Project Trip Assignment – Off-Base

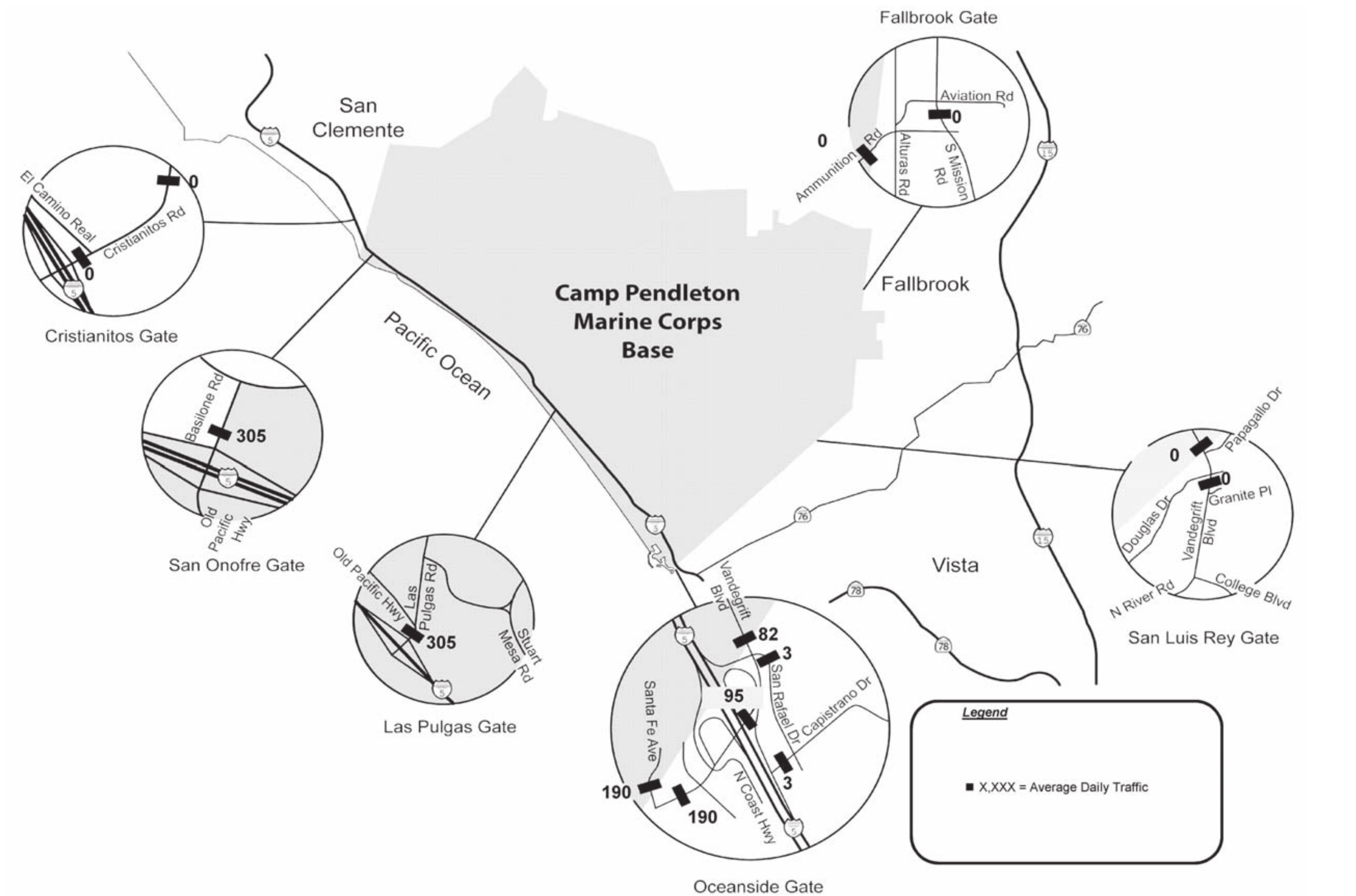


Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-3
Alternative 1 Project Trip Assignment – On-Base

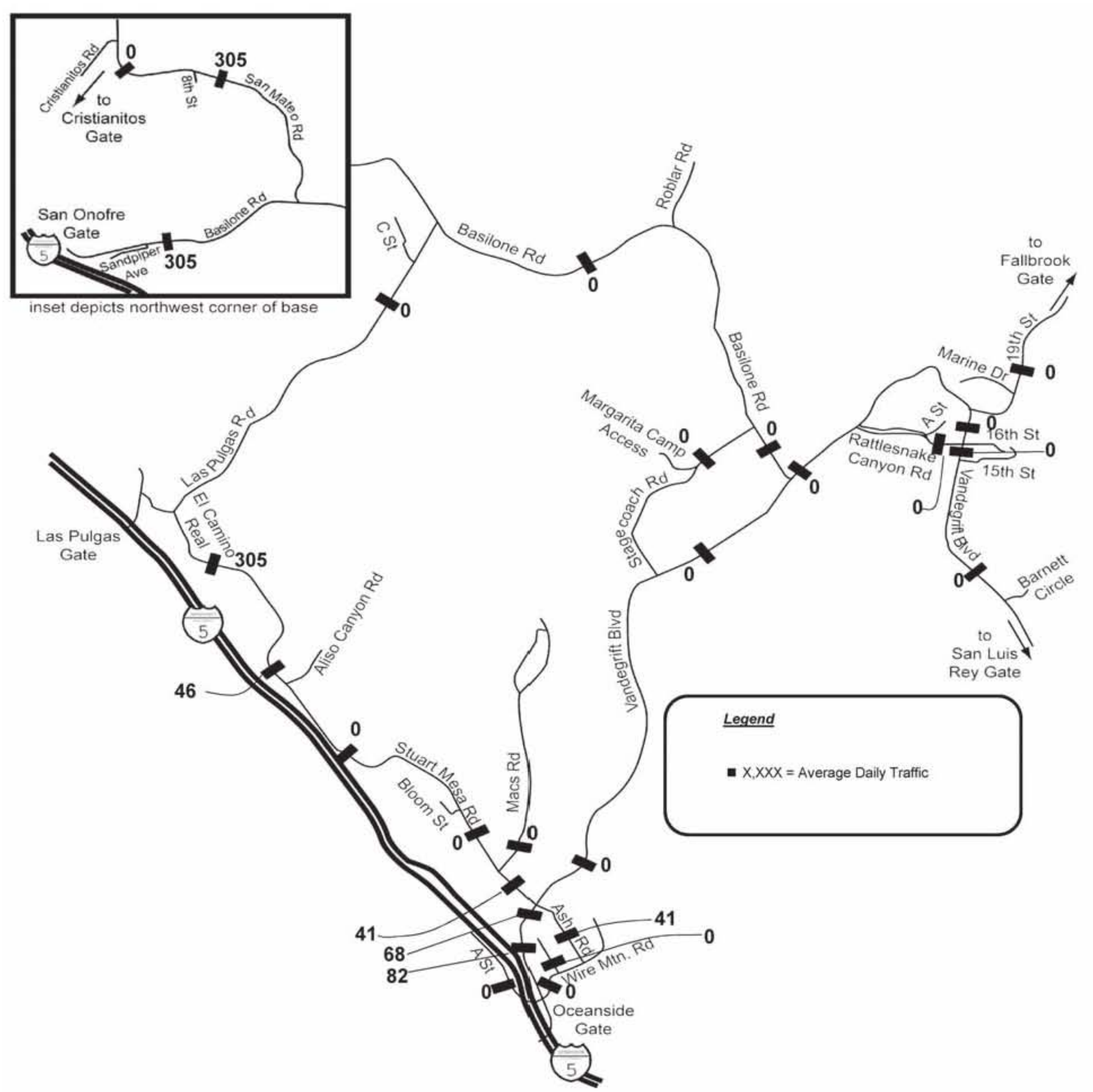
Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-4
2014 Alternative 1 Project Trip Assignment – Study Intersections



Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-5
2014 Alternative 1 Project Trip Assignment – Off-Base

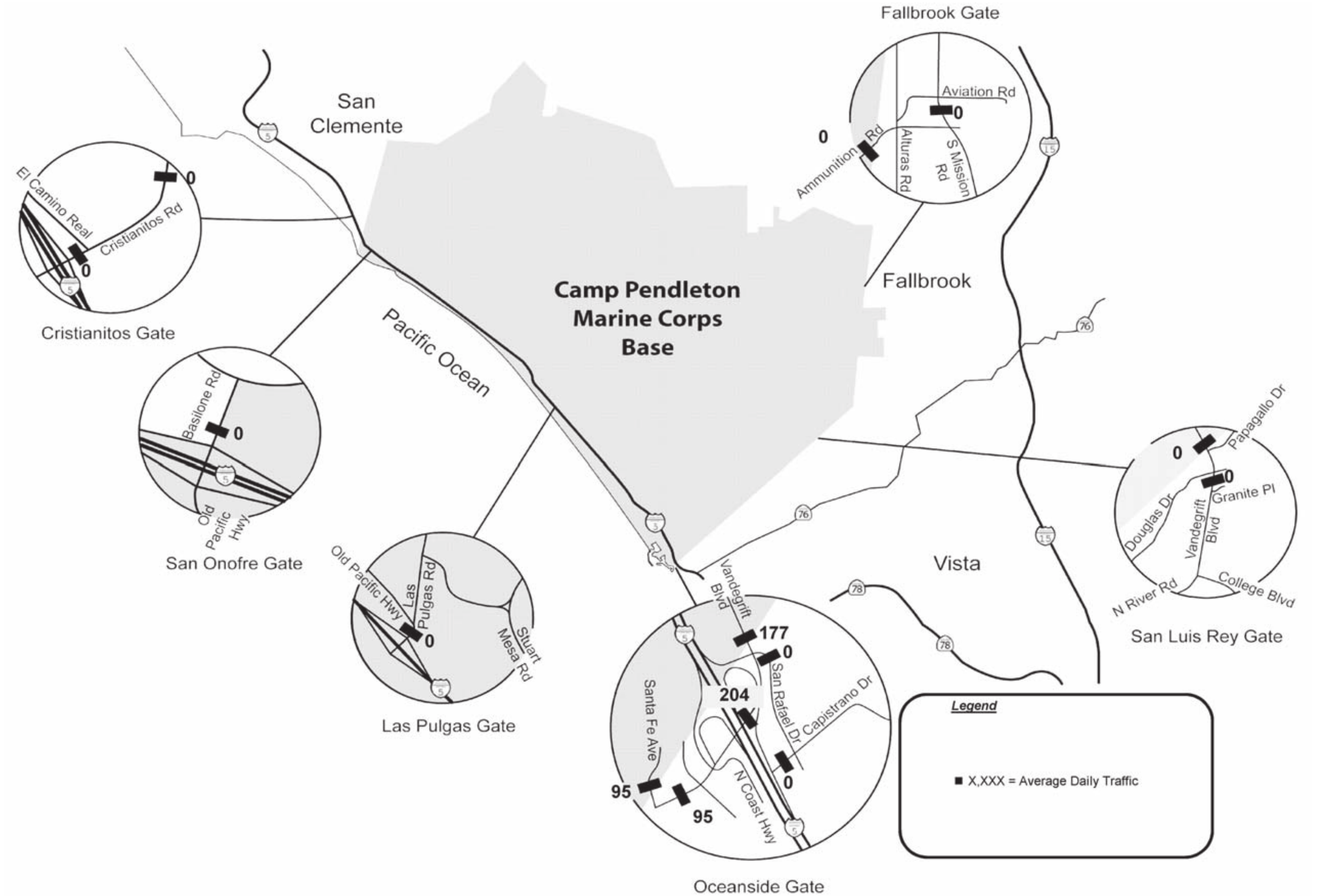


Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-6
2014 Alternative 1 Project Trip Assignment – On-Base

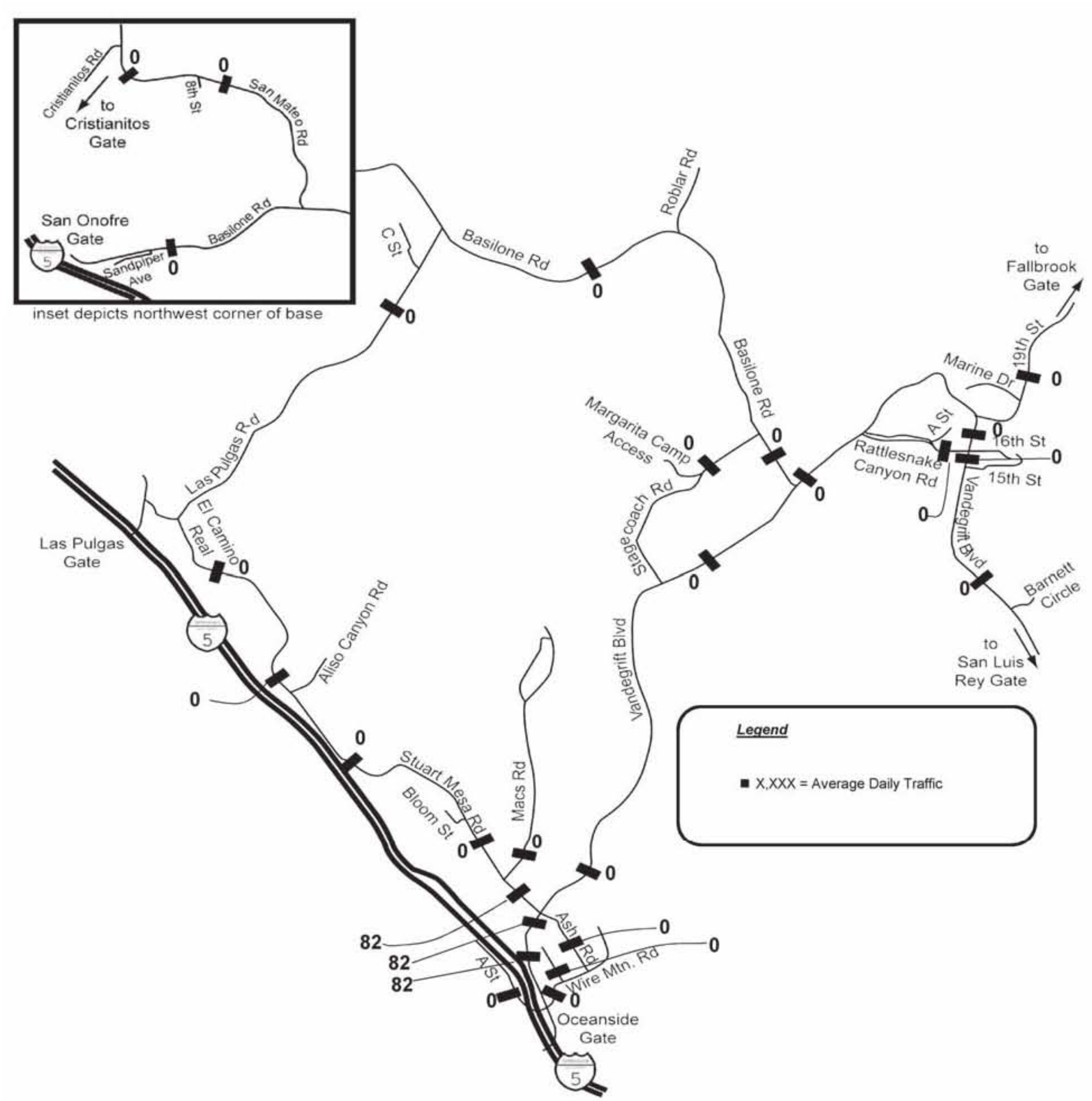
Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-7
2015 Alternative 1 Project Trip Assignment – Study Intersections



Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-8
2015 Alternative 1 Project Trip Assignment – Off-Base



Source: Kimley-Horn Traffic Modeling Analysis for AECOM 2010

Figure 4.1.8-9
2015 Alternative 1 Project Trip Assignment – On-Base

4.1.9 Air Quality

4.1.9.1 Both MILCONs (Alternative 1)

Methodology

The impact methodology common to each of the MILCONs (Alternative 1) under Sections 4.1.9.2 through 4.1.9.4 is to estimate the anticipated annual emissions from each MILCON (Alternative 1) under Alternative 1, compare the emissions to the NAAQS, and determine if mitigation is required for each of the MILCONs (Alternative 1).

The impact methodology for the MILCONs (Alternative 1) is to combine all of the annual emissions of each MILCON (Alternative 1) for each calendar year (e.g., all 2011 emissions), as determined in Sections 4.1.9.2 through 4.1.9.4, to compare against the significance thresholds established for General Conformity and NEPA to determine any potential air quality impacts and mitigation required for Alternative 1.

Emission Sources

All of the MILCONs (Alternative 1) would generate air pollutant emissions primarily from the construction of the proposed facilities, and to a lesser degree, the operation and maintenance of the constructed facilities. Construction activities would generate temporary (short-term) emissions such as fugitive dust emissions (PM_{10} and $PM_{2.5}$) from earth movement activities (e.g., grading, trenching, and backfilling), and exhaust emissions (NO_X, SO_X, CO, VOCs, $PM_{2.5}$, and PM_{10}) from construction equipment and vehicles, including worker vehicles.

Operation of the constructed facilities would generate minor, permanent exhaust emissions from operation and maintenance of constructed facilities (e.g., the Northern AWT and pump stations), including area sources (natural gas heating emissions of operation centers of treatment plants) and stationary-source emissions (the Northern AWT and pump stations), and mobile-source emissions (operation and maintenance vehicle trips).

Air Quality Modeling

Air pollutant emissions that would be generated by the each of the MILCONs (Alternative 1) were estimated using the URBEMIS 2007 model, version 9.2.4 (Rimpo 2008). The emission factors and calculation methodologies contained in the URBEMIS

2007 program have been approved for use by CARB. URBEMIS is a calculation tool designed to estimate air pollutant emissions from land use development projects based on development type and size.[32] The model contains data that are specific for certain California air basins and counties; San Diego County and APCD declined to participate in the development of URBEMIS 2007. Therefore, the URBEMIS database for Orange County was used for this project.[33] The differences between areas are limited to on-road emission parameters and the variations would be negligible compared to the overall accuracy of the estimated input data and the assumptions used for the URBEMIS model.

The URBEMIS model groups emission sources into three categories: construction, area, and operation. Depending upon the facilities proposed, construction emission sources in URBEMIS include facility demolition, site grading, utility installation, facility construction, and surface paving. Area-source emission sources from the constructed facilities include primarily use of natural gas for space and water heating, and landscape maintenance. Operational-related emission sources in URBEMIS include mobile sources (i.e., vehicle trips) associated with the operation and maintenance of the constructed facilities. However, for both MILCONs (Alternative 1), the operational emissions would be negligible since this is primarily the emplacement or replacement of utility pipeline that does not generate emissions when operational. Therefore, operational emissions are not included in the URBEMIS emission modeling for both MILCONs (Alternative 1).

Inputs to the URBEMIS modeling include data provided by the Base, data based on standard construction procedures, or industry standard defaults included in the URBEMIS model. The Base provided the project construction schedules, including start dates and durations, and identified a linear installation rate of approximately 200 feet per day for underground pipelines.

Project Emissions and Significance Thresholds

Since the CAA General Conformity *de minimis* thresholds are annual thresholds in tons per calendar year, project emissions in SDAB and SCAB were quantified for each of the

[32] The URBEMIS 2007 program calculates reactive organic gases (ROG) as opposed to VOC. ROG is the term used by the CARB. The definition of ROG and VOC are similar; however, ROG includes several additional compounds. For purposes of air quality analysis these terms are interchangeable.

[33] This is why the URBEMIS output sheets included in Appendix D include the label “Project Location: Orange County” despite the fact that except for a very small portion of P-1044 that extends into Orange County, all proposed action related activities would occur in San Diego County.

MILCONs (Alternative 1) in URBEMIS as total emissions per calendar year (January–December). Project construction for the MILCONs (Alternative 1) would occur based on designated funding fiscal years (October through September) ranging from FY 2012 through 2013. Projects are assumed to be funded at the end of the program fiscal year (September) and begin construction in January of the next calendar year (e.g., FY 2012 projects would start construction in January 2013), except for P-1044, an FY 2012 project with construction anticipated to begin in January 2013. Construction durations are estimated at either 1 or 2 calendar years, as specified for each MILCON, and any MILCON with operational emissions would assess operational emissions for the calendar years following the final calendar year of the MILCON construction. Thus, based on construction initiation and duration assumptions, construction emissions for both MILCONs (Alternative 1) were assessed for calendar years ranging from 2013 through 2015, and operational emissions were assessed for calendar years ranging 2015 through 2016.

The MILCONs (Alternative 1) are almost entirely located within SDAB, with a pump station and a minor portion of the MILCON P-1044 (Alternative 1) utility corridor extending approximately 100 feet north into a small portion of SCAB in the 64 Area (Talega). Since the NEPA significance thresholds in SDAB use *de minimis* thresholds, annual project emissions are expressed as tons per calendar year.

In addition to General Conformity, determination of significant air quality impacts under NEPA is required for NEPA documents such as this EIS. A NEPA air quality significance analysis differs from the General Conformity analysis in that all project criteria pollutant emissions are considered; this would include attainment pollutants, as well as nonattainment and maintenance pollutant emissions (previously considered under General Conformity). Therefore, in SDAB, project attainment emissions of oxides of sulfur (SO_X), PM_{10}, and $PM_{2.5,}$ would be considered for NEPA impact significance for air quality in addition to CO, VOCs, and NO_X, which were also addressed under General Conformity.

For those air pollutants in SDAB that are in attainment of the NAAQS, the General Conformity requirements and thresholds do not apply. For these air pollutants, the analysis used thresholds from the USEPA Prevention of Significant Deterioration (PSD) permitting program that define major stationary sources of emissions as the evaluation criteria for determining the potential for significance of air quality impacts for the project alternatives. Although the PSD permitting program is not applicable to mobile sources, PSD thresholds are being used as criteria for measuring air quality impacts under NEPA. Therefore, for NEPA significance, the total annual direct and indirect project emissions of attainment pollutants, as well as the emissions of nonattainment/ maintenance pollutants (analyzed for General Conformity above), from project construction and operation activities would be compared against the PSD emission rate thresholds of 250 tons/year for these pollutants.

Local Emissions

In addition to regional emission impacts, localized air quality impacts of CO and TAC emissions are also considered.

According to the CO Protocol, localized CO impacts are considered where project traffic contributed to unacceptable LOS at signalized intersections, where human receptors are in proximity to these intersections. As described in Section 3.8, Traffic, the Harbor Drive and I-5 southbound ramps operate at LOS E during the a.m. peak (existing conditions) and Stuart Mesa Road and Vandegrift Boulevard operate at LOS E during the p.m. peak. Both of these are signalized intersections and both would be affected by the proposed action. There are, however, no potentially sensitive receptors within 300 feet of these intersections. Therefore, no potential localized CO impacts would occur as a result of both MILCONs (Alternative 1).

The principal TAC of concern for both MILCONs (Alternative 1) is diesel PM, which is included in emissions from diesel construction equipment and vehicles. Asbestos and LBP are a consideration for older structures proposed for demolition.

The primary local concern with diesel PM is the proximity of sensitive air quality receptors (e.g., children and those convalescing in medical facilities) to high concentrations of diesel vehicle operation, such as interstate highways, distribution centers, or bus stations or port facilities. The project construction areas of the MILCONs (Alternative 1) are an extensive corridor along the major Base roadways adjacent to sensitive air quality receptors (e.g., children at schools and residences with outdoor recreational areas). Overall, diesel equipment and vehicles would be substantially used along the utility pipeline routes, which are adjacent to major and minor roadways of the Base that pass through developed and populated areas. Use of diesel equipment and vehicles at nonlinear site facilities (e.g., the Northern AWT, the pump stations) would be in areas relatively far away from sensitive receptors, so those receptors would not be adversely affected.

There are sensitive air quality receptors such as military family housing and schools with recreational areas in proximity to the proposed alignments of the MILCONs

(Alternative 1). However, overall, utility installation would be short term (approximately 1 year) and of short duration in one location (moving at approximately 200 feet per day), and would cease after construction is completed. Overall, the diesel PM emissions generated from these mobile sources would not be considered to subject sensitive receptors to adverse levels of diesel PM emissions.

Demolition of buildings and structures generates diesel PM emissions, and potentially asbestos and lead emissions. If the buildings or structures were constructed before 1980, there is a potential that insulation materials may contain asbestos and LBP, which could be present in the building materials (insulation and paint) that were used for building construction. The Base is required to survey its buildings and facilities for asbestos materials and LBP. Disturbance of asbestos materials during demolition creates the potential that asbestos fibers would become airborne and create a health hazard for inhalation and ingestion. Appropriate asbestos abatement measures are to be performed on asbestos materials before demolition of the buildings. For lead, the Base policy is to inspect and sample the paint in the building to be demolished. If detected, appropriate lead abatement measures are performed before building demolition occurs. For asbestos, a Notice of Intention, and/or an asbestos permit from the San Diego Air Pollution Control District (SDAPCD) shall be acquired for all renovation and demolition activities, regardless of the presence of asbestos for all projects within MCBCP, excluding the 64 Area (Talega). For all demolition and renovation activities within the 64 Area (Talega), a Notification of Demolition or Asbestos Removal and/or an asbestos permit shall be acquired from the South Coast Air Quality Management District (SCAQMD).Greenhouse Gases

The GHG and climate change impact methodology of both MILCONs (Alternative 1) is discussed in Chapter 5, Cumulative Impacts under NEPA.

Impacts

Annual project emissions for each calendar year are estimated for each MILCON under Alternative 1 and listed for each air basin (SDAB and SCAB) in Tables 4.1.9-1 and 4.1.9-2, respectively. To account for the emissions of both MILCONs (Alternative 1) in the same calendar year in each basin, the estimated annual emissions for each year are summed in Table 4.1.9-1. Construction timing assumptions are consistent with those discussed in Section 2.3.

Table 4.1.9-1
Estimated Annual Air Pollutant Emissions of Both MILCONs (Alternative 1) in SDAB

MILCON Projects (by year)	Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 1	2	14	13	0	19	4
P-1045 Alternative 1	2	17	17	0	32	7
Total 2013 Emissions	**4**	**31**	**30**	**0**	**51**	**11**
2014						
P-1044 Alternative 1	2	15	15	0	19	4
P-1045 Alternative 1	2	19	22	0	32	7
Total 2014 Emissions	**4**	**34**	**37**	**0**	**51**	**11**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.1.9-2
Estimated Air Pollutant Emissions of Both MILCONs (Alternative 1) in SCAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 1	<1	<1	<1	0	<1	<1
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Impact significance in SDAB was determined by comparing the annual emissions of both MILCONs (Alternative 1) for each calendar year against CAA General Conformity thresholds (Table 4.1.9-1). As shown in Table 4.1.9-1, the total estimated annual emissions of VOCs, NO_X, and CO for both MILCONs (Alternative 1) in 2013 and 2014 are less than the *de minimis* levels for these pollutants.

Since CAA General Conformity thresholds would not be exceeded, the MILCONs (Alternative 1) in SDAB would conform to the SIP and a conformity determination is not required.

Impact significance in SCAB is determined the same way as in SDAB, as shown in Table 4.1.9-2. The minor portions of MILCONs (Alternative 1) in SCAB do not exceed CAA General Conformity thresholds and NEPA significance thresholds. Therefore, the

MILCON (Alternative 1) in SCAB would conform to the SIP and a conformity determination is not required, and would not result in a significant impact under NEPA.

To minimize the construction emissions of dust and particulates during grading and earthwork operations, the following dust reduction measures would be incorporated into the MILCONs (Alternative 1):

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least 2 feet of freeboard.
- Pave, apply water twice daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent paved streets.

Local Emissions

Localized CO impacts of MILCONs (Alternative 1) were considered where project traffic contributed to unacceptable LOS at signalized intersections, where potentially sensitive receptors are within 300 feet of these intersections. Of the three signalized intersections that would operate at an unacceptable LOS during at least one of the years during the Alternative 1 construction period, two (Harbor Drive and I-5 southbound ramps, and Stuart Mesa Road and Vandegrift Boulevard) are not in proximity to sensitive receptors. In the case of the third intersection (Wire Mountain Road and Vandegrift Boulevard), the Pacific View Housing Area is within 300 feet of the intersection, but Alternative 1 would not lower the LOS nor increase delay compared to projected no-project conditions for any of the years during the Alternative 1 construction period. Therefore, no localized CO impacts would occur from the MILCONs (Alternative 1).

Localized diesel PM impacts of MILCONs (Alternative 1) were considered where sensitive receptors are in proximity to high concentrations of project diesel vehicle operation. There are sensitive air quality receptors such as military family housing and schools with recreational areas in proximity to the proposed alignments. However, overall, utility installation (P-1044 and P-1045) would be short term (approximately 1 year) and of short duration in one location (moving at approximately 200 feet per day), and would cease after construction is completed. Overall, the diesel PM emissions generated from these mobile sources would not be considered to subject sensitive receptors to adverse levels of diesel PM emissions.

Greenhouse Gases

The GHG and climate change impacts of the MILCONs (Alternative 1) are discussed in Chapter 5, Cumulative Impacts under NEPA.

<u>Mitigation</u>

No mitigation measures are proposed.

4.1.9.2 P-1044 Alternative 1

<u>Impacts</u>

P-1044 Alternative 1 would generate air pollutant emissions primarily from the construction of proposed facilities. Minor emissions would be generated from the operation and maintenance of the constructed facilities (primarily the Northern AWT and the pump stations).

P-1044 Alternative 1 project emissions were estimated based on the project description in Section 2.3 of the proposed facilities. With funding anticipated in FY 2012, construction would occur for 2 years over 2013 and 2014, with operation beginning in 2015.

Annual project emissions for P-1044 (Alternative 1) were estimated by URBEMIS in SDAB and SCAB, as shown in Tables 4.1.9-3 and 4.1.9-4, respectively. The URBEMIS model output data are included in Appendix G.

Table 4.1.9-3
Estimated Annual Air Pollutant Emissions
of P-1044 (Alternative 1) in SDAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Total 2013 Emissions	**2**	**14**	**13**	**0**	**19**	**4**
Total 2014 Emissions	**2**	**15**	**15**	**0**	**19**	**4**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.1.9-4
Estimated Annual Air Pollutant Emissions
of P-1044 (Alternative 1) in SCAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.1.9-3, the estimated annual emissions of VOCs, NO_X, and CO for P-1044 (Alternative 1) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. As shown in Table 4.2.9-4, the estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for P-1044 (Alternative 1) in SCAB in 2013 are less than the *de minimis* levels for these pollutants. Therefore, P-1044 (Alternative 1) would conform to the SIP and a conformity determination is not required.

To minimize the project emissions of dust and particulates during grading and earthwork operations, the fugitive dust reduction measures, identified for both MILCONs (Alternative 1), would be incorporated into P-1044 Alternative 1.

The proposed Northern AWT plant (for the advanced treatment of raw water to drinking water standards) is less likely to generate odors of concern than treatment of wastewater. Spills of treatment chemicals (e.g., chlorine) could generate localized odors of concern. The proposed Northern AWT plant would be downwind and approximately 3,000 feet southeast of the nearest housing area on-Base (San Onofre 3 Housing Area), and 2.5 miles east of the Base boundary with the city of San Clemente. Therefore, odor is not anticipated to be an adverse impact for P-1044 Alternative 1.

Mitigation

No mitigation measures are proposed.

4.1.9.3 P-1045 Alternative 1

Impacts

P-1045 Alternative 1 would generate air pollutant emissions primarily from construction of the proposed facilities. Minor emissions would be generated from the operation and maintenance of the constructed facilities.

P-1045 Alternative 1 project emissions were estimated based on the project description in Section 2.3 of the proposed facilities. With funding anticipated in FY 2012, construction is assumed to occur for 1 to 2 years in 2013 and 2014, with the project completed and operational by 2015.

Annual project emissions for P-1045 were estimated by URBEMIS as shown in Table 4.1.9-5. The URBEMIS model output data are included in Appendix G.

Table 4.1.9-5
Estimated Annual Air Pollutant Emissions of P-1045 (Alternative 1)

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**2**	**17**	**17**	**0**	**32**	**7**
Total 2014 Emissions	**2**	**19**	**22**	**0**	**32**	**7**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.1.9-5, the estimated annual project emissions of VOCs, NO_X, and CO for P-1045 Alternative 1 in 2013 and 2014 are less than the *de minimis* levels for these pollutants. Therefore, P-1045 Alternative 1 would conform to the SIP, and a formal conformity determination would not be required. The General Conformity conclusions of this project are documented in the draft RONA in Appendix G.

To minimize the project emissions of dust and particulates during grading and earthwork operations, the fugitive dust reduction measures, identified for both MILCONs (Alternative 1), would be incorporated into P-1045 Alternative 1.

Mitigation

No mitigation measures are proposed.

4.1.10 Noise

4.1.10.1 Both MILCONs (Alternative 1)

Methodology

The construction and operation of new facilities generate noise. Construction noise is generated by the operation of construction equipment and vehicles, and the transport of material and workers to and from the site. Construction noise levels are a function of the number and type of equipment used and the timing and duration of their noise-generating activities. Table 4.1.10-1 provides a list of noise levels generated by various types of equipment that could be used for the construction of water pipelines and associated site facilities (e.g., treatment plant, and pump stations).

As shown in Table 4.1.10-1, maximum noise levels from construction equipment range from approximately 70 to 90 dBA at 50 feet from the equipment. These noise levels vary for individual pieces of equipment, based on different sizes and engines. Equipment noise levels also vary as a function of the activity level, or duty cycle. In a typical construction project, the loudest short-term noise generators tend to be earth-moving equipment under full load at approximately 85 to 90 dBA at a distance of 50 feet from the source. In addition to these maximum instantaneous noise levels, the magnitude of overall construction noise can be defined by the type of construction activity, the various pieces of equipment operating, and the duration of their activity. Typically, construction noise is averaged over time and expressed as dBA L_{eq}.

Noise levels from construction activities are typically considered as point sources of noise and attenuate with distance at a rate of 6 dBA per doubling of distance over hard site surfaces, such as streets and parking lots, and a rate of 7.5 dBA per doubling of distance for soft site surfaces, such as grass fields and open terrain with vegetation (FHWA 2006).

Operational noise from constructed facilities includes equipment operation (e.g., pumps, generators, fans, etc.), and vehicle trips for facilities operation and maintenance.

Table 4.1.10-1
Construction Equipment Noise Levels

Equipment	Maximum Noise Level (dBA) 50 feet from Source
All Other Equipment (5 horsepower or less)	85
Backhoe	80
Boring Jack Power Unit	80
Chain Saw	85
Compactor (ground)	80
Compressor (air)	80
Concrete Mixer Truck	85
Concrete Pump	82
Concrete Saw	90
Dozer	85
Dump Truck	84
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator (25 KVA or less)	70
Generator (more than 25 KVA)	82
Grader	85
Horizontal Boring Hydraulic Jack	80
Hydra Break Ram	90
Jackhammer	85
Paver	85
Pneumatic Tools	85
Pumps	77
Scraper	85
Soil Mix Drill Rig	80
Tractor	84
Vacuum Street Sweeper	80
Vibratory Concrete Mixer	80
Welder	73

KVA = kilovolt ampere
Source: FHWA 2006

<u>Impacts</u>

The two MILCONs (Alternative 1) would generate noise above ambient levels from construction of the proposed facilities. Construction noise would include the operation of construction equipment and vehicles at the proposed construction sites, and the transport of construction materials and workers as vehicle trips to and from the project sites.

Construction would generate temporary noise levels from construction equipment and vehicles during structure demolition, site grading activities, conveyance pipeline installation, building and facility construction, and surface paving. Construction along the conveyance pipeline routes is estimated to progress at 200 LF per daytime workday (weekdays 7 a.m. to 7 p.m.); thus, construction noise from conveyance line activity at any one location along the route would be short term (less than 1 workday). Construction of site facilities (i.e., treatment plant, pump stations, roadway) would be over a longer term (approximately 1 to 3 years) at a single location.

Noise impacts from construction are a function of the noise levels generated by equipment, the timing and duration of the noise-generating activities, and the proximity and sensitivity of land uses to the noise sources. The potential construction noise impacts of Alternative 1 would be limited to noise sensitive receptors in proximity to site facilities and conveyance pipeline routes. Construction would occur on weekdays between 7 a.m. and 7 p.m. and would not disturb typical weeknight sleep when in proximity to housing receptors (e.g., family housing areas, BEQs). However, daytime receptors such as schools and hospitals could be temporarily subjected to and affected by construction noise including brief maximum noise levels and/or noise levels averaged over time (e.g., 1 hour), depending on the type of construction (linear conveyance lines or single site facilities).

The construction equipment required for these projects is anticipated to be for typical construction (e.g., no piledriving needed for facility foundation support); however, construction noise may include rock blasting in undeveloped off-road areas or pavement breaking for pipeline corridors along existing paved roadways, as necessary. The construction equipment anticipated for the MILCONs (Alternative 1) is estimated to generate maximum noise levels of short duration not to exceed 90 dBA L_{max} at 50 feet, or average noise levels of approximately 80 dBA L_{eq} at 50 feet. Without intervening topography or structures, these levels would attenuate over distance at a conservative rate of approximately 6 dBA per doubling of distance (i.e., 80 dBA at 50 feet would attenuate to approximately 74 dBA at 100 feet, and approximately 68 dBA at 200 feet, etc.).

There are no Marine Corps regulations that limit construction noise levels. However, for reference, many jurisdictions, such as the County of San Diego, have established an acceptable daytime construction noise limit of 75 dBA L_{eq} averaged over 8 hours at the property line of a residence. Therefore, sensitive receptors beyond approximately 100 feet from project construction areas would experience the average construction noise levels at less than 75 dBA L_{eq} (averaged over 1 hour). However, receptors within this distance would be subject to instantaneous maximum construction noise levels of up to 85 dBA, which could be disturbing to daytime receptor activities such as concentration for office or classrooms, or convalescing at hospitals. Greater distance from the construction activities would further attenuate construction noise, thereby lessening the potential for disturbance.

Construction of the MILCONs (Alternative 1) is estimated to range over 3 years between January 2013 and December 2015. Project construction for each MILCON would start based on its designated funding fiscal year (October to September) ranging from FY 2012 through FY 2013. Both MILCONs (Alternative 1) are assumed to be funded at the end of the MILCON's fiscal year (September), and begin construction in January of the next calendar year (e.g., FY 2012 funded MILCONs would start construction in January 2013), except for P-1044, an FY 2012 funded project with construction anticipated to start in January 2013. Construction durations are estimated at either 1 or 2 calendar years, as specified for each MILCON.

After construction, operation of the constructed facilities would generate noise from facilities operation and maintenance (i.e., treatment plants, pump stations), which may increase ambient noise levels in proximity to the constructed facilities. Operational noise would be generated continuously (24 hours per day/7 days per week) from the site facilities operation; regularly scheduled maintenance and associated vehicle trips to the operational facilities are anticipated to be minor and maintenance related. The effect of operational noise levels on receptors would be based on the proximity of sensitive receptors, and any shielding or barriers to noise generated by the facilities (e.g., pipelines would be underground; pump stations and some treatment plant facilities would be enclosed by structures). Site facilities are not located in proximity to receptors, while pipelines primarily follow Base roadways, which pass near sensitive receptors.

Potential construction and operational noise impacts to noise sensitive wildlife of special status are addressed in Section 4.3, Biological Resources.

The potential noise impacts from the MILCONs (Alternative 1) to each noise sensitive receptor in proximity to the proposed pipeline corridors and site facilities locations can be a potential cumulative noise impact. The timing and location of construction activities of each MILCON determine the cumulative noise impacts on an individual noise sensitive receptor.

Sensitive receptors in proximity to the proposed project corridors and site facilities for the MILCONs (Alternative 1) are described in Section 3.7, Socioeconomics, and Section 3.10, Noise. Noise impacts to receptors along the corridors would be of relatively short duration (approximately 1 to 2 days) at each receptor. Therefore, the combined noise impact of pipeline routes overlapping at individual receptors would be several construction noise events of short duration staggered over the overall construction period for the MILCONs.

Overall, the combined construction noise of Alternative 1 is limited to daytime construction along some major and minor roadway corridors and developed areas of the Base. The combined construction noise is anticipated to be within typical construction noise levels and would attenuate with distance to receptors. The noise duration would be temporary and brief along the project corridors, and would be spaced out over the construction schedule of several years.

The operational noise impact of Alternative 1 would be limited to noise sensitive receptors in proximity to the operational site facilities, primarily the aboveground water system-related facilities (e.g., the Northern AWT and pump stations), as the underground pipelines would not generate operational noise, except for maintenance activities, including emergency repair. The proposed operational site facilities would provide the latest technology and sufficient capacity to minimize the operational noise levels of the facilities, which would replace existing aged facilities likely to be noisier due to aged, out-of-date technology, and potential insufficient capacity for the useful life of the facilities.

Mitigation

No mitigation measures are proposed.

4.1.10.2 P-1044 Alternative 1

Impacts

P-1044 Alternative 1 would generate noise above ambient levels from the construction of the Northern AWT and the pump stations, and the installation of the underground water pipelines along the roadways of the P-1044 Alternative 1 corridor, which would include site clearing, grubbing, and grading; corridor excavation and trenching; horizontal boring; pipeline installation; the Northern AWT and pump station construction; and surface paving of new and existing access roads. With funding anticipated in FY

2012, construction would occur for 2 years over 2013 and 2014, with operation beginning in 2015.

The noise sensitive receptors in proximity to P-1044 Alternative 1, identified in Section 3.10.5, include the BEQs, housing areas, and a child development center along the P-1044 Alternative 1 corridor. The estimated average construction noise level of approximately 80 dBA L_{eq} at 50 feet would attenuate to less than the acceptable noise limit of 75 dBA L_{eq} at 100 feet, and at these receptors along the P-1044 Alternative 1 corridor. Therefore, there would be no exceedances at the receptors, except for possibly at the houses of the San Onofre 2 Housing Area and San Onofre 3 Housing Area that abut Basilone Road or the construction corridor immediately adjacent to these areas to the east, and the houses in the San Onofre 1 Housing Area that abut Chaisson Road. Other potential exceedances could occur for BEQs that abut construction corridors along Basilone Road in the 52 Area (School of Infantry) and the 53 Area (Horno), or San Mateo Road the 62 Area (San Mateo). Actual construction noise levels at these housing units would depend on actual location of the pipeline within the corridor.

These receptors would be subject to varying instantaneous maximum construction noise levels of up to 85 dBA L_{max}, which would attenuate with distance to the receptors but could be disturbing due to the nature of the particular noise. However, an installation rate of approximately 200 LF per day would ensure a brief period of construction noise as linear construction moves past the receptors. The BEQs and housing areas are sensitive to noise when residents are sleeping, typically in the evening and nighttime, and thus are less likely to be disturbed during daytime construction.

The estimated average construction noise level of approximately 80 dBA L_{eq} at 50 feet at the Northern AWT site would attenuate to less than the acceptable construction noise limit of 75 dBA L_{eq} at 100 feet and therefore would be approximately 52 dBA L_{eq} at the nearest receptor approximately 0.5 mile away. Therefore, no significant construction noise impact to receptors from site facilities would occur. These receptors would be subject to varying instantaneous maximum construction noise levels of up to 85 dBA L_{max}, which would attenuate with distance to the receptors but could be disturbing due to the nature of the particular noise.

P-1044 Alternative 1 is closest to the Base boundary as the pipeline corridor extends approximately 300 feet north of the Orange County line in the northwest corner of the Base. Construction noise levels at the farthest extent would attenuate to less than the acceptable construction noise limit of 75 dBA L_{eq} at 50 feet, and therefore at the Base boundary as well, approximately 550 feet to the north. Therefore, no noise impacts to receptors in Orange County would occur.

The operation of the constructed facilities would generate continuous noise from the operation and maintenance of the Northern AWT, and associated vehicle trips to the constructed facility for operation. Facility operations may increase ambient noise levels in proximity to the constructed facilities. Assuming the operational noise level of the Northern AWT is 85 dBA L_{eq} at 50 feet, this noise level would attenuate to approximately 51 dBA L_{eq} at the nearest receptor approximately 0.5 mile away, which is an acceptable operational noise level at receptors. NAVFAC P-970 provides noise compatibility criteria for various land uses; exterior sound levels up to 65 dBA CNEL (the cumulative 24-hour community noise equivalent level) are considered compatible with land uses such as residences, transient lodging, classrooms, and medical facilities. The proposed pump stations would be enclosed by protective structures, which would provide noise attenuation. Therefore, no significant operational noise impact of the site facilities to the nearest receptors would occur.

<u>Mitigation</u>

No mitigation measures are proposed.

4.1.10.3 P-1045 Alternative 1

<u>Impacts</u>

P-1045 Alternative 1 would generate noise above ambient levels along the P-1045 Alternative 1 corridor from the installation of the water conveyance pipelines and the pump stations. Construction activities would include site grading, trenching, large-diameter water pipeline installation, and surface paving. With funding anticipated in FY 2012, construction is assumed to occur for 1 to 2 years in 2013 and 2014, with the project completed and operational by 2015.

The noise sensitive receptors along the P-1045 corridor, identified in Section 3.10.5, include BEQs in cantonment areas, multiple military family housing areas, schools, child development centers, and a community center. The estimated construction noise of approximately 80 dBA L_{eq} at 50 feet would attenuate to less than the assumed construction noise threshold of 75 dBA L_{eq} at 100 feet. Therefore, there would be no exceedances at the receptors, except for possibly homes, BEQs, and child-oriented facilities that abut the construction corridors, as described Section 3.10.5. These include multiple homes in the Stuart Mesa Housing Area and the playground within the Stuart Mesa School Area along Stuart Mesa Road; multiple homes in the Pacific View 1, Pacific View 2, Forster Hills, South Mesa 1, South Mesa 2, and Wire Mountain 3 housing areas; the Abby Reinke Community Center along Wire Mountain Road; and multiple homes in the Santa Margarita and Wire Mountain 2 housing areas where the corridor approaches the proposed new 4-million-gallon reservoir along multiple streets east of the intersection of Wire Mountain Road and Carnes Road. This would also include BEQs in the 43 Area (Las Pulgas), the 41 Area (Las Flores), the 31A Area (Edson Range), and the 33 Area (Margarita).

Actual construction noise levels at these houses, BEQs, or child-oriented facilities would depend on actual location of the pipeline within the corridor. In addition, the 75 dBA L_{eq} threshold is an assumed threshold for comparative purposes only. Further, construction noise would be of short duration, assuming a construction rate of 200 LF per day, and would be confined to daytime hours. Therefore, no significant noise impacts would occur.

In addition, these receptors would be subject to varying instantaneous maximum construction noise levels of up to 85 dBA L_{max}, which would attenuate with distance to the receptors but could be disturbing for daytime educational or sleeping activities at the housing areas and BEQs. However, an installation rate of 200 LF per day for utility lines would provide a brief period of construction noise at any one location as the linear construction progressed past the receptors. The BEQs and housing areas are noise sensitive for sleeping activities, which occur typically in the evening and nighttime and are thus less likely to be disturbed during daytime construction.

Additional noise would be generated from the operation of the water pump stations and associated maintenance vehicle trips. The proposed pump stations would not be in proximity to the housing areas and BEQs and would be enclosed by protective structures, which would provide appropriate noise attenuation.

Mitigation

No mitigation measures are proposed.

4.1.11 Public Health and Safety

4.1.11.1 Both MILCONs (Alternative 1)

Methodology

This public health and safety analysis was completed in an effort to determine whether the proposed activities would increase the potential of health and safety risks to the public and/or military personnel due to historical or existing use, storage, and migration of hazardous substances, hazardous waste, and hazardous materials that have been identified in the study areas. To evaluate the proposed development sites, available previous environmental work performed in the vicinity of the project sites was reviewed. No additional interview, site reconnaissance, or sampling activity was conducted. The findings of this investigation are summarized in the sections below. Documentation used for the completion of this public health and safety assessment includes the following:

- Annual UST Compliance Audit, MCBCP, prepared by RORE, Inc., July 2009
- Response to Final Site Summary and Recommendations for RFA Sites at MCBCP, prepared by RWQCB, 23 April 2009
- Draft Five-Year Review for Operable Unit 1 through 5, MCBCP, prepared by Battelle, 31 March 2009
- Final Site Summary and Recommendations Report for RFA Sites, prepared by Zec, 14 November 2008
- Environment Condition of Property Public Private Venture Phase VI-East Stuart Mesa Military Family Housing, prepared by ChaduxTt, 16 May 2008
- Environmental Baseline Survey for Three Agricultural Outlease Sites at MCBCP, prepared by TEC, November 2003
- Geographic Information System (GIS) Database from ES Information Systems Branch
- Program Updates from ES RCRA Division Hazardous Waste Branch Head
- Program Updates from ES Spill Prevention & Planning Branch Head

Impacts

The presence of active UST/AST sites, hazardous waste storage sites, RFA sites, and IR sites; and the potential for LBP, PCBs, and asbestos within the Alternative 1 alignment corridors or facilities project limits are minimal.

- There are no hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, or APZs in any of the projects included in Alternative 1.
- In Alternative 1, IR sites are found in P-1044 and P-1045 corridors; IR Site 33 is present in the P-1044 corridor while one IR site is present in the P-1045 corridor (IR Site 1D).
- In Alternative 1, the only alignment corridor in which UST sites are found is P-1044, which has 11 UST sites present (active LUST Site 62507 and closed UST Sites 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536). No other project corridors/sites contain UST sites.
- In Alternative 1, the only alignment corridor in which RFA sites are found is P-1044, which has four RFA sites present (active RFA Site 220 and no further action RFA Sites 199, 221, and 225). No other project corridors/sites contain RFA sites.
- In Alternative 1, the two alignment corridors in which ASTs are found are P-1044 and P-1045, which have eight ASTs present (ASTs 52021, 52410, 52710, 61513, 20816, 31520-1, 31523-P, and 52021). No other project corridors/sites contain ASTs.
- In Alternative 1, the two alignment corridors in which training areas are found are P-1044 and P-1045, which have nine training areas present (Range 207 Military Range Area, Range 14 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 15 Artillery Firing Area, Firing Line 103, X-Ray Impact Area, Range 102 Military Range Area, Range 103 Military Range Area, and Range 104b Military Range Area). No other project corridors/sites contain training areas.
- In Alternative 1, the only alignment corridor in which pesticides are found is P-1044, which has one pesticide site (former North Agricultural Lease Site). No other project corridors/sites contain pesticide sites.

In addition, all project limits have RFA, UST, or IR sites near enough to have an effect on construction. Generally, the risk of having these sites close to the P-1044 and P-1045 Alternative 1 project corridors/sites is the potential to encounter contaminated groundwater when digging or excavating and during dewatering operations. Dewatering would not be conducted near environmental restoration sites due to potential influence on contaminated groundwater movement and potential contaminant release to the surface. A summary of the sites and nearby corridors is provided in Table 4.1.11-1. As shown in the table, several of these sites could potentially impact construction in multiple corridors.

If soil contamination (discolored and/or odorous) is discovered during construction, the Installation Restoration/Remediation Branch at (760) 725-9744/9774 would be contacted for necessary remedial requirements. If the construction of structures would be outside of any known, identified groundwater plume, additional regulatory concurrence would not be required. However, these locations would still be evaluated by Navy and Marine Corps Installation Restoration Program (IRP) managers to ensure they are not downgradient of an existing plume where further investigation and/or cleanup may take place.

The northern portion of MCBCP is laden with former and current training ranges. The potential presence of MEC and small arms rounds is real. When excavation, grading, and/or digging occurs within the boundaries of a former or current range, all work would be accomplished with every effort to maximize safety and prevent the spread of any potential contamination or the release of any potential existing contaminants to the environment in accordance with all federal, state, and local laws, regulations, and guidelines. During any construction in an area of a current or former range, an Explosive Ordnance Disposal technician should be consulted and on-site during construction activities.

Before construction of any alignment, ES would review construction plans along with the current list of hazardous material sites on-Base to ensure that sites with the potential to affect construction were identified. Construction would not be allowed within the vicinity of those hazardous material sites without assurance that the site had been remediated or that the influence of the hazardous materials site would not affect the construction area.

Table 4.1.11-1
RFA, UST, IR, and AST Sites within Alternative 1 Project Corridors/Sites or Adjacent Buffers

Project Corridor/Site	Type of Site: RFA – Within Project Corridor/ Site	RFA – Within 50-Foot Buffer	UST – Within Project Corridor/Site	UST – Within 200-Foot Buffer	IR – Within Project Corridor/ Site	IR – Within 500-Foot Buffer	AST – Within Project Corridor/ Site	AST – Within 10-Foot Buffer	Military Training Areas, Impact Areas, Live-Fire Facilities, and ESQD Arcs within the Project Corridors/Sites
P-1044 Alternative 1	199(NFA), 220(LSI), 221(NFA), 225(NFA)	185(NFA), 192(NFA), 218(NFA), 236(NFA), 280(NFA)	520400(Closed), 52291(Closed), 52651(Closed), 52710(Closed), 62420(Closed), 62435(Closed), 62436(Closed), 62520(Closed), 62535(Closed), 62536(Closed), 62507	51091-6, 51091-7, 51091-8, 51091-9 520167-1, 520167-2, 62507-3, 62507-4	33	1I-2(Closed), 34(Closed), 36(Closed)	52021, 52410, 52710, 61513	-	Range 207 Military Range Area
P-1045 Alternative 1	-	168(NFA), 278(NFA), 279(NFA)	-	-	1D	7,32(Closed)	20816, 31520-1, 31523-P, 52021	41611	Range 14 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 15 Artillery Firing Area, Firing Line 103, X-Ray Impact Area, Range 102 Military Range Area, Range 103 Military Range Area, Range 104b Military Range Area

LSI = Limited Site Investigation; NFA = No Further Action

A number of child-oriented facilities are near enough to the alignments for noise and dust during construction to be of concern. These facilities are:

- San Onofre Elementary School
- San Onofre Child Development Center
- San Onofre Youth Center
- Stuart Mesa Elementary School
- Stuart Mesa Child Development Center
- Wire Mountain Youth Center
- Santa Margarita Elementary School
- Browne Child Development Center
- Abby Reinke Community Center

To eliminate disturbances to children that may come from construction, such as noise, dust, and unacceptable air quality, measures such as dust abatement and BMPs that would reduce other construction impacts would be applied. These measures are summarized in Section 2.5. When successfully implemented, these measures would not adversely alter existing environmental health conditions or impose additional safety risks to children and therefore would minimize the possibility of project-related adverse impacts to children.

Mitigation

No mitigation measures are proposed.

4.1.11.2 P-1044 Alternative 1

Impacts

There are no hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, or APZs located within the P-1044 Alternative 1 project corridor/site.

Hazardous waste sites that were identified within portions of the project corridor/site include the following:

- One IR site (active IR Site 33);
- Four ASTs (active ASTs 52021, 52410, 52710, and 61513);

- Four RFA sites (no further action RFA Sites 199, 221, 225 and active RFA Site 220);
- Eleven USTs (LUST Site 62507 and closed USTs 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536);
- One IR site (active IR Site 33);
- One training area (Range 207 Military Range Area); and
- Pesticide (former North Agricultural Lease Site).

In addition, no further action RFA Sites 185, 192, 218, 236, and 280; operational USTs 51091-6, 51091-7, 51091-8, 51091-9, 520167-1, 520167-2, 62507-3, and 62507-4; closed IR Sites 1I-2, 34, and 36; and active IR Site 33 were identified within the buffer zone of the project corridor/site.

- Construction crews could potentially encounter hazardous materials when working around active ASTs and operational USTs.
- Construction within the project corridor/site may encounter contaminated soil from "no further action" RFA Sites 185, 192, 199, 218, 221, 225, 236, and 280.
- Construction within the project corridor/site may encounter contaminated soil associated with RFA Site 220.
- Construction within the project corridor/site may encounter contaminated soil from closed USTs 520400, 52291, 52710, 62420, 62435, 62436, 62520, 62535, and 62536.
- Construction within the project corridor/site may encounter contaminated soil from LUST Site 62507.
- Construction within the project corridor/site may encounter contaminated groundwater from IR Site 33, where soil and groundwater cleanup action is currently being planned. Contaminated groundwater could be encountered during shallow excavations or dewatering activities, which may result in exposure to construction workers. Dewatering would not be conducted near environmental restoration sites due to potential influence on contaminated groundwater movement and potential contaminant release to the surface. Construction could potentially damage groundwater monitoring wells around Buildings 52651 and 52655.

- Construction within the project corridor/site may encounter contaminated soil from closed IR Sites 1I-2, 34, and 36.
- Weapons training in the proximity of construction areas or activities could be highly dangerous to construction personnel.
- Construction within the project corridor/site may encounter contaminated soil from the former North Agricultural Lease Site.

In addition, other unidentified contaminant residue in the soil or groundwater from historical spills that may be encountered when digging or excavating in the project corridor/site would be assessed. If any of the contaminants are identified, appropriate remediation would be implemented before construction.

With the implementation of the measures listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area. In terms of potential impacts to children specifically, construction activities for the project corridor/site are generally expected to generate short-term construction noise levels and increase fugitive dust. There are three child-oriented facilities within a 500-yard buffer zone of the project corridor/site: the San Onofre Elementary School, the San Onofre Child Development Center, and the San Onofre Youth Center. These facilities are located approximately 90 to 460 yards from the project corridor/site. To mitigate potential impacts to children from construction activities, measures such as dust abatement and other BMPs described in Section 2.5 that would reduce construction impacts would be applied. These measures would minimize the possibility of proposed action-related adverse impacts.

Mitigation

No mitigation measures are proposed.

4.1.11.3 P-1045 Alternative 1

Impacts

There are no USTs, RFA sites, hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, APZs, or pesticides located within the P-1045 Alternative 1 project corridor/site.

Hazardous waste sites identified within portions of the project corridor/site include the following:

- Four ASTs (active ASTs 20816, 31520-1, 31523-P, and 52021);
- One IR site (active IR Site 1D); and
- Eight training areas (Range 14 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 15 Artillery Firing Area, Firing Line 103, X-Ray Impact Area, Range 103 Military Range Area, Range 103 Military Range Area, and Range 104b Military Range Area).

In addition, active AST 41611; no further action RFA Sites 168, 278 and 279; active IR Site 7 and closed IR Site 32 were identified within the buffer zone of the project corridor/site.

- Construction crews could potentially encounter hazardous materials when working around active ASTs and operational USTs.
- Construction within the project corridor/site may encounter contaminated soil from “no further action” RFA Sites 168, 278, and 279.
- Construction within the project corridor/site may encounter contaminated soil from IR Site 7.
- Construction within the project corridor/site may encounter contaminated groundwater from IR Site 1D.
- Construction within the project corridor/site may encounter contaminated soil from closed IR Site 32.
- Weapons training in proximity of construction areas or activities could be highly dangerous to construction personnel.

In addition, other unidentified contaminant residue in the soil or groundwater from historical spills that may be encountered when digging or excavating within the project corridor/site would be assessed. If any contaminants are identified, appropriate remediation would be implemented before construction.

With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area. Regarding potential impacts to children in particular, construction activities for the project corridor/site would generally be expected to generate short-term construction noise levels and increase fugitive dust. There are six child-oriented facilities within a 500-yard buffer zone of the project corridor/site: the Stuart Mesa Elementary School, Stuart Mesa Child Development Center, Wire Mountain Youth Center, Santa Margarita Elementary School, Browne Child Development Center, and the Abby Reinke Community Center, with the closest of these being immediately adjacent to a project corridor. To mitigate potential impacts to children from construction activities, measures such as dust abatement and other BMPs described in Section 2.5 that would reduce construction impacts would be applied. These measures would minimize the possibility of proposed action-related adverse impacts.

Mitigation

No mitigation measures are proposed.

4.1.12 Services and Utilities

4.1.12.1 Both MILCONs (Alternative 1)

Methodology

The demand for services and utilities attributable to each of the MILCONs was compared to existing service and utility capacities and capabilities to provide service, as discussed in Section 3.12.

Impacts

Police Protection

P-1044 and P-1045 would have a negligible impact on the PMO services. Both projects are utility improvements primarily involving the installation and operation of underground conveyance lines. P-1044 would also include the Northern AWT, which would result in slightly increased security surveillance; however, the facility would be fenced with security lighting.

Fire Protection

Fire protection impacts would be similar to police protection impacts discussed above. P-1044 and P-1045 would have a negligible impact on the fire protection services since both projects are utility improvements primarily involving the installation and operation of underground conveyance lines. P-1044 would also include the Northern AWT, which would slightly increase the demand for fire protection services. The Northern AWT would include fire protection systems, fire monitoring/control panels, and fire alarms thereby minimizing the risk or spread of fire.

Wastewater

The only one of the MILCONs that would require wastewater service would be P-1044. Operation of the Northern AWT plant would not generate a significant amount of sewage to be treated. There would be no significant wastewater impacts from the MILCONs.

Potable Water Supply

Potable water for human or treatment process use could be needed at the Northern AWT facility, and the plant would produce sufficient potable water for that minor demand. The only other demands for potable water for the two MILCONs would be negligible amounts that might be used for temporary irrigation of revegetation and landscaping at the Northern AWT plant and pipelines in P-1044 and the pump station and pipelines in P-1045. No significant impacts related to demand for potable water would result.

Treatment at the proposed Northern AWT plant would reduce the TDS, TOC, and aggressiveness in the raw water from the San Mateo and the San Onofre basins and would also reduce, if not eliminate, the measureable amounts of copper in the wastewater sludge caused by possible leaching from bronze or brass fittings, bearings or seals in the conveyance system, thereby eliminating the requirement of handling of the wastewater sludge as a hazardous waste. Currently, when the copper content of the sludge exceeds the regulatory limit, the sludge must be disposed of out-of-state in a designated hazardous waste facility. Reducing the copper would be a beneficial effect.

Electricity

Construction of the two MILCONs would require portable, fuel-powered generators to supply electricity for construction activities. Later stages of construction, after electrical connections had been made to, for instance, the Northern AWT plant, might use electricity from MCBCP's electrical distribution system, but the demand during construction would be temporary and is not expected to be significant.

P-1044's Northern AWT facility would require electrical systems for such functions as communications, electrical distribution, exterior lighting, substation operation, pump station power, common bank, and mobile equipment. P-1045's pump station would require electrical energy to power the pumps. The sum of electrical demand generated could be considerable, especially from the pump stations and Northern AWT plant, but both of the projects would comply with the mandatory energy use reduction measures discussed in Section 3.12. While these two MILCONs would not likely require significant upgrades in the Base's electrical transmission and distribution system, the Public Works Office is also planning comprehensive upgrades of the system through the P-1048 project, now undergoing separate environmental review as part of a different proposed action. No significant impact from Alternative 1 would occur.

Communication

Operation of the Northern AWT plant would require fire alarm and fire monitoring/control panels, information systems, energy management control systems, and direct digital controls. Monitoring and control systems would also be required at the P-1045 pump station. These new systems would contribute to but not significantly increase the demand on the Basewide communications systems. Therefore, no significant impact on MCBCP's communication system would occur as a result of implementing the two MILCONs.

Natural Gas

Construction and subsequent use of the proposed MILCONs would not require the use of natural gas. Therefore, no significant impacts on the availability of natural gas would occur.

Solid Waste Collection and Disposal

Construction of the proposed MILCONs would generate debris associated with clearing of the proposed site and trenching. Solid waste associated with site clearing of and preparation would be collected at the site and transported to the Las Pulgas landfill for disposal. The Las Pulgas landfill has sufficient capacity to handle estimated solid waste generation associated with construction, including clearing and site preparation, and with operation of the P-1044 Northern AWT plant and the P-1045 pump station. With completion of the five-phase expansion program, the landfill would have a remaining site life of 175 years. Therefore, no significant impacts to solid waste collection and disposal would occur.

<u>Mitigation</u>

No mitigation measures are proposed.

4.1.13 Coastal Zone Resources

4.1.13.1 Both MILCONs (Alternative 1)

Impacts

For MCBCP, the coastal zone is defined as extending from the mean high-tide line to 3 miles offshore. Of the two MILCONs, only P-1044 would have any component located within the coastal zone. None of the MILCONs would impact recreational or other access to the shore or cause land use incompatibility, but coastal zone resources could be indirectly affected by activities that are inland and upgradient should BMPs be insufficient or not compliant with applicable permits and/or regulations.

All of the MILCONs share the potential to discharge pollutants to drainages terminating in the coastal zone. For the most part, these potential impacts are associated with construction, especially TLS crossings in the Santa Margarita River, which could result in minor erosion, sediment transport, pollutant exposure to storm water, and/or material spills and storage/handling issues.

The locations of TLS construction for Alternative 1 are:

- P-1044 Alternative 1 – San Mateo Creek bridge crossing north of the proposed Northern AWT site, San Mateo Creek crossing south of the 62 Area (San Mateo), and brine discharge pipeline under I-5
- P-1045 Alternative 1 – Las Flores Creek crossing south of Las Pulgas Road; French Creek and Aliso Creek crossings between the 41 Area (Las Flores) and the 31A Area (Edson Range); Santa Margarita River at Stuart Mesa Road; and Santa Margarita River between the 25 Area (Vado Del Rio) and Haybarn Canyon

The potential for inland construction to adversely affect coastal resources would be most severe in wet weather conditions or while ephemeral streams are actively flowing. These adverse potential effects would be associated with construction and would therefore be temporary.

Potential impacts on marine resources from implementation of brine discharge through the SONGS outfall conduit are discussed in Section 4.1.14. Modifications to the existing pipeline and/or outfall structure would require concurrence by the CCC in either a Coastal Consistency Negative Determination or Coastal Consistency Determination per the CZMA. MCBCP has prepared a Consistency Determination for P-1044 and Negative Determinations for P-1045. The Consistency Determination for P-1044 found that the proposed action would be consistent with enforceable policies of the California Coastal Management Plan. The Negative Determination for P-1045 found that the proposed action would not impact coastal resources.

Construction of the brine discharge lines either onshore or offshore would not restrict access to the shore, and no land use incompatibilities would occur. Inland and coastal zone pipelines would not restrict recreational access to the coast and would not affect the scenic and visual qualities of the coastal zone. The brine discharge line from the Northern AWT inshore outfall connection to the conduit would be entirely underground and would not be visible from west of I-5 or from offshore vantage points. During construction, visual impacts in the area would likely be manifested as disrupted oceanic views from construction equipment and water discoloration and turbidity from benthic disturbance. Inland from the coastal zone, construction of P-1044 facilities would be subject to regulation to protect water quality as described in Section 3.2, Water Quality and Hydrology. This regulation would ensure that water quality impacts from construction operations that could reach the Pacific Ocean would be reduced to a less than significant level.

Deep injection wells would be located along El Camino Real in the San Onofre percolation ponds area east of I-5 or along the inland access road in the MCBCP San Onofre Beach recreation area west of I-5. Neither well field would be in the coastal zone. Operation and maintenance procedures, and inspection protocols also would be integrated into permit conditions to address proper operation, maintenance, and spill/damage protection for the deep-well brine injection system to safeguard coastal zone resources. Provided licensed groundwater drilling contractors are used, proper permits are obtained from RWQCB, and wells are purged immediately after construction, impacts to coastal resources would be negligible.

Proposed TLS construction could impact the creeks' or river's receiving waters (by release of sediment, bentonite, drilling lubricants, or other pollutants) that could be transported downstream to the ocean. Permitting by the RWQCB would require a project-specific SWPPP for each MILCON incorporating a variety of BMPs relative to site-specific needs and conditions, as well as environmental permit requirements from the regulatory agencies discussed in Section 3.2. Temporary construction and permanent operational activities inland from the coastal zone for the two MILCONs would comply with the pollution prevention requirements listed in Section 2.5 and the regulations presented in Section 3.2 to minimize potential coastal zone impacts to levels of insignificance.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.1.14 Marine Resources

Marine resources are covered in this section; please see Section 4.1.2 for related impacts to water quality and hydrology and Section 4.1.3 for related impacts to biological resources.

The impacts of proposed brine discharge from the Northern AWT RO facility on marine resources are addressed in this section. Indirect effects on marine resources from implementation of projects inland are discussed in Section 4.1.13, Coastal Zone Resources.

4.1.14.1 P-1044 Alternative 1

Impacts

P-1044 proposes to pass a 12-inch-diameter pipe through the former SONGS outfall conduit for ocean discharge of brine from the Northern AWT RO process.

Placement of the brine discharge line in the ocean environment would involve potential impacts to marine resources. The discharge line would be buried along the beachfront, including the point of insertion into the former SONGS outfall conduit, and extend offshore within the conduit to its seaward terminus. Core drilling or abrasive blade cutting would be used to make an opening into the conduit through which the brine line would be inserted. The work area would be enclosed by an interlocking steel cofferdam and may require dewatering. The cofferdam steel sheeting would be driven into place by hydraulic pushing to avoid excessive noise or vibration. Placement of the brine line within the conduit would utilize barges, divers, and construction equipment such as barge-mounted cranes.

Diffuser and Brine Line Installation

Installation of the brine discharge pipeline inside the outfall conduit would be performed by divers entering/exiting the manhole access points offshore along the conduit. Seaward of the insertion point into the outfall conduit, disturbance from the brine discharge pipeline installation would be confined within the conduit structure and would not impact marine resources until emergence from the conduit.

At the seaward terminus of the conduit, the brine line would pass through the mammal barrier, and a diffuser system would be installed for brine discharge into the ocean. The diffuser system would consist of a single, approximately 150-foot pipeline extending seaward from the conduit terminus with six 2-inch-diameter diffuser ports on 2-foot risers evenly spaced along its length to provide dilution of the brine discharge. A permanent rock blanket would be placed on the seabed over the diffuser pipe, extending 15 feet around the pipe in all directions. Installation of the rock blanket would be preceded by leveling of the seabed, possibly using a dragline attached to a crane.

Installation of the brine discharge pipeline inside the conduit would likely be performed under tension using winches at beach and barge locations by fusing high-density polyethylene pipe and pulling it into the conduit after fusing. The segments could also be fused together into a floating string, followed by flooding and winching into the conduit from the seaward end. The pipe would be fixed in place inside the conduit by mechanical connections and/or backfill. Between the onshore insertion point into the outfall conduit and the diffusion system at the conduit terminus, installation of the brine line would be confined within the conduit structure.

Construction-related impacts would be expected to occur within the work area where the diffuser would be installed and around the former SONGS intake access manholes. Marine water quality impacts from would occur from multiple benthic disturbances during construction (e.g., anchoring, dredging, and construction) but would be dependent on the ultimate construction methods and materials used. The SONGS outfall conduit and modified terminal structure would serve as a sleeve for the 12-inch-diameter brine discharge line, thereby containing much of the construction-related disturbance within the pipeline and reducing impacts to the outside benthos and water column (Figure 4.1.14-1).

Construction disturbances to the seafloor would be confined to the less environmentally sensitive soft-bottom habitats as much as possible. Temporary disturbance could be expected in areas about 50 feet square around the former manhole access ports, which could be used for access into the conduit for placement of the brine line. Temporary disturbance to the seafloor could occur within an area 50 feet wide by 250 feet long at the offshore terminus of the outfall. The seabed at the diffuser location would be leveled to provide a flat surface for the diffuser. Rock bedding would be placed on the leveled area and the diffuser placed on the bedding, then covered with a rock blanket extending about 15 feet to either side of the diffuser and 4 to 8 feet over the diffuser pipeline.

The significance of marine water quality impacts and multiple benthic disturbances during construction would depend on the ultimate construction methods used and the diffuser design implemented. Repairs to the existing intake conduit structure would be expected to improve operational integrity and maintenance access (e.g., repairing manhole access points and removing or grading the internal sediment). Some of these repairs may be performed by SCE and would not be a part of P-1044. Based on proposed preliminary engineering considerations to date (Brown and Caldwell 2012), the following construction impacts to marine resources would be expected at the conduit terminus as well as at points of repair/attachment along the intake conduit pipeline:

- Increased turbidity, decreased light transmittance, and release of sediment into the water column could result from the construction of the brine diffuser and cleaning of intrusive material from the conduit. Such activities would temporarily disturb the fine sands (and likely silts) of the benthic environment, causing sediment suspension and inducing localized turbidity plumes from silt that could remain in suspension for many hours or days before settling. Sand-sized particles would fall out of suspension within seconds or minutes in the immediate vicinity, while silt-sized particles could remain in suspension for many hours or days before settling. These plumes of lighter particulates could be transported farther downcoast into undisturbed areas beyond the construction area.
- Sediment fallout and turbidity plume transport from potential construction-related dredging operations would depend on the presence and magnitude of longshore currents, the grain size distribution of the excavated sediment, and the drop height above the seabed. Based on an analysis of currents and littoral transport for the potential disposition of the SONGS Unit 1 outfall conduit, sediment plume dispersal characteristics were estimated relative to the anticipated construction-related seabed excavation necessary (Gerwick 2003). This analysis assumed that excavations would employ a closed-cap dredge bucket, sediment would have an average grain size diameter of 0.02 inch, current velocity would average 1 knot, and dredged sediment would be dropped from a height of 10 feet above the seafloor. This analysis showed that sediment would settle at a rate of 0.23 feet/second, meeting the seafloor within 44.1 seconds, which equated to a horizontal settling distance of 63.8 feet from the point of release (Gerwick 2003). The results showed that turbidity plume transport could be greatly reduced by minimizing the drop height during dredged material side casting.
- Increased turbidity in and outside the construction area could reduce light transmission through the water column and affect surrounding biological resources. A few individual giant kelp stands or plants occur in the construction area. An increase in turbidity could negatively affect biological productivity of this kelp and other primary producers in the vicinity by reducing the amount of sunlight needed for growth as well as potentially causing suffocation. This impact

would be limited to the immediate area of construction activity and would be temporary, occurring only during construction in any one area.

- Multiple seabed disturbances and potential impacts would occur from vessel anchoring during reconnaissance, dredging, and construction activities. Support vessels and barges or similar equipment would require multiple mooring arrangements in multiple-point anchorages. Anchoring protocols and plans would be developed to minimize benthic damage from deploying, utilizing, and recovering anchorages. An anchoring plan would serve to establish anchor zones to avoid or minimize turbidity and biological impacts, avoid hard rock resources and kelp, and avoid impacts to recreational or commercial boaters.

  Differential geographic positioning system (DGPS) equipment with submeter accuracy would be employed to accurately locate anchoring positions. All bathymetric and geophysical survey data and diver verification would be preprogrammed into this DGPS system before work begins.

  Anchoring impacts would be minimized by lowering the initial anchor of each anchor set to the seafloor at the predesignated anchor location. Once the first anchor is lowered, a support vessel may "fly" other anchors to the predesignated anchor locations specified via a crown line. The anchor would be lowered by the crown line into place at the predesignated site during deployment and raised vertically by the crown line when the anchors are "weighed" (lifted off of the seafloor). Flying anchors to and from location would eliminate unnecessary anchor wire contact with the seafloor. Dragging anchors across the seabed would be prohibited.

- Exposure and potential pollutant discharges from equipment/material staging and laydown areas could occur at the shoreline and/or nearby coastal areas farther inland that discharge runoff to the ocean.

- The seabed at the diffuser location would be leveled to provide a flat surface for the diffuser, and rock bedding would be placed on the leveled area around the diffuser. Because of disturbance of the seabed, marine water quality impacts are expected, but are anticipated to be mitigated through federal and state regulation and monitoring (e.g., monitoring and reporting programs mandated by USEPA/ SWRCB NPDES permit[s]).

- Maintenance of the SONGS outfall diffuser would require periodic inspection and possible cleaning of the brine diffuser system. Typically, inspections in the industry are conducted annually, but frequency would be expected to be specified within the NPDES discharge permit authorized by RWQCB.

- Potential pollutant discharges of hydraulic oils or other contaminants from shipborne systems on the deck areas of marine vessels could occur. Sufficient planning and preparation of countermeasures would be required to preempt impacts from an accidental release or spill. Countermeasures would have to be designed to minimize the potential for unanticipated release of pollutants due to inclement weather or rough sea conditions. The potential for these discharges would increase if the ocean installation option for the brine discharge line is implemented.

The proposed brine discharge system would be designed to meet all applicable regulatory requirements and protect marine resources. Fundamental plume dilution modeling for a terminal diffuser has been conducted and evaluated to determine initial brine discharge dilution and compliance with Ocean Plan limitations (SWRCB 2009a). The proposed diffuser, approximately 3,350 feet offshore, would achieve a dilution ratio of 95:1 (ocean water to brine) that would allow brine constituent concentrations to comply with the Ocean Plan (Brown and Caldwell 2012). The results of this analysis indicate that:

- Brine effluent would meet Ocean Plan Table A limits for oil and grease, suspended solids, settleable solids, turbidity, and pH before ocean discharge.
- The discharge plume would be less dense than the surrounding receiving waters, rise to the ocean surface, and occupy one-fourth to one-third of the water column depth of 29 feet above the diffuser system. The diameter of the plume at initial dilution, the point at which the plume ceases to rise and spread horizontally, has not been assessed.
- The temperature of the RO concentrate would not be expected to significantly change during transport from the Northern AWT to the ocean diffusers because the buried portion of the pipeline will be a minimum of 4 feet below grade where the ambient temperature would likely approximate the temperature of adjacent groundwater (60°F, similar to the RO concentrate temperature). The portion of the pipeline in the abandoned intake conduit would equilibrate with the prevalent ocean temperature, which would further reduce the temperature of the RO concentrate before discharge and decrease the thermal differential at the point of diffusion.

Thermal modeling of dilution of the brine effluent with receiving waters predicts that the dilution will comply with all of the specific water quality objectives for coastal waters listed in the Thermal Plan (SWRCB 1998). NOAA buoys in waters off MCBCP and the city of Oceanside indicate that the ocean surface temperature in the vicinity of SONGS ranges from approximately 54°F in winter to 68°F in late summer (NOAA 2012a and 2012b). With 95:1 initial dilution, the change in receiving water temperature (delta T) would be undetectable after initial dilution. In the winter, the RO concentrate will have a low delta T at the point of discharge. In the summer with a receiving water temperature of 68°F and an RO concentrate temperature of 60°F, the delta T would be less than 1°F within about 10 port diameters, or 20 inches, of discharge because a jet discharge typically achieves a 10:1 initial dilution within 10 port diameters. The same rapid initial dilution would occur in the winter. Specific Water Quality Objective 3.B.(4) of the Thermal Plan does not allow the discharge of elevated temperature wastes to increase the natural water temperature by more than 4°F at the shoreline, at the surface of any ocean substrate, or at the ocean surface beyond 1,000 feet from the discharge system. Sea surface temperature must also be maintained over at least 50 percent of any complete tidal cycle. The proposed brine discharge system would be designed to meet plume thermal discharge requirements and protect aquatic resources.

Significant impacts to marine resources would be avoided. Additional evaluation of the marine outfall discharge would be conducted to accurately assess potential environmental impacts. Environmental issues for ocean discharge that require closer study include, but are not limited to:

- Subsequent dilution of the brine plume by waves, wind, and currents. Although it was recognized that subsequent dilution would continue within surface waters, these dynamics were not included in the modeling assessment to account for seasonal oceanographic conditions (e.g., stratified and unstratified water columns, seasonal current regimes, and sea level rise).
- Potential re-entrainment of adjacent benthic sediments from diffuser discharge turbulence that could cause aesthetic discoloration of surface waters. Installing armor rock protection around the diffuser section could provide beneficial benthic protection against sediment entrainment and turbidity upward in the water column.
- Ocean diffuser outfall inspection and cleaning to maintain proper port velocities, minimize turbidity, and avoid chemical treatments.

- Ocean disposal of brine would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Spill prevention and control, hazardous materials storage, and other effects would be addressed through compliance with environmental permit stipulations. Accordingly, a variety of design safeguards and BMPs would be required and implemented before and during construction and operation.

In addition to the ocean outfall discharge, up to eight brine injection wells would discharge approximately 330 to 750 feet below the ground surface. Although the injection location west of I-5 would be situated within the ocean (saltwater) side of the coastal seawater/freshwater interface, the point of injection would be below the approximate 330-foot interface depth to protect groundwater resources. The injection of brine into the San Mateo Formation aquifer would enhance the oceanward groundwater flow direction and augment the coastal seawater intrusion barrier (Stetson Engineering 2011). Groundwater modeling indicated that the injected brine would mix with surrounding groundwater and migrate upward due to its buoyancy until reaching density equilibrium with the surrounding saline groundwater, follow the prevailing flow toward the Pacific Ocean, and fully mix with seawater in the San Mateo Formation aquifer before reaching the seafloor (Stetson Engineering 2011). A series of upgradient and downgradient monitoring wells would be used to continuously monitor the saltwater/freshwater interface in the San Mateo Formation aquifer.

Subterranean injection and ocean disposal of brine would be closely regulated by USACE, NOAA, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Spill prevention and control, hazardous materials storage, and other adverse effects would be addressed through compliance with environmental permit stipulations. Accordingly, a variety of design safeguards and BMPs would be required and implemented before and during construction and operation.

The potential effects of the SONGS outfall conduit on EFH, biologically significant marine habitats, and listed or other sensitive marine species are presented below.

ESSENTIAL FISH HABITAT

Designated EFH is found in the project area for fish species managed under the Coastal Pelagic, Pacific Groundfish, and Highly Migratory Species Fishery Management Plans (FMPs), although species managed under the Highly Migratory Species FMP would likely not occur in the project vicinity. Installation of the diffuser system, as well as anchoring of construction-related vessels, would disturb existing soft-bottom substrate that serves as habitat for benthic organisms and EFH for groundfish species. Installation of the diffuser system would result in permanent impacts to soft-bottom habitat in the immediate area, by converting it to hard-bottom substrate (rock blanket protection). An increase in hard-bottom substrate would provide new cover habitat for groundfish species, in particular the California scorpionfish (*Scorpeana guttata*). Hard-bottom substrates also provide suitable foraging habitat for groundfish.

Temporary impacts to soft-bottom habitat would result from anchoring of construction vessels. This habitat would, however, quickly be recolonized by benthic organisms and again serve as suitable groundfish foraging habitat. Disturbance of the ocean substrate for diffuser system installation would temporarily increase turbidity and sedimentation and decrease water quality in the project area, but since construction would be temporary and localized, no long-term significant impacts would occur.

Recovery to pre-project conditions could be expected within several months. Groundfish species and pelagic species, such as northern anchovy and Pacific sardine, that are transient in the project area would be able to move away from project activities and return after completion. Due to the mobile nature of fish species in the project area and the avoidance of sensitive hard-bottom substrate, impacts to EFH for groundfish and pelagic species from construction and anchoring would not be a significant impact.

During operation of the diffuser, the 95:1 initial dilution that was modeled would dilute copper in the RO brine sufficiently to meet the requirements of the Ocean Plan. Therefore, potential adverse effects on fish from high copper exposure (e.g., lowered resistance to disease, hyperactivity, impaired respiration, disrupted osmoregulation, or impacted olfactory performance) would be avoided.

BIOLOGICALLY SIGNIFICANT HABITATS

The groundfish EFH management plan also designates various habitats important to groundfish, such as “habitat areas of particular concern.” These habitats include estuaries, eelgrass beds, kelp forests, rocky reefs, and “areas of interest” (a variety of submarine features, such as banks, seamounts, and canyons). Small surfgrass (*Phyllospadix scouleri*) beds have been observed in the vicinity of manhole access point 3 on the SONGS conduits and hard-bottom substrate is located within the project limits. Small stands of giant kelp or individual kelp plants may occasionally be present on hard substrate within the project area (SCE 2005). Increased turbidity and suspended sediments can have adverse and beneficial effects on plants and animals. Increased turbidity would reduce light penetration, which may reduce primary production and, if persistent, could lead to reduced growth and reproductive capacity.

Increased sedimentation can bury surfgrass beds, hard-bottom habitat, and kelp forests; however, surfgrass is found in dynamic nearshore areas that may undergo varying degrees of annual sedimentation and can therefore tolerate periods of increased sedimentation. Additionally, relatively high turbidity levels have been observed in the project area, as it is an area subject to wave action and tidal surge (SCE 2009). Higher turbidity levels are common in coastal regions geophysically similar to those in the project area.

Threatened, Endangered, or Species of Concern

No federally or state listed fish, plant, or invertebrate species are present in the project area.

Marine Mammals and Sea Turtles

The marine mammals that would most likely occur in the area during the project implementation period (April through September) are the California sea lion, Pacific harbor seal, common dolphin, and bottlenose dolphin. The project area may be utilized for foraging by these species. Gray whales regularly occur within nearshore areas of MCBCP (NAVFAC SW 2010); however, this species is normally present only during its migration period along the coast of southern California, generally between December-March

The proposed project could affect marine mammals and sea turtles through collision with water craft, direct injury from proposed activities, injury related to turbidity and construction noise, exposure to contaminants, and interference with foraging. Two or three tugboats with barges would transport equipment for disposition at speeds less than 9 miles per hour (8 knots). With construction-vessels traveling at such slow speeds and remaining 100 yards away from marine mammals during transit, collisions with marine wildlife would be unlikely. Crew boats that would transport divers and other personnel would travel at a greater speed, but the risk of collision with marine mammals would still be extremely low, the same as with any other water craft.

The mobility of the marine mammals is also important in addressing concern from direct injury from project activities and influence from increased turbidity. The activity would be localized and limited in extent and time. The initiation of activities may result in a startle response from marine mammals present in the project area, and they would be expected to avoid the immediate vicinity. California sea lions and bottlenose dolphins are known to be curious and may investigate the activities but likely in a transitory manner. Pacific harbor seals are more wary and would likely stay well away. Although turbidity is expected to increase locally due to the project, the turbidity is likely to increase in proximity to the seafloor, where turbidity is naturally high due to the presence of fine sediments that are readily resuspended by wave action. Local marine mammals are familiar with the magnitude and variability in turbidity in the nearshore habitat; greater-than-ambient turbidity due to the project is expected to be limited to the immediate project vicinity and would dissipate rapidly following project activities.

P-1044 construction would generate noise from installing the brine pipeline and attendant activity, including drilling, anchoring, and installation of armor rock. Noise may affect marine mammals, which are dependent on the production of sounds for various biological functions including social interaction, foraging, orientation, and predator detection (Tyack 2009). Noise impacts of this type are partially dependent on the increase over existing ambient noise levels. Ambient noise as measured in deep water is characterized by several dominant sources, including surface noise from the wind/wave action, seismic disturbances (tremors), turbulence from currents, and distant shipping noise. In contrast to the sources in deep-water ambient noise, the ambient levels in coastal waters are subject to wide variation. In shallow waters such as the project site, the noise background is a mixture of sources including shipping/boating and military activity; wind noise; and biological noise (e.g., whales, dolphins). It is, therefore, difficult to quantify the shallow-water background noise levels and the impacts that introducing increased anthropogenic sources may cause.

Construction equipment and activity would produce both underwater and airborne noise with a potential for disturbance of marine mammals and pinnipeds. Airborne noise from individual pieces of above-water construction equipment could attain disturbance levels at distances up to 412 meters from their source. As a result, Level A and B airborne noise harassment levels would not be exceeded beyond 500 meters. However, no pinniped haul out or rookery sites are known within proximity of the project area where hauled-out pinnipeds could potentially be impacted by airborne noise. The nearest documented pinniped haul out or rookery sites are located at La Jolla, approximately 64.4 kilometers south; at Santa Catalina Island, approximately 72.5 kilometers west; and at San Clemente Island, approximately 96.5 kilometers southwest.

Project activities are also expected to generate noise from mechanical equipment, generators, boat activities, and other project functions, and noise may affect marine mammals, which are dependent on the production of sounds for various biological functions including social interaction, foraging, orientation, and predator detection. The proposed construction activities for installing the brine line could include drilling, anchoring, dredging, and construction and installation of armor rock. The typical noise levels for these types of equipment are shown in Table 4.1.14-1.

Table 4.1.14-1
Typical Underwater Construction Tool and Activities Noise Source Levels

Tool Type	Source Level (dB re 1μPa at 1 meter)	Distance to 120 dB re 1 μPa (meters)	Calculated Sound Level at 500 Meters (dB re 1 μPa RMS)
Small drill	147	63	107
Large drill	143	34	103
Small grinder	150	100	110
Large grinder	146	54	106

dB = decibel; RMS = root mean square; μPa = micropascal
Source: WSDOT 2008

Underwater noise levels were calculated on the basis of data and methods described in Washington State Department of Transportation's Advanced Training Manual, Biological Assessment Preparation for Transportation Projects Version 10-08 (WSDOT 2008). In accordance with guidance from the NMFS, this analysis used the Practical Spreading Loss Model.

Several construction activities would occur sequentially, e.g., ship mooring or rock bed placement, to maintain safety. However, several simultaneous activities are anticipated during preparation of the existing conduit and installation of the diffuser system, e.g., riser removal, brine line layout and connection, and diffuser line anchoring. In addition, ship movement and activities onboard ships would generate noise in the marine environment. If two pieces of equipment of similar noise levels were operating simultaneously in proximity, noise from the equipment would generate noise levels at the receiver 3 dBA higher than a single piece of equipment. For equipment with greatly different levels, i.e., greater than 10 dB, the equipment emitting the lower noise level would not cause an increase in the noise level generated by the louder piece of equipment.

Ships and boats produce a highly complex mixture of noise from mechanical sources within the vessel, each of which has its own amplitude and frequency. Ship noise sources include the engine, transmission, and propellers. Construction ships/barges include additional sources of sound, such as the pump and suction pipe, crane, or excavator. As with other surface vessels, construction vessels are considered continuous sources of noise for the purposes of noise assessment or environmental impact assessment requirements.

Construction would also occur on the beach to access the SONGS conduit. Construction activities would involve excavation and insertion, and connection of the brine discharge pipeline. An interlocking steel cofferdam would be constructed with dewatering activities as required. Construction of the cofferdam would require the insertion of sheet piles at least 15 meters deep, based on the depth of the conduit. It is anticipated the piles would be pressed into place. Hydraulic pile presses generate much less noise than typical impact pile drivers and very little vibration.

The NMFS harassment noise levels (NMFS 2010b) are:

- (Level A Harassment) has the potential to injure a marine mammal or marine mammal stock in the wild; or,
- (Level B Harassment) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

Level A harassment may occur above 190 dB for pinnipeds and 180 dB for cetaceans. Level B harassment may occur above 160 dB for impulse sounds (e.g., impact pile driving and dredging), and 120 dB for continuous sounds (e.g., vibratory pile driving) for both pinnipeds and cetaceans (NOAA 2010b). For airborne sound, disturbance during haul outs has been documented at 100 dB (unweighted) for pinnipeds in general, and at 90 dB (unweighted) for harbor seals.

According to these source levels, noise from these pieces of equipment would exceed harassment levels within 1 meter from the source. However, using an underwater noise propagation rate of a 4.5-dB noise reduction per doubling of distance, the proposed underwater construction activity would not exceed Level B harassment thresholds outside of the 500-meter project buffer/shut-down zone around the project limits (marine mammal observers would be used during in-water work and work would be shut down if a marine mammal were observed within or approaching the 500-meter buffer). Any equipment with a maximum source sound level of 160 dB or less at 1 meter would generate noise levels equal to or less than 120 dB within the 500-meter buffer.

Equipment exceeding this maximum source sound level would be excluded from in-water construction.

The 500-meter buffer may be refined to ensure marine mammal protection from underwater noise during construction. If in-situ noise monitoring indicates greater than predicted sound levels that would not attenuate within the designated project buffer/shut-down zone, then work would stop and experts from NMFS would be consulted to identify the necessary preventive measures for construction activities, including modifying the project buffer area and monitoring needs. Implementation of such measures and others described in this section, would ensure the protection of marine mammal species.

Mitigation

Potential marine resource impacts from the land-based portions of the proposed action would be mitigated through compliance with regulatory permit requirements from a variety of resource agencies. Spill prevention and control, hazardous materials storage, and other measures would also be addressed through compliance with standard building codes, plumbing codes, military specification requirements, and environmental permit stipulations. Accordingly, a variety of design safeguards and structural/ nonstructural BMP requirements would be required and implemented before and during construction, continuing through the postconstruction operational phase. These would include the implementation of a project-specific SWPPP that incorporates a variety of BMPs relative to site-specific needs and conditions, as well as environmental permit requirements passed down from the regulatory agencies discussed in Section 3.2. Operation and maintenance procedures and inspection protocols also would be integrated to address proper operation, maintenance, and spill/damage protection for the ocean diffuser outfall line/diffuser system to safeguard marine resources.

Consistent with NPDES permits and other similar WDRs governed by the state, a suitable comprehensive monitoring and reporting program would be required to monitor and evaluate marine conditions in accordance with NPDES permits or other similar regulatory requirements. Areas of potential impact, such as the zone of initial dilution as well as upcurrent control stations, would need to be sampled and evaluated on a suitable time scale to gauge potential impacts and allow reasonable response times to correct significant adverse water quality impacts. Within these response times, the monitoring and reporting program would need to integrate the ability to adjust and modify additional protection (BMPs) to reduce impacts.

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.1.14.2 P-1045 Alternative 1

Impacts

No direct impacts to marine resources are anticipated from implementation of P-1045.

Mitigation

No mitigation is proposed.

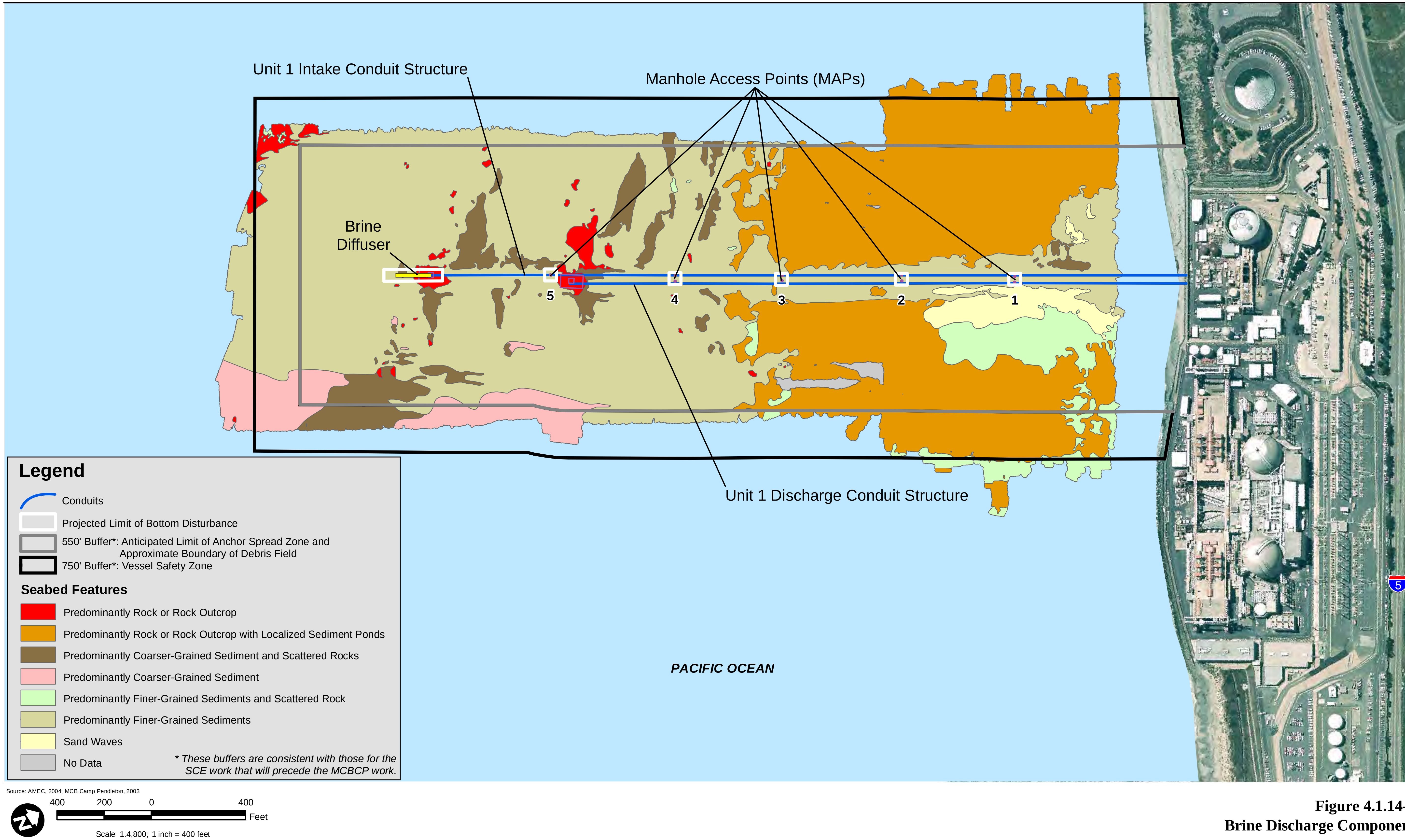


Figure 4.1.14-1
Brine Discharge Component

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4.2 ALTERNATIVE 2

4.2.1 Geology and Soils

4.2.1.1 Both MILCONs (Alternative 2)

Methodology

Methodology is described in Section 4.1.1.1.

Impacts

Alternative 2 would differ in some of the areas affected, but the geotechnical requirements for construction and erosion control would generally be the same as those discussed for Alternative 1. The same regulations, requirements, and controls would apply. Alternative 2 of P-1045 would not include the 4-million-gallon reservoir and would place a pipeline in Las Pulgas Canyon, one of the landslide-prone areas on-Base. However, the pipeline would be along Las Pulgas Road along the bottom of the canyon, not in the canyon slopes where landslides could occur, and would be underground. It therefore would not be subject to damage from landslides. With this exception, the discussion of impacts in Section 4.1.1.1 is applicable to Alternative 2.

Mitigation

No mitigation measures are proposed.

4.2.2 Water Quality and Hydrology

Water quality and hydrology are covered in this section; please see Section 4.2.3 for related impacts to biological resources and Section 4.2.14 for related impacts to marine resources.

4.2.2.1 Both MILCONs (Alternative 2)

Impacts

The discussion in Section 4.1.2.1 of general impacts common to both MILCONs is applicable to Alternative 2.

Mitigation

No mitigation measures are proposed.

4.2.2.2 P-1044 Alternative 2

Impacts

P-1044 Alternative 2 would include an additional TLS construction crossing of San Onofre Creek (three for this alternative versus two for Alternative 1) and approximately 4,000 LF of pipelines (Table 2.6-2) and 5,000 LF of TLS construction less than Alternative 1. The additional crossing of San Onofre Creek under this alternative would result in a greater chance for stream or creek bank damage from TLS construction on both sides of the creek, including residues or releases from bentonite handling, spoils management, and hazardous liquids. Otherwise, the potential impacts of P-1044 Alternative 2 would be the same as for P-1044 Alternative 1, as discussed in Section 4.1.2.2.

Mitigation

No mitigation measures are proposed.

4.2.2.3 P-1045 Alternative 2

Impacts

Water quality impacts associated with the construction of P-1045 Alternative 2 would avoid construction of the 4-million-gallon reservoir and associated connections and TLS crossings of Las Flores Creek, Aliso Canyon drainage, and French Creek by using the Las Pulgas Road to Basilone Road alignment instead of the Stuart Mesa Road to Vandegrift Boulevard route. Alternative 2 would be in the Las Flores Creek drainage, following Las Pulgas Road between Stuart Mesa Road and Basilone Road. P-1045 Alternative 2 would cross approximately 26 unnamed drainages and, in the Basilone Road segment, the upper reaches of Las Flores Creek and Aliso Creek. TLS construction would be used to cross the Santa Margarita River and other sensitive resources from Basilone Road just south of the 25 Area (Vado Del Rio) to the vicinity of the future AWT South in Haybarn Canyon. Temporary construction impacts from TLS operations and other associated activities would be similar to the description in Section 4.1.2.3. The construction of the pipeline along Las Pulgas Road would be in proximity to Las Flores Creek and would increase the potential for water quality impacts in that drainage area. Pump station locations would be at the same locations as P-1045 Alternative 1.

Construction and operation of P-1045 Alternative 2 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5 and applicable regulations in Section 3.2.

Mitigation

No mitigation measures are proposed.

4.2.3 Biological Resources

Biological resources are covered in this section; please see Section 4.2.2 for related impacts to water quality and hydrology and Section 4.2.14 for related impacts to marine resources.

4.2.3.1 Both MILCONs (Alternative 2)

Impacts

For a general description of the potential direct and indirect impacts to biological resources that would result from construction and operation of the alternatives, refer to Alternative 1, Section 4.1.3.1. A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1. The special conservation and construction measures listed in Section 2.5 would be incorporated as part of any of the alternatives and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources.

The total impacts to biological resources associated with implementing the projects associated with Alternative 2 are presented below. In all cases, the total area of impacts associated with each project is presented separately, and then those totals are summed across both projects. However, in areas common to both projects, impacts would not happen anew in overlapping areas if the projects were implemented simultaneously. Therefore, the totals that are summed across both projects represent the greatest disturbance possible, which would occur if every project took place at a different time in every overlap area.

As previously noted, analyzing impacts within utility corridors for the full 125-foot width represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the maximum (100 percent) and the anticipated (48 percent) impact scenarios for comparison. The direct impacts that would arise from trenching within project corridors to install the proposed water pipelines would be considered temporary for habitats that can be restored after construction activities are complete. Temporary, direct impacts may also arise from construction-generated fugitive dust; noise; increased human presence; and construction-related erosion, runoff, and sedimentation into plant communities. Direct impacts from these construction-related activities would be considered temporary wherever the impacts would end with cessation of project construction. However, direct impacts to some resources, e.g., occupied San Diego and Riverside fairy shrimp habitat (vernal pool basins) and occupied thread-leaved brodiaea habitat may or may not be reversible as construction impacts within the corridor could result in the permanent alteration of physical characteristics critical to the species, compared to the preconstruction condition. Therefore, as discussed previously, all proposed trenching-related corridor impacts to occupied San Diego and Riverside fairy shrimp habitat and occupied thread-leaved brodiaea habitat are analyzed as permanent impacts herein.

A thorough analysis of impacts to listed species is provided in the biological assessment for the proposed action (AECOM 2012).

Additional impacts to biological resources may occur as a result of habitat restoration. At this time, these effects are not quantifiable. Additional impacts to regulated biological resources would be analyzed after finalization and approval of habitat restoration plans as submitted to ES; USFWS; and USACE.

<u>Mitigation</u>

Mitigation measures that would be required for one or both of the projects are summarized in Section 4.1.3.1 (Table 4.1.3.1-2). The project-specific relevance of these measures is presented in the following sections.

If acreage is needed for mitigation of impacts to federally listed species or habitats, any on-Base mitigation should not interfere with the Base's training mission. Any such interference would be avoided through consultation between ES and Base Operations and Training, as explained in Section 4.1.5.1.

Plant Communities

<u>Impacts</u>

The total permanent and temporary direct impacts to plant communities from development of the two separate projects that compose Alternative 2 are presented in Table 4.2.3.1-1. As noted above, in all cases the temporary impacts represent the worst-case scenario that could occur to biological resources because technologies would be employed to minimize resource impacts within the 125-foot-wide utility corridors. The maximum versus anticipated direct impacts to plant communities associated with Alternative 2 are summarized for riparian and upland habitat types for each project in

Table 4.2.3.1-2. Further details about direct impacts associated with project-specific facilities, and potential indirect impacts that could occur in the adjoining 100- and 400-foot buffer areas, are presented in subsequent sections of this EIS.

Only the permanent and temporary impacts to plant communities (grasslands, scrublands, and woodlands) that coincide with regulated waters (e.g., riparian wetlands or nonvegetated channels regulated under Section 404 of the CWA) or that are occupied by, or support, federally listed or covered species (i.e., ESA and/or MBTA) would be considered significant. Potential total impacts to these regulated/covered resources are discussed in the following subsections.

Mitigation

Mitigation required for unavoidable impacts to plant communities that are regulated or otherwise covered by federal statutes (i.e., waters regulated under the CWA and habitats for species listed under the ESA or covered under the MBTA) are discussed in the following subsections.

Waters of the U.S.

Impacts

Development of the two separate projects that compose Alternative 2 would result in permanent and temporary direct impacts to jurisdictional waters, including wetlands, as summarized in Table 4.2.3.1-3. All direct impacts to jurisdictional waters would be considered significant. The maximum versus anticipated direct impacts to wetlands and other waters associated with Alternative 2 are summarized for each project in Table 4.2.3.1-4. Additional project-specific details about potential direct impacts to jurisdictional waters are presented below for each separate project. The CWA Section 404(b)(1) Guidelines require USACE to determine that the project is the least environmentally damaging practicable alternative for the proposed unavoidable impacts to jurisdictional waters. Therefore, as project designs are finalized, attempts to avoid and minimize impacts to jurisdictional waters (wetlands and nonwetland waters) to the greatest extent practicable would be undertaken.

The determination of whether the utility projects may be permitted under USACE's NWP program, or whether specific individual permits would be required, would be determined formally as part of the CWA Section 404 permit process. As noted in Section 4.1.3.1, to qualify for a NWP, the proposed action and the associated unavoidable impacts to jurisdictional waters based on final project designs must satisfy all terms and conditions of the specific NWP, as well as all general conditions and any relevant regional conditions of the NWP program. One of the regional conditions published by the USACE Los Angeles District indicates that individual permits are required for all discharges of fill material into jurisdictional vernal pools (USACE Special Public Notice May 18, 2007).

Based on data collected during formal wetland delineations for Alternative 2, potential jurisdictional vernal pools were delineated within the proposed impact areas for MILCONs P-1044 and P-1045 (the jurisdictional status of all delineated waters is not considered final until the USACE has completed a jurisdictional determination). Therefore, if, based on final project design it is determined that impacting a jurisdictional vernal pool is unavoidable, then an Individual Permit would be required for these MILCONs. However, if the discharge of fill material into jurisdictional vernal pools can be avoided, then these MILCONs may qualify for authorization under NWP 12 (Utility Line Activities) pending USACE's review of pre-construction notification materials. It should be noted that the District Engineer may exercise "discretionary authority" for any activity that is determined to have a more than minimal individual or cumulative adverse effect on the environment or may be contrary to public interest and thus require an Individual Permit (33 CFR 330.2 [g]). Therefore, as noted above, the determination of whether MILCONs P-1044 and P-1045 may be permitted under NWPs or require individual permits would be determined formally as part of the CWA Section 404 permit process.

<u>Mitigation</u>

Mitigation for unavoidable impacts to jurisdictional waters is summarized in measure J1 in Table 4.1.3.1-2. Based on mitigation ratios of 2:1 for permanent impacts to wetlands, 1:1 for permanent impacts to other waters, and 1:1 for all temporary wetlands and waters impacts, the mitigation for waters of the U.S. that could be required for development of Alternative 2 is summarized in Table 4.2.3.1-5. Mitigation ratios across wetland types, e.g., coastal and valley freshwater marsh versus southern riparian woodland, must be finalized with USACE and RWQCB via the permitting process; some types may require more than a 2:1 ratio for the permanent loss of that wetland.

As noted in Section 2.5.2, unavoidable impacts to waters of the U.S. would require mitigation consistent with the final rule for Compensatory Mitigation for Losses to Aquatic Resources that was issued by USACE and USEPA. This would include the preparation of a detailed mitigation plan prepared collaboratively with ES and reviewed and approved by USACE and RWQCB before resource impact. If the unavoidable impacts to jurisdictional waters support federally listed species, then input from USFWS would also be required. The mitigation plan would describe on-site, off-site, and as needed, off-Base mitigation. For all habitat restoration that is proposed, this plan would include details regarding site preparation (e.g., grading), planting specifications, and irrigation design, as well as maintenance and monitoring procedures. The plan would also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria, and a strategy for long-term mitigation site management. A portion of the mitigation obligations may be satisfied by participating in a fee-based mitigation program (e.g., a wetland mitigation bank) in which case, long-term management for such mitigation would be covered under the terms of the formal banking agreement.

Federally Listed Plants

Impacts

All direct impacts to federally listed plants within the project limits, including the water utility corridors, are considered permanent impacts. Indirect impacts are evaluated for occurrences of federally listed plants within the 100-foot buffer zone. One federally listed plant species, thread-leaved brodiaea, may be directly impacted by implementation of Alternative 2. Acreages associated with this species that may potentially be impacted are noted in Table 4.2.3.1-6. The maximum versus anticipated impacts to federally listed plant species from Alternative 2 are summarized in Table 4.2.3.1-7. As previously noted, trenching impacts within the corridor would be considered permanent within thread-leaved brodiaea-occupied habitat, but temporary for all other plant habitat. Two additional listed plant species, San Diego button-celery and spreading navarretia, are not known to occur in the project limits or buffer areas. However, suitable habitat for these species (i.e., vernal pools) does occur and every effort would be made to avoid impacts to vernal pool habitat as described in Section 2.5.2 and measure P2 in Table 4.1.3.1-2.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed plant species. Mitigation for unavoidable impacts to federally listed plant species is summarized in measures P1 and P2 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed plant species from development of Alternative 2 is noted in Table

4.2.3.1-8. Species-specific mitigation ratios required for the project must be finalized with USFWS.

Nonfederally Listed Rare Plants

Impacts

Habitat supporting various nonfederally listed rare plant species occurs throughout Alternative 2. Rare plant species detected during project surveys that may potentially be impacted include, but are not limited to, Pendleton button-celery, sticky dudleya, Blochman's dudleya, many-stemmed dudleya, Palmer's grappling-hook, San Diego tarplant, coast wallflower, and western dichondra. One location of Pendleton button-celery would be directly impacted by the P-1045 project within the corridor. Eight locations of Pendleton button-celery could be indirectly impacted within the 100-foot buffer. Impacts to this species would be reduced to a level below significance through conservation measures identified in Section 2.5.2. In particular, impacts to this species would be avoided or minimized through worker environmental protection briefings, markers or fencing, biological monitoring, erosion and sedimentation prevention, and restoration of areas temporarily affected, as determined necessary by the project biologist. None of the impacts that would occur to nonfederally listed rare plant species from development of Alternative 2 were considered significant and are therefore not discussed further in the project-specific sections of this EIS.

Mitigation

Implementation of measures as discussed in Section 2.5.2 would avoid and minimize potential impacts to nonfederally listed rare plant species. Unavoidable impacts to the nonfederally listed rare plants as a result of Alternative 2 do not warrant additional project-specific mitigation measures.

Federally Listed Wildlife

Impacts

A total of nine federally listed wildlife species may be impacted by implementation of Alternative 2. These species are San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat. Acreages of habitat occupied by these species that may potentially be impacted and could require mitigation are provided in Table 4.2.3.1-6. These acreages are broken down according to plant community classifications and type of impact (temporary versus permanent). Impacts within the maintenance access, P-1044 facilities and P-1045 facilities are assessed as permanent direct impacts. As previously noted, analyzing impacts within the 125-foot-wide utility corridors represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the worst-case (100 percent) and the anticipated (48 percent) impact scenarios for comparison. As previously noted, trenching impacts within the corridor would be considered permanent within habitat occupied by Riverside fairy shrimp and San Diego fairy shrimp, but temporary for all other wildlife habitat. The maximum and anticipated direct impacts to federally listed species associated with Alternative 2 are provided in Table 4.2.3.1-7. Indirect impacts associated with the buffer are not quantified in this section, but are discussed in more detail in project specific discussions included within Sections 4.2.3.2 to 4.2.3.5.

A discussion of potential impacts specific to each federally listed wildlife species that may be impacted by Alternative 2 is provided in Section 4.1.3.1, with the exception of Stephens' kangaroo rat (not known for Alternative 1); thus a discussion of potential impacts to Stephens' kangaroo rat is included below. The discussion of each species is organized by (1) permanent direct impacts associated with the facilities; (2) permanent and temporary direct impacts associated with the corridor; and (3) permanent and temporary indirect impacts associated with the buffers associated with the facilities and corridor.

Stephens' Kangaroo Rat

FACILITIES – No occupied Stephens' kangaroo rat habitat is known to occur within the facilities, thus no permanent direct impacts to Stephens' kangaroo rat would occur.

CORRIDOR – Occupied habitat for Stephens' kangaroo rat is known for the corridor. These temporary direct impacts would result from construction activities that are expected to kill kangaroo rats in the area of impact by crushing kangaroo rats in their burrows during earth-disturbing activities, such as trenching or grading, and by collapsing burrows by driving over them with equipment. It is likely that Stephens' kangaroo rat within the corridor would suffer from injury, death, or, at a minimum, be harmed by the loss of some portion of their primary breeding, feeding, and/or sheltering habitat. While these measures may prevent a majority of kangaroo rat from being injured, some individuals may potentially escape detection and be killed or injured.

Conservation measures as discussed in Section 2.5.2 would minimize these potential impacts. These temporary direct impacts would be significant.

BUFFER – Permanent indirect impacts to occupied Stephens' kangaroo rat within the buffer may occur. Kangaroo rat whose home range includes a substantial portion of the impact area but are not killed as a result of construction activity would likely experience high mortality rates as a result of increased predation and territorial interactions with resident kangaroo rat. The monthly survival rate of healthy adult beach mice (*Peromyscus poliontus allophrys*) in Florida that were translocated into already occupied habitat was about 15 percent compared to a monthly survival rate of about 52 percent for resident mice (Van Zant and Wooten 2003). These impacts would be considered significant. However, implementation of measures as described in Section 2.5.2 would reduce impacts to below a level of significance. Thus, indirect impacts to Stephens' kangaroo rats would not be significant.

Temporary indirect impacts to adjacent occupied Stephen's kangaroo rat habitat may occur. Stephens' kangaroo rat are nocturnal species, and the alteration of natural light patterns (e.g., the introduction of artificial night lighting) can attract predators and/or increase predator effectiveness. However, construction activities would not occur at night, and no permanent lighting would be installed in or adjacent to kangaroo rat habitat, avoiding significant impacts of construction-related nighttime lighting. Also, noise and vibrations associated with the use of construction equipment have the potential to disrupt Stephens' kangaroo rat above ground or within their burrows, and alter their normal behavior. All construction activities would occur during the day in areas occupied by Stephens' kangaroo rat, when they are underground in their burrows. Some level of increased noise and vibration is likely to reach kangaroo rats within their burrows; however, most noise and vibration should be substantially attenuated by transmission through the soil and are unlikely to substantially disturb kangaroo rat or cause kangaroo rat to abandon the surrounding area. Therefore, these temporary indirect impacts of noise and light are expected to be insignificant.

Additional temporary indirect impacts to all of these listed wildlife species within the buffer would occur from construction-generated fugitive dust accumulation on surrounding vegetation, and erosion, runoff, and sedimentation in plant communities supporting this species. However, implementation of the measures proposed in Section 2.5.2 would make these impacts less than significant. Thus, these temporary direct impacts to these species would not be significant.

As mentioned previously, additional impacts to these federally listed wildlife species may occur as a result of habitat restoration. However, effects as a result of habitat restoration are not included in this EIS.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of Alternative 2 is noted in Table 4.2.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Nonfederally Listed Rare Wildlife

Impacts

The nonfederally listed rare wildlife impact assessment discussion for Alternative 1 is also applicable to Alternative 2. See Section 4.1.3.1.

Mitigation

The nonfederally listed rare wildlife mitigation assessment discussion for Alternative 1 is also applicable to Alternative 2. See Section 4.1.3.1.

Wildlife Corridors

Impacts

The wildlife corridor impact assessment discussion for Alternative 1 is also applicable to Alternative 2. See Section 4.1.3.1.

Mitigation

The wildlife corridors mitigation assessment discussion for Alternative 1 is also applicable to Alternative 2. See Section 4.1.3.1.

Table 4.2.3.1-1
Potential Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 2 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 2	P-1045 – Alternative 2	Total[2]
Permanent	**40.23**	**28.11**	**68.34**
Riparian and Wetlands	1.58	0.14	1.72
Mulefat Scrub	0.06	0.04	0.10
Riparian Scrub	-	<0.005	<0.005
Southern Riparian Woodland	1.20	0.07	1.27
Southern Willow Scrub	0.31	0.03	0.34
Sycamore Alder Riparian Woodland	-	<0.005	<0.005
Uplands	13.27	6.57	19.84
Coast Live Oak Woodland	0.15	-	0.15
Diegan Coastal Sage Scrub	10.16	5.38	15.54
Nonnative Grassland	1.46	0.73	2.19
Valley Needlegrass Grassland	1.49	0.46	1.95
Other Cover Types	25.38	21.40	46.78
Disturbed Habitat	3.52	0.18	3.70
Urban/Developed	21.86	21.22	43.08
Temporary	**275.26**	**304.29**	**579.55**
Riparian and Wetlands	12.22	23.20	35.42
Beach	0.89	-	0.89
Coastal and Valley Freshwater Marsh	0.15	-	0.15
Mulefat Scrub	2.96	7.81	10.77
Nonvegetated Channel	-	0.01	0.01
Open Water	0.42	-	0.42
Riparian Scrub	0.05	1.28	1.33
Southern Riparian Woodland	3.22	4.09	7.31
Southern Willow Scrub	4.52	9.11	13.63
Sycamore Alder Riparian Woodland	-	0.45	0.45
Vernal Pool	0.01	0.45	0.46
Uplands	113.20	162.96	276.16
Coast Live Oak Woodland	3.34	-	3.34
Diegan Coastal Sage Scrub	82.19	119.76	201.95
Nonnative Grassland	14.53	28.31	42.84
Valley Needlegrass Grassland	13.13	14.89	28.02
Other Cover Types	149.84	118.13	267.97
Disturbed Habitat	30.18	5.46	35.64
Urban/Developed	119.66	112.67	232.33
Total[2]	**315.49**	**332.40**	**647.89**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.

Table 4.2.3.1-2
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 2 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 2		P-1045 – Alternative 2		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**40.23**	**40.23**	**28.11**	**28.11**	**68.34**	**68.34**
Riparian and Wetlands	1.58	1.58	0.14	0.14	1.72	1.72
Uplands	13.27	13.27	6.57	6.57	19.84	19.84
Other Cover Types	25.38	25.38	21.40	21.40	46.78	46.78
Temporary	**275.26**	**147.10**	**304.29**	**152.19**	**579.55**	**299.29**
Riparian and Wetlands	12.22	6.43	23.20	11.25	35.42	17.68
Uplands	113.20	66.12	162.96	82.92	276.16	149.04
Other Cover Types	149.84	74.54	118.13	58.02	267.97	132.56
Total[2]	**315.49**	**187.33**	**332.40**	**180.30**	**647.89**	**367.63**

[1] The table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) maximum impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts).
[2] Numbers may not sum exactly due to rounding.

Table 4.2.3.1-3
Potential Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 2 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 2	P-1045 – Alternative 2	Total[2]
Permanent	**0.07**	**0.04**	**0.11**
Wetland[3]	<0.005	0.01	0.01
Southern Riparian Woodland	<0.005	-	<0.005
Sycamore-Alder Riparian Woodland	-	0.01	0.01
Other Waters[4]	0.07 (174)	0.02 (319)	0.09
Fresh Water	-	<0.005 (16)	<.005
Nonvegetated Channel	0.07 (174)	0.02 (303)	0.09
Temporary	**1.79**	**1.32**	**3.11**
Wetland[3]	1.23	0.80	2.03
Coastal and Valley Freshwater Marsh	0.26	<0.005	0.26
Mulefat Scrub	0.07	0.49	0.56
Southern Riparian Woodland	0.74	-	0.74
Sycamore-Alder Riparian Woodland	0.16	0.12	0.28
Vernal Pool	-	0.18	0.18
Other Waters[4]	0.56 (3,103)	0.52 (4,926)	1.08
Disturbed Wetland	0.07 (762)	<0.005 (36)	0.07
Fresh Water	-	0.01 (109)	0.01
Nonvegetated Channel	0.50 (2,341)	0.51 (4,782)	1.01
Total[2]	**1.87**	**1.36**	**3.23**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories. Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.
[3] Differences in the acreages presented in this table that summarize the area of jurisdictional wetlands within project boundaries vs. acreages presented in the previous two tables that summarize the area of riparian and other wetland vegetation communities within project boundaries are attributable to the different methodologies used for vegetation mapping vs. delineating jurisdictional wetlands.
[4] Linear distance (feet) impacts are provided in parentheses.

Table 4.2.3.1-4
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 2 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 2		P-1045 – Alternative 2		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**0.07**	**0.07**	**0.04**	**0.04**	**0.11**	**0.11**
Wetland	<0.005	<0.005	0.01	0.01	0.01	0.01
Other Waters[3]	0.07 (174)	0.07 (174)	0.02 (319)	0.02 (319)	0.09	0.09
Temporary	**1.79**	**0.92**	**1.32**	**0.91**	**3.11**	**1.83**
Wetland	1.23	0.65	0.80	0.64	2.03	1.29
Other Waters[3]	0.56 (3,103)	0.27 (3,103)	0.52 (4,926)	0.28 (4,926)	1.08	0.55
Total[2]	**1.87**	**1.00**	**1.36**	**0.95**	**3.23**	**1.95**

[1] This table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.
[3] Linear distance (feet) impacts are provided in parentheses.

Table 4.2.3.1-5
Mitigation for Permanent and Temporary Direct Impacts to Waters of the U.S. – Alternative 2 (acres)

Jurisdictional Waters	Mitigation Ratio	Potential Impacts[1]	Potential Mitigation[2,3]
Permanent	**-**	**-**	**0.11**
Wetland	2:1	0.01	0.02
Other Waters	1:1	0.09	0.09
Temporary	**-**	**-**	**1.84**
Wetland	1:1	1.29	1.29
Other Waters	1:1	0.55	0.55
Total	**-**	**-**	**1.95**

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.
[2] All temporary impacts to non-Waters of the U.S. will be restored in kind, on site at a 1:1 ratio. Because of the temporary nature of the impacts associated with installation of the communication lines, the plan will focus on the restoration of a variety of native habitats *in situ* after construction has been completed. A habitat mitigation plan for all temporary impacts to Waters of the U.S. will be developed in compliance with the CWA 404 mitigation regulations. All temporary impacts to WUS will be restored in kind, on site at a 1:1 ratio. Combine this plan to permanent impacts HMP.
[3] In compliance with CWA Section 404 permit process, a habitat mitigation plan detailing the mitigation measures for permanent impacts to wetlands and nonwetland Waters of the U.S., including jurisdictional vernal pools, must be prepared before impacts occurring.

Table 4.2.3.1-6
Potential Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 2 (acres)[1]

Species	P-1044 – Alternative 2	P-1045 – Alternative 2	Total[2]
Thread-leaved Brodiaea	0.92	-	0.92
Permanent	0.92	-	0.92
San Diego Fairy Shrimp	30 basins	-	30 basins
Permanent	30 basins	-	30 basins
Branchinecta spp.	3 basins	2 basins	5 basins
Permanent	3 basins	2 basins	5 basins
Southern California steelhead	0.31	-	0.31
Temporary	0.31	-	0.31
Open Water	0.31	-	0.31
Tidewater Goby	0.19	-	0.19
Temporary	0.19	-	0.19
Coastal and Valley Freshwater Marsh	0.13	-	0.13
Southern Riparian Woodland	0.06	-	0.06
Arroyo Toad (Aestivation/Dispersal)	25.93	0.28	26.21
Permanent	0.96	-	0.96
Coast Live Oak Woodland	0.09	-	0.09
Diegan Coastal Sage Scrub	0.64	-	0.64
Nonnative Grassland	0.02	-	0.02
Valley Needlegrass Grassland	0.20	-	0.20
Temporary	24.97	0.28	25.25
Coast Live Oak Woodland	0.85	-	0.85
Diegan Coastal Sage Scrub	16.49	0.28	16.77
Nonnative Grassland	4.64	-	4.64
Valley Needlegrass Grassland	2.98	-	2.98
Arroyo Toad (Breeding)	5.48	-	5.48
Permanent	0.41	-	0.41
Southern Riparian Woodland	0.29	-	0.29
Southern Willow Scrub	0.12	-	0.12
Temporary	5.07	-	5.07
Mulefat Scrub	0.59	-	0.59
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	1.15	-	1.15
Southern Willow Scrub	3.28	-	3.28
Coastal California Gnatcatcher	77.37	96.72	174.09
Permanent	9.18	3.60	12.78
Diegan Coastal Sage Scrub	9.18	3.60	12.78
Temporary	68.18	93.12	161.30
Diegan Coastal Sage Scrub	68.18	93.12	161.30

Species	P-1044 – Alternative 2	P-1045 – Alternative 2	Total[2]
Least Bell's Vireo	9.12	17.48	26.60
Permanent	1.32	0.10	1.42
Mulefat Scrub	-	0.01	0.01
Riparian Scrub	-	<0.005	<0.005
Southern Riparian Woodland	1.20	0.07	1.27
Southern Willow Scrub	0.12	0.02	0.14
Sycamore Alder Riparian Woodland	-	<0.005	<0.005
Temporary	7.81	17.38	25.19
Coastal and Valley Freshwater Marsh	0.15	-	0.15
Mulefat Scrub	0.66	3.76	4.42
Riparian Scrub	0.05	1.28	1.33
Southern Riparian Woodland	3.22	3.65	6.87
Southern Willow Scrub	3.72	8.23	11.95
Sycamore Alder Riparian Woodland	-	0.45	0.45
Southwestern Willow Flycatcher	7.34	12.89	20.23
Permanent	0.22	0.03	0.25
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	0.10	<0.005	0.10
Southern Willow Scrub	0.12	0.02	0.14
Sycamore Alder Riparian Woodland	-	<0.005	<0.005
Temporary	7.12	12.86	19.98
Coastal and Valley Freshwater Marsh	0.15	-	0.15
Mulefat Scrub	0.66	2.08	2.74
Southern Riparian Woodland	3.06	2.65	5.71
Southern Willow Scrub	3.25	7.78	11.03
Sycamore Alder Riparian Woodland	-	0.35	0.35
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	-	5.98
Temporary	5.98	-	5.98
Diegan Coastal Sage Scrub	5.98	-	5.98
Pacific Pocket Mouse (Microhabitat)[3]	1.82	0.64	2.46
Temporary	1.82	0.64	2.46
Diegan Coastal Sage Scrub	1.78	0.59	2.37
Mulefat Scrub	0.05	0.05	0.10
Pacific Pocket Mouse (Suitable Habitat)[3]	4.46	2.12	6.58
Permanent	<0.005	-	<0.005
Diegan Coastal Sage Scrub	<0.005	-	<0.005
Temporary	4.46	2.12	6.58
Diegan Coastal Sage Scrub	4.37	2.10	6.47
Disturbed Habitat	0.06	-	0.06

Species	P-1044 – Alternative 2	P-1045 – Alternative 2	Total[2]
Mulefat Scrub	0.02	0.02	0.04
Southern Riparian Woodland	0.02	-	0.02
Stephens' Kangaroo Rat	-	0.42	0.42
Permanent	-	<0.005	<0.005
Valley Needlegrass Grassland	-	<0.005	<0.005
Temporary	-	0.42	0.42
Nonnative Grassland	-	0.01	0.01
Valley Needlegrass Grassland	-	0.42	0.42

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.

[2] Numbers may not sum exactly due to rounding. Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for the MILCONs are not provided.

[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.2.3.1-7
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 2 (acres)[1]

Species	P-1044 – Alternative 2		P-1045 – Alternative 2		Total Maximum Impacts	Total Anticipated Impacts
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Thread-leaved Brodiaea[2]	0.92	0.51	-	-	0.92	0.51
San Diego Fairy Shrimp[2]	30 basins	14 basins	-	-	30 basins	14 basins
Branchinecta spp.[2]	3 basins	1 basin	2 basins	2 basins	5 basins	3 basins
Southern California steelhead	0.31	0.15	-	-	0.31	0.15
Tidewater Goby	0.19	0.09	-	-	0.19	0.09
Arroyo Toad (Aestivation/Dispersal)	25.93	13.61	0.28	0.28	26.21	13.89
Arroyo Toad (Breeding)	5.48	2.86	-	-	5.48	2.86
Coastal California Gnatcatcher	77.37	52.94	96.72	52.46	174.09	105.40
Least Bell's Vireo	9.12	5.63	17.48	8.48	26.60	14.11
Southwestern Willow Flycatcher	7.34	4.19	12.89	6.23	20.23	10.42
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	2.87	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[3]	1.82	1.02	0.64	0.45	2.46	1.47
Pacific Pocket Mouse (Suitable Habitat)[3]	4.46	2.75	2.12	1.63	6.58	4.38
Stephens' Kangaroo Rat	-	-	0.42	0.20	0.42	0.20

[1] Table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48%) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts).
[2] While impacts within the construction corridor are considered temporary and reversible for most resources, all direct impacts to these species and their habitats are considered permanent.
[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.2.3.1-8
Mitigation for Federally Listed Species – Alternative 2 (acres)[1]

Species	Mitigation Ratio	P-1044 – Alternative 2	Potential Mitigation	P-1045 – Alternative 2	Potential Mitigation	Total Potential Mitigation[7,8]
Plants						
Thread-leaved Brodiaea						
Permanent Impacts	2:1	0.51	1.02	-	-	1.02
Wildlife						
San Diego Fairy Shrimp						
Permanent Impacts	2:1[2]	14 basins	28 basins	-	-	28 basins
Southern California steelhead						
Temporary Impacts	1:1[3]	0.15	0.15	-	-	0.15
Tidewater Goby						
Temporary Impacts	1:1[3]	0.09	0.09	-	-	0.09
Arroyo Toad (Aestivation/ Dispersal)						
Permanent Impacts	0.5:1[4]	0.96	0.48	-	-	0.48
Temporary Impacts	1:1[3]	12.65	12.65	0.28	0.28	12.93
Arroyo Toad (Breeding)						
Permanent Impacts	2:1[4]	0.41	0.82	-	-	0.82
Temporary Impacts	1:1[4]	2.45	2.45	-	-	2.45
Coastal California Gnatcatcher						
Permanent Impacts	2:1	9.18	18.36	3.60	7.20	25.56
Temporary Impacts	1:1[3]	43.76	43.76	48.86	48.86	92.62
Least Bell's Vireo						
Permanent Impacts	2:1[4]	1.32	2.64	0.10	0.20	2.84
Temporary Impacts	1:1[4]	4.31	4.31	8.37	8.37	12.68
Southwestern Willow Flycatcher						
Permanent Impacts	2:1[4]	0.22	0.44	0.03	0.06	0.50
Temporary Impacts	1:1[4]	3.97	3.97	6.21	6.21	10.18
Pacific Pocket Mouse (Occupied Habitat)[5]						
Temporary Impacts	1:1[3,6]	2.87	2.87	-	-	2.87
Pacific Pocket Mouse (Microhabitat)[5]						
Temporary Impacts	1:1[3,6]	1.02	1.02	0.45	0.45	1.47
Pacific Pocket Mouse (Suitable Habitat)[5]						
Permanent Impacts	0:1[6]	<0.005	0.0	-	-	0.0
Temporary Impacts	1:1[3,6]	2.75	2.75	1.63	1.63	4.38

Species	Mitigation Ratio	P-1044 – Alternative 2	Potential Mitigation	P-1045 – Alternative 2	Potential Mitigation	Total Potential Mitigation[7,8]
Stephens' Kangaroo Rat						
Permanent Impacts	-	-	-	<0.005	0.0[9]	0.0[9]
Temporary Impacts	1:1[6]	-	-	0.20	0.20	0.20

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.

[2] Impacts noted for *Branchinecta* spp. in the above impact table are not included in this mitigation summary. Findings from the 2011/2012 protocol surveys and USFWS consultation will determine whether additional mitigation for listed fairy shrimp species would be required.

[3] Areas temporarily impacted by construction activities would be restored in-place (1:1) to native vegetation following construction.

[4] Mitigation for impacts to arroyo toad (aestivation) would be fulfilled through restoration of riparian vegetation at a 0.5:1 ratio as noted above. Alternatively, MCBCP may restore upland habitat at a ratio of 2:1. Per the Riparian BO (USFWS 1995), mitigation for impacts to arroyo toad (breeding), least Bell's vireo, and southwestern willow flycatcher would be fulfilled through mitigation of anticipated project impacts to riparian habitat (Table 4.1.3.1-4) regardless of occupation by a sensitive species, as discussed in Table 4.1.3.1-2.

[5] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

[6] In addition to in-place restoration, MCBCP would provide additional compensation for areas of suitable, but unoccupied habitat for Pacific pocket mouse that are temporarily impacted by construction activities. As stated in the FBO, the MCBCP would contribute to the San Diego Zoological Society's effort to establish a captive Pacific pocket mouse population and reintroduce this species to locations within their former distribution. Alternatively, MCBCP may restore Pacific pocket mouse habitat outside the project footprint; however, if that alternative is pursued then consultation with USFWS would need to be re-initiated. No mitigation is required to compensate for the unavoidable permanent impacts to unoccupied, but suitable Pacific pocket mouse habitat. As noted in the FBO, the USFWS determined that such impacts are not anticipated to substantially affect the availability of habitat that is likely to be used by this species.

[7] Numbers may not sum exactly due to rounding.

[8] Where applicable, permanent impacts to listed species riparian habitat will be offset by restoring riparian habitat in the Lower Santa Margarita River. Permanent impacts to the coastal California gnatcatcher habitat (coastal sage scrub or thread-leaved brodiaea would be offset at a 2:1 ratio through restoration of habitat in the Lima Coastal Sage Scrub Restoration site within the Lima Training Area, and vernal pool mitigation should take place in the San Onofre State Park Lease Area Vernal Pool Mesa site, or other available sites as determined by ES Land Management Branch and USFWS.

[9] No mitigation is proposed to offset this permanent loss; the effect is considered discountable.

4.2.3.2 P-1044 Alternative 2

Permanent and temporary direct and indirect impacts for P-1044 Alternative 2 would be similar to those discussed above for P-1044 Alternative 1. See Section 4.1.3.1 for a general discussion of these potential project effects to plant communities and other cover types, jurisdictional waters, habitats occupied by federally listed and other rare species, and migratory birds covered under the MBTA.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1044 Alternative 2 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.2.3.2-1, 4.2.3.2-2, and 4.2.3.2-3, respectively, with additional detail shown in Figures 4.2.3.2-4 and 4.2.3.2-5.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1044 Alternative 2 facilities would result in permanent direct impacts to riparian and upland native plant communities and other cover types (Table 4.2.3.2-1). Development within the project corridor, which includes the area of the P-1044 TLS site, would result in temporary direct impacts to plant communities and other cover types including vernal pools (Table 4.2.3.2-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, and vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under the CWA or occupied by federally listed species would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 2 could cause indirect impacts to plant communities and other cover types that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.2.3.2-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

<u>Impacts</u>

Direct Impacts

The project limits of the proposed action have been constrained to avoid and minimize permanent and temporary direct impacts to jurisdictional waters (including wetlands) that were identified via formal delineation. Development of the P-1044 Alternative 2 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of southern riparian woodland and nonvegetated channel (Table 4.2.3.2-4). Development of the TLS sites and project corridor would result in temporary direct impacts to jurisdictional waters and wetlands in the form of nonvegetated channel, disturbed wetland, southern riparian woodland, coastal and valley freshwater marsh, sycamore-alder riparian woodland, and mulefat scrub habitat (Table 4.2.3.2-5).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 2 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.2.3.2-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be temporarily or permanently, indirectly affected by the project as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measure J1, which would compensate for impacts to jurisdictional waters, including wetlands, is discussed in Section 4.1.3.1.

Federally Listed Plants

<u>Impacts</u>

Potential effects to federally listed plant species and habitat associated with development of P-1044 Alternative 2 are depicted in Figure 4.2.3.2-1 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.2.3.2-6 and 4.2.3.2-7.

Direct Impacts

Approximately 0.12 acre of thread-leaved brodiaea occupied habitat is known to occur within one of the P-1044 Alternative 2 project facilities and would be directly affected by development (Table 4.2.3.2-6). These individuals are located northeast of Reservoir 62310. Approximately 0.80 acre of thread-leaved brodiaea occupied habitat is known to occur within the P-1044 project corridor and may also be directly affected by the proposed action (Table 4.2.3.2-6). Direct effects to thread-leaved brodiaea may be minimized following implementation of avoidance, minimization, and compensation measures described in the mitigation section below. Any direct effect to this species is considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 1.28 acres of thread-leaved brodiaea occupied habitat are known to occur within the 100-foot buffer of the proposed action area (Table 4.2.3.2-7). Indirect effects to this species would be minimized by implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

Mitigation

Mitigation measures P1 and P2 would compensate for impacts to federally listed plant species as discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Wildlife

Impacts

Eight federally listed wildlife species, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be impacted by P-1044 Alternative 2. Locations of these species relevant to P-1044 are depicted in Figure 4.2.3.2-3. Occupied and/or suitable habitat for federally listed wildlife species near P-1044 Alternative 2 project components is depicted in Figures 4.1.3.2-4 through 4.1.3.2-12 (shown with Alternative 1 project components). A breakdown of occupied and/or suitable habitat according to vegetation type is provided in Table 4.2.3.1-6.

Construction of the brine outfall line for P-1044 Alternative 2 would not adversely affect the green sea turtle, loggerhead sea turtle, olive (Pacific) sea turtle, and leatherback sea turtle, as discussed in Section 4.2.14 of this EIS and in Appendix E.

Direct Impacts

P-1044 Facilities – Habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher occurs within the proposed P-1044 Alternative 2 facilities; thus, these species may be permanently, directly impacted. Pacific pocket mouse suitable habitat occurs within the P-1044 corridor; however, this habitat is not occupied and impacts would not be considered significant. Habitat occupied by these species that would be permanently, directly impacted is quantified in Table 4.2.3.2-8. Potential permanent direct impacts to wildlife species are depicted in Figure 4.2.3.2-3.

A thorough discussion of specific types of permanent direct impacts to these species is provided in Section 4.2.3.1.

P-1044 Corridor – Habitat occupied by and/or suitable for listed wildlife within the P-1044 corridor would be temporarily, directly impacted. Temporary direct impacts would occur to those four species discussed above, in addition to the San Diego fairy shrimp, southern California steelhead, tidewater goby, and occupied Pacific pocket mouse habitat. Additionally, basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1044 corridor; these basins are currently being analyzed and may be determined to be San Diego or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. Pacific pocket mouse-occupied habitat occurs within the P-1044 corridor; however, all direct impacts to occupied Pacific pocket mouse habitat would be considered significant, regardless of whether impacts are temporary. Habitat occupied by and/or suitable for these species that would be temporarily, directly impacted is quantified in Table 4.2.3.2-9.

A thorough discussion of specific types of permanent and temporary direct impacts to these species is provided in Section 4.2.3.1.

Indirect Impacts

Eight federally listed wildlife species may be indirectly impacted by construction of P-1044 Alternative 2. Habitat occupied by San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse occurs within the 400-foot buffer of the P-1044 facilities and corridor. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.2.3.2-10.

A thorough discussion of specific types of permanent and temporary indirect impacts to these species is provided in Section 4.2.3.1.

Indirect impacts to nesting shorebirds such as California least tern and western snowy plover within the beach habitat coincident with the brine discharge pipeline area at the SONGS outfall conduit were assessed for P-1044. However, it was determined that suitable habitat for these bird species does not occur due to constant disturbance from ocean waves and the high tide associated with this area. Thus, no indirect impacts to tern or plover would occur from P-1044.

<u>Mitigation</u>

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1044 Alternative 2 is noted in Table 4.2.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.2.3.2-1
Permanent Direct Impacts to Plant Communities and Cover Types Associated with P-1044 Alternative 2 Facilities (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Maintenance Access	Northern AWT Site 6	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	Paving of El Camino Real	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	Total[1]
Riparian and Wetlands	**0.12**	**0.19**	**-**	**-**	**-**	**0.07**	**0.11**	**-**	**-**	**1.10**	**1.58**
Mulefat Scrub	-	0.06	-	-	-	-	-	-	-	-	0.06
Southern Riparian Woodland	-	0.10	-	-	-	-	-	-	-	1.10	1.20
Southern Willow Scrub	0.12	0.02	-	-	-	0.07	0.11	-	-	-	0.31
Uplands	**0.58**	**2.14**	**5.28**	**-**	**-**	**1.48**	**1.22**	**2.39**	**-**	**0.18**	**13.27**
Coast Live Oak Woodland	-	0.15	-	-	-	-	-	-	-	-	0.15
Diegan Coastal Sage Scrub	0.58	1.10	4.10	-	-	1.01	0.80	2.39	-	0.18	10.16
Nonnative Grassland	-	0.29	1.17	-	-	-	-	-	-	-	1.46
Valley Needlegrass Grassland	-	0.60	-	-	-	0.47	0.42	-	-	-	1.49
Other Cover Types	**-**	**14.46**	**3.13**	**0.25**	**1.18**	**1.06**	**0.29**	**2.56**	**0.23**	**2.23**	**25.38**
Disturbed Habitat	-	0.03	3.13	-	-	0.37	-	-	-	-	3.52
Urban/Developed	-	14.43	-	0.25	1.18	0.69	0.29	2.56	0.23	2.23	21.86
Total[1]	**0.70**	**16.78**	**8.40**	**0.25**	**1.18**	**2.61**	**1.62**	**4.95**	**0.23**	**3.50**	**40.23**

[1] Numbers may not sum exactly due to rounding.

Table 4.2.3.2-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1044 Alternative 2 Corridor (acres)

Plant Communities and Other Cover Types	TLS Sites	Injection Wells	RWL Connection	Corridor[1]	
				Maximum Impacts (100%)	Anticipated Impacts (48%)
Riparian and Wetlands	**1.09**	**-**	**-**	**11.13**	**5.34**
Beach	-	-	-	0.89	0.43
Coastal and Valley Freshwater Marsh	-	-	-	0.15	0.07
Mulefat Scrub	0.07	-	-	2.90	1.39
Open Water	-	-	-	0.42	0.20
Riparian Scrub	-	-	-	0.05	0.03
Southern Riparian Woodland	0.99	-	-	2.23	1.07
Southern Willow Scrub	0.03	-	-	4.48	2.15
Vernal Pool	-	-	-	0.01	<0.005
Uplands	**16.84**	**0.45**	**5.37**	**90.54**	**43.46**
Coast Live Oak Woodland	-	-	-	3.34	1.60
Diegan Coastal Sage Scrub	15.56	0.45	5.37	60.82	29.19
Nonnative Grassland	1.06	-	-	13.47	6.47
Valley Needlegrass Grassland	0.23	-	-	12.91	6.20
Other Cover Types	**3.04**	**1.20**	**0.80**	**144.80**	**69.50**
Disturbed Habitat	1.13	-	-	29.05	13.94
Urban/Developed	1.91	1.20	0.80	115.75	55.56
Total[2]	**20.97**	**1.65**	**6.17**	**246.47**	**118.30**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.2.3.2-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1044 Alternative 2 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Northern AWT Site 6	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	Paving of El Camino Real	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
Riparian and Wetlands	**0.57**	**-**	**-**	**0.06**	**0.01**	**0.26**	**0.05**	**1.71**	**-**	**7.07**	**0.30**	**-**	**36.04**	**46.08**
Beach	-	-	-	-	-	-	0.05	-	-	-	-	-	2.67	2.72
Coastal and Valley Freshwater Marsh	-	-	-	-	-	-	-	-	-	-	-	-	0.43	0.43
Mulefat Scrub	-	-	-	-	-	-	-	0.16	-	2.99	0.30	-	11.30	14.75
Open Water	-	-	-	-	-	-	-	-	-	-	-	-	1.60	1.60
Riparian Scrub	-	-	-	-	-	-	-	-	-	-	-	-	0.14	0.14
Southern Riparian Woodland	-	-	-	0.06	-	-	-	1.55	-	3.08	-	-	10.50	15.19
Southern Willow Scrub	0.57	-	-	-	0.01	0.26	-	-	-	1.00	-	-	9.13	10.97
Vernal Pool	-	-	-	-	-	-	-	-	-	-	-	-	0.28	0.28
Uplands	**1.97**	**2.79**	**0.19**	**-**	**2.87**	**2.34**	**-**	**1.23**	**16.98**	**16.59**	**0.60**	**5.54**	**192.54**	**243.62**
Coast Live Oak Woodland	-	-	-	-	-	-	-	-	-	0.06	-	-	8.12	8.17
Diegan Coastal Sage Scrub	1.97	2.52	0.19	-	1.98	1.49	-	1.23	16.98	14.53	0.60	5.54	128.82	175.85
Nonnative Grassland	-	0.27	-	-	0.25	-	-	-	-	1.19	-	-	24.94	26.65
Valley Needlegrass Grassland	-	-	-	-	0.64	0.85	-	-	-	0.81	-	-	30.66	32.95
Other Cover Types	**0.14**	**1.48**	**0.82**	**1.79**	**0.33**	**-**	**1.13**	**0.83**	**2.84**	**5.52**	**2.47**	**0.18**	**174.71**	**192.23**
Disturbed Habitat	0.01	1.48	-	-	0.09	-	-	-	-	1.71	-	-	43.11	46.40
Urban/Developed	0.13	-	0.82	1.79	0.24	-	1.13	0.83	2.84	3,81	2.47	0.18	131.60	145.83
Total[1]	**2.68**	**4.27**	**1.01**	**1.85**	**3.20**	**2.60**	**1.18**	**3.77**	**19.81**	**29.18**	**3.37**	**5.71**	**403.30**	**481.94**

[1] Numbers may not sum exactly due to rounding.

Table 4.2.3.2-4
Permanent Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 2 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Wetland	**<0.005**
Southern Riparian Woodland	<0.005
Other Waters[1]	**0.07 (174)**
Nonvegetated Channel	0.07 (174)
Total[2]	**0.07**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.2.3.2-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 2 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridor[1] Maximum Impacts (100%)	Corridor[1] Anticipated Impacts (48%)
Wetland	**0.12**	**1.11**	**0.53**
Coastal and Valley Freshwater Marsh	-	0.26	0.12
Mulefat Scrub	<0.005	0.07	0.03
Southern Riparian Woodland	0.12	0.62	0.30
Sycamore-Alder Riparian Woodland	-	0.16	0.08
Other Waters[2]	**-**	**0.56 (3,103)**	**0.27 (3,103)**
Disturbed Wetland	-	0.07 (762)	0.03 (762)
Nonvegetated Channel	-	0.50 (2,341)	0.24 (2,341)
Total[3]	**0.12**	**1.67**	**0.80**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.2.3.2-6
Permanent Direct Impacts to Federally Listed Plants Associated with P-1044 Alternative 2 Facilities (acres)

Habitat Occupied by:	Facilities	Corridor
Thread-leaved Brodiaea	0.12 acre	0.80 acre
San Diego Button-celery	0 basins	0 basins
Spreading Navarretia	0 basins	0 basins

Table 4.2.3.2-7
Potential Indirect Impacts to Federally Listed Plants within 100 Feet of P-1044 Alternative 2 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	1.28 acre
San Diego Button-celery	0 basins
Spreading Navarretia	0 basins

Table 4.2.3.2-8
Permanent Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 2 Facilities (acres)

Listed Wildlife Species	Above Ground Pipeline	Maintenance Access	Northern AWT Site 6	Paving of El Camino Real	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/ Pump Station/ TLS Site	Total[1]
Arroyo Toad (Aestivation/ Dispersal)	0.58	0.38	-	-	-	-	-	0.96
Arroyo Toad (Breeding)	0.12	0.09	-	-	-	-	0.20	0.41
Coastal California Gnatcatcher	0.21	0.50	4.10	2.39	1.01	0.80	0.18	9.18
Least Bell's Vireo	0.12	0.10	-	-	-	-	1.10	1.32
Southwestern Willow Flycatcher	0.12	0.10	-	-	-	-	-	0.22
Pacific Pocket Mouse (Suitable Habitat)[2]	-	<0.005	-	-	-	-	-	<0.005
Total[1]	**1.15**	**1.16**	**4.10**	**2.39**	**1.01**	**0.80**	**1.48**	**12.09**

[1] Numbers may not sum exactly due to rounding.
[2] Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.2.3.2-9
Permanent[1] and Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 2 Corridor (acres)

Listed Wildlife Species	TLS Sites	Injection Wells	RWL Connection	Corridor[2,3] Maximum Impacts (100%)	Corridor[2,3] Anticipated Impacts (48%)
San Diego Fairy Shrimp	-	-	-	30 basins[4]	14 basins
Branchinecta spp.	-	-	-	3 basins[5]	1 basin
Southern California steelhead[6]	-	-	-	0.31	0.15
Tidewater Goby	-	-	-	0.19	0.09
Arroyo Toad (Aestivation/Dispersal)	1.27	-	-	23.70	11.37
Arroyo Toad (Breeding)	0.03	-	-	5.04	2.42
Coastal California Gnatcatcher	15.56	0.28	5.37	46.98	22.55
Least Bell's Vireo	1.09	-	-	6.71	3.22
Southwestern Willow Flycatcher	1.06	-	-	6.06	2.91
Pacific Pocket Mouse (Occupied Habitat)[7]	-	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[7]	0.28	-	-	1.54	0.74
Pacific Pocket Mouse (Suitable Habitat)[7]	1.17	-	-	3.29	1.58

[1] Impacts to fairy shrimp species are considered irreversible and permanent; for all other species listed in this table, impacts are considered temporary.
[2] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[3] Numbers may not sum exactly due to rounding.
[4] San Diego fairy shrimp were found in basins with the following ID numbers: 799, 802, 803, 810, 811, 812, 814, 817, 827, 833, 837, 840, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 2797, 2798, 2799, 2800, and 2801.
[5] *Branchinecta* spp. fairy shrimp were found in basins with the following ID numbers: 801, 816, and 848.
[6] Temporary impacts to Southern California steelhead occur in San Onofre Creek.
[7] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.2.3.2-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1044 Alternative 2 Facilities and Corridor (acres)

Listed Wildlife Species	Above Ground Pipeline	Northern AWT Site 6	Paving of El Camino Real	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/Pump Station/TLS Site	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
San Diego Fairy Shrimp	-	-	-	-	-	-	-	-	-	-	-	1 basin[2]	1 basin
Southern California steelhead[3]	-	-	-	-	-	-	-	1.64	7.29	-	0.13	8.24	17.30
Tidewater Goby	-	-	-	-	-	-	-	-	0.48	-	-	3.23	3.71
Arroyo Toad (Aestivation/Dispersal)	9.04	-	-	3.48	1.02	-	-	3.43	17.76	-	-	240.69	275.42
Arroyo Toad (Breeding)	4.06	-	-	0.94	5.25	-	-	12.11	6.65	-	-	71.65	100.66
Coastal California Gnatcatcher	4.13	21.66	72.30	8.37	-	13.67	12.41	5.76	95.56	7.04	12.27	447.24	700.41
Least Bell's Vireo	4.06	-	-	0.94	5.25	-	-	13.40	62.63	-	0.83	154.27	241.37
Southwestern Willow Flycatcher	4.06	-	-	0.94	5.25	-	-	-	42.17	-	0.83	100.71	153.96
Pacific Pocket Mouse (Occupied Habitat)[4]	-	-	-	-	-	-	-	-	1.87	-	-	55.09	56.96
Pacific Pocket Mouse (Microhabitat)[4]	-	-	-	-	-	-	-	-	2.82	-	-	3.92	6.75
Pacific Pocket Mouse (Suitable Habitat)[4]	-	-	-	-	-	-	-	-	11.35	-	-	54.20	65.55

[1] Numbers may not sum exactly due to rounding.
[2] San Diego fairy shrimp were found in one basin with the following ID numbers: 862.
[3] Indirect impacts to southern California steelhead occur in San Mateo and San Onofre Creeks.
[4] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

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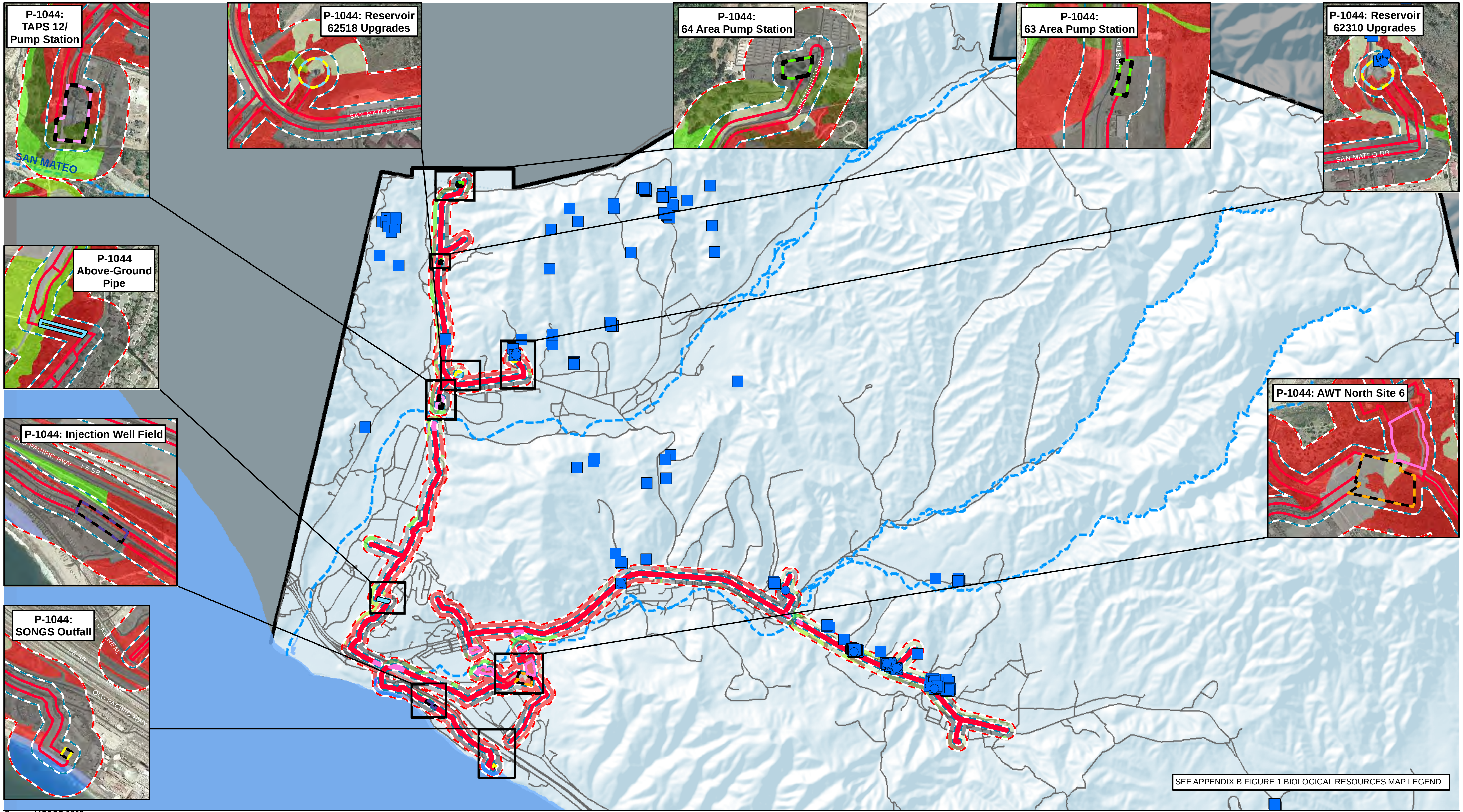

Source: MCBCP 2009

5,000 0 5,000 Feet

Scale 1:60,000; 1 inch = 5,000 feet

Figure 4.2.3.2-1
P-1044 Alternative 2
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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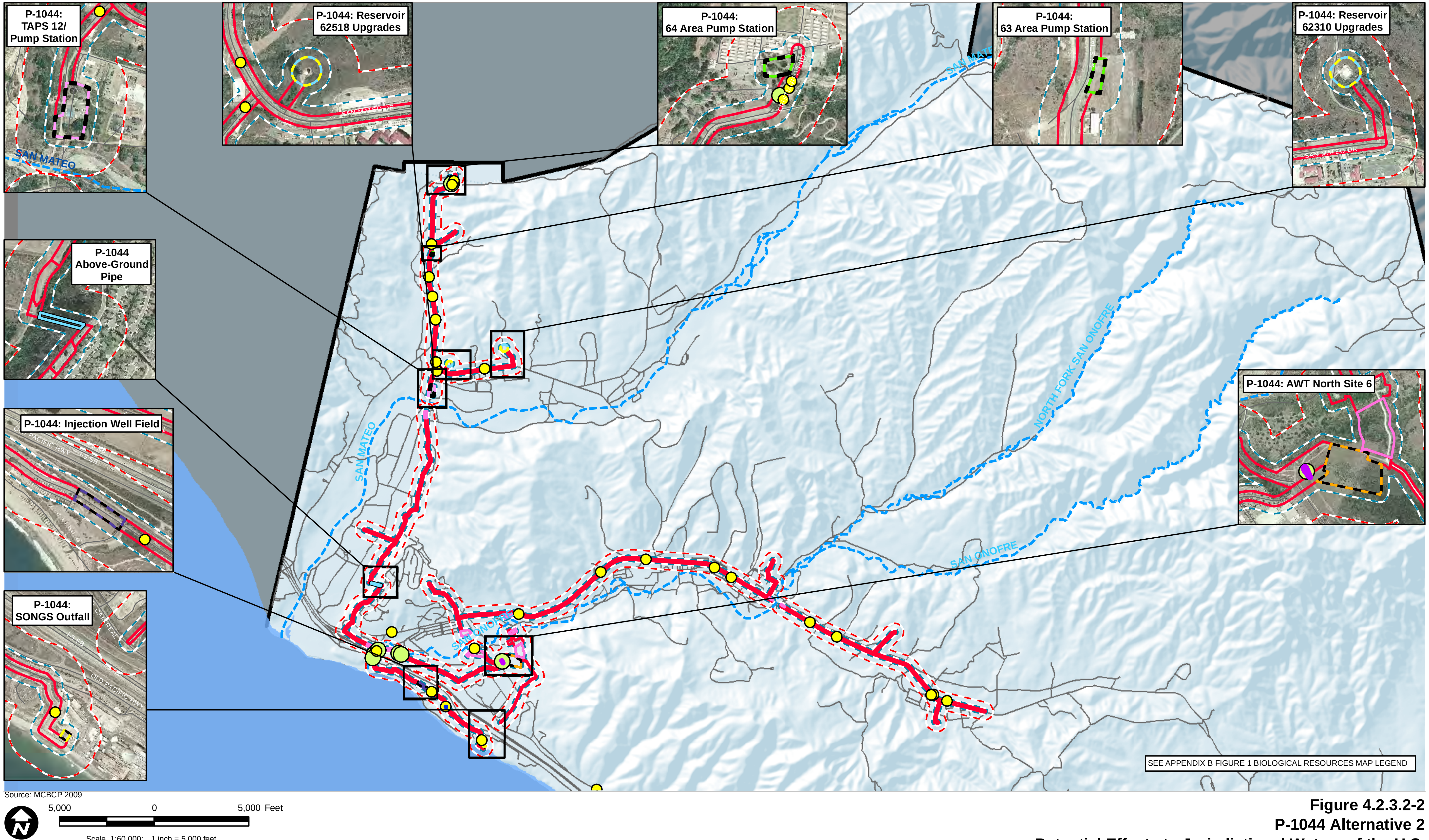

Figure 4.2.3.2-2
P-1044 Alternative 2
Potential Effects to Jurisdictional Waters of the U.S.

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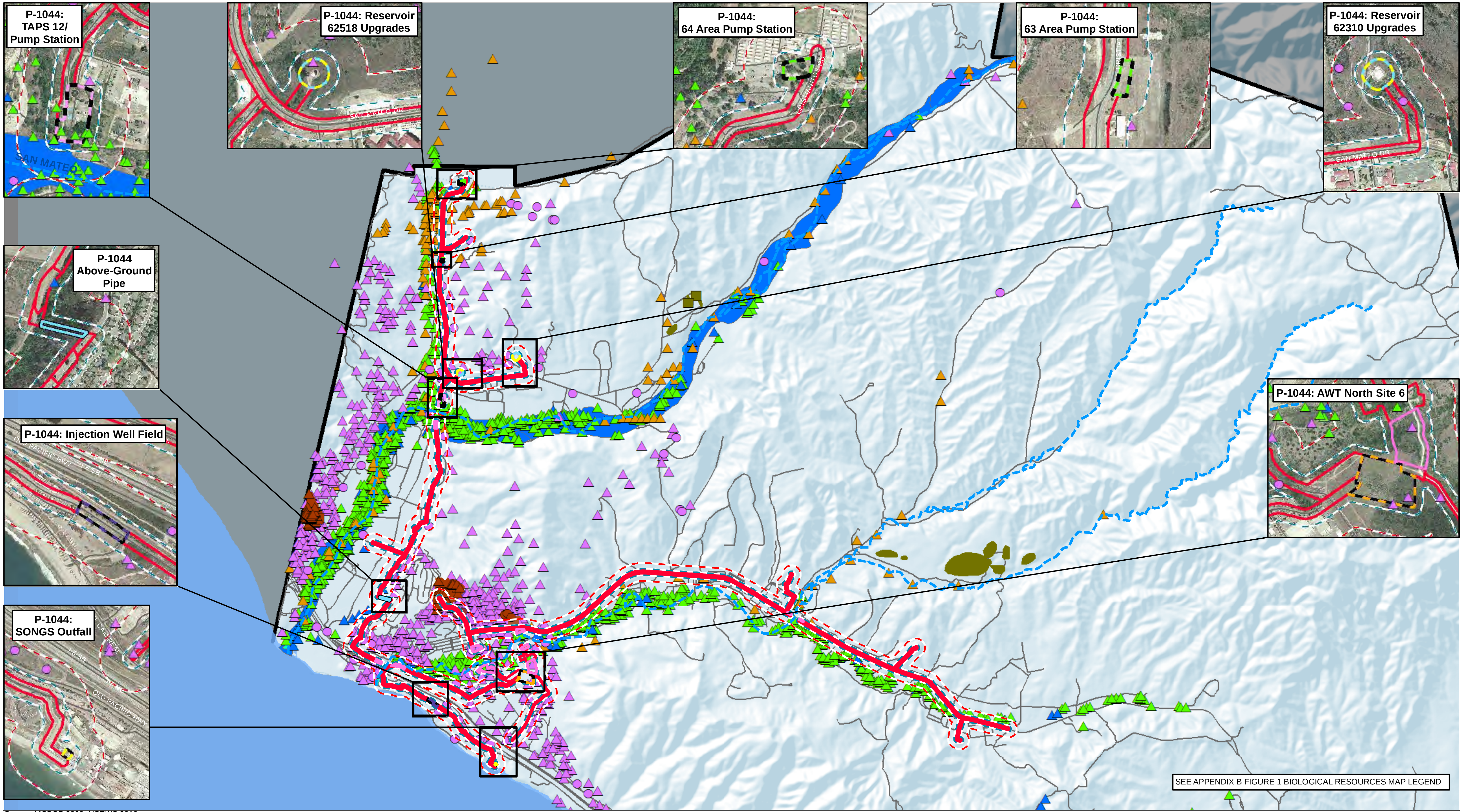

Source: MCBCP 2009; USFWS 2010

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Scale 1:60,000; 1 inch = 5,000 feet

Figure 4.2.3.2-3
P-1044 Alternative 2
Potential Effects to Listed Wildlife Species

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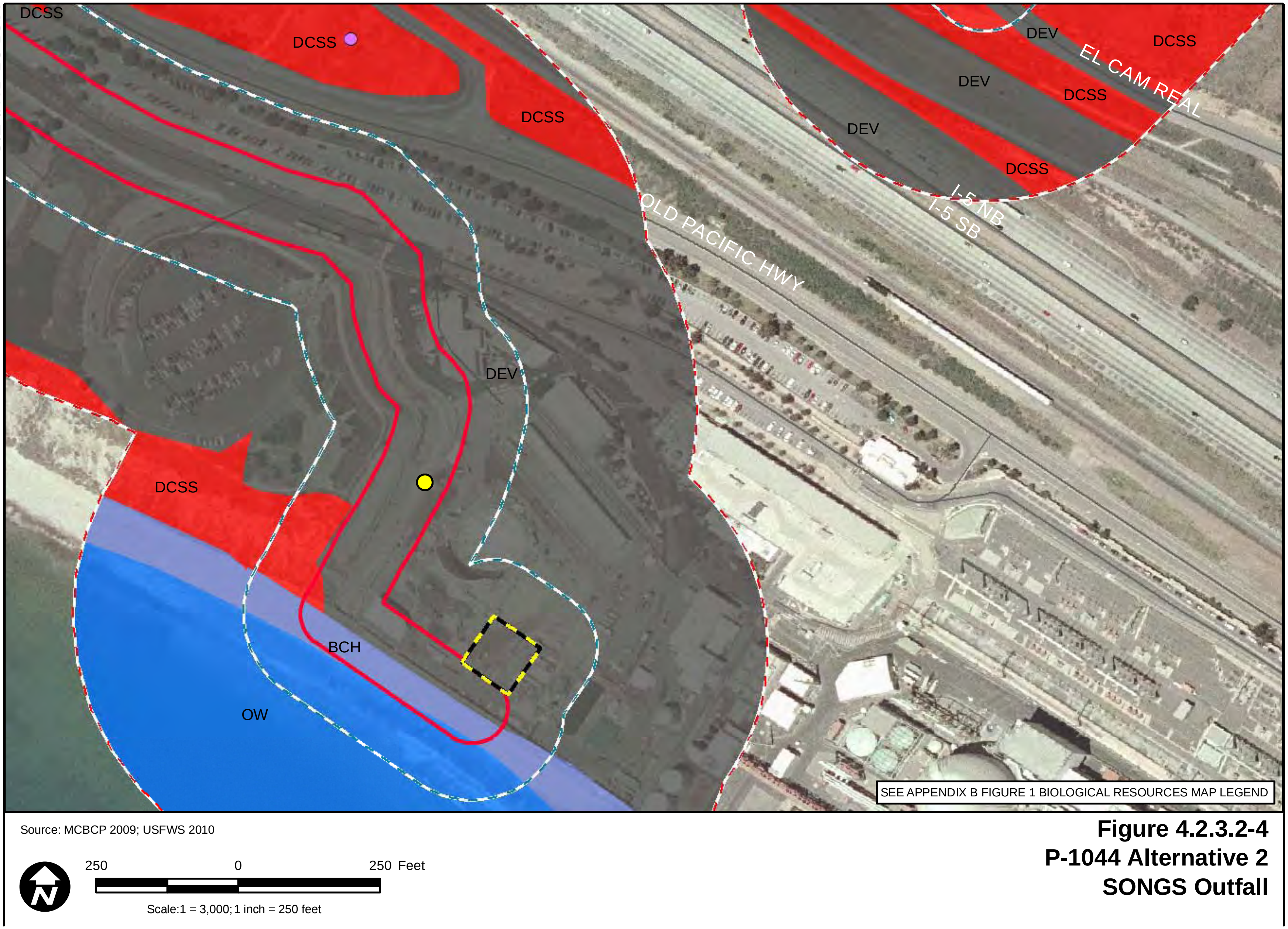

Source: MCBCP 2009; USFWS 2010

Figure 4.2.3.2-4
P-1044 Alternative 2
SONGS Outfall

MCBCP BWI EIS

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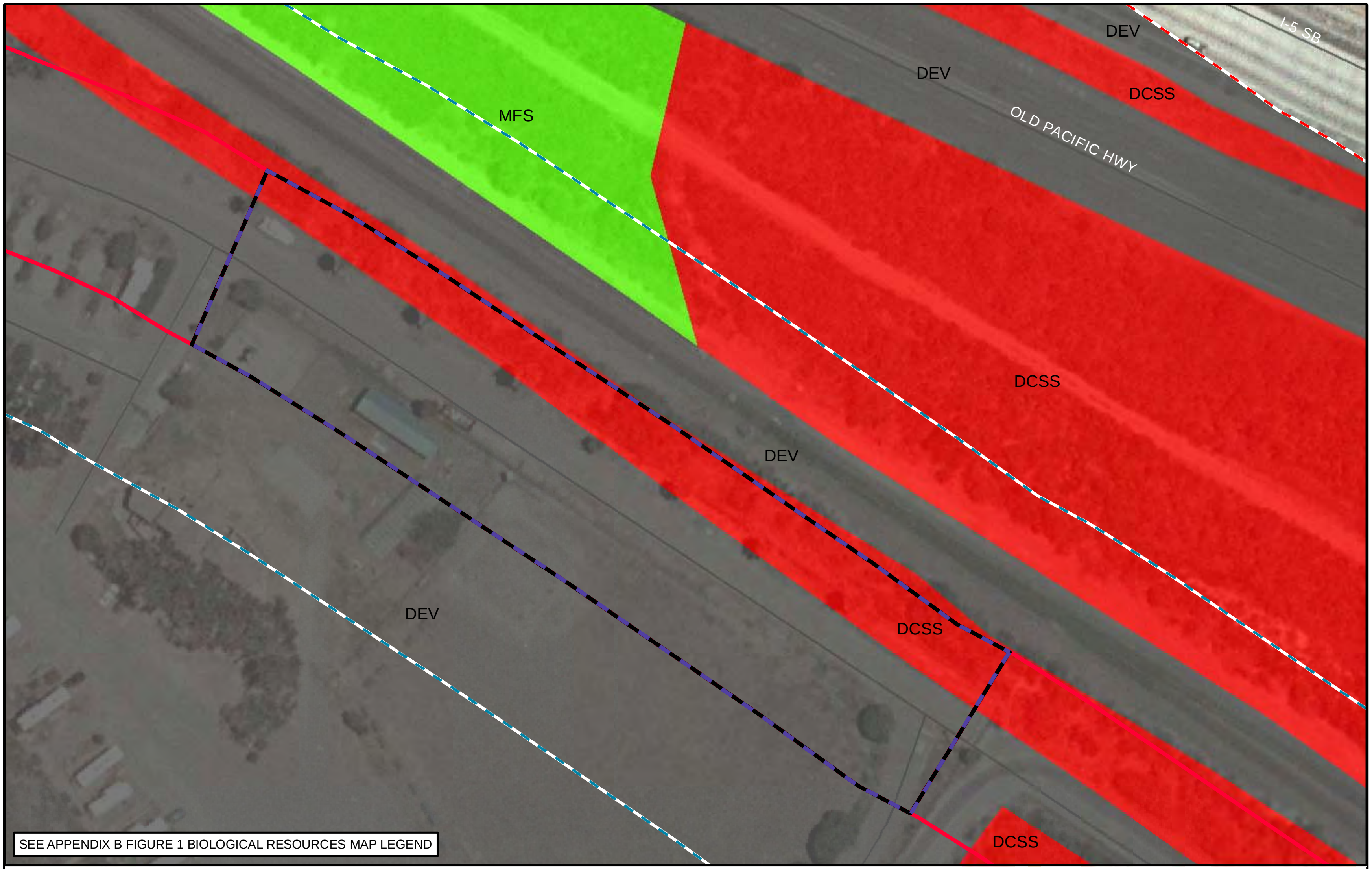


Source: MCBCP 2009; USFWS 2010

100 0 100 Feet

Scale:1 = 1,200;1 inch = 100 feet

Figure 4.2.3.2-5
P-1044 Alternative 2
Injection Well Field

4.2.3.3 P-1045 Alternative 2

Permanent and temporary direct and indirect impacts for P-1045 Alternative 2 would be similar to those discussed previously for P-1044 Alternative 1. See Section 4.1.3.1 for a general discussion of these potential project effects to plant communities and other cover types, jurisdictional waters, habitats occupied by federally listed and other rare species, and migratory birds covered under the MBTA.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1045 Alternative 2 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.2.3.3-1, 4.2.3.3-2, and 4.2.3.3-3, respectively.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1045 Alternative 2 facilities would result in permanent direct impacts to riparian and upland native plant communities and other cover types (Table 4.2.3.3-1). Development within the project corridor would result in temporary direct impacts to predominately coastal sage scrub, southern willow scrub, and developed land with smaller amounts of numerous other plant communities and cover types (Table 4.2.3.3-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, or vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under the CWA or occupied by federally listed species

would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 could cause indirect impacts to plant communities and other cover types that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.2.3.3-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

Mitigation

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

Impacts

Direct Impacts

Development of the P-1045 Alternative 2 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of sycamore-alder riparian woodland, nonvegetated channel, and freshwater (Table 4.2.3.3-4). Development of the project corridor would result in temporary direct impacts to jurisdictional waters and wetlands, primarily in the form of mulefat scrub and nonvegetated channel with lesser amounts of sycamore-alder riparian woodland, disturbed wetland, freshwater, and coastal and valley freshwater marsh, respectively (Table 4.2.3.3-5). Construction along the corridor also has the potential to impact vernal pools that coincide with the project area, and those individual pools may be considered jurisdictional by USACE (determination is pending final reviews by ES and USACE).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.2.3.3-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be temporarily or permanently, indirectly affected by the project as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measures that would compensate for impacts to jurisdictional waters, including wetlands, are discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Plants

Impacts

Potential effects to federally listed plant species and habitat associated with development of P-1045 Alternative 2 are depicted in Figure 4.2.3.3-1 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.2.3.3-6 and 4.2.3.3-7.

Direct Impacts

Approximately 0.08 acre of thread-leaved brodiaea occupied habitat is known to occur within the P-1045 Alternative 2 project corridor and would be directly affected by development (Table 4.2.3.3-6). Direct effects to thread-leaved brodiaea may be minimized following implementation of avoidance, minimization, and compensation measures described in the mitigation section below. Any direct effect to this species is considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 0.40 acre of thread-leaved brodiaea occupied habitat is known to occur within the 100-foot buffer of the proposed action area (Table 4.2.3.3-7). Indirect effects to this species would be minimized by implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

Mitigation

Mitigation measures P1 and P2, which would compensate for impacts to federally listed plant species, are discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Wildlife

Impacts

Seven federally listed wildlife species, southern California steelhead, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat, have the potential to be impacted by P-1045 Alternative 2. Locations of these species relevant to P-1045 are depicted in Figure 4.2.3.3-3.

Occupied and/or suitable habitat for federally listed wildlife species near P-1045 Alternative 2 project components is depicted in Figures 4.1.3.3-4 through 4.1.3.3-11 (shown with Alternative 1 project components). A breakdown of occupied and/or suitable habitat for these species according to vegetation type is provided in Table 4.2.3.1-6.

Direct Impacts

P-1045 Facilities – Four listed wildlife species, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Stephens' kangaroo rat, have the potential to be directly impacted by the proposed construction of facilities for P-1045 Alternative 2. Additionally, two basins, basins 773 and 775, are occupied by unidentifiable *Branchinecta* spp. occur within the P-1045 facilities; these basins are currently being analyzed. It is assumed all habitat occupied by these species within P-1045 facilities would be permanently, directly affected. Permanent direct impacts include permanent loss of habitat and individuals as a result of project construction. Permanent direct impacts are summarized in Table 4.2.3.3-8. Potential permanent direct impacts to wildlife species are depicted in Figure 4.2.3.3-3.

A thorough discussion of specific types of permanent direct impacts to these species is provided in Section 4.2.3.1.

P-1045 Corridor – Habitat occupied by and/or suitable for arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat within the P-1045 corridor would be temporarily, directly impacted. Thus, temporary direct impacts would occur to these species. Habitat occupied by and/or suitable for federally listed species that would be temporarily, directly impacted is quantified in Table 4.2.3.3-9.

A thorough discussion of specific types of permanent and temporary direct impacts to these species is provided in Section 4.2.3.1.

Indirect Impacts

Seven federally listed wildlife species may be indirectly impacted by construction of P-1045 Alternative 2. Habitat occupied by southern California steelhead, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, Pacific pocket mouse, and Stephens' kangaroo rat occurs within the 400-foot buffer of the P-1045 facilities and corridor. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.2.3.3-10.

A thorough discussion of specific types of permanent and temporary indirect impacts to these species is provided in Section 4.2.3.1.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1045 Alternative 2 is noted in Table 4.2.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.2.3.3-1
Permanent Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 2 Facilities (acres)

Plant Communities and Other Cover Types	Pump Station at Future AWT South	Maintenance Access	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	Total[1]
Riparian and Wetlands	**-**	**0.14**	**-**	**-**	**0.14**
Mulefat Scrub	-	0.04	-	-	0.04
Riparian Scrub	-	<0.005	-	-	<0.005
Southern Riparian Woodland	-	0.07	-	-	0.07
Southern Willow Scrub	-	0.03	-	-	0.03
Sycamore Alder Riparian Woodland	-	<0.005	-	-	<0.005
Uplands	**-**	**1.66**	**<0.005**	**4.90**	**6.57**
Diegan Coastal Sage Scrub	-	0.48	<0.005	4.90	5.38
Nonnative Grassland	-	0.73	-	-	0.73
Valley Needlegrass Grassland	-	0.46	-	-	0.46
Other Cover Types	**0.91**	**17.98**	**0.52**	**1.99**	**21.40**
Disturbed Habitat	-	0.18	-	-	0.18
Urban/Developed	0.91	17.80	0.52	1.99	21.22
Total[1]	**0.91**	**19.79**	**0.52**	**6.90**	**28.11**

[1] Numbers may not sum exactly due to rounding.

Table 4.2.3.3-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 2 Corridor (acres)

Plant Communities and Other Cover Types	TLS Sites	Corridor[1]	
		Maximum Impacts (100%)	Anticipated Impacts (48%)
Riparian and Wetlands	**0.22**	**22.98**	**11.03**
Mulefat Scrub	0.06	7.74	3.72
Nonvegetated Channel	-	0.01	0.01
Riparian Scrub	-	1.28	0.62
Southern Riparian Woodland	-	4.09	1.96
Southern Willow Scrub	0.16	8.95	4.30
Sycamore Alder Riparian Woodland	-	0.45	0.22
Vernal Pool	-	0.45	0.22
Uplands	**9.04**	**153.92**	**73.88**
Diegan Coastal Sage Scrub	8.60	111.15	53.35
Nonnative Grassland	0.44	27.87	13.38
Valley Needlegrass Grassland	-	14.89	7.15
Other Cover Types	**2.53**	**115.60**	**55.49**
Disturbed Habitat	-	5.46	2.62
Urban/Developed	2.53	110.15	52.87
Total[2]	**11.79**	**292.50**	**140.40**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.2.3.3-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1045 Alternative 2 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Pump Station at Future AWT South	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	TLS Sites	Corridor	Total[1]
Riparian and Wetlands	**-**	**-**	**-**	**2.61**	**68.33**	**70.94**
Mulefat Scrub	-	-	-	2.16	19.02	21.18
Nonvegetated Channel	-	-	-	-	0.12	0.12
Riparian Scrub	-	-	-	-	3.77	3.77
Southern Riparian Woodland	-	-	-	-	12.89	12.89
Southern Willow Scrub	-	-	-	0.45	29.86	30.31
Sycamore Alder Riparian Woodland	-	-	-	-	1.53	1.53
Vernal Pool	-	-	-	-	1.14	1.14
Uplands	**0.41**	**0.99**	**4.11**	**10.72**	**349.17**	**365.39**
Diegan Coastal Sage Scrub	0.41	0.99	4.11	10.08	223.86	239.45
Nonnative Grassland	-	-	-	0.64	81.59	82.23
Valley Needlegrass Grassland	-	-	-	-	43.72	43.72
Other Cover Types	**1.55**	**0.74**	**0.51**	**3.00**	**76.21**	**82.01**
Disturbed Habitat	-	-	-	-	14.74	14.74
Urban/Developed	1.55	0.74	0.51	3.00	61.46	67.27
Total[1]	**1.96**	**1.73**	**4.63**	**16.33**	**493.71**	**518.35**

[1] Numbers may not sum exactly due to rounding.

Table 4.2.3.3-4
Permanent Direct Impacts to Waters of the U.S. Associated with P-1045 Alternative 2 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Wetland	**0.01**
Sycamore-Alder Riparian Woodland	0.01
Other Waters[1]	**0.02** (319)
Fresh Water	<0.005 (16)
Nonvegetated Channel	0.02 (303)
Total[2]	**0.04**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.2.3.3-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1045 Alternative 2 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridor[1]	
		Maximum Impacts (100%)	Anticipated Impacts (48%)
Wetland	**0.49**	**0.31**	**0.15**
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Mulefat Scrub	0.49	0.01	<0.005
Sycamore-Alder Riparian Woodland	-	0.12	0.06
Vernal Pool	-	0.18	0.09
Other Waters[2]	**0.05**	**0.47 (4,926)**	**0.23 (4,926)**
Disturbed Wetland	<0.005	-	-
Fresh Water	-	0.01 (109)	<0.005 (109)
Nonvegetated Channel	0.05	0.46 (4,782)	0.22 (4,782)
Total[3]	**0.54**	**0.78**	**0.38**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.2.3.3-6
Permanent Direct Impacts to Federally Listed Plants
Associated with P-1045 Alternative 2

Habitat Occupied by:	Facilities	Corridor
Thread-leaved Brodiaea	0 acres	0 acres
San Diego Button-celery	0 basins	0 basins
Spreading Navarretia	0 basins	0 basins

Table 4.2.3.3-7
Potential Indirect Impacts to Federally Listed Plants within
100 Feet of P-1045 Alternative 2 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	0 acres
San Diego Button-celery	0 basins
Spreading Navarretia	0 basins

Table 4.2.3.3-8
Permanent Direct Impacts to Federally Listed Wildlife Associated with P-1045 Alternative 2 Facilities (acres)

Listed Wildlife Species	Maintenance Access	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	Total Facility Permanent Impacts[1]
Branchinecta spp.	2 basins	-	-	2 basins[2]
Coastal California Gnatcatcher	0.23	<0.005	3.36	3.60
Least Bell's Vireo	0.10	-	-	0.10
Southwestern Willow Flycatcher	0.03	-	-	0.03
Stephens' Kangaroo Rat	<0.005	-	-	<0.005

[1] Numbers may not sum exactly due to rounding.
[2] *Branchinecta* spp. fairy shrimp were detected in basins with the following ID numbers: 773 and 775.

Table 4.2.3.3-9
Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1045 Alternative 2 Corridor (acres)

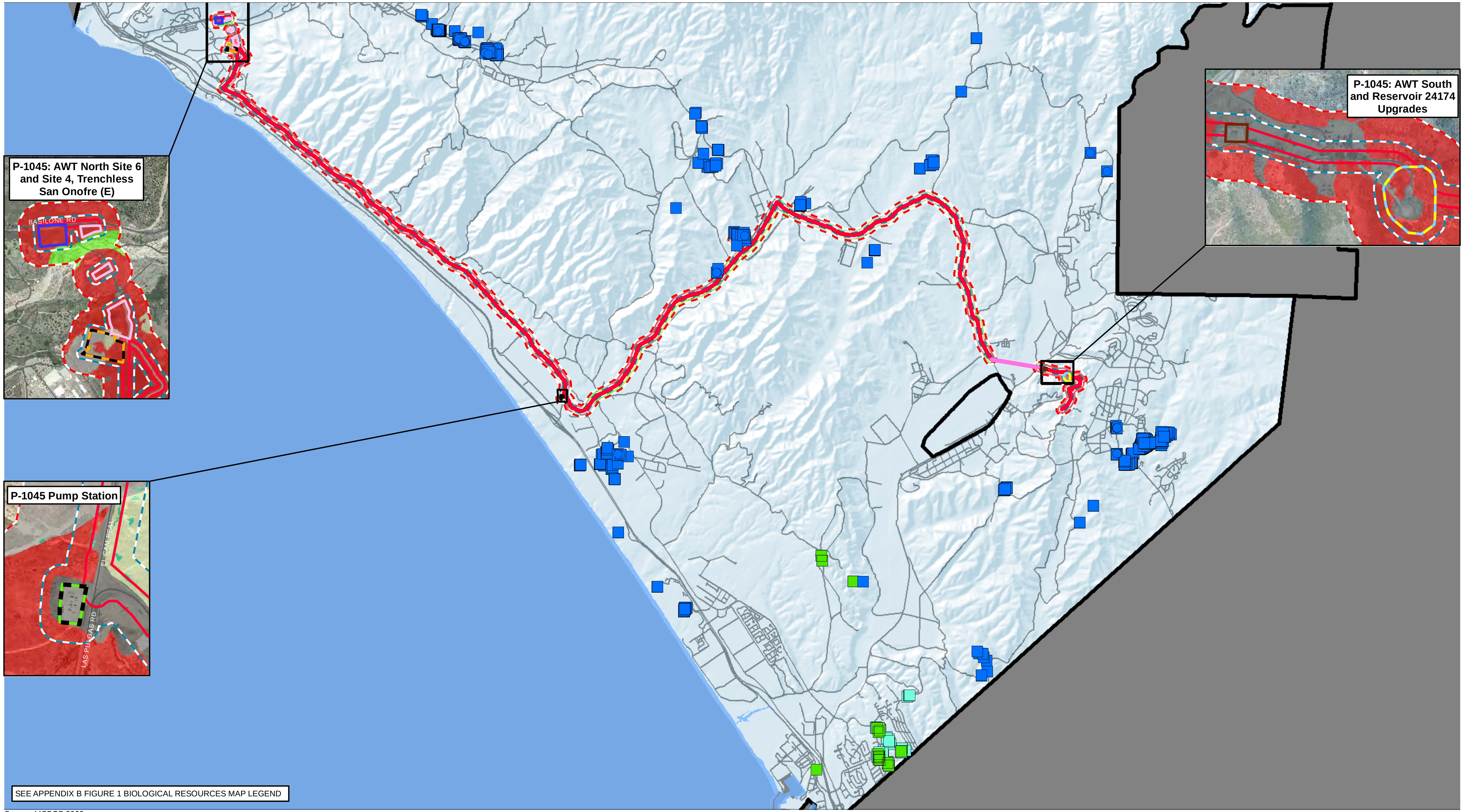
Listed Wildlife Species	TLS Sites	Corridor[1,2]	
		Maximum Impacts (100%)	Anticipated Impacts (48%)
Arroyo Toad (Aestivation/Dispersal)	0.28	-	-
Coastal California Gnatcatcher	8.01	85.11	40.85
Least Bell's Vireo	0.06	17.31	8.31
Southwestern Willow Flycatcher	0.06	12.80	6.14
Pacific Pocket Mouse (Microhabitat)[3]	0.28	0.36	0.17
Pacific Pocket Mouse (Suitable Habitat)[3]	1.17	0.94	0.45
Stephens' Kangaroo Rat	-	0.42	0.20

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.
[3] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.2.3.3-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1045 Alternative 2 Facilities and Corridor (acres)

Listed Wildlife Species	Pump Station at Future AWT South	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	TLS Sites	Corridor	Total[1]
Southern California steelhead[2]	-	-	-	0.45	-	0.45
Arroyo Toad (Aestivation/Dispersal)	-	-	-	10.44	2.42	12.87
Arroyo Toad (Breeding)	-	-	-	9.53	<0.005	9.53
Coastal California Gnatcatcher	0.75	10.57	17.96	70.33	738.59	838.20
Least Bell's Vireo	-	-	-	23.31	299.13	322.44
Southwestern Willow Flycatcher	-	-	-	18.65	216.01	234.65
Pacific Pocket Mouse (Occupied Habitat)[3]	-	-	-	1.87	5.45	7.32
Pacific Pocket Mouse (Microhabitat)[3]	-	-	-	3.29	2.96	6.25
Pacific Pocket Mouse (Suitable Habitat)[3]	-	-	-	11.03	14.01	25.04
Stephens' Kangaroo Rat	-	-	-	-	7.13	7.13

[1] Numbers may not sum exactly due to rounding.
[2] Indirect impacts to Southern California steelhead occur in San Onofre Creek.
[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.



Source: MCBCP 2009

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Figure 4.2.3.3-1
P-1045 Alternative 2
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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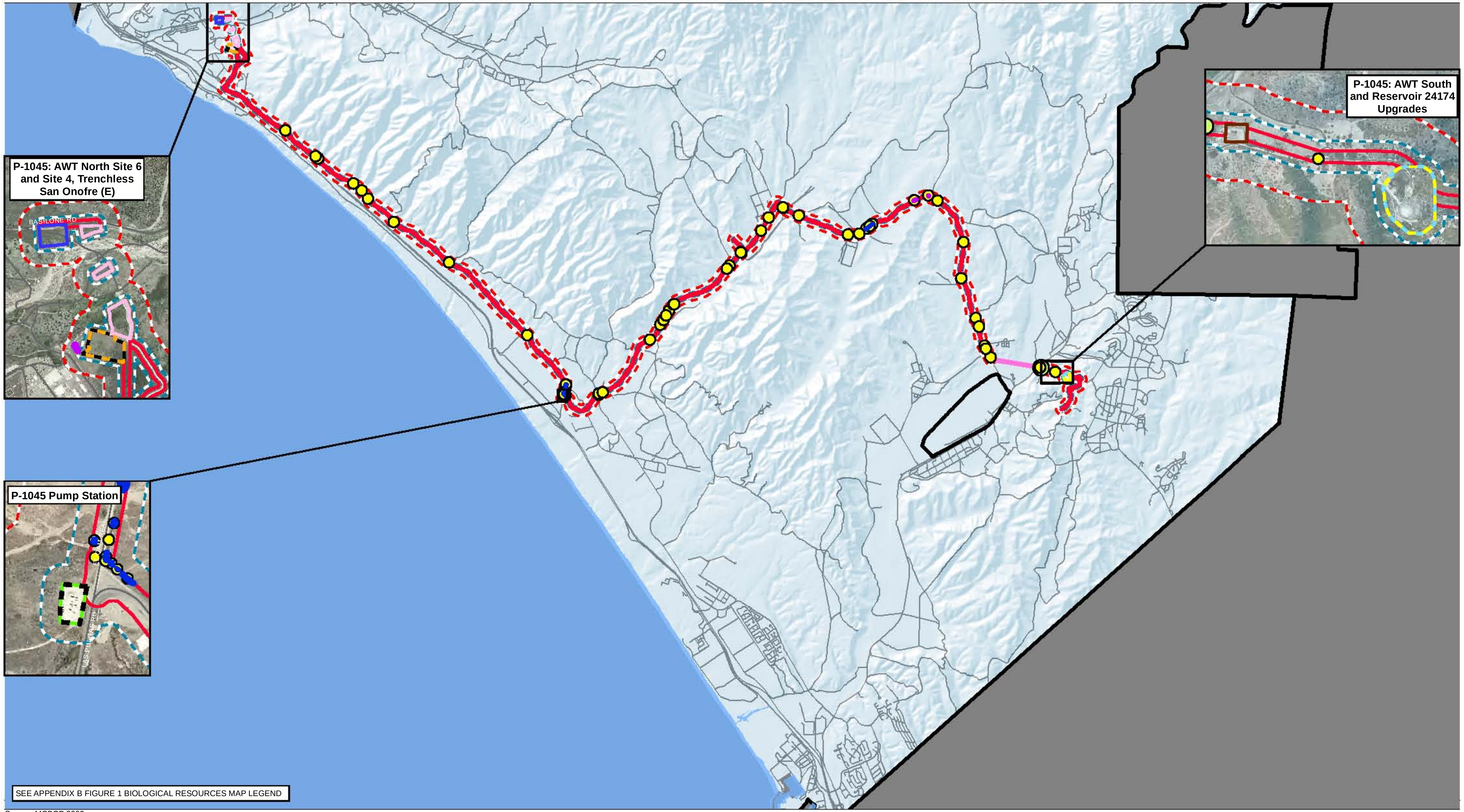

Source: MCBCP 2009

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Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.2.3.3-2
P-1045 Alternative 2
Potential Effects to Jurisdictional Waters of the U.S.

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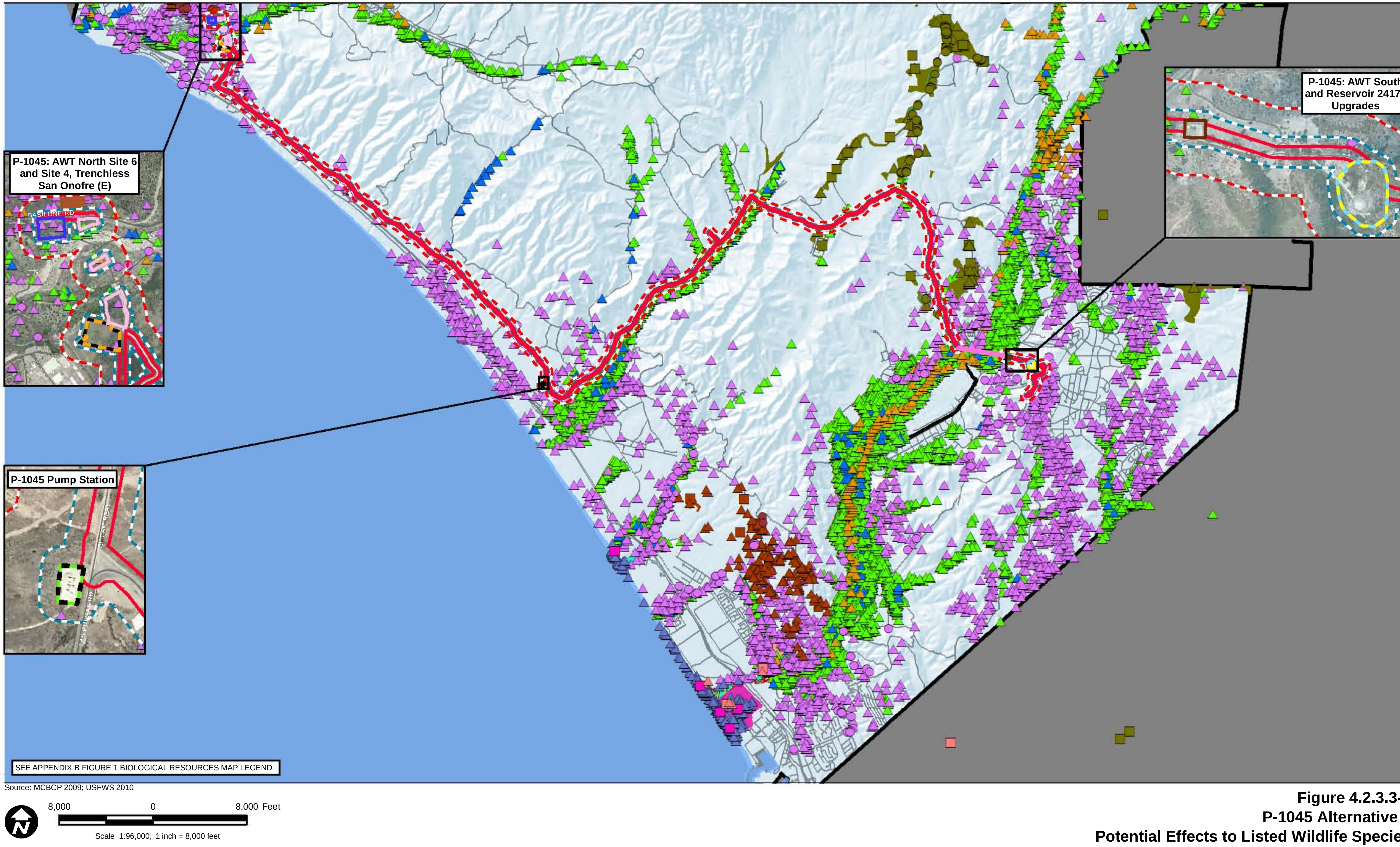

Figure 4.2.3.3-3
P-1045 Alternative 2
Potential Effects to Listed Wildlife Species

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4.2.3.4 No Action Alternative

Impacts

Under the No Action Alternative, Alternative 2 would not be constructed and no ground-disturbing activities would occur. Baseline conditions (as described in Section 3.3, Biological Resources) would remain unchanged and no significant impacts to biological resources would occur as a result of implementation of the No Action Alternative.

Mitigation

No mitigation measures are proposed.

4.2.4 Cultural Resources

4.2.4.1 Both MILCONs (Alternative 2)

Cultural resources within Alternative 2 are summarized in Table 4.2.4-1. A total of 22 resources are identified, of which 12 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites resulting from Alternative 2 would not be significant.

Table 4.2.4-1
Cultural Resources within Alternative 2 APE

NRHP Status	P-1044	P-1045	Total
Eligible/Listed	5	5	10
Ineligible	7	5	12
Total	**12**	**10**	**22**

Impacts

Because most of the historic properties within the APE of Alternative 2 consist of prehistoric archaeological deposits, most impacts would result from physical destruction or alteration of historic properties that are eligible under NRHP criterion D. Properties that are eligible under NRHP criteria A, B, or C could also be subject to visual or audible impacts if activities related to Alternative 2 diminish the integrity of their settings.

Mitigation

Mitigation of impacts to cultural properties resulting from Alternative 2 would be as described in Section 4.1.4.1.

4.2.4.2 P-1044 Alternative 2

Impacts

Impacts to cultural resources from P-1044 Alternative 2 would be the same as for P-1044 Alternative 1 (Section 4.1.4.2).

Mitigation

Mitigation of impacts to cultural properties resulting from P-1044 Alternative 2 would be as described in Section 4.1.4.1.

4.2.4.3 P-1045 Alternative 2

Impacts

P-1045 Alternative 2 would result in impacts to five properties that are either listed in or have been determined eligible for the NRHP. These include prehistoric archaeological deposits associated with CA-SDI-812/H, -4538, and -19,392, as well as the historic resources CA-SDI-14,005H (Segment A) and CA-SDI-14,006H (Segment C).

Mitigation

Mitigation of impacts to cultural properties resulting from P-1045 Alternative 2 would be as described in Section 4.1.4.1.

4.2.5 Land Use

4.2.5.1 Both MILCONs (Alternative 2)

Impacts

The discussion in Section 4.1.5.1 of impacts of Alternative 1 applies equally to P-1044 and P-1045 in Alternative 2. No significant land use impacts would result from the implementation of either of these two Alternative 2 MILCONs.

Mitigation

No mitigation measures are proposed.

4.2.5.2 P-1044 Alternative 2

Impacts

P-1044 Alternative 2 differs from Alternative 1 only in the routes followed by pipelines connecting the Northern AWT plant to the SONGS outfall conduit and to serve the northerly cantonments. The differing alignments would be underground pipelines following roadways with a TLS crossing under San Onofre Creek, and would, therefore, be compatible with and would not displace any existing land uses. As described in P-1044 Alternative 1, the pipeline from Chaisson Road to the Sierra 1 Training Area percolation ponds would be constructed aboveground with the same land use impacts. The discussion of Alternative 1 impacts in Section 4.1.5.1 would apply to Alternative 2 as well. No significant land use impacts would result.

Mitigation

No mitigation measures are proposed.

4.2.5.3 P-1045 Alternative 2

Impacts

P-1045 Alternative 2 would be the same as Alternative 1 except that the pipeline route from the Stuart Mesa Road/Las Pulgas Road intersection would follow Las Pulgas Road and then Basilone Road to the TLS boring site near the 25 Area (Vado Del Rio). The entire length of the different alignment would be in or along existing roads. The 4-million-gallon reservoir and associated pipelines proposed in the Wire Mountain area under P-1045 Alternative 1 would not be included in this alternative. P-1045 Alternative 2 would be compatible with the Base Master Plan and would not displace or be incompatible with any other existing uses. There would be no significant land use impacts from Alternative 2.

Mitigation

No mitigation measures are proposed.

4.2.6 Visual Resources

4.2.6.1 Both MILCONs (Alternative 2)

Impacts

Visual features and impacts common to both MILCONs (Alternative 2) would be the same as those described in Section 4.1.6.1.

Mitigation

No mitigation measures are proposed.

4.2.6.2 P-1044 Alternative 2

Impacts

Impacts of P-1044 Alternative 2 would be the same as P-1044 Alternative 1, described in Section 4.1.6.2, except for the route of the brine pipeline connecting the Northern AWT plant to the former SONGS outfall conduit and both injection well fields. Rather than a TLS crossing under I-5 west of the SONGS East Mesa facility, the connection in Alternative 2 would follow the same route as the Alternative 1 pipeline to the El Camino Real/San Onofre percolation ponds proposed injection well field, then pass under I-5 in El Camino Real/Beach Club Drive and in Beach Club Drive through the 51 Area (San Onofre) and through the inland access road/MCBCP San Onofre Beach recreation area proposed injection well field, and on to SONGS to the outfall conduit connection.

This alternative would avoid the temporary impacts associated with TLS construction under I-5. Construction through the 51 Area and SONGS would result in the effects associated with pipeline construction but would be in developed areas not readily visible from Base or public views of freeway or railroad travelers. Otherwise, visual effects would be the same as those described in Section 4.1.6.2 and would not be significant.

Mitigation

No mitigation measures are proposed.

4.2.6.3 P-1045 Alternative 2

Impacts

The P-1045 Alternative 2 pipeline would follow a different route than Alternative 1 from the Stuart Mesa Road/Las Pulgas Road intersection to the reservoirs on a ridge above Haybarn Canyon. The pipeline would be underground for this entire segment. The 4-million-gallon reservoir would not be included in P-1045 Alternative 2. Construction impacts, temporary and not significant, of this segment would affect a different area but would be similar to Alternative 1, but no significant permanent visual impacts would occur.

Mitigation

No mitigation measures are proposed.

4.2.7 Socioeconomics and Environmental Justice

4.2.7.1 Both MILCONs (Alternative 2)

Methodology

The methodological approach and data sources utilized to assess socioeconomic impacts of Alternative 2 are the same as described for Alternative 1 in Section 4.1.7.1.

Impacts

Construction

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

For all work included in Alternative 2, the design and construction work on the project features would be by civilian contracting firms that would nearly exclusively draw their employees from a labor pool outside of MCBCP. Given the nature of the construction and that the project sites are on a military base, no increase in population would occur from workers relocating to MCBCP, and no increase in demand for on-Base housing would occur. Most of the construction work would be performed by workers from a labor pool within commuting distance of MCBCP, such that off-Base demand for temporary construction worker housing would be minimal. Some incidental construction-related employment opportunities may arise for military dependents, but the socioeconomic impact of these opportunities would be negligible.

Total funding for the proposed action is estimated to be $213 million, with funding running from FY 2012 through FY 2013. As shown in Table 4.2.7-1, total funding varies from year to year. Fiscal year of funding, however, differs from calendar year of project expenditures. Expenditures by calendar year, based on estimated start dates and estimated duration of construction by project, are shown in Table 4.2.7-2. For the purposes of economic modeling, it was assumed that (1) all funding would be spent on construction, (2) construction schedules would be as illustrated in Table 4.2.7-2, and (3) monthly construction expenditures would remain even across all months of the construction period. As both the level of funding and the timing of construction are subject to revision, the purpose of the modeling is to facilitate an order-of-magnitude economic output and employment impact assessment rather than an exact projection of economic output and employment levels.

Summaries of the modeling of the economic activity related to construction for the three-county and six-county regions are presented in Tables 4.2.7-3 and 4.2.7-4, respectively. These results combine direct, indirect, and induced economic output and employment results to give an overall economic output and employment figure by region for each construction year. Existing regional economic output and employment baseline information by sector is also provided to allow a comparison of impacts to existing conditions. Details of direct, indirect, and induced economic output and employment by sector by year for the three-county and six-county regions are provided in Appendix F, Socioeconomic Employment and Economic Output Impact Tables.

As shown, economic output for the three-county region would peak at about $135 million per year over the course of construction, and employment would peak at about 791 jobs per year. The majority of the total proposed action-related economic output in each year would consist of direct output from the construction sector, and the majority of total employment would consist of direct employment in the construction industry. For the six-county region, economic output would peak at about $226 million (an increase of about $91 million over the three-county region) during both construction expenditure years (2013 and 2014) and employment would peak at approximately 1,283 jobs (an increase of about 492 jobs over the three-county region) for 2013 and 2014. Some highly localized economic activity would likely occur with small-scale purchases of goods and services by construction companies and their workers, resulting in a minor beneficial impact to the on-Base economy.

Localized Socioeconomic Impacts

Localized, temporary socioeconomic impacts could potentially accrue due to the proximity of sensitive receptors (such as family housing areas, school areas, child-oriented facilities, hospitals, and BEQs, among others) to the construction corridors for linear project components or the project limits of other project facilities. These localized socioeconomic impacts could result from construction noise, a temporary degradation of air quality, or a decrease in traffic level of service and/or accessibility. A description of sensitive receptors closest to each of the project corridors and facilities project limits is presented in the following discussions of project alternatives.

Facility Operation

Regional Employment and Economic Impacts

At present, employment related to operations of on-Base utilities infrastructure facilities involves a limited number of both federal civilian employees and private sector

contractor personnel, but specific employment figures are not readily available (U.S. Navy 2010d). While some new long-term employment could be created through the additional labor demand brought about by operation of the new portions of the water distribution system, the number of new employees would likely be minimal. It is expected that initial employment at the new facilities would be dominated by contractor personnel, but that over time these positions would come to be occupied predominantly by regular (federal civilian) employees.

LOCALIZED SOCIOECONOMIC IMPACTS

No localized socioeconomic impacts would be anticipated from the postconstruction operation of either of the proposed action MILCONs in Alternative 2. Project linear features would be underground and would have no adverse effects on sensitive receptors. Aboveground facilities would not be near enough to sensitive receptors to cause adverse effects. Whether aboveground or underground, completed MILCON project alternatives in Alternative 2 would not have any socioeconomic impact.

Environmental Justice

When the proposed action projects included in Alternative 2 are considered as a group, project linear corridor and facilities project limits would be located within six different populated census blocks on MCBCP (Blocks 9005, 9008, 9015, 9019, 9025, and 9032), the same blocks potentially affected by Alternative 1. These blocks have a combined population of 28,920 persons, which is 80.0 percent of the total population of MCBCP. For this group of blocks combined, total minority population is 44.1 percent, compared to a total minority population of 43.1 percent for MCBCP as a whole, and less than the minority percentage of San Diego, Orange, and Riverside counties. As a result, the area affected by Alternative 2 would not have a minority population of concern with respect to environmental justice. In terms of low-income status (as defined by percentage of persons living below poverty), statistics are not available for the Alternative 2 blocks specifically. For MCBCP as a whole, however, approximately 8.4 percent of the population was below poverty level as of the last decennial census, a lower figure than was the case in San Diego, Orange, and Riverside counties, which ranged between 10.3 and 14.2 percent. As a result, the project area is not considered to have a low-income population of concern with respect to environmental justice issues. Further, no significant socioeconomic or other directly relevant environmental impacts are anticipated for Alternative 2, and there is no indication that any disproportionately high and adverse impacts would occur that would accrue to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.2.7.2 P-1044 Alternative 2

Impacts

Total cost for P-1044 Alternative 2 is estimated to be $101 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. Because of the same funding level and the same timing of construction, the economic output and employment output for Alternative 2 would be the same as for Alternative 1. The number of new employees for project operations would likely be minimal.

The project features of P-1044 Alternative 2 would be located in the same proximity to potentially sensitive receptors as the project features of P-1044 Alternative 1, as described in Section 4.1.7.2. Potential impacts for P-1044 Alternative 2 would be the same as for P-1044 Alternative 1. No significant impacts are anticipated.

One of the two census blocks potentially directly affected by this alternative had minority population percentages higher than MCBCP or the counties in the surrounding region at the time of the 2000 census, but it is known that this census block has no population at present, following the discontinuation of the northern agricultural area lease. There is no indication that there would be any disproportionately high and adverse impacts to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.2.7.3 P-1045 Alternative 2

Impacts

Total cost for P-1045 Alternative 2 is estimated to be $112 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $71.0 million per year, and employment output would be approximately 416 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $118.9 million per year, and employment output would be approximately 675 jobs per year. The number of new employees for project operations would likely be minimal. No socioeconomic impacts would be anticipated from the postconstruction operation.

Linear features of P-1045 Alternative 2 would not occur near any housing areas, school areas, child-oriented facilities, or any other potentially sensitive receptors except for BEQs. BEQs in proximity to project corridors are limited to those BEQs along Las Pulgas Road in the 43 Area (Las Pulgas), which are less than 15 yards from a project corridor. No nonlinear features of P-1045 Alternative 2 are located near any potentially sensitive receptors.

For the construction of linear project features, impacts would be minimized by the short duration of construction activity in any one place, as it is assumed that construction would occur at an average rate of 200 LF of pipe placement per day, depending on location. Potential noise impacts would be minimized through a number of construction practices, which include no construction during nighttime hours, described in Section 4.1.10. There would be impacts to traffic flow and disruption of access to facilities, as much of this work would occur adjacent to or within roadbeds, but these impacts would be minimized through a variety of measures detailed in the traffic analyses of this EIS. Impacts to air quality, including those associated with fugitive dust, would be minimized through a variety of BMPs as described in the air quality analysis of this EIS. No significant impacts are anticipated.

Of the four census blocks potentially directly affected by this alternative, one had a minority population percentage greater than 50 percent (and higher than that of MCBCP and the counties in the surrounding region at the time of the 2000 census. There is no indication, however, that any disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

Table 4.2.7-1
Funding by Fiscal Year ($ Millions) Alternative 2

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$101	$0	$101
FY 2012	$0	$112	$112
All Years	**$101**	**$112**	**$213**

Note: All Years total may vary from sum of FY subtotals due to rounding.

Table 4.2.7-2
Construction Schedule and Expenditures
by Project, Month, and Year – Alternative 2

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.20	$50.5	$50.5	$101
P-1045	April 2013	18	$6.20	$56.0	$56.0	$112
Total				**$106.5**	**$106.5**	**$213**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table 4.2.7-3
Alternative 2 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 3-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 3-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.3	$0.3	32,988	1.8	1.8
Mining	$1,241.7	$0.2	$0.2	3,318	0.8	0.8
Utilities	$15,558.8	$0.8	$0.8	12,432	0.6	0.6
Construction	$51,446.2	$85.6	$85.6	337,572	483.0	483.0
Manufacturing	$135,386.5	$7.1	$7.1	341,197	18.5	18.5
Wholesale Trade	$39,026.3	$3.2	$3.2	181,370	13.9	13.9
Retail Trade	$39,116.0	$4.1	$4.1	488,360	48.6	48.6
Transportation and Warehousing	$10,754.6	$0.8	$0.8	86,583	6.0	6.0
Information	$44,927.0	$2.5	$2.5	89,139	4.4	4.4
Finance and Insurance	$51,476.1	$4.0	$4.0	226,444	16.1	16.1
Real Estate and Rental	$102,950.6	$7.6	$7.6	366,409	18.8	18.8
Professional, Scientific, and Technical Services	$57,707.5	$8.3	$8.3	391,226	56.2	56.2
Management	$9,482.5	$0.5	$0.5	48,580	2.3	2.3
Administrative and Waste Services	$23,778.3	$1.7	$1.7	369,193	25.1	25.1
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.4	6.4
Health and Social Services	$34,208.9	$3.0	$3.0	342,697	28.7	28.7
Arts, Entertainment, and Recreation	$12,255.8	$0.7	$0.7	125,303	7.5	7.5
Accommodation and Food Services	$24,417.9	$1.4	$1.4	357,882	22.9	22.9
Other	$19,513.1	$2.3	$2.3	271,933	26.0	26.0
Government	$64,451.0	$0.6	$0.6	656,931	3.1	3.1
Total	**$745,750.4**	**$135.0**	**$135.0**	**4,806,509**	**790.5**	**790.5**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

Table 4.2.7-4
Alternative 2 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside-Los Angeles-San Bernardino-Imperial Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 6-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 6-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$7,850.5	$0.4	$0.4	59,069	2.4	2.4
Mining	$8,697.3	$1.4	$1.4	14,975	2.6	2.6
Utilities	$31,705.3	$1.7	$1.7	29,926	1.5	1.5
Construction	$92,642.0	$106.1	$106.1	610,158	602.9	602.9
Manufacturing	$358,362.8	$25.4	$25.4	858,357	52.4	52.4
Wholesale Trade	$94,509.4	$6.6	$6.6	493,501	32.6	32.6
Retail Trade	$91,980.4	$8.2	$8.2	1,132,121	95.1	95.1
Transportation and Warehousing	$43,502.0	$3.7	$3.7	325,556	25.8	25.8
Information	$154,948.9	$7.0	$7.0	368,602	12.6	12.6
Finance and Insurance	$115,155.1	$9.6	$9.6	485,909	37.5	37.5
Real Estate and Rental	$225,259.1	$15.9	$15.9	729,263	38.4	38.4
Professional, Scientific, and Technical Services	$140,355.6	$16.0	$16.0	936,634	104.4	104.4
Management	$23,983.7	$1.4	$1.4	110,862	6.2	6.2
Administrative and Waste Services	$51,537.5	$3.7	$3.7	799,005	56.9	56.9
Educational Services	$13,904.6	$1.0	$1.0	220,354	15.4	15.4
Health and Social Services	$89,328.8	$6.9	$6.9	916,303	67.7	67.7
Arts, Entertainment, and Recreation	$36,319.5	$1.5	$1.5	319,858	15.0	15.0
Accommodation and Food Services	$52,206.9	$3.3	$3.3	771,455	51.6	51.6
Other	$48,290.5	$4.7	$4.7	715,259	54.1	54.1
Government	$139,840.0	$1.6	$1.6	1,450,595	8.0	8.0
Total	**$1,820,379.9**	**$226.0**	**$226.0**	**11,347,763**	**1,283.2**	**1,283.2**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

4.2.8 Traffic

4.2.8.1 Methodology (Alternative 2)

The methodology used to evaluate impacts of Alternative 2 is the same as explained in Section 4.1.8.1 for Alternative 1. The estimated traffic volumes generated by Alternative 2 would be equal to the traffic shown in Alternative 1, even though the specific locations of some project components in Alternative 2 vary from those in Alternative 1. The differences between projects in the alternatives would not change the number of construction crews needed to complete the project within the given timeline. Therefore, traffic patterns for construction traffic related to the project would be the same as those analyzed in Alternative 1. Further, the roadway network would remain the same.

4.2.8.2 Impacts

Impacts of Alternative 2 would be equal to or less than the impacts of Alternative 1. Refer to Section 4.1.8 for traffic impacts of Alternative 2.

4.2.8.3 Mitigation (Alternative 2)

Mitigation recommended for Alternative 1 in Section 4.1.8.3 would be applicable to Alternative 2.

4.2.9 Air Quality

4.2.9.1 Both MILCONs (Alternative 2)

Methodology and the related conditions, as discussed in Section 4.1.9.1, are applicable to Alternative 2 as well as to Alternative 1.

Annual project emissions for Alternative 2 were estimated by URBEMIS and grouped by calendar year in SDAB and SCAB, as shown in Tables 4.2.9-1 and 4.2.9-2, respectively. The URBEMIS model output data are included in Appendix G.

Table 4.2.9-1
Estimated Annual Air Pollutant Emissions of Both MILCONs (Alternative 2) in SDAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2013						
P-1044 Alternative 2	2	14	13	0	18	4
P-1045 Alternative 2	2	16	16	0	28	6
Total 2013 Emissions	**4**	**30**	**29**	**0**	**46**	**10**
2014						
P-1044 Alternative 2	2	15	13	0	17	4
P-1045 Alternative 2	2	18	20	0	28	6
Total 2014 Emissions	**4**	**33**	**33**	**0**	**45**	**10**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.2.9-2
Estimated Annual Air Pollutant Emissions of Alternative 2 in SCAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2013						
P-1044 Alternative 2	<1	<1	<1	0	<1	<1
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.2.9-1, the total estimated annual emissions of VOCs, NO_X, and CO for 2013 and 2014 for Alternative 2 in SDAB are less than the *de minimis* levels for these pollutants. As shown in Table 4.2.9-2, the total estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for 2013 for Alternative 2 in SCAB are less than the *de minimis* levels for these pollutants. Therefore, Alternative 2 in SDAB and SCAB would conform to the SIP and a conformity determination is not required.

The same measures recommended for Alternative 1 to minimize fugitive dust during construction are recommended for Alternative 2.

Mitigation

No mitigation measures are proposed.

4.2.9.2 P-1044 Alternative 2

Impacts

Annual project emissions for P-1044 (Alternative 2) were estimated by URBEMIS in SDAB and SCAB, as shown in Tables 4.2.9-3 and 4.2.9-4. The URBEMIS model output data are included in Appendix G.

Table 4.2.9-3
Estimated Annual Air Pollutant Emissions of P-1044 (Alternative 2) in SDAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**2**	**15**	**13**	**0**	**18**	**4**
Total 2014 Emissions	**2**	**12**	**13**	**0**	**17**	**4**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.2.9-4
Estimated Annual Air Pollutant Emissions of P-1044 (Alternative 2) in SCAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.2.9-3, the estimated annual emissions of VOCs, NO_X, and CO for P-1044 (Alternative 2) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. As shown in Table 4.2.9-4, the estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for P-1044 (Alternative 2) in SCAB in 2013 are less than the *de minimis* levels for these pollutants. Therefore, P-1044 (Alternative 2) would conform to the SIP and a conformity determination is not required.

The same measures recommended for P-1044 Alternative 1 to minimize fugitive dust during construction are recommended for P-1044 Alternative 2.

<u>Mitigation</u>

No mitigation measures are proposed.

4.2.9.3 P-1045 Alternative 2

<u>Impacts</u>

Annual project emissions for P-1045 (Alternative 2) were estimated by URBEMIS, as shown in Table 4.2.9-5. The URBEMIS model output data are included in Appendix G.

Table 4.2.9-5
Estimated Annual Air Pollutant Emissions
of P-1045 (Alternative 2)

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**2**	**16**	**16**	**0**	**28**	**6**
Total 2014 Emissions	**2**	**18**	**20**	**0**	**28**	**6**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.2.9-5, the estimated annual emissions of VOCs, NO_X, and CO for P-1045 (Alternative 2) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. Therefore, P-1045 (Alternative 2) would conform to the SIP and a conformity determination is not required.

<u>Mitigation</u>

No mitigation measures are proposed.

4.2.10 Noise

4.2.10.1 Both MILCONs (Alternative 2)

Methodology and impacts, and the conditions related to them, as discussed in Section 4.1.9.1, are applicable to Alternative 2 as well as to Alternative 1.

No mitigation measures are proposed.

4.2.10.2 P-1044 Alternative 2

Impacts

P-1044 Alternative 2 would generate construction and operational noise levels similar to P-1044 Alternative 1, but with portions along different routes within the same general area, in proximity to the same receptors (except fewer homes in the San Onofre 2 Housing Area and San Onofre 3 Housing Area along Basilone Road would be subject to potential construction exceedances, while the San Onofre Child Development Center would be somewhat closer to a pipeline corridor). Therefore, pipeline construction noise impacts would be similar to those described for P-1044 Alternative 1, and less than significant. The Northern AWT would be located on the same site as for P-1044 Alternative 1.

Mitigation

No mitigation measures are proposed.

4.2.10.3 P-1045 Alternative 2

Impacts

P-1045 Alternative 2 would generate noise levels similar to P-1045 Alternative 1, but along a somewhat different route. A number of different sensitive receptors would potentially be affected. P-1045 Alternative 2 would pass in close proximity of BEQs in 43 Area (Las Pulgas) (unlike P-1044 Alternative 1), but P-1044 Alternative 2 would not be within proximity to homes and child-oriented facilities in the southern portion of MCBCP, or BEQs in 41 Area (Las Flores), the 31A Area (Edson Range), and the 33 Area (Margarita). However, pipeline construction noise impacts would ultimately be the same as for P-1045 Alternative 1, and less than significant, for the same reasons described in Section 4.1.10.3, P-1045 Alternative 1.

Mitigation

No mitigation measures are proposed.

4.2.11 Public Health and Safety

4.2.11.1 Both MILCONs (Alternative 2)

Methodology

The methodological approach and data sources utilized to assess public health and safety impacts of Alternative 2 are same as described for Alternative 1 in Section 4.1.11.1.

Impacts

The presence of active UST/AST sites, hazardous waste storage sites, RFA sites, and IR sites; and the potential for LBP, PCBs, and asbestos within the Alternative 2 alignment corridors are minimal.

- There are no hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, or APZs in any of the project MILCONs in Alternative 2.
- In Alternative 2, the alignment corridor in which an IR site is found is P-1044 (IR Site 33). No other project corridors/sites contain IR sites.
- In Alternative 2, the two alignment corridors in which UST sites are found are P-1044 and P-1045, which have 14 UST sites present (active LUST Site 62507, operational USTs 43286-3 and 43286-4, and closed UST Sites 43201, 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536). No other project corridors/sites contain UST sites.
- In Alternative 2, the two alignment corridors in which RFA sites are found are P-1044 and P-1045, which have five RFA sites present (active RFA Site 220 and no further action RFA Sites 176, 199, 221, and 225). No other project corridors/sites contain RFA sites.
- In Alternative 2, the two alignment corridors in which ASTs are found are P-1044 and P-1045, which have four ASTs present (ASTs 52021, 52410, 52710, and 61513). No other project corridors/sites contain ASTs.
- In Alternative 2, two alignment corridors in which training areas are found are P-1044 and P-1045, which have 12 training areas present (Range 207 Military Range Area, Range 14 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 15 Artillery Firing Area, Firing Line 103, Range 16 Artillery

Firing Area, Complex Firing Line Area 116, Range 116A KD Rifle Military Range Area, Range 19 Artillery Firing Area, Range 117A Military Range Area, Range D700 Live Fire and Maneuver, and Range RSOP 25). No other project corridors/sites contain training areas.

- In Alternative 2, the only alignment corridor in which pesticides are found is P-1044, which has one pesticide site (former North Agricultural Lease Site). No other project corridors/sites contain pesticide sites.

In addition, all alignments have RFA, UST, or IR sites near enough to the project corridors to have an effect on construction. Generally, the risk of having these sites close to Alternative 2 project corridors/sites is the potential to encounter contaminated groundwater when digging or excavating and during dewatering operations within the construction area. A summary of the sites and nearby corridors is provided in Table 4.2.11-1. As shown in the table, several of these sites could potentially impact construction in multiple corridors.

If soil contamination (discolored and/or odorous) is discovered during construction, the Installation Restoration/Remediation Branch at (760) 725-9744/9774 would be contacted for necessary remedial requirements. If the construction of structures would be outside of any known, identified groundwater plume, additional regulatory concurrence would not be required. However, these locations would still be evaluated by Navy and Marine Corps Installation Restoration Program (IRP) managers to ensure they are not downgradient of an existing plume where further investigation and/or cleanup may take place.

The northern portion of MCBCP is laden with former and current training ranges. The potential presence of MEC and small arms rounds is real. When excavation, grading, and/or digging occurs within the boundaries of a former or current range, all work would be accomplished with every effort to maximize safety and prevent the spread of any potential contamination or the release of any potential existing contaminants to the environment in accordance with all federal, state, and local laws, regulations, and guidelines.

Table 4.2.11-1
RFA, UST, IR, and AST Sites within Alternative 2
Project Corridors/Sites or Adjacent Buffers

Project Corridor/Site	Type of Site: RFA – Within Project Corridor/ Site	RFA – Within 50-Foot Buffer	UST – Within Project Corridor/Site	UST – Within 200-Foot Buffer	IR – Within Project Corridor/ Site	IR – Within 500-Foot Buffer	AST – Within Project Corridor/ Site	AST – Within 10-Foot Buffer	Military Training Areas, Impact Areas, Live-Fire Facilities, and ESQD Arcs within the Project Corridors/Sites
P-1044 Alternative 2	199(NFA), 220(LSI), 221(NFA), 225(NFA)	192(NFA), 218(NFA), 236(NFA), 280(NFA)	520400(Closed), 52291(Closed), 52651(Closed), 52710(Closed), 62420(Closed), 62435(Closed), 62436(Closed), 62520(Closed), 62535(Closed), 62536(Closed), 62507	520167-1, 520167-2, 62507-3, 62507-4	33	1I-2(Closed), 34(Closed), 36(Closed)	52021, 52410, 52710, 61513	-	Range 207 Military Range Area
P-1045 Alternative 2	176/B1(NFA)	168(NFA), 170(NFA), 176/B2(NFA), 278(NFA), 279(NFA)	43201(Closed), 43286-3, 43286-4	43260	-	1F(Closed), 2D(Closed), 20(Closed)	52021	41611	Range 14 Artillery Firing Area, Range 15 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 16 Artillery Firing Area, Complex Firing Line Area 116, Range 116A KD Rifle Military Range Area, Range 19 Artillery Firing Area, Range

	Type of Site								
	RFA		UST		IR		AST		Military Training Areas, Impact Areas, Live-Fire Facilities, and ESQD Arcs within the Project Corridors/Sites
Project Corridor/Site	Within Project Corridor/ Site	Within 50-Foot Buffer	Within Project Corridor/Site	Within 200-Foot Buffer	Within Project Corridor/ Site	Within 500-Foot Buffer	Within Project Corridor/ Site	Within 10-Foot Buffer	
									117A Military Range Area, Range D700, Live Fire and Maneuver, Range RSOP 25

LSI = Limited Site Investigation; NFA = No Further Action

Before construction of any alignment, ES would review construction plans along with the current list of hazardous material sites on-Base to ensure that sites with the potential to affect construction were identified. Construction would not be allowed within the vicinity of those hazardous material sites without assurance that the site was remediated or that the influence of the hazardous materials site would not affect the construction area.

Three child-oriented facilities are near enough to the alignments for noise and dust during construction to be of concern:

- San Onofre Elementary School
- San Onofre Child Development Center
- San Onofre Youth Center

To eliminate disturbances to children that may come from construction, such as noise, dust, and unacceptable air quality, measures such as dust abatement and BMPs that would reduce other construction impacts would be applied. These measures are summarized in Section 2.5. When successfully implemented, these measures would not adversely alter existing environmental health conditions or impose additional safety risks to children and therefore would minimize the possibility of project-related adverse impacts to children.

Mitigation

No mitigation measures are proposed.

4.2.11.2 P-1044 Alternative 2

Impacts

There are no hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, or APZs located within the P-1044 Alternative 2 project corridor/site.

Hazardous waste sites that were identified within portions of the project corridor/site include the following:

- One IR site (active IR Site 33);
- Four ASTs (active ASTs 52021, 52410, 52710, and 61513);

- Four RFA sites (no further action RFA Sites 199, 221, 225, and active RFA Site 220);
- Eleven USTs (LUST Site 62507 and closed USTs 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536);
- One IR site (active IR Site 33);
- One training area (Range 207 Military Range Area); and
- Pesticide (former North Agricultural Lease Site).

In addition, no further action RFA Sites 192, 218, 236, and 280; operational USTs 520167-1, 520167-2, 62507-3, and 62507-4; and closed IR Sites 1I-2, 34, and 36 were identified within the buffer zone of the project corridor/site.

- Construction within the project corridor/site may encounter contaminated soil from no further action RFA Sites 192, 199, 218, 221, 225, 236, and 280.
- Construction within the project corridor/site may encounter contaminated soil associated with RFA Site 220.
- Construction within the project corridor/site may encounter contaminated soil from closed USTs 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536.
- Construction within the project corridor/site may encounter contaminated soil from LUST Site 62507. A remediation alternative was recommended for the site. Groundwater at the site is relatively deep.
- Construction within the project corridor/site may encounter contaminated groundwater from IR Site 33. Soil and groundwater cleanup action at IR Site 33 is currently being planned. Contaminated groundwater may be encountered during shallow excavations or dewatering activities, which could result in exposure to construction workers.
- Construction within the project corridor/site may encounter contaminated soil from closed IR Sites 11-2, 34, and 36.
- Weapons training in the proximity of construction areas or activities could be highly dangerous to construction personnel.
- Construction within the project corridor/site may encounter contaminated soil from the former North Agricultural Lease Site.

In addition, other unidentified contaminant residue in the soil or groundwater from historical spills that may be present underneath the area of the project corridor/site would be assessed. If any contaminants are identified, appropriate remediation would be implemented before construction. Precautions would be taken when working around the active ASTs and operational USTs to protect construction crews.

With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area. With respect to potential impacts to children specifically, construction activities for the project corridor/site are generally expected to generate short-term construction noise levels and increase fugitive dust. There are three child-oriented facilities within a 500-yard buffer zone of the project corridor/site: the San Onofre Elementary School, the San Onofre Child Development Center, and the San Onofre Youth Center. The facilities are located approximately 15 to 420 yards from the project corridor/site. To mitigate potential impacts to children that may come from construction activities, measures such as dust abatement and other BMPs described in Section 2.5 that would reduce construction impacts should be applied. These measures would minimize the possibility of proposed action-related adverse impacts.

Mitigation

No mitigation measures are proposed.

4.2.11.3 P-1045 Alternative 2

Impacts

There are no IR sites, hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, APZs, or pesticides located within the P-1045 Alternative 2 project corridor/site.

Hazardous waste sites that were identified within portions of the project corridor/site include the following:

- One AST (active AST 52021);
- One RFA (no further action RFA Site 176/B1)
- Three USTs (closed UST 43201, operational USTs 43286-3 and 43286-4); and

- Ten training areas (Range 14 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Complex Firing Line Area 116, Range 116A KD Rifle Military Range Area, Range 19 Artillery Firing Area, Range 117A Military Range Area, Range D700 Live Fire and Maneuver, Range RSOP 25).

In addition, active AST 41611; no further action RFA Sites 168, 170, 176/B2, 278, and 279; LUST Site 43260; and closed IR Sites 1F, 2D, and 20 were identified within the buffer zone of the project corridor/site.

- Construction within the project corridor/site may encounter contaminated soil from no further action RFA Sites 168, 170, 176/B2, 278, and 279.
- Construction within the project corridor/site may encounter contaminated groundwater from UST Site 43260. The groundwater at UST Site 43260 is relatively shallow ranging from 10 to 20 feet bgs.
- Construction within the project corridor/site may encounter contaminated soil from closed IR Sites 1F, 2D, and 20.
- Weapons training in the proximity of construction areas or activities could be highly dangerous to construction personnel.

In addition, other unidentified contaminant residue in the soil or groundwater from historical spills that may be present underneath the area of the project corridor/site would be assessed. If any contaminants are identified, appropriate remediation would be implemented before construction.

Under this alternative, no project corridors would come within a 500-yard buffer zone of child-oriented facilities, minimizing the specific potential for impacts to children.

With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area.

Mitigation

No mitigation measures are proposed.

4.2.12 Services and Utilities

4.2.12.1 Both MILCONs (Alternative 2)

Methodology

The assessment of impacts on services and utilities for Alternative 2 followed the same procedures as for Alternative 1, as discussed in Section 4.1.12.1.

Impacts

In terms of impacts on services and utilities, there would be negligible differences between Alternative 2 and Alternative 1, as discussed in Section 4.1.12.1, with the exception of police protection and fire protection, which are addressed below. No significant impacts would result from implementation of Alternative 2.

Police Protection

As described for Alternative 1, P-1044 and P-1045 would have a negligible impact on the PMO services. Both projects are utility improvements primarily involving the installation and operation of underground conveyance lines. P-1044 would also include the Northern AWT, which would result in slightly increased security surveillance; however, the facility would be fenced with security lighting.

Fire Protection

As described for Alternative 1, fire protection impacts would be similar to police protection impacts discussed above. P-1044 and P-1045 would have a negligible impact on the fire protection services since both projects are utility improvements primarily involving the installation and operation of underground conveyance lines. P-1044 would also include the Northern AWT, which would slightly increase the demand for fire protection services. The Northern AWT would include fire protection systems, fire monitoring/control panels, and fire alarms thereby minimizing the risk or spread of fire.

Mitigation

No mitigation measures are proposed.

4.2.13 Coastal Zone Resources

4.2.13.1 Both MILCONs (Alternative 2)

Impacts

The coastal zone impacts of Alternative 2 would be similar to those discussed in Section 4.1.13.1. There would be some differences in the locations of the inland drainages crossed and where TLS crossings are proposed. The difference in TLS working site locations between Alternatives 1 and 2 of P-1044 and P-1045 would be:

- P-1044 Alternative 2 would not have a TLS brine line crossing under I-5 but would have an additional TLS boring site under San Mateo Creek from El Camino Real/Beach Club Drive to Basilone Road.
- P-1045 Alternative 2 would not have any TLS creek crossings in the Stuart Mesa Road alignment south of Las Pulgas Road.

Only P-1044 would have project elements that extend into the coastal zone. Alternative 2 would be subject to the same regulatory and permit controls discussed for Alternative 1 in Section 4.1.13.2.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.2.14 Marine Resources

Marine resources are covered in this section; please see Section 4.2.2 for related impacts to water quality and hydrology and Section 4.2.3 for related impacts to biological resources. Impacts related to proposed brine discharge from the Northern AWT RO facility on marine resources are addressed in this section. Indirect effects on marine resources from implementation of projects inland are discussed in Section 4.2.13, Coastal Zone Resources.

4.2.14.1 P-1044 Alternative 2

Impacts

Marine resource impacts of P-1044 Alternative 2 of would be similar to those discussed in Section 4.1.14.1.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.2.14.2 P-1045 Alternative 2

Impacts

No direct impacts to marine resources are anticipated from implementation of P-1045.

Mitigation

No mitigation is proposed.

4.3 ALTERNATIVE 3

4.3.1 Geology and Soils

4.3.1.1 Both MILCONs (Alternative 3)

Methodology

Methodology is described in Section 4.1.1.1.

Impacts

Alternative 3 would differ in some of the areas affected, but the geotechnical requirements for construction and erosion control would generally be the same as those discussed for Alternative 1. However, the Northern AWT plant in P-1044 Alternative 3 would be south of Basilone Road where San Onofre Creek approaches the road and so would require more topographical alteration than Alternative 1 or 2, possibly with fill needed to raise the site above the floodplain. If so, grading would be conducted subject to the regulations cited in Section 4.1.1.1 and in conformance with a site-specific geotechnical report. With these exceptions, the discussion of impacts in Section 4.1.1.1 is applicable to Alternative 3.

Mitigation

No mitigation measures are proposed.

4.3.2 Water Quality and Hydrology

Water quality and hydrology are covered in this section; please see Section 4.3.3 for related impacts to biological resources and Section 4.3.14 for related impacts to marine resources.

4.3.2.1 Both MILCONs (Alternative 3)

Impacts

The discussion of general impacts common to both MILCONs in Section 4.1.2.1 is applicable to Alternative 3.

Mitigation

No mitigation measures are proposed.

4.3.2.2 P-1044 Alternative 3

Impacts

MILCON P-1044 Alternative 3 is similar to Alternative 1 except that the Northern AWT would be constructed south of and adjacent to Basilone Road near the north side of San Onofre Creek. A narrow strip of the Northern AWT site along its southern border in this alternative is within the 100-year floodplain of San Onofre Creek. Site planning could avoid encroachment into the floodplain, but it is also possible that construction, most likely placement of fill, and elements of the completed Northern AWT could encroach into the floodplain. If such encroachment occurs, risk of accidental impacts to the creek could increase, especially during construction. Construction and operation of the Northern AWT and other components would be subject to the same regulatory controls and requirements as Alternative 1, described in Section 4.1.2.4. In addition, if permanent encroachment into the 100-year floodplain occurred at the Northern AWT site, Alternative 3 would be required to meet the requirements of EO 11988. Pipelines would be in the same alignments as Alternative 1, and TLS construction would be employed to cross San Mateo Creek and San Onofre Creek in the same locations as Alternative 1.

Construction and operation of P-1044 Alternative 3 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5, the applicable regulations in Section 3.2, and the requirements of EO 11988.

Mitigation

No mitigation measures are proposed.

4.3.2.3 P-1045 Alternative 3

Impacts

P-1045 Alternative 3 would be the same as P-1045 Alternative 1, with the pipeline route running from the Northern AWT to the existing reservoirs and proposed new reservoir north of Wire Mountain 2 Housing Area and the Santa Margarita Housing Area, but with no connection to the reservoirs on the ridge above Haybarn Canyon. The Alternative 1 alignment along the west side of the Santa Margarita River and across the river to Haybarn Canyon would be eliminated. TLS construction would be employed at the same sites in the El Camino Real/Stuart Mesa Road route and at the Santa Margarita River crossing, and pump stations would be at the Northern AWT and in the same location near the Las Pulgas gate as in Alternative 1, but no new pump station would be constructed at the future AWT South.

A project-specific SWPPP with BMPs to avoid adverse impacts would be required for this alternative, and the same regulatory controls and requirements described in Section 4.1.2.3 would be applicable. Construction and operation of P-1045 Alternative 3 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5 and the applicable regulations in Section 3.2.

Mitigation

No mitigation measures are proposed.

4.3.3 Biological Resources

Biological resources are covered in this section; please see Section 4.3.2 for related impacts to water quality and hydrology and Section 4.3.14 for related impacts to marine resources.

4.3.3.1 Both MILCONs (Alternative 3)

Impacts

For a general description of the potential direct and indirect impacts to biological resources that would result from construction and operation of the alternatives, refer to Alternative 1, Section 4.1.3.1. A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1. The special conservation and construction measures listed in Section 2.5 would be incorporated as part of any of the alternatives and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources.

The total impacts to biological resources associated with implementing the projects associated with Alternative 3 are presented below. In all cases, the total area of impacts associated with each project is presented separately, and then those totals are summed across both projects. However, in areas common to two or more projects, impacts would not happen anew in overlapping areas if the projects were implemented simultaneously. Therefore, the totals that are summed across both projects represent the greatest disturbance possible, which would occur if every project took place at a different time in every overlap area.

As previously noted, analyzing impacts within utility corridors for the full 125-foot width represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the maximum (100 percent) and the anticipated (48 percent) impact scenarios for comparison. For the maintenance access and utility facilities (e.g., reservoirs and pump stations) permanent impacts were assessed at 100 percent for both maximum and anticipated scenarios. The direct impacts that would arise from trenching within project corridors to install the proposed water pipelines would be considered temporary for habitats that can be restored after construction activities are complete. Temporary, direct impacts may also arise from construction-generated fugitive dust; noise; increased human presence; and construction-related erosion, runoff, and sedimentation into plant communities. Direct impacts from these construction-related activities would be considered temporary wherever the impacts would end with cessation of project construction. However, direct impacts to some resources, e.g., occupied San Diego and Riverside fairy shrimp habitat (vernal pool basins) and occupied thread-leaved brodiaea habitat may or may not be reversible as construction impacts within the corridor could result in the permanent alteration of physical characteristics critical to the species, compared to the preconstruction condition. Therefore, as discussed previously, all proposed trenching-related corridor impacts to occupied San Diego and Riverside fairy shrimp habitat and occupied thread-leaved brodiaea habitat are analyzed as permanent impacts herein.

For the maintenance access roads and utility facilities (e.g., reservoirs and pump stations) permanent impacts were assessed at 100 percent for both maximum and anticipated scenarios.

A thorough analysis of impacts to listed species is provided in the biological assessment for the proposed action (AECOM 2012).

Additional impacts to biological resources may occur as a result of habitat restoration. At this time, these effects are not quantifiable. Additional impacts to regulated biological resources would be analyzed after finalization and approval of habitat restoration plans as submitted to ES; USFWS; and USACE.

Mitigation

Mitigation measures that would be required for one or both of the projects are summarized in Section 4.1.3.1 (Table 4.1.3.1-2). The project-specific relevance of these measures is presented in the following sections.

If acreage is needed for mitigation of impacts to federally listed species or habitats, any on-Base mitigation should not interfere with the Base's training mission. Any such interference would be avoided through consultation between ES and Base Operations and Training, as explained in Section 4.1.5.1.

Plant Communities

Impacts

The total permanent and temporary direct impacts to plant communities from development of the two separate projects that compose Alternative 3 are presented in

Table 4.3.3.1-1. As noted above, in all cases the temporary impacts represent the worst-case scenario that could occur to biological resources because technologies would be employed to minimize resource impacts within the 125-foot-wide utility corridors. The maximum versus anticipated direct impacts to plant communities associated with Alternative 2 are summarized for riparian and upland habitat types for each project in Table 4.3.3.1-2. Further details about direct impacts associated with project-specific facilities, and potential indirect impacts that could occur in the adjoining 100- and 400-foot buffer areas are presented in subsequent sections of this EIS.

Only the permanent and temporary impacts to plant communities (grasslands, scrublands, and woodlands) that coincide with regulated waters (e.g., riparian wetlands or nonvegetated channels regulated under Section 404 of the CWA) or that are occupied by, or support, federally listed or covered species (i.e., ESA and/or MBTA) would be considered significant. Potential total impacts to these regulated/covered resources are discussed in the following subsections.

<u>Mitigation</u>

Mitigation required for unavoidable impacts to plant communities that are regulated or otherwise covered by federal statutes (i.e., waters regulated under the CWA and habitats for species listed under the ESA or covered under the MBTA) are discussed in the following subsections.

Waters of the U.S.

<u>Impacts</u>

Development of the two separate projects that compose Alternative 3 would result in permanent and temporary direct impacts to jurisdictional waters, including wetlands, as summarized in Table 4.3.3.1-3. All direct impacts to jurisdictional waters would be considered significant. The maximum versus anticipated direct impacts to wetlands and other waters associated with Alternative 3 are summarized for each project in Table 4.3.3.1-4. Additional project-specific details about potential direct impacts to jurisdictional waters are presented below for each separate project. The CWA Section 404(b)(1) Guidelines require USACE to determine that the project is the least environmentally damaging practicable alternative for the proposed unavoidable impacts to jurisdictional waters. Therefore, as project designs are finalized, attempts to avoid and minimize impacts to jurisdictional waters (wetlands and nonwetland waters) to the greatest extent practicable would be undertaken.

The determination of whether the utility projects may be permitted under USACE's NWP program, or whether specific individual permits would be required, would be determined formally as part of the CWA Section 404 permit process. As noted in Section 4.1.3.1, to qualify for a NWP, the proposed action and the associated unavoidable impacts to jurisdictional waters based on final project designs must satisfy all terms and conditions of the specific NWP, as well as all general conditions and any relevant regional conditions of the NWP program. One of the regional conditions published by the USACE Los Angeles District indicates that individual permits are required for all discharges of fill material into jurisdictional vernal pools (USACE Special Public Notice May 18, 2007).

Based on data collected during formal wetland delineations for Alternative 3, potential jurisdictional vernal pools were delineated within the proposed impact areas for MILCONs P-1044 and P-1045 (the jurisdictional status of all delineated waters is not considered final until the USACE has completed a jurisdictional determination). Therefore, if, based on final project design it is determined that impacting a jurisdictional vernal pool is unavoidable, then an Individual Permit would be required for these MILCONs. However, if the discharge of fill material into jurisdictional vernal pools can be avoided, then these MILCONs may qualify for authorization under NWP 12 (Utility Line Activities) pending USACE's review of pre-construction notification materials. It should be noted that the District Engineer may exercise "discretionary authority" for any activity that is determined to have a more than minimal individual or cumulative adverse effect on the environment or may be contrary to public interest and thus require an Individual Permit (33 CFR 330.2 [g]). Therefore, as noted above, the determination of whether MILCONs P-1044 and P-1045 may be permitted under NWPs or require individual permits would be determined formally as part of the CWA Section 404 permit process.

Mitigation

Mitigation for unavoidable impacts to jurisdictional waters is summarized in measure J1 in Table 4.1.3.1-2. Based on mitigation ratios of 2:1 for permanent impacts to wetlands, 1:1 for permanent impacts to other waters, and 1:1 for all temporary wetlands and waters impacts, the mitigation for waters of the U.S. that could be required for development of Alternative 3 is summarized in Table 4.3.3.1-5. Mitigation ratios across wetland types, (e.g., coastal and valley freshwater marsh versus southern riparian woodland), must be finalized with USACE and RWQCB via the permitting process; some types may require more than a 2:1 ratio for the permanent loss of that wetland.

As noted in Section 2.5.2, unavoidable impacts to waters of the U.S. would require mitigation consistent with the final rule for Compensatory Mitigation for Losses to Aquatic Resources that was issued by USACE and USEPA. This would include the preparation of a detailed mitigation plan prepared collaboratively with ES and reviewed and approved by USACE and RWQCB before resource impact. If the unavoidable impacts to jurisdictional waters support federally listed species, then input from USFWS would also be required. The mitigation plan would describe on-site, off-site, and as needed, off-Base mitigation. For all habitat restoration that is proposed, this plan would include details regarding site preparation (e.g., grading), planting specifications, and irrigation design, as well as maintenance and monitoring procedures. The plan would also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria, and a strategy for long-term mitigation site management. A portion of the mitigation obligations may be satisfied by participating in a fee-based mitigation program (e.g., a wetland mitigation bank) in which case, long-term management for such mitigation would be covered under the terms of the formal banking agreement.

Federally Listed Plants

Impacts

All direct impacts to federally listed plants within the project limits, including the water utility corridors, are considered permanent impacts. Indirect impacts are evaluated for occurrences of federally listed plants within the 100-foot buffer zone. Two federally listed plant species, thread-leaved brodiaea and spreading navarretia, may be directly impacted by implementation of Alternative 3. Acreage and number of vernal pool basins associated with these species that may potentially be impacted are noted in Table 4.3.3.1-6. The maximum versus anticipated impacts to federally listed plant species from Alternative 3 are summarized in Table 4.3.3.1-7. As previously noted, trenching impacts within the corridor would be considered permanent within thread-leaved brodiaea-occupied habitat and vernal pool habitat, but temporary for all other plant habitat. One additional listed plant species, San Diego button-celery, is not known to occur in the project limits but does occur in the 100-foot buffer areas. Vernal pools supporting both San Diego button-celery and spreading navarretia are known to occur within the 100-foot buffer of P-1045 along Wire Mountain Road. However, every effort would be made to avoid impacts to vernal pool habitat, as described in Section 2.5.2 and measure P2 in Table 4.1.3.1-2.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed plant species. Mitigation for unavoidable impacts to federally listed plant species is summarized in measures P1 and P2 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed plant species from development of Alternative 3 is noted in Table 4.3.3.1-8. Species-specific mitigation ratios required for the project must be finalized with USFWS.

Nonfederally Listed Rare Plants

Impacts

Habitat supporting various nonfederally listed rare plant species occurs throughout Alternative 3. Rare plant species detected during project surveys that may potentially be impacted include, but may not be limited to, Pendleton button-celery, sticky dudleya, Blochman's dudleya, many-stemmed dudleya, Palmer's grappling-hook, San Diego tarplant, coast wallflower, and western dichondra. One location of Pendleton button-celery would be directly impacted by the P-1045 project within the corridor. Eight locations of Pendleton button-celery could be indirectly impacted within the 100-foot buffer. Impacts to this species would be reduced to a level below significance through conservation measures identified in Section 2.5.2. In particular, impacts to this species would be avoided or minimized through worker environmental protection briefings, markers or fencing, biological monitoring, erosion and sedimentation prevention, and restoration of areas temporarily affected, as determined necessary by the project biologist. With implementation of these and other measures identified in Section 2.5.2, none of the impacts that would occur to nonfederally listed rare plant species from development of Alternative 3 were considered significant and are therefore not discussed further in the project-specific sections of this EIS.

Mitigation

Implementation of measures as discussed in Section 2.5.2 would avoid and minimize potential impacts to nonfederally listed rare plant species. Unavoidable impacts to the nonfederally listed rare plants as a result of Alternative 3 do not warrant additional project-specific mitigation measures.

Federally Listed Wildlife

Impacts

A total of eight federally listed wildlife species may be impacted by implementation of Alternative 3. These species are the Riverside fairy shrimp, San Diego fairy shrimp, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Acreages of habitat occupied by these species that may potentially be impacted and could require mitigation are provided in Table 4.3.3.1-6. These acreages are broken down according to plant community classifications and type of impact (temporary versus permanent). Impacts within the maintenance access, P-1044 facilities, and P-1045 facilities are assessed as permanent direct impacts. As previously noted, analyzing impacts within the 125-foot-wide utility corridors represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the worst-case (100 percent) and the anticipated (48 percent) impact scenarios for comparison. As previously noted, trenching impacts within the corridor would be considered permanent within habitat occupied by Riverside fairy shrimp and San Diego fairy shrimp, but temporary for all other wildlife habitat. The maximum and anticipated direct impacts to federally listed species associated with Alternative 3 are provided in Table 4.3.3.1-7. Indirect impacts associated with the buffer are not quantified in this section, but are discussed in more detail in project specific discussions included within Sections 4.3.3.2 to 4.3.3.5.

A discussion of potential impacts specific to each federally listed wildlife species that may be impacted by Alternative 3 is provided in Section 4.1.3.1. The discussion of each species is organized by (1) permanent direct impacts associated with the facilities footprint and potential temporary direct impacts associated with the temporary work areas; (2) permanent and temporary direct impacts associated with the corridor; and (3) permanent and temporary indirect impacts associated with the buffers associated with the facilities and corridor.

Mitigation

The federally listed wildlife mitigation assessment discussion for Alternative 1 is also applicable to Alternative 3. See Section 4.1.3.1.

Nonfederally Listed Rare Wildlife

Impacts

The nonfederally listed rare wildlife impact assessment discussion for Alternative 1 is also applicable to Alternative 3. See Section 4.1.3.1.

Mitigation

The nonfederally listed rare wildlife mitigation assessment discussion for Alternative 1 is also applicable to Alternative 3. See Section 4.1.3.1.

Wildlife Corridors

Impacts

The wildlife corridor impact assessment discussion for Alternative 1 is also applicable to Alternative 3. See Section 4.1.3.1.

Mitigation

The wildlife corridors mitigation assessment discussion for Alternative 1 is also applicable to Alternative 3. See Section 4.1.3.1.

Table 4.3.3.1-1
Potential Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 3 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 3	P-1045 – Alternative 3	Total[2]
Permanent	**34.28**	**15.96**	**50.24**
Riparian and Wetlands	1.58	0.05	1.63
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Disturbed Wetland	-	-	0.05
Mulefat Scrub	0.06	0.01	0.07
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.31	0.03	0.34
Uplands	10.93	3.10	14.03
Coast Live Oak Woodland	0.15	-	0.15
Diegan Coastal Sage Scrub	9.00	2.67	11.67
Eucalyptus Woodland	-	0.01	0.01
Nonnative Grassland	0.29	0.37	0.66
Valley Needlegrass Grassland	1.49	0.05	1.54
Other Cover Types	21.77	12.81	34.58
Disturbed Habitat	0.39	1.30	1.69
Urban/Developed	21.38	11.51	32.89
Temporary	**290.24**	**373.38**	**663.62**
Riparian and Wetlands	11.26	22.72	33.98
Beach	0.45	-	0.45
Coastal and Valley Freshwater Marsh	-	0.07	0.07
Disturbed Wetland	-	<0.005	<0.005
Freshwater Seep	-	0.11	0.11
Mulefat Scrub	2.96	7.26	10.22
Nonvegetated Channel	-	0.01	0.01
Open Water	0.42	<0.005	0.42
Riparian Scrub	0.05	0.38	0.43
Southern Coastal Salt Marsh	-	0.37	0.37
Southern Riparian Woodland	2.85	3.04	5.89
Southern Willow Scrub	4.52	11.11	15.63
Vernal Pool	0.01	0.37	0.38
Uplands	125.52	179.55	305.07
Coast Live Oak Woodland	3.34	-	3.34
Diegan Coastal Sage Scrub	93.90	137.14	231.04
Eucalyptus Woodland	-	0.12	0.12
Nonnative Grassland	15.15	27.07	42.22
Valley Needlegrass Grassland	13.13	15.22	28.35
Other Cover Types	153.45	171.22	324.67
Disturbed Habitat	30.05	8.79	38.84
Urban/Developed	123.40	162.33	285.73
Total[2]	324.52	389.35	713.87

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.

Table 4.3.3.1-2
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 3 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 3		P-1045 – Alternative 3		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**34.28**	**34.28**	**15.96**	**15.96**	**50.24**	**50.24**
Riparian and Wetlands	1.58	1.58	0.05	0.05	1.63	1.63
Uplands	10.93	10.93	3.10	3.10	14.03	14.03
Other Cover Types	21.77	21.77	12.81	12.81	34.58	34.58
Temporary	**290.24**	**153.98**	**373.38**	**183.61**	**663.62**	**337.59**
Riparian and Wetlands	11.26	5.94	22.72	11.06	33.98	17.00
Uplands	125.52	71.84	179.55	86.99	305.07	158.83
Other Cover Types	153.45	76.19	171.12	85.56	324.57	161.75
Total[2]	**324.52**	**188.26**	**389.35**	**199.57**	**713.87**	**387.83**

[1] The table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) maximum impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts).
[2] Numbers may not sum exactly due to rounding.

Table 4.3.3.1-3
Potential Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 3 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 3	P-1045 – Alternative 3	Total[2]
Permanent	**0.07**	**0.03**	**1.53**
Wetland[3]	<0.005	-	1.19
Coastal and Valley Freshwater Marsh	-	-	0.04
Mulefat Scrub	-	-	0.12
Southern Coastal Salt Marsh	-	-	0.58
Southern Riparian Woodland	<0.005	-	<0.005
Southern Willow Scrub	-	-	0.44
Other Waters[4]	0.07 (190)	0.03 (233)	0.34
Alkali Playa	-	-	<0.005
Fresh Water	-	-	0.24
Nonvegetated Channel	0.07 (190)	0.03 (233)	0.10
Temporary	**1.13**	**2.48**	**86.25**
Wetland[3]	0.57	2.00	64.04
Coastal and Valley Freshwater Marsh	-	0.03	0.63
Freshwater Seep	-	0.08	0.08
Mulefat Scrub	0.07	0.84	4.92
Southern Coastal Salt Marsh	-	0.33	14.69
Southern Riparian Woodland	0.49	-	0.49
Southern Willow Scrub	-	0.29	42.80
Vernal Pool	0.01	0.43	0.44
Other Waters[4]	0.57 (3,214)	0.48 (3,485)	22.21
Alkali Playa	-	0.05	7.01
Disturbed Wetland	0.07 (762)	<0.005 (40)	0.07
Fresh Water	-	0.01	14.21
Nonvegetated Channel	0.50 (2,452)	0.42 (3,445)	0.92
Total[2]	**1.21**	**2.50**	**87.78**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.
[3] Differences in the acreages presented in the above table that summarize the area of jurisdictional wetlands within project boundaries vs. acreages presented in the previous two tables that summarize the area of riparian and other wetland vegetation communities within project boundaries are attributable to the different methodologies used for vegetation mapping vs. delineating jurisdictional wetlands.
[4] Linear distance (feet) impacts are provided in parentheses.

Table 4.3.3.1-4
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 3 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 3		P-1045 – Alternative 3		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**0.07**	**0.07**	**0.03**	**0.03**	**0.1**	**0.1**
Wetland	<0.005	<0.005	-	-	<0.005	<0.005
Other Waters[3]	0.07 (190)	0.07 (190)	0.03 (233)	0.03 (233)	0.1	0.1
Temporary	**1.13**	**0.55**	**2.48**	**1.11**	**3.61**	**1.66**
Wetland	0.57	0.27	2.00	0.89	2.57	1.16
Other Waters[3]	0.57 (3,214)	0.27 (3,214)	0.48 (3,485)	0.22 (3,485)	1.05	0.49
Total[2]	**1.21**	**0.62**	**2.50**	**1.29**	**3.71**	**1.91**

[1] This table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.
[3] Linear distance (feet) impacts are provided in parentheses.

Table 4.3.3.1-5
Mitigation for Permanent and Temporary Direct Impacts to Waters of the U.S. – Alternative 3 (acres)

Jurisdictional Waters	Mitigation Ratio	Potential Impacts[1]	Potential Mitigation[2,3]
Permanent	**-**	**-**	**0.11**
Wetland	2:1	<0.005	0.01
Other Waters	1:1	0.10	0.10
Temporary	**-**	**-**	**1.65**
Wetland	1:1	1.16	1.16
Other Waters	1:1	0.49	0.49
Total	**-**	**-**	**1.76**

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.
[2] All temporary impacts to non-Waters of the U.S. will be restored in kind, on site at a 1:1 ratio. Because of the temporary nature of the impacts associated with installation of the communication lines, the plan will focus on the restoration of a variety of native habitats *in situ* after construction has been completed. A habitat mitigation plan for all temporary impacts to Waters of the U.S. will be developed in compliance with the CWA 404 mitigation regulations. All temporary impacts to WUS will be restored in kind, on site at a 1:1 ratio. Combine this plan to permanent impacts HMP.
[3] In compliance with CWA Section 404 permit process, a habitat mitigation plan detailing the mitigation measures for permanent impacts to wetlands and nonwetland Waters of the U.S., including jurisdictional vernal pools, must be prepared before impacts occurring.

Table 4.3.3.1-6
Potential Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 3 (acres)[1]

Species	P-1044 – Alternative 3	P-1045 – Alternative 3	Total[2]
Thread-leaved Brodiaea	0.92	0.08	1.00
Permanent	0.92	0.08	1.00
Riverside Fairy Shrimp	-	19 basins	19 basins
Permanent	-	19 basins	19 basins
San Diego Fairy Shrimp	30 basins	65 basins	95 basins
Permanent	30 basins	65 basins	95 basins
Branchinecta spp.	3 basins	17 basins	20 basins
Permanent	3 basins	17 basins	20 basins
Arroyo Toad (Aestivation/Dispersal)	25.63	6.66	32.29
Permanent	0.96	-	0.96
Coast Live Oak Woodland	0.09	-	0.09
Diegan Coastal Sage Scrub	0.64	-	0.64
Nonnative Grassland	0.02	-	0.02
Valley Needlegrass Grassland	0.20	-	0.20
Temporary	24.67	6.66	31.33
Coast Live Oak Woodland	0.85	-	0.85
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Diegan Coastal Sage Scrub	16.19	4.77	20.96
Disturbed Habitat	-	0.13	0.13
Mulefat Scrub	-	0.77	0.77
Nonnative Grassland	4.64	0.54	5.18
Southern Willow Scrub	-	0.45	0.45
Valley Needlegrass Grassland	2.98	-	2.98
Arroyo Toad (Breeding)	5.48	1.43	6.91
Permanent	0.41	-	0.41
Southern Riparian Woodland	0.29	-	0.29
Southern Willow Scrub	0.12	-	0.12
Temporary	5.07	1.43	6.50
Mulefat Scrub	0.59	<0.005	0.59
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	1.15	-	1.15
Southern Willow Scrub	3.28	1.43	4.71
Light-Footed Clapper Rail	-	0.39	0.39
Temporary	-	0.39	0.39
Southern Coastal Salt Marsh	-	0.30	0.30
Southern Willow Scrub	-	0.10	0.10
Coastal California Gnatcatcher	88.23	113.51	201.74
Permanent	8.02	2.43	10.45
Diegan Coastal Sage Scrub	8.02	2.43	10.45

Species	P-1044 – Alternative 3	P-1045 – Alternative 3	Total[2]
Temporary	80.21	111.08	191.29
Diegan Coastal Sage Scrub	80.21	111.08	191.29
Least Bell's Vireo	8.60	17.05	25.65
Permanent	1.32	0.04	1.36
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.12	0.03	0.15
Temporary	7.28	17.01	24.29
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Disturbed Wetland	-	-	3.85
Mulefat Scrub	0.66	5.19	5.85
Open Water	-	<0.005	<0.005
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	2.85	2.65	5.50
Southern Willow Scrub	3.72	9.17	12.89
Southwestern Willow Flycatcher	6.82	14.16	20.98
Permanent	0.22	0.04	0.26
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	0.10	<0.005	0.10
Southern Willow Scrub	0.12	0.03	0.15
Temporary	6.60	14.13	20.73
Mulefat Scrub	0.66	2.96	3.62
Southern Riparian Woodland	2.69	2.65	5.34
Southern Willow Scrub	3.25	8.51	11.76
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	-	5.98
Temporary	5.98	-	5.98
Diegan Coastal Sage Scrub	5.98	-	5.98
Pacific Pocket Mouse (Microhabitat)[3]	2.68	7.96	10.64
Permanent	1.27	<0.005	1.27
Diegan Coastal Sage Scrub	1.27	-	1.27
Disturbed Habitat	-	<0.005	<0.005
Nonnative Grassland	-	-	0.01
Temporary	1.41	7.96	9.37
Diegan Coastal Sage Scrub	1.37	6.41	7.78
Disturbed Habitat	-	0.86	0.86
Eucalyptus Woodland	-	0.01	0.01
Mulefat Scrub	0.05	0.05	0.10
Nonnative Grassland	-	0.63	0.63
Vernal Pool	-	<0.005	<0.005
Pacific Pocket Mouse (Suitable Habitat)[3]	9.04	26.02	35.06
Permanent	3.86	2.65	6.51
Diegan Coastal Sage Scrub	3.86	1.37	5.23
Disturbed Habitat	-	1.28	1.28
Nonnative Grassland	-	0.01	0.01

Species	P-1044 – Alternative 3	P-1045 – Alternative 3	Total[2]
Temporary	5.18	23.37	28.55
Diegan Coastal Sage Scrub	5.08	18.10	23.18
Disturbed Habitat	0.06	2.67	2.73
Eucalyptus Woodland	-	0.05	0.05
Mulefat Scrub	0.02	0.02	0.04
Nonnative Grassland	-	0.61	0.61
Riparian Scrub	-	0.27	0.27
Southern Riparian Woodland	0.02	-	0.02
Southern Willow Scrub	-	1.64	1.64

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.

[2] Numbers may not sum exactly due to rounding. Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for both MILCONs are not provided.

[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.3.3.1-7
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 3 (acres)[1]

Species	P-1044 – Alternative 3		P-1045 – Alternative 3		Total Maximum Impacts	Total Anticipated Impacts
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Thread-leaved Brodiaea[2]	0.92	0.51	0.08	0.01	1.00	0.52
Riverside Fairy Shrimp[2]	-	-	19 basins	2 basins	19 basins	2 basins
San Diego Fairy Shrimp[2]	30 basins	14 basins	65 basins	10 basins	95 basins	24 basins
Branchinecta spp.[2]	3 basins	1 basin	17 basins	6 basins	20 basins	7 basins
Arroyo Toad (Aestivation/Dispersal)	25.63	13.09	6.66	3.37	32.29	16.46
Arroyo Toad (Breeding)	5.48	2.86	1.43	0.94	6.91	3.80
Light-footed Clapper Rail	-	-	0.39	0.24	0.39	0.24
Coastal California Gnatcatcher	88.23	57.35	113.51	60.13	201.74	117.48
Least Bell's Vireo	8.60	5.35	17.05	8.62	25.65	13.97
Southwestern Willow Flycatcher	6.82	3.91	14.16	7.12	20.98	11.03
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	2.87	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[3]	2.68	2.09	7.96	3.97	10.64	6.06
Pacific Pocket Mouse (Suitable Habitat)[3]	9.04	6.95	26.01	14.52	35.05	21.47

[1] Table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48%) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for both MILCONs are not provided.
[2] While impacts within the construction corridor are considered temporary and reversible for most resources, all direct impacts to these species and their habitats are considered permanent.
[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.3.3.1-8
Mitigation for Federally Listed Species
– Alternative 3 (acres)[1]

Species	Mitigation Ratio	P-1044 – Alternative 3	Potential Mitigation	P-1045 – Alternative 3	Potential Mitigation	Total Potential Mitigation[7,8]
Plants						
Thread-leaved Brodiaea						
Permanent Impacts	2:1	0.51	1.02	0.08	0.02	1.04
Wildlife						
Riverside Fairy Shrimp						
Permanent Impacts	2:1[2]	-	-	2 basins	4 basins	4 basins
San Diego Fairy Shrimp						
Permanent Impacts	2:1[2]	14 basins	28 basins	10 basins	20 basins	48 basins
Arroyo Toad (Aestivation/ Dispersal)						
Permanent Impacts	0.5:1[4]	0.96	0.48	-	-	0.48
Temporary Impacts	1:1[3]	12.50	12.50	3.37	3.37	15.87
Arroyo Toad (Breeding)						
Permanent Impacts	2:1[4]	0.41	0.82	-	-	0.82
Temporary Impacts	1:1[4]	2.45	2.45	0.94	0.94	3.39
Light-footed Clapper Rail						
Temporary Impacts	1:1[3]	-	-	0.24	0.24	0.24
Coastal California Gnatcatcher						
Permanent Impacts	2:1	8.02	16.04	2.43	4.86	20.90
Temporary Impacts	1:1[3]	49.33	49.33	57.70	57.70	107.03
Least Bell's Vireo						
Permanent Impacts	2:1[4]	1.32	2.64	0.04	0.08	2.72
Temporary Impacts	1:1[4]	4.03	4.03	8.58	8.58	12.61
Southwestern Willow Flycatcher						
Permanent Impacts	2:1[4]	0.22	0.44	0.04	0.08	0.52
Temporary Impacts	1:1[4]	3.69	3.69	7.09	7.09	10.78
Pacific Pocket Mouse (Occupied Habitat)[5]						
Temporary Impacts	1:1[3,6]	2.87	2.87	-	-	2.87
Pacific Pocket Mouse (Microhabitat)[5]						
Permanent Impacts	0:1[6]	1.27	0.0	-	-	0.0
Temporary Impacts	1:1[3,6]	0.82	0.82	3.97	3.97	4.79

Species	Mitigation Ratio	P-1044 – Alternative 3	Potential Mitigation	P-1045 – Alternative 3	Potential Mitigation	Total Potential Mitigation[7,8]
Pacific Pocket Mouse (Suitable Habitat)[5]						
Permanent Impacts	0:1[6]	3.86	0.0	2.64	0.0	0.0
Temporary Impacts	1:1[3,6]	3.10	3.10	11.82	11.82	14.92

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.
[2] Impacts noted for *Branchinecta* spp. In the above impact table are not included in this mitigation summary. Findings from the 2011/2012 protocol surveys and USFWS consultation would determine whether additional mitigation for listed fairy shrimp species would be required.
[3] Areas temporarily impacted by construction activities would be restored in-place (1:1) to native vegetation following construction.
[4] Mitigation for impacts to arroyo toad (aestivation) would be fulfilled through restoration of riparian vegetation at a 0.5:1 ratio as noted above. Alternatively, MCBCP may restore upland habitat at a ratio of 2:1. Per the Riparian BO (USFWS 1995), mitigation for impacts to arroyo toad (breeding), least Bell's vireo, and southwestern willow flycatcher would be fulfilled through mitigation of anticipated project impacts to riparian habitat (Table 4.1.3.1-4) regardless of occupation by a sensitive species, as discussed in Table 4.1.3.1-2.
[7] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.
[6] In addition to in-place restoration, MCBCP would provide additional compensation for areas of suitable, but unoccupied habitat for Pacific pocket mouse that are temporarily impacted by construction activities. As stated in the FBO, the MCBCP would contribute to the San Diego Zoological Society's effort to establish a captive Pacific pocket mouse population and reintroduce this species to locations within their former distribution. Alternatively, MCBCP may restore Pacific pocket mouse habitat outside the project footprint; however, if that alternative is pursued then consultation with USFWS would need to be re-initiated. No mitigation is required to compensate for the unavoidable permanent impacts to unoccupied, but suitable Pacific pocket mouse habitat. As noted in the FBO, the USFWS determined that such impacts are not anticipated to substantially affect the availability of habitat that is likely to be used by this species.
[7] Numbers may not sum exactly due to rounding.
[8] Where applicable, permanent impacts to listed species riparian habitat will be offset by restoring riparian habitat in the Lower Santa Margarita River. Permanent impacts to the coastal California gnatcatcher habitat (coastal sage scrub or thread-leaved brodiaea would be offset at a 2:1 ratio through restoration of habitat in the Lima Coastal Sage Scrub Restoration site within the Lima Training Area, and vernal pool mitigation should take place in the San Onofre State Park Lease Area Vernal Pool Mesa site, or other available sites as determined by ES Land Management Branch and USFWS.

4.3.3.2 P-1044 Alternative 3

Permanent and temporary direct and indirect impacts for P-1044 Alternative 3 would be similar to those discussed above for P-1044 Alternative 1. See Section 4.1.3.1 for a general discussion of these potential project effects to plant communities and other cover types, jurisdictional waters, habitats occupied by federally listed and other rare species, and migratory birds covered under the MBTA.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1044 Alternative 3 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.3.3.2-1, 4.3.3.2-2, and 4.3.3.2-3, respectively, with additional detail shown in Figure 4.3.3.2-4.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1044 Alternative 3 facilities would result in permanent direct impacts to riparian and upland native plant communities and other cover types (Table 4.3.3.2-1). Development within the project corridor, which includes the area of the P-1044 TLS site, would result in temporary direct impacts to plant communities and other cover types including vernal pools (Table 4.3.3.2-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, and vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under the CWA or occupied by federally listed species would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 3 could cause indirect impacts to plant communities and other cover types that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.3.3.2-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

<u>Impacts</u>

Direct Impacts

The project limits of the proposed action have been constrained to avoid and minimize permanent and temporary direct impacts to jurisdictional waters (including wetlands) that were identified via formal delineation. Development of the P-1044 Alternative 3 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of southern riparian woodland and nonvegetated channel (Table 4.3.3.2-4). Development of the TLS sites and project corridor would result in temporary direct impacts to jurisdictional waters and wetlands, primarily in the form of southern riparian woodland and nonvegetated channel with lesser amounts of mulefat scrub and disturbed wetland, respectively (Table 4.3.3.2-5).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 3 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.3.3.2-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be temporarily or permanently, indirectly affected by the project as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measure J1, which would compensate for impacts to jurisdictional waters, including wetlands, is discussed in Section 4.1.3.1.

Federally Listed Plants

<u>Impacts</u>

Potential effects to federally listed plant species and habitat associated with development of P-1044 Alternative 3 are depicted in Figure 4.3.3.2-1 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.3.3.2-6 and 4.3.3.2-7.

Direct Impacts

Approximately 0.12 acre of thread-leaved brodiaea occupied habitat occurs within one of the P-1044 Alternative 3 project facilities and would be directly affected by development (Table 4.3.3.2-6). The occupied habitat is located northeast of Reservoir 62310. Approximately 0.80 acre of thread-leaved brodiaea occupied habitat is known to occur within the P-1044 project corridor and may also be directly affected by the proposed action (Table 4.3.3.2-6). Direct effects to thread-leaved brodiaea may be minimized following implementation of avoidance, minimization, and compensation measures described in the mitigation section below. Any direct effect to this species is considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 1.28 acre of thread-leaved brodiaea occupied habitat is known to occur within the 100-foot buffer of the proposed action area (Table 4.3.3.2-7). Indirect effects to this species would be minimized by implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

<u>Mitigation</u>

Mitigation measures P1 and P2 would compensate for impacts to federally listed plant species as discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Wildlife

Impacts

Six federally listed wildlife species, San Diego fairy shrimp, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be impacted by P-1044 Alternative 3. Locations of these species relevant to P-1044 are depicted in Figure 4.3.3.2-3. Occupied and/or suitable habitat for federally listed wildlife species near P-1044 Alternative 3 project components is depicted in Figures 4.1.3.2-4 through 4.1.3.2-12 (shown with Alternative 1 project components). A breakdown of occupied and/or suitable habitat according to vegetation type is provided in Table 4.3.3.1-6.

Construction of the brine outfall line for P-1044 Alternative 3 would not adversely affect the green sea turtle, loggerhead sea turtle, olive (Pacific) sea turtle, and leatherback sea turtle, as discussed in Section 4.3.14 of this EIS and in Appendix E.

Direct Impacts

P-1044 Facilities – Habitat occupied by four federally listed species, arroyo toad, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher, occurs within the proposed P-1044 facilities; thus, these species may be permanently, directly impacted. Suitable habitat also occurs for the Pacific pocket mouse; however, only impacts to occupied habitat would be considered significant. Habitat occupied by these species that would be permanently, directly impacted is quantified in Table 4.3.3.2-8. Potential permanent direct impacts to wildlife species are depicted in Figure 4.3.3.2-3.

A thorough discussion of specific types of permanent direct impacts to these species is provided in Section 4.3.3.1.

P-1044 Corridor – Habitat occupied by and/or suitable for listed wildlife within the P-1044 corridor would be temporarily, directly impacted. Temporary direct impacts would occur to those four species discussed above, in addition to the San Diego fairy shrimp and Pacific pocket mouse (occupied habitat). Additionally, three basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1044 corridor; these basins are currently being analyzed and may be determined to be San Diego or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. Pacific pocket mouse-occupied habitat occurs within the P-1044 corridor; however, all direct impacts to occupied Pacific pocket mouse habitat would be considered significant, regardless of whether impacts are temporary. Habitat occupied by and/or suitable for these species that would be temporarily, directly impacted is quantified in Table 4.3.3.2-9.

A thorough discussion of specific types of permanent and temporary, direct impacts to these species is provided in Section 4.3.3.1.

Indirect Impacts

Six federally listed wildlife species may be indirectly impacted by construction of P-1044 Alternative 3. Habitat occupied by southern California steelhead, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse occurs within the 400-foot buffer of the P-1044 facilities and corridor. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.3.3.2-10.

A thorough discussion of specific types of permanent and temporary, indirect impacts to these species is provided in Section 4.3.3.1.

Indirect impacts to nesting shorebirds such as California least tern and western snowy plover within the beach habitat coincident with the brine discharge pipeline area at the SONGS outfall conduit were assessed for P-1044. However, it was determined that suitable habitat for these bird species does not occur due to constant disturbance from ocean waves and the high tide associated with this area. Thus, no indirect impacts to tern or plover would occur from P-1044.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1044 Alternative 3 is noted in Table 4.3.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.3.3.2-1
Permanent Direct Impacts to Plant Communities and Cover Types Associated with P-1044 Alternative 3 Facilities (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Maintenance Access	Northern AWT Site 4	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	Total[1]
Riparian and Wetlands	**0.12**	**0.19**	**-**	**-**	**-**	**0.07**	**0.11**	**-**	**1.10**	**1.58**
Mulefat Scrub	-	0.06	-	-	-	-	-	-	-	0.06
Southern Riparian Woodland	-	0.10	-	-	-	-	-	-	1.10	1.20
Southern Willow Scrub	0.12	0.02	-	-	-	0.07	0.11	-	-	0.31
Uplands	**0.58**	**2.35**	**5.12**	**-**	**-**	**1.48**	**1.22**	**-**	**0.18**	**10.93**
Coast Live Oak Woodland	-	0.15	-	-	-	-	-	-	-	0.15
Diegan Coastal Sage Scrub	0.58	1.31	5.12	-	-	1.01	0.80	-	0.18	9.00
Nonnative Grassland	-	0.29	-	-	-	-	-	-	-	0.29
Valley Needlegrass Grassland	-	0.60	-	-	-	0.47	0.42	-	-	1.49
Other Cover Types	**-**	**16.26**	**0.27**	**0.25**	**1.18**	**1.06**	**0.29**	**0.23**	**2.23**	**21.77**
Disturbed Habitat	-	0.03	-	-	-	0.37	-	-	-	0.39
Urban/Developed	-	16.23	0.27	0.25	1.18	0.69	0.29	0.23	2.23	21.38
Total[1]	**0.70**	**18.80**	**5.39**	**0.25**	**1.18**	**2.61**	**1.62**	**0.23**	**3.50**	**34.28**

[1] Numbers may not sum exactly due to rounding.

Table 4.3.3.2-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1044 Alternative 3 Corridor (acres)

Plant Communities and Other Cover Types	TLS Sites	Injection Wells	RWL Connection	Corridor[1]	
				Maximum Impacts (100%)	Anticipated Impacts (48%)
Riparian and Wetlands	**1.03**	**-**	**-**	**10.23**	**4.91**
Beach	-	-	-	0.45	0.22
Mulefat Scrub	0.07	-	-	2.90	1.39
Open Water	-	-	-	0.42	0.20
Riparian Scrub	-	-	-	0.05	0.03
Southern Riparian Woodland	0.93	-	-	1.92	0.92
Southern Willow Scrub	0.03	-	-	4.48	2.15
Vernal Pool	-	-	-	0.01	<0.005
Uplands	**16.47**	**0.45**	**5.37**	**103.24**	**49.55**
Coast Live Oak Woodland	-	-	-	3.34	1.60
Diegan Coastal Sage Scrub	15.18	0.45	5.37	72.90	34.99
Nonnative Grassland	1.06	-	-	14.09	6.76
Valley Needlegrass Grassland	0.23	-	-	12.91	6.20
Other Cover Types	**2.87**	**1.20**	**0.80**	**148.58**	**71.32**
Disturbed Habitat	0.35	-	-	29.70	14.26
Urban/Developed	2.52	1.20	0.80	118.88	57.06
Total[2]	**20.37**	**1.65**	**6.17**	**262.04**	**125.78**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.3.3.2-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1044 Alternative 3 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Northern AWT Site 4	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
Riparian and Wetlands	**0.57**	**0.70**	**-**	**0.06**	**0.01**	**0.26**	**0.05**	**1.71**	**5.36**	**0.30**	**-**	**31.55**	**40.58**
Beach	-	-	-	-	-	-	0.05	-	-	-	-	0.28	0.32
Mulefat Scrub	-	0.70	-	-	-	-	-	0.16	2.86	0.30	-	11.27	15.29
Open Water	-	-	-	-	-	-	-	-	-	-	-	1.29	1.29
Riparian Scrub	-	-	-	-	-	-	-	-	-	-	-	0.14	0.14
Southern Riparian Woodland	-	-	-	0.06	-	-	-	1.55	1.50	-	-	9.16	12.27
Southern Willow Scrub	0.57	-	-	-	0.01	0.26	-	-	1.00	-	-	9.13	10.97
Vernal Pool	-	-	-	-	-	-	-	-	-	-	-	0.28	0.28
Uplands	**1.97**	**3.17**	**0.19**	**-**	**2.87**	**2.34**	**-**	**1.23**	**17.33**	**0.64**	**5.54**	**216.31**	**251.58**
Coast Live Oak Woodland	-	-	-	-	-	-	-	-	0.06	-	-	8.12	8.17
Diegan Coastal Sage Scrub	1.97	3.17	0.19	-	1.98	1.49	-	1.23	14.97	0.64	5.54	151.84	183.01
Eucalyptus Woodland	-	-	-	-	-	-	-	-	-	-	-	0.31	0.31
Nonnative Grassland	-	-	-	-	0.25	-	-	-	1.49	-	-	25.39	27.13
Valley Needlegrass Grassland	-	-	-	-	0.64	0.85	-	-	0.81	-	-	30.66	32.95
Other Cover Types	**0.14**	**-**	**0.82**	**1.79**	**0.33**	**-**	**1.13**	**0.83**	**5.70**	**2.72**	**0.18**	**181.05**	**194.67**
Disturbed Habitat	0.01	-	-	-	0.09	-	-	-	0.03	-	-	45.53	45.67
Urban/Developed	0.13	-	0.82	1.79	0.24	-	1.13	0.83	5.67	2.72	0.18	135.52	149.01
Total[1]	**2.68**	**3.86**	**1.01**	**1.85**	**3.20**	**2.60**	**1.18**	**3.77**	**28.39**	**3.66**	**5.71**	**428.91**	**486.83**

[1] Numbers may not sum exactly due to rounding.

Table 4.3.3.2-4
Permanent Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 3 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Wetland	**<0.005**
Southern Riparian Woodland	<0.005
Other Waters[1]	**0.07 (190)**
Nonvegetated Channel	0.07 (190)
Total[2]	**0.07**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.3.3.2-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 3 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridor[1]	
		Maximum Impacts (100%)	Anticipated Impacts (48%)
Wetland	**<0.005**	**0.56**	**0.27**
Mulefat Scrub	<0.005	0.07	0.03
Southern Riparian Woodland	-	0.49	0.23
Other Waters[2]	**-**	**0.57 (3,214)**	**0.27 (3,214)**
Disturbed Wetland	-	0.07 (762)	0.03 (762)
Nonvegetated Channel	-	0.50 (2,452)	0.24 (2,452)
Total[3]	**<0.005**	**1.12**	**0.54**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.3.3.2-6
Permanent Direct Impacts to Federally Listed Plants
Associated with P-1044 Alternative 3 Facilities (acres)

Habitat Occupied by:	Facilities	Corridor
Thread-leaved Brodiaea	0.12 acre	0.80 acre
San Diego Button-celery	0 basins	0 basins
Spreading Navarretia	0 basins	0 basins

Table 4.3.3.2-7
Potential Indirect Impacts to Federally Listed Plants within 100 Feet of P-1044 Alternative 3 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	1.28 acre
San Diego Button-celery	0 basins
Spreading Navarretia	0 basins

Table 4.3.3.2-8
Permanent Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 3 Facilities (acres)

Listed Wildlife Species	Above Ground Pipeline	Maintenance Access	Northern AWT Site 6	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/ Pump Station/ TLS Site	Total[1]
Arroyo Toad (Aestivation/ Dispersal)	0.58	0.38	-	-	-	-	0.96
Arroyo Toad (Breeding)	0.12	0.09	-	-	-	0.20	0.41
Coastal California Gnatcatcher	0.21	0.71	5.12	1.01	0.80	0.18	8.02
Least Bell's Vireo	0.12	0.10	-	-	-	1.10	1.32
Southwestern Willow Flycatcher	0.12	0.10	-	-	-	-	0.22
Pacific Pocket Mouse (Microhabitat)[2]	-	<0.005	1.26	-	-	-	1.27
Pacific Pocket Mouse (Suitable Habitat)[2]	-	0.09	3.77	-	-	-	3.86
Total[1]	**1.15**	**1.47**	**10.15**	**1.01**	**0.80**	**1.48**	**16.06**

[1] Numbers may not sum exactly due to rounding.
[2] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.3.3.2-9
Permanent[1] and Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 3 Corridor (acres)

Listed Wildlife Species	TLS Sites	Injection Wells	RWL Connection	Corridor[2,3]	
				Maximum Impacts (100%)	Anticipated Impacts (48%)
San Diego Fairy Shrimp	-	-	-	30 basins[4]	14 basins
Branchinecta spp.	-	-	-	3 basins[5]	1 basin
Arroyo Toad (Aestivation/Dispersal)	1.27	-	-	23.40	11.23
Arroyo Toad (Breeding)	0.03	-	-	5.04	2.42
Coastal California Gnatcatcher	15.18	0.28	5.37	59.38	28.50
Least Bell's Vireo	1.03	-	-	6.25	3.00
Southwestern Willow Flycatcher	1.00	-	-	5.60	2.69
Pacific Pocket Mouse (Occupied Habitat)[6]	-	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[6]	0.28	-	-	1.13	0.54
Pacific Pocket Mouse (Suitable Habitat)[6]	1.17	-	-	4.00	1.92

1 Impacts to fairy shrimp species are considered irreversible and permanent; for all other species listed in this table, impacts are considered temporary.
2 For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
3 Numbers may not sum exactly due to rounding.
4 San Diego fairy shrimp were found in basins with the following ID numbers: 799, 802, 803, 810, 811, 812, 814, 817, 827, 833, 837, 840, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 2797, 2798, 2799, 2800, and 2801.
5 *Branchinecta* spp. fairy shrimp were found in basins with the following ID numbers: 801, 816, and 848.
6 Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.3.3.2-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1044 Alternative 3 Facilities and Corridor (acres)

Listed Wildlife Species	Above Ground Pipeline	Northern AWT Site 4	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/Pump Station/TLS Site	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
Southern California steelhead[2]	-	0.25	-	-	-	-	1.64	3.80	-	-	5.59	11.28
Arroyo Toad (Aestivation/Dispersal)	9.04	-	3.48	1.02	-	-	3.43	17.76	-	-	235.75	270.48
Arroyo Toad (Breeding)	4.06	-	0.94	5.25	-	-	12.11	6.65	-	-	71.03	100.04
Coastal California Gnatcatcher	4.13	22.82	8.37	-	13.67	12.41	5.76	103.55	7.04	13.32	534.61	725.69
Least Bell's Vireo	4.06	7.07	0.94	5.25	-	-	13.40	45.25	-	0.42	158.88	235.26
Southwestern Willow Flycatcher	4.06	7.07	0.94	5.25	-	-	-	24.79	-	0.42	105.32	147.84
Pacific Pocket Mouse (Occupied Habitat)[3]	-	4.12	-	-	-	-	-	0.49	-	-	52.35	56.96
Pacific Pocket Mouse (Microhabitat)[3]	-	2.24	-	-	-	-	-	2.49	-	-	2.87	7.60
Pacific Pocket Mouse (Suitable Habitat)[3]	-	19.16	-	-	-	-	-	7.27	-	-	60.90	87.33

[1] Numbers may not sum exactly due to rounding.
[2] Indirect impacts to southern California steelhead occur in both San Mateo and San Onofre Creeks.
[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

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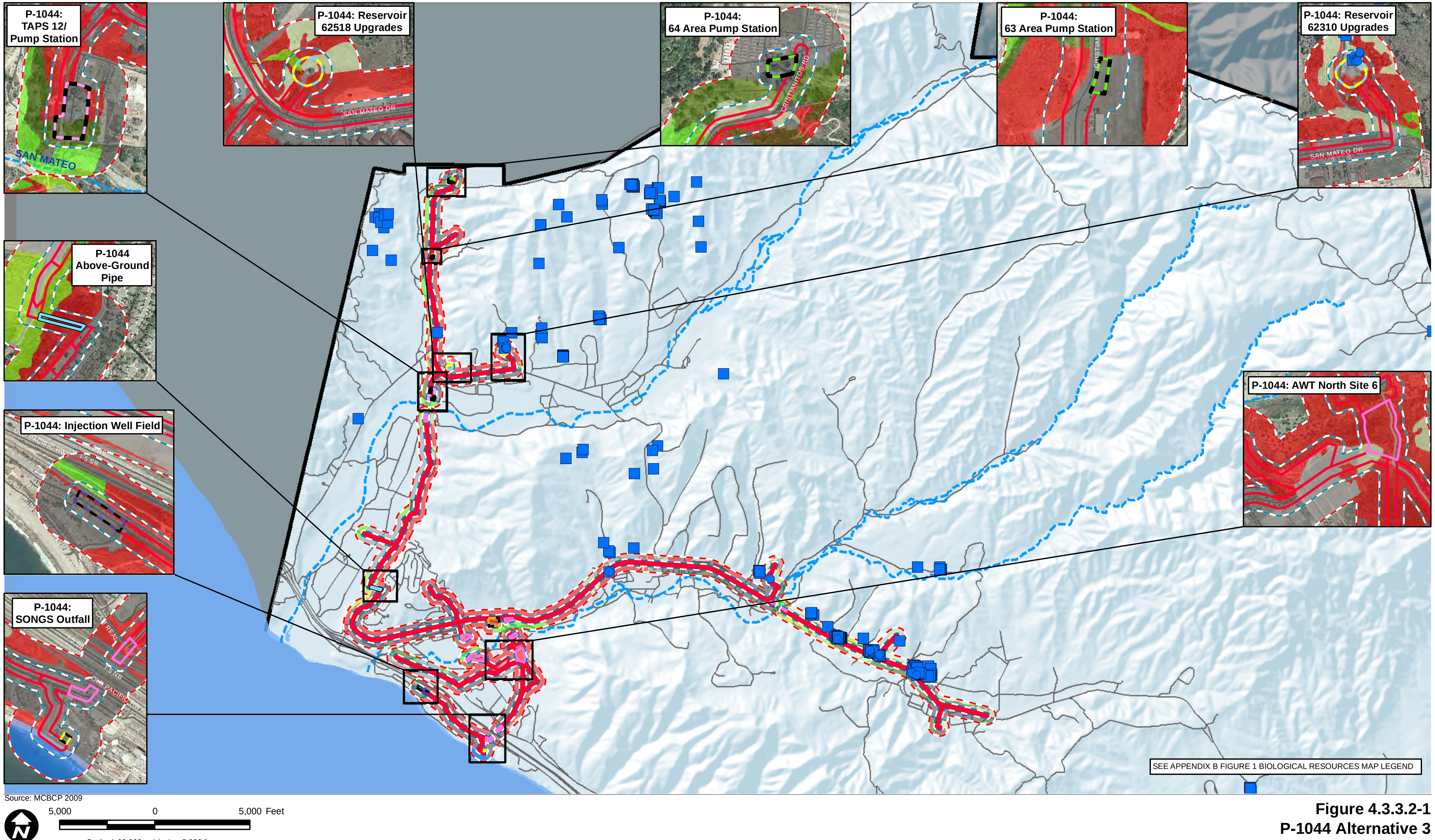

Figure 4.3.3.2-1
P-1044 Alternative 3
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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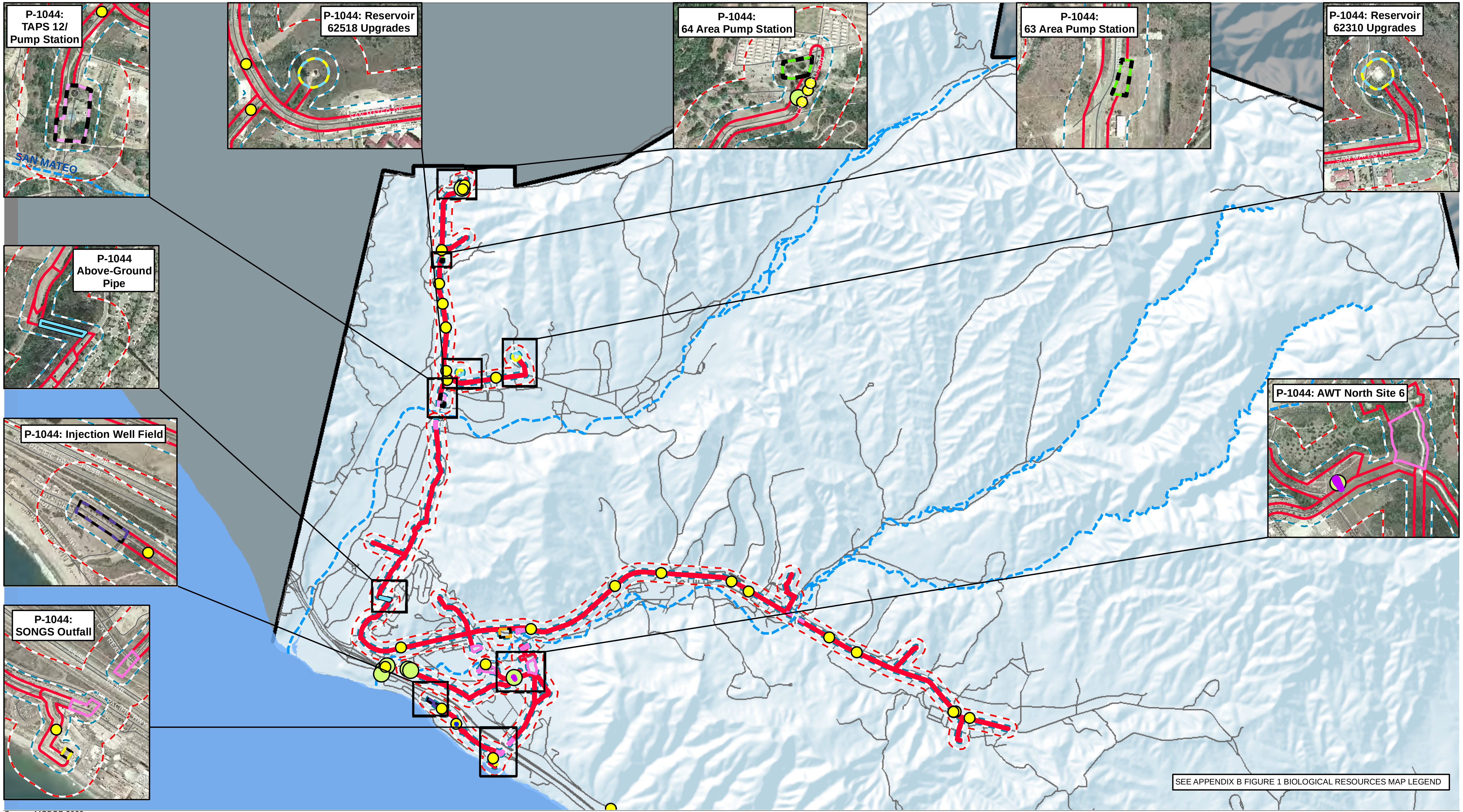

Source: MCBCP 2009

5,000 0 5,000 Feet

Scale 1:60,000; 1 inch = 5,000 feet

Figure 4.3.3.2-2
P-1044 Alternative 3
Potential Effects to Jurisdictional Waters of the U.S.

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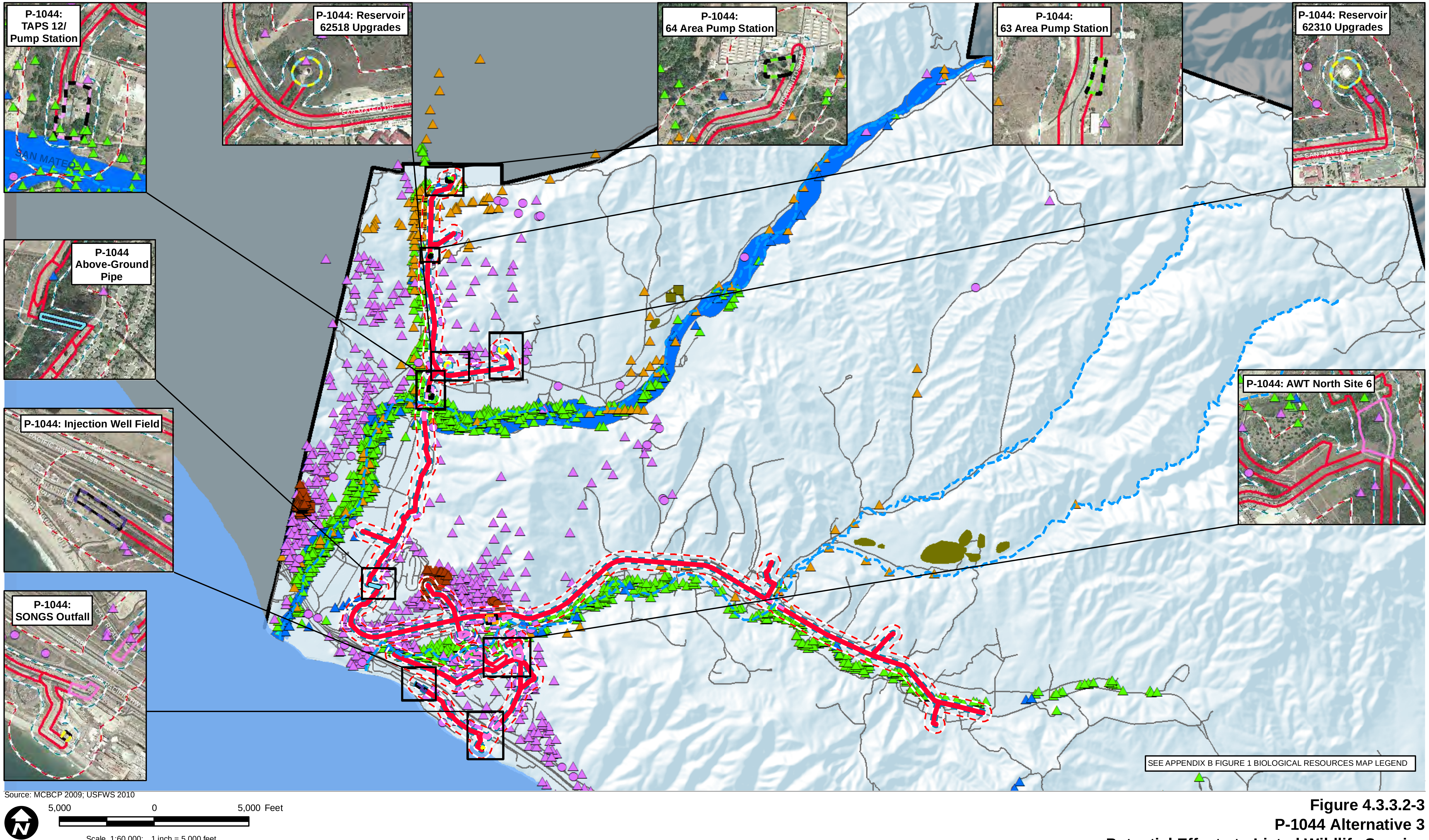

Figure 4.3.3.2-3
P-1044 Alternative 3
Potential Effects to Listed Wildlife Species

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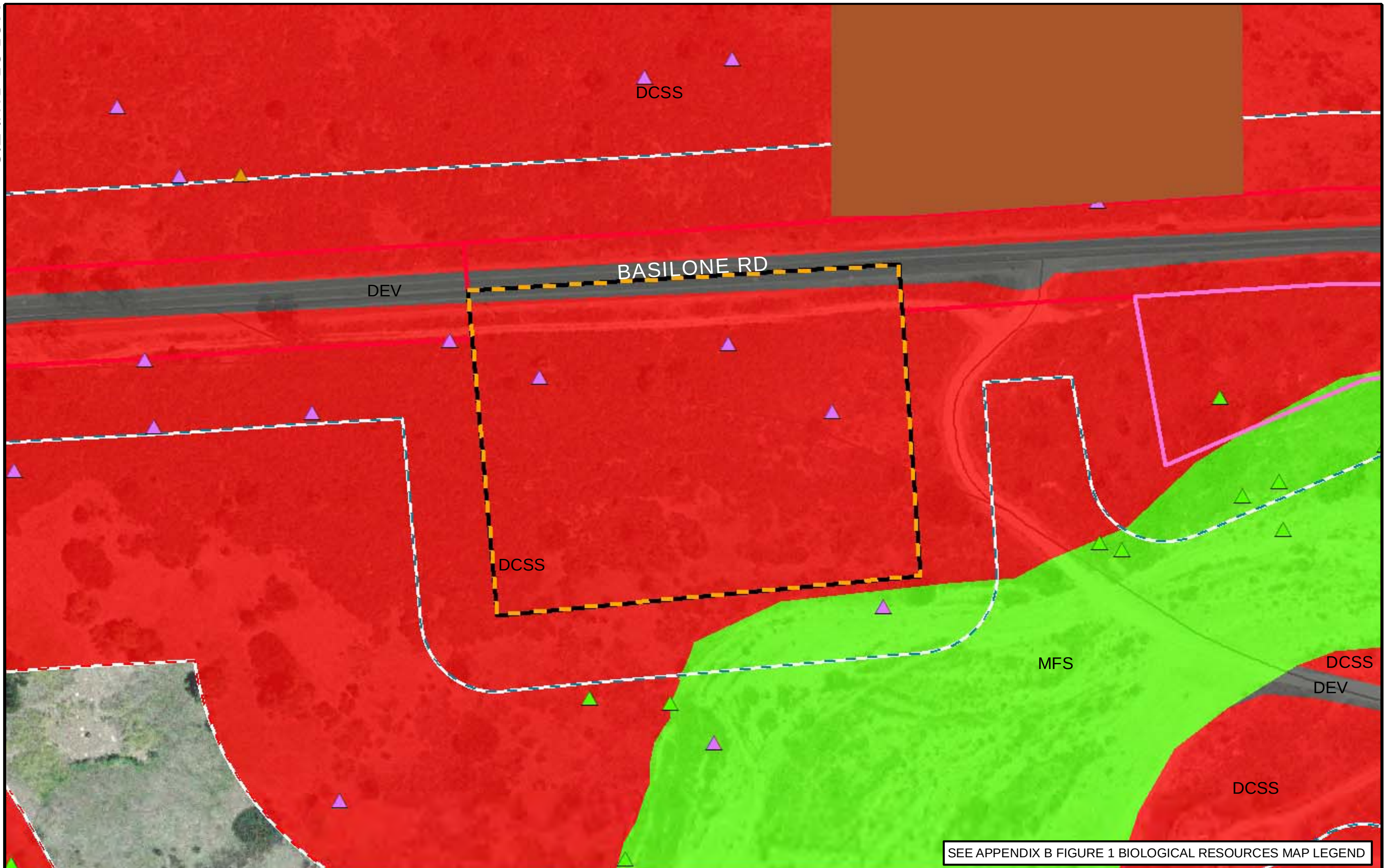

Source: MCBCP 2009; USFWS 2010

200 0 200 Feet

Scale: 1 = 2,400; 1 inch = 200 feet

Figure 4.3.3.2-4
P-1044 Alternative 3
Northern AWT Site 4

4.3.3.3 P-1045 Alternative 3

Permanent and temporary direct and indirect impacts for P-1045 Alternative 3 would be similar to those discussed above for P-1044 Alternative 1. See Section 4.1.3.1 for a general discussion of these potential project effects to plant communities and other cover types, jurisdictional waters, habitats occupied by federally listed and other rare species, and migratory birds covered under the MBTA.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1045 Alternative 3 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.3.3.3-1, 4.3.3.3-2, and 4.3.3.3-3, respectively.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1045 Alternative 3 facilities would result in permanent direct impacts to riparian and upland native plant communities and other cover types (Table 4.3.3.3-1). Development within the project corridor would result in temporary direct impacts to predominately coastal sage scrub, southern willow scrub, and developed land with smaller amounts of numerous other plant communities and cover types (Table 4.3.3.3-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, or vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under the CWA or occupied by federally listed species

would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 Alternative 3 could cause indirect impacts to plant communities and other cover types that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.3.3.3-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

Mitigation

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

Impacts

Direct Impacts

Development of the P-1045 Alternative 3 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of nonvegetated channel (Table 4.3.3.3-4). Development of the project corridor would result in temporary direct impacts to jurisdictional waters and wetlands, primarily in the form of mulefat scrub with lesser amounts of southern willow scrub, southern coastal salt marsh, nonvegetated channel, freshwater seep, coastal and valley freshwater marsh, and freshwater, respectively (Table 4.3.3.3-5). Construction along the corridor also has the potential to impact vernal pools that coincide with the project area, and those individual pools may be considered jurisdictional by USACE (determination is pending final reviews by ES and USACE).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 Alternative 3 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.3.3.3-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be temporarily or permanently, indirectly affected by the project as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measures that would compensate for impacts to jurisdictional waters, including wetlands, are discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Plants

Impacts

Potential effects to federally listed plant species and habitat associated with development of P-1045 Alternative 3 are depicted in Figure 4.3.3.3-1 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.3.3.3-6 and 4.3.3.3-7.

Direct Impacts

Approximately 0.08 acre of thread-leaved brodiaea occupied habitat and one vernal pool basin occupied by spreading navarretia are known to occur within the P-1045 Alternative 3 project corridor. However, no construction activity will occur within a 50-foot setback buffer surrounding the one basin occupied by spreading navarretia, thus no direct effects to this species would occur. Approximately 0.08 acre of thread-leaved brodiaea habitat would be directly affected by development (Table 4.3.3.3-6). Direct effects to thread-leaved brodiaea may be minimized following implementation of avoidance, minimization, and compensation measures described in the mitigation section below. Any direct effect to this species is considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 0.40 acre of thread-leaved brodiaea occupied habitat, 11 vernal pool basins occupied by San Diego button-celery, and five vernal pool basins occupied by spreading navarretia are known to occur within the 100-foot buffer of the proposed action area (Table 4.3.3.3-7). Indirect effects to these species would be minimized by implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

Mitigation

Mitigation measures that would compensate for direct and indirect impacts to federally listed plant species, are discussed in Section 4.1.3.1.

Federally Listed Wildlife

Eight federally listed wildlife species, the Riverside fairy shrimp, San Diego fairy shrimp, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be impacted by P-1045 Alternative 3. Locations of these species relevant to P-1045 are depicted in Figure 4.3.3.3-3. Occupied and/or suitable habitat for federally listed wildlife species near P-1045 Alternative 3 project components is depicted in Figures 4.1.3.3-4 through 4.1.3.3-11 (shown with Alternative 1 project components). A breakdown of occupied and/or suitable habitat for these species (with the exception of Riverside and San Diego fairy shrimp) according to vegetation type is provided in Table 4.3.3.1-6. USFWS issued a Final Biological Opinion for this action on 15 August 2012.

Direct Impacts

P-1045 Facilities – Four listed wildlife species, the coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be directly impacted by the proposed construction of facilities for P-1045. It is assumed all habitat occupied by these species within P-1045 facilities would be permanently, directly affected. Impacts to Pacific pocket mouse suitable habitat would not be considered significant. Permanent direct impacts include permanent loss of habitat and individuals as a result of project construction. Permanent direct impacts are summarized in Table 4.3.3.3-8. Potential permanent direct impacts to wildlife species are depicted in Figure 4.3.3.3-3.

A thorough discussion of specific types of permanent direct impacts to these species is provided in Section 4.3.3.1.

P-1045 Corridor – Habitat occupied by and/or suitable for listed wildlife within the P-1045 corridor would be directly impacted. Direct impacts would occur to eight federally listed wildlife species: Riverside fairy shrimp, San Diego fairy shrimp, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Additionally, basins occupied by an unidentifiable *Branchinecta* spp. occur within the P-1045 corridor; these basins are currently being analyzed and may be determined to be San Diego or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. Habitat occupied by and/or suitable for these species that would be temporarily, directly impacted is quantified in Table 4.3.3.3-9.

A thorough discussion of specific types of permanent and temporary, direct impacts to these species is provided in Section 4.3.3.1.

Indirect Impacts

Ten federally listed wildlife species may be indirectly impacted by construction of P-1045. Habitat occupied by the Riverside fairy shrimp, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse occurs within the 400-foot buffer of the P-1045 facilities and corridor. Additionally, basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1045 buffer; these basins are currently being analyzed and upon completion may be determined to be occupied by San Diego fairy shrimp. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.3.3.3-10.

A thorough discussion of specific types of permanent and temporary, indirect impacts to these species is provided in Section 4.3.3.1.

<u>Mitigation</u>

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1045 Alternative 3 is noted in Table 4.3.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.3.3.3-1
Permanent Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 3 Facilities (acres)

Plant Communities and Other Cover Types	Maintenance Access	New Reservoir	Pulgas Gate Area Pump Station	Total[1]
Riparian and Wetlands	**0.05**	**-**	**-**	**0.05**
Coastal and Valley Freshwater Marsh	<0.005	-	-	<0.005
Mulefat Scrub	0.01	-	-	0.01
Southern Riparian Woodland	<0.005	-	-	<0.005
Southern Willow Scrub	0.03	-	-	0.03
Uplands	**0.95**	**2.15**	**<0.005**	**3.10**
Diegan Coastal Sage Scrub	0.52	2.15	<0.005	2.67
Eucalyptus Woodland	0.01	-	-	0.01
Nonnative Grassland	0.37	-	-	0.37
Valley Needlegrass Grassland	0.05	-	-	0.05
Other Cover Types	**11.02**	**1.28**	**0.52**	**12.81**
Disturbed Habitat	0.02	1.27	-	1.30
Urban/Developed	11.00	<0.005	0.52	11.51
Total[1]	**12.02**	**3.43**	**0.52**	**15.96**

[1] Numbers may not sum exactly due to rounding.

Table 4.3.3.3-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 3 Corridor (acres)

Plant Communities and Other Cover Types	Laydown Area	TLS Sites	Corridors[1] (outside 1.75-mile section)		Corridors[1] (within 1.75-mile section)	
			Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Riparian and Wetlands	**-**	**0.85**	**21.12**	**10.14**	**0.75**	**0.07**
Coastal and Valley Freshwater Marsh	-	-	0.07	0.03	-	-
Disturbed Wetland	-	-	<0.005	<0.005	-	-
Freshwater Seep	-	-	0.11	0.05	-	-
Mulefat Scrub	-	0.14	6.95	3.33	0.18	0.02
Nonvegetated Channel	-	-	0.01	0.01	-	-
Open Water	-	-	<0.005	<0.005	-	-
Riparian Scrub	-	-	0.38	0.18	-	-
Southern Coastal Salt Marsh	-	0.04	0.32	0.15	-	-
Southern Riparian Woodland	-	-	3.04	1.46	-	-
Southern Willow Scrub	-	0.66	10.14	4.87	0.31	0.03
Vernal Pool	-	-	0.11	0.05	0.26	0.03
Uplands	**-**	**11.91**	**153.47**	**73.66**	**14.17**	**1.42**
Diegan Coastal Sage Scrub	-	8.43	128.64	61.75	0.07	0.01
Eucalyptus Woodland	-	-	0.12	0.06	-	-
Nonnative Grassland	-	2.96	19.62	9.42	4.49	0.45
Valley Needlegrass Grassland	-	0.52	5.09	2.44	9.61	0.96
Other Cover Types	**7.42**	**7.83**	**143.99**	**69.12**	**11.87**	**1.19**
Disturbed Habitat	-	0.13	8.66	4.16	-	-
Urban/Developed	7.42	7.71	135.33	64.96	11.87	1.19
Total[2]	**7.42**	**20.59**	**318.58**	**152.92**	**26.79**	**2.68**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.3.3.3-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1045 Alternative 3 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Laydown Area	New Reservoir	Pump Station	TLS Sites	Corridor	Total[1]
Riparian and Wetlands	**-**	**-**	**-**	**9.13**	**64.86**	**73.99**
Alkali Playa	-	-	-	-	0.06	0.06
Coastal and Valley Freshwater Marsh	-	-	-	-	1.22	1.22
Disturbed Wetland	-	-	-	0.04	0.16	0.20
Freshwater Seep	-	-	-	-	0.20	0.20
Mulefat Scrub	-	-	-	2.83	16.64	19.47
Nonvegetated Channel	-	-	-	-	0.12	0.12
Open Water	-	-	-	0.36	1.60	1.97
Riparian Scrub	-	-	-	-	0.97	0.97
Southern Coastal Salt Marsh	-	-	-	0.83	2.45	3.27
Southern Riparian Woodland	-	-	-	0.31	8.58	8.88
Southern Willow Scrub	-	-	-	4.71	31.30	36.01
Vernal Pool	-	-	-	0.04	1.61	1.66
Uplands	**-**	**1.77**	**0.99**	**18.81**	**351.97**	**373.54**
Diegan Coastal Sage Scrub	-	1.77	0.99	11.07	244.06	257.89
Eucalyptus Woodland	-	-	-	-	1.65	1.65
Nonnative Grassland	-	-	-	5.92	65.58	71.50
Valley Needlegrass Grassland	-	-	-	1.81	40.69	42.50
Other Cover Types	**3.92**	**0.08**	**0.74**	**8.99**	**131.52**	**145.25**
Disturbed Habitat	-	0.02	-	0.51	14.44	14.97
Urban/Developed	3.92	0.06	0.74	8.48	117.08	130.28
Total[1]	**3.92**	**1.85**	**1.73**	**36.93**	**548.37**	**592.81**

[1] Numbers may not sum exactly due to rounding.

Table 4.3.3.3-4
Permanent Direct Impacts to Waters of the U.S. Associated with P-1045 Alternative 3 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Other Waters[1]	**0.03 (233)**
Nonvegetated Channel	0.03 (233)
Total[2]	**0.03**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.3.3.3-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1045 Alternative 3 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridors[1] (outside 1.75-mile section)		Corridors[1] (within 1.75-mile section)	
		Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Wetland	**0.14**	**1.49**	**0.71**	**0.37**	**0.04**
Coastal and Valley Freshwater Marsh	-	0.03	0.01	-	-
Freshwater Seep	<0.005	0.33	0.16	-	-
Mulefat Scrub	-	0.04	0.02	0.03	<0.005
Southern Coastal Salt Marsh	0.14	0.65	0.31	0.06	0.01
Southern Willow Scrub	<0.005	0.29	0.14	-	-
Vernal Pool	-	0.15	0.07	0.28	0.03
Other Waters[2]	**-**	**0.45**	**0.22**	**0.03**	**<0.005**
Alkali Playa	-	0.05	0.02	-	-
Disturbed Wetland	-	<0.005	<0.005	-	-
Fresh Water	-	0.01	<0.005	-	-
Nonvegetated Channel	-	0.39	0.19	0.03	<0.005
Total[3]	**0.14**	**1.94**	**0.93**	**0.40**	**0.04**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.3.3.3-6
Permanent Direct Impacts to Federally Listed Plants
Associated with P-1045 Alternative 3

Habitat Occupied by:	Facilities	Corridors (outside 1.75-mile section)	Corridors (within 1.75-mile section)	Total
Thread-leaved Brodiaea	0 acres	0 acres	0.08 acre	0.08 acre
San Diego Button-celery	0 basins	0 basins	0 basins	0 basins
Spreading Navarretia	0 basins	0 basins	0 basins	0 basins

Table 4.3.3.3-7
Potential Indirect Impacts to Federally Listed Plants within
100 Feet of P-1045 Alternative 3 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	0.40 acre
San Diego Button-celery	11 basins
Spreading Navarretia	5 basins

Table 4.3.3.3-8
Permanent Direct Impacts to Federally Listed Wildlife Associated with P-1045 Alternative 3 Facilities (acres)

Listed Wildlife Species	Maintenance Access	New Reservoir	Pulgas Gate Area Pump Station	Total Facility Permanent Impacts[1]
Coastal California Gnatcatcher	0.27	2.15	<0.005	2.43
Least Bell's Vireo	0.04	-	-	0.04
Southwestern Willow Flycatcher	0.04	-	-	0.04
Pacific Pocket Mouse (Microhabitat)[2]	<0.005	-	-	<0.005
Pacific Pocket Mouse (Suitable Habitat)[2]	0.01	2.64	-	2.65
Total[1]	**0.36**	**4.79**	**<0.005**	**5.16**

[1] Numbers may not sum exactly due to rounding.
[2] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.3.3.3-9
Permanent[1] and Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1045 Alternative 3 Corridor (acres)

Listed Wildlife Species	TLS Sites	Corridors[2,3] (outside 1.75-mile section)		Corridors[2,3] (within 1.75-mile section)	
		Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Riverside Fairy Shrimp	-	-	-	19 basins	2 basins
San Diego Fairy Shrimp	-	8 basins	4 basins	57 basins	6 basins
Branchinecta spp.	-	5 basins	2 basins	12 basins	1 basin
Arroyo Toad (Aestivation/Dispersal)	0.34	6.32	3.03	-	-
Arroyo Toad (Breeding)	0.49	0.94	0.45	-	-
Light-Footed Clapper Rail	0.10	0.30	0.14	-	-
Coastal California Gnatcatcher	8.43	102.65	49.27	-	-
Least Bell's Vireo	0.80	16.02	7.70	0.19	0.02
Southwestern Willow Flycatcher	0.59	13.54	6.50	-	-
Pacific Pocket Mouse (Microhabitat)[4]	0.28	7.67	3.68	-	-
Pacific Pocket Mouse (Suitable Habitat)[4]	1.17	22.19	10.65	-	-

[1] Impacts to fairy shrimp species are considered irreversible and permanent; for all other species listed in this table, impacts are considered temporary.
[2] For corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[3] Numbers may not sum exactly due to rounding.
[4] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.3.3.3-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1045 Alternative 3 Facilities and Corridor (acres)

Listed Wildlife Species	New Reservoir	Pulgas Gate Area Pump Station	TLS Sites	Corridor	Total[1]
Riverside Fairy Shrimp	-	-	-	5 basins[2]	5 basins
San Diego Fairy Shrimp	1 basin	-	-	97 basins[3]	98 basins
Branchinecta spp.	-	-	2 basins[4]	7 basins[4]	9 basins
Southern California steelhead[5]	-	-	4.45	0.98	5.43
Tidewater Goby	-	-	4.46	2.03	6.48
Arroyo Toad (Aestivation/Dispersal)	-	-	10.20	85.72	95.92
Arroyo Toad (Breeding)	-	-	19.79	33.74	53.54
Light-Footed Clapper Rail	-	-	11.04	15.03	26.08
Coastal California Gnatcatcher	14.03	10.57	86.17	874.67	985.43
Least Bell's Vireo	-	-	71.41	262.08	333.49
Southwestern Willow Flycatcher	-	-	65.84	215.64	281.49
Pacific Pocket Mouse (Occupied Habitat)[6]	-	-	1.87	5.45	7.32
Pacific Pocket Mouse (Microhabitat)[6]	0.03	-	3.29	16.55	19.87
Pacific Pocket Mouse (Suitable Habitat)[6]	2.33	-	11.03	179.08	192.44

[1] Numbers may not sum exactly due to rounding.
[2] Riverside fairy shrimp were found in basins with the following ID numbers: 2286, 2289, 2516, 2658, and 2668.
[3] San Diego fairy shrimp were found in basins with the following ID numbers: 71, 79, 89, 97, 106, 197, 198, 438, 676, 706, 713, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1112, 1120, 1121, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1132, 1365, 1539, 1566, 1934, 1936, 1938, 2044, 2483, 2487, 2490, 2495, 2514, 2516, 2596, 2598, 2602, 2606, 2617, 2619, 2621, 2622, 2623, 2624, 2625, 2626, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2638, 2640, 2641, 2645, 2649, 2652, 2658, 2661, 2666, 2667, 2668, 2670, 2673, 2674, 2677, 2681, 2919, and 2920.
[4] *Branchinecta* spp. fairy shrimp were found in basins with the following ID numbers: 2, 104, 108, 440, 444, 519, 523, 1602, 1632, 2827, 2832, and 2904.
[5] Indirect impacts to southern California steelhead occur in both Santa Margarita and San Onofre Creeks.
[6] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

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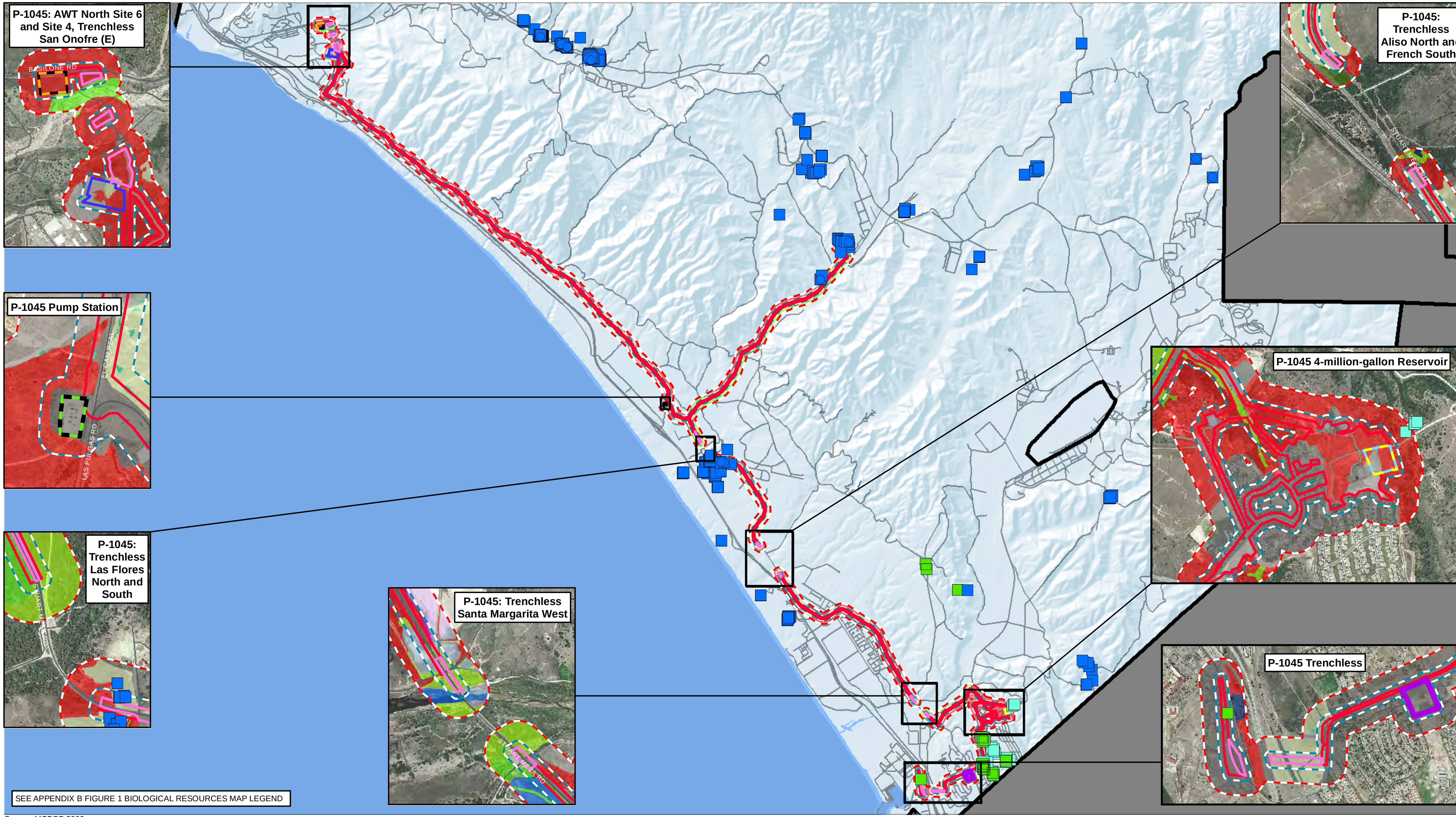

Source: MCBCP 2009

8,000 0 8,000 Feet

Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.3.3.3-1
P-1045 Alternative 3
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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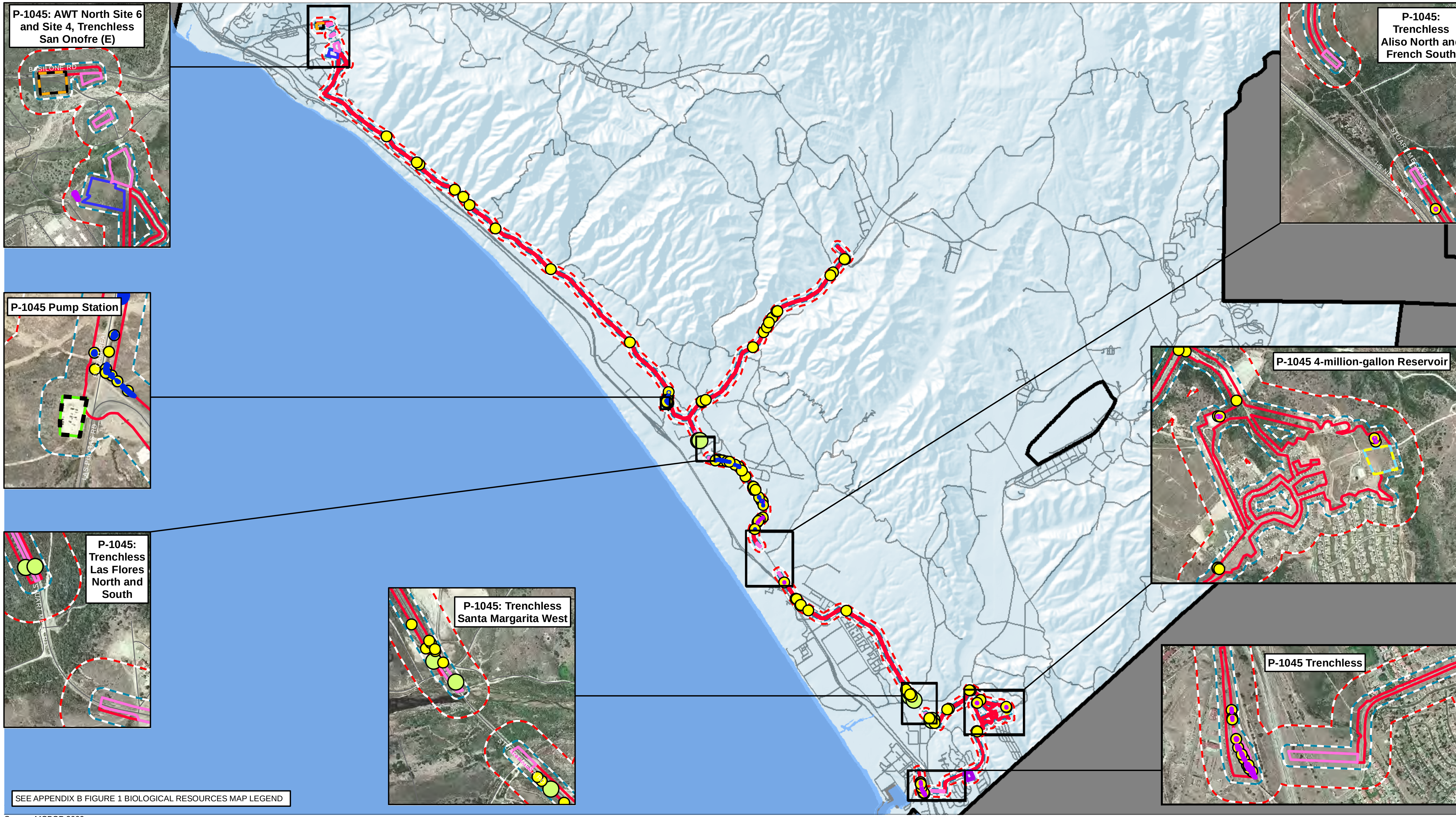

Source: MCBCP 2009

8,000 0 8,000 Feet

Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.3.3.3-2
P-1045 Alternative 3
Potential Effects to Jurisdictional Waters of the U.S.

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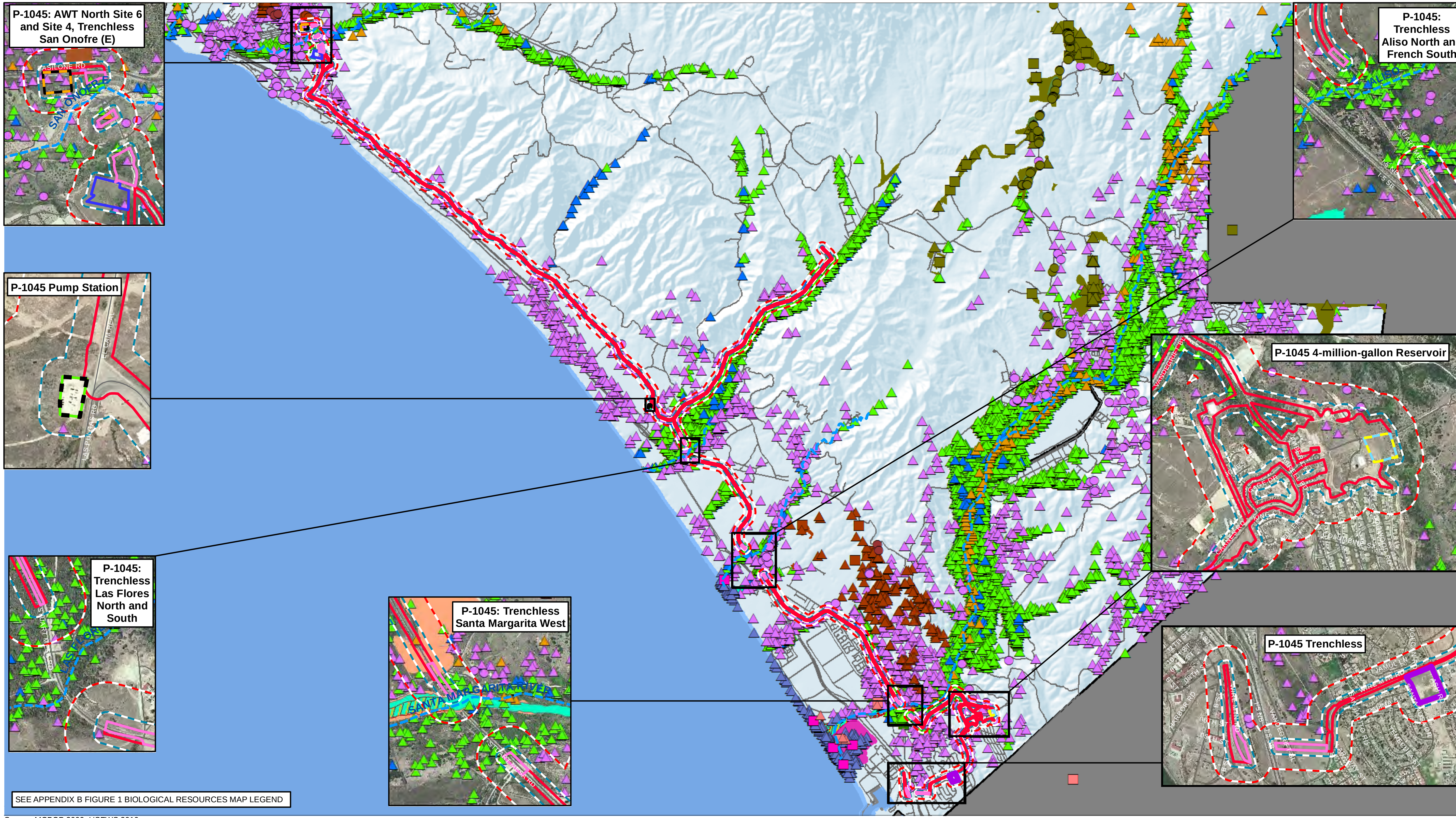

Source: MCBCP 2009; USFWS 2010

8,000 0 8,000 Feet

Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.3.3.3-3
P-1045 Alternative 3
Potential Effects to Listed Wildlife Species

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4.3.4 Cultural Resources

4.3.4.1 Both MILCONs (Alternative 3)

Cultural resources within Alternative 3 are summarized in Table 4.3.4-1. A total of 26 resources are identified, of which 16 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites resulting from Alternative 3 would not be significant.

Table 4.3.4-1
Cultural Resources within Alternative 3 APE

NRHP Status	P-1044	P-1045	Total
Eligible/Listed	5	5	10
Ineligible	6	10	16
Total	**11**	**15**	**26**

<u>Impacts</u>

Because most of the historic properties within the APE of Alternative 3 consist of prehistoric archaeological deposits, most impacts would result from physical destruction or alteration of historic properties that are eligible under NRHP criterion D. Properties that are eligible under NRHP criteria A, B, or C could also be subject to visual or audible impacts if activities related to Alternative 3 diminish the integrity of their settings.

<u>Mitigation</u>

Mitigation of impacts to cultural properties resulting from Alternative 3 would be as described in Section 4.1.4.1.

4.3.4.2 P-1044 Alternative 3

<u>Impacts</u>

Impacts to cultural resources from P-1044 Alternative 3 would be the same as for P-1044 Alternative 1 (Section 4.1.4.2) and Alternative 2 (Section 4.2.4.2).

Mitigation

Mitigation of impacts to cultural properties resulting from P-1044 Alternative 3 would be as described in Section 4.1.4.1.

4.3.4.3 P-1045 Alternative 3

Impacts

P-1045 Alternative 3 would result in impacts to five properties that are either listed in or have been determined eligible for the NRHP. These include NRHP-listed CA-SDI-812/H, two additional prehistoric resources (CA-SDI-4538 and CA-SDI-10,731), and the historic sites CA-SDI-14,005H Segment A and CA-SDI-14,006H Segment C. The PA was signed by SHPO on 7 August 2012 for this alternative.

Mitigation

Mitigation of impacts to cultural properties resulting from P-1045 Alternative 3 would be as described in Section 4.1.4.1.

4.3.5 Land Use

4.3.5.1 Both MILCONs (Alternative 3)

Impacts

The discussion in Section 4.1.5.1 of impacts of Alternative 1 applies equally to Alternative 3. No significant land use impacts would result from the implementation of P-1044 or P-1045.

Mitigation

No mitigation measures are proposed.

4.3.5.2 P-1044 Alternative 3

Impacts

P-1044 Alternative 3 differs from Alternative 1 in the location of the Northern AWT plant. In Alternative 3 the Northern AWT plant would be adjacent to and south of Basilone Road as shown in Figure 2.3.3-1. The Alternative 3 site is between Basilone Road and San Onofre Creek and is undeveloped. To ensure that no land use conflicts would occur with the Base's training mission, coordination with Base Operations and Training would be necessary. The closest San Onofre housing area (the San Onofre 3 Housing Area) is approximately 1,300 feet to the west and is separated from the site by undeveloped land. The SONGS East Mesa facility is less than 0.5 mile south and is a similar industrial/utility use, so the Northern AWT plant would be relatively close to existing development but separated by a reasonable distance from residential uses. There would be no difference from Alternative 1 in the location of pipelines, pump stations, or reservoirs. The discussion of those elements in Section 4.1.5.1 would apply to Alternative 3 as well. The Northern AWT plant would be compatible with and would not displace any existing land uses. No significant land use impacts would result.

Mitigation

No mitigation measures are proposed.

4.3.5.3 P-1045 Alternative 3

Impacts

P-1045 Alternative 3 would use the same route as Alternative 1 from the Northern AWT to the reservoirs north and east of the Wire Mountain 2 Housing Area and the Santa Margarita Housing Area but, unlike Alternative 1, would have no connection to the reservoirs on a ridge above Haybarn Canyon. Alternative 3 would also include the 4-million-gallon reservoir and associated pipeline connections discussed under P-1045 Alternative 1. Overall, the land use impacts of P-1045 Alternative 3 would be the same as Alternative 1, and no significant impacts would result.

Mitigation

No mitigation measures are proposed.

4.3.6 Visual Resources

4.3.6.1 Both MILCONs (Alternative 3)

Impacts

Visual features and impacts common to the projects in Alternative 3 would be the same as those described in Section 4.1.6.1.

Mitigation

No mitigation measures are proposed.

4.3.6.2 P-1044 Alternative 3

Impacts

P-1044 Alternative 3 would differ from P-1044 Alternative 1, described in Section 4.1.6.2, only in the location of the Northern AWT facility. In Alternative 3, the Northern AWT facility would be adjacent to and south of Basilone Road roughly 1,000 feet east of the San Onofre 2 Housing Area and the San Onofre 3 Housing Area. It would therefore be more prominently visible on-Base to travelers on Basilone Road and residents of the housing areas. But it would not be unsightly or out of place in this location near the housing and the SONGS East Mesa facility. It would likely not be noticeable to travelers on I-5 or the railroad.

Other features of Alternative 3 would be the same as those described for Alternative 1 in Section 4.1.6.2. No significant permanent visual impacts would result from Alternative 3.

Mitigation

No mitigation measures are proposed.

4.3.6.3 P-1045 Alternative 3

Impacts

P-1045 Alternative 3 would be the same as P-1045 Alternative 1 except that Alternative 3 proposes no connection from Stuart Mesa Road to the reservoirs on a ridge above Haybarn Canyon. The pipelines would be underground throughout, so that visual effects would be similar to Alternative 1, as described in Section 4.2.6.3 except that a smaller area would be affected during construction. No significant visual impacts would result from this alternative.

Mitigation

No mitigation measures are proposed.

4.3.7 Socioeconomics and Environmental Justice

4.3.7.1 Both MILCONs (Alternative 3)

Methodology

The methodological approach and data sources utilized to assess socioeconomic impacts of Alternative 3 are the same as described for Alternative 1 in Section 4.1.7.1.

Impacts

Construction

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

For all work included in Alternative 3, the design and construction work on the project features would be by civilian contracting firms that would nearly exclusively draw their employees from a labor pool outside of MCBCP. Given the nature of the construction and that the project sites are on a military base, no increase in population would occur from workers relocating to MCBCP, and no increase in demand for on-Base housing would occur. Most of the construction work would be performed by workers from a labor pool within commuting distance of MCBCP, such that off-Base demand for temporary construction worker housing would be minimal. Some incidental construction-related employment opportunities may arise for military dependents, but the socioeconomic impact of these opportunities would be negligible.

Total funding for both MILCONs included in the proposed action is estimated to be $205 million, with funding running from FY 2012 through FY 2013. As shown in Table 4.3.7-1, total funding varies from year to year. Fiscal year of funding, however, differs from calendar year of project expenditures. Expenditures by calendar year, based on estimated start dates and estimated duration of construction by project, are shown in Table 4.3.7-2. For the purposes of economic modeling, it was assumed that (1) all funding would be spent on construction, (2) construction schedules would be as illustrated in Table 4.3.7-2, and (3) monthly construction expenditures would remain even across all months of the construction period. As both the level of funding and the timing of construction are subject to revision, the purpose of the modeling is to facilitate an order-of-magnitude economic output and employment impact assessment rather than an exact projection of economic output and employment levels.

Summaries of the modeling of the economic activity related to construction for the three-county and six-county regions are presented in Tables 4.3.7-3 and 4.3.7-4, respectively. These results combine direct, indirect, and induced economic output and employment results to give an overall economic output and employment figure by region for each construction year. Existing regional economic output and employment baseline information by sector is also provided to allow a comparison of impacts to existing conditions. Details of direct, indirect, and induced economic output and employment by sector by year for the three-county and six-county regions are provided in Appendix F, Socioeconomic Employment and Economic Output Impact Tables.

As shown, economic output for the three-county region would peak at about $130 million per year over the course of construction, and employment would peak at about 761 jobs per year. The majority of the total proposed action-related economic output in each year would consist of direct output from the construction sector, and the majority of total employment would consist of direct employment in the construction industry. For the six-county region, economic output would peak at about $218 million (an increase of about $88 million over the three-county region) during both construction expenditure years (2013 and 2014) and employment would peak at approximately 1,235 jobs (an increase of about 474 jobs over the three-county region) for 2013 and 2014. Some highly localized economic activity would likely occur with small-scale purchases of goods and services by construction companies and their workers, resulting in a minor beneficial impact to the on-Base economy.

LOCALIZED SOCIOECONOMIC IMPACTS

Localized, temporary socioeconomic impacts could potentially accrue due to the proximity of sensitive receptors (such as family housing areas, school areas, child-oriented facilities, hospitals, and BEQs, among others) to the construction corridors for linear project components or the project limits of other project facilities. These localized socioeconomic impacts could result from construction noise, a temporary degradation of air quality, or a decrease in traffic level of service and/or accessibility. A description of sensitive receptors closest to each of the project corridors and facilities project limits is presented in the following discussions of project alternatives.

Facility Operation

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

At present, employment related to operations of on-Base utilities infrastructure facilities involves a limited number of both federal civilian employees and private sector

contractor personnel, but specific employment figures are not readily available (U.S. Navy 2010d). While some new long-term employment could be created through the additional labor demand brought about by operation of the new portions of the water distribution system, the number of new employees would likely be minimal. It is expected that initial employment at the new facilities would be dominated by contractor personnel, but that over time these positions would come to be occupied predominantly by regular (federal civilian) employees.

LOCALIZED SOCIOECONOMIC IMPACTS

No localized socioeconomic impacts would be anticipated from the postconstruction operation of any of the proposed action MILCONs in Alternative 3. Project linear features would be underground and would have no adverse effects on sensitive receptors. Aboveground facilities would not be near enough to sensitive receptors to cause adverse effects. Whether aboveground or underground, completed MILCON project alternatives in Alternative 3 would not have any socioeconomic impact.

Environmental Justice

When the proposed action projects included in Alternative 3 are considered as a group, project linear corridor and facilities project limits would be located within five different populated census blocks on MCBCP (Blocks 9005, 9008, 9015, 9032, and 9040). These blocks have a combined population of 26,687 persons, which is 73.8 percent of the total population of MCBCP. For this group of blocks combined, total minority population is 43.8 percent, compared to a total minority population of 43.1 percent for MCBCP as a whole, and less than the minority percentage of San Diego, Orange, and Riverside counties. As a result, the area affected by Alternative 3 would not have a minority population of concern with respect to environmental justice. In terms of low-income status (as defined by percentage of persons living below poverty), statistics are not available for the Alternative 3 blocks specifically. For MCBCP as a whole, however, approximately 8.4 percent of the population was below poverty level as of the 2000 census, a lower figure than was the case in San Diego, Orange, and Riverside counties, which ranged between 10.3 and 14.2 percent. As a result, the project area is not considered to have a low-income population of concern with respect to environmental justice issues. Further, no significant socioeconomic or other directly relevant environmental impacts are anticipated for Alternative 3, and there is no indication that any disproportionately high and adverse impacts would accrue to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.3.7.2 P-1044 Alternative 3

Impacts

Total cost for P-1044 Alternative 3 is estimated to be $100 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $63.4 million per year, and employment output would be approximately 371 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $106.1 million per year, and employment output would be approximately 602 jobs per year. The number of new employees for project operations would likely be minimal.

The linear features along with the 62 Area (Cristianitos) pump station of P-1044 Alternative 3 would be located in the same proximity to potentially sensitive receptors as the project features of P-1044 Alternative 1, as described in Section 4.1.7.2. The Northern AWT plant itself, however, would be located approximately 500 yards from the nearest residences (in the San Onofre 3 Housing Area) as opposed to approximately 1,000 yards in Alternative 1, but this is still a great enough distance that no increase in impacts to potentially sensitive receptors is likely. Potential impacts for P-1044 Alternative 3 would be the same as for P-1044 Alternative 1. No significant impacts are anticipated.

One of the two census blocks potentially directly affected by this alternative had minority population percentages higher than MCBCP or the counties in the surrounding region at the time of the 2000 census, but it is known that this census block has no population at present, following the discontinuation of the northern agricultural area lease. There is no indication that there would be any disproportionately high and adverse impacts to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.3.7.3 P-1045 Alternative 3

<u>Impacts</u>

Total cost for P-1045 Alternative 3 is estimated to be $105 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $66.5 million per year, and employment output would be approximately 390 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $111.4 million per year, and employment output would be approximately 633 jobs per year. The number of new employees for project operations would likely be minimal. No socioeconomic impacts would be anticipated from the postconstruction operation.

Linear features of P-1045 Alternative 3 would be in the same proximity to potentially sensitive receptors as P-1045 Alternative 1, described in Section 4.1.7.3, with two exceptions. For P-1045 Alternative 3, the project corridor would not be near BEQs in the 33 Area (Margarita). Another P-1045 Alternative 3 project corridor, however, would come within less than 15 yards of BEQs in the 43 Area (Las Pulgas). No significant impacts are anticipated.

Of the four census blocks potentially directly affected by this alternative, one had a minority population percentage greater than 50 percent (and higher than that of MCBCP and the counties in the surrounding region) at the time of the 2000 census, while another had a minority population percentage higher than MCBCP and San Diego County, but lower than either Orange County or Riverside County. There is no indication, however, that any disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.

<u>Mitigation</u>

No mitigation measures are proposed.

Table 4.3.7-1
Funding by Fiscal Year ($ Millions) – Alternative 3

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$100	$0	$100
FY 2012	$0	$105	$105
All Years	**$100**	**$105**	**$205**

Note: All Years total may vary from sum of FY subtotals due to rounding.

Table 4.3.7-2
Construction Schedule and Expenditures
by Project, Month, and Year – Alternative 3

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.20	$50.0	$50.0	$100
P-1045	April 2013	18	$5.80	$52.5	$52.5	$105
Total				**$102.5**	**$102.5**	**$205**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table 4.3.7-3
Alternative 3 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 3-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 3-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.2	$0.2	32,988	1.8	1.8
Mining	$1,241.7	$0.2	$0.2	3,318	0.7	0.7
Utilities	$15,558.8	$0.8	$0.8	12,432	0.6	0.6
Construction	$51,446.2	$82.4	$82.4	337,572	464.8	464.8
Manufacturing	$135,386.5	$6.8	$6.8	341,197	17.8	17.8
Wholesale Trade	$39,026.3	$3.1	$3.1	181,370	13.4	13.4
Retail Trade	$39,116.0	$4.0	$4.0	488,360	46.8	46.8
Transportation and Warehousing	$10,754.6	$0.8	$0.8	86,583	5.7	5.7
Information	$44,927.0	$2.4	$2.4	89,139	4.2	4.2
Finance and Insurance	$51,476.1	$3.9	$3.9	226,444	15.5	15.5
Real Estate and Rental	$102,950.6	$7.3	$7.3	366,409	18.1	18.1
Professional, Scientific, and Technical Services	$57,707.5	$8.0	$8.0	391,226	54.0	54.0
Management	$9,482.5	$0.4	$0.4	48,580	2.2	2.2
Administrative and Waste Services	$23,778.3	$1.6	$1.6	369,193	24.2	24.2
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.1	6.1
Health and Social Services	$34,208.9	$2.9	$2.9	342,697	27.7	27.7
Arts, Entertainment, and Recreation	$12,255.8	$0.7	$0.7	125,303	7.3	7.3
Accommodation and Food Services	$24,417.9	$1.4	$1.4	357,882	22.0	22.0
Other	$19,513.1	$2.2	$2.2	271,933	25.0	25.0
Government	$64,451.0	$0.6	$0.6	656,931	3.0	3.0
Total	**$745,750.4**	**$129.9**	**$129.9**	**4,806,509**	**760.8**	**760.8**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

Table 4.3.7-4
Alternative 3 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside-Los Angeles-San Bernardino-Imperial Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 6-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 6-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$7,850.5	$0.4	$0.4	59,069	2.3	2.3
Mining	$8,697.3	$1.3	$1.3	14,975	2.5	2.5
Utilities	$31,705.3	$1.6	$1.6	29,926	1.4	1.4
Construction	$92,642.0	$102.1	$102.1	610,158	580.3	580.3
Manufacturing	$358,362.8	$24.4	$24.4	858,357	50.4	50.4
Wholesale Trade	$94,509.4	$6.4	$6.4	493,501	31.3	31.3
Retail Trade	$91,980.4	$7.9	$7.9	1,132,121	91.5	91.5
Transportation and Warehousing	$43,502.0	$3.5	$3.5	325,556	24.9	24.9
Information	$154,948.9	$6.7	$6.7	368,602	12.2	12.2
Finance and Insurance	$115,155.1	$9.2	$9.2	485,909	36.1	36.1
Real Estate and Rental	$225,259.1	$15.3	$15.3	729,263	37.0	37.0
Professional, Scientific, and Technical Services	$140,355.6	$15.4	$15.4	936,634	100.5	100.5
Management	$23,983.7	$1.3	$1.3	110,862	5.9	5.9
Administrative and Waste Services	$51,537.5	$3.6	$3.6	799,005	54.8	54.8
Educational Services	$13,904.6	$0.9	$0.9	220,354	14.8	14.8
Health and Social Services	$89,328.8	$6.7	$6.7	916,303	65.2	65.2
Arts, Entertainment, and Recreation	$36,319.5	$1.5	$1.5	319,858	14.5	14.5
Accommodation and Food Services	$52,206.9	$3.2	$3.2	771,455	49.7	49.7
Other	$48,290.5	$4.5	$4.5	715,259	52.1	52.1
Government	$139,840.0	$1.5	$1.5	1,450,595	7.7	7.7
Total	**$1,820,379.9**	**$217.5**	**$217.5**	**11,347,763**	**1,235.0**	**1,235.0**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

4.3.8 Traffic

4.3.8.1 Methodology (Alternative 3)

The methodology used to evaluate impacts of Alternative 3 is the same as explained in Section 4.1.8.1 for Alternative 1. The estimated traffic volumes generated by Alternative 3 would be equal to the traffic shown in Alternative 1, even though the specific locations of some project components in Alternative 3 vary from those in Alternative 1. The differences between projects in the alternatives would not change the number of construction crews needed to complete the project within the given timeline. Therefore, traffic patterns for construction traffic related to the project would be the same as those analyzed in Alternative 1. Further, the roadway network would remain the same.

4.3.8.2 Impacts

Impacts of Alternative 3 would be equal to or less than the impacts of Alternative 1. Refer to Section 4.1.8 for traffic impacts of Alternative 3.

4.3.8.3 Mitigation

Mitigation recommended for Alternative 1 in Section 4.1.8.3 would be applicable to Alternative 3.

4.3.9 Air Quality

4.3.9.1 Both MILCONs (Alternative 3)

Methodology and the related conditions, as discussed in Section 4.1.9.1, are applicable to Alternative 3 as well as to Alternative 1.

Annual project emissions for Alternative 3 were estimated by URBEMIS and grouped by calendar year in SDAB and SCAB, as shown in Tables 4.3.9-1 and 4.3.9-2, respectively. The URBEMIS model output data are included in Appendix G.

Table 4.3.9-1
Estimated Annual Air Pollutant Emissions of Alternative 3 in SDAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 3	2	14	13	0	19	4
P-1045 Alternative 3	2	15	15	0	25	6
Total 2013 Emissions	**4**	**29**	**28**	**0**	**44**	**10**
2014						
P-1044 Alternative 3	2	15	15	0	19	4
P-1045 Alternative 3	2	17	18	0	25	6
Total 2014 Emissions	**4**	**32**	**33**	**0**	**44**	**10**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.3.9-2
Estimated Annual Air Pollutant Emissions of Alternative 3 in SCAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 3	<1	<1	<1	0	<1	<1
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.3.9-1, the total estimated annual emissions of VOCs, NO_X, and CO for 2013 and 2014 for Alternative 3 in SDAB are less than the *de minimis* levels for these pollutants. As shown in Table 4.3.9-2, the total estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for 2013 for Alternative 3 in SCAB are less than the *de minimis* levels for these pollutants. Therefore, Alternative 3 in SDAB and SCAB would conform to the SIP and a conformity determination is not required.

The same measures recommended for Alternative 1 to minimize fugitive dust during construction are recommended for Alternative 3.

<u>Mitigation</u>

No mitigation measures are proposed.

4.3.9.2 P-1044 Alternative 3

<u>Impacts</u>

Annual project emissions for P-1044 (Alternative 3) were estimated by URBEMIS in SDAB and SCAB, as shown in Tables 4.3.9-3 and 4.3.9-4. The URBEMIS model output data are included in Appendix G.

Table 4.3.9-3
Estimated Annual Air Pollutant Emissions of P-1044 (Alternative 3) in SDAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**2**	**14**	**13**	**0**	**19**	**4**
Total 2014 Emissions	**2**	**15**	**15**	**0**	**19**	**4**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.3.9-4
Estimated Annual Air Pollutant Emissions of P-1044 (Alternative 3) in SCAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.3.9-3, the estimated annual emissions of VOCs, NO_X, and CO for P-1044 (Alternative 3) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. As shown in Table 4.3.9-4, the estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for P-1044 (Alternative 3) in SCAB in 2013 are less than the *de minimis* levels for these pollutants. Therefore, P-1044 (Alternative 3) would conform to the SIP and a conformity determination is not required.

The same measures recommended for P-1044 Alternative 1 to minimize fugitive dust during construction are recommended for P-1044 Alternative 3.

<u>Mitigation</u>

No mitigation measures are proposed.

4.3.9.3 P-1045 Alternative 3

<u>Impacts</u>

Annual project emissions for P-1045 (Alternative 3) were estimated by URBEMIS, as shown in Table 4.3.9-5. The URBEMIS model output data are included in Appendix G.

Table 4.3.9-5
Estimated Annual Air Pollutant Emissions
of P-1045 (Alternative 3)

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**2**	**15**	**15**	**0**	**25**	**6**
Total 2014 Emissions	**2**	**17**	**18**	**0**	**25**	**6**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.3.9-5, the estimated annual emissions of VOCs, NO_X, and CO for P-1044 (Alternative 3) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. Therefore, P-1044 (Alternative 3) would conform to the SIP and a conformity determination is not required.

The same measures recommended for P-1045 Alternative 1 to minimize fugitive dust during construction are recommended for P-1045 Alternative 3.

<u>Mitigation</u>

No mitigation measures are proposed.

4.3.10 Noise

4.3.10.1 Both MILCONs (Alternative 3)

Methodology and impacts, and the conditions related to them, as discussed in Section 4.1.9.1, are applicable to Alternative 3 as well as to Alternative 1.

No mitigation measures are proposed.

4.3.10.2 P-1044 Alternative 3

Impacts

P-1044 Alternative 3 would generate noise levels similar to P-1044 Alternative 1, along the same pipeline routes, in proximity to the same receptors. However, the Northern AWT would be 0.25 mile east of the nearest receptor. The estimated average construction noise level of approximately 80 dBA L_{eq} at 50 feet at the Northern AWT site would attenuate to less than the acceptable construction noise limit of 75 dBA L_{eq} at 100 feet. At the nearest receptor approximately 0.5 mile away, the noise level would be approximately 52 dBA L_{eq}. Therefore, no significant construction noise impact to receptors from site facilities would occur.

The assumed operational noise level of the Northern AWT is 85 dBA L_{eq} at 50 feet and would attenuate to approximately 57 dBA L_{eq} at the nearest receptor approximately 0.25 mile away, which is an acceptable operational noise level at receptors, based on NAVFAC P-970 noise compatibility criteria for various land uses. Therefore, no significant operational noise impact of the site facilities to the nearest receptors would occur.

Mitigation

No mitigation measures are proposed.

4.3.10.3 P-1045 Alternative 3

Impacts

P-1045 Alternative 3 would generate noise levels similar to P-1045 Alternative 1, along much of the same route, except to a shorter extent, thereby avoiding proximity to BEQs in the 33 Area (Margarita). However, noise impacts would be the same as for that portion of P-1045 Alternative 1, and less than significant.

Mitigation

No mitigation measures are proposed.

4.3.11 Public Health and Safety

4.3.11.1 Both MILCONs (Alternative 3)

Methodology

The methodological approach and data sources utilized to assess public health and safety impacts of Alternative 3 are the same as described for Alternative 1 in Section 4.1.11.1.

Impacts

The presence of active UST/AST sites, hazardous waste storage sites, RFA sites, and IR sites; and the potential for LBP, PCBs, and asbestos within the Alternative 3 alignment corridors are minimal.

- There are no hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, or APZs in any of the project MILCONs in Alternative 3.
- In Alternative 3, IR Site 33 is found in the project corridors of P-1044, while IR Site 1D is found within the project corridor of P-1045.
- In Alternative 3, the only alignment corridor in which UST sites are found is P-1044, which has 11 UST sites present (active LUST Site 62507 and closed UST Sites 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536). No other project corridors/sites contain UST sites.
- In Alternative 3, the only alignment corridor in which RFA sites are found is P-1044, which has four RFA sites present (active RFA Site 220 and no further action RFA Sites 199, 221, and 225). No other project corridors/sites contain RFA sites.
- In Alternative 3, the two alignment corridors in which ASTs are found are P-1044 and P-1045, which have eight ASTs present (ASTs 52021, 52410, 52710, 61513, 20816, 31520-1, 31523-P, and 52021). No other project corridors/sites contain ASTs.
- In Alternative 3, two alignment corridors in which training areas are found are P-1044 and P-1045, which have nine training areas present (Range 207 Military Range Area, Range 14 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Range 503 Firing Line, Range 505 Firing Line, Dudded Impact Area 1/503 Hand

Grenade Range, and Non-Dudded Impact Area/Edson Range Impact Area). No other project corridors/sites contain training areas.

- In Alternative 3, the only alignment corridor in which pesticides are found is P-1044, which has one pesticide site (former North Agricultural Lease Site). No other project corridors/sites contain pesticide sites.

In addition, all alignments have RFA, UST, or IR sites close enough to the project corridors to have an effect on construction. Generally, the risk of having these sites close to Alternative 3 project corridors/sites is the potential to encounter contaminated groundwater when digging or excavating and during dewatering operations within the construction area. A summary of the sites and nearby corridors is provided in Table 4.3.11-1. As shown in the table, several of these sites could potentially impact construction in multiple corridors.

If soil contamination (discolored and/or odorous) is discovered during construction, the Installation Restoration/Remediation Branch at (760) 725-9744/9774 would be contacted for necessary remedial requirements. If the construction of structures would be outside of any known, identified groundwater plume, additional regulatory concurrence would not be required. However, these locations would still be evaluated by Navy and Marine Corps IRP managers to ensure they are not downgradient of an existing plume where further investigation and/or cleanup may take place.

The northern portion of MCBCP is laden with former and current training ranges. When excavation, grading, and/or digging occurs within the boundaries of a former or current range, all work would be accomplished with every effort to maximize safety and prevent the spread of any potential contamination or the release of any potential existing contaminants to the environment in accordance with all federal, state, and local laws, regulations, and guidelines.

Before construction of any alignment, ES would review construction plans along with the current list of hazardous material sites on-Base to ensure that sites with the potential to affect construction were identified. Construction would not be allowed within the vicinity of those hazardous material sites without assurance that the site was remediated or that the influence of the hazardous materials site would not affect the construction area.

Table 4.3.11-1
RFA, UST, IR, and AST Sites within Alternative 3
Project Corridors/Sites or Adjacent Buffers

Project Corridor/Site	Type of Site								
	RFA		UST		IR		AST		Military Training Areas, Impact Areas, Live-Fire Facilities, and ESQD Arcs within the Project Corridors/Sites
	Within Project Corridor/ Site	Within 50-Foot Buffer	Within Project Corridor/Site	Within 200-Foot Buffer	Within Project Corridor/ Site	Within 500-Foot Buffer	Within Project Corridor/ Site	Within 10-Foot Buffer	
P-1044 Alternative 3	199(NFA), 220(LSI), 221(NFA), 225(NFA)	185(NFA), 192(NFA), 218(NFA), 236(NFA), 280(NFA)	520400(Closed), 52291(Closed), 52651(Closed), 52710(Closed), 62420(Closed), 62435(Closed), 62436(Closed), 62520(Closed), 62535(Closed), 62536(Closed), 62507	51091-6, 51091-7, 51091-8, 51091-9 520167-1, 520167-2, 62507-3, 62507-4	33	1I-2(Closed), 34(Closed), 36(Closed)	52021, 52410, 52710, 61513	-	Range 207 Military Range Area
P-1045 Alternative 3	-	168(NFA), 278(NFA), 279(NFA)	-	-	1D	7,32(Closed)	20816, 31520-1, 31523-P, 52021	41611	Range 14 Artillery Firing Area, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 503 Firing Line, Range 505 Firing Line, Dudded Impact Area 1/503 Hand Grenade Range, Non-Dudded Impact Area/Edson Range

LSI = Limited Site Investigation; NFA = No Further Action

A number of child-oriented facilities are near enough to the alignments for noise and dust during construction to be a concern:

- San Onofre Elementary School
- San Onofre Child Development Center
- San Onofre Youth Center
- Stuart Mesa Elementary School
- Stuart Mesa Child Development Center
- Wire Mountain Youth Center
- Santa Margarita School
- Browne Child Development Center
- Abby Reinke Community Center

To eliminate disturbances to children that may come from construction, such as noise, dust, and unacceptable air quality, measures such as dust abatement and BMPs that would reduce other construction impacts would be applied. These measures are summarized in Section 2.5. When successfully implemented, these measures would not adversely alter existing environmental health conditions or impose additional safety risks to children and therefore would minimize the possibility of project-related adverse impacts to children.

Mitigation

No mitigation measures are proposed.

4.3.11.2 P-1044 Alternative 3

Public health and safety impacts and mitigation for the P-1044 Alternative 3 project corridor/site would be the same as discussed for P-1044 Alternative 1 under Section 4.1.11.2.

4.3.11.3 P-1045 Alternative 3

Impacts

There are no USTs, RFA sites, hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, APZs, or pesticides located within the P-1045 Alternative 3 project corridor/site.

Hazardous waste sites that were identified within portions of the project corridor/site include the following:

- Four ASTs (active ASTs 20816, 31520-1, 31523-P, and 52021);
- One IR site (active IR Site 1D); and
- Four training areas (Range 14 Artillery Firing Area, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Range D704 Live Fire and Maneuver).

In addition, active AST 41611; no further action RFA Sites 168, 278, and 279; active IR Site 7; and closed IR Site 32 were identified within the buffer zone of the project corridor/site.

- Construction within the project corridor/site may encounter contaminated soil from no further action RFA Sites 168, 278, and 279. The contamination at the RFA Sites was shallow.
- Construction within the project corridor/site may encounter contaminated soil from IR Site 7. The remedial action implemented at IR Site 7 has been found to be protective of human health and the environment because potential exposure pathways have been controlled and monitored.
- Construction within the project corridor/site may encounter contaminated groundwater from IR Site 1D. The groundwater at IR Site 1D is relatively shallow, ranging from 6 to 10 feet bgs. Groundwater monitoring wells are located around IR Site 1D.
- Construction within the project corridor/site may encounter contaminated soil from closed IR Site 32.
- Weapons training in the proximity of construction areas or activities could be highly dangerous to construction personnel.

In addition, other unidentified contaminant residue in the soil or groundwater from historical spills that may be present underneath the area of the project corridor/site would be assessed. If any contaminants are identified, appropriate remediation would be implemented before construction.

With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area. With respect to potential impacts to children specifically, construction activities for the project corridor/site are generally expected to generate short-term construction noise levels and increase fugitive dust. Child-oriented facilities within a 500-yard buffer zone of the project corridor/site and their location relative to construction corridors/sites would be the same as those described for P-1045 Alternative 1, Section 4.1.11.3. To mitigate potential impacts to children that may come from construction activities, measures such as dust abatement and other BMPs described in Section 2.5 that would reduce construction impacts would be applied. These measures would minimize the possibility of proposed action-related adverse impacts.

With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts should occur as a result of the implementation of the project corridor/site in this area.

Mitigation

No mitigation measures are proposed.

4.3.12 Services and Utilities

4.3.12.1 Both MILCONs (Alternative 3)

Methodology

The assessment of impacts on services and utilities for Alternative 3 followed the same procedures as for Alternative 1, as discussed in Section 4.1.12.1.

Impacts

In terms of impacts on services and utilities, there would be negligible differences between Alternative 3 and Alternative 1, as discussed in Section 4.1.12.1. No significant impacts would result from implementation of Alternative 3.

Mitigation

No mitigation measures are proposed.

4.3.13 Coastal Zone Resources

4.3.13.1 Both MILCONs (Alternative 3)

Impacts

The coastal zone impacts of Alternative 3 would be similar to those discussed in Section 4.1.13.1. TLS working pits in P-1044 Alternative 3 would be in the same locations as Alternative 1. TLS boring sites in P-1045 Alternative 3 would be in the same locations in the Stuart Mesa Road alignment as in Alternative 1.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.3.13.2 P-1044 Alternative 3

Impacts

P-1044 Alternative 3 would have the same impacts in relation to coastal zone resources as those discussed for Alternative 1 in Section 4.1.13.2.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.3.14 Marine Resources

Marine resources are covered in this section; please see Section 4.3.2 for related impacts to water quality and hydrology and Section 4.3.3 for related impacts to biological resources.

Impacts related to proposed brine discharge from the Northern AWT RO facility on marine resources are addressed in this section. Indirect effects on marine resources from implementation of projects inland are discussed in Section 4.3.13, Coastal Zone Resources.

4.3.14.1 P-1044 Alternative 3

Impacts

Marine resource impacts of P-1044 Alternative 3 of would be similar to those discussed in Section 4.1.14.1.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.3.14.2 P-1045 Alternative 3

Impacts

No direct impacts to marine resources are anticipated from implementation of P-1045.

Mitigation

No mitigation is proposed.

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4.4 ALTERNATIVE 4

4.4.1 Geology and Soils

4.4.1.1 Both MILCONs (Alternative 4)

Methodology

Methodology is described in Section 4.1.1.1.

Impacts

Alternative 4 would differ in some of the areas affected, but the geotechnical requirements for construction and erosion control would generally be the same as those discussed for Alternative 3. Therefore, impacts would be the same as discussed in Sections 4.1.1.1 and 4.3.1.1.

Mitigation

No mitigation measures are proposed.

4.4.2 Water Quality and Hydrology

Water quality and hydrology are covered in this section; please see Section 4.4.3 for related impacts to biological resources and Section 4.4.14 for related impacts to marine resources.

4.4.2.1 Both MILCONs (Alternative 4)

Impacts

The discussion of general impacts of Alternative 1 in Section 4.1.2.1 is applicable to Alternative 4.

Mitigation

No mitigation measures are proposed.

4.4.2.2 P-1044 Alternative 4

Impacts

P-1044 Alternative 4 is similar to Alternative 2 except that the Northern AWT would be constructed south of and adjacent to Basilone Road near the north side of San Onofre Creek, at the same location as Alternative 3. The difference in the Northern AWT location from Alternatives 1 and 2 is discussed in Section 4.3.2.2, and the potential impacts of the pipeline alignments and other components are discussed in Section 4.2.2.2.

Construction and operation of P-1044 Alternative 4 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5, the applicable regulations in Section 3.2, and the requirements of EO 11988.

Mitigation

No mitigation measures are proposed.

4.4.2.3 P-1045 Alternative 4

Impacts

P-1045 Alternative 4 would be the same as P-1045 Alternative 1, except that the pipeline connection from the Stuart Mesa Road pipeline to the reservoirs on a ridge above Haybarn Canyon would be east of the Santa Margarita River rather than west of the river. Compared to Alternative 1, the long TLS crossing from near the 25 Area (Vado Del Rio) to Haybarn Canyon would be eliminated; there would be only one crossing of the Santa Margarita River, at the Stuart Mesa Bridge. The difference could eliminate a source of potential adverse accidental impacts on the river during construction.

A project-specific SWPPP with BMPs to avoid adverse impacts would be required for this alternative, and the same regulatory controls and requirements described in Section 4.1.2.3 would be applicable. Construction and operation of P-1045 Alternative 4 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5 and the applicable regulations in Section 3.2.

Mitigation

No mitigation measures are proposed.

4.4.3 Biological Resources

Biological resources are covered in this section; please see Section 4.4.2 for related impacts to water quality and hydrology and Section 4.4.14 for related impacts to marine resources.

4.4.3.1 Both MILCONs (Alternative 4)

Impacts

For a general description of the potential direct and indirect impacts to biological resources that would result from construction and operation of the alternatives, refer to Alternative 1, Section 4.1.3.1. A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1. The special conservation and construction measures listed in Section 2.5 would be incorporated as part of any of the alternatives and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources.

The total impacts to biological resources associated with implementing the projects associated with Alternative 4 are presented below. In all cases, the total area of impacts associated with each project is presented separately, and those totals are summed across both projects. However, in areas common to two or more projects, impacts would not happen anew in overlapping areas if the projects were implemented simultaneously. Therefore, the totals that are summed across both projects represent the greatest disturbance possible, which would occur if every project took place at a different time in every overlap area.

As previously noted, analyzing impacts within utility corridors for the full 125-foot width represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the maximum (100 percent) and the anticipated (48 percent) impact scenarios for comparison. For the maintenance access roads and for utility facilities (e.g., reservoirs and pump stations), permanent impacts were assessed at 100 percent for both maximum and anticipated scenarios. The direct impacts that would arise from trenching within project corridors to install the proposed water pipelines would be considered temporary for habitats that can be restored after construction activities are complete. Temporary, direct impacts may also arise from construction-generated fugitive dust; noise; increased human presence; and construction-related erosion, runoff, and sedimentation into plant communities. Direct impacts from these construction-related activities would be considered temporary wherever the impacts would end with cessation of project construction. However, direct impacts to some resources, e.g., occupied San Diego and Riverside fairy shrimp habitat (vernal pool basins) and occupied thread-leaved brodiaea habitat may or may not be reversible as construction impacts within the corridor could result in the permanent alteration of physical characteristics critical to the species, compared to the preconstruction condition. Therefore, as discussed previously, all proposed trenching-related corridor impacts to occupied San Diego and Riverside fairy shrimp habitat and occupied thread-leaved brodiaea habitat are analyzed as permanent impacts herein.

For the maintenance access roads and utility facilities (e.g., reservoirs and pump stations) permanent impacts were assessed at 100 percent for both maximum and anticipated scenarios.

A thorough analysis of impacts to listed species is provided in the biological assessment for the proposed action (AECOM 2012).

Additional impacts to biological resources may occur as a result of habitat restoration. At this time, these effects are not quantifiable. Additional impacts to regulated biological resources would be analyzed after finalization and approval of habitat restoration plans as submitted to ES; USFWS; and USACE.

Mitigation

Mitigation measures that would be required for one or both of the two projects are summarized in Section 4.1.3.1 (Table 4.1.3.1-2). The project-specific relevance of these measures is presented in the following sections.

If acreage is needed for mitigation of impacts to federally listed species or habitats, any on-Base mitigation should not interfere with the Base's training mission. Any such interference would be avoided through consultation between ES and Base Operations and Training, as explained in Section 4.1.5.1.

Plant Communities

Impacts

The total permanent and temporary direct impacts to plant communities from development of Alternative 4 are presented in Table 4.4.3.1-1. As noted above, in all cases the temporary impacts represent the worst-case scenario that could occur to biological resources because technologies would be employed to minimize resource impacts within the 125-foot-wide utility corridors. The maximum versus anticipated direct impacts to plant communities associated with Alternative 4 are summarized for riparian and upland habitat types for each project in Table 4.4.3.1-2. Further details about direct impacts associated with project-specific facilities, and potential indirect impacts that could occur in the adjoining 100- and 400-foot buffer areas are presented in subsequent sections of this EIS.

Only the permanent and temporary impacts to plant communities (grasslands, scrublands, and woodlands) that coincide with regulated waters (e.g., riparian wetlands or nonvegetated channels regulated under Section 404 of the CWA) or that are occupied by, or support, federally listed or covered species (i.e., ESA and/or MBTA) would be considered significant. Potential total impacts to these regulated/covered resources are discussed in the following subsections.

Mitigation

Mitigation required for unavoidable impacts to plant communities that are regulated or otherwise covered by federal statutes (i.e., waters regulated under the CWA and habitats for species listed under the ESA or covered under the MBTA) are discussed in the following subsections.

Waters of the U.S.

Impacts

Development of Alternative 4 would result in permanent and temporary direct impacts to jurisdictional waters, including wetlands, as summarized in Table 4.4.3.1-3. All direct impacts to jurisdictional waters would be considered significant. The maximum versus anticipated direct impacts to wetlands and other waters associated with Alternative 4 are summarized for each project in Table 4.4.3.1-4. Additional project-specific details about potential direct impacts to jurisdictional waters are presented below for each separate project. The CWA Section 404(b)(1) Guidelines require USACE to determine that the project is the least environmentally damaging practicable alternative for the proposed unavoidable impacts to jurisdictional waters. Therefore, as project designs are finalized, attempts to avoid and minimize impacts to jurisdictional waters (wetlands and nonwetland waters) to the greatest extent practicable would be undertaken.

The determination of whether the utility projects may be permitted under USACE's NWP program, or whether specific individual permits would be required, would be determined formally as part of the CWA Section 404 permit process. As noted in Section 4.1.3.1, to qualify for a NWP, the proposed action and the associated unavoidable impacts to jurisdictional waters based on final project designs must satisfy all terms and conditions of the specific NWP, as well as all general conditions and any relevant regional conditions of the NWP program. One of the regional conditions published by the USACE Los Angeles District indicates that individual permits are required for all discharges of fill material into jurisdictional vernal pools (USACE Special Public Notice May 18, 2007).

Based on data collected during formal wetland delineations for Alternative 4, potential jurisdictional vernal pools were delineated within the proposed impact areas for MILCONs P-1044 and P-1045 (the jurisdictional status of all delineated waters is not considered final until the USACE has completed a jurisdictional determination). Therefore, if, based on final project design it is determined that impacting a jurisdictional vernal pool is unavoidable, then an Individual Permit would be required for these MILCONs. However, if the discharge of fill material into jurisdictional vernal pools can be avoided, then these MILCONs may qualify for authorization under NWP 12 (Utility Line Activities) pending USACE's review of pre-construction notification materials. It should be noted that the District Engineer may exercise "discretionary authority" for any activity that is determined to have a more than minimal individual or cumulative adverse effect on the environment or may be contrary to public interest and thus require an Individual Permit (33 CFR 330.2 [g]). Therefore, as noted above, the determination of whether MILCONs P-1044 and P-1045 may be permitted under NWPs or require individual permits would be determined formally as part of the CWA Section 404 permit process.

<u>Mitigation</u>

Mitigation for unavoidable impacts to jurisdictional waters is summarized in measure J1 in Table 4.1.3.1-2. Based on mitigation ratios of 2:1 for permanent impacts to wetlands, 1:1 for permanent impacts to other waters, and 1:1 for all temporary wetlands and waters impacts, the mitigation for waters of the U.S. that could be required for development of Alternative 4 is summarized in Table 4.4.3.1-5. Mitigation ratios across wetland types, e.g., coastal and valley freshwater marsh versus southern riparian woodland, must be finalized with USACE and RWQCB via the permitting process; some types may require more than a 2:1 ratio for the permanent loss of that wetland.

As noted in Section 2.5.2, unavoidable impacts to waters of the U.S. would require mitigation consistent with the final rule for Compensatory Mitigation for Losses to Aquatic Resources that was issued by USACE and USEPA. This would include the preparation of a detailed mitigation plan prepared collaboratively with ES and reviewed and approved by USACE and RWQCB before resource impact. If the unavoidable impacts to jurisdictional waters support federally listed species, then input from USFWS would also be required. The mitigation plan would describe on-site, off-site, and as needed, off-Base mitigation. For all habitat restoration that is proposed, this plan would include details regarding site preparation (e.g., grading), planting specifications, and irrigation design, as well as maintenance and monitoring procedures. The plan would also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria, and a strategy for long-term mitigation site management. A portion of the mitigation obligations may be satisfied by participating in a fee-based mitigation program (e.g., a wetland mitigation bank) in which case, long-term management for such mitigation would be covered under the terms of the formal banking agreement.

Federally Listed Plants

Impacts

All direct impacts to federally listed plants within the project limits, including the water utility corridors, are considered permanent impacts. Indirect impacts are evaluated for occurrences of federally listed plants within the 100-foot buffer zone. Two federally listed plant species, thread-leaved brodiaea, and spreading navarretia, may be directly impacted by implementation of Alternative 4. Acreage and number of vernal pool basins associated with these species that may potentially be impacted are noted in Table 4.4.3.1-6. The maximum versus anticipated impacts to federally listed plant species from Alternative 4 are summarized in Table 4.4.3.1-7. As previously noted, trenching impacts within the corridor would be considered permanent within thread-leaved brodiaea-occupied habitat and vernal pool habitat, but temporary for all other plant habitat. One additional listed plant species, San Diego button-celery is not known to occur in the project limits but does occur in the 100-foot buffer areas. Vernal pools supporting both San Diego button-celery and spreading navarretia are known to occur within the 100-foot buffer of P-1045 along Wire Mountain Road. However every effort would be made to avoid impacts to vernal pool habitat as described in Section 2.5.2 and measure P2 in Table 4.1.3.1-2.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed plant species. Mitigation for unavoidable impacts to federally listed plant species is summarized in measures P1 and P2 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed plant species from development of Alternative 4 is noted in Table 4.4.3.1-8. Species-specific mitigation ratios required for the project must be finalized with USFWS.

Nonfederally Listed Rare Plants

Impacts

Habitat supporting various nonfederally listed rare plant species occurs throughout Alternative 4. Rare plant species detected during project surveys that may potentially be impacted include, but may not be limited to, Pendleton button-celery, sticky dudleya, Blochman's dudleya, many-stemmed dudleya, Palmer's grappling-hook, San Diego tarplant, coast wallflower, and western dichondra. One location of Pendleton button-celery would be directly impacted by the P-1045 project within the corridor. Eight locations of Pendleton button-celery could be indirectly impacted within the 100-foot buffer. Impacts to this species would be reduced to a level below significance through conservation measures identified in Section 2.5.2. In particular, impacts to this species would be avoided or minimized through worker environmental protection briefings, markers or fencing, biological monitoring, erosion and sedimentation prevention, and restoration of areas temporarily affected, as determined necessary by the project biologist. With implementation of these and other measures identified in Section 2.5.2, none of the impacts that would occur to nonfederally listed rare plant species from development of Alternative 4 were considered significant and are therefore not discussed further in the project-specific sections of this EIS.

Mitigation

Implementation of measures as discussed in Section 2.5.2 would avoid and minimize potential impacts to nonfederally listed rare plant species. Unavoidable impacts to the nonfederally listed rare plants as a result of Alternative 4 do not warrant additional project-specific mitigation measures.

Federally Listed Wildlife

Impacts

A total of 10 federally listed wildlife species may be impacted by implementation of Alternative 4. These species are the Riverside fairy shrimp, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Acreages of habitat occupied by these species that may potentially be directly impacted and could require mitigation are provided in Table 4.4.3.1-6. These acreages are broken down according to plant community classifications and type of impact (temporary versus permanent). Impacts within the P-1044 facilities, P-1045 facilities are assessed as permanent direct impacts. As previously noted, analyzing impacts within the 125-foot-wide utility corridors represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the worst-case (100 percent) and the anticipated (48 percent) impact scenarios for comparison. As previously noted, trenching impacts within the corridor would be considered permanent within habitat occupied by Riverside fairy shrimp and San Diego fairy shrimp, but temporary for all other wildlife habitat. The maximum and anticipated direct impacts to federally listed species associated with Alternative 4 are provided in Table 4.4.3.1-7. Indirect impacts associated with the buffer are not quantified in this section, but are discussed in more detail in project specific discussions included within Sections 4.4.3.2 to 4.4.3.5.

A discussion of potential impacts specific to each federally listed wildlife species that may be impacted by Alternative 4 is provided in Section 4.1.3.1. The discussion of each species is organized by (1) permanent direct impacts associated with the facilities; (2) permanent and temporary direct impacts associated with the corridor; and (3) permanent and temporary indirect impacts associated with the buffers associated with the facilities and corridor.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of Alternative 4 is noted in Table 4.4.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Nonfederally Listed Rare Wildlife

<u>Impacts</u>

The nonfederally listed rare wildlife impact assessment discussion for Alternative 1 is also applicable to Alternative 4. See Section 4.1.3.1.

<u>Mitigation</u>

The nonfederally listed rare wildlife mitigation assessment discussion for Alternative 1 is also applicable to Alternative 4. See Section 4.1.3.1.

Wildlife Corridors

<u>Impacts</u>

The wildlife corridor impact assessment discussion for Alternative 1 is also applicable to Alternative 4. See Section 4.1.3.1.

<u>Mitigation</u>

The wildlife corridors mitigation assessment discussion for Alternative 1 is also applicable to Alternative 4. See Section 4.1.3.1.

Table 4.4.3.1-1
Potential Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 4 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 4	P-1045 – Alternative 4	Total[2]
Permanent	**32.16**	**23.77**	**55.93**
Riparian and Wetlands	1.58	0.05	1.63
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Disturbed Wetland	-	-	0.05
Mulefat Scrub	0.06	0.01	0.07
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.31	0.03	0.34
Uplands	10.70	8.01	18.71
Coast Live Oak Woodland	0.15	-	0.15
Diegan Coastal Sage Scrub	8.77	7.57	16.34
Eucalyptus Woodland	-	0.01	0.01
Nonnative Grassland	0.29	0.37	0.66
Valley Needlegrass Grassland	1.49	0.05	1.54
Other Cover Types	19.88	15.71	35.59
Disturbed Habitat	0.39	1.30	1.69
Urban/Developed	19.49	14.42	33.91
Temporary	**276.17**	**492.93**	**769.10**
Riparian and Wetlands	12.22	37.45	49.67
Beach	0.89	-	0.89
Coastal and Valley Freshwater Marsh	0.15	0.07	0.22
Disturbed Wetland	-	<0.005	<0.005
Freshwater Seep	-	0.11	0.11
Mulefat Scrub	2.96	7.41	10.37
Nonvegetated Channel	-	0.01	0.01
Open Water	0.42	0.08	0.50
Riparian Scrub	0.05	0.40	0.45
Southern Coastal Salt Marsh	-	2.41	2.41
Southern Riparian Woodland	3.22	3.04	6.26
Southern Willow Scrub	4.52	23.54	28.06
Vernal Pool	0.01	0.37	0.38
Uplands	113.60	220.03	333.63
Coast Live Oak Woodland	3.34	-	3.34
Diegan Coastal Sage Scrub	81.98	164.16	246.14
Eucalyptus Woodland	-	0.12	0.12
Nonnative Grassland	15.15	40.53	55.68
Valley Needlegrass Grassland	13.13	15.23	28.36
Other Cover Types	150.35	235.46	385.81
Disturbed Habitat	30.88	34.58	65.46
Urban/Developed	119.46	200.88	320.34
Total[2]	**308.33**	**516.70**	**825.03**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.

[2] Numbers may not sum exactly due to rounding.

Table 4.4.3.1-2
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 4 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 4		P-1045 – Alternative 4		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**32.16**	**32.16**	**23.77**	**23.77**	**55.93**	**55.93**
Riparian and Wetlands	1.58	1.58	0.05	0.05	1.63	1.63
Uplands	10.70	10.70	8.01	8.01	18.71	18.71
Other Cover Types	19.88	19.88	15.71	15.71	35.59	35.59
Temporary	**276.17**	**147.54**	**492.93**	**240.99**	**769.10**	**388.53**
Riparian and Wetlands	12.22	6.43	37.45	18.13	49.67	24.56
Uplands	113.60	66.31	220.03	106.42	333.63	172.73
Other Cover Types	150.35	74.79	235.46	116.44	385.81	191.23
Total[2]	**308.33**	**179.70**	**516.70**	**264.76**	**825.03**	**444.46**

[1] The table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) maximum impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts).
[2] Numbers may not sum exactly due to rounding.

Table 4.4.3.1-3
Potential Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 4 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 4	P-1045 – Alternative 4	Total[2]
Permanent	**0.07**	**0.03**	**0.10**
Wetland[3]	<0.005	-	<0.005
Southern Riparian Woodland	<0.005	-	<0.005
Other Waters[4]	0.07 (174)	0.03 (233)	0.10
Nonvegetated Channel	0.07 (174)	0.03 (233)	0.10
Temporary	**1.80**	**8.87**	**10.67**
Wetland[3]	1.24	8.28	9.52
Coastal and Valley Freshwater Marsh	0.26	0.03	0.29
Freshwater Seep	-	0.08	0.08
Mulefat Scrub	0.07	2.25	2.32
Southern Coastal Salt Marsh	-	1.30	1.30
Southern Riparian Woodland	0.74	-	0.74
Southern Willow Scrub	-	4.19	4.19
Sycamore-Alder Riparian Woodland	0.16	-	0.16
Vernal Pool	0.01	0.43	0.44
Other Waters[4]	0.56 (3,103)	0.59 (4,183)	1.05
Alkali Playa	-	0.05	0.05
Disturbed Wetland	0.07 (762)	<0.005 (450)	0.07
Fresh Water	-	0.01	0.01
Nonvegetated Channel	0.50 (2,341)	0.53 (3,733)	1.03
Total[2]	**1.87**	**8.90**	**10.77**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.
[3] Differences in the acreages presented in the above table that summarize the area of jurisdictional wetlands within project boundaries vs. acreages presented in the previous two tables that summarize the area of riparian and other wetland vegetation communities within project boundaries are attributable to the different methodologies used for vegetation mapping vs. delineating jurisdictional wetlands.
[4] Linear distance (feet) impacts are provided in parentheses.

Table 4.4.3.1-4
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 4 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 4		P-1045 – Alternative 4		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**0.07**	**0.07**	**0.03**	**0.03**	**0.10**	**0.10**
Wetland	<0.005	<0.005	-	-	01.19	01.19
Other Waters[3]	0.07 (174)	0.07 (174)	0.03 (233)	0.03 (233)	0.10	0.10
Temporary	**1.80**	**0.93**	**8.87**	**4.18**	**10.67**	**5.11**
Wetland	1.24	0.66	8.28	3.91	9.52	4.57
Other Waters[3]	0.56 (3,103)	0.27 (3,103)	0.59 (4,183)	0.27 (4,183)	1.15	0.54
Total[2]	**1.87**	**1.00**	**8.90**	**4.21**	**10.77**	**5.21**

[1] This table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.
[3] Linear distance (feet) impacts are provided in parentheses.

Table 4.4.3.1-5
Mitigation for Permanent and Temporary Direct Impacts to Waters of the U.S. – Alternative 4 (acres)

Jurisdictional Waters	Mitigation Ratio	Potential Impacts[1]	Potential Mitigation[2,3]
Permanent	**-**	**-**	**2.48**
Wetland	2:1	1.19	2.38
Other Waters	1:1	0.10	0.10
Temporary	**-**	**-**	**1.65**
Wetland	1:1	4.57	1.16
Other Waters	1:1	0.54	0.49
Total	**-**	**-**	**4.13**

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.
[2] All temporary impacts to non-Waters of the U.S. will be restored in kind, on site at a 1:1 ratio. Because of the temporary nature of the impacts associated with installation of the communication lines, the plan will focus on the restoration of a variety of native habitats *in situ* after construction has been completed. A habitat mitigation plan for all temporary impacts to Waters of the U.S. will be developed in compliance with the CWA 404 mitigation regulations. All temporary impacts to WUS will be restored in kind, on site at a 1:1 ratio. Combine this plan to permanent impacts HMP.
[3] In compliance with CWA Section 404 permit process, a habitat mitigation plan detailing the mitigation measures for permanent impacts to wetlands and nonwetland Waters of the U.S., including jurisdictional vernal pools, must be prepared before impacts occurring.

Table 4.4.3.1-6
Potential Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 4 (acres)[1]

Species	P-1044 – Alternative 4	P-1045 – Alternative 4	Total[2]
Thread-leaved Brodiaea	0.92	0.08	1.00
Permanent	0.92	0.08	1.00
Riverside Fairy Shrimp	-	19 basins	19 basins
Permanent	-	19 basins	19 basins
San Diego Fairy Shrimp	30 basins	65 basins	95 basins
Permanent	30 basins	65 basins	95 basins
Branchinecta spp.	3 basins	19 basins	22 basins
Permanent	3 basins	19 basins	22 basins
Southern California steelhead	0.28	-	0.28
Temporary	0.28	-	0.28
Open Water	0.28	-	0.28
Tidewater Goby	0.19	-	0.19
Temporary	0.19	-	0.19
Coastal and Valley Freshwater Marsh	0.13	-	0.13
Southern Riparian Woodland	0.06	-	0.06
Arroyo Toad (Aestivation/Dispersal)	25.93	7.39	33.32
Permanent	0.96	-	0.96
Coast Live Oak Woodland	0.09	-	0.09
Diegan Coastal Sage Scrub	0.64	-	0.64
Nonnative Grassland	0.02	-	0.02
Valley Needlegrass Grassland	0.20	-	0.20
Temporary	24.97	7.39	32.36
Coast Live Oak Woodland	0.85	-	0.85
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Diegan Coastal Sage Scrub	16.49	5.49	21.98
Disturbed Habitat	-	0.13	0.13
Mulefat Scrub	-	0.77	0.77
Nonnative Grassland	4.64	0.56	5.20
Southern Willow Scrub	-	0.45	0.45
Valley Needlegrass Grassland	2.98	-	2.98
Arroyo Toad (Breeding)	5.48	7.05	12.53
Permanent	0.41	-	0.41
Southern Riparian Woodland	0.29	-	0.29
Southern Willow Scrub	0.12	-	0.12
Temporary	5.07	7.05	12.12
Mulefat Scrub	0.59	<0.005	0.59
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	1.15	-	1.15

Species	P-1044 – Alternative 4	P-1045 – Alternative 4	Total[2]
Southern Willow Scrub	3.28	7.05	10.33
Light-Footed Clapper Rail	-	0.39	0.39
Temporary	-	0.39	0.39
Southern Coastal Salt Marsh	-	0.30	0.30
Southern Willow Scrub	-	0.10	0.10
Coastal California Gnatcatcher	75.76	135.09	210.85
Permanent	7.79	5.79	13.58
Diegan Coastal Sage Scrub	7.79	5.79	13.58
Temporary	67.96	129.30	197.26
Diegan Coastal Sage Scrub	67.96	129.30	197.26
Least Bell's Vireo	9.12	29.11	38.23
Permanent	1.32	0.04	1.36
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.12	0.03	0.15
Temporary	7.81	29.08	36.89
Coastal and Valley Freshwater Marsh	0.15	<0.005	0.15
Mulefat Scrub	0.66	5.22	5.88
Open Water	-	<0.005	<0.005
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	3.22	2.65	5.87
Southern Willow Scrub	3.72	21.21	24.93
Southwestern Willow Flycatcher	7.34	22.38	29.72
Permanent	0.22	0.04	0.26
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	0.10	<0.005	0.10
Southern Willow Scrub	0.12	0.03	0.15
Temporary	7.12	22.34	29.46
Coastal and Valley Freshwater Marsh	0.15	-	0.15
Mulefat Scrub	0.66	2.96	3.62
Southern Riparian Woodland	3.06	2.65	5.71
Southern Willow Scrub	3.25	16.73	19.98
Pacific Pocket Mouse (Occupied Habitat)	5.98	-	5.98
Temporary	5.98	-	5.98
Diegan Coastal Sage Scrub	5.98	-	5.98
Pacific Pocket Mouse (Microhabitat)[3]	2.64	7.96	10.60
Permanent	1.26	<0.005	1.26
Diegan Coastal Sage Scrub	1.26	-	1.26
Disturbed Habitat	-	<0.005	<0.005
Nonnative Grassland	-	-	0.01

Species	P-1044 – Alternative 4	P-1045 – Alternative 4	Total[2]
Temporary	1.38	7.96	9.34
Diegan Coastal Sage Scrub	1.33	6.41	7.74
Disturbed Habitat	-	0.86	0.86
Eucalyptus Woodland	-	0.01	0.01
Mulefat Scrub	0.05	0.05	0.10
Nonnative Grassland	-	0.63	0.63
Vernal Pool	-	<0.005	<0.005
Pacific Pocket Mouse (Suitable Habitat)[3]	8.22	26.04	34.26
Permanent	3.77	2.65	6.42
Diegan Coastal Sage Scrub	3.77	1.37	5.14
Disturbed Habitat	-	1.28	1.28
Nonnative Grassland	-	0.01	0.01
Temporary	4.45	23.39	27.84
Diegan Coastal Sage Scrub	4.35	18.13	22.48
Disturbed Habitat	0.06	2.67	2.73
Eucalyptus Woodland	-	0.05	0.05
Mulefat Scrub	0.02	0.02	0.04
Nonnative Grassland	-	0.61	0.61
Riparian Scrub	-	0.27	0.27
Southern Riparian Woodland	0.02	-	0.02
Southern Willow Scrub	-	1.64	1.64

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.

[2] Numbers may not sum exactly due to rounding. Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for both MILCONs are not provided.

[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.4.3.1-7
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 4 (acres)[1]

Species	P-1044 – Alternative 4		P-1045 – Alternative 4		Total Maximum Impacts	Total Anticipated Impacts
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Thread-leaved Brodiaea[2]	0.92	0.51	0.08	0.02	1.00	0.53
Riverside Fairy Shrimp[2]	-	-	19 basins	2 basins	19 basins	2 basins
San Diego Fairy Shrimp[2]	30 basins	14 basins	65 basins	10 basins	95 basins	24 basins
Branchinecta spp.[2]	3 basins	1 basin	19 basins	5 basins	22 basins	6 basins
Southern California steelhead	0.28	0.14	-	-	0.28	0.14
Tidewater Goby	0.19	0.09	-	-	0.19	0.09
Arroyo Toad (Aestivation/Dispersal)	25.93	13.23	7.39	3.72	33.32	16.95
Arroyo Toad (Breeding)	5.48	2.86	7.05	3.64	12.53	6.50
Light-footed Clapper Rail	-	-	0.39	0.24	0.39	0.24
Coastal California Gnatcatcher	75.76	51.44	135.09	72.24	210.85	123.68
Least Bell's Vireo	9.12	5.63	29.11	14.41	38.23	20.04
Southwestern Willow Flycatcher	7.34	4.19	22.38	11.07	29.72	15.26
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	2.87	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[3]	2.64	2.07	7.96	3.97	10.60	6.04
Pacific Pocket Mouse (Suitable Habitat)[3]	8.22	6.52	26.04	14.49	34.26	21.01

[1] Table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48%) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for both MILCONs are not provided.

[2] While impacts within the construction corridor are considered temporary and reversible for most resources, all direct impacts to these species and their habitats are considered permanent.

[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.4.3.1-8
Mitigation for Federally Listed Species – Alternative 4 (acres)[1]

Species	Mitigation Ratio	P-1044 – Alternative 4	Potential Mitigation	P-1045 – Alternative 4	Potential Mitigation	Total Potential Mitigation[7,8]
Plants						
Thread-leaved Brodiaea						
Permanent Impacts	2:1	0.51	1.02	0.02	0.04	1.06
Wildlife						
Riverside Fairy Shrimp						
Permanent Impacts	2:1[2]	-	-	2 basins	4 basins	4 basins
San Diego Fairy Shrimp						
Permanent Impacts	2:1[2]	14 basins	28 basins	10 basins	20 basins	48 basins
Southern California steelhead						
Temporary Impacts	1:1[3]	0.14	0.14	-	-	0.14
Tidewater Goby						
Temporary Impacts	1:1[3]	0.09	0.09	-	-	0.09
Arroyo Toad (Aestivation/ Dispersal)						
Permanent Impacts	0.5:1[4]	0.96	0.48	-	-	0.48
Temporary Impacts	1:1[3]	12.65	12.65	3.72	3.72	16.37
Arroyo Toad (Breeding)						
Permanent Impacts	2:1[4]	0.41	0.82	-	-	0.82
Temporary Impacts	1:1[4]	2.45	2.45	3.64	3.64	6.09
Light-footed Clapper Rail						
Temporary Impacts	1:1[3]	-	-	0.24	0.24	0.24
Coastal California Gnatcatcher						
Permanent Impacts	2:1	7.79	15.58	5.79	11.58	27.16
Temporary Impacts	1:1[3]	43.65	43.65	66.45	66.45	110.10
Least Bell's Vireo						
Permanent Impacts	2:1[4]	1.32	2.64	0.04	0.08	2.72
Temporary Impacts	1:1[4]	4.31	4.31	14.37	14.37	18.68
Southwestern Willow Flycatcher						
Permanent Impacts	2:1[4]	0.22	0.44	0.04	0.08	0.52
Temporary Impacts	1:1[4]	3.97	3.97	11.03	11.03	15.00
Pacific Pocket Mouse (Occupied Habitat)[5]						
Temporary Impacts	1:1[3,6]	2.87	2.87	-	-	2.87

Species	Mitigation Ratio	P-1044 – Alternative 4	Potential Mitigation	P-1045 – Alternative 4	Potential Mitigation	Total Potential Mitigation[7,8]
Pacific Pocket Mouse (Microhabitat)[5]						
Permanent Impacts	0:1[6]	1.26	0.0	-	-	0.0
Temporary Impacts	1:1[3,6]	0.81	0.81	3.97	3.97	4.78
Pacific Pocket Mouse (Suitable Habitat)[5]						
Permanent Impacts	0:1[6]	3.77	0.0	2.64	0.0	0.0
Temporary Impacts	1:1[3,6]	2.75	2.75	11.83	11.83	14.58

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.

[2] Impacts noted for *Branchinecta* spp. in the above impact table are not included in this mitigation summary. Findings from the 2011/2012 protocol surveys and USFWS consultation will determine whether additional mitigation for listed fairy shrimp species would be required.

[3] Areas temporarily impacted by construction activities would be restored in-place (1:1) to native vegetation following construction.

[4] Mitigation for impacts to arroyo toad (aestivation) would be fulfilled through restoration of riparian vegetation at a 0.5:1 ratio as noted above. Alternatively, MCBCP may restore upland habitat at a ratio of 2:1. Per the Riparian BO (USFWS 1995), mitigation for impacts to arroyo toad (breeding), least Bell's vireo, and southwestern willow flycatcher would be fulfilled through mitigation of anticipated project impacts to riparian habitat (Table 4.1.3.1-4) regardless of occupation by a sensitive species, as discussed in Table 4.1.3.1-2.

[5] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

[6] In addition to in-place restoration, MCBCP would provide additional compensation for areas of suitable, but unoccupied habitat for Pacific pocket mouse that are temporarily impacted by construction activities. As stated in the FBO, the MCBCP would contribute to the San Diego Zoological Society's effort to establish a captive Pacific pocket mouse population and reintroduce this species to locations within their former distribution. Alternatively, MCBCP may restore Pacific pocket mouse habitat outside the project footprint; however, if that alternative is pursued then consultation with USFWS would need to be re-initiated. No mitigation is required to compensate for the unavoidable permanent impacts to unoccupied, but suitable Pacific pocket mouse habitat. As noted in the FBO, the USFWS determined that such impacts are not anticipated to substantially affect the availability of habitat that is likely to be used by this species.

[7] Numbers may not sum exactly due to rounding.

[8] Where applicable, permanent impacts to listed species riparian habitat will be offset by restoring riparian habitat in the Lower Santa Margarita River. Permanent impacts to the coastal California gnatcatcher habitat (coastal sage scrub or thread-leaved brodiaea would be offset at a 2:1 ratio through restoration of habitat in the Lima Coastal Sage Scrub Restoration site within the Lima Training Area, and vernal pool mitigation should take place in the San Onofre State Park Lease Area Vernal Pool Mesa site, or other available sites as determined by ES Land Management Branch and USFWS.

4.4.3.2 P-1044 Alternative 4

Permanent and temporary direct and indirect impacts for P-1044 Alternative 4 would be similar to those discussed above for P-1044 Alternative 1. See Section 4.1.3.1 for a general discussion of these potential project effects to plant communities and other cover types, jurisdictional waters, habitats occupied by federally listed and other rare species, and migratory birds covered under the MBTA.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1044 Alternative 4 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.4.3.2-1, 4.4.3.2-2, and 4.4.3.2-3, respectively.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1044 Alternative 4 facilities would result in permanent direct impacts to riparian and upland native plant communities and other cover types (Table 4.4.3.2-1). Development within the project corridor, which includes the P-1044 TLS sites, would result in temporary direct impacts to plant communities and other cover types including vernal pools (Table 4.4.3.2-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, and vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under the CWA or occupied by federally listed species would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 4 could cause indirect impacts to plant communities and other cover types that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.4.3.2-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

<u>Impacts</u>

Direct Impacts

The project limits of the proposed action have been constrained to avoid and minimize permanent and temporary direct impacts to jurisdictional waters (including wetlands) that were identified via formal delineation. Development of the P-1044 Alternative 4 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of southern riparian woodland and nonvegetated channel (Table 4.4.3.2-4). Development of the TLS sites and project corridor would result in temporary direct impacts to jurisdictional waters and wetlands, primarily in the form of southern riparian woodland with lesser amounts of nonvegetated channel, coastal and valley freshwater marsh, sycamore-alder riparian woodland, mulefat scrub, and disturbed wetland, respectively (Table 4.4.3.2-5).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1044 Alternative 4 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.4.3.2-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be temporarily or permanently, indirectly affected by the project as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

Mitigation

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measure J1, which would compensate for impacts to jurisdictional waters, including wetlands, is discussed in Section 4.1.3.1.

Federally Listed Plants

<u>Impacts</u>

Potential effects to federally listed plant species and habitat associated with development of P-1044 Alternative 4 are depicted in Figure 4.4.3.2-1 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.4.3.2-6 and 4.4.3.2-7.

Direct Impacts

Approximately 0.12 acre of thread-leaved brodiaea occupied habitat is known to occur within one of the P-1044 Alternative 4 project facilities and would be directly affected by development (Table 4.4.3.2-6). This occupied habitat is located northeast of Reservoir 62310. Approximately 0.80 acre of thread-leaved brodiaea occupied habitat is known to occur within the P-1044 project corridor and may also be directly affected by the proposed action (Table 4.4.3.2-6). Direct effects to thread-leaved brodiaea may be minimized following implementation of avoidance, minimization, and compensation measures described in the mitigation section below. Any direct effect to this species is considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 1.28 acres of thread-leaved brodiaea occupied habitat are known to occur within the 100-foot buffer of P-1044 Alternative 4 (Table 4.4.3.2-7). Indirect effects to this species would be minimized by implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

Mitigation

Mitigation measures P1 and P2 would compensate for impacts to federally listed plant species as discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Wildlife

Impacts

Eight federally listed wildlife species, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be impacted by P-1044 Alternative 4. Locations of these species relevant to P-1044 are depicted in Figure 4.4.3.2-3. Occupied and/or suitable habitat for federally listed wildlife species near P-1044 Alternative 4 project components is depicted in Figures 4.1.3.2-4 through 4.1.3.2-12 (shown with Alternative 1 project components). A breakdown of occupied and/or suitable habitat according to vegetation type is provided in Table 4.4.3.1-6.

Construction of the brine outfall line for P-1044 Alternative 4 would not adversely affect the green sea turtle, loggerhead sea turtle, olive (Pacific) sea turtle, and leatherback sea turtle, as discussed in Section 4.4.14 of this EIS and in Appendix E.

Direct Impacts

P-1044 Facilities – Habitat occupied by arroyo toad, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher occurs within the proposed P-1044 facilities; thus, these species may be permanently, directly impacted. Suitable habitat for Pacific pocket mouse also occurs; impacts would not considered significant since habitat is not occupied. Habitat occupied by the other species that would be permanently, directly impacted is quantified in Table 4.4.3.2-8. Potential permanent direct impacts to wildlife species are depicted in Figure 4.4.3.2-3.

A thorough discussion of specific types of permanent direct impacts to these species is provided in Section 4.4.3.1.

P-1044 Corridor – Habitat occupied by and/or suitable for listed wildlife within the P-1044 corridor would be temporarily, directly impacted. Temporary direct impacts would occur to those four species discussed above, in addition to the San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse (occupied). Additionally, basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1044 corridor; these basins are currently being analyzed and may be determined to be occupied by San Diego or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. Pacific pocket mouse-occupied habitat occurs within the P-1044 corridor; however, all direct impacts to occupied Pacific pocket mouse habitat would be considered significant, regardless of whether impacts are temporary. Habitat occupied by and/or suitable for these species that would be temporarily, directly impacted is quantified in Table 4.4.3.2-9.

A thorough discussion of specific types of permanent and temporary, direct impacts to these species is provided in Section 4.4.3.1.

Indirect Impacts

Eight federally listed wildlife species may be indirectly impacted by construction of P-1044 Alternative 4. Habitat occupied by San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse occurs within the 400-foot buffer of the P-1044 facilities and corridor. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.4.3.2-10.

A thorough discussion of specific types of permanent and temporary, indirect impacts to these species is provided in Section 4.4.3.1.

Indirect impacts to nesting shorebirds such as California least tern and western snowy plover within the beach habitat coincident with the brine discharge pipeline area at the SONGS facility were assessed for P-1044. However, it was determined that suitable habitat for these bird species does not occur due to constant disturbance from ocean waves and the high tide associated with this area. Thus, no indirect impacts to tern or plover would occur from P-1044.

<u>Mitigation</u>

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1044 Alternative 4 is noted in Table 4.4.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.4.3.2-1
Permanent Direct Impacts to Plant Communities and Cover Types Associated with P-1044 Alternative 4 Facilities (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Maintenance Access	Northern AWT Site 4	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	Total[1]
Riparian and Wetlands	**0.12**	**0.19**	**-**	**-**	**-**	**0.07**	**0.11**	**-**	**1.10**	**1.58**
Mulefat Scrub	-	0.06	-	-	-	-	-	-	-	0.06
Southern Riparian Woodland	-	0.10	-	-	-	-	-	-	1.10	1.20
Southern Willow Scrub	0.12	0.02	-	-	-	0.07	0.11	-	-	0.31
Uplands	**0.58**	**2.13**	**5.12**	**-**	**-**	**1.48**	**1.22**	**-**	**0.18**	**10.70**
Coast Live Oak Woodland	-	0.15	-	-	-	-	-	-	-	0.15
Diegan Coastal Sage Scrub	0.58	1.08	5.12	-	-	1.01	0.80	-	0.18	8.77
Nonnative Grassland	-	0.29	-	-	-	-	-	-	-	0.29
Valley Needlegrass Grassland	-	0.60	-	-	-	0.47	0.42	-	-	1.49
Other Cover Types	**-**	**14.37**	**0.27**	**0.25**	**1.18**	**1.06**	**0.29**	**0.23**	**2.23**	**19.88**
Disturbed Habitat	-	0.03	-	-	-	0.37	-	-	-	0.39
Urban/Developed	-	14.34	0.27	0.25	1.18	0.69	0.29	0.23	2.23	19.49
Total[1]	**0.70**	**16.68**	**5.39**	**0.25**	**1.18**	**2.61**	**1.62**	**0.23**	**3.50**	**32.16**

[1] Numbers may not sum exactly due to rounding.

Table 4.4.3.2-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1044 Alternative 4 Corridor (acres)

Plant Communities and Other Cover Types	TLS Sites	Injection Wells	RWL Connection	Corridor[1]	
				Maximum Impacts (100%)	Anticipated Impacts (48%)
Riparian and Wetlands	**1.09**	**-**	**-**	**11.13**	**5.34**
Beach	-	-	-	0.89	0.43
Coastal and Valley Freshwater Marsh	-	-	-	0.15	0.07
Mulefat Scrub	0.07	-	-	2.90	1.39
Open Water	-	-	-	0.42	0.20
Riparian Scrub	-	-	-	0.05	0.03
Southern Riparian Woodland	0.99	-	-	2.23	1.07
Southern Willow Scrub	0.03	-	-	4.48	2.15
Vernal Pool	-	-	-	0.01	<0.005
Uplands	**16.84**	**0.45**	**5.37**	**90.94**	**43.65**
Coast Live Oak Woodland	-	-	-	3.34	1.60
Diegan Coastal Sage Scrub	15.56	0.45	5.37	60.60	29.09
Nonnative Grassland	1.06	-	-	14.09	6.76
Valley Needlegrass Grassland	0.23	-	-	12.91	6.20
Other Cover Types	**3.04**	**1.20**	**0.80**	**145.30**	**69.75**
Disturbed Habitat	1.13	-	-	29.75	14.28
Urban/Developed	1.91	1.20	0.80	115.55	55.47
Total[2]	**20.97**	**1.65**	**6.17**	**247.37**	**118.74**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.4.3.2-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1044 Alternative 4 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Above Ground Pipeline	Northern AWT Site 4	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	SONGS Outfall	TAPS 12/ Pump Station/ TLS Site	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
Riparian and Wetlands	**0.57**	**0.70**	**-**	**0.06**	**0.01**	**0.26**	**0.05**	**1.71**	**7.07**	**0.30**	**-**	**36.04**	**46.78**
Beach	-	-	-	-	-	-	0.05	-	-	-	-	2.67	2.72
Coastal and Valley Freshwater Marsh	-	-	-	-	-	-	-	-	-	-	-	0.43	0.43
Mulefat Scrub	-	0.70	-	-	-	-	-	0.16	2.99	0.30	-	11.30	15.45
Open Water	-	-	-	-	-	-	-	-	-	-	-	1.60	1.60
Riparian Scrub	-	-	-	-	-	-	-	-	-	-	-	0.14	0.14
Southern Riparian Woodland	-	-	-	0.06	-	-	-	1.55	3.08	-	-	10.50	15.19
Southern Willow Scrub	0.57	-	-	-	0.01	0.26	-	-	1.00	-	-	9.13	10.97
Vernal Pool	-	-	-	-	-	-	-	-	-	-	-	0.28	0.28
Uplands	**1.97**	**3.17**	**0.19**	**-**	**2.87**	**2.34**	**-**	**1.23**	**16.91**	**0.60**	**5.54**	**192.09**	**226.90**
Coast Live Oak Woodland	-	-	-	-	-	-	-	-	0.06	-	-	8.12	8.17
Diegan Coastal Sage Scrub	1.97	3.17	0.19	-	1.98	1.49	-	1.23	14.55	0.60	5.54	127.92	158.64
Nonnative Grassland	-	-	-	-	0.25	-	-	-	1.49	-	-	25.39	27.13
Valley Needlegrass Grassland	-	-	-	-	0.64	0.85	-	-	0.81	-	-	30.66	32.95
Other Cover Types	**0.14**	**-**	**0.82**	**1.79**	**0.33**	**-**	**1.13**	**0.83**	**5.55**	**2.47**	**0.18**	**176.81**	**190.03**
Disturbed Habitat	0.01	-	-	-	0.09	-	-	-	1.71	-	-	45.15	46.96
Urban/Developed	0.13	-	0.82	1.79	0.24	-	1.13	0.83	3.84	2.47	0.18	131.65	143.07
Total[1]	**2.68**	**3.86**	**1.01**	**1.85**	**3.20**	**2.60**	**1.18**	**3.77**	**29.53**	**3.37**	**5.71**	**404.94**	**463.71**

[1] Numbers may not sum exactly due to rounding.

Table 4.4.3.2-4
Permanent Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 4 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Wetland	**0.002**
Southern Riparian Woodland	0.002
Other Waters[1]	**0.07 (174)**
Nonvegetated Channel	0.07 (174)
Total[2]	**0.07**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.4.3.2-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1044 Alternative 4 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridor[1]	
		Maximum Impacts (100%)	Anticipated Impacts (48%)
Wetland	**0.12**	**1.11**	**0.53**
Coastal and Valley Freshwater Marsh	-	0.26	0.12
Mulefat Scrub	<0.005	0.007	0.03
Southern Riparian Woodland	0.12	0.62	0.30
Sycamore-Alder Riparian Woodland	-	0.16	0.08
Other Waters[2]	**-**	**0.56 (3,103)**	**0.27 (3,103)**
Disturbed Wetland	-	0.07 (762)	0.03 (762)
Nonvegetated Channel	-	0.50 (2,341)	0.24 (2,341)
Total[3]	**0.12**	**1.67**	**0.80**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.4.3.2-6
Permanent Direct Impacts to Federally Listed Plants
Associated with P-1044 Alternative 4 Facilities (acres)

Habitat Occupied by:	Facilities	Corridor
Thread-leaved Brodiaea	0.12 acre	0.80 acre
San Diego Button-celery	0 basins	0 basins
Spreading Navarretia	0 basins	0 basins

Table 4.4.3.2-7
Potential Indirect Impacts to Federally Listed Plants within 100 Feet of P-1044 Alternative 4 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	1.28 acre
San Diego Button-celery	0 basins
Spreading Navarretia	0 basins

Table 4.4.3.2-8
Permanent Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 4 Facilities (acres)

Listed Wildlife Species	Above Ground Pipeline	Maintenance Access	Northern AWT Site 4	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/ Pump Station/ TLS Site	Total[1]
Arroyo Toad (Aestivation/ Dispersal)	0.58	0.38	-	-	-	-	0.96
Arroyo Toad (Breeding)	0.12	0.09	-	-	-	0.20	0.41
Coastal California Gnatcatcher	0.21	0.49	5.12	1.01	0.80	0.18	7.79
Least Bell's Vireo	0.12	0.10	-	-	-	1.10	1.32
Southwestern Willow Flycatcher	0.12	0.10	-	-	-	-	0.22
Pacific Pocket Mouse (Microhabitat)[2]	-	-	1.26	-	-	-	1.26
Pacific Pocket Mouse (Suitable Habitat)[2]	-	-	3.77	-	-	-	3.77
Total[1]	**1.15**	**1.15**	**10.15**	**1.01**	**0.80**	**1.48**	**15.74**

[1] Numbers may not sum exactly due to rounding.
[2] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.4.3.2-9
Permanent[1] and Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1044 Alternative 4 Corridor (acres)

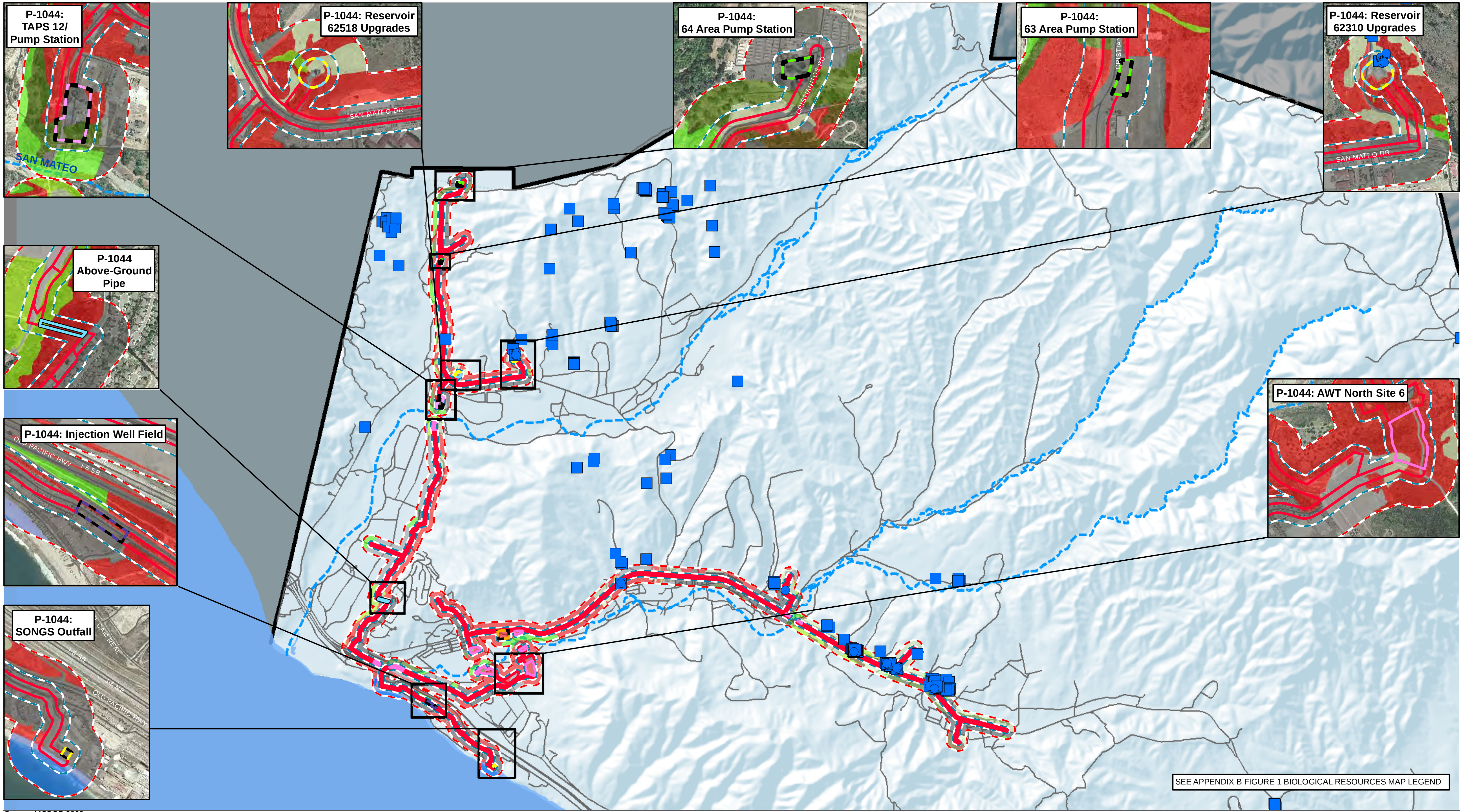
Listed Wildlife Species	TLS Sites	Injection Wells	RWL Connection	Corridor[2,3]	
				Maximum Impacts (100%)	Anticipated Impacts (48%)
San Diego Fairy Shrimp	-	-	-	30 basins[4]	14 basins
Branchinecta spp.	-	-	-	3 basins[5]	1 basin
Southern California steelhead[6]	-	-	-	0.28	0.14
Tidewater Goby	-	-	-	0.19	0.09
Arroyo Toad (Aestivation/Dispersal)	1.27	-	-	23.70	11.37
Arroyo Toad (Breeding)	0.03	-	-	5.04	2.42
Coastal California Gnatcatcher	15.56	0.28	5.37	46.76	22.44
Least Bell's Vireo	1.09	-	-	6.71	3.22
Southwestern Willow Flycatcher	1.06	-	-	6.06	2.91
Pacific Pocket Mouse (Occupied Habitat)[7]	-	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[7]	0.28	-	-	1.09	0.53
Pacific Pocket Mouse (Suitable Habitat)[7]	1.17	-	-	3.28	1.57

[1] Impacts to fairy shrimp species are considered irreversible and permanent; for all other species listed in this table, impacts are considered temporary.
[2] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[3] Numbers may not sum exactly due to rounding.
[4] San Diego fairy shrimp were found in basins with the following ID numbers: 799, 802, 803, 810, 811, 812, 814, 817, 827, 833, 837, 840, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 2797, 2798, 2799, 2800, and 2801.
[5] *Branchinecta* spp. fairy shrimp were found in basins with the following ID numbers: 801, 816, and 848.
[6] Temporary impacts to southern California steelhead occur in San Onofre Creek.
[7] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.4.3.2-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1044 Alternative 4 Facilities and Corridor (acres)

Listed Wildlife Species	Above Ground Pipeline	Northern AWT Site 4	Pump Station (63 Area)	Pump Station (64 Area)	Reservoir 62310 Upgrades	Reservoir 62518 Upgrades	TAPS 12/Pump Station/TLS Site	TLS Sites	Injection Wells	RWL Connection	Corridor	Total[1]
San Diego Fairy Shrimp	-	-	-	-	-	-	-	-	-	-	1 basin[2]	1 basin
Southern California steelhead[3]	-	0.25	-	-	-	-	1.64	7.22	-	-	8.24	17.35
Tidewater Goby	-	-	-	-	-	-	-	0.48	-	-	3.23	3.71
Arroyo Toad (Aestivation/Dispersal)	9.04	-	3.48	1.02	-	-	3.43	17.76	-	-	240.69	275.42
Arroyo Toad (Breeding)	4.06	-	0.94	5.25	-	-	12.11	6.65	-	-	71.65	100.66
Coastal California Gnatcatcher	4.13	22.82	8.37	-	13.67	12.41	5.76	100.34	7.04	13.32	435.82	623.68
Least Bell's Vireo	4.06	7.07	0.94	5.25	-	-	13.40	60.33	-	0.42	154.12	245.59
Southwestern Willow Flycatcher	4.06	7.07	0.94	5.25	-	-	-	39.87	-	0.42	100.56	158.17
Pacific Pocket Mouse (Occupied Habitat)[4]	-	4.12	-	-	-	-	-	0.49	-	-	52.35	56.96
Pacific Pocket Mouse (Microhabitat)[4]	-	2.24	-	-	-	-	-	2.49	-	-	2.08	6.81
Pacific Pocket Mouse (Suitable Habitat)[4]	-	19.16	-	-	-	-	-	7.27	-	-	41.24	67.67

[1] Numbers may not sum exactly due to rounding.
[2] San Diego fairy shrimp were found in one basin with the following ID number: 862.
[3] Indirect impacts to southern California steelhead occur in San Mateo and San Onofre Creeks.
[4] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.



Source: MCBCP 2009

5,000 0 5,000 Feet

Scale 1:60,000; 1 inch = 5,000 feet

Figure 4.4.3.2-1
P-1044 Alternative 4
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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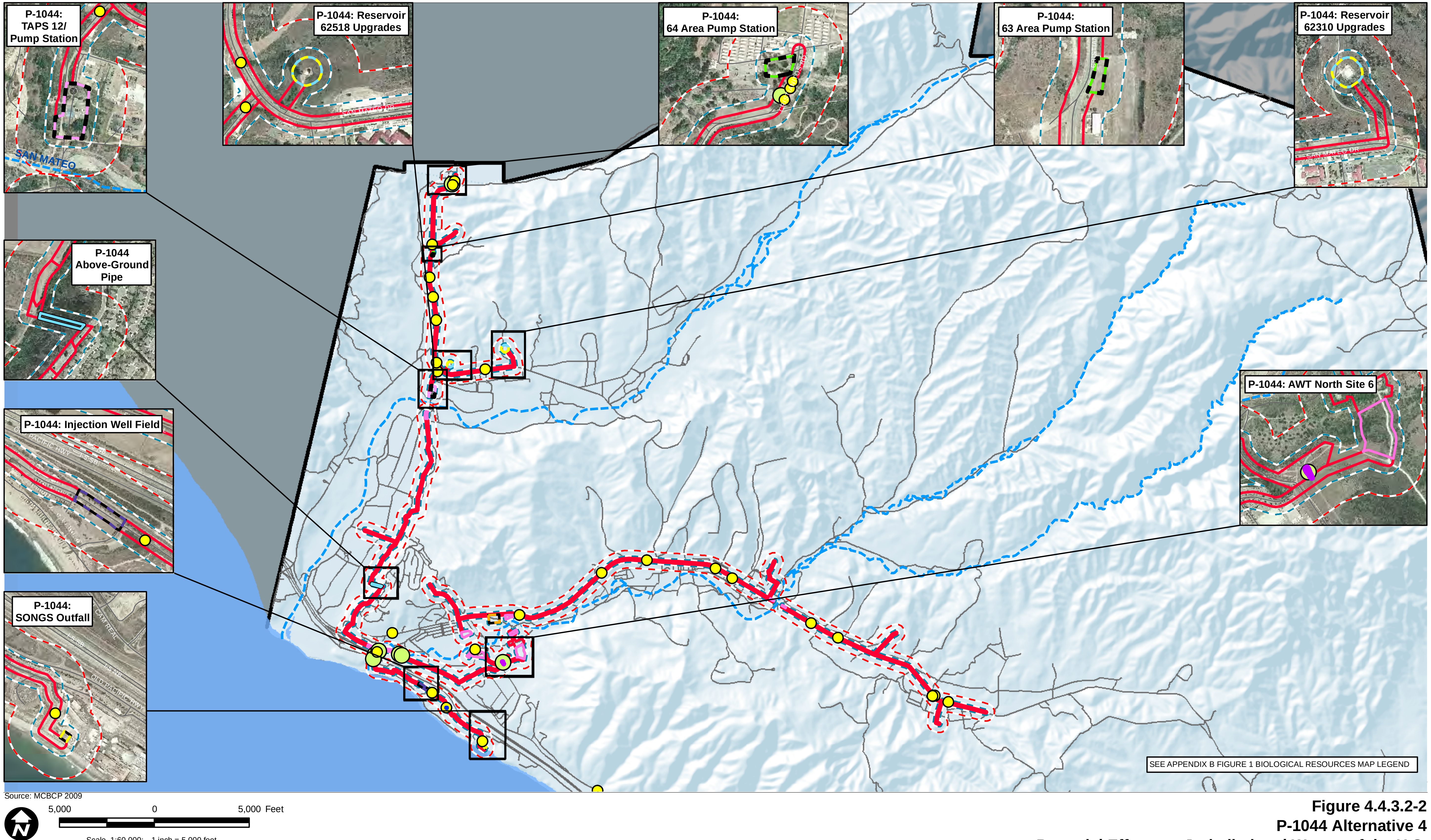

Source: MCBCP 2009

Figure 4.4.3.2-2
P-1044 Alternative 4
Potential Effects to Jurisdictional Waters of the U.S.

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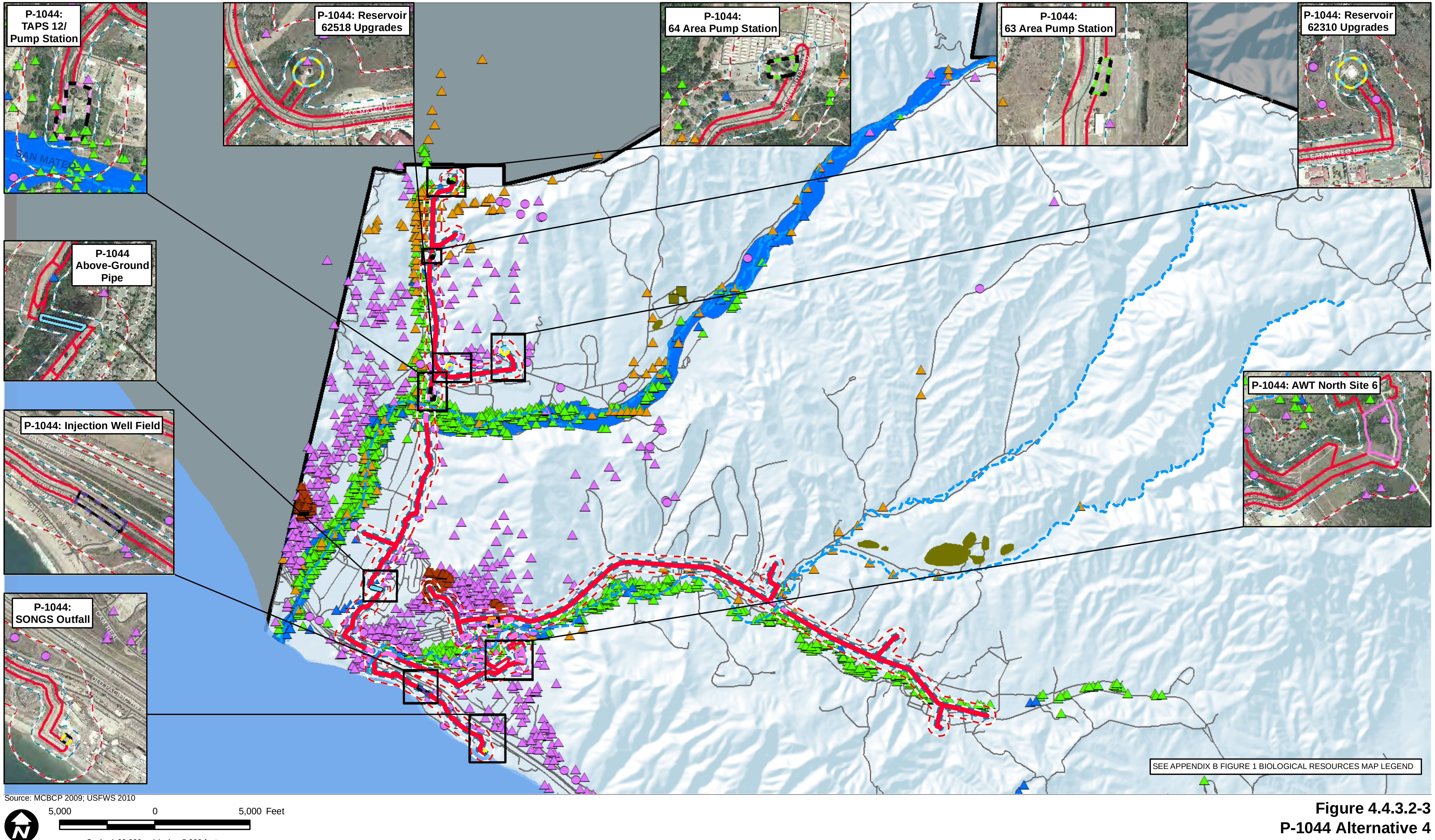

Figure 4.4.3.2-3
P-1044 Alternative 4
Potential Effects to Listed Wildlife Species

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4.4.3.3 P-1045 Alternative 4

Permanent and temporary direct and indirect impacts for P-1045 Alternative 4 would be similar to those discussed above for P-1044 Alternative 1. See Section 4.1.3.1 for a general discussion of these potential project effects to plant communities and other cover types, jurisdictional waters, habitats occupied by federally listed and other rare species, and migratory birds covered under the MBTA.

A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1.

The special conservation and construction measures listed in Section 2.5 would be incorporated as part of the proposed action and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources. These measures are referred to below where relevant.

The potential impacts from P-1045 Alternative 4 project development to (1) plant communities and other cover types and listed plant species, (2) jurisdictional waters, and (3) listed wildlife species are depicted in Figures 4.4.3.3-1, 4.4.3.3-2, and 4.4.3.3-3, respectively.

Plant Communities

<u>Impacts</u>

Direct Impacts

Development of the P-1045 Alternative 4 facilities would result in permanent direct impacts to riparian and upland native plant communities and other cover types (Table 4.4.3.3-1). Development within the project corridor would result in temporary direct impacts to predominately coastal sage scrub, southern willow scrub, and developed land with smaller amounts of numerous other plant communities and cover types (Table 4.4.3.3-2).

The permanent and temporary impacts to plant communities or cover types (i.e., habitat) that coincide with regulated waters (e.g., portions of riparian wetlands, nonvegetated channels, or vernal pools regulated under Section 404 of the CWA) or that are occupied by federally listed species would be considered significant. Impacts to habitat that is not regulated under CWA or occupied by federally listed species would not be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 Alternative 4 could cause indirect impacts to plant communities and other cover types that neighbor the proposed action area. Potential indirect impacts are evaluated for all plant communities and other cover types that occur within 100 feet of the proposed action area as summarized in Table 4.4.3.3-3.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent native habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust. Permanent indirect impacts to these communities may also include increased exotic species invasion into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

<u>Mitigation</u>

Mitigation would only be required for direct and indirect impacts to vegetation community areas that are occupied by federally listed species or determined to be under USACE jurisdiction. Mitigation measures that would compensate for impacts to such vegetation communities were discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Waters of the U.S.

<u>Impacts</u>

Direct Impacts

Development of the P-1045 Alternative 4 facilities would result in permanent direct impacts to jurisdictional waters and wetlands in the form of nonvegetated channel (Table 4.4.3.3-4). Development of the project corridor would result in temporary direct impacts to jurisdictional waters and wetlands, primarily southern willow scrub with lesser amounts of mulefat scrub, southern coastal salt marsh, nonvegetated channel, disturbed wetland, freshwater seep, coastal and valley freshwater marsh, and freshwater, respectively (Table 4.4.3.3-5). Construction along the corridor also has the potential to impact vernal pools that coincide with the project area, and those individual pools may be considered jurisdictional by USACE (determination is pending final reviews by ES and USACE).

The permanent and temporary impacts (including recurring temporary impacts from overlapping projects) to jurisdictional waters and wetlands would be considered significant. Incorporation of proposed mitigation measures would minimize potential impacts to below a level of significance. Project design features; compliance with the INRMP (USMC 2007a); guidance provided in the Riparian BO (USFWS 1995), the State of California under the Nonpoint Source Pollution Control Plan, and Phase II Municipal Storm Water Permit; and implementation of BMPs, including Basewide efforts to control invasive species, would minimize all potential impacts to below a level of significance.

Indirect Impacts

Development of P-1045 Alternative 4 could cause indirect impacts to jurisdictional waters and wetlands that neighbor the proposed action area. Because wetland delineations were not conducted outside the proposed action area, potential indirect impacts to jurisdictional waters and wetlands are only evaluated qualitatively. Based on the project-specific vegetation mapping that was conducted within buffer zones surrounding the proposed action area, riparian and wetland vegetation communities occur within 100 feet of the proposed action area (see Table 4.4.3.3-3). Although the jurisdictional status of these riparian and wetland areas has not been determined, these potential jurisdictional waters, including wetlands, could be temporarily or permanently, indirectly affected by the project as described below.

Temporary indirect impacts related to construction activities may include unauthorized incursion into adjacent aquatic habitats by construction workers and equipment, construction-related erosion, increased wildfire potential, and construction dust.

Permanent indirect impacts to these communities may also include increased siltation and runoff into areas exposed by construction activities. However, project design features and the implementation of BMPs as listed in Section 2.5, including Basewide efforts to control invasive species, would minimize these potential impacts to below a level of significance.

Mitigation

Temporary and permanent impacts to jurisdictional waters, including riparian habitats and wetlands, would require permits from USACE and RWQCB under Sections 404 and 401, respectively, of the CWA.

One component of obtaining issuance of permits is mitigation for temporary and permanent impacts to jurisdictional waters. Mitigation could occur in the form of approved mitigation bank credits, an approved in-lieu fee program, and/or wetland creation-restoration (that results in a net increase in wetland acreage), or creation-restoration combined with enhancement; however, the mitigation could not result in a net loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation-restoration ratio would be applied toward any impacts to jurisdictional waters.

Mitigation measures that would compensate for impacts to jurisdictional waters, including wetlands, are discussed in Section 4.1.3.1 (Table 4.1.3.1-2).

Federally Listed Plants

<u>Impacts</u>

Potential effects to federally listed plant species and habitat associated with development of P-1045 Alternative 4 are depicted in Figure 4.4.3.3-1 (see legend for Chapter 4 figures in Appendix B) and quantified in Tables 4.4.3.3-6 and 4.4.3.2-7.

Direct Impacts

Approximately 0.08 acre of thread-leaved brodiaea occupied habitat and one vernal pool basin occupied by spreading navarretia are known to occur within the P-1045 Alternative 4 project corridor and would be directly affected by development (Table 4.4.3.3-6). Direct effects to thread-leaved brodiaea and spreading navarretia may be minimized following implementation of avoidance, minimization, and compensation measures described in the mitigation section below. Any direct effect to these species are considered significant. No other federally listed plant species are known to occur within the proposed action area.

Indirect Impacts

Approximately 0.40 acre of thread-leaved brodiaea occupied habitat, 11 vernal pool basins occupied by San Diego button-celery, and five vernal pool basins occupied by spreading navarretia are known to occur within the 100-foot buffer of the proposed action area (Table 4.4.3.3-7). Indirect effects to these species would be minimized by implementation of avoidance, minimization, and compensation measures described in Section 2.5.2.

<u>Mitigation</u>

Mitigation measures that would compensate for direct and indirect impacts to federally listed plant species are discussed in Section 4.1.3.1.

Federally Listed Wildlife

Impacts

Ten federally listed wildlife species, Riverside fairy shrimp, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse, have the potential to be impacted by P-1045 Alternative 4. Locations of these species relevant to P-1045 are depicted in Figure 4.4.3.3-3. Occupied and/or suitable habitat for federally listed wildlife species near P-1045 Alternative 4 project components is depicted in Figures 4.1.3.3-4 through 4.1.3.3-11 (shown with Alternative 1 project components). A breakdown of occupied and/or suitable habitat according to vegetation type is provided in Table 4.4.3.1-6.

Direct Impacts

P-1045 Facilities – Five listed wildlife species, the Riverside fairy shrimp, San Diego fairy shrimp, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher, have the potential to be directly impacted by the proposed construction of facilities for P-1045. Additionally, basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1045 facilities; these basins are currently being analyzed and may be determined to be San Diego or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. It is assumed all habitat occupied by these species within P-1045 facilities would be permanently, directly affected. Permanent direct impacts include permanent loss of habitat and individuals as a result of project construction. Permanent direct impacts are summarized in Table 4.4.3.3-8. Potential permanent direct impacts to wildlife species are depicted in Figure 4.4.3.3-3.

A thorough discussion of specific types of permanent indirect impacts to these species is provided in Section 4.4.3.1.

P-1045 Corridor – Habitat occupied by and/or suitable for listed wildlife within the P-1045 corridor would be temporarily, directly impacted. Direct impacts would occur to eight federally listed wildlife species: Riverside fairy shrimp, San Diego fairy shrimp, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Additionally, basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1045 corridor; these basins are currently being analyzed and may be determined to be San Diego or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. Habitat occupied by and/or suitable for these species that would be temporarily, directly impacted is quantified in Table 4.4.3.3-9. Pacific pocket mouse microhabitat and suitable habitat also occur within the P-1045 corridor; however, impacts to habitat would not be considered significant since it is not occupied.

A thorough discussion of specific types of permanent and temporary, direct impacts to these species is provided in Section 4.4.3.1.

Indirect Impacts

Ten federally listed wildlife species may be indirectly impacted by construction of P-1045 Alternative 4. Habitat occupied by the Riverside fairy shrimp, San Diego fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse occurs within the 400-foot buffer of the P-1045 facilities and corridor. Additionally, basins occupied by unidentifiable *Branchinecta* spp. occur within the P-1045 buffer; these basins are currently being analyzed and upon completion may be determined to be occupied by San Diego fairy shrimp or Lindahl's fairy shrimp. Impacts to Lindahl's fairy shrimp would not be considered significant since this species does not have a sensitive status. Potential indirect impacts to these species are evaluated for occupied habitat within the 400-foot buffer of the project area as summarized in Table 4.4.3.3-10.

A thorough discussion of specific types of permanent and temporary, indirect impacts to these species is provided in Section 4.4.3.1.

<u>Mitigation</u>

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of P-1045 Alternative 4 is noted in Table 4.4.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Table 4.4.3.3-1
Permanent Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 4 Facilities (acres)

Plant Communities and Other Cover Types	Pump Station at Future AWT South	Maintenance Access	New Reservoir	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	Total[1]
Riparian and Wetlands	**-**	**0.05**	**-**	**-**	**-**	**0.05**
Coastal and Valley Freshwater Marsh	-	<0.005	-	-	-	<0.005
Mulefat Scrub	-	0.01	-	-	-	0.01
Southern Riparian Woodland	-	<0.005	-	-	-	<0.005
Southern Willow Scrub	-	0.03	-	-	-	0.03
Uplands	**-**	**0.95**	**2.15**	**<0.005**	**4.90**	**8.10**
Diegan Coastal Sage Scrub	-	0.52	2.15	<0.005	4.90	7.57
Eucalyptus Woodland	-	0.01	-	-	-	0.01
Nonnative Grassland	-	0.37	-	-	-	0.37
Valley Needlegrass Grassland	-	0.05	-	-	-	0.14
Other Cover Types	**0.91**	**11.02**	**1.28**	**0.52**	**1.99**	**15.71**
Disturbed Habitat	-	0.02	1.27	-	-	1.30
Urban/Developed	0.91	11.00	<0.005	0.52	1.99	14.42
Total[1]	**0.91**	**12.02**	**3.43**	**0.52**	**6.90**	**23.77**

[1] Numbers may not sum exactly due to rounding.

Table 4.4.3.3-2
Temporary Direct Impacts to Plant Communities and Cover Types Associated with P-1045 Alternative 4 Corridor (acres)

Plant Communities and Other Cover Types	Laydown Area	TLS Sites	Corridors[1] (outside 1.75-mile section)		Corridors[1] (within 1.75-mile section)	
			Maximum Impacts (100%)	Anticipated Impacts (100%)	Maximum Impacts (100%)	Anticipated Impacts (100%)
Riparian and Wetlands	**-**	**0.85**	**35.85**	**17.21**	**0.75**	**0.07**
Coastal and Valley Freshwater Marsh	-	-	0.07	0.03	-	-
Disturbed Wetland	-	-	<0.005	<0.005	-	-
Freshwater Seep	-	-	0.11	0.05	-	-
Mulefat Scrub	-	0.14	7.09	3.40	0.18	0.02
Nonvegetated Channel	-	-	0.01	0.01	-	-
Open Water	-	-	0.08	0.04	-	-
Riparian Scrub	-	-	0.40	0.19	-	-
Southern Coastal Salt Marsh	-	0.04	2.37	1.14	-	-
Southern Riparian Woodland	-	-	3.04	1.46	-	-
Southern Willow Scrub	-	0.66	22.57	10.83	0.31	0.03
Vernal Pool	-	-	0.11	0.05	0.26	0.03
Uplands	**-**	**11.91**	**193.95**	**93.10**	**14.17**	**1.42**
Diegan Coastal Sage Scrub	-	8.43	155.65	74.71	0.07	0.01
Eucalyptus Woodland	-	-	0.12	0.06	-	-
Nonnative Grassland	-	2.96	33.07	15.87	4.49	0.45
Valley Needlegrass Grassland	-	0.52	5.11	2.45	9.61	0.96
Other Cover Types	**7.42**	**7.83**	**208.34**	**100.00**	**11.87**	**1.19**
Disturbed Habitat	-	0.13	34.45	16.54	-	-
Urban/Developed	7.42	7.71	173.88	83.46	11.87	1.19
Total[2]	7.42	20.59	438.14	210.31	26.79	2.68

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[2] Numbers may not sum exactly due to rounding.

Table 4.4.3.3-3
Potential Indirect Impacts to Plant Communities and Cover Types within 100 Feet of P-1045 Alternative 4 Facilities and Corridor (acres)

Plant Communities and Other Cover Types	Pump Station at Future AWT South	Laydown Area	New Reservoir	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	TLS Sites	Corridor	Total[1]
Riparian and Wetlands	**-**	**-**	**-**	**-**	**-**	**9.13**	**105.64**	**114.76**
Alkali Playa	-	-	-	-	-	-	0.06	0.06
Coastal and Valley Freshwater Marsh	-	-	-	-	-	-	1.22	1.22
Disturbed Wetland	-	-	-	-	-	0.04	0.16	0.20
Freshwater Seep	-	-	-	-	-	-	0.20	0.20
Mulefat Scrub	-	-	-	-	-	2.83	17.83	20.66
Nonvegetated Channel	-	-	-	-	-	-	0.12	0.12
Open Water	-	-	-	-	-	0.36	1.93	2.30
Riparian Scrub	-	-	-	-	-	-	1.48	1.48
Soft-Bottom Channel	-	-	-	-	-	-	0.05	0.05
Southern Coastal Salt Marsh	-	-	-	-	-	0.83	7.17	8.00
Southern Riparian Woodland	-	-	-	-	-	0.31	8.58	8.88
Southern Willow Scrub	-	-	-	-	-	4.71	65.24	69.95
Vernal Pool	-	-	-	-	-	0.04	1.61	1.66
Uplands	**0.41**	**-**	**1.77**	**0.99**	**4.11**	**18.81**	**447.96**	**474.05**
Diegan Coastal Sage Scrub	0.41	-	1.77	0.99	4.11	11.07	312.81	331.16
Eucalyptus Woodland	-	-	-	-	-	-	1.65	1.65
Nonnative Grassland	-	-	-	-	-	5.92	92.16	98.09
Valley Needlegrass Grassland	-	-	-	-	-	1.81	41.34	43.15
Other Cover Types	**1.55**	**3.92**	**0.08**	**0.74**	**0.51**	**8.99**	**181.09**	**196.90**
Disturbed Habitat	-	-	0.02	-	-	0.51	52.28	52.81
Open Water	-	-	-	-	-	-	0.47	0.47
Urban/Developed	1.55	3.92	0.06	0.74	0.51	8.48	128.34	143.61
Total[1]	**1.96**	**3.92**	**1.85**	**1.73**	**4.63**	**36.93**	**734.69**	**785.71**

[1] Numbers may not sum exactly due to rounding.

Table 4.4.3.3-4
Permanent Direct Impacts to Waters of the U.S.
Associated with P-1045 Alternative 4 Facilities (acres)

Jurisdictional Waters	Maintenance Access
Other Waters[1]	**0.03 (233)**
Nonvegetated Channel	0.03 (233)
Total[2]	**0.03**

[1] Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.

Table 4.4.3.3-5
Temporary Direct Impacts to Waters of the U.S.
Associated with P-1045 Alternative 4 Corridor (acres)

Jurisdictional Waters	TLS Sites	Corridors[1] (outside 1.75-mile section)		Corridors[1] (within 1.75-mile section)	
		Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Wetland	**0.14**	**7.77**	**3.73**	**0.37**	**0.04**
Coastal and Valley Freshwater Marsh	-	0.03	0.01	-	-
Freshwater Seep	<0.005	1.29	0.62	-	-
Mulefat Scrub	-	0.04	0.02	0.03	<0.005
Southern Coastal Salt Marsh	0.14	2.06	0.99	0.06	0.01
Southern Willow Scrub	<0.005	4.19	2.01	-	-
Vernal Pool	-	0.15	0.07	0.28	0.03
Other Waters[2]	**-**	**0.57 (4,183)**	**0.27**	**0.03**	**<0.005**
Alkali Playa	-	0.05	0.02	-	-
Disturbed Wetland	-	<0.005 (450)	<0.005	-	-
Fresh Water	-	0.01	<0.005	-	-
Nonvegetated Channel	-	0.50 (3,733)	0.24	0.03	<0.005
Total[3]	**0.14**	**8.33**	**4.00**	**0.40**	**0.04**

[1] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet.
[2] Linear distance (feet) impacts are provided in parentheses.
[3] Numbers may not sum exactly due to rounding.

Table 4.4.3.3-6
Permanent Direct Impacts to Federally Listed Plants Associated with P-1045 Alternative 4

Habitat Occupied by:	Facilities	Corridor
Thread-leaved Brodiaea	0 acres	0.08 acre
San Diego Button-celery	0 basins	0 basins
Spreading Navarretia	0 basins	1 basins

Table 4.4.3.3-7
Potential Indirect Impacts to Federally Listed Plants within 100 Feet of P-1045 Alternative 4 Facilities and Corridor (acres)

Habitat Occupied by:	100-foot Buffer Areas
Thread-leaved Brodiaea	0.40 acre
San Diego Button-celery	11 basins
Spreading Navarretia	5 basins

Table 4.4.3.3-8
Permanent Direct Impacts to Federally Listed Wildlife Associated with P-1045 Alternative 4 Facilities (acres)

Listed Wildlife Species	Maintenance Access	New Reservoir	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	Total Facility Permanent Impacts[1]
Coastal California Gnatcatcher	0.27	2.15	<0.005	3.36	5.79
Least Bell's Vireo	0.04	-	-	-	0.04
Southwestern Willow Flycatcher	0.04	-	-	-	0.04
Pacific Pocket Mouse (Microhabitat)[2]	<0.005	-	-	-	<0.005
Pacific Pocket Mouse (Suitable Habitat)[2]	0.01	2.64	-	-	2.65
Total[1]	**0.36**	**4.79**	**<0.005**	**3.36**	**8.52**

[1] Numbers may not sum exactly due to rounding.
[2] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.4.3.3-9
Permanent[1] and Temporary Direct Impacts to Federally Listed Wildlife Associated with P-1045 Alternative 4 Corridor (acres)

Listed Wildlife Species	TLS Sites	Corridors[2,3] (outside 1.75-mile section)		Corridors[2,3] (within 1.75-mile section)	
		Maximum Impacts (100%)	Anticipated Impacts (48%)	Maximum Impacts (100%)	Anticipated Impacts (48%)
Riverside Fairy Shrimp	-	-	-	19 basins	2 basins
San Diego Fairy Shrimp	1 basin	8 basins	4 basins	57 basins	6 basins
Branchinecta spp.	-	7 basins	3 basins	12 basins	1 basin
Arroyo Toad (Aestivation/Dispersal)	0.34	7.05	3.39	-	-
Arroyo Toad (Breeding)	0.49	6.57	3.15	-	-
Light-Footed Clapper Rail	0.10	0.30	0.14	-	-
Coastal California Gnatcatcher	8.43	120.87	58.02	-	-
Least Bell's Vireo	0.80	28.09	13.48	0.19	0.02
Southwestern Willow Flycatcher	0.59	21.75	10.44	-	-
Pacific Pocket Mouse (Microhabitat)[4]	0.28	7.67	3.68	-	-
Pacific Pocket Mouse (Suitable Habitat)[4]	1.17	22.22	10.66	-	-

[1] Impacts to fairy shrimp species are considered irreversible and permanent; for all other species listed in this table, impacts are considered temporary.
[2] For temporary corridor impacts, worst-case (100%) vs. anticipated (48%) impacts are provided for comparison.
[3] Numbers may not sum exactly due to rounding.
[4] Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.4.3.3-10
Potential Indirect Impacts to Federally Listed Wildlife within 400 Feet of P-1045 Alternative 4 Facilities and Corridor (acres)

Listed Wildlife Species	Pump Station at Future AWT South	New Reservoir	Pulgas Gate Area Pump Station	Reservoir 24174 Upgrades	TLS Sites	Corridor	Total[1]
Riverside Fairy Shrimp	-	-	-	-	-	5 basins[2]	5 basins
San Diego Fairy Shrimp	-	1 basin	-	-	-	97 basins[3]	98 basins
Branchinecta spp.	-	-	-	-	2 basins[2]	9 basins[4]	11 basins
Southern California steelhead[5]	-	-	-	-	4.45	4.25	8.70
Tidewater Goby	-	-	-	-	4.46	2.03	6.48
Arroyo Toad (Aestivation/Dispersal)	-	-	-	-	10.20	88.16	98.36
Arroyo Toad (Breeding)	-	-	-	-	19.79	134.48	154.28
Light-Footed Clapper Rail	-	-	-	-	11.04	15.03	26.08
Coastal California Gnatcatcher	0.75	14.03	10.57	17.96	86.17	1123.75	1253.23
Least Bell's Vireo	-	-	-	-	71.41	447.59	519.01
Southwestern Willow Flycatcher	-	-	-	-	65.84	372.55	438.39
Pacific Pocket Mouse (Occupied Habitat)[6]	-	-	-	-	1.87	5.45	7.32
Pacific Pocket Mouse (Microhabitat)[6]	-	0.03	-	-	3.29	16.55	19.87
Pacific Pocket Mouse (Suitable Habitat)[6]	-	2.33	-	-	11.03	179.42	192.78

[1] Numbers may not sum exactly due to rounding.
[2] Riverside fairy shrimp were found in basins with the following ID numbers: 2286, 2289, and 2516.
[3] San Diego fairy shrimp were found in basins with the following ID numbers: 71, 79, 89, 97, 106, 197, 198, 438, 676, 706, 713, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1112, 1120, 1121, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1132, 1365, 1539, 1566, 1934, 1936, 1938, 2044, 2483, 2487, 2490, 2495, 2514, 2516, 2596, 2598, 2602, 2606, 2617, 2619, 2621, 2622, 2623, 2624, 2625, 2626, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2638, 2640, 2641, 2645, 2649, 2652, 2658, 2661, 2666, 2667, 2668, 2670, 2673, 2674, 2677, 2681, 2919, and 2920.
[4] *Branchinecta* spp. fairy shrimp were found in basins with the following ID numbers: 2, 104, 108, 444, 519, 523, 1602, 1632, 2827, 2832, 2898, and 2904.
[5] Indirect impacts to southern California steelhead occur in Santa Margarita and San Onofre Creeks.
[6] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

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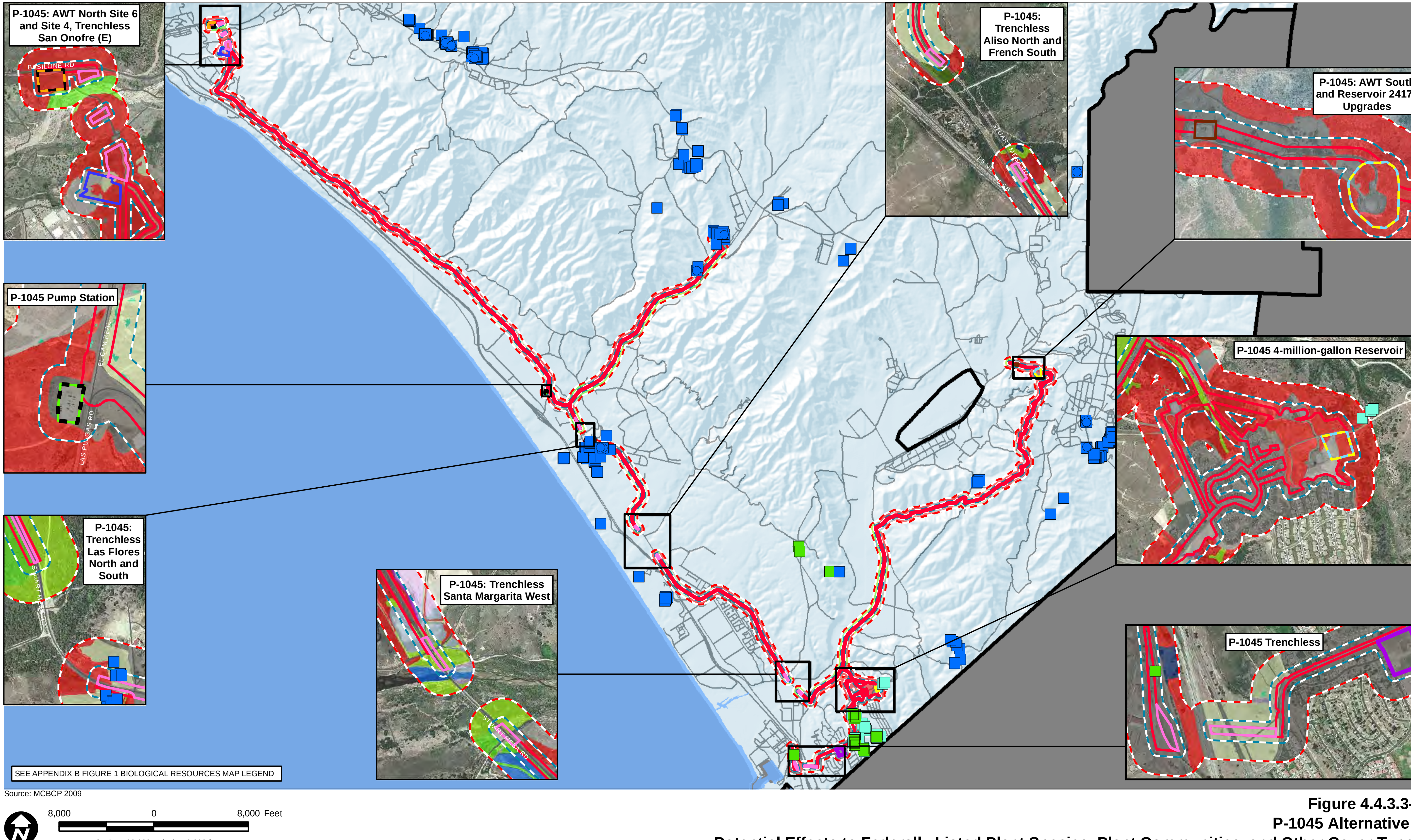

Figure 4.4.3.3-1
P-1045 Alternative 4
Potential Effects to Federally Listed Plant Species, Plant Communities, and Other Cover Types

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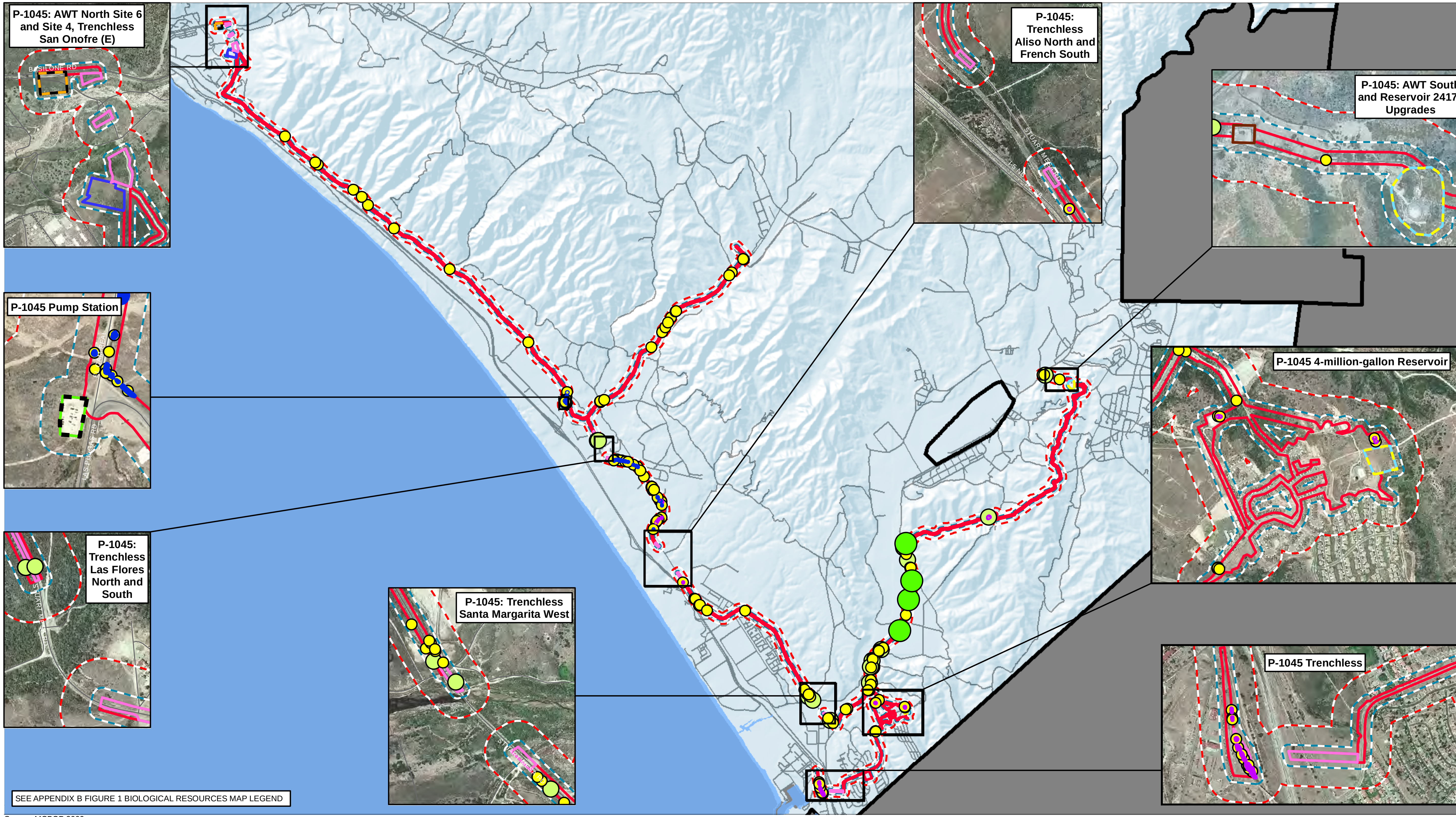

Source: MCBCP 2009

8,000 0 8,000 Feet

Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.4.3.3-2
P-1045 Alternative 4
Potential Effects to Jurisdictional Waters of the U.S.

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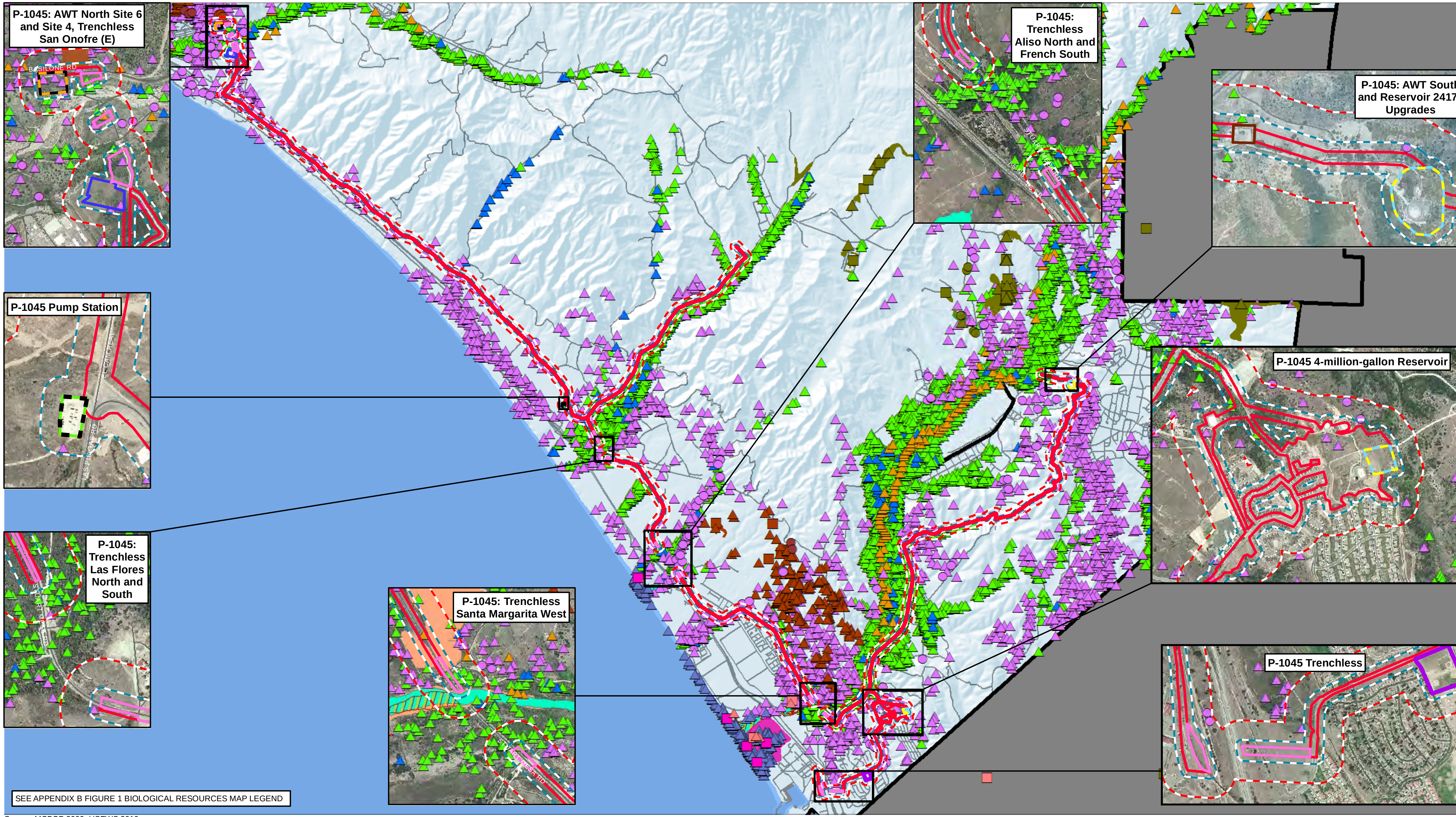

Source: MCBCP 2009; USFWS 2010

8,000 0 8,000 Feet

Scale 1:96,000; 1 inch = 8,000 feet

Figure 4.4.3.3-3
P-1045 Alternative 4
Potential Effects to Listed Wildlife Species

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4.4.4 Cultural Resources

4.4.4.1 Both MILCONs (Alternative 4)

Cultural resources within Alternative 4 are summarized in Table 4.4.4-1. A total of 35 resources are identified, of which 19 are ineligible for the NRHP and 16 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites resulting from Alternative 4 would not be significant.

Table 4.4.4-1
Cultural Resources within Alternative 4 APE

NRHP Status	P-1044	P-1045	Total
Eligible/Listed	5	11	16
Ineligible	7	12	19
Total	**12**	**23**	**35**

Impacts

Because most of the historic properties within the APE of Alternative 4 consist of prehistoric archaeological deposits, most impacts would result from physical destruction or alteration of historic properties that are eligible under NRHP criterion D. Properties that are eligible under NRHP criteria A, B, or C could also be subject to visual or audible impacts if activities related to Alternative 4 diminish the integrity of their settings.

Mitigation

Mitigation of impacts to cultural properties resulting from Alternative 4 would be as described in Section 4.1.4.1.

4.4.4.2 P-1044 Alternative 4

Impacts

Impacts to cultural resources from P-1044 Alternative 4 would be the same as for P-1044 Alternative 1 (Section 4.1.4.2), Alternative 2 (Section 4.2.4.2), and Alternative 3 (Section 4.3.4.2).

Mitigation

Mitigation of impacts to cultural properties resulting from P-1044 Alternative 4 would be as described in Section 4.1.4.1.

4.4.4.3 P-1045 Alternative 4

Impacts

P-1045 Alternative 4 would result in impacts to 10 properties that are either listed in or have been determined eligible for the NRHP. These include NRHP-listed CA-SDI-812/H, seven additional prehistoric resources (CA-SDI-4538, -10,731, -14,170, -14,749, -14,750, -14,751, and -14,752), and the historic sites CA-SDI-14,005H Segment A and CA-SDI-14,006H Segments A/B and C.

Mitigation

Mitigation of impacts to cultural properties resulting from P-1045 Alternative 4 would be as described in Section 4.1.4.1.

4.4.5 Land Use

4.4.5.1 Both MILCONs (Alternative 4)

Impacts

The discussion in Section 4.2.5.1 of impacts of Alternative 2 applies equally to Alternative 4. No significant land use impacts would result from the implementation of Alternative 4.

Mitigation

No mitigation measures are proposed.

4.4.5.2 P-1044 Alternative 4

Impacts

P-1044 Alternative 4 would combine the Northern AWT location of Alternative 3 with the conveyance pipeline routes of Alternative 2. The discussion of the Northern AWT facility in relation to land use in Section 4.3.1.2 would also apply to P-1044 Alternative 4. With the exception of the short aboveground pipeline segment from Chaisson Road to the Sierra 1 Training Area percolation ponds, all conveyance lines would be underground. Conveyance line construction and operation would be compatible with other land uses in the area, as discussed in Section 4.2.1.2. No significant land use impacts would result from implementation of P-1044 Alternative 4.

Mitigation

No mitigation measures are proposed.

4.4.5.3 P-1045 Alternative 4

Impacts

P-1045 Alternative 4 would use the same route as Alternatives 1 and 3 from the Northern AWT to the reservoirs north of the Wire Mountain 2 Housing Area and the Santa Margarita Housing Area. Unlike Alternative 3, however, it would connect with reservoirs on a ridge above Haybarn Canyon by a pipeline in Vandegrift Boulevard to about 0.75 mile south of the 22 Area (Chappo). From there, it would run northeast to the ridge between the 22 Area (Chappo) and 24 Area and the 18 Area (Golf Course) and the 13 and 16 Areas (Headquarters), following the ridge to connect to the reservoirs above Haybarn Canyon area from the east. The entire length of the segment would be in or along Vandegrift Boulevard and in undeveloped areas. It would be compatible with and would not displace any existing land uses, and no significant land use impacts would result.

Mitigation

No mitigation measures are proposed.

4.4.6 Visual Resources

4.4.6.1 Both MILCONs (Alternative 4)

Impacts

Visual features and impacts common to the projects in Alternative 4 would be the same as those described in Section 4.1.6.1.

Mitigation

No mitigation measures are proposed.

4.4.6.2 P-1044 Alternative 4

Impacts

The visual effects of the Northern AWT facility in P-1044 Alternative 4 would be the same as those described for Alternative 3 in 4.3.6.2, and the effects of other elements of the alternative would be the same as those described for Alternative 2 in Section 4.2.6.2. No significant visual impacts would result.

Mitigation

No mitigation measures are proposed.

4.4.6.3 P-1045 Alternative 4

Impacts

P-1045 Alternative 4 would use the same route as Alternatives 1 and 3 from the northern connection point to the reservoirs north of the Wire Mountain 2 Housing Area and the Santa Margarita Housing Area. Unlike Alternative 3, however, P-1045 Alternative 4 would connect with reservoirs on a ridge above Haybarn Canyon by a pipeline in Vandegrift Boulevard to about 0.75 mile south of the 22 Area (Chappo). From there, it would run northeast to the ridge between the 22 Area (Chappo) and 24 Area, and the 18 Area (Golf Course) and the 13 and 16 Areas (Headquarters), following the ridge to connect to the reservoirs above Haybarn Canyon area from the east. The entire length of the segment would be in or along Vandegrift Boulevard and in undeveloped areas. The pipelines would be underground and visual effects would occur only during construction and would only effect on-Base viewers. The effects of other elements of the alternative would be the same as those described for Alternative 3 in Section 4.3.6.3. No significant visual impacts would result.

Mitigation

No mitigation measures are proposed.

4.4.7 Socioeconomics and Environmental Justice

4.4.7.1 Both MILCONs (Alternative 4)

Methodology

The methodological approach and data sources utilized to assess socioeconomic impacts of Alternative 4 are the same as described for Alternative 1 in Section 4.1.7.1.

Impacts

Construction

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

For all work included in Alternative 4, the design and construction work on the project features would be by civilian contracting firms that would nearly exclusively draw their employees from a labor pool outside of MCBCP. Given the nature of the construction and that the project sites are on a military base, no increase in population would occur from workers relocating to MCBCP, and no increase in demand for on-Base housing would occur. Most of the construction work would be performed by workers from a labor pool within commuting distance of MCBCP, such that off-Base demand for temporary construction worker housing would be minimal. Some incidental construction-related employment opportunities may arise for military dependents, but the socioeconomic impact of these opportunities would be negligible.

Total funding for both MILCONs included in the proposed action is estimated to be $231 million, with funding running from FY 2012 through FY 2013. As shown in Table 4.4.7-1, total funding varies from year to year. Fiscal year of funding, however, differs from calendar year of project expenditures. Expenditures by calendar year, based on estimated start dates and estimated duration of construction by project, are shown in Table 4.4.7-2. For the purposes of economic modeling, it was assumed that (1) all funding would be spent on construction, (2) construction schedules would be as illustrated in Table 4.4.7-2, and (3) monthly construction expenditures would remain even across all months of the construction period. As both the level of funding and the timing of construction are subject to revision, the purpose of the modeling is to facilitate an order-of-magnitude economic output and employment impact assessment rather than an exact projection of economic output and employment levels.

Summaries of the modeling of the economic activity related to construction for the three-county and six-county regions are presented in Tables 4.4.7-3 and 4.4.7-4, respectively. These results combine direct, indirect, and induced economic output and employment results to give an overall economic output and employment figure by region for each construction year. Existing regional economic output and employment baseline information by sector is also provided to allow a comparison of impacts to existing conditions. Details of direct, indirect, and induced economic output and employment by sector by year for the three-county and six-county regions are provided in Appendix F, Socioeconomic Employment and Economic Output Impact Tables.

As shown, economic output for the three-county region would peak at about $146 million per year over the course of construction, and employment would peak at about 857 jobs per year. The majority of the total proposed action-related economic output in each year would consist of direct output from the construction sector, and the majority of total employment would consist of direct employment in the construction industry. For the six-county region, economic output would peak at about $245 million (an increase of about $99 million over the three-county region) during both construction expenditure years (2013 and 2014) and employment would peak at approximately 1,392 jobs (an increase of about 535 jobs over the three-county region) for 2013 and 2014. Some highly localized economic activity would likely occur with small-scale purchases of goods and services by construction companies and their workers, resulting in a minor beneficial impact to the on-Base economy.

LOCALIZED SOCIOECONOMIC IMPACTS

Localized, temporary socioeconomic impacts could potentially accrue due to the proximity of sensitive receptors (such as family housing areas, school areas, child-oriented facilities, hospitals, and BEQs, among others) to the construction corridors for linear project components or the project limits of other project facilities. These localized socioeconomic impacts could result from construction noise, a temporary degradation of air quality, or a decrease in traffic level of service and/or accessibility. A description of sensitive receptors closest to each of the project corridors and facilities project limits is presented in the following discussions of project alternatives.

Facility Operation

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

At present, employment related to operations of on-Base utilities infrastructure facilities involves a limited number of both federal civilian employees and private sector

contractor personnel, but specific employment figures are not readily available (U.S. Navy 2010d). While some new long-term employment could be created through the additional labor demand brought about by operation of the new portions of the water distribution system, the number of new employees would likely be minimal. It is expected that initial employment at the new facilities would be dominated by contractor personnel, but that over time these positions would come to be occupied predominantly by regular (federal civilian) employees.

LOCALIZED SOCIOECONOMIC IMPACTS

No localized socioeconomic impacts would be anticipated from the postconstruction operation of any of the proposed action MILCONs in Alternative 4. Project linear features would be underground and would have no adverse effects on sensitive receptors. Aboveground facilities would not be near enough to sensitive receptors to cause adverse effects. Whether aboveground or underground, completed MILCON project alternatives in Alternative 4 would not have any socioeconomic impact.

Environmental Justice

When the proposed action projects included in Alternative 4 are considered as a group, project linear corridor and facilities project limits would be located within nine different census blocks on MCBCP (Blocks 9005, 9008, 9015, 9019, 9025, 9026, 9027, 9032, and 9040). These blocks have a combined population of 32,217 persons, which is 89.1 percent of the total population of MCBCP. For this group of blocks combined, total minority population is 43.3 percent, compared to a total minority population of 43.1 percent for MCBCP as a whole, and less than the minority percentage of San Diego, Orange, and Riverside counties. As a result, the area affected by Alternative 4 would not have a minority population of concern with respect to environmental justice. In terms of low-income status (as defined by percentage of persons living below poverty), statistics are not available for the Alternative 4 blocks specifically. For MCBCP as a whole, however, approximately 8.4 percent of the population was below poverty level as of the last decennial census, a lower figure than was the case in San Diego, Orange, and Riverside counties, which ranged between 10.3 and 14.2 percent. As a result, the project area is not considered to have a low-income population of concern with respect to environmental justice issues. Further, no significant socioeconomic or other directly relevant environmental impacts are anticipated for Alternative 4, and there is no indication that any disproportionately high and adverse impacts would occur that would accrue to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.4.7.2 P-1044 Alternative 4

Impacts

Total cost for P-1044 Alternative 4 is estimated to be $106 million, with funding in FY 2012. Construction would occur over 24 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $67.2 million per year, and employment output would be approximately 393 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $112.5 million per year, and employment output would be approximately 639 jobs per year. The number of new employees for project operations would likely be minimal.

The project features of P-1044 Alternative 4 would be located in the same proximity to potentially sensitive receptors as the project features of P-1044 Alternative 3, as described in Section 4.3.7.2. No significant impacts are anticipated.

One of the two census blocks potentially directly affected by this alternative had minority population percentages higher than MCBCP or the counties in the surrounding region at the time of the 2000 census, but it is known that this census block has no population at present, following the discontinuation of the northern agricultural area lease. There is no indication that any disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.4.7.3 P-1045 Alternative 4

Impacts

Total cost for P-1045 Alternative 4 is estimated to be $125 million, with funding in FY 2012. Construction would occur over approximately 18 months in 2013–2014. For each construction year, the economic output for the three-county (San Diego, Orange, and Riverside) region would be approximately $81.8 million per year, and employment output would be approximately 464 jobs per year. Over the six-county region (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial), economic output would be approximately $136.6 million per year, and employment output would be approximately 753 jobs per year. The number of new employees for project operations would likely be minimal. No socioeconomic impacts would be anticipated from the postconstruction operation.

The location of relevant potentially sensitive receptors in relation to P-1045 Alternative 4 would be in the same locations as those described for P-1045 Alternative 3 in Section 4.3.7.3, given that the additional segment included in Alternative 4 comes no closer than approximately 540 yards from the nearest sensitive receptors (BEQs in the 13 Area [Headquarters]). No significant impacts are anticipated.

Of the eight census blocks potentially directly affected by this alternative, two had a minority population percentage greater than 50 percent (and higher than that of MCBCP and the counties in the surrounding region) at the time of the 2000 census, while another had a minority population percentage higher than MCBCP and San Diego County, but lower than either Orange County or Riverside County. There is no indication, however, that any disproportionately high and adverse impacts would occur to minority or low-income populations. No environmental justice impacts have been identified.

<u>Mitigation</u>

No mitigation measures are proposed.

Table 4.4.7-1
Funding by Fiscal Year ($ Millions) – Alternative 4

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$106	$0	$106
FY 2012	$0	$125	$125
All Years	**$106**	**$125**	**$231**

Note: All Years total may vary from sum of FY subtotals due to rounding.

Table 4.4.7-2
Construction Schedule and Expenditures by Project, Month, and Year – Alternative 4

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.40	$53.0	$53.0	$106
P-1045	April 2013	18	$7.20	$65.0	$60.0	$125
Total				**$118.0**	**$113.0**	**$231**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table 4.4.7-3
Alternative 4 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 3-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 3-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.3	$0.3	32,988	2.0	2.0
Mining	$1,241.7	$0.2	$0.2	3,318	0.8	0.8
Utilities	$15,558.8	$0.9	$0.9	12,432	0.6	0.6
Construction	$51,446.2	$92.8	$92.8	337,572	523.8	523.8
Manufacturing	$135,386.5	$7.7	$7.7	341,197	20.0	20.0
Wholesale Trade	$39,026.3	$3.5	$3.5	181,370	15.1	15.1
Retail Trade	$39,116.0	$4.5	$4.5	488,360	52.7	52.7
Transportation and Warehousing	$10,754.6	$0.9	$0.9	86,583	6.5	6.5
Information	$44,927.0	$2.7	$2.7	89,139	4.8	4.8
Finance and Insurance	$51,476.1	$4.3	$4.3	226,444	17.4	17.4
Real Estate and Rental	$102,950.6	$8.3	$8.3	366,409	20.3	20.3
Professional, Scientific, and Technical Services	$57,707.5	$9.0	$9.0	391,226	60.9	60.9
Management	$9,482.5	$0.5	$0.5	48,580	2.5	2.5
Administrative and Waste Services	$23,778.3	$1.8	$1.8	369,193	27.2	27.2
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.9	6.9
Health and Social Services	$34,208.9	$3.2	$3.2	342,697	31.2	31.2
Arts, Entertainment, and Recreation	$12,255.8	$0.8	$0.8	125,303	8.2	8.2
Accommodation and Food Services	$24,417.9	$1.6	$1.6	357,882	24.8	24.8
Other	$19,513.1	$2.5	$2.5	271,933	28.2	28.2
Government	$64,451.0	$0.7	$0.7	656,931	3.4	3.4
Total	**$745,750.4**	**$146.4**	**$146.4**	**4,806,509**	**857.3**	**857.3**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

Table 4.4.7-4
Alternative 4 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside-Los Angeles-San Bernardino-Imperial Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 6-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 6-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$7,850.5	$0.5	$0.5	59,069	2.6	2.6
Mining	$8,697.3	$1.5	$1.5	14,975	2.9	2.9
Utilities	$31,705.3	$1.8	$1.8	29,926	1.6	1.6
Construction	$92,642.0	$115.1	$115.1	610,158	653.8	653.8
Manufacturing	$358,362.8	$27.5	$27.5	858,357	56.8	56.8
Wholesale Trade	$94,509.4	$7.2	$7.2	493,501	35.3	35.3
Retail Trade	$91,980.4	$8.9	$8.9	1,132,121	103.1	103.1
Transportation and Warehousing	$43,502.0	$4.0	$4.0	325,556	28.0	28.0
Information	$154,948.9	$7.6	$7.6	368,602	13.7	13.7
Finance and Insurance	$115,155.1	$10.4	$10.4	485,909	40.7	40.7
Real Estate and Rental	$225,259.1	$17.2	$17.2	729,263	41.7	41.7
Professional, Scientific, and Technical Services	$140,355.6	$17.4	$17.4	936,634	113.3	113.3
Management	$23,983.7	$1.5	$1.5	110,862	6.7	6.7
Administrative and Waste Services	$51,537.5	$4.0	$4.0	799,005	61.7	61.7
Educational Services	$13,904.6	$1.1	$1.1	220,354	16.7	16.7
Health and Social Services	$89,328.8	$7.5	$7.5	916,303	73.4	73.4
Arts, Entertainment, and Recreation	$36,319.5	$1.7	$1.7	319,858	16.3	16.3
Accommodation and Food Services	$52,206.9	$3.6	$3.6	771,455	56.0	56.0
Other	$48,290.5	$5.1	$5.1	715,259	58.7	58.7
Government	$139,840.0	$1.7	$1.7	1,450,595	8.7	8.7
Total	**$1,820,379.9**	**$245.1**	**$245.1**	**11,347,763**	**1,391.6**	**1,391.6**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

4.4.8 Traffic

4.4.8.1 Methodology (Alternative 4)

The methodology used to evaluate impacts of Alternative 4 is the same as explained in Section 4.1.8.1 for Alternative 1. The estimated traffic volumes generated by Alternative 4 would be equal to the traffic shown in Alternative 1, even though the specific locations of some project components included in Alternative 4 vary from those included in Alternative 1. The differences between projects in the alternatives would not change the number of construction crews needed to complete the project within the given timeline. Therefore, traffic patterns for construction traffic related to the project would be the same as those analyzed in Alternative 1. Further, the roadway network would remain the same.

4.4.8.2 Impacts

Impacts of Alternative 4 would be equal to or less than the impacts of Alternative 1. Refer to Section 4.1.8 for traffic impacts of Alternative 1.

4.4.8.3 Mitigation

Mitigation recommended for Alternative 1 in Section 4.1.8.3 would be applicable to Alternative 4.

4.4.9 Air Quality

4.4.9.1 Both MILCONs (Alternative 4)

Methodology and the related conditions, as discussed in Section 4.1.9.1, are applicable to Alternative 4 as well as to Alternative 1.

Annual project emissions for Alternative 4 were estimated by URBEMIS and grouped by calendar year in SDAB and SCAB, as shown in Tables 4.4.9-1 and 4.4.9-2, respectively. The URBEMIS model output data are included in Appendix G.

Table 4.4.9-1
Estimated Annual Air Pollutant Emissions of Alternative 4 in SDAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 4	2	14	13	0	18	4
P-1045 Alternative 4	2	17	17	0	32	7
Total 2013 Emissions	**4**	**31**	**30**	**0**	**50**	**11**
2014						
P-1044 Alternative 4	2	12	13	0	17	4
P-1045 Alternative 4	2	19	22	0	32	7
Total 2014 Emissions	**4**	**31**	**35**	**0**	**49**	**11**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.4.9-2
Estimated Annual Air Pollutant Emissions of Alternative 4 in SCAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 4	<1	<1	<1	0	<1	<1
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.4.9-1, the total estimated annual emissions of VOCs, NO_X, and CO for 2013 and 2014 for Alternative 4 in SDAB are less than the *de minimis* levels for these pollutants. As shown in Table 4.4.9-2, the total estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for 2013 for Alternative 4 in SCAB are less than the *de minimis* levels for these pollutants. Therefore, Alternative 4 in SDAB and SCAB would conform to the SIP and a conformity determination is not required.

The same measures recommended for Alternative 1 to minimize fugitive dust during construction are recommended for Alternative 4.

<u>Mitigation</u>

No mitigation measures are proposed.

4.4.9.2 P-1044 Alternative 4

<u>Impacts</u>

Annual project emissions for P-1044 (Alternative 4) were estimated by URBEMIS in SDAB and SCAB, as shown in Tables 4.4.9-3 and 4.4.9-4. The URBEMIS model output data are included in Appendix G.

Table 4.4.9-3
Estimated Annual Air Pollutant Emissions
of P-1044 (Alternative 4) in SDAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**2**	**14**	**13**	**0**	**18**	**4**
Total 2014 Emissions	**2**	**12**	**13**	**0**	**17**	**4**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

Table 4.4.9-4
Estimated Annual Air Pollutant Emissions
of P-1044 (Alternative 4) in SCAB

Year	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	NA	No	No

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.4.9-3, the estimated annual emissions of VOCs, NO_X, and CO for P-1044 (Alternative 4) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. As shown in Table 4.2.9-4, the estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for P-1044 (Alternative 4) in SCAB in 2013 are less than the *de minimis* levels for these pollutants. Therefore, P-1044 (Alternative 4) would conform to the SIP and a conformity determination is not required.

The same measures recommended for P-1044 Alternative 1 to minimize fugitive dust during construction are recommended for P-1044 Alternative 4.

Mitigation

No mitigation measures are proposed.

4.4.9.3 P-1045 Alternative 4

Impacts

Annual project emissions for P-1045 (Alternative 4) were estimated by URBEMIS, as shown in Table 4.4.9-5. The URBEMIS model output data are included in Appendix G.

Table 4.4.9-5
Estimated Annual Air Pollutant Emissions
of P-1045 (Alternative 4)

	Annual Air Pollutant Emissions (tons/year)					
Year	**VOCs**	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Total 2013 Emissions	**2**	**17**	**17**	**0**	**32**	**7**
Total 2014 Emissions	**2**	**19**	**22**	**0**	**32**	**7**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	NA	NA	NA

Totals rounded to the nearest whole number.
Source: 40 C.F.R. § 93

As shown in Table 4.4.9-5, the estimated annual emissions of VOCs, NO_X, and CO for P-1045 (Alternative 4) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. Therefore, P-1045 (Alternative 4) would conform to the SIP and a conformity determination is not required.

The same measures recommended for P-1045 Alternative 1 to minimize fugitive dust during construction are recommended for P-1045 Alternative 4.

Mitigation

No mitigation measures are proposed.

4.4.10 Noise

4.4.10.1 Both MILCONs (Alternative 4)

Methodology and impacts, and the conditions related to them, as discussed in Section 4.1.9.1, are applicable to Alternative 4 as well as to Alternative 1.

No mitigation measures are proposed.

4.4.10.2 P-1044 Alternative 4

Impacts

P-1044 Alternative 4 would generate noise levels similar to P-1044 Alternative 1, but along a different route (the same route as P-1044 Alternative 2) within the same general area, and with the Northern AWT in a different location (the same location as P-1044 Alternative 2). Therefore, noise impacts would be the same as previously described under Alternative 1, and less than significant.

Mitigation

No mitigation measures are proposed.

4.4.10.3 P-1045 Alternative 4

Impacts

P-1045 Alternative 4 would generate noise levels similar to P-1045 Alternative 1. However, while much of the route is the same, P-1045 Alternative 4 would not come close to BEQs in the 33 Area (Margarita) as would P-1045 Alternative 1. Noise impacts would be similar, and less than significant.

Mitigation

No mitigation measures are proposed.

4.4.11 Public Health and Safety

4.4.11.1 Both MILCONs (Alternative 4)

Methodology

The methodological approach and data sources utilized to assess public health and safety impacts of Alternative 4 are same as described for Alternative 1 in Section 4.1.11.1.

Impacts

The presence of active UST/AST sites, hazardous waste storage sites, RFA sites, and IR sites; and the potential for LBP, PCBs, and asbestos within the Alternative 4 alignment corridors is minimal.

- There are no hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, or APZs in any of the MILCONs in Alternative 4.
- In Alternative 4, IR Site 33 is found in the project corridor of P-1044, while IR Site 1D is found within the project corridor of P-1045.
- In Alternative 4, the only alignment corridor in which UST sites are found is P-1044, which has 11 UST sites present (active LUST Site 62507 and closed UST Sites 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536). No other project corridors/sites contain UST sites.
- In Alternative 4, the only alignment corridor in which RFA sites are found is P-1044, which has four RFA sites present (active RFA Site 220 and no further action RFA Sites 199, 221, and 225). No other project corridors/sites contain RFA sites.
- In Alternative 4, the two alignment corridors in which ASTs are found are P-1044 and P-1045, which have eight ASTs present (ASTs 52021, 52410, 52710, 61513, 20816, 31520-1, 31523-P, and 52021). No other project corridors/sites contain ASTs.
- In Alternative 4, two alignment corridors in which training areas are found are P-1044 and P-1045, which have six training areas present (Range 207 Military Range Area, Range 14 artillery Firing Area, Range D704 Live Fire and

Maneuver, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, and Range FMSS Facility). No other project corridors/sites contain training areas.

- In Alternative 4, the only alignment corridor in which pesticides are found is P-1044 Alternative 4, which has one pesticide site (North Agricultural Lease Site). No other project corridors/sites contain pesticide sites.

In addition, all alignments have RFA, UST, or IR sites near enough to the project corridors to have an effect on construction. Generally, the risk of having these sites close to Alternative 4 project corridors/sites is the potential migration of contaminated groundwater into the construction area. The chemical concentration and physical extent of the groundwater contamination in these instances is not fully known and in any case could change by the time of construction. A summary of the sites and nearby corridors is provided in Table 4.4.11-1. As shown in the table, several of these sites potentially impact construction in multiple corridors.

If soil contamination (discolored and/or odorous) is discovered during construction, the Installation Restoration/Remediation Branch at (760) 725-9744/9774 would be contacted for necessary remedial requirements. If the construction of structures would be outside of any known, identified groundwater plume, additional regulatory concurrence would not be required. However, these locations would still be evaluated by Navy and Marine Corps IRP managers to ensure they are not downgradient of an existing plume where further investigation and/or cleanup may take place.

The northern portion of MCBCP is laden with former and current training ranges. The potential presence of MEC and small arms rounds is real. When excavation, grading, and/or digging occurs within the boundaries of a former or current range, all work would be accomplished with every effort to maximize safety and prevent the spread of any potential contamination or the release of any potential existing contaminants to the environment in accordance with all federal, state, and local laws, regulations, and guidelines.

Before construction of any alignment, ES would review construction plans along with the current list of hazardous material sites on-Base to ensure that sites with the potential to affect construction were identified. Construction would not be allowed within the vicinity of those hazardous material sites without assurance that the site was remediated or that the influence of the hazardous materials site would not affect the construction area.

Table 4.4.11-1
RFA, UST, IR, and AST Sites within Alternative 4
Project Corridors/Sites or Adjacent Buffers

Project Corridor/Site	Type of Site: RFA – Within Project Corridor/ Site	RFA – Within 50-Foot Buffer	UST – Within Project Corridor/Site	UST – Within 200-Foot Buffer	IR – Within Project Corridor/ Site	IR – Within 500-Foot Buffer	AST – Within Project Corridor/ Site	AST – Within 10-Foot Buffer	Military Training Areas, Impact Areas, Live-Fire Facilities, and ESQD Arcs within the Project Corridors/Sites
P-1044 Alternative 4	199(NFA), 220(LSI), 221(NFA), 225(NFA)	192(NFA), 218(NFA), 236(NFA), 280(NFA)	520400(Closed), 52291(Closed), 52651(Closed), 52710(Closed), 62420(Closed), 62435(Closed), 62436(Closed), 62520(Closed), 62535(Closed), 62536(Closed), 62507	520167-1, 520167-2, 62507-3, 62507-4	33	1I-2(Closed), 34(Closed), 36(Closed)	52021, 52410, 52710, 61513	-	Range 207 Military Range Area
P-1045 Alternative 4	-	168(NFA), 278(NFA), 279(NFA)	-	-	1D	7,32(Closed)	20816, 31520-1, 31523-P, 52021	41611	Range 14 Artillery Firing Area, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range FMSS Facility

LSI = Limited Site Investigation; NFA = No Further Action

A number of child-oriented facilities are near enough to the alignments for noise and dust during construction to be concern:

- San Onofre Elementary School
- San Onofre Child Development Center
- San Onofre Youth Center
- Stuart Mesa Elementary School
- Stuart Mesa Child Development Center
- Wire Mountain Youth Center
- Santa Margarita Elementary School
- Browne Child Development Center
- Abby Reinke Community Center

To eliminate disturbances to children that may come from construction, such as noise, dust, and unacceptable air quality, measures such as dust abatement and BMPs that would reduce other construction impacts should be applied. These measures are summarized in Section 2.5. When successfully implemented, these measures would not adversely alter existing environmental health conditions or impose additional safety risks to children and therefore would minimize the possibility of project-related adverse impacts to children.

Mitigation

No mitigation measures are proposed.

4.4.11.2 P-1044 Alternative 4

Public health and safety impacts and mitigation for the P-1044 Alternative 4 project corridor/site would be the same as discussed for P-1044 Alternative 2, Section 4.2.11.2.

4.4.11.3 P-1045 Alternative 4

Impacts

There are no USTs, RFA sites, hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, APZs, or pesticides located within the P-1045 Alternative 4 project corridor/site.

Hazardous waste sites identified within portions of the project corridor/site include the following:

- Four ASTs (active ASTs 20816, 31520-1, 31523-P, and 52021);
- One IR site (active IR Site 1D); and
- Five training areas (Range 14 Artillery Firing Area, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range FMSS Facility).

In addition, active AST 41611; no further action RFA Sites 168, 278, and 279; active IR Site 7; and closed IR Site 32 were identified within the buffer zone of the project corridor/site.

- Construction within the project corridor/site may encounter contaminated soil from no further action RFA Sites 168, 278, and 279.
- Construction within the project corridor/site may encounter contaminated soil from IR Site 7. The remedial action implemented at IR Site 7 has been found to be protective of human health and the environment because potential exposure pathways have been controlled and monitored.
- Construction within the project corridor/site may encounter contaminated groundwater from IR Site 1D. The groundwater at IR Site 1D is relatively shallow, ranging from 6 to 10 feet bgs. Groundwater monitoring wells are located around IR Site 1D.
- Construction within the project corridor/site may encounter contaminated soil from closed IR Site 32.
- Weapons training in the proximity of construction areas or activities could be highly dangerous to construction personnel.

In addition, other unidentified contaminant residue in the soil or groundwater from historical spills that may be present underneath the area of the project corridor/site would be assessed. If any contaminants are identified, appropriate remediation should be implemented before construction.

With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area. With respect to potential impacts to children specifically, construction activities for the project corridor/site are generally expected to generate short-term construction noise levels and increase fugitive dust. Child-oriented facilities within a 500-yard buffer zone of the project corridor/site and their location relative to construction corridors/sites would be the same as those described for P-1045 Alternative 1, Section 4.1.11.3. To mitigate potential impacts to children that may come from construction, measures such as dust abatement and other BMPs described in Section 2.5 that would reduce construction impacts would be applied. These measures would minimize the possibility of proposed action-related adverse impacts.

Mitigation

No mitigation measures are proposed.

4.4.12 Services and Utilities

4.4.12.1 Both MILCONs (Alternative 4)

Methodology

The assessment of impacts on services and utilities for Alternative 4 followed the same procedures as for Alternative 2, as discussed in Section 4.2.12.1.

Impacts

In terms of impacts on services and utilities, there would be negligible differences between Alternative 4 and Alternative 2, as discussed in Section 4.2.12.1. No significant impacts would result from implementation of Alternative 4.

Mitigation

No mitigation measures are proposed.

4.4.13 Coastal Zone Resources

4.4.13.1 Both MILCONs (Alternative 4)

Impacts

The coastal zone impacts of Alternative 4 would be similar to those discussed in Section 4.2.13.1. TLS boring pits in P-1044 Alternative 4 would be in the same locations as Alternative 2. TLS working pits in P-1045 Alternative 4 would be in the same locations in the Stuart Mesa Road alignment as in Alternative 1, except that there would be no crossing under the Santa Margarita River south of the 25 Area (Vado Del Rio).

Only P-1044 would have project elements that extend into the coastal zone. Alternative 4 would be subject to the same regulatory and permit controls discussed for Alternative 1 in Section 4.1.13.2.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.4.13.2 P-1044 Alternative 4

Impacts

P-1044 Alternative 4 would have the same impacts in relation to coastal zone resources as those discussed for Alternative 1 in Section 4.1.13.2.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.4.13.3 P-1045 Alternative 4

Impacts

P-1045 Alternative 4 would have the same impacts in relation to coastal zone resources as those discussed for Alternative 1 in Section 4.1.13.3.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.4.14 Marine Resources

Marine resources are covered in this section; please see Section 4.4.2 for related impacts to water quality and hydrology and Section 4.4.3 for related impacts to biological resources.

Impacts related to proposed brine discharge from the Northern AWT RO facility on marine resources are addressed in this section. Indirect effects on marine resources from implementation of projects inland are discussed in Section 4.4.13, Coastal Zone Resources.

4.4.14.1 P-1044 Alternative 4

Impacts

Marine resource impacts of P-1044 Alternative 4 would be similar to those discussed in Section 4.1.14.1.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.4.14.2 P-1045 Alternative 4

Impacts

No direct impacts to marine resources are anticipated from implementation of P-1045.

Mitigation

No mitigation is proposed.

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4.5 ALTERNATIVE 5

4.5.1 Geology and Soils

4.5.1.1 Both MILCONs (Alternative 5)

Methodology

Methodology is described in Section 4.1.1.1.

Impacts

Alternative 5 is composed of P-1044 Alternative 1 and P-1045 Alternative 3. While these would differ in some of the areas affected, the geotechnical requirements for construction and erosion control would generally be the same as those discussed for Alternative 1. The discussion of impacts in Section 4.1.1.1 is applicable to Alternative 5. With the incorporation of the construction and conservation measures discussed in Section 2.5, no significant impacts would occur to geology and soils.

Mitigation

No mitigation measures are proposed.

4.5.2 Water Quality and Hydrology

Water quality and hydrology are covered in this section; please see Section 4.5.3 for related impacts to biological resources and Section 4.5.14 for related impacts to marine resources.

4.5.2.1 Both MILCONs (Alternative 5)

Impacts

Alternative 5 is composed of P-1044 Alternative 1 and P-1045 Alternative 3. The discussion in Section 4.1.2.1 of general impacts common to both MILCONs is applicable to Alternative 5.

Mitigation

No mitigation measures are proposed.

4.5.2.2 P-1044 Alternative 1/Alternative 5

Impacts

The impacts of P-1044 Alternative 1/Alternative 5 are described in Section 4.1.2.2. Construction and operation of P-1044 Alternative 1/Alternative 5 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5 and the applicable regulations in Section 3.2.

Mitigation

No mitigation measures are proposed.

4.5.2.3 P-1045 Alternative 3/Alternative 5

Impacts

The impacts of P-1045 Alternative 3/Alternative 5 are described in Section 4.3.2.3.

Construction and operation of P-1045 Alternative 3/Alternative 5 would have no significant effect on water quality and hydrology or flood hazards provided there is successful compliance with the special conservation and construction measures described in Section 2.5 and applicable regulations in Section 3.2.

Mitigation

No mitigation measures are proposed.

4.5.3 Biological Resources

Biological resources are covered in this section; please see Section 4.5.2 for related impacts to water quality and hydrology and Section 4.5.14 for related impacts to marine resources.

4.5.3.1 Both MILCONs (Alternative 5)

Impacts

For a general description of the potential direct and indirect impacts to biological resources that would result from construction and operation of the alternatives, refer to Alternative 1, Section 4.1.3.1. A summary of the criteria utilized in this EIS for evaluating direct and indirect impacts to federally listed species is provided in Table 4.1.3.1-1. The special conservation and construction measures listed in Section 2.5 would be incorporated as part of any of the alternatives and would avoid and minimize many potential direct and indirect impacts to sensitive biological resources.

Alternative 5 is composed of P-1044 Alternative 1 and P-1045 Alternative 3. The total impacts to biological resources associated with implementing the projects associated with Alternative 5 are presented below. In all cases, the total area of impacts associated with each project is presented separately, and then those totals are summed across both projects. However, in areas common to two or more projects, impacts would not happen anew in overlapping areas if the projects were implemented simultaneously. Therefore, the totals that are summed across both projects represent the greatest disturbance possible, which would occur if every project took place at a different time in every overlap area.

As previously noted, analyzing impacts within utility corridors for the full 125-foot width represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the maximum (100 percent) and the anticipated (48 percent) impact scenarios for comparison. The direct impacts that would arise from trenching within project corridors to install the proposed water pipelines would be considered temporary for habitats that can be restored after construction activities are complete. Temporary, direct impacts may also arise from construction-generated fugitive dust; noise; increased human presence; and construction-related erosion, runoff, and sedimentation into plant communities. Direct impacts from these construction-related activities would be considered temporary wherever the impacts would end with cessation of project construction. However, direct impacts to some resources, e.g., occupied San Diego and Riverside fairy shrimp habitat (vernal pool basins) and occupied thread-leaved brodiaea habitat, may or may not be reversible as construction impacts within the corridor could result in the permanent alteration of physical characteristics critical to the species, compared to the preconstruction condition. Therefore, as discussed previously, all proposed trenching-related corridor impacts to occupied San Diego and Riverside fairy shrimp habitat, occupied listed vernal pool plant species habitat, and occupied thread-leaved brodiaea habitat are analyzed as permanent impacts herein.

For the maintenance access corridors and for utility facilities (e.g., reservoirs and pump stations), permanent impacts were assessed at 100 percent for both maximum and anticipated scenarios.

A thorough analysis of impacts to listed species is provided in the biological assessment for the proposed action (AECOM 2012). USFWS issued a Final Biological Opinion for this action on 15 August 2012.

Additional impacts to biological resources may occur as a result of habitat restoration. At this time, these effects are not quantifiable. Additional impacts to regulated biological resources would be analyzed after finalization and approval of habitat restoration plans as submitted to ES; USFWS; and USACE.

Mitigation

Mitigation measures that would be required for one or both of the projects are summarized in Section 4.1.3.1 (Table 4.1.3.1-2). The project-specific relevance of these measures is presented in the following sections.

If acreage is needed for mitigation of impacts to federally listed species or habitats, any on-Base mitigation should not interfere with the Base's training mission. Any such interference would be avoided through consultation between ES and Base Operations and Training, as explained in Section 4.1.5.1.

Plant Communities

Impacts

The total permanent and temporary direct impacts to plant communities from development of Alternative 5 are presented in Table 4.5.3.1-1. As noted above, in all cases the temporary impacts represent the worst-case scenario that could occur to biological resources because technologies would be employed to minimize resource impacts within the 125-foot-wide utility corridors. The maximum versus anticipated direct impacts to plant communities associated with Alternative 5 are summarized for riparian and upland habitat types for each project in Table 4.5.3.1-2. Further details about direct impacts associated with project-specific facilities, and potential indirect impacts that could occur in the adjoining 100- and 400-foot buffer areas, are presented in subsequent sections of this EIS.

Only the permanent and temporary impacts to plant communities (grasslands, scrublands, and woodlands) that coincide with regulated waters (e.g., riparian wetlands or nonvegetated channels regulated under Section 404 of the CWA) or that are occupied by, or support, federally listed or covered species (i.e., ESA and/or MBTA) would be considered significant. Potential total impacts to these regulated/covered resources are discussed in the following subsections.

<u>Mitigation</u>

Mitigation required for unavoidable impacts to plant communities that are regulated or otherwise covered by federal statutes (i.e., waters regulated under the CWA and habitats for species listed under the ESA or covered under the MBTA) are discussed in the following subsections.

Waters of the U.S.

<u>Impacts</u>

Development of Alternative 5 would result in permanent and temporary direct impacts to jurisdictional waters, including wetlands, as summarized in Table 4.5.3.1-3. All direct impacts to jurisdictional waters would be considered significant. The maximum versus anticipated direct impacts to wetlands and other waters associated with Alternative 5 are summarized for each project in Table 4.5.3.1-4. Additional project-specific details about potential direct impacts to jurisdictional waters are presented below for each separate project. The CWA Section 404(b)(1) Guidelines require USACE to determine that the project is the least environmentally damaging practicable alternative for the proposed unavoidable impacts to jurisdictional waters. Therefore, as project designs are finalized, attempts to avoid and minimize impacts to jurisdictional waters (wetlands and nonwetland waters) to the greatest extent practicable would be undertaken.

The determination of whether the utility projects may be permitted under USACE's NWP program, or whether specific individual permits will be required, would be determined formally as part of the CWA Section 404 permit process. As noted in Section 4.1.3.1, to qualify for a NWP, the proposed action and the associated unavoidable impacts to jurisdictional waters based on final project designs must satisfy all terms and conditions of the specific NWP, as well as all general conditions and any relevant regional conditions of the NWP program. One of the regional conditions published by the USACE Los Angeles District indicates that individual permits are required for all discharges of fill material into jurisdictional vernal pools (USACE Special Public Notice May 18, 2007).

Based on data collected during formal wetland delineations for Alternative 5, potential jurisdictional vernal pools were delineated within the proposed impact areas for MILCONs P-1044 and P-1045 (the jurisdictional status of all delineated waters is not considered final until the USACE has completed a jurisdictional determination). Therefore, if, based on final project design it is determined that impacting a jurisdictional vernal pool is unavoidable, then an Individual Permit would be required for these MILCONs. However, if the discharge of fill material into jurisdictional vernal pools can be avoided, then these MILCONs may qualify for authorization under NWP 12 (Utility Line Activities) pending USACE's review of pre-construction notification materials. It should be noted that the District Engineer may exercise “discretionary authority” for any activity that is determined to have a more than minimal individual or cumulative adverse effect on the environment or may be contrary to public interest and thus require an Individual Permit (33 CFR 330.2 [g]). Therefore, as noted above, the determination of whether MILCONs P-1044 and P-1045 may be permitted under NWPs or require individual permits would be determined formally as part of the CWA Section 404 permit process.

Mitigation

Mitigation for unavoidable impacts to jurisdictional waters is summarized in measure J1 in Table 4.1.3.1-2. Based on mitigation ratios of 2:1 for permanent impacts to wetlands, 1:1 for permanent impacts to other waters, and 1:1 for all temporary wetlands and waters impacts, the mitigation for waters of the U.S. that could be required for development of Alternative 5 is summarized in Table 4.5.3.1-5. Mitigation ratios across wetland types, e.g., coastal and valley freshwater marsh versus southern riparian woodland, must be finalized with USACE and RWQCB via the permitting process; some types may require more than a 2:1 ratio for the permanent loss of that wetland.

As noted in Section 2.5.2, unavoidable impacts to waters of the U.S. would require mitigation consistent with the final rule for Compensatory Mitigation for Losses to Aquatic Resources that was issued by USACE and USEPA. This would include the preparation of a detailed mitigation plan prepared collaboratively with ES and reviewed and approved by USACE and RWQCB before resource impact. If the unavoidable impacts to jurisdictional waters support federally listed species, then input from USFWS would also be required. The mitigation plan would describe on-site, off-site, and as needed, off-Base mitigation. For all habitat restoration that is proposed, this plan would include details regarding site preparation (e.g., grading), planting specifications, and irrigation design, as well as maintenance and monitoring procedures. The plan would also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria, and a strategy for long-term mitigation site management. A portion of the mitigation obligations may be satisfied by participating in a fee-based mitigation program (e.g., a wetland mitigation bank) in which case, long-term management for such mitigation would be covered under the terms of the formal banking agreement.

Federally Listed Plants

Impacts

All direct impacts to federally listed plants within the project limits, including the water utility corridors, are considered permanent impacts. Indirect impacts are evaluated for occurrences of federally listed plants within the 100-foot buffer zone. Two federally listed plant species, thread-leaved brodiaea and spreading navarretia, may be directly impacted by implementation of Alternative 5. Acreage and number of vernal pool basins associated with these species that may potentially be impacted are noted in Table 4.5.3.1-6. The maximum versus anticipated impacts to federally listed plant species from Alternative 5 are summarized in Table 4.5.3.1-7. As previously noted, trenching impacts within the corridor would be considered permanent within thread-leaved brodiaea-occupied and spreading navarretia habitat, but temporary for all other plant habitat. One additional listed plant species, San Diego button-celery, is not known to occur in the Alternative 5 project limits but does occur in the 100-foot buffer areas. Vernal pools supporting both San Diego button-celery and spreading navarretia are known to occur within the 100-foot buffer of P-1045 along Wire Mountain Road. However, every effort would be made to avoid impacts to vernal pool habitat as described in Section 2.5.2 and measure P2 in Table 4.1.3.1-2.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed plant species. Mitigation for unavoidable impacts to federally listed plant species is summarized in measures P1 and P2 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed plant species from development of Alternative 5 is noted in Table 4.5.3.1-8. Species-specific mitigation ratios required for the project must be finalized with USFWS.

Nonfederally Listed Rare Plants

Impacts

Habitat supporting various nonfederally listed rare plant species occurs throughout Alternative 5. Rare plant species detected during project surveys that may potentially be impacted include, but are not limited to, Pendleton button-celery, sticky dudleya, San Diego tarplant, and coast wallflower. One location of Pendleton button-celery and sticky dudleya would be directly impacted by the P-1045 project within the corridor. Eight locations of Pendleton button-celery and four locations of coast wallflower could be indirectly impacted within the 100-foot buffer. None of the impacts that would occur to nonfederally listed rare plant species from development of Alternative 5 were considered significant and are therefore not discussed further in the project-specific sections of this EIS.

Mitigation

Implementation of measures as discussed in Section 2.5.2 would avoid and minimize potential impacts to nonfederally listed rare plant species. Unavoidable impacts to the nonfederally listed rare plants as a result of Alternative 5 do not warrant additional project-specific mitigation measures.

Federally Listed Wildlife

Impacts

A total of eight federally listed wildlife species may be directly impacted by implementation of Alternative 5. These species are Riverside fairy shrimp, San Diego fairy shrimp, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least

Bell's vireo, southwestern willow flycatcher, and Pacific pocket mouse. Acreages of habitat occupied by these species that may potentially be impacted and could require mitigation are provided in Table 4.5.3.1-6. These acreages are broken down according to plant community classifications and type of impact (temporary versus permanent). Impacts within the P-1044 facilities and P-1045 facilities are assessed as permanent direct impacts. As previously noted, analyzing impacts within the 125-foot-wide utility corridors represents the worst-case scenario of impacts that could occur. The anticipated impacts are closer to 48 percent of the corridor width. Therefore, for biological resources, the corridor impacts that are summarized in tables within this document present both the worst-case (100 percent) and the anticipated (48 percent) impact scenarios for comparison. As previously noted, trenching impacts within the corridor would be considered permanent within habitat occupied by Riverside fairy shrimp and San Diego fairy shrimp, but temporary for all other wildlife habitat. The maximum and anticipated direct impacts to federally listed species associated with Alternative 5 are provided in Table 4.5.3.1-7.

A discussion of potential impacts specific to each federally listed wildlife species that may be impacted by Alternative 5 is provided in Section 4.1.3.1. The discussion of each species is organized by (1) permanent direct impacts associated with the facilities; (2) permanent and temporary direct impacts associated with the corridor; and (3) permanent and temporary indirect impacts associated with the buffers associated with the facilities and corridor.

Mitigation

Implementation of measures presented in Section 2.5.2 would avoid and minimize potential impacts to federally listed wildlife. Mitigation for unavoidable impacts to federally listed wildlife is summarized in measures W1 through W9 in Table 4.1.3.1-2. Quantitatively, the total mitigation that could be required to compensate for impacts to federally listed wildlife from development of Alternative 5 is noted in Table 4.5.3.1-8. Where mitigation ratios have not already been established via prior Section 7 consultation (e.g., for the Riparian BO), mitigation requirements will be in accordance with conditions of the Final BO for the project.

Nonfederally Listed Rare Wildlife

Impacts

The nonfederally listed rare wildlife impact assessment discussion for Alternative 1 is also applicable to Alternative 5. See Section 4.1.3.1.

Mitigation

The nonfederally listed rare wildlife mitigation assessment discussion for Alternative 1 is also applicable to Alternative 5. See Section 4.1.3.1.

Wildlife Corridors

Impacts

The wildlife corridor impact assessment discussion for Alternative 1 is also applicable to Alternative 5. See Section 4.1.3.1.

Mitigation

The wildlife corridors mitigation assessment discussion for Alternative 1 is also applicable to Alternative 5. See Section 4.1.3.1.

Table 4.5.3.1-1
Potential Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 5 (acres)[1]

Plant Communities and Other Cover Types	P-1044 – Alternative 1/5	P-1045 – Alternative 3/5	Total[2]
Permanent	**42.35**	**15.96**	**58.31**
Riparian and Wetlands	1.58	0.05	1.63
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Disturbed Wetland	-	-	0.05
Mulefat Scrub	0.06	0.01	0.07
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.31	0.03	0.34
Uplands	13.49	3.10	16.59
Coast Live Oak Woodland	0.15	-	0.15
Diegan Coastal Sage Scrub	10.39	2.67	13.06
Eucalyptus Woodland	-	0.01	0.01
Nonnative Grassland	1.46	0.37	1.83
Valley Needlegrass Grassland	1.49	0.05	1.54
Other Cover Types	27.28	12.81	40.09
Disturbed Habitat	3.52	1.30	4.82
Urban/Developed	23.75	11.51	35.26
Temporary	**284.33**	**373.38**	**657.71**
Riparian and Wetlands	11.26	22.72	33.98
Beach	0.45	-	0.45
Coastal and Valley Freshwater Marsh	-	0.07	0.07
Disturbed Wetland	-	<0.005	<0.005
Freshwater Seep	-	0.11	0.11
Mulefat Scrub	2.96	7.26	10.22
Nonvegetated Channel	-	0.01	0.01
Open Water	0.42	<0.005	0.42
Riparian Scrub	0.05	0.38	0.43
Southern Coastal Salt Marsh	-	0.37	0.37
Southern Riparian Woodland	2.85	3.04	5.89
Southern Willow Scrub	4.52	11.11	15.63
Vernal Pool	0.01	0.37	0.38
Uplands	122.69	179.55	302.24
Coast Live Oak Woodland	3.34	-	3.34
Diegan Coastal Sage Scrub	91.68	137.14	228.82
Eucalyptus Woodland	-	0.12	0.12
Nonnative Grassland	14.53	27.07	41.60
Valley Needlegrass Grassland	13.13	15.22	28.35
Other Cover Types	150.38	171.12	321.50
Disturbed Habitat	29.35	8.79	38.14
Urban/Developed	121.03	160.70	281.73
Total[2]	**326.68**	**389.35**	**716.03**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.

Table 4.5.3.1-2
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Plant Communities and Other Cover Types Associated with Alternative 5 (acres)[1]

Plant Communities and Other Cover Types	P-1044 Alternative 1/5		P-1045 Alternative 3/5		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**42.35**	**42.35**	**15.96**	**15.96**	**58.31**	**58.31**
Riparian and Wetlands	1.58	1.58	0.05	0.05	1.63	1.63
Uplands	13.49	13.49	3.10	3.10	16.59	16.59
Other Cover Types	27.28	27.28	12.81	12.81	40.09	40.09
Temporary	**284.33**	**151.09**	**373.28**	**183.61**	**657.61**	**334.70**
Riparian and Wetlands	11.26	5.94	22.72	11.06	33.98	17.00
Uplands	122.69	70.46	179.55	86.99	302.24	157.45
Other Cover Types	150.38	74.69	171.12	85.56	321.50	160.25
Total[2]	**326.68**	**193.44**	**389.35**	**199.57**	**716.03**	**393.01**

[1] The table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) maximum impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts).
[2] Numbers may not sum exactly due to rounding.

Table 4.5.3.1-3
Potential Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 5 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 1/5	P-1045 – Alternative 3/5	Total[2]
Permanent	**0.07**	**0.03**	**0.10**
Wetland[3]	<0.005	-	<0.005
Southern Riparian Woodland	<0.005	-	<0.005
Other Waters[4]	0.07 (190)	0.03 (233)	0.10
Nonvegetated Channel	0.07 (190)	0.03 (233)	0.10
Temporary	**1.13**	**2.48**	**3.61**
Wetland[3]	0.57	2.00	2.57
Coastal and Valley Freshwater Marsh	-	0.03	0.03
Freshwater Seep	-	0.08	0.08
Mulefat Scrub	0.07	0.84	0.91
Southern Coastal Salt Marsh	-	0.33	0.33
Southern Riparian Woodland	0.49	-	0.49
Southern Willow Scrub	-	0.29	0.29
Vernal Pool	0.01	0.43	0.44
Other Waters[4]	0.57 (3,214)	0.48 (3,485)	1.05
Alkali Playa	-	0.05	0.05
Disturbed Wetland	0.07 (762)	<0.005 (40)	0.07
Fresh Water	-	0.01	0.01
Nonvegetated Channel	0.50 (2,452)	0.42 (3,445)	0.92
Total[2]	**1.21**	**2.50**	**3.71**

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 corridors, the anticipated temporary impacts are closer to 48%. Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.
[2] Numbers may not sum exactly due to rounding.
[3] Differences in the acreages presented in the above table that summarize the area of jurisdictional wetlands within project boundaries vs. acreages presented in the previous two tables that summarize the area of riparian and other wetland vegetation communities within project boundaries are attributable to the different methodologies used for vegetation mapping vs. delineating jurisdictional wetlands.
[4] Linear distance (feet) impacts are provided in parentheses.

Table 4.5.3.1-4
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Waters of the U.S. Associated with Alternative 5 (acres)[1]

Jurisdictional Waters	P-1044 – Alternative 1/5		P-1045 – Alternative 3/5		Total Maximum Impacts[2]	Total Anticipated Impacts[2]
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Permanent	**0.07**	**0.07**	**0.03**	**0.03**	**0.10**	**0.10**
Wetland	<0.005	<0.005			01.19	01.19
Other Waters[3]	0.07 (190)	0.07 (190)	0.03 (233)	0.03 (233)	0.10	0.10
Temporary	**1.13**	**0.54**	**2.48**	**1.11**	**3.61**	**1.65**
Wetland	0.56	0.27	2.00	0.89	2.56	1.16
Other Waters[3]	0.57 (3,214)	0.27 (3,214)	0.48 (3,485)	0.22 (3,485)	1.05	0.49
Total[2]	**1.20**	**0.62**	**2.50**	**1.14**	**3.70**	**1.76**

[1] This table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48% of temporary corridor impacts + 100% of temporary TLS impacts) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Both permanent and temporary impacts to other waters (e.g., nonwetland waters) will remain the same with regard to linear feet. Linear distance (feet) impacts are provided in parentheses.
[2] Numbers may not sum exactly due to rounding.
[3] Linear distance (feet) impacts are provided in parentheses.

Table 4.5.3.1-5
Mitigation for Permanent and Temporary Direct Impacts to Waters of the U.S. – Alternative 5 (acres)

Jurisdictional Waters	Mitigation Ratio	Potential Impacts[1]	Potential Mitigation[2,3]
Permanent	**-**	**-**	**2.48**
Wetland	2:1	1.19	2.38
Other Waters	1:1	0.10	0.10
Temporary	**-**	**-**	**1.65**
Wetland	1:1	1.16	1.16
Other Waters	1:1	0.49	0.49
Total	**-**	**-**	**4.13**

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table. Linear distance (feet) impacts are provided in parentheses.
[2] All temporary impacts to non-Waters of the U.S. will be restored in kind, on site at a 1:1 ratio. Because of the temporary nature of the impacts associated with installation of the communication lines, the plan will focus on the restoration of a variety of native habitats *in situ* after construction has been completed. A habitat mitigation plan for all temporary impacts to Waters of the U.S. will be developed in compliance with the CWA 404 mitigation regulations. All temporary impacts to WUS will be restored in kind, on site at a 1:1 ratio. Combine this plan to permanent impacts HMP.
[3] In compliance with CWA Section 404 permit process, a habitat mitigation plan detailing the mitigation measures for permanent impacts to wetlands and nonwetland Waters of the U.S., including jurisdictional vernal pools, must be prepared before impacts occurring.

Table 4.5.3.1-6
Potential Permanent and Temporary Direct Impacts to
Federally Listed Species Associated with Alternative 5 (acres)[1]

Species	P-1044 – Alternative 1/5	P-1045 – Alternative 3/5	Total[2]
Thread-leaved Brodiaea	0.92	0.08	1.00
Permanent	0.92	0.08	1.00
Riverside Fairy Shrimp	-	19 basins	19 basins
Permanent	-	19 basins	19 basins
San Diego Fairy Shrimp	30 basins	65 basins	95 basins
Permanent	30 basins	65 basins	95 basins
Branchinecta spp.	3 basins	17 basins	30 basins
Permanent	3 basins	17 basins	30 basins
Arroyo Toad (Aestivation/Dispersal)	25.63	6.66	32.29
Permanent	0.96	-	0.96
Coast Live Oak Woodland	0.09	-	0.09
Diegan Coastal Sage Scrub	0.64	-	0.64
Nonnative Grassland	0.02	-	0.02
Valley Needlegrass Grassland	0.20	-	0.20
Temporary	24.67	6.66	31.33
Coast Live Oak Woodland	0.85	-	0.85
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Diegan Coastal Sage Scrub	16.19	4.77	20.96
Disturbed Habitat	-	0.13	0.13
Mulefat Scrub	-	0.77	0.77
Nonnative Grassland	4.64	0.54	5.18
Southern Willow Scrub	-	0.45	0.45
Valley Needlegrass Grassland	2.98	-	2.98
Arroyo Toad (Breeding)	5.48	1.43	6.91
Permanent	0.41	-	0.41
Southern Riparian Woodland	0.29	-	0.29
Southern Willow Scrub	0.12	-	0.12
Temporary	5.07	1.43	6.50
Mulefat Scrub	0.59	<0.005	0.59
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	1.15	-	1.15
Southern Willow Scrub	3.28	1.43	4.71
Light-Footed Clapper Rail	-	0.39	0.39
Temporary	-	0.39	0.39
Southern Coastal Salt Marsh	-	0.30	0.30
Southern Willow Scrub	-	0.10	0.10
Coastal California Gnatcatcher	87.40	113.51	200.91
Permanent	9.41	2.43	11.84
Diegan Coastal Sage Scrub	9.41	2.43	11.84
Temporary	77.99	111.08	189.07

Species	P-1044 – Alternative 1/5	P-1045 – Alternative 3/5	Total[2]
Diegan Coastal Sage Scrub	77.99	111.08	189.07
Least Bell's Vireo	8.60	17.05	25.65
Permanent	1.32	0.04	1.36
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	1.20	<0.005	1.20
Southern Willow Scrub	0.12	0.03	0.15
Temporary	7.28	17.01	24.29
Coastal and Valley Freshwater Marsh	-	<0.005	<0.005
Disturbed Wetland	-	-	3.85
Mulefat Scrub	0.66	5.19	5.85
Open Water	-	<0.005	<0.005
Riparian Scrub	0.05	-	0.05
Southern Riparian Woodland	2.85	2.65	5.50
Southern Willow Scrub	3.72	9.17	12.89
Southwestern Willow Flycatcher	6.82	14.16	20.98
Permanent	0.22	0.04	0.26
Mulefat Scrub	-	0.01	0.01
Southern Riparian Woodland	0.10	<0.005	0.10
Southern Willow Scrub	0.12	0.03	0.15
Temporary	6.60	14.13	20.73
Mulefat Scrub	0.66	2.96	3.62
Southern Riparian Woodland	2.69	2.65	5.34
Southern Willow Scrub	3.25	8.51	11.76
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	-	5.98
Temporary	5.98	-	5.98
Diegan Coastal Sage Scrub	5.98	-	5.98
Pacific Pocket Mouse (Microhabitat)[3]	1.86	7.96	9.82
Temporary	1.86	7.96	9.82
Diegan Coastal Sage Scrub	1.81	6.41	8.22
Disturbed Habitat	-	0.86	0.86
Eucalyptus Woodland	-	0.01	0.01
Mulefat Scrub	0.05	0.05	0.10
Nonnative Grassland	-	0.63	0.63
Vernal Pool	-	<0.005	<0.005
Pacific Pocket Mouse (Suitable Habitat)[3]	5.28	26.02	31.30
Permanent	0.09	2.65	2.74
Diegan Coastal Sage Scrub	0.09	1.37	1.46
Disturbed Habitat	-	1.28	1.28
Nonnative Grassland	-	0.01	0.01
Temporary	5.19	23.37	28.56
Diegan Coastal Sage Scrub	5.09	18.10	23.19

Species	P-1044 – Alternative 1/5	P-1045 – Alternative 3/5	Total[2]
Disturbed Habitat	0.06	2.67	2.73
Eucalyptus Woodland	-	0.05	0.05
Mulefat Scrub	0.02	0.02	0.04
Nonnative Grassland	-	0.61	0.61
Riparian Scrub	-	0.27	0.27
Southern Riparian Woodland	0.02	-	0.02
Southern Willow Scrub	-	1.64	1.64

[1] Temporary impacts summarized in this table assume that 100% of the utility corridors would be disturbed through project construction. However, for the entire P-1044 and P-1045 project corridors, the anticipated temporary impacts are closer to 48%. See the following table for a comparison of the 100% vs. 48% temporary impacts, summarized for the primary resource categories.

[2] Numbers may not sum exactly due to rounding. Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for both MILCONs are not provided.

[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.5.3.1-7
Maximum vs. Anticipated Permanent and Temporary Direct Impacts to Federally Listed Species Associated with Alternative 5 (acres)[1]

Species	P-1044 – Alternative 1/5		P-1045 – Alternative 3/5		Total Maximum Impacts	Total Anticipated Impacts
	Maximum Impacts	Anticipated Impacts	Maximum Impacts	Anticipated Impacts		
Thread-leaved Brodiaea[2]	0.92	0.51	0.08	0.01	1.00	0.52
Riverside Fairy Shrimp[2]	-	-	19 basins	2 basins	19 basins	2 basins
San Diego Fairy Shrimp[2]	30 basins	14 basins	65 basins	10 basins	95 basins	24 basins
Branchinecta spp.[2]	3 basins	1 basin	17 basins	4 basins	20 basins	5 basins
Arroyo Toad (Aestivation/Dispersal)	25.63	12.88	6.66	3.37	32.29	16.25
Arroyo Toad (Breeding)	5.48	2.86	1.43	0.94	6.91	3.80
Light-footed Clapper Rail	-	-	0.39	0.24	0.39	0.24
Coastal California Gnatcatcher	87.40	57.66	113.51	60.13	200.91	117.79
Least Bell's Vireo	8.60	5.35	17.05	8.55	25.65	13.90
Southwestern Willow Flycatcher	6.82	3.91	14.16	7.12	20.98	11.03
Pacific Pocket Mouse (Occupied Habitat)[3]	5.98	2.87	-	-	5.98	2.87
Pacific Pocket Mouse (Microhabitat)[3]	1.86	1.04	7.96	3.97	9.82	5.01
Pacific Pocket Mouse (Suitable Habitat)[3]	5.28	3.19	26.02	14.48	31.30	17.67

[1] Table includes permanent and temporary impacts. For permanent impacts, this table includes the worst-case (100%) project impacts. For temporary impacts, this table summarizes the worst-case (100%) vs. anticipated (48%) project impacts. The anticipated 48% temporary impact applies to the entire P-1044 and P-1045 corridors. Anticipated Impacts = (100% Permanent Impacts) + (48% Temporary Impacts). Additionally, because this table presents impacts to occupied habitats calculated separately by species, it contains appreciable overlap or redundant counting when comparing acreages of different species within a single project. Therefore, totals of occupied habitat across all species for both MILCONs are not provided.

[2] While impacts within the construction corridor are considered temporary and reversible for most resources, all direct impacts to these species and their habitats are considered permanent.

[3] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

Table 4.5.3.1-8
Mitigation for Federally Listed Species – Alternative 5 (acres)[1]

Species	Mitigation Ratio	P-1044 – Alternative 1/5	Potential Mitigation	P-1045 – Alternative 3/5	Potential Mitigation	Total Potential Mitigation[7,8]
Plants						
Thread-leaved Brodiaea						
Permanent Impacts	2:1	0.51	1.02	0.01	0.02	1.04
Wildlife						
Riverside Fairy Shrimp						
Permanent Impacts	2:1[2]	-	-	2 basins	4 basins	4 basins
San Diego Fairy Shrimp						
Permanent Impacts	2:1[2]	14 basins	28 basins	10 basins	20 basins	48 basins
Arroyo Toad (Aestivation/ Dispersal)						
Permanent Impacts	0.5:1[4]	0.96	0.48	-	-	0.48
Temporary Impacts	1:1[3]	12.50	12.50	3.37	3.37	15.87
Arroyo Toad (Breeding)						
Permanent Impacts	2:1[4]	0.41	0.82	-	-	0.82
Temporary Impacts	1:1[4]	2.45	2.45	0.94	0.94	3.39
Light-footed Clapper Rail						
Temporary Impacts	1:1[3]	-	-	0.24	0.24	0.24
Coastal California Gnatcatcher						
Permanent Impacts	2:1	9.41	18.82	2.43	4.86	23.68
Temporary Impacts	1:1[3]	48.25	48.25	57.70	57.70	105.95
Least Bell's Vireo						
Permanent Impacts	2:1[4]	1.32	2.64	0.04	0.08	2.72
Temporary Impacts	1:1[4]	4.03	4.03	8.58	8.58	12.61
Southwestern Willow Flycatcher						
Permanent Impacts	2:1[4]	0.22	0.44	0.04	0.08	0.52
Temporary Impacts	1:1[4]	3.69	3.69	7.09	7.09	10.78
Pacific Pocket Mouse (Occupied Habitat)[5]						
Temporary Impacts	1:1[3,6]	2.87	2.87	-	-	2.87
Pacific Pocket Mouse (Microhabitat)[5]						
Temporary Impacts	1:1[3,6]	1.04	1.04	3.97	3.97	5.01

Species	Mitigation Ratio	P-1044 – Alternative 1/5	Potential Mitigation	P-1045 – Alternative 3/5	Potential Mitigation	Total Potential Mitigation[7,8]
Pacific Pocket Mouse (Suitable Habitat)[5]						
Permanent Impacts	0:1[6]	0.09	0.0	2.64	0.0	0.0
Temporary Impacts	1:1[3,6]	3.10	3.10	11.82	11.82	14.92

[1] Potential temporary impacts noted above are the anticipated (48%) project impacts as summarized in the previous table.

[2] Impacts noted for *Branchinecta* spp. in the above impact table are not included in this mitigation summary. Findings from the 2011/2012 protocol surveys and USFWS consultation will determine whether additional mitigation for listed fairy shrimp species would be required.

[3] Areas temporarily impacted by construction activities would be restored in-place (1:1) to native vegetation following construction.

[4] Mitigation for impacts to arroyo toad (aestivation) would be fulfilled through restoration of riparian vegetation at a 0.5:1 ratio as noted above. Alternatively, MCBCP may restore upland habitat at a ratio of 2:1. Per the Riparian BO (USFWS 1995), mitigation for impacts to arroyo toad (breeding), least Bell's vireo, and southwestern willow flycatcher would be fulfilled through mitigation of anticipated project impacts to riparian habitat (Table 4.1.3.1-4) regardless of occupation by a sensitive species, as discussed in Table 4.1.3.1-2.

[5] Occupied Pacific pocket mouse habitat – a 150-foot buffer around a Pacific pocket mouse location, Microhabitat – highly suitable habitat with a high potential to support Pacific pocket mouse, Suitable habitat – habitat with a low to moderate potential to support Pacific pocket mouse.

[6] In addition to in-place restoration, MCBCP would provide additional compensation for areas of suitable, but unoccupied habitat for Pacific pocket mouse that are temporarily impacted by construction activities. As stated in the FBO, the MCBCP would contribute to the San Diego Zoological Society's effort to establish a captive Pacific pocket mouse population and reintroduce this species to locations within their former distribution. Alternatively, MCBCP may restore Pacific pocket mouse habitat outside the project footprint; however, if that alternative is pursued then consultation with USFWS would need to be re-initiated. No mitigation is required to compensate for the unavoidable permanent impacts to unoccupied, but suitable Pacific pocket mouse habitat. As noted in the FBO, the USFWS determined that such impacts are not anticipated to substantially affect the availability of habitat that is likely to be used by this species.

[7] Numbers may not sum exactly due to rounding.

[8] Where applicable, permanent impacts to listed species riparian habitat will be offset by restoring riparian habitat in the Lower Santa Margarita River. Permanent impacts to the coastal California gnatcatcher habitat (coastal sage scrub or thread-leaved brodiaea would be offset at a 2:1 ratio through restoration of habitat in the Lima Coastal Sage Scrub Restoration site within the Lima Training Area, and vernal pool mitigation should take place in the San Onofre State Park Lease Area Vernal Pool Mesa site, or other available sites as determined by ES Land Management Branch and USFWS.

4.5.3.2 P-1044 Alternative 1/Alternative 5

Permanent and temporary direct and indirect impacts as well as mitigation for P-1044 Alternative 1/Alternative 5 were discussed in Section 4.1.3.2.

4.5.3.3 P-1045 Alternative 3/Alternative 5

Permanent and temporary direct and indirect impacts as well as mitigation for P-1045 Alternative 3/Alternative 5 were discussed in Section 4.3.3.3.

4.5.4 Cultural Resources

4.5.4.1 Both MILCONs (Alternative 5)

Cultural resources within Alternative 5 are summarized in Table 4.5.4-1. Alternative 5 is composed of P-1044 Alternative 1 and P-1045 Alternative 3. A total of 26 resources are identified, of which 16 are ineligible for the NRHP and 10 have been evaluated as eligible or are listed in the NRHP. Impacts to ineligible sites resulting from Alternative 5 would not be significant.

Table 4.5.4-1
Cultural Resources within Alternative 5 APE

NRHP Status	P-1044 Alternative 1/5	P-1045 Alternative 3/5	Total
Eligible/Listed	5	5	10
Ineligible	6	10	16
Total	**11**	**15**	**26**

Impacts

Because most of the archaeological properties within the APE of Alternative 5 consist of prehistoric archaeological deposits, most significant impacts would result from physical destruction or alteration of cultural resources that are eligible under NRHP criterion D. Properties that are eligible under NRHP criteria A, B, or C could also be subject to visual or audible impacts if activities related to Alternative 5 diminish the integrity of their settings. The PA was signed by SHPO on 7 August 2012.

Mitigation

Mitigation of impacts to cultural properties resulting from Alternative 5 would be as described in Section 4.1.4.1.

4.5.4.2 P-1044 Alternative 1/Alternative 5

Impacts

Impacts to cultural resources from P-1044 Alternative 1/Alternative 5 would be the same as for P-1044 Alternative 1 (Section 4.1.4.2).

Mitigation

Mitigation of impacts to cultural properties resulting from P-1044 Alternative 1/Alternative 5 would be as described in Section 4.1.4.1.

4.5.4.3 P-1045 Alternative 3/Alternative 5

Impacts

Impacts to cultural resources for P-1045 Alternative 3/Alternative 5 would be the same as for P-1045 Alternative 3 (Section 4.3.4.3).

Mitigation

Mitigation of impacts to cultural properties resulting from P-1045 Alternative 3/Alternative 5 would be as described in Section 4.1.4.1.

4.5.5 Land Use

4.5.5.1 Both MILCONs (Alternative 5)

Impacts

Alternative 5 is composed of P-1044 Alternative 1 and P-1045 Alternative 3. The discussion in Section 4.1.5.1 of general impacts of Alternative 1 is applicable to Alternative 5.

No significant land use impacts would result from the implementation of P-1044 Alternative 1 and P-1045 Alternative 3 included in Alternative 5.

Mitigation

No mitigation measures are proposed.

4.5.5.2 P-1044 Alternative 1/Alternative 5

Impacts

Potential impacts associated with P-1044 Alternative 1/Alternative 5 are described in Section 4.1.5.2. No significant land use impacts would result.

Mitigation

No mitigation measures are proposed.

4.5.5.3 P-1045 Alternative 3/Alternative 5

Impacts

Potential impacts associated with P-1045 Alternative 3/Alternative 5 are described in Section 4.3.5.3. No significant land use impacts would result.

Mitigation

No mitigation measures are proposed.

4.5.6 Visual Resources

4.5.6.1 Both MILCONs (Alternative 5)

Impacts

Visual features and impacts common to both project alternatives included in Alternative 5 (P-1044 Alternative 1 and P-1045 Alternative 3) would be the same as those described for Alternative 1 in Section 4.1.6.1.

Mitigation

No mitigation measures are proposed.

4.5.6.2 P-1044 Alternative 1/Alternative 5

Impacts

Potential impacts associated with P-1044 Alternative 1/Alternative 5 are described in Section 4.1.6.2. Visual effects would not be significant.

Mitigation

No mitigation measures are proposed.

4.5.6.3 P-1045 Alternative 3/Alternative 5

Impacts

Potential impacts associated with P-1045 Alternative 3/Alternative 5 are described in Section 4.3.6.3. Visual effects would not be significant.

Mitigation

No mitigation measures are proposed.

4.5.7 Socioeconomics and Environmental Justice

4.5.7.1 Both MILCONs (Alternative 5)

Methodology

The methodological approach and data sources utilized to assess socioeconomic impacts of Alternative 5 are the same as described for Alternative 1 in Section 4.1.7.1.

Impacts

Construction

REGIONAL EMPLOYMENT AND ECONOMIC IMPACTS

For all work included in Alternative 5, the design and construction work on the project features would be by civilian contracting firms that would nearly exclusively draw their employees from a labor pool outside of MCBCP. Given the nature of the construction and that the project sites are on a military base, no increase in population would occur from workers relocating to MCBCP, and no increase in demand for on-Base housing would occur. Most of the construction work would be performed by workers from a labor pool within commuting distance of MCBCP, such that off-Base demand for temporary construction worker housing would be minimal. Some incidental construction-related employment opportunities may arise for military dependents, but the socioeconomic impact of these opportunities would be negligible.

Total funding for both MILCONs included in the proposed action is estimated to be $206 million, with funding running from FY 2012 through FY 2013. As shown in Table 4.5.7-1, total funding varies from year to year. Fiscal year of funding, however, differs from calendar year of project expenditures. Expenditures by calendar year, based on estimated start dates and estimated duration of construction by project, are shown in Table 4.5.7-2. For the purposes of economic modeling, it was assumed that (1) all funding would be spent on construction, (2) construction schedules would be as illustrated in Table 4.5.7-2, and (3) monthly construction expenditures would remain even across all months of the construction period. As both the level of funding and the timing of construction are subject to revision, the purpose of the modeling is to facilitate an order-of-magnitude economic output and employment impact assessment rather than an exact projection of economic output and employment levels.

Summaries of the modeling of the economic activity related to construction for the three-county and six-county regions are presented in Tables 4.5.7-3 and 4.5.7-4, respectively. These results combine direct, indirect, and induced economic output and employment results to give an overall economic output and employment figure by region for each construction year. Existing regional economic output and employment baseline information by sector is also provided to allow a comparison of impacts to existing conditions. Details of direct, indirect, and induced economic output and employment by sector by year for the three-county and six-county regions are provided in Appendix F, Socioeconomic Employment and Economic Output Impact Tables.

As shown, economic output for the three-county region would peak at about $131 million per year over the course of construction, and employment would peak at about 765 jobs per year. The majority of the total proposed action related economic output in each year would consist of direct output from the construction sector, and the majority of total employment would consist of direct employment in the construction industry. For the six-county region, economic output would peak at about $219 million (an increase of about $88 million over the three-county region) during both construction expenditure years (2013 and 2014) and employment would peak at approximately 1,241 jobs (an increase of about 476 jobs over the three-county region) for 2013 and 2014. Some highly localized economic activity would likely occur with small-scale purchases of goods and services by construction companies and their workers, resulting in a minor beneficial impact to the on-Base economy.

Localized Socioeconomic Impacts

Localized, temporary socioeconomic impacts could potentially accrue due to the proximity of sensitive receptors (such as family housing areas, school areas, child-oriented facilities, hospitals, and BEQs, among others) to the construction corridors for linear project components or the construction limits of other project facilities. These localized socioeconomic impacts could result from construction noise, a temporary degradation of air quality, or a decrease in traffic level of service and/or accessibility. A description of sensitive receptors closest to each of the project corridors and facilities project limits is presented in the following discussions of project alternatives.

Facility Operation

Regional Employment and Economic Impacts

At present, employment related to operations of on-Base utilities infrastructure facilities involves a limited number of both federal civilian employees and private sector contractor personnel, but specific employment figures are not readily available (Personal communication, MCBCP Public Works Office, via e-mail 28 January 2009). While some new long-term employment could be created through the additional labor demand brought about by operation of the new portions of the water distribution system, the number of new employees would likely be minimal. It is expected that initial employment at the new facilities would be dominated by contractor personnel, but that over time these positions would come to be occupied predominantly by regular (federal civilian) employees.

LOCALIZED SOCIOECONOMIC IMPACTS

No localized socioeconomic impacts would be anticipated from the postconstruction operation of any of the proposed action MILCONs in Alternative 5. Project linear features would be underground and would have no adverse effects on sensitive receptors. Aboveground facilities would not be near enough to sensitive receptors to cause adverse effects. Whether aboveground or underground, completed MILCON project alternatives in Alternative 5 would not have any socioeconomic impact.

Environmental Justice

When the proposed action projects included in Alternative 5 are considered as a group, project linear corridor and facilities project limits would be located within five different populated census blocks on MCBCP (9005, 9008, 9015, 9032, and 9040), the same blocks potentially affected by Alternative 3. These blocks have a combined population of 26,687 persons, which is 73.8 percent of the total population of MCBCP. For this group of blocks combined, total minority population is 43.8 percent, compared to a total minority population of 43.1 percent for MCBCP as a whole, and less than the minority percentage of San Diego, Orange, and Riverside counties. As a result, the area affected by Alternative 5 would not have a minority population of concern with respect to environmental justice. In terms of low-income status (as defined by percentage of persons living below poverty), statistics are not available for the Alternative 5 blocks specifically. For MCBCP as a whole, however, approximately 8.4 percent of the population was below poverty level as of the last decennial census, a lower figure than was the case in San Diego, Orange, and Riverside counties, which ranged between 10.3 and 14.2 percent. As a result, the project area is not considered to have a low-income population of concern with respect to environmental justice issues. Further, no significant socioeconomic or other directly relevant environmental impacts are anticipated for Alternative 5, and there is no indication that there would be any disproportionately high and adverse impacts that would accrue to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.5.7.2 P-1044 Alternative 1/Alternative 5

Impacts

Regional economic and employment impacts of P-1044 Alternative 1/Alternative 5 would be the same as Alternative 1 and the project features of P-1044 Alternative 1/Alternative 5 would be located in the same proximity to potentially sensitive receptors as the project features of P-1044 Alternative 1, as described in Section 4.1.7.2. Potential impacts for P-1044 Alternative 1/Alternative 5 would be the same as for P-1044 Alternative 1. No significant impacts are anticipated.

No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

4.5.7.3 P-1045 Alternative 3/Alternative 5

Impacts

Regional economic and employment impacts of P-1045 Alternative 3/Alternative 5 would be the same as Alternative 3 and the linear features of P-1045 Alternative 3/Alternative 5 would be in the same proximity to potentially sensitive receptors as P-1045 Alternative 1, described in Section 4.1.7.3, with one exception. For P-1045 Alternative 3/Alternative 5, the project corridor would not be near BEQs in the 33 Area (Margarita). No significant impacts are anticipated.

There would not be any disproportionately high and adverse impacts to minority or low-income populations. No environmental justice impacts have been identified.

Mitigation

No mitigation measures are proposed.

Table 4.5.7-1
Funding by Fiscal Year ($ Millions) – Alternative 5

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$101	$0	$101
FY 2012	$0	$105	$105
All Years	**$101**	**$105**	**$206**

Note: All Years total may vary from sum of FY subtotals due to rounding.

Table 4.5.7-2
Construction Schedule and Expenditures
by Project, Month, and Year – Alternative 5

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.20	$50.5	$50.5	$101
P-1045	April 2013	18	$5.80	$52.5	$52.5	$105
Total				**$103.0**	**$103.0**	**$206**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table 4.5.7-3
Alternative 5 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 3-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 3-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.2	$0.2	32,988	1.8	1.8
Mining	$1,241.7	$0.2	$0.2	3,318	0.7	0.7
Utilities	$15,558.8	$0.8	$0.8	12,432	0.6	0.6
Construction	$51,446.2	$82.8	$82.8	337,572	467.1	467.1
Manufacturing	$135,386.5	$6.8	$6.8	341,197	17.9	17.9
Wholesale Trade	$39,026.3	$3.1	$3.1	181,370	13.5	13.5
Retail Trade	$39,116.0	$4.0	$4.0	488,360	47.0	47.0
Transportation and Warehousing	$10,754.6	$0.8	$0.8	86,583	5.8	5.8
Information	$44,927.0	$2.4	$2.4	89,139	4.3	4.3
Finance and Insurance	$51,476.1	$3.9	$3.9	226,444	15.6	15.6
Real Estate and Rental	$102,950.6	$7.4	$7.4	366,409	18.1	18.1
Professional, Scientific, and Technical Services	$57,707.5	$8.0	$8.0	391,226	54.3	54.3
Management	$9,482.5	$0.4	$0.4	48,580	2.2	2.2
Administrative and Waste Services	$23,778.3	$1.6	$1.6	369,193	24.3	24.3
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.2	6.2
Health and Social Services	$34,208.9	$2.9	$2.9	342,697	27.8	27.8
Arts, Entertainment, and Recreation	$12,255.8	$0.7	$0.7	125,303	7.3	7.3
Accommodation and Food Services	$24,417.9	$1.4	$1.4	357,882	22.1	22.1
Other	$19,513.1	$2.2	$2.2	271,933	25.2	25.2
Government	$64,451.0	$0.6	$0.6	656,931	3.0	3.0
Total	**$745,750.4**	**$130.5**	**$130.5**	**4,806,509**	**764.6**	**764.6**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

Table 4.5.7-4
Alternative 5 Projects Combined Economic Output and Employment Impacts by Industry Sector by Year for the San Diego-Orange-Riverside-Los Angeles-San Bernardino-Imperial Counties Region

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing 6-County Output	2013 Total Project Impact	2014 Total Project Impact	Existing 6-County Employment	2013 Total Project Impact	2014 Total Project Impact
Agriculture, Forestry, Fishing, and Hunting	$7,850.5	$0.4	$0.4	59,069	2.3	2.3
Mining	$8,697.3	$1.4	$1.4	14,975	2.6	2.6
Utilities	$31,705.3	$1.6	$1.6	29,926	1.4	1.4
Construction	$92,642.0	$102.6	$102.6	610,158	583.1	583.1
Manufacturing	$358,362.8	$24.5	$24.5	858,357	50.7	50.7
Wholesale Trade	$94,509.4	$6.4	$6.4	493,501	31.5	31.5
Retail Trade	$91,980.4	$7.9	$7.9	1,132,121	91.9	91.9
Transportation and Warehousing	$43,502.0	$3.5	$3.5	325,556	25.0	25.0
Information	$154,948.9	$6.8	$6.8	368,602	12.2	12.2
Finance and Insurance	$115,155.1	$9.2	$9.2	485,909	36.3	36.3
Real Estate and Rental	$225,259.1	$15.3	$15.3	729,263	37.2	37.2
Professional, Scientific, and Technical Services	$140,355.6	$15.5	$15.5	936,634	101.0	101.0
Management	$23,983.7	$1.3	$1.3	110,862	6.0	6.0
Administrative and Waste Services	$51,537.5	$3.6	$3.6	799,005	55.0	55.0
Educational Services	$13,904.6	$0.9	$0.9	220,354	14.9	14.9
Health and Social Services	$89,328.8	$6.7	$6.7	916,303	65.5	65.5
Arts, Entertainment, and Recreation	$36,319.5	$1.5	$1.5	319,858	14.5	14.5
Accommodation and Food Services	$52,206.9	$3.2	$3.2	771,455	49.9	49.9
Other	$48,290.5	$4.5	$4.5	715,259	52.4	52.4
Government	$139,840.0	$1.5	$1.5	1,450,595	7.7	7.7
Total	**$1,820,379.9**	**$218.6**	**$218.6**	**11,347,763**	**1,241.0**	**1,241.0**

Notes: Total Project Impact = Combined direct, indirect, and induced impacts; FTEs = full-time equivalent jobs
Source: Minnesota IMPLAN Group 2011

4.5.8 Traffic

4.5.8.1 Methodology (Alternative 5)

The methodology used to evaluate impacts of Alternative 5 is the same as explained in Section 4.1.8.1 for Alternative 1. The estimated traffic volumes generated by Alternative 5 would be equal to the traffic shown in Alternative 1, even though the specific locations of some project components included in Alternative 5 (specifically those associated with P-1045) vary from those included in Alternative 1. The differences between projects in the alternatives would not change the number of construction crews needed to complete the project within the given timeline. Therefore, traffic patterns for construction traffic related to the project would be the same as those analyzed in Alternative 1. Further, the roadway network would remain the same.

4.5.8.2 Impacts

Impacts of Alternative 5 would be equal to or less than the results found in Alternative 1. Refer to Section 4.1.8 for traffic impacts of Alternative 5.

4.5.8.3 Mitigation

Mitigation recommended for Alternative 1 in Section 4.1.8.3 would be applicable to Alternative 5.

4.5.9 Air Quality

4.5.9.1 Both MILCONs (Alternative 5)

Methodology and the related conditions, as discussed in Section 4.1.9.1, are applicable to Alternative 5 as well as to Alternative 1.

Annual project emissions estimated for Alternative 5: P-1044 Alternative 1 and P-1045 Alternative 3, are grouped by calendar year in SDAB and SCAB, as shown in Tables 4.5.9-1 and 4.5.9-2, respectively. The URBEMIS model output data are included in Appendix G.

Table 4.5.9-1
Estimated Annual Air Pollutant Emissions of
Alternative 5 in SDAB

MILCON Projects (by year)	Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 1	2	14	13	0	19	4
P-1045 Alternative 3	2	15	15	0	25	6
Total 2013 Emissions	**4**	**29**	**28**	**0**	**44**	**10**
2014						
P-1044 Alternative 1	2	15	15	0	19	4
P-1045 Alternative 3	2	17	18	0	25	6
Total 2014 Emissions	**4**	**32**	**33**	**0**	**44**	**10**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	No	No	No

Totals rounded to the nearest whole number.

Table 4.5.9-2
Estimated Air Pollutant Emissions of
Alternative 5 in SCAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 1	<1	<1	<1	0	<1	<1
Total 2013 Annual Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	No	No	No

Totals rounded to the nearest whole number.

As shown in Table 4.5.9-1, the total estimated annual emissions of VOCs, NO_X, and CO for 2013 and 2014 for Alternative 5 in SDAB are less than the *de minimis* levels for these pollutants. As shown in Table 4.5.9-2, the total estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for 2012 for Alternative 5 in SCAB are less than the *de minimis* levels for these pollutants. Therefore, Alternative 5 in SDAB and SCAB would conform to the SIP and a conformity determination is not required.

The same measures recommended for Alternative 1 to minimize fugitive dust during construction are recommended for Alternative 5.

<u>Mitigation</u>

No mitigation measures are proposed.

4.5.9.2 P-1044 Alternative 1/Alternative 5

<u>Impacts</u>

Annual project emissions for P-1044 (Alternative 1/Alternative 5) in SDAB and SCAB were estimated by URBEMIS in Section 4.1.9.2 for P-1044 (Alternative 1), as shown in Tables 4.1.9-3 and 4.1.9-4. The URBEMIS model output data are included in Appendix G.

As shown in Table 4.1.9-3, the estimated annual emissions of VOCs, NO_X, and CO for P-1044 (Alternative 1/Alternative 5) in SDAB in 2012 and 2013 are less than the *de minimis* levels for these pollutants. As shown in Table 4.1.9-4, the estimated annual emissions of VOCs, NO_X, CO, PM_{10}, and $PM_{2.5}$ for P-1044 (Alternative 1/Alternative 5) in SCAB in 2012 are less than the *de minimis* levels for these pollutants. Therefore, P-1044 (Alternative 1/Alternative 5) would conform to the SIP and a conformity determination is not required.

The same measures recommended for P-1044 Alternative 1 to minimize fugitive dust during construction are recommended for P-1044 Alternative 1/Alternative 5.

<u>Mitigation</u>

No mitigation measures are proposed.

4.5.9.3 P-1045 Alternative 3/Alternative 5

<u>Impacts</u>

Annual project emissions for P-1045 (Alternative 3/Alternative 5) were estimated by URBEMIS, in Section 4.3.9.3 for P-1045 (Alternative 3), as shown in Table 4.3.9-5. The URBEMIS model output data are included in Appendix G.

As shown in Table 4.3.9-5, the estimated annual emissions of VOCs, NO_X, and CO for P-1045 (Alternative 3) in SDAB in 2013 and 2014 are less than the *de minimis* levels for these pollutants. Therefore, P-1045 (Alternative 3) would conform to the SIP and a conformity determination is not required.

<u>Mitigation</u>

No mitigation measures are proposed.

4.5.10 Noise

4.5.10.1 Both MILCONs (Alternative 5)

Methodology and impacts, and the conditions related to them, as discussed in Section 4.1.9.1, are applicable to Alternative 5 as well as to Alternative 1.

No significant impacts are anticipated. No mitigation measures are proposed.

4.5.10.2 P-1044 Alternative 1/Alternative 5

Impacts

P-1044 Alternative 1/Alternative 5 would generate the same construction and operational noise levels as P-1044 Alternative 1 in proximity to the same receptors. Therefore, pipeline construction noise impacts would be the same as for P-1044 Alternative 1, and less than significant. The Northern AWT would be located on the same site as for P-1044 Alternative 1.

Mitigation

No mitigation measures are proposed.

4.5.10.3 P-1045 Alternative 3/Alternative 5

Impacts

P-1045 Alternative 3/Alternative 5 would generate noise levels similar to P-1045 Alternative 1, along the same route, except to a shorter extent. However, noise impacts would be the same as for that portion of P-1045 Alternative 1, and less than significant.

Mitigation

No mitigation measures are proposed.

4.5.11 Public Health and Safety

4.5.11.1 Both MILCONs (Alternative 5)

Methodology

The methodological approach and data sources utilized to assess public health and safety impacts of Alternative 5 are same as described for Alternative 1 in Section 4.1.11.1.

Impacts

The presence of active UST/AST sites, hazardous waste storage sites, RFA sites, and IR sites; and the potential for LBP, PCBs, and asbestos within the Alternative 5 alignment corridors are minimal.

- There are no hazardous waste storage sites, ESQD arcs, electromagnetic hazard areas, or APZs in Alternative 5.
- In Alternative 5, IR Site 33 is found within the project corridor of P-1044, while IR Site 32 is found within the project corridor of P-1045.
- In Alternative 5, the only corridor in which UST sites are found is P-1044, which has 11 UST sites present (active LUST Site 62507, and closed UST Sites 520400, 52291, 52651, 52710, 62420, 62435, 62436, 62520, 62535, and 62536). No other project corridors/sites contain UST sites.
- In Alternative 5, the one alignment corridor in which RFA sites are found is P-1044, which has four RFA sites present (active RFA Site 220 and no further action RFA Sites 199, 221, and 225). No other project corridors/sites contain RFA sites.
- In Alternative 5, the two alignment corridors in which ASTs are found are P-1044 and P-1045, which have seven ASTs present (ASTs 52021, 52410, 52710, 61513, 20816, 31520-1, and 31523-P). No other project corridors/sites contain ASTs.
- In Alternative 5, two alignment corridors in which training areas are found are P-1044 and P-1045, which have nine training areas present (Range 207 Military Range Area, Range 14 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Range

503 Firing Line, Range 505 Firing Line, Dudded Impact Area 1/503 Hand Grenade Range, and Non-Dudded Impact Area/Edson Range). No other project corridors/sites contain training areas.

- In Alternative 5, the only alignment corridor in which pesticides are found is P-1044, which has one pesticide site (former North Agricultural Lease Site). No other project corridors/sites contain pesticide sites.

In addition, all alignments have RFA, UST, or IR sites near enough to the project corridors to have an effect on construction. Generally, the risk of having these sites close to the Alternative 5 project corridors/sites is the potential to encounter contaminated groundwater when digging or excavating and during dewatering operations within the construction area. A summary of the sites and nearby corridors is provided in Table 4.5.11-1.

The northern portion of MCBCP is laden with former and current training ranges. The potential presence of MEC and small arms rounds is real. When excavation, grading, and/or digging occurs within the boundaries of a former or current range, all work would be accomplished with every effort to maximize safety and prevent the spread of any potential contamination or the release of any potential existing contaminants to the environment in accordance with all federal, state, and local laws, regulations, and guidelines.

Before construction of any alignment, ES would review construction plans along with the current list of hazardous material sites on-Base to ensure that sites with the potential to affect construction were identified. Construction would not be allowed within the vicinity of those hazardous material sites without assurance that the site was remediated or that the influence of the hazardous materials site would not affect the construction area.

Table 4.5.11-1
RFA, UST, IR, and AST Sites within Alternative 5
Project Corridors/Sites or Adjacent Buffers

Project Corridor/Site	Type of Site: RFA – Within Project Corridor/ Site	RFA – Within 50-Foot Buffer	UST – Within Project Corridor/Site	UST – Within 200-Foot Buffer	IR – Within Project Corridor/ Site	IR – Within 500-Foot Buffer	AST – Within Project Corridor/ Site	AST – Within 10-Foot Buffer	Military Training Areas, Impact Areas, Live-Fire Facilities, and ESQD Arcs within the Project Corridors/Sites
P-1044 Alternative 1	199(NFA), 220(LSI), 221(NFA), 225(NFA)	185(NFA), 192(NFA), 218(NFA), 236(NFA), 280(NFA)	520400(Closed), 52291(Closed), 52651(Closed), 52710(Closed), 62420(Closed), 62435(Closed), 62436(Closed), 62520(Closed), 62535(Closed), 62536(Closed), 62507	51091-6, 51091-7, 51091-8, 51091-9, 520167-1, 520167-2, 62507-3, 62507-4	33	1I-2(Closed), 34(Closed), 36(Closed)	52021, 52410, 52710, 61513	-	Range 207 Military Range Area
P-1045 Alternative 3	-	168(NFA), 278(NFA), 279(NFA)	-	-	1D	7,32(Closed)	20816, 31520-1, 31523-P, 52021	41611	Range 14 Artillery Firing Area, Range 15 Artillery Firing Area, Range 16 Artillery Firing Area, Range D704 Live Fire and Maneuver, Range 503 Firing Line, Range 505 Firing Line, Dudded Impact Area 1/503 Hand Grenade Range, Non-Dudded Impact Area/Edson Range

LSI = Limited Site Investigation; NFA = No Further Action

A number of child-oriented facilities are near enough to the alignments for noise and dust during construction to be of concern:

- San Onofre Elementary School
- San Onofre Child Development Center
- San Onofre Youth Center
- Stuart Mesa Elementary School
- Stuart Mesa Center
- Wire Mountain Youth Center
- Santa Margarita Elementary School
- Browne Child Development Center
- Abby Reinke Community Center

To eliminate disturbances to children that may come from construction, such as noise, dust, and unacceptable air quality, measures such as dust abatement and BMPs that would reduce other construction impacts would be applied. These measures are summarized in Section 2.5. When successfully implemented, these measures would not adversely alter existing environmental health conditions or impose additional safety risks to children and therefore would minimize the possibility of project-related adverse impacts to children.

Mitigation

No mitigation measures are proposed.

4.5.11.2 P-1044 Alternative 1/Alternative 5

Impacts

Potential impacts related to P-1044 Alternative 1/Alternative 5 are described in Section 4.1.11.2. With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area.

Mitigation

No mitigation measures are proposed.

4.5.11.3 P-1045 Alternative 3/Alternative 5

Impacts

Potential impacts related to P-1045 Alternative 3/Alternative 5 are described in Section 4.3.11.3. With the implementation of the measures discussed above and listed in Section 2.5.6, no significant public health and safety impacts would occur as a result of the implementation of the project corridor/site in this area.

Mitigation

No mitigation measures are proposed.

4.5.12 Services and Utilities

4.5.12.1 Both MILCONs (Alternative 5)

Methodology

The assessment of impacts on services and utilities for Alternative 5 followed the same procedures as for Alternative 2, as discussed in Section 4.2.12.1.

Impacts

In terms of impacts on services and utilities, there would be negligible differences between Alternative 5 and Alternative 2, as discussed in Section 4.2.12.1. No significant impacts would result from implementation of Alternative 5.

Mitigation

No mitigation measures are proposed.

4.5.13 Coastal Zone Resources

4.5.13.1 Both MILCONs (Alternative 5)

Impacts

The coastal zone impacts of Alternative 5 would be similar to those discussed in Section 4.1.13.1. There would be some differences in the locations of the inland drainages crossed and where TLS crossings are proposed for P-1045 (but not for P-1044). Specifically, P-1045 Alternative 3/Alternative 5 would not have a TLS crossing of the Santa Margarita River between Basilone Road and Vandegrift Boulevard northeast of MCAS Camp Pendleton as it would under P-1045 Alternative 1.

Only P-1044 Alternative 1/Alternative 5 could have project elements that extend into the coastal zone. Potential impacts would be the same as described for P-1044 Alternative 1 in Section 4.1.13.1.

Alternative 5 would be subject to the same regulatory and permit controls discussed for Alternative 1 in Section 4.1.13.1. A CCD has been prepared for Alternative 5 and will be submitted to the CCC.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

4.5.14 Marine Resources

Marine resources are covered in this section; please see Section 4.5.2 for related impacts to water quality and hydrology and Section 4.5.3 for related impacts to biological resources.

Impacts related to proposed brine discharge from the Northern AWT RO facility on marine resources are addressed in this section. Indirect effects on marine resources from implementation of projects inland are discussed in Section 4.5.13, Coastal Zone Resources.

4.5.14.1 P-1044 Alternative 1/Alternative 5

Impacts

Marine resource impacts of P-1044 Alternative 1/Alternative 5 would be similar to those discussed in Section 4.1.14.1. As discussed in P-1044 Alternative 1, the use of the SONGS outfall conduit is included only at a programmatic NEPA level of analysis and is not part of the proposed action at this time.

Mitigation

No mitigation other than compliance with resource agency regulations and permit requirements is proposed.

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4.6 NO ACTION ALTERNATIVE

4.6.1 Geology and Soils

Impacts

The No Action Alternative would not involve any construction or earthwork and would not result in any impacts to geology and soils.

Mitigation

No mitigation measures are proposed.

4.6.2 Water Quality and Hydrology

Impacts

Without the proposed water treatment improvements, well water obtained from the Base wells would continue to exceed the SDWA's secondary standard (500 mg/L) for TDS and would remain in noncompliance with Title 22 for reuse. TOC levels would remain unchanged and raw well water characteristics would continue to cause possible leaching from system-related bronze or brass fittings, bearings or seals and maintain high levels of copper in the wastewater sludge. As a result, some of the sludge from the wastewater plants would continue to be classified as hazardous waste requiring continued special disposal requirements and greater disposal costs. Additionally, the risk of old and deteriorating pipelines rupturing would increase under this alternative. Rupturing of any type of water pipeline could result in additional off-site sediment transport and pollutant exposure.

Mitigation

No mitigation measures are proposed.

4.6.3 Biological Resources

Impacts

The No Action Alternative would not impact any biological resources.

Mitigation

No mitigation is proposed.

4.6.4 Cultural Resources

Impacts

The No Action Alternative would not cause any impacts to properties that are listed in or eligible for the NRHP.

Mitigation

No mitigation is proposed.

4.6.5 Land Use

Impacts

Without the proposed water infrastructure improvements, the Base's existing water infrastructure system would continue in its deteriorating conditions without adequate redundancy/backup. Portions of the Base would experience more frequent interruptions to water delivery system services. Repair and maintenance of this system would become more frequent and more expensive.

Mitigation

No mitigation measures are proposed.

4.6.6 Visual Resources

Impacts

No construction and no permanent features that would affect visual resources would occur under this alternative.

Mitigation

No mitigation measures are proposed.

4.6.7 Socioeconomics and Environmental Justice

Impacts

Under the No Action Alternative, the proposed action would not be implemented and existing socioeconomic conditions would remain unchanged. The P-1044 pipeline to be replaced that extends from Basilone Road to the reservoirs above San Onofre II Housing is an aging pipeline. If a break occurred, a flow rate of 13,700 gallons per minute would result until closed. The response time in an unexpected blowout would be approximately 1 hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire. This type of pipeline failure under the No Action Alternative could have significant socioeconomic impacts.

Mitigation

No mitigation measures are proposed.

4.6.8 Traffic

Impacts

Under the No Action Alternative, none of the projects included in the proposed action would be implemented.

Mitigation

No mitigation measures are proposed.

4.6.9 Air Quality

Impacts

Under the No Action Alternative, none of the alternatives would be constructed; therefore, no pollutant emissions would be generated and no potential adverse air quality impacts would occur.

Mitigation

No mitigation measures are proposed.

4.6.10 Noise

Impacts

Under the No Action Alternative, none of the build alternatives would be constructed or operated; therefore, no project construction or operational noise would be generated, or contribute to the ambient noise levels of the project sites and surrounding areas.

Mitigation

No mitigation measures are proposed.

4.6.11 Public Health and Safety

Impacts

Aging AC pipes are unreliable under water pressure changes. The P-1044 pipeline to be replaced extends from Basilone Road to the reservoirs above San Onofre II Housing, an elevation difference of 150 feet. If a break occurred, a flow rate of 13,700 gallons per minute would result until closed. The response time in an unexpected blowout would be approximately 1 hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, including Pacific pocket mouse habitat, and inundate Basilone Road and San Onofre II and III housing, causing property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire. This type of pipe failure could result in a significant public health and safety impact.

Mitigation

No mitigation measures are proposed.

4.6.12 Services and Utilities

Impacts

Under the No Action Alternative, none of the projects included in the proposed action would be implemented.

In the case of P-1044, the No Action Alternative would not provide the need for adequately treated water in the northern water system and could result in a deficiency of potable water for Marines assigned to MCBCP. Current drinking water has TDS concentrations that are in the upper limits of the national secondary standard for TDS and the elevated TOC levels that could violate the Disinfection Byproducts Rule for drinking water and Title 22 for recycling water. In addition, copper loading/leaching to the wastewater system would continue to result in wastewater sludge being classified as hazardous waste, which increases disposal costs by requiring disposal at an out-of-state designated Hazardous Waste Facility. These impacts would be significant.

In the case of P-1045, MCBCP would continue to rely on two separate water systems. Maintenance of the two systems would continue to be conducted on an as-needed basis. In the event of a system failure, one or both of the Base's water regions (northern or southern) would lose the only source of potable water. The Base would have to transport potable water to the region in need from the other system (by tanker truck, for instance) or make other potable water supply arrangements. Disrupted water service could impair the Base's mission through suspension of training and operations, the inability to fight fires, and other life quality and safety issues. Such impacts would be significant.

Mitigation

Mitigation would consist of the adoption of Alternative 1, Alternative 2, Alternative 3, Alternative 4, or Alternative 5; some other combination of the alternatives for P-1044 and P-1045; or a similar program of infrastructure and utilities improvements.

4.6.13 Coastal Zone Resources

Impacts

The No Action Alternative would require SCE to fulfill its lease agreement with the California State Lands Commission. As part of the California State Lands Commission

Easement Agreement with SCE, the SONGS outfall conduits were to be removed in their entirety. An alternative proposed by SCE would abandon the conduits in place, disassemble and remove the vertical structure at the terminus of the conduit and the associated buoy markers, and install a concrete plug between the mean lower low water boundary and the tsunami gates located inland of the seawall when the conduit was no longer needed. The plug has been installed. The only remaining required action is removal of the vertical structure and associated buoy markers. Under the No Action Alternative, the current status of the conduits would not change, but the alternative scenarios for the conduits might be implemented at some future date. The impacts to coastal zone resources of either of these actions were addressed in the 2005 *Disposition of Offshore Cooling Water Conduit SONGS Unit 1 Environmental Impact Report* (SCE 2005). These potential impacts would include disturbing existing habitat, essential fish habitat, and marine water quality from anchoring, excavation, and sedimentation, but would be due to the disposition of the conduits by SCE and not as a result of the No Action Alternative.

Mitigation

No mitigation would be required.

4.6.14 Marine Resources

Impacts

The No Action Alternative for marine resources would be similar to coastal zone resources. As described above, the No Action Alternative would require SCE to fulfill its lease agreement with the California State Lands Commission and remove the vertical structure and associated buoy markers. The impacts to marine resources of this action were addressed in the 2005 *Disposition of Offshore Cooling Water Conduit SONGS Unit 1 Environmental Impact Report* (SCE 2005). These impacts would include disturbing existing habitat, essential fish habitat, and marine water quality from anchoring, excavation, and sedimentation.

Mitigation

No mitigation measures would be required.

CHAPTER 5.0
CUMULATIVE IMPACTS UNDER NEPA

NEPA regulations require a discussion of those cumulative impacts with the potential for significance. CEQ regulations implementing the procedural provisions of NEPA define cumulative effects as “The impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 C.F.R. § 1508.7). Cumulative impacts can result from “individually minor but collectively significant actions taking place over a period of time” (§ 1508.7). The CEQ also provides guidance on cumulative impacts analysis in *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997), and the Memorandum *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ 2005). This cumulative impacts analysis summarizes expected environmental effects of the action alternatives combined with impacts of past, current, and reasonably foreseeable future projects. As part of the evaluation of cumulative impacts, a review of other projects in the vicinity of the proposed action was conducted. The projects discussed below are those that have the potential to interact directly or indirectly with the proposed action; other projects that do not have the potential to interact cumulatively with the proposed action are not addressed in this EIS. Research has indicated that there are no major past, present, or reasonably foreseeable future projects in the immediate surrounding off-Base areas of the cities of Oceanside (Oceanside 2009) and San Clemente (San Clemente 2009), the County of San Diego, and the Cleveland National Forest (U.S. Forest Service 2009).

Section 5.1 provides a description of relevant projects with respect to potential cumulative impacts with the proposed action or alternatives. Section 5.2 provides a summary of potential cumulative environmental impacts associated with the proposed action and alternatives.

5.1 CUMULATIVE PROJECTS

Past, present, and reasonably foreseeable actions in the ROI for cumulative effects are summarized in Table 5-1. The past projects included go back for a period of 3 years. These tables represent a list of past, present, and planned projects with the potential to interact with each of the project alternatives but are neither dependent on nor part of the proposed action.

5.2 CUMULATIVE IMPACT ANALYSIS

This section addresses the potential additive effects of implementing the proposed action (or any of the build alternatives)[34] in combination with other past, present, and reasonably foreseeable actions. The proposed action involves the construction and use of Basewide utilities infrastructure features and facilities. Cumulative impacts are considered in time and geographic contexts. The geographic scope of the analysis varies by resource area. In the case of this analysis, the relevant timeframe context includes the construction and operational phases of the proposed Basewide water and transportation infrastructure projects. As many of the potential impacts resulting from the proposed action would be associated with project construction phase activities rather than operational phase use, many potential impacts would be localized and of relatively short duration.

Resource/issue areas that have the potential for cumulative impacts under the proposed action include water quality and hydrology, biological resources, cultural resources, air quality, and marine resources. These are discussed, in turn, later in this section.

Impacts from the action alternatives, when combined with impacts of projects discussed in Section 5.1, would result in negligible cumulative impacts on other resource/issue areas. These resource/issue areas include geology and soils, land use, visual resources, socioeconomics and environmental justice, traffic, noise, public health and safety, infrastructure and utilities, and coastal zone management.

- The proposed action would not involve extensive earthwork (i.e., cuts, fills, or import or export of significant soil volumes) in any one location (although when considered over the length of some project corridors it would be considerable) and would not be located in areas of geologic hazards. Trenching for pipelines would occur in some of the same corridors and perhaps at the same time as trenching for pipeline and communication lines in MILCONs P-1043/1046, P-1093, P-1099, and R-130 UII incorporated in the Base Utilities Infrastructure (BUI) proposed action. There are no identified geological conditions in any of the overlapping corridors that would result in adverse impacts if simultaneous trenching (in time or location) were to occur. The geology and soils impacts

[34] Any of the build alternatives would be similar in nature to the proposed action with respect to cumulative impacts. While alternatives are not specifically called out in the following discussion, the cumulative analysis presented in this section applies to the alternatives to the proposed action as well as the proposed action.

would be minor, and when combined with geology and soils impacts from other projects, would have a negligible cumulative impact.

- Existing land use designations would not change and the proposed action would occur within compatible areas; apart from disturbance during construction and with few exceptions, land use would be unchanged before and after implementation of the proposed action. The proposed action would be consistent with land use planning on Base and would not conflict or interfere with operations and training. Thus the proposed action would not result in a land use impact or any cumulative land use impacts.

- Following construction, completed projects would have the same aesthetic character as existing water and traffic infrastructure. Underground pipelines would not be visible. Expanded or new aboveground facilities or structures would not be built within the viewshed of sensitive receptors. Although the proposed action and other combined actions would result in incremental visual changes, the proposed action would not result in any cumulative visual impacts.

- Construction phase employment and economic output impacts of the proposed action on the region would be positive. Given the nature of the construction and the availability of labor within commuting distance of MCBCP, construction-related demand for local worker housing would be modest. Postconstruction operation of the facilities encompassed by the proposed action would not generate substantial increases in employment. Socioeconomic impacts associated with use of Basewide water infrastructure would not be concentrated in specific residential areas on- or off-Base, nor would they exceed the capacity of socioeconomic service providers, such as local schools. No environmental justice concerns would be associated with the proposed action. The proposed action would have an overall beneficial effect on socioeconomics and when combined with other actions would not have an adverse cumulative impact.

- Beyond some temporary impediments to traffic flow during construction of some components of the proposed action, traffic is not expected to increase or decrease as a result of the proposed action. No permanent significant adverse impacts to local roadways and intersections are anticipated. The proposed action in combination with other actions would not result in adverse cumulative operational impacts.

- Noise levels would increase slightly in the project areas during construction; however, apart from those areas with new permanent facilities, no increase in ambient noise levels would occur. The increases that would occur would be similar to existing uses in the areas and would not be significant. The proposed action in combination with other actions would result in short-term and temporary noise impacts that would not be cumulatively significant.

- Construction activities could expose MCBCP and contractor personnel to temporary safety risks. Construction associated with implementation of the proposed action would be required to adhere to all applicable BMPs and safety standards and procedures established by MCBCP. The proposed and reasonably foreseeable construction activities would not combine to produce significant cumulative impacts to environmental health and safety. None of the activities related to the proposed action would result in increased environmental health or safety risks to children.

- Implementation of the proposed action would not result in increases in personnel or activities that would increase utility demand. The proposed action itself is intended to address current and future demand for a range of utilities. Slight increases in demand for services and utilities would occur in some of the project areas, but these increases would not be significant or require additional off-site facilities or staffing. The proposed action would result in beneficial impacts to utilities and services basewide. The proposed action combined with other actions would not result in cumulative adverse impacts to utilities and services.

- No changes in the character of the coastal zone or impacts on coastal zone resources are anticipated. After construction, no component of the proposed action would combine with any other component or with any of the other cumulative projects to adversely affect coastal water resources, restrict coastal access, or obtrusively affect coastal scenic and visual resources.

Resources specifically analyzed in detail for potential cumulative impacts include water quality and hydrology, biological resources, cultural resources, air quality, and marine resources. Each is discussed below.

5.2.1 Water Quality and Hydrology

Construction activities associated with the proposed action would combine with other construction activities to produce significant cumulative impacts on hydrology and water quality at MCBCP, as impacts would be short-term and temporary. Throughout construction, the proposed action would be required to incorporate hydrology/water quality measures such as compliance with the new NPDES General Permit CAS000002 and the associated Order 2009-0009-DWQ, *General Permit for Storm Water Discharges*

Associated with Construction and Land Disturbance Activities. This new General Construction Permit (Order 2009-0009-DWQ, NPDES CAS000002; effective as of 1 July 2010) supersedes and consolidates the requirements of the previous Construction General Permit (Order 99-08-DWQ) and the Linear Underground Projects Permit (Order 2003-0007-DWQ). A discussion of these measures is included in Sections 2.5 and 3.2 of this EIS. In accordance with these requirements, a SWPPP, along with applicable BMPs, would be implemented to control erosion, minimize sediment transport, and protect surface waters. Denuded or graded areas would be stabilized as they are disturbed during the construction of the project. Trenched and excavated areas would be returned to preconstruction conditions upon the completion of construction, and new drainage improvements would be installed to properly collect and convey surface runoff.

Operation of the proposed action has the potential to contribute to cumulative impacts to water resources, hydrology, and water quality. Potential operational impacts would be associated with the discharge of brine and excess recycled water from the Northern AWT (P-1044). The Northern AWT is a feature of P-1044 in all alternatives, with the only difference being location. Potential brine and excess water discharge impacts would be the same for all alternatives. The RWQCB would require the characterization of the expected waste streams to be discharged, the scientific evaluation of the effects of waste discharged to the environment, and the securing of an NPDES permit that would strictly regulate such discharges through pollutant limitations and environmental monitoring and regulatory reporting. Similar regulations and controls are being required from the other project with such discharges in the cumulative project list, P-113 (the future AWT South).

Inadvertent discharges from spills, ruptures, or leaks could also occur from the proposed utility improvements, albeit the potential for such discharges would be less than existing conditions. Such potential occurrences would be addressed through Spill Prevention Control and Countermeasures Plans, SWPPPs, or similar documents required for facility operations.

In terms of specific water quality impacts that may occur relative to listed impairments for the Santa Margarita River, the 2010 303(d) impaired waterbodies list shows the lower river as being impaired for phosphorus enterococcus, fecal coliform, and total nitrogen as N. The Pacific Ocean at the mouth of San Mateo Creek is impaired for bacteria and the Santa Margarita River Lagoon is listed as impaired for eutrophication. Upstream sources of phosphorus (e.g., agriculture, recreational and residential turf management, etc.) could continue to potentially exacerbate phosphorus levels in the river. However, this condition would not constitute a cumulative impact associated with the proposed action, but would rather be an action or activity requiring attention separate from the proposed action.

Discharge of brine associated with the RO process at the proposed Northern AWT would be into deep injection wells. The design and location of the injection wells would be the same for all the build alternatives, and the potential impacts would be the same. There are no other deep injection wells in the northern part of the Base, and before injection well discharge of brine was permitted, geologic testing would be required to establish that the proposed discharge depth (from 330 to 750 feet below the ground surface) would be under impervious formations, so there would be no cumulative effect on shallower wells or aquifers in the San Mateo and San Onofre basins. There are no other deep injection wells in this area that would be cumulatively affected. Discharge into deep injection wells would be required to conform to Basin Plan and RWQCB permit requirements. No other project in the cumulative project list proposes injection wells, so there would be no cumulative impacts.

MILCON P-113 is a project that will convert the Haybarn Canyon Iron-Manganese Water Treatment Plant to an AWT (the future AWT South) employing an RO process similar to the one proposed by P-1044 for the Northern AWT. Construction of P-113 began in 2011, with an expected completion date of 2013. Brine effluent from the future AWT South (not part of this proposed action) will be discharged into the Pacific Ocean at a nearshore outfall system at the 21 Area (Del Mar). Discharges from the two AWTs would be expected to be similar but with some differences in constituents. The future AWT South outfall would be more than 14 miles south of the proposed P-1044 outfall diffusers. Both discharges would be required to conform to the requirements of the California Ocean Plan, discussed in Section 3.14.2 of this EIS. Because of regulatory requirements, distance, and dilution and dispersion factors, there would be no interaction of discharge plumes from the two facilities at a detectable level and no cumulative impacts on ocean water quality if the Northern AWT RO brine effluent is discharged though the SONGS outfall conduit.

The Santa Margarita Conjunctive Use Project (CUP), in the early stages of a Draft EIS, would propose measures of managing surface water and groundwater sources to optimize water demand/supply balance in the Santa Margarita River basin. The proposed CUP would meet the water demands of MCBCP and Fallbrook Public Utility District, reduce dependence on imported water, maintain watershed resources, and improve water supply reliability by managing the yield of the lower Santa Margarita River basin. This project would help to minimize cumulative water resources impacts.

The other cumulative projects also would be required to incorporate specific measures and procedures into project designs and operational plans. These projects would be required to implement BMPs to avoid or minimize erosion, sedimentation, and water quality degradation. Examples of such measures and procedures include, but are not limited to (1) ensuring that storm water discharges are in compliance with all pertinent regulations such as the CWA, and (2) adherence to appropriate permits and plans such as NPDES permits and other spill contingency requirements. Therefore, the proposed action, in conjunction with other projects on MCBCP, would not result in significant cumulative impacts to hydrology and water quality.

5.2.2 Biological Resources

The action area considered in this cumulative effects analysis is the entire western area of MCBCP where the projects would be located. Implementation of the proposed action and other projects within the Base would result in the cumulative loss of biological resources in the form of vegetation, habitat, and species. The proposed action would result in the loss of riparian and wetland plant communities, native uplands, and nonnative grassland areas, all of which potentially provide habitat for sensitive species. In addition, the proposed action would affect, or would potentially affect, individuals and/or habitat occupied by the federally protected thread-leaved brodiaea, spreading navarretia, San Diego fairy shrimp, Riverside fairy shrimp, southern California steelhead, tidewater goby, arroyo toad, light-footed clapper rail, coastal California gnatcatcher, least Bell’s vireo, southwestern willow flycatcher, and Pacific pocket mouse.

All federal activities within the Base potentially affecting federally protected species and habitats would be subject to ESA Section 7 consultation and would require the issuance of a BO by USFWS with reasonable and prudent measures, terms and conditions, and conservation recommendations. In addition, MCBCP, in concert with USFWS, has established plans and conditions throughout the Base to protect, preserve, and conserve natural resources to minimize significant cumulative impacts. These conditions are identified in several BOs issued by USFWS, training and operations guidelines, and the INRMP. The most sensitive species and habitats on the Base are protected through these procedures and policies, and construction and conservation measures based on previous BOs have been incorporated into Section 2.5.2.

All federal activities within the Base that would result in unavoidable direct and indirect impacts to riparian or other wetland vegetation communities or to open waters and nonvegetated channels that are determined to be under USACE jurisdiction would require mitigation as negotiated between MCBCP and both USACE and RWQCB during the Section 404 permitting and Section 401 certification processes.

The combined biological effects of both projects in the proposed action are discussed in sections 4.1.3, 4.2.3, 4.3.3, and 4.4.3 of this EIS. Cumulatively, these would combine with the effects of the projects listed in Table 5-1. The effects of many of the projects in Table 5-1 cannot be quantified because the projects have not been sufficiently defined or designed, resource surveys have not yet been conducted, changes may be probable or in process, or assessment of effects could change due to the permitting process. Only impacts that are reasonably foreseeable have been included in this cumulative effects analysis.

The project most likely to combine with the proposed action to produce cumulative effects is the BUI program (Table 5-1, project 51). Some projects in the BUI program include trenching in the same routes as the proposed P-1044 and P-1045 projects. The MILCONs in the BUI program that would require trenching are P-1043/1046, P-1093, P-1099, and R-130 UII. Depending on the alternative in the proposed project, this could occur in segments of Basilone Road, El Camino Real, San Mateo Road, River Road north of the Santa Margarita River, Cristianitos Road, Talega Road, and Las Pulgas Road. Only temporary impact areas would overlap, except for R-130 UII in Las Pulgas Road where paving of the road would result in permanent impacts.

In the analysis of trenching for projects in this EIS and the BUI EIS, impacts are presented separately for each MILCON. Summed, these impacts represent for each EIS the impacts if both projects were constructed independently. There may be, within the suite of projects in each EIS, overlaps if projects are constructed simultaneously and also if a project or projects from one suite and a project or projects from the other suite are constructed simultaneously in the same location. There could also be occasions when trenching for one project is completed and a later project comes through the same route. Since in both EISs the assessment of impacts is corridor based, acreage of impacts for each possible case of impacts in the same area is already accounted for by the method used for assessing impacts in each of the EISs. Therefore, cumulative impacts would not exceed the summed construction impact acreages, and additional mitigation would not be required.

Where necessary, mitigation would be required to compensate for the loss of jurisdictional waters, habitats occupied by federally listed, and migratory bird species covered under the MBTA. Consultation between ES and Base Operations and Training would avoid any potential mitigation so as to minimize impact to the Base’s operations and training mission. Therefore, while the proposed action would, in combination with other actions on the Base, contribute to cumulative impacts, the overall cumulative impact would not be significant.

5.2.3 Cultural Resources

Effects on cultural resources from implementation of the projects included in the proposed action would combine with the effects of the projects listed in Table 5-1. The effects of many of the projects in Table 5-1 cannot be quantified because the projects have not been sufficiently defined or designed, cultural resource surveys have not yet been conducted, changes may be probable or in process, or assessment of effects could change during Section 106 review. Only impacts that are reasonably foreseeable have been included in this cumulative effects analysis.

Effects to cultural resources from implementation of the proposed action in combination with other actions on the Base, would contribute to cumulative impacts. In particular, cumulative impacts may result from implementation of the BUI undertakings in that they overlap substantially with the BWI APEs. As discussed for Biological Resources, some projects in the BUI program include trenching in the same routes as the proposed P-1044 and P-1045 projects. These MILCONs are P-1043/1046, P-1093, P-1099, and R-130 UII. The overlap could occur in segments of Basilone Road, El Camino Real, San Mateo Road, River Road north of the Santa Margarita River, Cristianitos Road, Talega Road, and Las Pulgas Road. Only temporary impact areas would overlap, except for R-130 UII in Las Pulgas Road where paving of the road would result in permanent impacts.

In the trenching analysis in this EIS and the BUI EIS, impacts are presented separately for each MILCON. Summed, these impacts represent the impacts for each EIS if the projects were constructed independently. There may be overlap if projects are constructed simultaneously and also if projects are constructed simultaneously in the same location. There could also be occasions when trenching for one project is completed and a later project comes through the same route. Since in both EISs the assessment of impacts is corridor based, acreage of impacts for each possible case of impacts in the same area is already accounted for by the method used for assessing impacts in each of the EISs. Therefore, cumulative impacts would not exceed the summed construction impact acreages, and additional mitigation would not be required.

Avoidance is the preferred treatment measure. If avoidance is not feasible, treatment of historic properties adversely affected by these undertakings would be implemented under Section 106 of the NHPA to resolve the adverse effects. Adverse effects would be resolved through implementation of the PA and HPTP. If treatment measures are destructive, such as data recovery, then project implementation could result in significant cumulative impacts to cultural resources.

5.2.4 Air Quality

General

As described in Chapter 4 of this EIS, construction of the proposed action would result in the emission of pollutants on both local and regional scales but would not directly result in a significant impact. The proposed action would conform to the SIP and would not trigger a conformity determination under Section 176(c) of the CAA. Due to the temporary nature of construction emissions, regional construction emissions from the proposed action in conjunction with the development of the projects listed in Table 5-1 would not result in a cumulatively significant impact. Moreover, implementation of the recommended fugitive dust control measures would ensure that all PM emissions from proposed construction and operational activities within the MCBCP project region, in combination with any reasonably foreseeable future emission source, would produce less than significant cumulative effects. With these measures, temporary dust associated with construction would be confined to the site area and would not cumulatively interact with dust generated from other projects.

The proposed action would have negligible operational CAP and TAC emissions and would not result in a direct or cumulatively significant impact.

In addition to health hazard pollutants, other natural and human-made air pollutant emissions, known as GHGs, have been determined to contribute to global climate change. This section includes a discussion of climate change and GHGs, a summary of applicable regulations, and a discussion of GHG emissions due to the proposed action and potential impacts related to climate change.

Greenhouse Gases

The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact on global climate change would only occur when proposed GHG emissions combine with GHG emissions from other man-made activities on a global scale.

Currently, there are no formally adopted or published NEPA thresholds of significance for GHG emissions. Therefore, in the absence of formally adopted thresholds of significance for GHGs, this EIS compares GHG emissions that would occur from the preferred alternative (Alternative 5) to (1) MCBCP's annual baseline GHG conditions and (2) the U.S. GHG baseline inventory of 2009 (USEPA 2011) to determine the relative increase in proposed GHG emissions with the proposed project.

Table 5-2 summarizes the annual GHG emissions associated with the preferred alternative (Alternative 5). Appendix D presents details on the estimated GHG emissions generated by the preferred alternative (Alternative 5). As shown in Table 5-2, the ratio of the total annual carbon dioxide equivalent (CO_2e) emissions from the preferred alternative to the CO_2e emissions associated with the U.S. 2009 U.S. CO_2e emission inventory is approximately 12,900:6,633,200,000 or approximately 0.00019 percent. Since GHG emissions from the preferred alternative would result in minimal amounts of GHG when compared with the annual MCBCP GHG baseline and the U.S. GHG baseline inventory, the project GHG emissions would not substantially contribute to global climate change. Therefore, GHG emissions from the proposed action would not be significant.

Although the proposed action would not cause significant cumulative impacts associated with global climate change, this important topic warrants discussion of Marine Corps and DoN leadership in broad-based programs to reduce energy consumption and shift to renewable and alternative fuels, thereby reducing emissions of CO_2 and other GHGs. Energy use between the alternatives to the proposed action would not differ substantially, and the preferred alternative (Alternative 5, consisting of P-1044 Alternative 1 and P-1045 Alternative 3) would require about the same amount of demand for energy as Alternative 3 and somewhat less than the other three build alternatives. The primary sources of energy consumption would be the Northern AWT (P-1044), the pump stations associated with P-1044 and P-1045, and the length of pipeline installed and operated for P-1044 and P-1045. Each alternative would include the same design and energy requirements for the Northern AWT, since the only change between alternatives is the possible Northern AWT location.

The Commandant of the Marine Corps' *"Bases to Battlefield" Expeditionary Energy Strategy and Implementation Plan* (USMC 2011b) declares that energy conservation is "an issue of combat readiness." The Commandant has issued his Commanders Intent to implement measures to conserve energy, supporting "our Nation's pledge to reduce greenhouse gas emissions and dependence on foreign oil." The current plan identifies long-term goals to reduce energy intensity and increase the percentage of renewable electrical energy consumed. He has mandated that all "acquisitions of relevant products will meet ENERGY STAR and Federal Energy Management Program (FEMP) requirements." He has directed "an integrated approach to optimize energy performance to meet Federal building performance requirements and achieve a LEED [Leadership in Energy and Environmental Design] rating of silver for new construction and major renovation projects."

The Commandant requires his Base Commanders to "evaluate the effectiveness of incorporating emerging technologies" including integrated photovoltaics, cool roofs, daylighting, ground source heat pumps, heat recovery ventilation, high efficiency chillers, occupancy sensors, premium efficiency motors, radiant heating, solar water heating, and variable air volume systems. According to the Commandant, "The Marine Corps is committed to taking a leadership position in on-site renewable power development with the assistance of private sector financing and development expertise."

Under the current plan, Marine Corps installation commanders are to "use EMCS [Energy Management Control Systems] to monitor building conditions, perform diagnostics, and optimize system performance." Further, GIS capabilities will be applied to management of metered data for energy consumption, and personnel awareness programs will emphasize conservation.

The current plan has resulted in a number of positive outcomes in southern California alone. MCAS Miramar is actively pursuing a power purchase agreement to procure approximately 3 megawatts of electricity generated from captured methane at the Miramar Landfill, and also is pursuing an Energy Savings Performance Contract under the Department of Energy's FEMP. MCAS Miramar won a Presidential Award for Leadership in Federal Energy Management recognizing its reduction of energy intensity to 49 million British Thermal Units per thousand square feet, placing it in the top percentile of all DoN installations. MCAS Miramar achieved this through energy awareness; retrofitting lighting and heating, ventilation, and air conditioning systems; consolidating chiller and thermal energy storage systems; installing heating, ventilation, and air conditioning occupancy sensors; and boiler upgrades. The most recent ribbon-cutting for the combined golf course pro shop, clubhouse, restaurant, and staff Noncommissioned Officer Club marked the grand opening of the first "LEED Silver Certified" building in the Marine Corps. The installation recently broke ground on construction of a new Youth Activities Center designed to the same standards. MCAS Miramar will far surpass its energy reduction goal under EO 13423 by 2015.

Marine Corps Air Ground Combat Center Twentynine Palms reduced energy intensity (energy usage per square foot) by 2.07 percent in 1 year during 2007, through a $5 million investment in energy improvements, including conversion from evaporative coolers to chilled water systems with EMCS, recommissioning 15 inoperable solar water heating systems, and installing lighting and photocell controls.

MCBCP won a Department of Energy award for solar thermal photovoltaic projects at two year-round training pools, converted from natural gas. More than 10 percent of the 3,000 vehicles that carry people and goods around MCBCP are powered by compressed natural gas that has low emissions of GHGs. MCBCP used approximately 350,000 gallons of biodiesel during FY 2009, as opposed to 6,500 gallons of diesel. Biodiesel has lower GHG emissions than petroleum diesel. MCBCP vehicle fleet includes 43 hybrid light and medium duty vehicles and 43 electric scooters. A portion of the electric scooters are charged using a solar panel sun shade structure. MCBCP is in the process of migrating its diesel forklifts to propane and electric forklifts. MCBCP is also participating in a study with General Motors to test a prototype hydrogen fuel cell vehicle. MCBCP is operating a 10-passenger shuttle bus provided by Ford powered by an internal combustion engine that has been adapted to use hydrogen as a fuel and funded by the Department of Energy through the U.S. Army Engineer Research & Development Center, Construction Engineering Research Laboratory.

A hydrogen fuel dispensing station next to I-5 and Oceanside Harbor Drive is in-operation and supporting test vehicles operated by Southwest Region Fleet Transportation. The station's hydrogen generating system, a steam methane reformer, is not functioning due to issues with the reformer production unit. Hydrogen is being supplied from an off-site industrial gas supplier as an interim delivery alternative until the reformer is repaired or replaced.

These examples illustrate the leadership role that the Marine Corps and the Navy play in achieving energy reductions that will contribute to the national effort to mitigate global climate change. As the Commandant of the Marine Corps has said, “As Marines, we take pride in providing the best value to the Nation. This extends to energy conservation aboard our facilities.”

In addition to assessing the GHG emissions from the proposed action and the potential, albeit negligible, direct impact on climate change, potential impacts from climate change on the proposed action and adaptation strategies are also considered. As discussed in the Quadrennial Defense Review Report (QDR) of February 2010, the DoD would need to adjust to the impacts of climate change on our facilities and military capabilities should such change occur. DoD already provides environmental stewardship at hundreds of installations throughout the United States and around the world, working diligently to meet resource efficiency and sustainability goals as set by relevant laws and executive orders. Although the United States has significant capacity to adapt to potential climate change, it would pose challenges for civil society and DoD alike, particularly in light of the nation's extensive coastal infrastructure. In 2008, the National Intelligence Council judged that more than 30 U.S. military installations would face elevated levels of risk from potentially rising sea levels. DoD's operational readiness hinges on continued access to land, air, and sea training and test space. Consequently, the DoD requires that all DoD installations complete a comprehensive assessment to assess the potential impacts of predicted climate change on its missions and adapt as required.

The QDR illustrates that DoD would work to foster efforts to assess, adapt to, and mitigate the impacts of climate change. Within the United States, the DoD would leverage the Strategic Environmental Research and Development Program, a joint effort among DoD, the Department of Energy, and the USEPA, to develop climate change assessment tools.

For MCBCP, adaptation issues requiring evaluation and consideration could revolve around both sea level changes and aridity associated with the Southwest. The 2010 U.S. Global Climate Research Program report, *Global Climate Change Impacts in the U.S.* portrayed the potential impacts of predicted climate change on both coastlines and Southwest. In terms of coastal areas, the report projects sea level increases ranging from approximately 0.6 feet to over 3 feet by the year 2100 depending upon the emission scenario. MCBCP ranges in elevation from sea level to approximately 3,000 feet in the Base's eastern hills. Any rise in sea level would not affect these proposed infrastructure projects. Coastal storms, also predicted to increase, could also affect coastal drainages. Such climate changes could alter habitats, including those on Base.

Overall, however, such changes would not pose a risk to any construction, infrastructure, or activities at MCBCP. The Southwest could also face droughts, scarcity of water supplies, increased temperature, drought, and wildfire. Reduced availability of freshwater is likely to occur, with implications for bases and communities in the arid Southwest. Water is essential for maintenance and personnel, so strategies dealing with drought would need to be implemented. With drought, temperature increases, and increased potential for invasive (less fire resistant) species associated with climate change, wildfires are predicted by the report to increase. MCB Camp Pendleton is experienced with the effects of wildfires and employs strategies and policies to prevent and combat them.

As climate science advances, the DoN would regularly reevaluate climate change risks and opportunities at the bases in order to develop policies and plans to manage its effects on the operating environment, missions, and facilities. Managing the national security effects of climate change would require DoN to work collaboratively, through a whole-of-government approach, with local, state, and federal agencies

5.2.5 Marine Resources

MILCON P-113, described in Section 5.2.1, would construct the future AWT South and would discharge brine effluent from an AWT RO process similar to the one proposed by P-1044 for the Northern AWT. Brine from the future AWT South will be discharged into the Pacific Ocean at a nearshore outfall system consisting of an underground concrete caisson and brine discharge piping extending into the ocean at the 21 Area (Del Mar), more than 14 miles south of the proposed P-1044 AWT. The Finding of No Significant Impact for P-113 found no adverse effect on marine resources, and CCC concurred with the Marine Corps' Coastal Consistency Negative Determination. After consultation, NMFS concurred that there would be no adverse effect on EFH.

During construction, disturbance of the ocean bottom at both sites could displace soft-bottom-dwelling organisms and create suspended sediments and turbidity. There would also be a potential for discharges of hydraulic oils, fuel, and other contaminants from machines and vessels used at each location. The potential for combined effects from these factors, if construction should occur simultaneously, is dependent on a number of factors such as prevailing currents, stratification of the water column, seasonal variation in ocean conditions, and weather.

Although the P-113 discharge will be nearshore and the P-1044 ocean discharge, if implemented sometime in the future, would be 3,350 feet offshore, some mobile marine organisms and populations could move from one area to the other, and thus be affected by discharges in both locations but at different times. Both discharges would be required to conform to the requirements of the California Ocean Plan, discussed in Section 3.14.2 of this EIS. Because of regulatory requirements, distance, and dilution and dispersion factors, there would be no interaction of discharge plumes from the two facilities. Discharges in the two locations would not significantly affect marine organisms, even mobile ones, at the same time.

Modeling found there would be minimal impacts on the marine environment from brine discharge (Nautilus 2011). For both P-1044 and P-113, construction and discharge of brine would be closely regulated by USACE, NMFS, and RWQCB during both construction and operation to reduce the potential for significant impacts to below a level of significance. Spill prevention and control, hazardous materials storage, and other adverse effects would be addressed through compliance with environmental permit stipulations. A variety of design safeguards and BMPs would be required and implemented before and during construction and operation, and there would be no significant cumulative impacts.

No other projects listed in Table 5-1 would directly affect marine resources.

Table 5-1
MCBCP and MCAS Camp Pendleton Cumulative Projects List

#	Name	Description
1.	Parking Apron Expansion (P-049)	Construction of an aircraft parking apron adjacent to existing facilities.
2.	Transportation Infrastructure (P-347)	Construction of an additional Troop Staging Area, including roads and parking lots, within an existing air station.
3.	Highbay Warehouse Phase II (P-050)	Construction of a highbay automated warehouse adjacent to an existing warehouse.
4.	Ultimate Clear Zone (Project PA303M)	Removal of all vegetation in an area extending 500 feet from centerline of runway and 1,000 feet from either end of runway.
5.	Convert Short Approach Landing System to Airfield Lighting Sequence Flashing System (Project PA403R)	Construction of runway approach lighting system consisting of support poles with cross arms for light mountings.
6.	Communications Electrical Infrastructure (P-004)	Construction of approximately 18,000 feet of underground electrical duct bank with cables.
7.	Northern Power Distribution System (P-046)	Construction and installation of three 12kV power distribution lines and upgrade of two 4kV systems to 12kV. Two new voltage regulators, power distribution system upgrades, and new 69kV metering stations.
8.	Tertiary Treatment Plant South	Construction and operation of a new tertiary wastewater treatment plant near the northwest quadrant of the intersection of Stuart Mesa Road and Vandegrift Boulevard, and demolition of five sewage treatment plants in the southern area of the Base. Tertiary Treatment Plant South is completed and operating.
9.	IR Program	Remediation of six contaminated soil sites with potential groundwater contamination and removal of the Box Canyon landfill.
10.	Ysidora Flats Effluent Outfall/ Groundwater Recharge Program	Installation of a valve in the existing wastewater conveyance line to recharge groundwater levels.
11.	Fallbrook Public Utilities District /MCBCP Joint Conjunctive Use Project	Perfect Permit 15000 from the SWRCB for diversion of water from the Santa Margarita River for use on-Base and within the San Diego County Water Authority service area by replacement of the existing sheet pile diversion structure with an inflatable weir diversion structure on the Santa Margarita River; improvements to O'Neill Ditch and headgate; improvements to Recharge Ponds 1-5; installation of new production wells, gallery wells, and an associated collection system; construction of the Fallbrook Public Utilities District (FPUD) Water Treatment Plant (WTP); construction of a water conveyance/distribution system infrastructure with bidirectional pipelines from MCBCP to Red Mountain Reservoir via the FPUD WTP, and from Reservoir Ridge to the Green Zone; brine discharge to FPUD's Oceanside outfall; expansion of the Haybarn Canyon Advanced WTP with addition of a surface water treatment facility; and establishment of an open space management zone.
12.	P-069	Construction of Fleet Hospital Operations Center, 63 Area.

#	Name	Description
13.	P-603	Construction of medical/dental clinic, 41 Area.
14.	P-604	Construction of medical/dental clinic, 43 Area.
15.	P-605	Construction of medical/dental clinic, 53 Area.
16.	P-017	Construction of BEQ, 62 Area.
17.	P-061	Construction of Helo Outlying Landing Field, Phase II.
18.	P-235	Construction of indoor fitness facility, 11 Area.
19.	N-219/T-014 (MCCS)	Construction of rental cabins, Del Mar Recreation Beach.
20.	P-093	Construction of BEQ, 22 Area.
21.	P-038	Construction of Expeditionary Fighting Vehicle Consolidated Training, Maintenance, Headquarters Complex, 21 Area.
22.	P-033	Reconstruction of Boat Maintenance Facility, Del Mar.
23.	P-724	Construction of RMS Complex, Phase I.
24.	P-116	Restoration of dental clinic, Edson Range.
25.	P-044	Construction of BEQ, Headquarters.
26.	P-068	Construction of Raw Water Transmission Pipeline.
27.	P-008	Construction of Force Intel Operations Center.
28.	P-071	Construction of water treatment plant/reservoir and treated water distribution system.
29.	P-098	Construction of BEQ, San Mateo.
30.	P-014	Construction of BEQ, Headquarters.
31.	P-613	Construction of Close Combat Battle Course.
32.	P-608	Construction of indoor fitness Facility, 33 Area.
33.	San Jacinto Street Extension and Temporary Lodging Facility	Extension of San Jacinto to Vandegrift Boulevard and construction of three-story Temporary Lodging Facilities with 69 guest rooms, a 105-vehicle parking lot, and support facilities with a fire safety zone and anti-terrorism/force protection setbacks.
34.	P-079	Construction of a new 4-million-gallon potable water reservoir on a ridge east of Vandegrift Blvd. and south of the existing iron/manganese water treatment plant.
35.	Redwood Reservoir Replacement Projects	Replacement of four redwood water storage tanks with one 121,000- and three 150,000-gallon steel tanks as four separate projects.
36.	22 Area (Chappo) Water Main	Construction of a new underground water main located in an existing road to provide water supply for firefighting and improve water quality.
37.	MCAS Fire Loop Mains	Construction of a potable water main at MCAS Camp Pendleton, with construction and laydown areas on developed lands.
38.	Sewer Pump Station and Force Mains Replacement	Replacement of sewer Pump Station 240154 to prevent spillage and discharge into the Santa Margarita River. Construction of a new pump station and 3,500 feet of force main. Replacement of 5,500 feet and 2,500 feet of force main and new overflow tanks at Pump Stations 31227 and 31220, respectively.
39.	P-633	Replacement of Range 210B/C with a modern Infantry Squad Battle Course and support facilities.
40.	P-634	Restructuring of Range 409 with an updated Armor/Anti-Armor Tracking Range.
41.	Assault Breacher Vehicle	Construction and modification of facilities in the 62 Area to accommodate these vehicles to conduct training in Ranges 409, 600, and 800; Papa Three area; and Drop Zone Case Springs.

#	Name	Description
42.	SONGS Steam Generation Replacement	Replacement of SONGS Units 2 and 3.
43.	Hydrogen Fueling Station	Siting and operation of a fueling station for a fuel cell vehicle demonstration.
44.	P-516	Construction and operation of a Marine Corps Reserve Center in 41 Area and demolition of 25 Quonset huts in 64 Area.
45.	Marine Corps Forces Special Operations Command (MARSOC)	Construction, operation, and maintenance of a special operations training complex in the 41 Area.
46.	Basewide Fuel Optimization Program	Construction and operation of six fuel stations within the 12 or 14, 21, 22, 41, 43, and 52 Areas.
47.	GTF Temporary Projects	Construction and operation of temporary bed-down development areas located in three separate areas of MCBCP, including the 32 Area, 33 Area, and 62 Area.
48.	GTF Permanent Projects	Construction and operation of approximately 39 projects throughout the Base to support the GTF initiative.
49.	GTF Interim Facilities Construction Programmatic Categorical Exclusion	Construction and use of temporary facilities consisting of administration, billeting, restroom, laundry, and lounge trailers; and shelters and sprung structures.
50.	West Coast Basing of the MV-22	Basing and operations of MV-22 squadrons for employment to provide medium lift capability to I Marine Expeditionary Force at Marine Corps installations in the southwest including MCBCP.
51.	Basewide Utilities Infrastructure Projects	Construction and operation of six linear infrastructure projects including electrical, water, wastewater, natural gas, and communication distribution lines along with associated facilities.
52.	Naval Hospital Replacement	Replacement of Naval Hospital Camp Pendleton replacement to meet needs for emergency services, in-patient services, out-patient clinics, ancillary services, surgical services, logistics, and other medical requirements.
53.	Main Exchange Mall Complex	Construction of Main Exchange Mall Complex in the 20 Area to provide private sector-grade retail shopping and services in proximity to on-Base and off-Base patrons near MCBCP's main gate.
54.	Main Gate Improvements	Construction of improvements to increase the main gate inbound capacity to a total of six lanes, including four lanes on Vandegrift Road and two adjacent overflow/secondary inspection lanes.
55.	Public-Private Venture Housing, Stuart Mesa Phases 6 through 9	Construction of 1,248 additional housing units in the Stuart Mesa area.
56.	Santa Margarita River Railroad Bridge Replacement and Second Track Project	Replacement of the railroad bridge downstream from the Stuart Mesa Bridge by North County Transit District.
57	P-113: Advanced Water Treatment Facility/Utility Corridor Project	Conversion of iron/manganese water treatment plant in Haybarn Canyon to AWT with brine discharge pipeline and ocean discharge system near Del Mar Boat Basin.
58	Santa Margarita Conjunctive Use Project	Conjunctive use of surface water and groundwater in the lower Santa Margarita River basin. "Conjunctive use" consists of managing surface water and groundwater sources to optimize water demand/supply balance in the basin to meet the water demands of MCBCP and Fallbrook Public Utility District.

Table 5-2
Summary of Modeled Project-Generated, Construction-Related Emissions of Greenhouse Gases (Carbon Dioxide Equivalent) – Preferred Alternative (Alternative 5)

Year	Estimated Emissions (metric tons CO_2e)
2013	2,502
2014	6,020
2015	4,378
Total Alternative 5 GHG emissions	**12,900**
MCBCP FY08 Baseline GHG emissions	**276,877**
Ratio of Alternative 5 GHG emissions/MCBCP FY08 Baseline GHG emissions	**12,900:276,877 (approximately 4.66 percent)**
U.S. 2009 Baseline GHG emissions	**6,633,200,000**
Ratio of Alternative 5 GHG emissions/ U.S. 2009 Baseline GHG emissions	12,900:6,633,200,000 (approximately 0.00019 percent)

Source: USEPA 2011, URS 2010

CHAPTER 6.0
POSSIBLE CONFLICTS WITH FEDERAL, REGIONAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS

There are several local land use plans, policies, and controls that address and guide land use for the proposed action sites on MCBCP. These documents include SECNAVINST 5090.6A (U.S. Navy 2004); MCO 5090.2A Chapter 12 (USMC 2009c); *Marine Corps Base Camp Pendleton 2030 Master Plan* (U.S. Navy 2011); RCUZ Study (USMC 2007b); *Air Installations Compatible Use Zones Update* (USMC 1995b); INRMP (USMC 2007a); and the *Range and Training Regulations* (USMC 2003). These documents are discussed in more detail in the analogous subsections of Chapters 3 and 4.

As stated in Section 2.1, the proposed action consists of the construction and use of Basewide water infrastructure projects across large areas of MCBCP. Since all project sites would continue to remain under federal ownership, the proposed action is not subject to the City of Oceanside, City of San Clemente, or County of San Diego plans or policies. The use of the SONGS outfall conduit is not included at this time due to the lack of sufficient design details. It is, however, analyzed at a programmatic level in this EIS. If approved for use at some future date, the SONGS outfall conduit would be the only use of off-Base lands from these two MILCONs. An agreement would be required between SCE and the Marine Corps for the transfer of operation of the SONGS outfall conduit. A real estate agreement with the California State Lands Commission (CSLC) for the submerged land occupied by the conduit would also be required and would require CSLC review under the California Environmental Quality Act. This process would begin after the NEPA process is complete. No other off-Base land uses would be affected by implementation of the proposed action. The proposed action would comply with the consistency provisions of the CZMA.

As discussed in Section 1.3, construction of Basewide water infrastructure projects would support current and future functioning of basic activities and the full range of operations on MCBCP. The commitment of the project sites for long-term water infrastructure usage does not pose any conflict between the proposed action and federal, state, regional, or local land uses. No other potential conflicts are anticipated between the proposed action and any of the local land use plans, policies, and controls that address and guide use of the project sites.

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CHAPTER 7.0
OTHER NEPA CONSIDERATIONS

7.1 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires an analysis of significant irreversible effects. Resources that are irreversibly or irretrievably committed to a proposed action are those that are utilized on a long-term or permanent basis. This includes the use of nonrenewable resources such as metal, wood, fuel, paper, and other natural or cultural resources. Human labor is also considered a nonrenewable resource. These resources are considered nonretrievable in that once they were used for a proposed action they would no longer be available for any other purpose.

Implementation of the proposed action would result in an irretrievable commitment of construction materials and fuel for construction vehicles and equipment. In addition, the proposed action would commit workforce time for construction, engineering, environmental review, and compliance.

An impact that could be considered an irreversible or irretrievable commitment of environmental resources is the unavoidable destruction of biological resources and cultural resources. Because some of the project components are in areas that support natural resources such as vernal pools, and native and nonnative grasslands, with some of these resources providing habitat for federally listed plant and animal species, there would be an irreversible commitment of biological resources. This commitment could be partially alleviated by restoration of the resource but would be permanent in some instances. Cultural resources are known to occur within several of the project corridors. If the cultural resources cannot be avoided, an extensive recovery and documentation program of artifacts would be implemented. Although the artifacts would be retrieved, the integrity of the cultural resources sites would be irreversibly affected. In addition, cultural sites are a limited resource and, therefore, any impact on a site that is eligible or potentially eligible for listing in the NRHP and/or is of concern to the Native American community may be irreversible.

The proposed action would result in increased demand for energy, water, and public services and utilities, and increased generation of wastewater, particularly during project construction. These commitments of resources are neither unusual nor unexpected, given the nature of the action, and are generally understood to be tradeoffs for the benefits of constructing and operating improved Basewide water infrastructure projects. The irreversible or irretrievable impacts associated with the proposed action have been discussed in greater detail for each specific environmental resource in previous sections of this EIS.

Implementation of the No Action Alternative would not result in any irreversible or irretrievable environmental effects or commitments since construction projects associated with the proposed action would not be initiated.

7.2 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA requires an EIS to address the relationship between short-term uses of the environment and the impact that such uses may have on the maintenance and enhancement of the long-term productivity of the environment. Of particular concern are impacts that would narrow the range of beneficial uses of the environment. This refers to the possibility that choosing one development alternative would reduce future flexibility in pursuing other alternatives or that committing a parcel of land or other resource to a certain use would eliminate the possibility of other uses being performed at that site.

A good portion of the water infrastructure of the proposed action would be underground and would not substantially constrain most future land use alternatives. Aboveground facilities and structures are expected to be completed within the next 3 to 5 years. The proposed action would therefore not preclude future use of these sites for alternate long-term or short-term purposes.

The proposed action would involve certain short-term activities that would provide employment opportunities for persons involved in the construction industry and related sectors. These short-term construction activities may result in localized adverse environmental impacts such as increased traffic and noise, and decreased air quality. However, implementation of the construction, design, and mitigation measures proposed to minimize these impacts would reduce potential adverse impacts. The impacts that would result from construction-related activity would cease upon the completion of this activity and would not have an adverse impact on the maintenance and enhancement of long-term productivity.

Balanced against short-term negative impacts associated with construction activities are the benefits of achieving the purpose and addressing the need as detailed in Section 1.3.

7.3 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF THE PROPOSED ACTION AND ALTERNATIVES

Energy required to successfully implement the proposed action would include fossil fuels and electricity to power construction and demolition activities and, once constructed, a number of infrastructure structures and support facilities (e.g., the Northern AWT and the pump stations, among others). Fuel for MCBCP and contractor vehicles is currently available and in adequate supply from Navy-owned sources. Required electricity demands would be supplied by the existing electrical services at MCBCP or by fuel-powered generators.

Energy use between alternatives would not differ substantially, and the preferred alternative (Alternative 5, consisting of P-1044 Alternative 1 and P-1045 Alternative 3) would require about the same amount of demand for energy as Alternative 3 and somewhat less than the other three build alternatives. The primary sources of energy consumption would be the Northern AWT (P-1044), the pump stations associated with P-1044 and P-1045, and the length of pipeline installed and operated for P-1044 and P-1045. Each alternative would include the same design and energy requirements for the Northern AWT, since the only change between alternatives is the possible Northern AWT location.

Direct energy requirements under the proposed action are limited to those necessary to operate vehicles and equipment. No superfluous use of energy related to the proposed action has been identified, and proposed energy uses would be minimized to the greatest extent possible without compromising the integrity of the proposed facilities to be constructed. Proposed new construction would comply with applicable local, state, and federal codes that are designed to promote energy efficiency and the use of renewable energy resources. Further, the new Basewide water infrastructure projects themselves are designed to be more efficient than the outdated systems that they are replacing. Therefore, no additional conservation measures related to direct energy consumption are identified.

7.4 UNAVOIDABLE ADVERSE EFFECTS

NEPA regulations require a description of any significant impacts, including those that can be mitigated to a less than significant level. The environmental effects of the proposed action alternatives are discussed in Chapter 4, Environmental Consequences. The analysis in Chapter 4 addresses whether the implementation of an alternative would result in a significant adverse impact to any of the specific environmental resource areas. When significant impacts were identified, mitigation measures were developed that could reduce impacts to a less than significant level, provided that such mitigation could feasibly be accomplished. An EIS must describe any unavoidable adverse environmental effects for which either no mitigation or only partial mitigation is feasible. The impact analyses presented in Chapters 4 and 5 of this EIS demonstrates that construction would result in a range of unavoidable impacts (depending on the alternative selected) related to Water Quality and Hydrology, Biological Resources, Cultural Resources, Traffic, Air Quality, Coastal Zone Resources, and Marine Resources. Summaries of these unavoidable impacts are provided in the respective resource sections of Chapters 4 and 5.

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CHAPTER 11.0
GLOSSARY OF TERMS

Term **- Definition**

Basin Plan - A water quality policy and guidance document developed by the RWQCB, the *Water Quality Control Plan for the San Diego Basin* sets effluent discharge limitations for the NPDES and other waste discharge permits. The Basin Plan, updated in 1994, describes beneficial uses and defines water quality objectives for surface and groundwater within the San Diego Basin.

Biosolids - A solid waste material, also known as sludge, which is a stabilized, dewatered product that can be applied as fertilizer or disposed of in a landfill.

Brine - Water containing large amounts of salt, typically sodium chloride. Often a byproduct of water treatment, such as osmosis.

Chemical storage and feed systems - Chemical storage and feed systems are generally used at various stages of water treatment processes such as disinfection, coagulation, and odor control.

Disinfected tertiary-treated effluent - Wastewater that has been filtered and subsequently disinfected with chlorine or disinfection process and meets specific maximum bacteria concentration criteria.

Drainage - In this document, *drainage* refers to a river, creek, stream, or watercourse and its associated surroundings. In this usage, flows in a drainage may be continuous, intermittent, or ephemeral. The associated surroundings may be related to the watercourse topographically or by characteristics such as distinctive vegetation. *Drainage basin* refers to the entire watershed of a stream, river, creek, or watercourse.

Groundwater - Subsurface water typically found in areas of high porosity soil where water can be stored between soil particles and within soil pore spaces.

Groundwater recharge - Replenishment of water into an aquifer.

Influent - Water that flows into a system.

Live-stream discharge - Treated wastewater discharged into a river or stream.

MILCON - The Marine Corps Military Construction program that covers the construction of facilities and structures as authorized by Congress.

Ocean outfall - Where a sewage treatment plant discharges treated water at a specified distance from the shore.

Point source - A well-defined single source at which a discharge occurs, as opposed to nonpoint source discharges that cannot be traced to a well-defined source.

Potable water - High quality water intended for drinking, cooking, and cleaning. This water grade conforms to strict drinking water standards set forth by regulatory agencies.

Preliminary treatment - Basic, often mechanical, water treatment process that occurs before other stages of water treatment are initiated.

Primary treatment - Removal of suspended solids, fine and coarse, which either float or settle out from raw sewage.

Recharge - Inflow to groundwater storage from precipitation, stream infiltration, and other sources of water.

Reclaimed water - Water suitable for a direct beneficial or controlled use after treatment.

Recycled water - Water that is either recirculated (used more than one time by the same users) or that is used more than one time before it passes back into the natural hydrologic system.

Reuse areas - Areas where tertiary-treated water is delivered for reuse, such as irrigation or storage.

Reverse osmosis (RO) - The process of removing salts from water or wastewater using a membrane filter. An external force reverses the normal osmotic process, resulting in the reduction of solvent concentrations.

Scoping process - Public process that occurs after the publication of a Notice of Intent (NOI). Scoping is an open process intended to invite the public and other agencies in determining the scope of an EIS.

Secondary treatment - A water treatment process that removes biochemical oxygen demand and suspended solids. The term is often used interchangeably with the concept of biological wastewater treatment.

Sewage Treatment Plant (STP) - Facility that collects and treats untreated wastewater.

Surface water Surface water includes all lakes, ponds, rivers, streams, estuaries, impoundments, and wetlands within a defined area or watershed.

Tertiary treatment - Treatment of wastewater beyond secondary treatment. Includes nutrient removal, such as phosphorus and nitrogen removal, and removal of suspended solids.

Total dissolved solids (TDS) - The quantity of minerals in solution in water.

Total organic carbon (TOC) - Organic carbon that can be oxidized and is present in recycled water measured by an approved analytical method.

Wastewater reclamation - Treating wastewater to make it suitable for a direct beneficial or controlled use.

Water table - Surface where groundwater is first encountered in a water well in an unconfined aquifer.

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APPENDIX A

A-1 FEDERAL REGISTER NOTICE OF INTENT

A-2 PUBLIC NOTICES OF SCOPING MEETING

A-3 SCOPING MEETING SUMMARY REPORT

A-4 RESPONSES TO PUBLIC COMMENTS ON DRAFT EIS

A-1

FEDERAL REGISTER NOTICE OF INTENT

requests for information, including this request, are strictly voluntary.

Dated: March 26, 2010.

Ronald K. Lorentzen,

Deputy Assistant Secretary for Import Administration.

[FR Doc. 2010–7217 Filed 3–30–10; 8:45 am]

BILLING CODE 3510–DS–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement for Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Projects at Marine Corps Base Camp Pendleton, San Diego County, CA

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: In accordance with Section 102(2)(c) of the National Environmental Policy Act (NEPA)of 1969 (42 U.S.C. 4332 (2) (c)), as implemented by the Council on Environmental Quality Regulations (40 CFR Parts 1500–1508), the Department of the Navy intends to prepare an Environmental Impact Statement (EIS) and conduct a public scoping meeting for the proposed replacement of the Stuart Mesa Bridge and installation and operation of water infrastructure improvements throughout Marine Corps Base Camp Pendleton (MCBCP) in San Diego County, California.

DATES: The Department of the Navy will review all comments received during the 30-day public scoping period, which starts with the publication of this Notice of Intent. A public scoping meeting, using an informal open house format, will be held in the San Clemente Community Center, 100 North Calle Seville, San Clemente, California 92672, from 6 p.m. to 8 p.m. on April 16, 2010. The meeting will be announced by notices published in the North County Times and San Clemente Sun Post News. The public is invited to attend the meeting at their convenience during the meeting hours and can view project-related displays and speak with Department of the Navy and MCBCP representatives and resource staff. A court reporter will be available at the meeting to accept oral comments.

ADDRESSES: Written comments on the scope of the MCBCP Basewide Water Infrastructure and Stuart Mesa Bridge Replacement EIS should be directed to: Mr. Jesse Martinez, Naval Facilities Engineering Command (NAVFAC) Southwest, 1220 Pacific Highway, San Diego, California 92132. Written comments may also be submitted via fax at 619–532–4160, or e-mailed to *jesse.w.martinez1@navy.mil.*

FOR FURTHER INFORMATION CONTACT: Mr. Jesse Martinez, NAVFAC Southwest at telephone 619–532–3844, fax 619–532–4160, or e-mail: *jesse.w.martinez1@navy.mil.*

Purpose and Need: The proposed action is needed to modernize and expand the capacity and capability of MCBCP's aging (1940s/1950s era) potable water system and roadway infrastructure. Due to the existing potable water system infrastructure's lack of redundancy/backup and its continued deteriorating condition, portions of MCBCP have experienced more frequent interruptions to water delivery services. Wildfires have also damaged system components (*e.g.* power feeds, pump stations, pipes, *etc.*), with resulting service interruptions. As the potable water system continues to age, and as demand increases, the frequency of the interruptions will also increase, adversely affecting MCBCP's mission. Repairs to and maintenance actions for the system are becoming more frequent and more expensive.

In the case of the roadway system, the Stuart Mesa Bridge, together with nearby roadway segments and the adjacent intersection of Stuart Mesa Road and Vandegrift Boulevard, represents a critical roadway connection on the main internal north-south connector in the southern and western portions of MCBCP. The roadway link has been severed in the past by flooding, underscoring the need for an all-weather solution.

The purpose of the proposed action is to enhance the ability of MCBCP to efficiently meet its mission by developing new or upgraded, reliable, and compliant infrastructure systems necessary to sustain military training and operations and quality of life services on MCBCP. The purpose is to provide (1) secure and more effective use of water resources, improved potable water quality and capacity, treatment and delivery capabilities, and water system redundancy necessary to reliably and efficiently deliver potable water in the northern region of MCBCP; (2) improved delivery of Basewide water services during periods of scheduled, unscheduled, and emergency system interruption; and (3) roadway improvements necessary to maintain efficient all-weather traffic accessibility to key areas in the southern portion of MCBCP that are now severed during periodic flooding in the vicinity of the Stuart Mesa Bridge.

The water infrastructure projects were initially included in the November 12, 2008, Notice of Intent (NOI) for MCBCP's Basewide Utilities Infrastructure project (73 FR 66879). These two water infrastructure projects were removed from that EIS for potential re-design and to develop additional alternatives for analysis. These two water infrastructure projects are independent of the Basewide Utilities Infrastructure projects and meet different needs.

Preliminary Alternatives

The EIS will address the proposed alternative sites, alignments, and construction methods as described below.

Advanced Water Treatment (AWT) North and Associated Facilities (MILCON P–1044)

Four alternatives involving a combination of two AWT sites and two pipeline routes are being evaluated. All alternatives include construction of a 54,000-square-foot AWT facility, 80,000 linear feet (LF) of new and replacement water lines, pump stations with emergency generators, connection to existing reservoirs and distribution system, a brine disposal system, and plant access improvements. The proposed AWT facility would process up to 7.5 million gallons per day (mgd) and would include micro-filtration, granulated activated carbon, and reverse osmosis. The facility would be designed in modular form for ease of expandability; however there are no current plans for expansion.

Alternative 1. Under this alternative the AWT facility would be constructed at a location about 1500 feet south of Basilone Road (Site 6). Raw water, treated water, and brine would be conveyed via new proposed lines. Raw water lines would extend from the existing wells to the AWT facility. Treated water lines would extend from the AWT facility to the west to serve the San Onofre Housing Areas and the 51 Area (San Onofre); to the north to serve the 62 Area (San Mateo), 63 Area (Cristianitos), and 64 Area (Talega); and to the east along Basilone Road to serve the 52 Area (School of Infantry) and 53 Area (Horno). Potable water loops eight inches in diameter would be installed within each cantonment and housing area. Bicycle lanes and/or pedestrian trails could also be included over proposed water lines where feasible. Either horizontal directional drilling (HDD) to extend lines beneath San Onofre Creek and San Mateo Creek or suspension of the pipelines over the creeks would be incorporated to minimize impacts.

Following water treatment at the AWT, brine would be disposed via ocean outfall and/or injection wells. The brine disposal line would extend from the AWT facility to the south to connect to the proposed injection wells east of Interstate 5 (I–5) and/or to the existing Unit 1 ocean intake pipeline at San Onofre Nuclear Generating Station (SONGS). The line to SONGS would extend beneath I–5 via HDD. Brine disposal would make up approximately 8 to 10 percent of the capacity of the proposed AWT or a maximum volume of approximately 0.6 to 0.75 mgd. The ocean outfall disposal would use the existing SONGS former Unit 1, 12-foot-diameter, 3,200-foot-long cooling water intake structure located on the Pacific Ocean floor. Deep injection wells (approximately 1,000 feet deep) would be located south and east of the existing San Onofre percolation ponds.

Alternative 2. Under this alternative, raw water, treated water, and brine would be conveyed via three proposed new pipelines located primarily in El Camino Real instead of Basilone Road as proposed under Alternative 1.

Alternative 3. Under this alternative, the AWT facility would be located immediately south of Basilone Road (Site 4). Water conveyance pipelines would be the same as Alternative 1.

Alternative 4. Under this alternative, the AWT facility would be located immediately south of Basilone Road (Site 4). Water conveyance pipelines would be the same as Alternative 2.

Connection of North and South Water Systems (MILCON P–1045)

Four alternatives involving different pipeline routes are being evaluated.

Alternative 1. Under this alternative, approximately 90,000 LF of potable water lines sized up to 36 inches in diameter to connect the northern and southern water systems of MCBCP. The water line would start at the new AWT North facility (P–1044) and extend south on an alignment using El Camino Real to Stuart Mesa Road. Dividing at the junction of Stuart Mesa Road and Las Pulgas Road, one branch would run north along Las Pulgas Road to the 43 Area (Las Pulgas). This lateral pipeline would be approximately 10 to 14 inches in diameter and would connect to the Las Pulgas distribution system to link developments in the Las Pulgas, Las Flores, and Stuart Mesa areas to the connected northern and southern water systems. The other branch would continue along Stuart Mesa Road before splitting again into two more branches. One of these branches would extend northeast on the west side of the Santa Margarita River along North River Road, passing east of the 32 Area (Marine Air Control Squadron-1) and 33 Area (Margarita) and west of the 23 Area (Marine Corps Air Station Camp Pendleton) to Basilone Road and on to connect to the AWT South facility at Haybarn Canyon as well as several reservoirs along a ridge above the AWT South (Reservoirs 13151, 13154, 24140, 24174, and 240173). The second branch would continue south along Stuart Mesa Road, passing under or suspending over the Santa Margarita River, to Vandegrift Boulevard before turning north and terminating approximately one mile north at an existing Vandegrift Boulevard/Magazine Road pump station and several nearby reservoirs (Reservoirs 20813, 20814, 20815, 200814, and 200815).

The pipelines would be HDD under or suspended over San Onofre Creek, Las Flores Creek, Aliso Canyon drainage, French Creek, and two locations on the Santa Margarita River to avoid impacts to these areas.

The project would also include the construction and operation of three pump stations along the alignment. One pump station would be located within the footprint of the AWT North and a second pump station would be located within a developed parking lot at the AWT South. A third pump station would be located in an existing parking area on the southwest side of the intersection of El Camino Real and Las Pulgas Road. Bicycle lanes and/or pedestrian trails could also be included over proposed water lines where feasible.

Alternative 2. The proposed north-south pipeline would start at the new AWT North facility (P–1044) and extend south in El Camino Real to Las Pulgas Road and run north in Las Pulgas Road to Basilone Road. The water line would then extend along Basilone Road to Vandegrift Boulevard and run east to connect to the AWT South at Haybarn Canyon as well as several reservoirs along a ridge above the AWT South (Reservoirs 13151, 13154, 24140, 24174, and 240173). This alternative would require two additional pump stations, for a total of five pump stations.

Alternative 3. This alternative would be similar to Alternative 1 except it would not include the segment on the west side of the Santa Margarita River along North River Road and could include a 1.0 mile line connecting to reservoir 32911 at 32 Area (Marine Air Control Squadron-1).

Alternative 4. This alternative would be similar in alignment to Alternative 3, with an additional pipe segment from the Vandegrift Boulevard/Magazine Road pump station east of the 22 Area (Chappo) before connecting to the AWT South at Haybarn Canyon as well as several reservoirs along a ridge above the AWT South (Reservoirs 13151, 13154, 24140, 24174, and 240173).

Stuart Mesa Bridge Replacement and Flood Control Improvements (P–0139)

Four alternatives including a combination of two flood control methods and the use of a temporary bridge during construction are being evaluated. All alternatives include demolition of the existing Stuart Mesa Bridge and construction of a new four lane bridge and flood protection measures.

Alternative 1. Construction would consist of a new cast-in-place prestressed concrete bridge (approximately 1,200 feet long by 56 feet wide) with pile foundations, new approach road and bridge abutments, earthwork and grading, rock protection and revetment, bridge deck, guard rails, night lighting, asphalt pavement, and pavement marking and signs.

The project includes "100-year storm" flood protection control measures to protect Stuart Mesa Road and Vandegrift Boulevard. They consist of levees; toe scour protection along the levee; a storm water drain system consisting of culverts, inlets, outlets, headwalls, channels, and earth and concrete ditches. Supporting activities would include the construction and relocation of utilities (electrical, communications/information lines, water main) during the demolition and construction of the new bridge. Under this alternative, no temporary replacement bridge would be constructed over the Santa Margarita River and traffic would need to utilize alternate routes during this time.

Alternative 2. Under this alternative, a temporary use bridge would be constructed to allow vehicular traffic along Stuart Mesa Road to continue to cross the Santa Margarita River. Bridge construction would be the same as Alternative 1.

Alternative 3. Under this alternative, flood walls would be constructed rather than levees. No temporary replacement bridge would be constructed over the Santa Margarita River. Bridge construction would be the same as Alternative 1.

Alternative 4. This alternative would be similar to Alternative 3, with the exception of a construction phase temporary use bridge, which would allow traffic along Stuart Mesa Road to continue to cross the Santa Margarita River during demolition of the existing bridge and construction of the new bridge.

Environmental Issues and Resources To Be Examined

The EIS will evaluate the potential environmental effects associated with each of the alternatives. Issues to be addressed include, but are not limited to; geology, topography and soils, hydrology and water quality, biological resources, cultural resources, land use, visual resources, socioeconomics and environmental justice, traffic, air quality, noise, public health and safety, services and utilities, and coastal zone management. Relevant and reasonable measures that could alleviate environmental effects will be considered.

Schedule

Comments on the scope of this EIS must be received by April 30, 2010. The Department of the Navy will publish a Notice of Availability (NOA) in the **Federal Register** and local media when the Draft EIS is issued for public review. A 45-day public comment period will start upon publication of the NOA in the **Federal Register**. The Department of the Navy will consider and respond to all comments received on the Draft EIS when preparing the Final EIS. The Department of the Navy expects to issue the Final EIS in July 2011, which will be available for a 30-day public comment period. The Department of the Navy will consider all comments received on the Final EIS in preparing for the Record of Decision.

Other Agency Involvement

The Department of the Navy will undertake appropriate consultations with regulatory entities pursuant to the Endangered Species Act, Clean Water Act, National Historic Preservation Act, and any other applicable law or regulation. Consultation will include but is not limited to the following Federal, State, and local agencies: U.S. Fish and Wildlife Service; National Oceanic and Atmospheric Administration Fisheries; State Historic Preservation Officer; American Indian Tribes; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; all local Historic Site Boards and Heritage organizations; California Regional Water Quality Control Board; California Coastal Commission; San Diego Air Pollution Control District; and the County of San Diego, Department of Environmental Health.

Dated: March 25, 2010.

A.M. Vallandingham,

Lieutenant Commander, Judge Advocate Generals Corps, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. 2010–7183 Filed 3–30–10; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

Smaller Learning Communities Program

Catalog of Federal Domestic Assistance (CFDA) Number: 84.215L.

AGENCY: Office of Elementary and Secondary Education, Department of Education.

ACTION: Notice of proposed priorities, requirements, definition, and selection criteria.

SUMMARY: The Assistant Secretary for Elementary and Secondary Education proposes priorities, requirements, a definition, and selection criteria under the Smaller Learning Communities (SLC) program. The Assistant Secretary will use these priorities, requirements, definition, and selection criteria, in addition to any other previously established priorities and requirements, for a competition using fiscal year (FY) 2009 funds and may use them in later years. We take this action to focus Federal financial assistance on an identified national need. We intend these priorities, requirements, definition, and selection criteria to enhance the effectiveness of SLC projects in improving academic achievement and helping to prepare students for postsecondary education and careers.

DATES: We must receive your comments on or before April 30, 2010.

ADDRESSES: Address all comments about the proposed priorities, requirements, definition, and selection criteria to Angela Hernandez-Marshall, U.S. Department of Education, 400 Maryland Avenue, SW., LBJ, Room 3E308, Washington, DC 20202–6200.

If you prefer to send your comments through the Internet, use the following address: *smallerlearningcommunities@ed.gov.* You must include the term "SLC Proposed Requirements" in the subject line of your electronic message.

FOR FURTHER INFORMATION CONTACT: Angela Hernandez-Marshall. *Telephone:* (202) 205–1909 or by *e-mail: smallerlearningcommunities@ed.gov.*

If you use a telecommunications device for the deaf (TDD), call the Federal Relay Service (FRS), toll-free, at 1–800–877–8339.

SUPPLEMENTARY INFORMATION:

Invitation to Comment: We invite you to submit comments regarding this notice. To ensure that your comments have maximum effect in developing the notice of final priorities, requirements, definition, and selection criteria, we urge you to identify clearly the specific proposed priority, requirement, definition, or selection criterion that each comment addresses.

We invite you to assist us in complying with the specific requirements of Executive Order 12866 and its overall requirement of reducing regulatory burden that might result from the proposed priorities, requirements, definition, and selection criteria. Please let us know of any further ways we could reduce potential costs or increase potential benefits while preserving the effective and efficient administration of the program.

During and after the comment period, you may inspect all public comments about this notice in room 3E308, 400 Maryland Avenue, SW., Washington, DC, between the hours of 8:30 a.m. and 4:00 p.m., Washington, DC time, Monday through Friday of each week except Federal holidays.

Assistance to Individuals with Disabilities in Reviewing the Rulemaking Record: On request we will provide an appropriate accommodation or auxiliary aid to an individual with a disability who needs assistance to review the comments or other documents in the public rulemaking record for this notice. If you want to schedule an appointment for this type of accommodation or auxiliary aid, please contact the person listed under **FOR FURTHER INFORMATION CONTACT**.

Purpose of Program: The SLC program awards discretionary grants to local educational agencies (LEAs) to support the restructuring of large public high schools (*i.e.,* schools with enrollments of 1,000 or more students) into smaller units for the purpose of improving academic achievement in large public high schools. These smaller units include freshman academies, multi-grade academies organized around career interests or other themes, "houses" in which small groups of students remain together throughout high school, and autonomous schools-within-a-school. These structural changes are typically complemented by other personalization strategies, such as student advisories, family advocate systems, and mentoring programs.

Program Authority: 20 U.S.C. 7249.

Applicable Program Regulations: (a) The Education Department General Administrative Regulations (EDGAR) in

A-2

PUBLIC NOTICES OF SCOPING MEETING

This space is for the County Clerk's Filing Stamp

PROOF OF PUBLICATION
(2010 & 2011 C.C.P.)

STATE OF CALIFORNIA
County of San Diego

I am a citizen of the United States and a resident of the County aforesaid: I am over the age of eighteen years and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of

North County Times

Formerly known as the Blade-Citizen and The Times-Advocate and which newspapers have been adjudicated newspapers of general circulation by the Superior Court of the County of San Diego, State of California, for the City of Oceanside and the City of Escondido, Court Decree number 171349, for the County of San Diego, that the notice of which the annexed is a printed copy (set in type not smaller than nonpariel), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

April 02nd, 03rd, & 04th, 2010

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated at **Escondido,** California

This 05th day of April 2010

Jane Allshouse
NORTH COUNTY TIMES
Legal Advertising

Proof of Publication of

PUBLIC SCOPING MEETING FOR AN ENVIRONMENTAL IMPACT STATEMENT FOR BASEWIDE WATER INFRASTRUCTURE AND STUART MESA BRIDGE REPLACEMENT AT MARINE CORPS BASE CAMP PENDLETON, SAN DIEGO COUNTY, CALIFORNIA

The Department of the Navy (Navy) and Marine Corps Base Camp Pendleton (MCBCP) intend to prepare an Environmental Impact Statement (EIS) for the construction, operation, and maintenance of an advanced water treatment facility and associated system improvements for the northern region of MCBCP; pipeline connection of the northern and southern water systems on MCBCP; and replacement of the Stuart Mesa Bridge over the Santa Margarita River and associated road, intersection, and flood control improvements. A public scoping meeting will be held in the Ole Hanson Fireside Room at the San Clemente Community Center, 100 North Calle Seville, San Clemente, California, from 6 p.m. to 8 p.m. on Friday, 16 April 2010.

The public is invited to attend the open-house type meeting at their convenience during the meeting hours and can view project-related displays and speak with Navy and MCBCP representatives and resource staff. The opinions of affected federal, state, and local agencies, any affected Native American tribes, and any other interested persons on environmental issues and alternatives to the proposed action will be sought. A court reporter will be available to accept and record oral comments.

The proposed action includes an advanced water treatment facility with distribution lines and reservoir improvements and a discharge system for reverse osmosis brine effluent; the connection of north and south potable water systems; and replacement of a two-lane bridge with a four-lane bridge, improvement of bridge approaches and an intersection, and flood walls or levees. With the exception of the possible use of an existing ocean outfall for discharge of reverse osmosis effluent from the water treatment plant, the proposed action will be entirely within MCBCP.

A 30-day public scoping period began with the publication of a Notice of Intent to prepare the EIS in the Federal Register on 31 March 2010. The Navy and MCBCP will review all comments received during the public scoping period. Written comments regarding environmental issues and alternatives potentially within the scope of the proposed action should be mailed to: Mr. Jesse Martinez, Naval Facilities Engineering Command Southwest, 1220 Pacific Highway, San Diego, California 92132-5190, or emailed to: jesse.w.martinez1@navy.mil.

NCT 2253797 • 04/02, 04/03, 04/04/2010

AFFIDAVIT OF PUBLICATION

STATE OF CALIFORNIA,)
) ss.
County of Orange)

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the **Sun Post News**, a newspaper that has been adjudged to be a newspaper of general circulation by the Superior Court of the County of Orange, State of California, on June 20, 1994, Case No. A-9140 in and for the City of San Clemente, County of Orange, State of California; that the notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

April 3, 2010

"I certify (or declare) under the penalty of perjury under the laws of the State of California that the foregoing is true and correct":

Executed at Santa Ana, Orange County, California, on

Date: April 3, 2010

Signature

Sun Post News
625 N. Grand Ave.
Santa Ana, CA 92701
(714) 796-2209

PROOF OF PUBLICATION

PUBLIC SCOPING MEETING FOR AN ENVIRONMENTAL IMPACT STATEMENT FOR BASEWIDE WATER INFRASTRUCTURE AND STUART MESA BRIDGE REPLACEMENT AT MARINE CORPS BASE CAMP PENDLETON, SAN DIEGO COUNTY, CALIFORNIA

The Department of the Navy (Navy) and Marine Corps Base Camp Pendleton (MCBCP) intend to prepare an Environmental Impact Statement (EIS) for the construction, operation, and maintenance of an advanced water treatment facility and associated system improvements for the northern region of MCBCP; pipeline connection of the northern and southern water systems on MCBCP; and replacement of the Stuart Mesa Bridge over the Santa Margarita River and associated road, intersection, and flood control improvements. A public scoping meeting will be held in the Ole Hanson Fireside Room at the San Clemente Community Center, 100 North Calle Seville, San Clemente, California, from 6 p.m. to 8 p.m. on Friday, 16 April 2010.

The public is invited to attend the open-house type meeting at their convenience during the meeting hours and can view project-related displays and speak with Navy and MCBCP representatives and resource staff. The opinions of affected federal, state, and local agencies, any affected Native American tribes, and any other interested persons on environmental issues and alternatives to the proposed action will be sought. A court reporter will be available to accept and record oral comments.

The proposed action includes an advanced water treatment facility with distribution lines and reservoir improvements and a discharge system for reverse osmosis brine effluent; the connection of north and south potable water systems; and replacement of a two-lane bridge with a four-lane bridge, improvement of bridge approaches and an intersection, and flood walls or levees. With the exception of the possible use of an existing ocean outfall for discharge of reverse osmosis effluent from the water treatment plant, the proposed action will be entirely within MCBCP.

A 30-day public scoping period began with the publication of a Notice of Intent to prepare the EIS in the Federal Register on 31 March 2010. The Navy and MCBCP will review all comments received during the public scoping period. Written comments regarding environmental issues and alternatives potentially within the scope of the proposed action should be mailed to: Mr. Jesse Martinez, Naval Facilities Engineering Command Southwest, 1220 Pacific Highway, San Diego, California 92132-5190, or emailed to: jesse.w.martinez1@navy.mil.

Published: Sun Post New / April 3, 2010 / 12-057 / 9223553

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SCOPING MEETING SUMMARY REPORT

DRAFT
SUMMARY REPORT FOR PUBLIC SCOPING MEETING FOR BASEWIDE WATER INFRASTRUCTURE AND STUART MESA BRIDGE REPLACEMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT, MARINE CORPS BASE CAMP PENDLETON, SAN DIEGO COUNTY, CALIFORNIA

May 2010

TABLE OF CONTENTS

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SECTION 1.0
INTRODUCTION

The public scoping period was initiated with the publication of the Notice of Intent to prepare an Environmental Impact Statement (EIS) in the Federal Register on 31 March 2010. The public scoping period extended from 31 March 2010 through 29 April 2010. A public scoping meeting was conducted on 16 April 2010 at the City of San Clemente Community Center from 6:00 p.m. to 8:00 p.m. Refer to Section 3.0 for more information on the scoping meeting.

Summary of Issues Raised During the Scoping Process

Issue Areas	Federal Agencies	State Agencies	Local Agencies	Local Organizations	Individuals	Total
Status and EIS evaluation of steelhead Distinct Population Segment	1					1

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SECTION 2.0
WRITTEN COMMENTS RECEIVED
DURING THE PUBLIC SCOPING PERIOD

A. COMMENTS RECEIVED

One written comment letter was received from a federal agency after the scoping meeting for the draft EIS.

- **Federal Agencies (1 comment only)**
  National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce
- **Local Agencies**
  No comments received.
- **Individuals**
  No comments received.

B. SUMMARY OF COMMENTS

<u>Federal Agencies</u>

National Marine Fisheries Service

The National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, submitted a letter received on 23 April 2010, stating that the proposed action is within the boundaries of the endangered Distinct Population Segment of steelhead (*Oncorhynchus mykiss*) habitat, with the species having been observed on-Base in San Mateo Creek and the Santa Margarita River. NMFS requests that the EIS evaluate potential effects of the proposed action on steelhead, include measures to avoid or minimize any adverse effects, and propose compensatory mitigation measures as appropriate. The NMFS letter, with enclosures, is included as Attachment 1.

<u>Local Agencies</u>

None.

<u>Individuals</u>

None.

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SECTION 3.0
PUBLIC SCOPING MEETING

A. OVERVIEW

The scoping meeting was held in an open house format on 16 April 2010 in the Ole Hanson Room at the San Clemente Community Center, 100 North Calle Sevilla, San Clemente, California. The open house included eight stations (Sign In, National Environmental Policy Act (NEPA) Process, Project Description and Alternatives, Biological Resources, Cultural Resources, Other Issues, Court Reporter, and Comment Table) where attendees could obtain information, ask questions, and submit written or oral comments. Each station was staffed with personnel from MCB Camp Pendleton Environmental Security and Public Works, Naval Facilities Engineering Command Southwest Division, and AECOM.

Four members of the public attended the open house. One was a planner from the City of San Clemente, one was a representative of the Pauma Band of Mission Indians, one was from the Public Works Office of MCBCP, and one was a representative of an engineering firm seeking information for possible future contract bids. The sign-in sheet for attendees is included as Attachment 2. No written comments were submitted, and no one gave formal verbal testimony to the court reporter.

B. ATTENDANCE

Attendance:

Total signed-in attendance:	4
Total written comments submitted:	0
Total formal comments to court reporter:	0

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ATTACHMENT 1

AGENCY LETTER

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

APR 2 3 2010

In response refer to:
T/SWR/2010/01664:SCG

Mr. Jesse Martinez
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132-5190

Dear Mr. Martinez:

NOAA's National Marine Fisheries Service (NMFS) reviewed the Department of the Navy (Navy) and Marine Corps Base Camp Pendleton's (Base) April 12, 2010, Notice of Preparation of an Environmental Impact Statement (EIS). The EIS is for the proposed construction, operations, and maintenance of an advanced water treatment facility and associated water system improvements for the northern portion of the Base. Additionally, the proposed project includes a pipeline connection of the Base's northern and southern water systems, replacement of the Stuart Mesa Bridge over the Santa Margarita River, and associated road, intersection, and flood control improvements. The proposed projects are of concern to NMFS because endangered steelhead (*Oncorhynchus mykiss*) and habitat for this species are present within the Base limits. In this regard, NMFS has the following comments.

The EIS should clearly acknowledge that the project area lies within the boundaries of the endangered Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*), and habitat for this species occurs within streams on the Base. The EIS should also acknowledge that steelhead have been recently observed in San Mateo Creek and more recently in the Santa Margarita River, and given their life history characteristics, steelhead could be present at times within other Base watersheds as well. The EIS should clearly identify and describe all individual project components, actions, and alternatives, including ones that are interrelated and interdependent. The EIS should clearly describe any potential effects (offsite, onsite, direct, indirect, temporary, and permanent) of each of the project components on steelhead and their habitat within the Base limits. The EIS should also clearly describe the effects of any water diversions or well withdrawals on surface flows and aquatic habitat within streams on the Base. Additionally, the EIS should include a list of measures for avoiding and minimizing potential negative effects of the project alternatives on steelhead and their aquatic habitat. Unavoidable impacts of individual project components should be fully described according to life stage of steelhead (*i.e.*, steelhead spawning, rearing and migration) and for important features of steelhead habitat (*i.e.*, riparian vegetation). Additionally, the EIS should describe any compensatory mitigation measures that will be employed for each of the project alternatives.

To further inform development of the draft EIS, enclosed herein are copies of three letters NMFS previously prepared and that pertain to endangered steelhead and their habitat in the planning area, and potential effects of the conjunctive-use project on this species. NMFS appreciates the opportunity to provide comments to the Navy and the Base that will support preparation of the EIS, and NMFS looks forward to a review of the EIS. Please contact Stan Glowacki at (562) 980-4061 or via email at Stan.Glowacki@noaa.gov if you have questions concerning this letter or if you would like additional information.

Sincerely,

for Rodney R. McInnis
Regional Administrator

Enclosures:

(1) November 19, 2008, letter from NMFS to BOR regarding the Santa Margarita Conjunctive Use Project
(2) December 5, 2009, letter to from NMFS to BOR regarding Southern California Steelhead Recovery Plan and the Santa Margarita Conjunctive Use Project
(3) March 12, 2010 letter from NMFS to Camp Pendleton regarding positive identification of steelhead in the Santa Margarita River Watershed

cc: Mary Larson, CDFG
Tim Hovey, CDFG
Kathy Mrowka, State Water Resources Control Board
Jonathon Snyder, U.S. Fish and Wildlife Service
Copy to File 151422SWR2010PR00153

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

In response please refer to
SWR/2007/04852:SCG

NOV 19 2008

Mr. Gregory Krzys
U.S. Bureau of Reclamation
27708 Jefferson Avenue, Suite 202
Temecula, California 92590

Dear Mr. Krzys:

NOAA's National Marine Fisheries Service (NMFS) is contacting you regarding the Bureau of Reclamation's (BOR) proposed Environmental Impact Statement (EIS) for the Santa Margarita River Conjunctive Use Project (project) on the Camp Pendleton Marine Corps Base (Base), near the City of Fallbrook (City), in San Diego County, California. The proposed project involves upgrading and improving water collection, storage and reuse for the Base and the City. Project alternative components include replacing an existing sheet pile water diversion dam with an inflatable "Obermeyer" type diversion structure, upgrading an existing groundwater recharge and recovery system, installing new wells and new pump stations, creating instream water retention structures, reclaiming wastewater for reuse, upgrading off-stream storage, and building a new pipeline between the Base and Fallbrook Public Utilities District facilities. The water yield from project implementation could increase from the current 7,000 acre-foot per year to 16,200 acre-feet per year. NMFS is concerned about the potential effects of the BOR's project on the long-term survival and recovery of endangered Southern California steelhead (*Oncorhynchus mykiss*) and therefore would like to provide the following comments on the proposed EIS.

First, NMFS would like to provide the BOR with updated information on the status of Southern California steelhead and how they are related to the Santa Margarita River. The Santa Margarita River watershed lies within the endangered Southern California Distinct Population Segment (DPS) of steelhead, which extends from the Santa Maria River to the U.S.-Mexican border (71 FR 834). This watershed is included in the Santa Catalina Gulf Coast biogeographic group, which includes nine streams located in Orange and San Diego Counties (Boughton et al. 2006). NMFS' Steelhead Technical Recovery Team has identified this group of streams as being essential to the viability and recovery of the Southern California DPS of steelhead (Boughton et al. 2006, Boughton et al. 2007). This watershed was historically inhabited by steelhead, and because steelhead have recently been found in other streams near the Santa Margarita River (*i.e.*, San Juan Creek, San Mateo Creek, and the San Luis Rey River) it is likely that adult steelhead will attempt to enter the Santa Margarita River during the winter and spring when rainstorms and increased wet-season flows occur.

After a careful review of the project alternatives, NMFS believes that the proposed project will have substantial effects on the timing, magnitude, duration and frequency of surface flows in the Santa Margarita River downstream of the water diversion facilities. The effects of the project alternatives on steelhead, specifically, how the project will affect immigration and emigration of adult and juvenile steelhead, spawning of adult steelhead, and rearing of juvenile steelhead within the watershed, should be thoroughly analyzed in the EIS, as required by the National Environmental Policy Act. NMFS understands that there may be preliminary plans for a fish-passage facility to be installed on the proposed diversion for steelhead passage, but NMFS is concerned with the BOR's premature conclusion in the December 11, 2006, feasibility study memorandum, which states on page 6 regarding the inflatable "Obermeyer" type diversion structure that "fish-passage capability has been considered but will not be pursued further." If a fish-passage facility for steelhead is in fact still under consideration, NMFS requests that plans for the facility are sent to NMFS so our engineers can evaluate the final fish-passage design and corresponding water releases to evaluate the efficacy of the fish passage facility.

Because of the potential importance of this watershed for long-term survival and recovery of the endangered Southern California steelhead DPS, NMFS believes that BOR has the responsibility under Section 7(a)(1) of the Endangered Species Act to ensure that its actions in this watershed are carried out in a manner that will support the conservation and recovery of endangered Southern California steelhead. Accordingly, we request that the EIS clearly analyzes the effects of the project on endangered steelhead, and that the BOR consult with NMFS on the proposed project to ensure that the project is designed in a manner that will promote the survival and recovery of steelhead in the Santa Margarita River, and the larger Southern California steelhead DPS.

NMFS appreciates the opportunity to provide comments to the BOR for the proposed project. Please contact Stan Glowacki at 562-980-4061 or via email at Stan.Glowacki@noaa.gov if you have any questions concerning this letter or if you require additional information.

Sincerely,

FOR

Rodney R. McInnis
Regional Administrator

cc: Bill Barry, Camp Pendleton

Literature Cited

Boughton, D. A., P. B. Adams, E. Anderson, C. Fusaro, E. Keller, E. Kelley, L. Lentsch, J. Nielsen, K. Perry, H. Regan, J. Smith, C. Swift, L. Thompson, and F. Watson. 2006. Steelhead of the south-central/southern California coast: population characterization for recovery planning. NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-394.

Boughton, D. A., P. B. Adams, E. Anderson, C. Fusaro, E. Keller, E. Kelley, L. Lentsch, J. Nielsen, K. Perry, H. Regan, J. Smith, C. Swift, L. Thompson, and F. Watson. 2007 Draft. Viability criteria for steelhead of the south-central and southern California coast. NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-XXX.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

DEC 5 2009

In response please refer to
SWR/2007/04852:SCG

Mr. William Steele
U.S. Bureau of Reclamation
27708 Jefferson Avenue, Suite 202
Temecula, California 92590

Dear Mr. Steele:

The purpose of this letter is to update you on NOAA's National Marine Fisheries Service's (NMFS) recovery planning efforts for endangered steelhead (*Oncorhynchus mykiss*) in southern California, particularly as the planning efforts relate to the Bureau of Reclamation's (BOR) proposed Santa Margarita River Conjunctive Use Project (CUP).

In July 2009, NMFS released for public review the draft recovery plan (Plan) for endangered southern California steelhead. Of particular note, the Plan identifies specific streams and essential management actions that represent the basis for recovering steelhead within southern California. The streams that are indentified in the Plan were selected because they exhibit the physical and hydrological characteristics that are expected to support viable populations of steelhead. The Santa Margarita River is identified as one such stream. With regard to the essential actions that are necessary to recover endangered steelhead, the Plan identifies removal or remediation of existing steelhead passage barriers. Information contained in the Plan can be used as a basis to guide the design of projects to ensure they are consistent with current recovery efforts for the species. Accordingly, project proponents who are planning an activity that has the potential to adversely affect this species should make all feasible modifications to the activity to ensure it is consistent with the life history and habitat requirements of the species, which are reflected in the essential actions that have been identified in the Plan. This is especially relevant to the BOR's Santa Margarita River CUP.

The Santa Margarita River CUP involves replacing an existing sheet pile water diversion dam with an inflatable "Obermeyer" type diversion structure, as well as other upgrades for collection, storage and reuse of water from the Santa Margarita River for the Camp Pendleton Marine Base and the City of Fallbrook. Based on NMFS' current understanding of the proposed project, the CUP has the potential to adversely affect endangered steelhead (see NMFS' letter of November 19, 2008, enclosed with this letter). However, NMFS is unaware of how the BOR would ensure that the construction and subsequent operation of the CUP does not interfere with, or disrupt, migration of endangered steelhead in the Santa Margarita River. In this context, NMFS would be pleased to collaborate with the BOR for the purpose of identifying the type and scope of measures that would be expected to minimize effects of the CUP on endangered steelhead in the Santa Margarita River.

Please contact Stan Glowacki at 562-980-4061 or via email at Stan.Glowacki@noaa.gov if you have any questions concerning this letter or if you require additional information.

Sincerely,

Chris E. Yates
Supervisor, Southern California
Office of Protected
Resources

Enclosure

cc: Bill Barry, Camp Pendleton
Mary Larson, CDFG
Penny Ruvelas, NMFS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

In response refer to:
T/SWR/2010/00816: SCG

MAR 12 2010

William H. Berry
Resource Management Division Head
Camp Pendleton Marine Corps Base
P.O. Box 555008
Camp Pendleton, California 92055-5008

Dear Mr. Berry:

NOAA's National Marine Fisheries Service (NMFS) is contacting the U.S. Marine Corps Base Camp Pendleton's (Base) Resource Management Division regarding your August 26, 2009, letter and enclosed tissue sample taken from an *Oncorhynchus mykiss* recently caught on the Santa Margarita River. At your request, the sample was analyzed at NMFS' Southwest Fisheries Science Center (Center) to confirm the genetic ancestry of the specimen. The results of the Center's genetic testing positively identified the Santa Margarita River *O. mykiss* to be of steelhead ancestry with no indication of hatchery origin. This finding is not surprising given the ecology of the species, as well as information indicating historical presence of steelhead in the Santa Margarita River watershed. Additionally, the finding supports NMFS' assessment of color photographs of the actual specimen taken in spring 2009 showing the outward characteristics indicative of a juvenile steelhead undergoing smoltification. Overall, the recent genetic finding and ecological evidence, which includes recent documented observations by Base biologist Mike Rouse, California Department of Fish and Game biologist Tim Hovey, and U.S. Forest Service resource officer Jeffrey M. Wells, clearly indicate that a population of endangered steelhead resides in the Santa Margarita River Watershed. NMFS looks forward to working with the Base, and other Federal and State resource agencies, to insure this steelhead population is adequately protected under the U.S. Endangered Species Act. Please contact Stan Glowacki at (562) 980-4061 or via email at Stan.Glowacki@noaa.gov if you have any questions concerning this letter, or if you require additional information.

Sincerely,

for Rodney R. McInnis
Regional Administrator

cc: Jonathon Snyder, U.S. Fish and Wildlife Service
Greg Krzys, Bureau of Reclamation
Doug McPherson, Bureau of Reclamation
William Steele, Bureau of Reclamation
Penny Ruvelas, NMFS
Mary Larson, CDFG
Tim Hovey, CDFG
Therese O'Rourke, Corps of Engineers
Michelle Mattson, Corps of Engineers
Kathy Mrowka, State Water Resources Control Board
Antonio Barrales, State Water Resources Control Board
Copy to File 151422SWR2007PR00337

ATTACHMENT 2

SIGN-IN SHEET

Public Scoping Meeting
Marine Corps Base Camp Pendleton
Basewide Water Infrastructure and
Stuart Mesa Bridge Replacement
Environmental Impact Statement

16 April 2010, 6:00 to 8:00 p.m.
San Clemente Community Center
100 North Calle Seville
San Clemente, California

Sign In Sheet

Name:	Organization:	Email/Phone Number:
Leslie Howard	CDM	howardla@cdm.com 760-438-7755
Todd Taylor	MCB CPPENDLETON PWD	todd.j.taylor@usmc.mil
John Ciampa	City of San Clemente	ciampaj@san-clemente.org
Jeremy Zagarella	PAUMA BAND MISSION INDIANS	jzagarella@pauma-nsn.gov
Jeremy Zagarella	Pauma Band Mission Indians	jeremyzagarella@hotmail.com

A-4

RESPONSES TO PUBLIC COMMENTS ON DRAFT EIS

APPENDIX A-4
RESPONSES TO PUBLIC COMMENTS ON DRAFT EIS

Basewide Water Infrastructure
Draft Environmental Impact Statement
Public Comments

Public Review Period: 2 December 2011–17 January 2012

Agency	Date Received
U.S. Department of the Interior, Office of Environmental Policy and Compliance	13 January 2012
San Diego County Archaeological Society	22 December 2011
Orange County Public Works Department	13 January 2012
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service	13 January 2012
California State Lands Commission	17 January 2012
Pechanga Cultural Resources, Temecula Band of Luiseño Mission Indians	17 January 2012
U.S. Environmental Protection Agency	31 January 2012

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

IN REPLY REFER TO:
ER# 11/1015

Electronically Filed

13 January 2012

Mr. Jesse Martinez
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132

Subject: Review of the Draft Environmental Impact Statement (DEIS) for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Project, Marine Corps Base Camp Pendleton, San Diego County, CA

Dear Mr. Martinez:

U.S. GEOLOGICAL SURVEY COMMENTS

As requested by the U.S. Department of the Interior, Office of Environmental Policy and Compliance, in their correspondence of December 2, 2011, the U.S. Geological Survey (USGS) has reviewed the subject draft environmental impact statement (DEIS) and offers the following comments.

COMMENTS

Executive Summary

Pg. ES-31, Table ES-3: The document addresses the possible impacts on basins occupied by fairy shrimp (*Streptocephalus wootoni*), however, the document does not include the work of Lahti et al (2010), which states that all detected genetic variability for the southern California fairy shrimp was located in the San Diego County pools, namely on Camp Pendleton and Otay Mesa. Lahti et al
1 (2010) states that in order to preserve the genetic diversity "these geographic regions in particular should continue to be protected". We suggest that the Final EIS include this information in the evaluation of the possible impacts on fairy shrimp presented in Section 3.3 and summarized on pages ES-31, ES-44, ES-62, and ES 78. The Lahti et al (2010) reference is:

Lahti, M. E., A. G. Vandergast, Y. Matta, A. J. Bohonak, K. Davis, and M. Simovich. 2010. Data summary for the 2010 field and genetic surveys of the Riverside fairy shrimp

Department of the Interior (USGS)

1 The reference suggested here has been reviewed and added to the References section of the EIS and BA, and the information has been incorporated as appropriate into the EIS and BA.

1 cont. (*Streptocephalus woottoni*) in southern California. U. S. Geological Survey Data Summary prepared for the U.S. Fish and Wildlife Service, Carlsbad, CA 47 pp.

3.3 Biological Resources

Pg. 3.3-22, and pg. 3.3-32, Table 3.3-3:

2 The document addresses issues associated with the arroyo toad at Camp Pendleton, however, observed spatial patterns of movement and habitat use during and outside of the breeding period, and climatological data, suggest that overwintering of toads in floodplain habitats of the near-coastal areas of southern California may be more common than previously considered. If adult toads are overwintering on stream terraces in near-coastal areas, then current management practices that assume toad absence from floodplain habitats may leave over-wintering adult toads vulnerable to human disturbance during a time of year when Arroyo Toad mortality is potentially highest. We suggest the Final EIS include a review and evaluation of the information available in:

> Brehme, C.S., Turschak, G.M., Schuster, S.L., and R.N. Fisher. 2009. MCB, Camp Pendleton Arroyo Toad Monitoring Results for 2008 with Multi-Year Trend Analysis and Monitoring Program Evaluation. U.S. Geological Survey Data Summary prepared for Marine Corps Base Camp Pendleton. 59 pp.
>
> Mitrovich, M.J., Gallegos, E.A., Lyren, L.M., Lovich, R.E. and Fisher, R.N. 2011. Habitat Use and Movement of the Endangered Arroyo Toad (*Anaxyrus californicus*) in Coastal Southern California. Journal of Herpetology 45(3):319-328.

Thank you for the opportunity to review and comment on the DEIS. If you have any questions concerning our comments, please contact Gary LeCain, USGS Coordinator for Environmental Document Reviews, at (303) 236-1475 or at gdlecain@usgs.gov

CARLSBAD FISH AND WILDLIFE OFFICE COMMENTS

In response to your transmittal notice of December 6, 2011, we have reviewed the Draft Environmental Impact Statement for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Project on Marine Corps Base Camp Pendleton. Accordingly, we provide the following comments for inclusion in the Departmental response to the U.S. Marine Corps. Questions pertaining to our draft comments should be directed to Peter Beck of the Carlsbad Fish and Wildlife Office at (760) 431-9440, extension 213.

Comments on the Draft Environmental Impact Statement for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Project

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Impact Statement (DEIS) for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement (BWI-SMB) Project on Marine Corps Base Camp Pendleton (MCBCP) provided by the U.S. Marine Corps (Marine Corps). The BWI-SMB Project would include the construction, operation, and maintenance of three separate infrastructure upgrade projects on MCBCP: 1) The Northern Advanced Water Treatment Plant and Associated Facilities (P-1044); 2) Connection of Northern and Southern Water Systems (P-1045); and 3) Replacement of Stuart Mesa Bridge (P-1039). The

2 The references suggested here have been reviewed and added to the References section of the EIS and BA, and the information has been incorporated as appropriate into the EIS and BA.

DEIS evaluates six alternatives including the "no action alternative." The preferred alternative, Alternative 5, is actually a recombination of Alternatives 1, 3, and 4 for each of the component projects. Alternative 6 is the "no action alternative."

The preferred alternative may impact the federally endangered San Diego button-celery (*Eryngium aristulatum* var. *parishii*, "button-celery"), San Diego fairy shrimp (*Branchinecta sandiegonensis*, "SDFS"), Riverside fairy shrimp (*Streptocephalus woottoni*, "RFS"), tidewater goby (*Eucyclogobius newberryi*, "goby"), arroyo toad (*Anaxyrus* (=*Bufo*) *californicus*, "arroyo toad"), light-footed clapper rail (*Rallus longirostris levipes*, "rail"), least Bell's vireo (*Vireo bellii pusillus*, "vireo"), southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher"), and Pacific pocket mouse (*Perognathus longimembris pacificus*, "PPM"), and the federally threatened thread-leaved brodiaea (*Brodiaea filifolia*, "brodiaea"), spreading navarretia (*Navarretia fossalis*, "navarretia"), and coastal California gnatcatcher (*Polioptila californica californica*, "gnatcatcher").

The following comments are provided to the Marine Corps for their use and information when preparing the final environmental impact statement (FEIS).

Comments on National Environmental Policy Act process in relation to Endangered Species Act compliance

3 1. For a project with significant impacts to federally listed species and other natural resources, such as the BWI-SMB Project, the Service recommends within the *Endangered Species Consultation Handbook* (Service 1998) that the project proponent engage the Service in informal consultation on the project prior to National Environmental Policy Act (NEPA) public scoping. During informal consultation, the Service and the project proponent are encouraged to "explore ways to modify the action to reduce or remove adverse effects to the species or critical habitats" (Service 1998). We are providing the following comments regarding your NEPA process on this project and the corresponding interagency consultation, in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*):

4 a. In contrast to the recommended procedure above regarding informal consultation on draft alternatives for the BWI-SMB Project, the Service was not engaged early in reviewing and commenting on alternative project designs. In fact, the Marine Corps requested initiation of formal consultation in accordance with the Act on October 28, 2011, prior to making the DEIS for the project available to the Service on December 7, 2011. In support of the request for formal consultation, the Marine Corps provided BWI-SMB Project designs on October 28, 2011 (Initial Biological Assessment), and updated these designs on November 17, 2011 (Supplemental BA). These project designs were based on the "preferred alternative" selected within the DEIS, which was not available at the time. Once formal consultation has been initiated, our ability to recommend significant changes to the project is constrained by regulatory limits that assume earlier coordination and comments on alternatives addressed through the NEPA process. Due to the complexity of the BWI-SMB Project and the level of significant impact it will have on federally listed species and other natural resources, formal consultation on the BWI-SMB Project should not have been initiated until comments on the DEIS had been solicited and incorporated into your analysis of project alternatives.

5 b. Based on the preceding comments, it is our recommendation that the Marine Corps withdraw formal consultation on this project until comments on the DEIS provided by the

3 MCBCP understands the need for early coordination with USFWS to explore ways to reduce potential adverse affects to species. As a result of the ongoing coordination and consultation between the Service and MCBCP on the 2010 MCBCP Basewide Utilities Infrastructure EIS and BA and the similarity of the type of projects and the impact analyses approaches with this project, and due to an early in the BWI process lessons learned meeting between MCBCP and the Service, MCBCP coordinated with the Service to get early input.

4 MCBCP understands the concerns of USFWS regarding alternatives input early in the process. Two of these MILCONs (P-1044 & P-1045) were originally included in the Basewide Utilities Infrastructure EIS NOI (FR 73-219 66879 12 November 2008) but were pulled from that EIS during the preparation of the DEIS due to potential significant PPM impacts. The projects were redesigned and again included in the NOI for the Basewide Water Infrastructure EIS (FR 75-61 16080 31 March 2010). MCBCP focused on alternatives to P-1044 that would minimize impacts to the extent practicable to sensitive species. As discussed in the response to comment #3 above, MCBCP used the same USFWS-approved approach for impact analysis. MCBCP will continue to work with USFWS on project implementation refinements to further minimize impacts.

5 Based on the lack of sufficient level of design detail and on responses provided during the DEIS public review period, MCBCP has withdrawn the Stuart Mesa Bridge Replacement Project (P-1039) and the use of the SONGS outfall conduit for brine disposal. MCBCP will reinitiate formal consultation on these potential projects at a later date. These changes resulted in a substantial reduction of potential environmental impacts.

5 cont. Service, other agencies, and the public have been reviewed and formally addressed. In particular, we request that the Marine Corps incorporate the recommended changes to the project provided subsequently in this letter. Once comments on the DEIS have been addressed and our recommended changes to the project have been incorporated or otherwise addressed, we recommend that the Marine Corp reinitiate formal consultation with the Service on this project.

Comments on Specific Project Components

6 2. The preferred alternative selected within the DEIS for the BWI-SMB Project includes paved maintenance access and recreation (e.g., bike lane) corridors adjacent to existing roads that will be placed over or adjacent to proposed pipeline trenching corridors. Preliminary designs provided indicate that these paved corridors will extend 8 feet on each side of the existing road pavement and will occur along a 7-mile stretch of Basilone Road, a 3-mile stretch along San Mateo and Cristianitos Roads, and greater (but unspecified) stretches of Las Pulgas and Stuart Mesa Roads. We have the following concerns with these paved access and recreation areas:

   a. These paved areas do not serve any specified maintenance function for the proposed pipelines. The DEIS does not specify any likely future maintenance actions that would be facilitated by surface paving. Although the paved access/recreation lanes are proposed for both sides of existing roads, the actual pipeline will only be placed on one side of, or underneath, the existing road; access is not needed on both sides of the existing roads. The fact that these paved areas are not proposed for all proposed pipeline segments (e.g., through the Sierra Training Area, along El Camino Real, and along Vandegrift Boulevard) also brings into doubt that these paved corridors are necessary for maintenance of the pipelines.

7 b. As primarily paved recreation corridors, these paved areas do not meet the purposes defined for the project in the DEIS (page 1-2), which are to improve water treatment capabilities, provide upgraded, reliable water infrastructure systems, and provide reliable all-weather access across the lower Santa Margarita River on MCBCP. The placement of these paved corridors also conflict with the need of the project to "conserve and effectively manage resources" (DEIS, page 1-3).

8 c. MCBCP currently supports vernal pools that are important for the long-term survival and recovery of RFS and SDFS. The DEIS (Table 4.5.3.1-7) indicates that about 71 pools occupied by SDFS, 20 pools occupied by RFS, and 16 pools occupied by an unidentified *Branchinecta* species (possibly SDFS) are anticipated to be impacted by construction of the BWI-SMB Project preferred alternative. The Supplemental BA (Table 4-13) indicates that at least 53 pools occupied by SDFS, 19 pools occupied by RFS, and 11 pools occupied by an unidentified *Branchinecta* species (possibly SDFS) are within proposed construction footprint for the paved maintenance access and recreation corridors and will be impacted by this portion of the project. Our preliminary review of the DEIS and the Supplemental BA indicates that almost all of the impacts to occupied vernal pools associated with construction of the paved recreation corridors occur adjacent to Stuart Mesa Road in the Oscar Two Training Area. The proposed maintenance access and recreation corridors will impact more than 12 percent of all RFS-occupied vernal pools on MCBCP and up to 23 percent of all SDFS-occupied vernal pools on MCBCP, substantially reducing the number of vernal pools occupied by RFS and SDFS on MCBCP.

6 a. The Base is planning to install the water lines in the shoulder of the roads. If the lines were placed in the center of the road and a break occurred, the road could be completely shut down for repairs. These roads (Stuart Mesa Road, Basilone Road, and Las Pulgas Road) are crucial roadways to the operation of the Base. The water lines would be installed on one side only; however, at this stage the preferred side of the road is not known. That will be determined by the design-build contractor after award.

Once the preferred side of the road is selected, it is the intent to stay on that side and not cross from one side to the other. There are two primary reasons for this. First, every fitting added for a direction change in the pipe results in an energy loss in the water flow. Adding additional fittings may require the installation of larger pumps, which would increase energy use and costs. Second, each time a pipeline crosses the road, the chance of the pipeline failure in the road increases and could result in temporary but complete shutdown of the roadway for the repairs. Therefore, the EIS analyzes the impacts to both sides of these roads, which allows flexibility for the system designer but increases the impacts identified in the EIS over what may be reasonably expected. The contract will require the contractor to take environmental factors into account in choosing the pipeline routes within the project corridor (i.e., one or the other side of the road).

Once the water line is installed, the maintenance corridor would be paved a width of 8 feet from the white outside lane line of the road. This is the minimum width a vehicle can safely negotiate. The roads where this would occur (Stuart Mesa Road, Basilone Road, and Las Pulgas Road) have blind horizontal and vertical curves. A maintenance or military training vehicle stopping on the side of the road would not be able to get completely clear of traffic. This presents a safety issue.

The maintenance corridors are not needed for every segment of the pipelines. El Camino Real is not a public access road. It is a concrete road on a long straightaway and is used for military training and base maintenance personnel access. Sierra Training area is also not a public access area. The pipeline segment there would run along dirt roads where there is plenty of room to work. Vandegrift Boulevard is a 4-lane road in which through traffic could still pass with the outside lane of traffic closed, so additional paved width at the shoulder would not be needed. The maintenance corridors will be located on only one side of the road but were analyzed on both sides of the road to provide a more conservative impact analyses and to allow the design/build contractor the flexibility to choose one side or the other. See the response to comment 2 above. The actual impacts to fairy shrimp will be less than stated in the EIS and BA. In the 41 Area and north to the TLS crossing of Las Flores Creek, no maintenance access road is proposed to avoid vernal pool and fairy shrimp impacts.

7 b. See the preceding response. The maintenance access corridors primarily provide areas to maintain and service the proposed pipelines, which meets the purpose and need. Recreational use is a secondary purpose. In addition, they provide a safe area for heavy vehicles to pull off the side of the road for emergency stops or other reasons. The purpose and need in both the BA and the EIS has been supplemented.

8 c. The maintenance corridors will be located on only one side of the road but were analyzed on both sides of the road to provide a more conservative impact analyses and to allow the design/build contractor the flexibility to choose one side or the other. See the response to comment 2 above. The actual impacts to fairy shrimp would be less than

9 d. By expanding the paved area beyond the existing road footprint, the proposed access/recreation corridors will expand the zone of indirect impacts beyond that which currently exists adjacent to these road segments. Although not clearly identified as an indirect effect of the project within the DEIS, expansion of the paved area around these roadways will lead to increased impacts by vehicles on adjacent native habitats and increase pressure to clear native vegetation adjacent these expanded roadways. These indirect impacts are likely to affect most of the species that are the subject of this consultation. Therefore, the actual impacts to federally listed plants, fairy shrimp, birds and mammals may significantly exceed that estimated in the DEIS.

10 e. Most of the impacts to occupied vernal pools and, therefore, the need to offset these impacts, will be caused by the construction of the paved maintenance access and recreation corridors. The DEIS (Table 4.5.3.1-8) indicates that up to 142 SDFS pools and 40 RFS pools will need to be enhanced, restored, or created to offset impacts to existing vernal pools caused by construction of the preferred alternative. Based on the limited availability of suitable areas on and off of MCBCP, it is unlikely that there are enough suitable sites to fully offset the projected impacts to vernal pools resulting from construction of the preferred alternative.

11 Because the proposed access/recreation corridors do not clearly meet the stated purpose and need for the BWI-SMB Project, we recommend that these corridors be removed from the currently proposed BWI-SMB Project and be evaluated separately. As part of that future project, we recommend that the footprint for these recreation corridors be reduced by restricting them to one side of the road or narrowing their width on each side of the road. We also recommend that these lanes not be proposed for areas where there are significant natural resources (e.g., vernal pools, federally listed plants, PPM) that need to be conserved. A particular area that should be avoided is the stretch of Stuart Mesa Road in the Oscar Two training Area that contains vernal pools occupied by RFS and SDFS. Most of these impacts would be avoided by implementing an alternative route that follows the proposed pipeline route up Las Pulgas Road and then extends southeast along Basilone Road, as shown within the DEIS for P-1045 Alternative 2 (Figure 2.6-2).

12 3. The proposed action includes up to 5.98 acres of direct impacts to occupied PPM habitat, and 48.36 acres of additional direct impacts to suitable PPM habitat (i.e., habitat not known to be occupied by PPM, but with soil conditions suitable for occupation by this species) (DEIS, Alternative 5, Table 4.5.3.1-6). All of the proposed direct impacts to occupied PPM habitat will occur in association with the installation of water conveyance pipelines extending northwest from Basilone Road up to reservoirs on the ridgeline east of the San Onofre Housing area. The nearly 6 acres of trenching and other construction impacts necessary to install these pipelines will significantly impact the "San Mateo South" PPM population (i.e., about six percent of the estimated area of occupied habitat at San Mateo South; Service 2010). The San Mateo South PPM population is one of only four remaining PPM populations, and conservation of this population is essential for the recovery of this highly endangered species (Service 2010).

Due to the significant anticipated impacts to PPM within the San Mateo South population, we recommend that the proposed route for these pipelines be changed. Two routes that would avoid most impacts would be pipelines that extend from a more westerly location on Basilone stated in the EIS and BA. In the 41 Area and north to the TLS crossing of Las Flores Creek, no maintenance access road is proposed to avoid vernal pool and fairy shrimp impacts.

9 In the 41 Area, north to the TLS boring pit for the Las Flores Creek crossing, and south to the TLS boring pit for the French and Aliso Creeks crossing, the maintenance access road has been confined to the east side of Stuart Mesa Road to avoid vernal pool and fairy shrimp impacts.

The maintenance access lane would extend 8 feet beyond the white line at the outside edge of the travel lane. In many areas there is already an existing paved shoulder. In some cases this shoulder is more than 8 feet wide and minimal work would need to be performed. In other areas, the shoulder may be only 3 feet wide, requiring widening of the asphalt surface to obtain the required width. Additional discussion of potential indirect effects to vernal pools occupied by fairy shrimp has been added to EIS text.

10 As explained in response 4 above, overall impacts are expected to be less than stated in the conservative tally in the BA and EIS. In addition, project design refinements have substantially reduced the potential impacts to vernal pools and fairy shrimp (down to approximately 12 basins) due to elimination of the maintenance access road in the 41 Area and additional confinement of the utility corridor in this area.

11 As explained in responses 4 and 10 above, impacts are expected to be less than stated in the conservative tally in the BA and EIS. Precise mitigation numbers to offset unavoidable impacts to vernal pools would not be known until after all avoidance measures have been exhausted.

The Purpose and Need of the BA has been revised to further address the maintenance access corridors. The corridors would ultimately be placed on one side of the road or the other. In the 41 Area and north to the TLS boring pit for the Las Flores Creek crossing, the maintenance access road has been confined to the east or 41 Area cantonment side of Stuart Mesa Road to avoid vernal pool and fairly shrimp impacts.

As discussed in Section 2.3.5.1 of the EIS, P 1045 Alternative 3 provides key connections to the new Naval Hospital and the 21 Area that Alternative 2 does not provide.

12 The Base evaluated numerous other conveyance and installation options that would either minimize or avoid impacts to PPM. These options included TLS, which is not preferred because it still resulted in direct impacts due to bore pits and the potential for frac-outs affecting the hillside and PPM habitat.

In evaluating a feasible avoidance route west of the PPM habitat, MCBCP Public Works Office determined it would add approximately 3,000 linear feet of pipeline to the project, require installation of 3 pressure reducing valves, necessitate routing around concrete drainage swales, all in rugged terrain. The added cost is estimated at approximately $1.2 million, not including the cost of additional biological surveys. The high cost of this option is prohibitive. Rather than implementing it if the proposed option is not possible, it would be dropped from the project. The pipes proposed for replacement are two 14" asbestos

12 cont. Road, along either the southeast or northwest perimeter of the San Onofre Housing area, staying within existing firebreaks or other previously impacted areas.

13

4. The proposed action includes construction of brine disposal injection wells located near San Onofre Creek, which is occupied by gobies, arroyo toads, vireos, and migratory flycatchers. We are concerned that brine injection may increase the salinity of local groundwater and surface water. Increased salinity within local groundwater may cause mortality of local willow riparian habitat, thereby reducing carrying capacity for vireos and flycatchers in this area and causing abandonment of the area by these species. Increased salinity within local surface water may cause hypersaline environments that are unfavorable for arroyo toad breeding and foraging and may reduce survival and reproduction of gobies within the nearly San Onofre Creek lagoon.

   Due to the potential adverse effects of brine disposal injection wells on gobies, arroyo toads, vireos, and flycatchers, we recommend the Marine Corps provide more detailed information and modeling regarding the potential for brine injection activities to increase salinity of local groundwater and surface water. In addition, we recommend that the Marine Corps establish groundwater and surface water salinity standards that will be evaluated and ensured through future monitoring of water salinity levels.

14

5. The proposed action includes pipeline construction in the 21 Area (Del Mar) near a vernal pool occupied by navarretia, and additional vernal pools that are in the process of being restored. The DEIS (Table 4.5.3.1-6) indicate that this pool may be impacted by pipeline construction. This pool is the only one occupied by navarretia at this location and is one of only three disjunct navarretia populations on MCBCP. Additionally, the illustrated footprint for this portion of the project (Figure 3.3-3b) indicates that the other vernal pools proposed for restoration at this site are within the project footprint. The restoration of these pools is part of a standing commitment by the Marine Corps to restore unauthorized impacts to the occupied vernal pool and other vernal pools in this area.

   We recommend that the Marine Corps ensure that proposed pipeline avoid all direct and indirect impacts to the vernal pool occupied by navarretia and other vernal pools in this area that are being restored.

15

6. The proposed action includes a bridge across the Santa Margarita River at Stuart Mesa Road to replace the existing bridge. The proposed bridge will be "a new cast-in-place pre-stressed concrete bridge approximately 1,200 feet long by 76 feet wide with pile foundations." Our preliminary review of the DEIS indicates that the proposed 1,200-foot bridge will not span the entire floodplain (i.e., an estimated 1,800-foot span from the proposed floodwall on north side of the Santa Margarita River floodplain to the proposed floodwall on south side of the floodplain). Although the proposed span is likely to improve flood conveyance capacity, channel movement, and braiding from the existing condition, the proposed span is likely to require the addition of elevated, reinforced approaches (e.g., soil foundations with concrete and rip rap flood protection) extending into the floodplain that will impair the full range of future channel flooding and movement. Approaches that require placement of fill material into the floodplain may result in unpredictable scouring patterns both up and downstream that may negatively affect existing habitats (e.g., riparian woodland upstream, estuary and beach downstream) for listed species.

cement (AC) pipes. They are functional and their replacement could be dropped from the project without interrupting the function of the system. However, the Base has had repeated problems with blowouts to AC pipe. It is unreliable and does not handle water hammer and pressure changes well. There is a good chance this line could break in the future. From the reservoirs above San Onofre II Housing, there is an elevation difference of 150 feet. If a break occurred, a flow rate of 13,700 gallons per minute would result and an operator from the Facilities Maintenance Department would have to go to the site to manually shut down the water line. The response time is approximately one hour. In an hour, the break could discharge 823,000 gallons of water. The resulting flood could damage downstream natural resources, potentially including PPM habitat, and inundate Basilone Road and San Onofre II and III housing, causing massive property damage. Failure of this line would interrupt the water supply to San Onofre I, II, and III housing. If the failure occurred during a fire-fighting event such as the 2007 Horno fire, these housing areas would not have water storage to fight the fire.

13 The injection wells would inject the brine well below the surface and groundwater levels as is described in Section 2.3.1.1. The Stetson modeling conducted by the Base indicates that the saltwater/freshwater interface is approximately 330 feet below the surface and, as cited in the DEIS on p. 4.1-13, "would be situated within the ocean (saltwater) side of the coastal seawater/freshwater interface, the point of injection would be below the approximate 330-foot interface depth to protect groundwater resources." The Stetson report (Stetson 2011) further states that injection at a depth of 330 feet or deeper 330 feet "will assure that mixing occurs within the saltwater side of the saltwater-freshwater interface and there are no negative impacts to beneficial uses of groundwater in the San Onofre Basin. Furthermore, an increased head towards the ocean is expected to produce a beneficial response to the fresh groundwater resources in the basin on the landward side of the saltwater-freshwater interface." This information has been clarified on p.4.1-14 of the DEIS, and the Stetson report indicates that monitoring of surface water and shallower groundwater that supports riparian vegetation would not be necessary.

14 The pipeline would avoid direct and indirect impacts to the pool occupied by navarretia in this area. Temporary ponded areas in the same area would be avoided to the maximum extent possible. Effects of pipeline construction in the area are included in consultation with USFWS on this area, separate from consultation on the EIS. The EIS and BA have been revised to reflect this information.

15 The Stuart Mesa Bridge Replacement project (P-1039) has been eliminated from this EIS due to insufficient design detail at this time. When sufficient design detail is available additional analysis of the bridge will occur and if viable evaluated in a separate, future NEPA document.

15 cont. We recommend that the Marine Corps lengthen the span of the proposed bridge to extend from the proposed floodwalls on the northern and southern side of the Santa Margarita River floodplain, which we estimate to be about 1,800 feet apart. If the entire floodplain cannot be spanned, we recommend that the Marine Corps develop and provide hydrological models that evaluate how the proposed bridge design (including approaches requiring the placement of fill within the existing floodplain) will alter future flooding and scour patterns within the Santa Margarita River on MCBCP.

Literature Cited:

U.S. Fish and Wildlife Service (Service). 1998. Endangered Species Consultation Handbook: Procedures for conducting section 7 consultations and conferences. March 1998.

U.S. Fish and Wildlife Service (Service). 2010. Pacific Pocket Mouse (*Perognathus longimembris pacificus*); 5-Year Review: Summary and Evaluation. Unpublished report prepared by the Carlsbad Fish and Wildlife Office. April 1, 2010.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port
Regional Environmental Officer

Cc:
Director, OEPC
Shawn Alam, OEPC staff contact
Ray Bransfield, FWS Ventura, CA

San Diego County Archaeological Society, Inc.

Environmental Review Committee

18 December 2011

To: Mr. Jesse Martinez
Naval Facilities Engineering Command Southwest
Building 1 Central IPT
1220 Pacific Highway
San Diego, California 92132-5190

Subject: Draft Environmental Impact Statement
Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Projects

Dear Mr. Martinez:

Thank you for providing the San Diego County Archaeological Society with the subject DEIS for our review and comment.

SDCAS has previously been provided documentation for the three individual projects included in the DEIS, and we have responded to the Assistant Chief of Staff, Environmental Security. A copy of our letter of 25 November 2011 is attached. Comment 3, in particular, remains a concern which has not been addressed. Consideration needs to be given to locations where buried sites without surface cultural material might be encountered, such as in flood plains.

SDCAS appreciates being included in the environmental review process for projects at Marine Corps Base Camp Pendleton.

Sincerely,

James W. Royle, Jr.

James W. Royle, Jr., Chairperson
Environmental Review Committee

cc: SDCAS President
File

P.O. Box 81106 • San Diego, CA 92138-1106 • (858) 538-0935

San Diego County Archaeological Society

@

San Diego County Archaeological Society, Inc.

Environmental Review Committee

25 November 2011

To: Ms. Danielle Page
Cultural Resources Branch Head
Marine Corps Base Camp Pendleton
Box 555008
Camp Pendleton, CA 92055-5008

Subject: Project Update for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Projects

Dear Ms. Page:

Earlier this month, your office provided an extensive package of information for the subject project. A previous submittal of data for these projects was provided earlier this year, resulting in our letter of 14 April 2011. We have the following comments on the current documents:

1 1. Comment 2 in our April letter noted the omission from the map provided of the label for site SDI-16283. The label has been added to map in the current submittal. However, the text for P-1044 in *Cultural Resources Inventories in Support of Basewide Water Infrastructure and Stuart Mesa Bridge Replacement, Marine Corps Base Camp Pendleton, California* omits discussion of that site.

2 2. We remain concerned about those cases where sites deemed ineligible for the National Register but for which monitoring is recommended. The specific concern, as stated in Comment 3 of our April letter, is that having the mitigation measures for those sites buried in text makes it more likely that the mitigation requirement will be overlooked. Providing that requirement in a table to which Base staff and consultants would refer is a simple step to reduce that possibility. The possibility of overlooking those monitoring requirements would be of heightened concern when different consultants do the later stages of work than did the current inventory.

3 3. Also, our concern, mentioned in Comment 4 of our April letter, still exists that the impact analysis and mitigation recommendations are limited to documented sites, with no discussion of areas where buried sites with no surface manifestations might be encountered. The obvious concern is with subsurface work in river flood plains, but there may be others. Wherever the concern exists, the presence of Native American and archaeological monitors should be a requirement. This is commonly a condition of similar projects under CEQA in other areas of San Diego County. Perhaps the intention is that monitoring will be required for all work that disturbs intact soil. If so, a clear statement to that effect would be appropriate.

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1 The report has been updated to include the omitted information on CA-SDI-16283.

2 The mitigation measures are captured in the Programmatic Agreement (PA) between the Navy, SHPO, and the Native Americans, and the Base will comply with them. The final PA will be added to the EIS. The Special Conservation and Construction Measures in Section 2.5 of the EIS include Measure CR-2, which requires archeological and Native American monitoring of all projects where there is a reasonable expectation of unknown archaeological resources (see the preceding response). The Special Conservation and Construction Measures will be included in the design/build contract for construction of the projects.

3 In Section 2.5.3, p. 2-106, cultural resource Special Conservation and Construction Measure CR-2 incorporated into the proposed action states: “Archaeological and Native American monitoring would be required during ground disturbance for all projects. The monitoring program, including procedures to be followed in the event of a discovery, would be specified in a Monitoring and Discovery Plan developed and approved by the Cultural Resources Branch Head before construction. Monitoring would be limited to archaeological sites, areas adjacent to archaeological sites, and areas of inadvertent discoveries as identified in the executed PA.” Monitoring requirements are captured in the Programmatic Agreement between the Navy, SHPO, and Native Americans, and the Base will comply with them. In addition, the Stuart Mesa Bridge Replacement project (P-1039), which has the greatest potential to impact buried sites in flood plains, has been eliminated from this EIS due to insufficient design detail at this time. When sufficient design detail is available additional analysis of the bridge will occur and if viable evaluated in a separate, future NEPA document.

@

Thank you for continuing to include SDCAS in the consultation process for projects at MCB Camp Pendleton.

Sincerely,

James W. Royle, Jr., Chairperson
Environmental Review Committee

cc: AECOM
SDCAS President
File

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@

ORANGE COUNTY
PublicWorks
Our Community. Our Commitment.

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NCL 11-062

January 9, 2012

Mr. Jesse Martinez
Department of the Navy
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132-5190

SUBJECT: Draft Environmental Impact Statement (EIS) for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement located in the Marine Corp Base at Camp Pendleton

Dear Mr. Martinez:

1 The County has reviewed Draft Environmental Impact Statement (EIS) for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement located in the Marine Corp Base at Camp Pendleton and has no comments at this time. We would like to be advised of any further developments, therefore, please keep us on the distribution list for future notifications related to this project.

Sincerely,

M Balsamo

Michael Balsamo
Manager, OC Community Development
OC Public Works/OC Planning
300 North Flower Street
Santa Ana, California 92702-4048
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MB/mmc

Orange County Public Works

1 Comment noted.

@ JAN. 13. 2012 1:20PM DOC NOAA NMFS SWR LB NO. 2221 P. 2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

JAN 13 2012

In response refer to:
T/SWR/2011/05990: KEM

Mr. Jesse Martinez
Naval Facilities Engineering Command SW
1220 Pacific Coast Highway,
San Diego, California 92132

Dear Mr. Martinez:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the Draft Environmental Impact Statement (DEIS) for Basewide Water Infrastructure and Stuart Mesa Bridge Replacement prepared by the U.S. Marine Corps Base Camp Pendleton (Base) December 2011. The proposed action is the construction, operations, and maintenance of an advanced water treatment facility and associated water system improvements for the northern portion of the Base. Additionally, the proposed project includes construction of a pipeline connection between the Base's northern and southern water systems, replacement of the Stuart Mesa Bridge over the Santa Margarita River, and associated road, intersection, and flood control improvements. The proposed projects are of concern to NMFS because endangered Southern California steelhead *(Oncorhynchus mykiss)* and critical habitat for this species, listed sea turtles, essential fish habitat (EFH), and protected marine mammals are present within the project area. NMFS offers the following comments pursuant to the Endangered Species Act (ESA), the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and the Marine Mammal Protection Act (MMPA).

Endangered Species Act Comments

Endangered Southern California Steelhead

NMFS released the Final Recovery Plan for Southern California Steelhead in January 2012 (NMFS 2012). This plan identifies the threats facing the species and provides a recommended recovery strategy and recovery actions necessary to recover the species. The Santa Margarita River and San Mateo and San Onofre creeks are identified in the plan as important watersheds in the recovery of endangered Southern California steelhead. Respectively, these watersheds are identified as Core 1, 1, and 2 watersheds for the recovery of the species. The description of Core 1, 2, and 3 populations is intended to provide general guidance to stakeholders on where to focus recovery efforts (not rank the absolute value of the watershed or create a requirement that recovery actions recommended in the plan occur). The Core labels of the watersheds are based on the potential role of the watershed in the recovery of the species and include a number of considerations, including the size of the watershed (which is reflected in its ecological diversity, amount of habitat, and overall intrinsic potential), the role of the population in the overall recovery strategy, and the threats to the watershed. The Core population labels are not based on the current conditions of the watersheds.

1

National Marine Fisheries Service

1 The final EIS should clearly acknowledge that the project area lies within the boundaries of the Distinct Population Segment (DPS) for endangered Southern California steelhead, and habitat for this species occurs within streams on the Base. Figures 3.3-5a and 3.3-5b of the EIS should clearly indicate locations of suitable steelhead habitat, which NMFS understands to include all streams on the Base. Steelhead have been recently observed in San Mateo Creek and more recently in the Santa Margarita River. Given their life history characteristics, steelhead could be present at times within other watersheds in the project area as well. The geographical occurrence of steelhead that is given in Table 3.3-3 should correspond with that provided in Section 3.3.7. The final EIS should also include a detailed description of habitat available to steelhead for spawning, rearing, and migration in each of the affected streams.

2 The final EIS should clearly describe any potential effects (offsite, onsite, direct, indirect, temporary, and permanent) arising from construction, operation, and maintenance of each of the project components on steelhead and their habitat within the project area. For example, the DEIS lacks detailed analysis of the effects of directional boring, trenching and trenchless technology, geotechnical borings, placement of spoils piles on the riverbank, and elevated suspended sediment and turbidity. For effects that are unavoidable, the final EIS should specify the degree and extent of the effects, and describe how conservation measures would reduce the effects. In addition, the proposed construction timeline should be described in greater detail to clarify whether the 24-month construction period is intended to mean consecutive months, or if the timeline accounts for periods when no construction occurs. NMFS typically recommends that instream construction activities be limited to the months of June through October to reduce potential effects on migrating and oversummering steelhead.

3 The final EIS should also clearly describe the effects of any water diversions or well withdrawals on the amount and extent of surface flows and aquatic habitat within streams on the Base. The DEIS does not specify whether temporary dewatering would be necessary for construction of any of the project components, nor does it provide detail about the long-term effects owing to operation of the proposed facilities on surface water flows, especially as these are affected by groundwater withdrawals. Section 4.1.3.1 of the DEIS states that reductions in streamflow as a result of the proposed project may "significantly impact breeding and foraging activities" for steelhead. The final EIS should provide relevant details on the extent of this impact, noting that reduced streamflow also has the potential to affect steelhead migration. NMFS considers dewatering of streams by groundwater extraction to be a very high threat to Southern California steelhead in San Mateo Creek, San Onofre Creek, and the Santa Margarita River (NMFS 2012). Given that the northern advanced water treatment facility is designed to have an increased capacity of 8.6 million gallons per day, the final EIS should specify where the increased water supply would originate, and what the pursuant effects on surface flows would be. A capacity of 8.6 million gallons per day, or 9,640 acre feet per year, is greater than the "safe perennial yield" listed for the Santa Margarita River basin (7,640 acre feet/year) and Las Pulgas Canyon (700 acre feet/year), a tributary to Las Flores Creek, in the Base's Integrated Natural Resources Management Plan (USMC 2007). In addition, activities that depend upon or are related to the proposed project, including the conjunctive-use project, should be described and analyzed in the EIS.

4 NMFS has concerns about the potential impact of constructing flood walls in the lower Santa Margarita River watershed, near the Stuart Mesa Bridge, on stream hydrology and flow characteristics. Section 4.1.3.4 of the DEIS mentions that the proposed levees would constrict the floodway during storm events, leading to increased velocity and scour potential. To adequately assess potential effects to steelhead, NMFS requests that the final EIS include hydraulic calculations for the existing and proposed Stuart Mesa Bridge flood wall site. Hydraulic calculations should include depth, velocity, and turbulence calculations, as well as hydrology for fish passage windows. The final EIS should also include all relevant details regarding the proposed location of the levees, how they would be constructed, and effects of construction

2

1 The EIS, including Figure 3.3-5 and Table 3.3-3, has been revised to reflect the Recovery Plan for steelhead.

2 The BWI Marine Resources Analysis presents temporary, direct, indirect, and permanent impacts to Southern California steelhead associated with individual project related elements. BWI project elements occur only in steelhead migratory, estuarine rearing, and open ocean habitats. Utilization of trenchless technology and directional boring is, in effect, the conservative methodology for an infrastructure project of this type. In-stream construction and ground disturbing activities are subject to avoidance and minimization measures directed at reducing elevated suspended sediments and increased turbidity, and include advanced BMP treatment controls and the application of a comprehensive SWPPP.

The 24-month timeline for construction begins at the award of the design-build contract. Thus it includes design of the project before any construction impacts can occur, but the timeline for design and construction will be set by the contractor after award. However, adequate stream flow for fish passage would be maintained throughout construction.

The design/build contractor will select many of the details of TLS. Geotechnical studies will occur before that selection. The method of the EIS is to identify a large enough area to keep options open for the contractor and to assess impacts on that basis. This leads to a conservative assessment of impacts.

Because of timelines for funding and design, the three projects will be constructed on separate, not simultaneous, schedules. The projects are design/build projects, so that construction periods in the EIS are projections. It is anticipated, however, that construction in any location that would affect potential steelhead habitat would occur only once for each project and would not last for the duration of the entire project construction, but would be held to the minimum amount of time necessary to accomplish the work in each locale (stream). Furthermore, TLS construction was selected to avoid in-stream construction. Since the projects are design/build, construction schedules other than broad estimates for the whole project are not available.

3 P-1044 and P-1045 are not water development projects; they are redundant water delivery and disposal infrastructure upgrades. Refer to pages 4.1-5 (Stetson 2005 and 2007) and 4.1-20 (Stetson 2007) of the FEIS for additional information. The Santa Margarita River Conjunctive Use Project (CUP) is a separate and unrelated project and the proposed BWI project would not depend on or relate to it. The CUP is evaluated in the EIS cumulative effects analysis.

5 on instream and riparian habitat. The use of rock protection or cement revetment as described in the DEIS would impair the regrowth of riparian vegetation. The final EIS should also consider the statement in Section 3.2.4 of the DEIS that the Santa Margarita River has no major dams. In contrast, the Southern California Steelhead Recovery Plan (NMFS 2012) identifies four total barriers to fish passage in the watershed, one of which, the Lake O'Neill diversion dam, is on the Base.

6 Some phrases in the DEIS are confusing or misleading. For example, the meaning of "MCBCP-designated potential transit reach" is unclear. Streams on the Base support endangered steelhead and primary constituent elements (e.g., freshwater rearing sites and migration corridors) of designated critical habitat for this species. The DEIS asserts multiple times that there will be "no permanent direct impacts to steelhead" but does not provide sufficient reasoning to validate this statement. As discussed above, alterations to the instream flow regime in streams that are migration routes for steelhead adults and smolts could result in permanent impacts to steelhead. The DEIS also uses the terms "infrequent" and "negligible" impact. The use of these terms should be defined and supported in the analysis.

7 Additionally, the final EIS should include a list of measures for avoiding and minimizing potential negative effects of the project alternatives on steelhead and their aquatic habitat, rather than referencing other documents. Unavoidable impacts of individual project components should be fully described according to life stage of steelhead (i.e., steelhead spawning, rearing and migration) and for important features of steelhead habitat (i.e., riparian vegetation). The final EIS should provide details about the impacts of project components on the various life stages of steelhead. Because steelhead may be present in the project area, the final EIS should provide a commitment to biological monitoring throughout

8 project construction, mitigation, and post-construction activities. The final EIS should also describe any compensatory mitigation measures that will be employed for each of the project alternatives. More details on the proposed mitigation for impacts to steelhead and riverine habitat are needed. For example, the final EIS should specify the number of acres of steelhead habitat impacted the mitigation ratio, location, and specific details about mitigation activities.

Sea Turtles

9 Several species of ESA-listed sea turtles may be found in the coastal waters of the project area. NMFS has conducted a preliminary review of the DEIS and has identified no significant concerns related to impacts on listed sea turtle. NMFS advises the Base to coordinate with NMFS during the further development of the EIS to address project effects on listed sea turtles and to ensure that the Base completes any necessary ESA section 7 consultation on the effects of the action on listed sea turtles prior to project implementation.

10 The DEIS is incorrect in its listing classification of the potentially affected sea turtles. Table 3.14-1 lists four species of sea turtles that may be found in the region of influence of the San Onofre Generating Station (SONGS) outfall. Based on the project area and the sea turtles likely to be found in that area, all affected sea turtles should be considered as coming from the Endangered species or distinct population segment, and not the Threatened species or population segments. Please note that the northern DPS of loggerhead sea turtles were listed as Endangered in September 2011 (76 FR 58868). NMFS recommends that the Base correct this table and consider how the project may affect these species in light of the corrected listing status.

Magnuson-Stevens Fishery Conservation and Management Act Comments

The proposed project occurs in EFH for various federally managed fish species within the Pacific Coast Groundfish, Coastal Pelagic Species and Highly Migratory Species Fishery Management Plans (FMPs).

No increased pumping of groundwater is proposed by the project from any groundwater basin on the Base. Water to supply the Northern AWT would be drawn from the San Mateo and San Onofre basins, not the Santa Margarita River or Las Pulgas basins. No new supply wells and no increase in the yield of water from the Santa Margarita River Basin is proposed, and no new wells and no change to the permitted safe yield of the San Mateo and San Onofre wells is proposed. This is implied in the DEIS on p. 1-4 and elsewhere but the EIS has been revised to be explicit.

The Conjunctive Use Project is a separate and unrelated project and the proposed action would not depend on or relate to it.

4 The Stuart Mesa Bridge Replacement project (P-1039) has been eliminated from this EIS due to insufficient design detail at this time. When sufficient design detail is available additional analysis of the bridge will occur and if viable evaluated in a separate, future NEPA document.

5 The Stuart Mesa Bridge Replacement project (P-1039) has been eliminated from this EIS due to insufficient design detail at this time. When sufficient design detail is available additional analysis of the bridge will occur and if viable evaluated in a separate, future NEPA document.

The Lake O'Neill diversion structure is not a total barrier to fish passage, as demonstrated by a 2009 observation and genetic characterization of a smolting southern California steelhead (not of hatchery origin) in the upper portion of the Santa Margarita watershed. The current maximum diversion rate at the Lake O'Neill structure is 60 cubic feet per second and is not an impediment to fish passage during high and moderate flows. However, the statement regarding dams on the Santa Margarita River has been deleted from the EIS.

6 "Designated potential transit reach" is the terminology that has been utilized by the Base since before the publication of the draft SCS recovery plan, and is equal in definition to NMFS' "migratory corridor," yet different in that it is not a synonym for any primary constituent element of designated critical habitat, of which none exists aboard the Base per 70 Federal Register 52501 and 52509.

The Stuart Mesa Bridge Replacement project (P-1039) has been eliminated from this EIS due to insufficient design detail at this time. When sufficient design detail is available additional analysis of the bridge will occur and if viable evaluated in a separate, future NEPA document.

As noted in Appendix B, there are a number of commercially and recreationally important fish species that have been observed in the area. In addition, the project occurs within the vicinity of rocky reef, surfgrass, and kelp, which are considered habitat areas of particular concern (HAPC) for various federally managed fish species within the Pacific Coast Groundfish FMP. HAPC are described in the regulations as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under MSA; however, federally permitted projects with potential adverse impacts to HAPC will be more carefully scrutinized during the consultation process.

NMFS would like to extend our appreciation to the Base for facilitating our review process by providing the marine-related information within the DEIS in a consolidated format in the document entitled "Analysis of Marine Resources for Basewide Water Infrastructure and Stuart Mesa Bridge Replacement". EFH-related comments based on NMFS' review of the DEIS can be separated into two categories, construction activities and brine discharge.

Construction Activities:

Construction activities within the marine environment involve pipeline connection and construction, including the dredging of sediments and the placement and burial of the connection line and diffuser system, and ship/barge movement and anchoring. There are three options for connecting the discharge pipeline to the intake conduit. The first alternative (landward connection) would connect north of the SONGS seawall. Although the exact location of the second alternative (beach connection) is not known, construction activities under this option could occur in intertidal habitat and would require dredging, placement of the pipeline within a trench, and armoring of the pipeline with quarry run rock. The third connection alternative (ocean) would involve running approximately 600 feet of pipeline from the shore through the surf zone. Construction of this additional length of pipeline would also include excavation and armoring. Of these three options, NMFS supports the landward connection, which would avoid construction activities on the shoreline and within the surf zone and would have the least impact on the marine environment. Section 6 of Appendix A notes some "Next Steps" that are to take place and that will be important for NMFS to complete the EFH consultation. For instance, one action includes "Incorporating any new information obtained from the Navy's inspection of the existing abandoned SONGS conduit", which may provide information to inform the Base's decision on how to connect the discharge pipeline to the intake conduit. Therefore, any conservation recommendations NMFS may provide on this project component during the EFH consultation will likely depend upon what construction method is selected.

The DEIS repeatedly mentions the intent to avoid sensitive resources, such as hard substrate (i.e., rocky
reef), during construction-related activities (e.g., See the Mitigation Measures included in Appendix B).
11 NMFS supports this measure and believes that, if implemented appropriately, it could effectively avoid
and/or minimize construction-related impacts to EFH. For instance, the dredging of a trench and burial of
the connection line and diffuser system will take place in close proximity to, and could adversely impact,
rocky reef habitat. Although these construction-related impacts would be deemed temporary, any impacts
to sensitive rocky reefs may take years to recover. Therefore, NMFS recommends that a pre-construction
habitat characterization survey be performed prior to construction activities, and that the Base use that
information to establish an appropriate buffer for the pipeline construction (and anchoring) components of
12 the project. If the Base has more detailed habitat characterization information that was not provided in
the DEIS, this may also be used to avoid this type of impact and may preclude the need for a pre-
construction survey as recommended above. Based upon previous coordination, the Base had expressed
intent to conduct a nearshore habitat characterization survey in the Camp Pendleton area, but NMFS is
not aware if this survey was ever completed.

7 There is no SCS spawning-type habitat associated with BWI project elements, and describing unavoidable impacts to spawning habitat is not warranted. While not specifically identified as such, avoidance and minimization measures presented in the Marine Resources Analysis are expressly directed at the migratory and rearing lifestages of SCS. Furthermore, these measures are consistent with maintaining riparian and aquatic ecosystem integrity, from which many other conspecific species mutually benefit.

The Base presently conducts aquatic biological monitoring in all BWI project-related waterways as a function of its aquatic exotic species control program. Intensive SCS directed surveys could negatively affect individual animals through stress related to capture, confinement, or relocation.

8 The BWI Marine Resources Analysis outlines methodologies for in-place riverine and SCS transit reach/migratory corridor associated riparian habitat restoration. In-place, 1:1 restoration is preferred due to the unique habitat type (the transitional reach of an estuary); the net ecological benefit will be the expansion of the natural river channel in the upper portion of the estuary, and will be consistent with TWG estuarine habitat measures presented in the Riparian BO. Maps will be created that depict these areas, primarily areas to be restored in place within the P-1039 project footprint as a function of restoration plans associated with project related construction.

9 The DEIS recognized the requirement to comply with ESA Section 7, as stated on p. 1-13: “Consultation with the U.S. Fish and Wildlife Service (USFWS) and NMFS is required under the federal Endangered Species Act (ESA) if the proposed action may affect federally threatened or endangered plant and animal species.” The Base is currently in consultation with NMFS.

10 The listing status of the northern DPS of loggerhead sea turtles has been revised in the EIS. The DEIS information, as noted in the reference, was based on accessing the NMFS website in April 2011. The North Pacific DPS of the species was listed in September 2011.

11 The Marine Corps will coordinate with NMFS on the final connection design.

12 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

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Brine Discharge

NMFS is concerned with the potential impacts associated with the release of large volumes of brine
discharge (up to 1.5 million gallons per day) associated with this project, especially given the presence of
HAPCs within the vicinity of the project area. As noted in Appendix B, in addition to the surfgrass,
rocky reef and some individual giant kelp plants observed in the area, there are kelp forests located near
the project site. Changes in salinity and temperature can have adverse impacts on kelp habitat. In
13 addition, copper has been noted to impact the resistance of fishes to disease, cause hyperactivity, impair
respiration, disrupt osmoregulation or impact olfactory performance (NMFS 2009). Based on initial trace
metal data supplied in the DEIS, the brine discharge will contain an average of 60.9 ug/l, which is
approximately 20 times higher than the limit of 3 ug/l identified in the State of California Ocean Plan.
The DEIS states that the initial dilution achieved with the diffuser would be approximately 95:1, which
14 would bring the copper concentration under the 3 ug/l limit. However, as noted in section II.A.1.1 of the
DEIS, "Although initial dilution modeling of the brine discharge has been conducted to assess compliance
with receiving water regulations, further modeling is required to determine the distance and extent from
the proposed diffuser system where the brine discharge plume would be indiscernible from the
surrounding seawater". This information is necessary to evaluate the potential for any impacts to
sensitive resources within the vicinity of the project area.

As with construction impacts, NMFS believes that some of the "Next Steps" identified in Section 6 of
Appendix A will need to be implemented before NMFS can complete our EFH consultation. For
example, the first item states "Obtaining accurate receiving water quality and bathymetry data, including
15 salinity and temperature, as a function of water depth for the vicinity of the proposed diffuser. This
information will allow better dilution modeling". In addition, NMFS supports the step aimed at
determining and addressing the source of copper in the system, and encourages the Base to incorporate
any additional information on these "Next Steps", including when they will occur, into the final EIS.

In section II.A.1.1, the DEIS mentions that brine disposal would make up approximately 12 to 17 percent
of the up to 8.6 million gallons per day capacity of the proposed Northern AWT or a maximum flow rate
of approximately 1.0 to 1.5 million gallons per day. However, Appendix A (p.1) states that "The reverse
16 osmosis (RO) treatment will produce approximately 600 gallons per minute of RO concentrate effluent",
which translates into approximately 864,000 gallons per day or 0.9 million gallons per day. Since the
CORMIX model assumptions are based on a flow of 600 gallons per minute, the Base should verify that
the constituent concentrations (e.g., copper levels) and/or size of the plume would not increase as the RO
concentrate flow rate increases with the planned expansion of the desalting facility.

Finally, injection well disposal (in addition to ocean outlet) is also discussed, but the DEIS does not mention the capacity of the wells or how this may affect the ocean discharge levels.

The letter from the Base dated December 7, 2011 requests "concurrence from the National Marine
Fisheries Service on EFH under section 305(b)(2) of the amended Magnuson-Stevens Act". However,
since NMFS will need the previously identified information to fully assess potential impacts to EFH, and
17 the expectation is that much of that information will be provided in the final EIS, NMFS anticipates
initiating the EFH consultation upon receipt of the final EIS. If this is unacceptable to the Base per your
internal environmental review process, NMFS will work with the Base to best address these information
needs and will expedite this EFH consultation as much as possible.

13 The Navy concurs with this comment. See also the response to comment 15 below. Discharge plume dilution would have to be scientifically characterized and monitored.

14 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

15 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

16 See comment response #15 above.

17 See comment response #15 above.

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Marine Mammal Protection Act Comments

18 All marine mammals are protected under the Marine Mammal Protection Act (MMPA). Under the MMPA, it is illegal to "take" a marine mammal without prior authorization from NMFS. "Take" is defined as harassing, hunting, capturing, or killing, or attempting to harass, hunt, capture, or kill any marine mammal. "Harassment" is defined as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. It is not clear from the DEIS if take of marine mammals is expected and if so, if the intent is to apply for a permit under the MMPA for take of marine mammals or if measures will be in place to avoid take. Based on the information provided in the DEIS and Marine Resources Report, NMFS recommends applying for a permit under the MMPA. NMFS provides the below rationale for the recommendation.

19 Current NMFS practice regarding exposure of marine mammals to sound is that cetaceans and pinnipeds exposed to impulsive sounds of 180 and 190 dBrms or above, respectively, are considered to have been taken by Level A (*i.e.*, injurious) harassment. Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to sounds at or above 160 dBrms for impulse sounds (*e.g.*, impact pile driving) and 120 dBrms for continuous sound (*e.g.*, vibratory pile driving), but below injurious thresholds. For airborne sound, pinniped disturbance from haulouts has been documented at 100 dB (unweighted) for pinnipeds in general, and at 90 dB (unweighted) for harbor seals. NMFS uses these levels as guidelines to estimate when harassment may occur. NMFS recommends correcting those sections within the DEIS and Marine Resources Report where this information was incorrectly interpreted and refer to these thresholds for the analysis of take of marine mammals. The expected noise levels for this project are currently unknown, as construction plans have not been developed in detail; therefore, NMFS is not able to recommend whether a permit may be necessary under the MMPA.

The DEIS and the Marine Resources Report both refer to the following measure to avoid take of marine mammals (Marine Resources Report, pages 106-107): "*...marine mammals within the transit route would easily avoid potential collision by moving out of the way of the oncoming craft. The combination of low vessel speed and presence of marine mammal/turtle observers during project activities will reduce impacts from boat traffic and construction activities on marine mammals. These studies have also found, however, that effects on behavior are greatly limited when applicable marine mammal protection guidelines are followed (e.g., boats remain at a given distance from marine mammals). Marine mammals are highly mobile and can avoid boat traffic.*"

20 NMFS agrees that it is likely that since the project area is frequented by vessel traffic from MCBCP, commercial sportfishing boats, and recreational vessels, it is unlikely that project activities would alter present vessel traffic conditions significantly; however, the expectation that a marine mammal will swim out of the way of an oncoming vessel is not a mitigation measure for project-related impacts to avoid or minimize take of a marine mammal. Although not stated here, the low vessel speed reported was below 10 knots. While traveling at slower speeds may reduce the lethality of a strike, it doesn't necessarily negate the risk of a strike with a marine mammal where vessels and marine mammals co-occur. Please provide the distance that boats will be expected to remain from marine mammals and what guidelines are expected to be followed to minimize a vessel interaction with a marine mammal. In addition, please indicate how the presence of an observer during project activities will reduce impacts to marine mammals. If a strike of a marine mammal is expected, a permit under the MMPA is recommended. As stated in the DEIS, the proposed activities may result in marine mammals leaving the project area. Although, NMFS agrees that this is likely temporary and that those marine mammals would be expected

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18 Conservation measures are presented to prevent “take” of any marine mammal (a qualified observer, and a 500’ construction buffer zone), and “take” is not anticipated under these measures. As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

19 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

20 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

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20 cont. to return upon completion of the project, details regarding what activities would cause marine mammals to leave should be provided and if take is expected, a permit under the MMPA is recommended.

21 The project description includes reference to work stoppage when marine mammals are present within the project area (within 500 feet of barge or ship operations) and that the area may be refined, with regard to ensuring marine mammal protection, during the permit consultation process. Please specify what permit consultation process is being referred to in the previous sentence (*i.e.,* ESA and/or MMPA). In addition, please provide justification for the 500 foot zone and how this is expected to avoid take or minimize impacts. NMFS recommends 500 meters, in those instances when underwater noise impacts and sound measurements are unknown and until measurements can be verified in the field. NMFS also recommends including a temporal component to work stoppage and when work can resume, due to the presence of a marine mammal.

NMFS recommends providing details regarding the initiation of activities and how those may result in a startle response from marine mammals present in the project area, what mitigation measures are proposed to avoid take or minimize impacts of a marine mammal, or if an application for a permit under the MMPA will be requested.

22 After the removal of the cooling water tank structure is removed, a mammal barrier will be fabricated to cover the resulting opening. Please provide a description of the marine mammal barrier and how it will be monitored to ensure that marine mammals will not gain access.

MR-7, specifies that construction would take place to the maximum extent practicable, outside of the migration period for whale species along the coast of California (December-March). Please note that this time frame typically refers to the gray whale migration along the entire California coast and not any other whale species.

Conclusion

NMFS appreciates the opportunity to provide comments to the Base that will support preparation of the final EIS. NMFS looks forward to a review of the final EIS. Please contact Kristin Mull at (562) 980-3265 or via email at Kristin.Mull@noaa.gov if you have questions concerning NMFS' comments that pertain to endangered steelhead. For questions related to endangered sea turtles, please contact Christina Fahy at (562) 980-4023 or via email at Christina.Fahy@noaa.gov. For questions related to NMFS' comments on EFH, please contact Eric Chavez at (562) 980-4064 or via email at Eric.Chavez@noaa.gov. For questions related to NMFS' comments on marine mammals, please contact Monica DeAngelis at (562)-980-3232 or at Monica.DeAngelis@noaa.gov.

Sincerely,

Kevin Ch

for Rodney R. McInnis
Regional Administrator

cc: Karen Goebel, USFWS, Carlsbad, CA
Mary Larson, CDFG, Los Alamitos, CA
Administrative File: 151422SWR2011PR00589

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21 See the preceding response. The factors that might cause marine mammals to leave the construction area include boat traffic and other surface and underwater construction activity, increased turbidity, and noise. These factors are described on p. 4.1-242 through 4.1-244 of the DEIS.

22 See responses 19 and 20 to NMFS comments above. The mammal barrier will be installed by SCE, not by the Navy, and not as part of the P-1044 project.

Measure MR-7 has been revised to refer to gray whales only.

Literature Cited

National Marine Fisheries Service (NMFS). 2012. Southern California Steelhead Recovery Plan. Southwest Region, Protected Resources Division, Long Beach, California.

NMFS. 2009. The Use of Treated Wood Products in Aquatic Environments: Guidelines to NOAA Fisheries Staff for Endangered Species Act and Essential Fish Habitat Consultations in the Alaska, Northwest and Southwest Regions. Southwest Region.

U.S. Marine Corps (USMC). 2007. Integrated Natural Resources Management Plan, Marine Corps Base Camp Pendleton (with chapter and appendix updates per http://www.cpp.usmc.mil/base/environmental/inrmp.asp).

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STATE OF CALIFORNIA EDMUND G. BROWN JR., *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

CURTIS L. FOSSUM, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
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from Voice Phone **1-800-735-2922**

***Contact Phone:* (916) 574-1890**
***Contact FAX:* (916) 574-1885**

January 17, 2012

File Ref: 3193.1

Jesse Martinez
Naval Facilities Engineering Command Southwest
1220 Pacific Coast Highway
Building 1, Central IPT
San Diego, CA 92132-5190

Subject: **Environmental Impact Statement for Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Project, Camp Pendleton, San Diego County**

Dear Mr. Martinez:

Staff of the California State Lands Commission (CSLC) has reviewed the subject Environmental Impact Statement (EIS) and Record of Decision (ROD) for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement Project, Camp Pendleton, San Diego County (Project), which is being prepared by the United States Department of the Navy (Navy). The Navy is the Lead Agency, under the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.). At this time, no state lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) has been identified; however, the CSLC has prepared these comments because of its jurisdiction, identified below, over State sovereign lands located within the planned area of construction. The CSLC has trust responsibility for any and all projects that could directly or indirectly affect state owned sovereign lands and/or school lands, and their resources or uses (pursuant to the State CEQA Guidelines,[1] §§ 15381 and 15386, subd. (b)).

Project components that may fall under the CSLC's jurisdiction include the following:

- Utilizing the existing, abandoned San Onofre Nuclear Generating Station (SONGS) 12-foot diameter, 3,200-foot-long cooling water intake conduit located in the Pacific Ocean for brine discharge.
- Replacing the existing Stuart Mesa Bridge.

[1] The "State CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

California State Lands Commission

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CSLC Jurisdiction and CEQA

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The CSLC also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6301, 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust.

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court. On navigable non-tidal waterways, including lakes, the State holds fee ownership of the bed of the waterway landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark, except where the boundary has been fixed by agreement or a court. Such boundaries may not be readily apparent from present day site inspections.

Although Section 1 of the Draft EIS states that the proposed Project is a Federal project,
exclusively supported by Federal funds, the Project proposes to place the Brine
Discharge Line and Brine Diffuser on State sovereign lands at the existing 3,200-foot-
long cooling water intake conduit. Additionally, after review of the information submitted
and historic in-house records, the CSLC staff has determined that abandoned SONGS
1 cooling water intake conduit located in the Pacific Ocean for brine discharge is located
on ungranted sovereign lands. Please be advised that the existing 3,200-foot-long
cooling water intake conduit is under a non-exclusive lease with Southern California
Edison Company and San Diego Gas and Electric Company. Any proposed use of the
existing abandoned SONGS cooling water intake conduit by the Navy will require a
lease from the CSLC and is therefore subject to the requirements of CEQA prior to any
approval by the CSLC.

The Stuart Mesa Bridge is located over the Santa Margarita River, which is possibly
navigable and tidal, and located within the Rancho Santa Margarita Y Los Flores.
The State is precluded from asserting that it acquired sovereign title interests by virtue
2 of its admission to the United States because it is located within the Rancho, pursuant
to the holdings in Summa Corporation v. California 466 U.S. 198 (1984). Therefore, the
proposed replacement of the Stuart Mesa Bridge is not within the leasing jurisdiction of
the CSLC.

Because the Project would require of a lease from CSLC for using the abandoned
3 SONGS cooling water intake conduit and placement of the Brine Discharge Line and
Brine Diffuser, it would require approval by the CSLC at a properly noticed public

1 The EIS recognizes the authority of CSLC over state sovereign lands and the SONGS outfall. As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

2 The Navy concurs with this comment.

3 The EIS recognizes the authority of CSLC over state sovereign lands. As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

@

3 cont. meeting, and as a discretionary action, would also require the CSLC to comply with CEQA (Pub. Resources Code § 21000 et seq.). The State CEQA Guidelines provide a mechanism by which an EIS can be used by an approving agency if specified conditions are met (see generally §§ 15220-15225). With regard to circulation and public review of the document, pursuant to section 15225 of the CEQA Guidelines, the CSLC may only use the EIS in place of an Environmental Impact Report if the federal lead agency circulated the EIS in accordance with CEQA and gave notice of the document's availability as specified in section 15087 of the State CEQA Guidelines. Because the CSLC is a state agency, when it acts as a lead agency under CEQA, it is required to circulate environmental documents through the State Clearinghouse at the Governor's Office of Planning and Research. For the Project EIS, CSLC staff has been unable to verify that the Navy gave such notice; therefore, prior to the Navy's approval of the Project and before the CSLC can use the EIS to consider approval of a lease for the Project, the EIS will need to be noticed and circulated in accordance with CEQA requirements. Please contact the CSLC staff identified below for further assistance in meeting this requirement. With regard to CEQA's substantive requirements to mitigate or avoid significant effects on the environment, CSLC staff has reviewed the EIS for compliance with the conditions set forth in CEQA and the State CEQA Guidelines and offers the following comments.

Project Location and Description

The proposed Project at Marine Corps Base Camp Pendleton (MCBCP) is located approximately 40 miles north of downtown San Diego extending approximately 17 miles along the Pacific Coast and 12 miles inland, and encompassing approximately 125,000 acres. The Base is bordered by the city of San Clemente to the northwest, the city of Oceanside to the south, the community of Fallbrook and the Cleveland National Forest to the east, and the Pacific Ocean to the west (Figure 1-1). Regional access to MCBCP is provided by Interstate 5 (I-5) and State Route 76 (SR-76).

The EIS indicates that the purpose of the Project is to provide MCBCP with up-to date, reliable and efficient infrastructure of sufficient capacity and redundancy for MCBCP to accomplish its mission of operating an amphibious training base that promotes combat readiness by providing facilities, services, and support responsive to the needs of Marines, Sailors, and their families. The Project is needed to modernize and expand the capacity and capability of MCBCP's aging (1940s/50s era) utility systems and infrastructure. The Project will accomplish this purpose through six separate projects designed to meet current and future needs.

Alternative 1 (Preferred Alternative) consists of six projects described in the EIS to improve the existing infrastructure. These include:

- Construction and operation of a 4-million-gallon-per-day (mgd) Northern Regional Tertiary Treatment Plant (NRTTP)with an option for a reverse osmosis membrane facility, a biosolids treatment facility, and of the Base. An operations facility, conversion of an existing wastewater treatment plant to a pump station, and construction of two new pump stations would be included. A separate reuse water system, including distribution pipelines and a reuse pump station and other

reuse system facilities would be constructed. A new pipeline would be constructed to discharge NRTTP effluent to existing percolation ponds

- Construction and operation of three new replacement electrical substations to replace older, existing substations to convert 69 kV power supplies to 12kV for on-Base distribution and construct one new 69kV to 12kV substation and related distribution lines.
- Construction and operation of a new intercamp and intracamp fiber-optic cable and telephone cable systems to meet redundancy and bandwidth operational needs. All new communication lines would be underground.
- Construction and operation of eight new 12kV electrical distribution circuits and a new meter station at the site of one of the new meter stations constructed as part of P-1048.
- Installation of approximately 90,000 linear feet of new high-pressure natural gas mains in three separate locations and install water and wastewater lines in the road. Ranges 130 and 131 are not currently served by the Base's potable water and wastewater systems.

CSLC staff understands the Project would require MCBCP to complete consultation with several agencies. They include:

- The United States Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA),
- The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) under Section 7 of the ESA,
4
- The California Department of Fish and Game (CDFG) under Fish and Game Code 2080.
- The California State Historical Preservation Officer (SHPO) under Section 106 of the National Historic Preservation Act (NHPA).
- Implementation of the Preferred Alternative will also require coordination and consultation with the U.S. Army Corps of Engineers (USACE) and California Regional Water Quality Control Board (RWQCB) for the project-specific Section 404 permits and Section 401 water quality certifications.
- Review and approval of a detailed mitigation plan will be required as part of the permitting and consultation processes, and implementation of the mitigation plan will be required as a condition of design/build contracts for all projects.

Environmental Review

Climate Change

5 While not specifically required by CEQA, the EIS should nonetheless consider the effects of sea level rise on all resource categories potentially affected by the proposed Project, and the Project's contribution to sea level rise due to Project-related

4 With the exception of CDFG, the EIS discusses these agencies and their regulatory roles with respect the project in Section 1.9 on pp. 1-13 through 1-17 and elsewhere. Because the project is a federal action, CDFG has no regulatory authority over the project.

5 The EIS discusses GHG effects of the project in Section 5.2.4, “Greenhouse Gases.”

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5 cont. greenhouse gas (GHG) emissions. Please note that when reviewing lease applications CSLC staff is directed to (1) request information concerning the potential effects of sea level rise on proposed projects, and (2) if applicable, require applicants to indicate how they plan to address sea level rise and what adaptation strategies are planned during the projected life of each project. For further information, please see "A Report on Sea Level Rise Preparedness, Resurvey" (Report), which the CSLC approved at its meeting on July 23, 2010 (the Report and accompanying staff report can be found on CSLC's website: http://www.slc.ca.gov/). One of the recommendations from the Report is to direct CSLC staff to consider the effects of sea level rise to hydrology, soils, geology, transportation, recreation, and other resource categories in all environmental determinations associated with CSLC leases.

Cultural Resources

Section 1.0 of the EIS provides the following environmental commitment regarding unanticipated discoveries of human remains, archeological deposits, or any other type of historic property during construction:

> *If impact avoidance is not feasible, the Marine Corps will implement a Historic Properties Treatment Plan (HPTP) for the affected resources. The Marine Corps, the California State Historic Preservation Office (SHPO), and other consulting parties (Native American Tribes) have developed and executed a Programmatic Agreement (PA) to resolve the adverse effects of the proposed action on historic properties within the area of potential effects. Implementation of the HPTP will be required as a condition of design/build contracts for all projects.*

6 The EIS should state that title to all abandoned shipwrecks and all archaeological sites and historic or cultural resources on or in the tide and submerged lands of California is vested in the state and under the jurisdiction of the CSLC. Any submerged archaeological site or submerged historic resource remaining in State waters for more than 50 years is presumed to be significant. The CSLC maintains a shipwrecks database of known and potential vessels located on the state's tide and submerged lands; however, the location of many shipwrecks remains unknown. The recovery of objects from any submerged archaeological site or shipwreck may require a salvage permit under Public Resources Code, section 6309.

7 Mitigation measures should be developed to address any submerged cultural resources that may be affected by the Project and any unanticipated discoveries during the Project's construction. Mitigation measures should either be presented as specific, feasible, enforceable obligations, or should be presented as formulas containing "performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way" (State CEQA Guidelines, § 15126.4, subd. (b)). CSLC staff requests that the Navy consult with CSLC staff, should any cultural resources be discovered during construction of the proposed Project, prior to Project construction.

6 A statement regarding title to abandoned shipwrecks and historic or cultural resources has been added to the EIS in accordance with this comment. The Navy has conducted extensive undersea reconnaissance in the vicinity of the conduits, and has found no evidence of shipwrecks or submerged cultural resources in the project area. The project pipeline will be inside the conduit, and construction of the conduit would have extensively disturbed the seafloor, so intact cultural resources are unlikely in this area. The EIS states on p. 4.1-131, "Potential impacts to undiscovered buried resources would be addressed through construction monitoring by a qualified archaeologist, with monitoring of construction in all portions of the APE(s) with a potential for buried cultural deposits." This applies to submerged as well as other land resources. Additional conditions may be developed during consultation with NMFS. As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

7 Federal EIS mitigation measures are not governed by CEQA regulations. Appropriate actions and treatment for any submerged cultural resources discovered during the project's construction are stated in the DEIS on p. 4.1-1-131, "MCBCP, SHPO, and other consulting parties would develop a Programmatic Agreement (PA) that records the terms and conditions agreed upon to resolve adverse effects resulting from the undertakings." Additional conditions may be developed during consultation with NMFS. Consultation with CSLC should be initiated if a lease application is made by any agency, but a lease application is not part of the proposed project. As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

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Biological Impacts

8 CSLC Staff recommends that the EIS provide a more comprehensive evaluation of temporary and/or permanent impacts to marine resources in the area of the Pacific Ocean. For example, in section 4.0 the EIS does not discuss potential impacts that may result from the construction and operation of the Brine Discharge Line and Brine Diffuser. The CSLC staff believes marine impacts resulting from construction activities will potentially impact marine resources, and therefore recommends the development and implementation of a Marine Mammal and Turtle Contingency Plan to minimize impacts to marine resources during construction. CSLC staff recommends that the Navy analyze impacts to marine resources during construction activities within the marine environment, and provide mitigation for any potential impacts identified. The CSLC staff is providing components of a Marine Mammal and Turtle Contingency Plan for Project construction activities, as follows:

Marine Mammal and Turtle Contingency Plan

Implementation of a Marine Mammal and Turtle Contingency Plan during construction is recommended to ensure the safety of any marine mammal or turtle. The plan includes the following criteria for ensuring the safety of mammals and turtles. The recommended components include:

1. Vessel operators shall be trained by a marine mammal expert to recognize and avoid marine mammals prior to project-related activities. Training sessions shall focus on the identification of marine mammal species, the specific behaviors of species common to the project area and transport routes, and awareness of seasonal concentrations of marine mammal and turtle species. The operators shall be re-trained annually throughout the life of the project.

2. A marine mammal observer shall be placed on all project vessels during the spring and fall gray whale migration periods (generally December through May), and during periods/seasons when other marine mammals, such as migrating fin, blue, and humpback whales (generally June through November), are known to be in the Project area in relatively large numbers. Observers can include the vessel operator and/or crew members, as well as any Project worker that has received proper training. Vessel operators and crews shall maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.

3. Vessel operators will make every effort to maintain a distance of 1,000 feet (305 m) from sighted whales, and 150 feet (45.7) or greater from sea turtles or smaller cetaceans whenever possible.

4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), vessel operators shall attempt to remain parallel to the animal's course. When paralleling whales, project vessels will operate at a constant speed that is not

8 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

faster than the whales' and shall avoid excessive speed or abrupt changes in direction until the cetacean has left the area.

5. Per NOAA recommendations, vessel speeds shall not exceed 11.5 mph (10 knots) when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits (i.e. excluding during poor sea and weather conditions, thereby ensuring safe vessel maneuverability under those special conditions). A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 300 feet (91.4 m) whenever possible.

6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, operators will reduce speed and shift the engine to neutral. Vessel operators will not engage the engines until the animals are clear of the area.

7. Project vessels shall not cross directly in front of migrating whales, other threatened or endangered marine mammals, or marine turtles.

8. Project vessels shall not separate female whales from their calves.

9. Project vessel operators will not herd or drive whales.

10. If a whale engages in evasive or defensive action, project vessels will drop back until the animal moves out of the area.

11. Collisions with marine wildlife will be reported promptly to the Federal and state agencies listed below pursuant to each agency's reporting procedures.

    Stranding Coordinator, Southwest Region
    National Marine Fisheries Service
    Long Beach, CA 90802-4213
    (562) 980-4017

    Enforcement Dispatch Desk
    California Department of Fish and Game
    Long Beach, CA 90802
    (562) 590-5132 or (562) 590-5133

    California State Lands Commission
    Environmental Planning and Management Division
    Sacramento, CA 95825-8202
    (916) 574-1900

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Underwater Construction Noise

9 The CSLC staff is concerned that an evaluation of the noise and vibration impacts on fish, mammals, sea turtles and sea birds from construction activities in the water and land-side supporting structures of the Project was not included in Section 4 of the EIS. In order to more fully comply with CEQA's requirement to disclose and analyze potentially significant effects and avoid or lessen such effects, noise impacts from construction related sources should be evaluated and the results along with applicable mitigation should be presented to the CSLC prior to the beginning of construction activities for review. Mitigation measures may be needed that would include species-specific work windows as defined by CDFG, USFWS, and NOAA NMFS. Additional concern and precaution should be taken to ensure any construction activities do not increase the chances of liquefaction or sloughing within the surrounding waters during installation of the Brine Discharge Line and Brine Diffuser.

Effluent Discharge Impacts

10 The ocean discharge portion of the project appears to occur within Essential Fish Habitat (EFH) for various federally managed fish species within the Pacific Groundfish and Coastal Pelagic Species Fishery Management Plans. Aspects of the project may adversely affect EFH, such as water quality impacts associated with the release of effluent from the treatment process into the nearshore environment. There does not appear to be any preliminary plume analysis of the brine discharge. Although the effluent concentrations may be low, a thorough impact evaluation to nearshore water quality and any sensitive habitats in the nearby area will be necessary to move forward with the CSLC lease. The CSLC will require a brine discharge impact evaluation for the proposed Project.

Cumulative Impacts

11 CSLC staff is concerned that Section 5 of the EIS does not adequately consider the cumulative impacts of the proposed Project when viewed in connection with the effects of other current projects in the area. For example, the EIS does not discuss an existing CSLC lease which authorizes the existing 3,200-foot-long cooling water intake conduit which is under a non-exclusive lease with Southern California Edison Company and San Diego Gas and Electric Company. In order to more fully comply with CEQA, the effects of placement of a Brine Discharge Line and Brine Diffuser will need to be evaluated in light of its incremental contribution to a significant cumulative effect, including both construction and potential long-term impacts of the discharge from this brine diffuser line when it becomes operational.

9 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

10 As discussed in Section 1.8 of the Final EIS, the USMC is not proposing the use of the outfall at this time. If the USMC considers use of the outfall in the future, it will conduct additional analysis of and evaluate impacts in a future NEPA document.

11 The Southern California Edison/San Diego Gas & Electric lease is a static existing condition and not a project. However, it is not discussed as a cumulative impact project in the EIS. The EIS acknowledges the lease, although no action regarding the lease is part of the proposed project. The SONGS lease is described in Section 3.13, "Coastal Zone Management," on p. 3.13.3.

Thank you for the opportunity to review and make comments on the EIS for the Project. Since part of the proposed Project involves use of State sovereign lands and will require issuance of a lease, the CSLC will need to rely on an environmental document that meets CEQA requirements. The CSLC will review the final document and determine whether it has met the requirements identified in this letter for use in lieu of a separate EIR. If it does not, the CSLC would be required to prepare and circulate a separate environmental document that complies with CEQA prior to taking action on approval of the lease.

If you have any questions regarding sovereign lands subject to the CSLC's jurisdiction, please contact Drew Simpkin, Public Land Manager at (916) 574-2275 or by e-mail at Drew.Simpkin@slc.ca.gov. Please send copies of future Project-related documents, including an electronic copy of the Final EIS, or refer questions concerning environmental review to Christopher Huitt at (916) 574-1938 or by e-mail at Christopher.Huitt@slc.ca.gov.

Sincerely,

Cy R. Oggins, Chief
Division of Environmental Planning
and Management

cc: D. Simpkin
C. Huitt
K. Colson

@

PECHANGA CULTURAL RESOURCES
Temecula Band of Luiseño Mission Indians

Post Office. Box 2183 • Temecula, CA 92593
Telephone (951) 308-9295 • Fax (951) 506-9491

January 17, 2012

VIA E-Mail and USPS

Mr. Jesse Martinez
NAVFAC Southwest
1220 Pacific Highway
San Diego, CA 92132-5190

Re: Pechanga Tribe Comments on the Draft Environmental Impact Statement for Basewide Water Infrastructure and Stuart Mesa Bridge Replacement, Marine Corps Base Camp Pendleton, California

Dear Mr. Martinez:

Thank you for inviting us to submit comments on the above named Project. This comment letter is submitted by the Pechanga Band of Luiseño Indians (hereinafter, "the Tribe"), a federally recognized Indian tribe and sovereign government, in response to the Draft Environmental Impact Statement ("DEIS") for this Project. If you haven't already done so, please add the Tribe to your distribution list(s) for public notices and circulation of all documents, including environmental review documents, archeological reports, and all documents pertaining to this Project. The Tribe further requests to be directly notified of all public hearings and scheduled approvals concerning this Project.

The Tribe submits these comments concerning the Project's potential impacts to cultural resources in conjunction with the environmental review of the Project. The Tribe reserves the right to fully participate in the environmental review process, as well as to provide further comment on the Project's impacts to cultural resources and potential avoidance and mitigation for such impacts.

1 The Tribe further requests to be notified and involved in the entire environmental review process for the duration of the above referenced project (the "Project"), and requests that these comments be part of the record of approval for this Project.

Sacred Is The Duty Trusted Unto Our Care And With Honor We Rise To The Need

Pechanga Cultural Resources

1 A Programmatic Agreement (PA) between the Base, the Tribes including the Pechanga Band, and the SHPO has been developed. Consultation with the Tribes will continue as specified in the PA to discuss and address tribal concerns.

@

MARINE CORPS BASE CAMP PENDLETON MUST INCLUDE INVOLVEMENT OF AND CONSULTATION WITH THE PECHANGA TRIBE IN ITS EVIRONMENTAL REVIEW PROCESS

2

It has been the intent of the Federal Government[1] and the State of California[2] that Indian tribes be consulted with regard to issues which impact cultural and spiritual resources, as well as other governmental concerns. The responsibility to consult with Indian tribes stems from the unique government-to-government relationship between the United States and Indian tribes. This arises when tribal interests are affected by the actions of governmental agencies and departments. In order to comply with Federal and California law, it is imperative that Marine Corps Base Camp Pendleton ("MCBCP") consult with the Tribe in order to guarantee an adequate basis of knowledge for an appropriate evaluation of the project effects, as well as generating adequate mitigation measures.

PECHANGA CULTURAL AFFILIATION TO PROJECT AREA

The Pechanga Tribe asserts that Marine Corps Base Camp Pendleton, and thus the Project area, is part of Luiseño, and therefore the Tribe's, aboriginal territory as evidenced by the existence of Luiseño place names, *tóota yixélval* (rock art, pictographs, petroglyphs), village complexes, human remains and an extensive Luiseño artifact record.

The Pechanga Tribe's knowledge of our ancestral boundaries is based on reliable information passed down to us from our elders; published academic works in the areas of anthropology, history and ethno-history; and through recorded ethnographic and linguistic accounts. Of the many anthropologists and historians who have presented boundaries of the Luiseño traditional territory, none have excluded the MCBCP area from their descriptions (Bean 1974; Sparkman 1908; Kroeber 1925; White 1963; Harvey 1974; Oxendine 1983; Smith and Freers 1994), and such territory descriptions correspond almost identically with those communicated to the Pechanga people by our elders. While historic accounts and anthropological and linguistic theories are important in determining traditional Luiseño territory, the most critical sources of information used to define our traditional territories are our songs, creation accounts, and oral traditions.

Luiseño history originates with the creation of all things at *'éxva Teméeku*, the present day City of Temecula, and dispersing out to all corners of creation (what is today known as Luiseño territory). *'éxva Teméeku* is located where the Murrieta Creek, Temecula Creek and Santa Margarita Creek join, just to the west of the modern Interstate 15 and Temecula Parkway exit. It was at Temecula that the Luiseño deity *Wuyóot* lived and taught the people, and here that he became sick, finally expiring at Lake Elsinore. Many of our songs relate the tale of the people

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[1] See Executive Memorandum of April 29, 1994 on Government-to-Government Relations with Native American Tribal Governments and Executive Order of November 6, 2000 on Consultation and Coordination with Indian Tribal Governments.
[2] See California Public Resource Code §5097.9 et seq.; California Government Code §§65351,65352,65352.3 and 65352.4.

2 MCBCP will comply with all applicable federal and state law. A Programmatic Agreement (PA) between the Base, the Tribes, and the SHPO has been developed. Consultation with the Tribes will continue as specified in the PA.

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taking the dying *Wuyóot* to the many hot springs at Elsinore, where he died (DuBois 1908). He was cremated at *'éxva Teméeku*. It is the Luiseño creation account that connects Elsinore to Temecula, and thus to the Temecula people who were evicted and moved to the Pechanga Reservation, and now known as the Pechanga Band of Luiseño Mission Indians (the Pechanga Tribe). From Elsinore, the people spread out, establishing villages and marking their territories. The first people also became the mountains, plants, animals and heavenly bodies.

Many traditions and stories are passed from generation to generation by songs. One of the Luiseño songs recounts the travels of the people to Elsinore after a great flood (DuBois 1908). From here, they again spread out to the north, south, east and west. Three songs, called *Moníivol*, are songs of the places and landmarks that were destinations of the Luiseño ancestors. They describe the exact route of the Temecula (Pechanga) people and the landmarks made by each to claim title to places in their migrations (DuBois 1908:110). These examples illustrate a direct correlation between the oral tradition and the physical place; proving the importance of songs and stories as a valid source of information outside of the published anthropological data.

Tóota yixélval (rock art) is also an important element in the determination of Luiseño territorial boundaries. *Tóota yixélval* can consist of petroglyphs (incised) elements, or pictographs (painted) elements. The science of archaeology tells us that places can be described through these elements. Riverside and Northern San Diego Counties are home to red-pigmented pictograph panels. Archaeologists have adopted the name for these pictograph-versions, as defined by Ken Hedges of the Museum of Man, as the San Luis Rey style. The San Luis Rey style incorporates elements which include chevrons, zig-zags, dot patterns, sunbursts, handprints, net/chain, anthropomorphic (human-like) and zoomorphic (animal-like) designs. Tribal historians and photographs inform us that some design elements are reminiscent of Luiseño ground paintings. A few of these design elements, particularly the flower motifs, the net/chain and zig-zags, were sometimes depicted in Luiseño basket designs and can be observed in remaining baskets and textiles today.

An additional type of *tóota yixélval*, identified by archaeologists also as rock art or petroglyphs, are cupules. Throughout Luiseño territory, there are certain types of large boulders, taking the shape of mushrooms or waves, which contain numerous small pecked and ground indentations, or cupules. Many of these cupule boulders have been identified within the MCBCP property boundaries. Additionally, according to historian Constance DuBois:

> When the people scattered from Ekvo Temeko, Temecula, they were very powerful. When they got to a place, they would sing a song to make water come there, and would call that place theirs; or they would scoop out a hollow in a rock with their hands to have that for their mark as a claim upon the land. The different parties of people had their own marks. For instance, Albañas's ancestors had theirs, and Lucario's people had theirs, and their own songs of Munival to tell how they traveled from Temecula, of the spots where they stopped and about the different places they claimed (1908:158).

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The Tribe's current research shows approximately 40+ Luiseño place names within MCBCP boundaries. Many of those are located along the drainages and waterways as much of traditional habitation areas centered around water and other resources these important features provided. The Santa Margarita River flows through what is now called Temecula Canyon to the east of MCBCP, through the Base and into the Pacific Ocean. It is the last fully protected free flowing river in southern California and one of the most pristine aquatic systems in the region. The canyon through which the river flows is also a natural corridor and was used by the Luiseño People to travel to and from the coast. The Luiseño name for this canyon is *Táatamay*, from the first words spoken by the *Káamalam* (DuBois 1906: 53). They traveled this canyon to the coast after Earth Mother, *Tamáyawut* (Tah-MAI-Yah-whut) created the ocean. The Santa Margarita River is a key element in the Luiseño Ancestral Origin Landscape and the Luiseño creation accounts. Other locations within the MCBCP boundaries have played an important part in the Tribe's history. These places are deeply integrated into the Tribe's cultural heritage and continue to teach important morals, values and lessons to today's Luiseño people.

Our songs and stories, our indigenous place names, as well as academic works, demonstrate that the Luiseño people who occupied what we know today as Marine Corps Base Camp Pendleton are ancestors of the present-day Luiseño/Pechanga people, and as such,
3 Pechanga is culturally affiliated to this geographic area. The Tribe welcomes the opportunity to meet with MCBCP to further explain and provide documentation concerning our specific cultural affiliation to lands within your jurisdiction.

PROJECT IMPACTS TO CULTURAL RESOURCES

The Tribe is in receipt of the Draft Environmental Impact Statement and associated archaeological technical studies prepared for the Project. According to the DEIS, there are three separate projects contemplated: an advanced water treatment plant and associated facilities (P-1044); connection of northern and southern water systems (P-1045); and replacement of the Stuart Mesa Bridge (P-1039). Each individual project includes several alternatives. According to the archaeological study, the APE for the Projects and their alternatives impacts 55 identified cultural resources.[3]

4 The DEIS includes mitigation requiring both archaeological and Native American monitoring during ground disturbance for all Projects as well as clearly delineating boundaries of NRHP-eligible properties less than 75 feet from construction. While the Tribe understands that these sites are required to be evaluated per NEPA criteria, the Tribe believes that all cultural sites are important and significant. Therefore, the Tribe requests that all sites that are within the various Project alternatives chosen, be avoided.

[3] There is an inconsistency on page 3.4-4 in that there is a reference to only 52 cultural resources within the APE in contradiction to the 55 identified in the inventory and to those referenced on 3.4-5.

3 MCBCP welcomes the opportunity to meet with the Tribe to discuss specific cultural affiliations.

4 NRHP-eligible properties that cannot be avoided by construction will be subject to treatment in accordance with the PA and an approved Historic Properties Treatment Plan. Additionally, as specified in the DEIS, all cultural sites, including ineligible sites, will be avoided to the extent practicable within engineering constraints.

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4 cont.

The Tribe believes that impacts and/or destruction of the cultural sites are a great irreparable loss to tribal culture and scientific knowledge, regardless of scientifically imposed notions of "integrity" or other analytic determinations. The Tribe believes that sites should not be analyzed on a site-by-site basis but as an integrated unit of interconnected living areas. Further, relying solely on "scientific" determinations for impact assessment rather than incorporating the tribal view on the importance of cultural resources and landscapes fails to provide an adequate and complete analysis that an undertaking may have on these irreplaceable resources. York et al. 2011 provides information on the five cultural sites that were evaluated for this Project. The Tribe concurs with all sites that have been determined as eligible for the NRHP however, the Tribe is concerned about the eligibility determinations for site P-37-012632 within P-1039 and P-37-012618 in P-1045.

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Site -012618 is small site that contributes to a larger community. The Tribe's research shows that these sites are often dismissed for their lack of scientific data. However, when addressed in connection with the surrounding sites and with tribal and oral information, these small sites consistently provide important information on landscapes, settlement patterning and other research topics.

Glassow (1985)[4] addresses the issue of how site complexes and regional complexes (i.e. villages and habitation areas) are being divided into smaller sites for analysis, and how such analysis misses the full meaning of the sites and results in a "write-off" or dismissal of sites based only a partial analysis. Small sites are described as those sites which "typically have surface areas on the order of 1,000 m^2 or less, deposits of less than 50 cm depth, only two or three major classes of cultural remains and very few, most often fragmentary finished artifacts" (59). He states, "…(S)ites on the smaller end of the size range are being systematically neglected by many archaeologists in favor of sites on the larger end of the size range. Not only are small sites seldom investigated, but they are frequently assessed as having no appreciable significance to research and are therefore being destroyed…"(ibid: 58). However, in order to understand the true meaning and value of small sites, it is imperative that any analysis take into account the relationship and contribution of those sites to the bigger complex.

While the analysis provided for -012618 appeared thorough, it lacked analysis of the site in a regional context. This site is located at the north end of a blue-line drainage which, from the site to the mouth of the drainage, is 1.13 miles. Associated with this drainage are 20 previously recorded sites mostly consisting of shell, lithics and other habitation remains. Just a visual analysis of this area shows that -012618 is linked to these other sites and likely represents a small community within a larger complex. In fact, less than ½ mile up the Santa Margarita River is a large multi-component habitation. Chronological data is not available at this time but proper research in this area may likely prove that these small seemingly ineligible sites are a part of this overall complex. The Tribe recommends that, even though a portion of -012618 has been

[4] Glassow, Michael A. The Significance of Small Sites to California Archaeology. Journal of California and Great Basin Anthropology Vol. 7, No.1. PP 58-66 (1985).

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5 Because SDI-12618 cannot be adequately dated, its association with other sites in the area cannot be established but the comment is valid that it still could provide valuable information from a landscape use perspective. The information collected will be used as part of a landscape interpretation of prehistoric use of the area.

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5 cont. impacted by the adjacent water tower, that this site be determined to be eligible and avoided if feasible.

6 In Project P-1039, site P-37-012632 has been determined to be ineligible based upon a sparse artifact concentration. The Tribe is confused by this determination because it is clear that this site is associated with P-37-004425 which is located directly across the road, less than 30 meters apart. Additionally, the archaeological study states that the site provided a date during the Archaic period, "an interval (the middle portion of the Archaic) that is not well represented in the archaeological record of this region."[5] If this site is analyzed in conjunction with -004425 which was considered eligible, it too would be eligible. This would ensure that impacts to the site from both a tribal perspective and a "scientific" one (i.e., what it may contribute to the understanding of the middle Archaic period) are addressed adequately. Therefore, the Tribe recommends that -004425 and -012632 be combined into one site and determined eligible.

7 The MCBCP area is culturally significant to the Tribe and the Tribe appreciates the inclusion within the DEIS for tribal monitoring during ground disturbing activities on the Projects; however, as discussed below, the Tribe believes that more mitigation is necessary and requests to continue working with MCBCP to protect and preserve traditional cultural resources.

<u>REQUESTED TRIBAL INVOLVEMENT AND MITIGATION</u>

The proposed Projects are on land that is within the traditional territory of the Pechanga Band of Luiseño Indians. The Tribe is not opposed to these Projects; however, we are opposed to any direct, indirect or cumulative impacts they may have to tribal cultural resources. 8 The Tribe's primary concerns stem from the proposed impacts on Native American cultural resources. The Tribe is concerned about both the protection of irreplaceable cultural resources, such as Luiseño village sites, sacred sites and archaeological items which would be displaced by ground disturbing work on the Projects, and on the proper and lawful treatment of cultural items, Native American human remains and sacred items likely to be discovered in the course of the work. Further, the Pechanga Tribe understands that if human remains are discovered, the MCBCP NAGPRA Comprehensive Agreement will be implemented.

As noted above, the Tribe believes that additional mitigation measures should be included in the DEIS. While we understand that alternatives for each proposed Project must still be chosen and therefore we do not know exactly which cultural sites will be impacted, the measures proposed below, in addition to the Programmatic Agreement (PA), Historic Property Treatment Plan (HPTP) and the Monitoring and Discovery Plan, will assist both MCBCP and the Tribe in the preservation and avoidance of important cultural resources. The Tribe requests that the following revisions and additions be made to the proposed mitigation measures (underlines are additions and strikeouts are deletions):

[5] York et al, 2011 page 10-6 & -7.

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6 SDI-4425 and -12632 were defined as separate sites by previous recorders, and subsurface investigations during the BWI testing program confirm that they are separated by sterile deposits. Additionally, radiocarbon dating suggests that SDI12632 was occupied more recently than SDI-4425. For these reasons they are still considered separate sites.

7 MCBCP is engaged in ongoing consultation with Native American tribes to reach agreement on mitigation measures to be included in the PA.

8 Comment acknowledged. See the preceding response.

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CR-1 ~~Boundaries of NRHP-eligible properties less than 75 feet from the proposed action construction limits would be clearly marked to ensure that construction impacts would be avoided.~~ All archaeological sites less than 100 feet from the proposed action construction limits and that are not to be directly impacted by the construction would be clearly marked to ensure that construction impacts would be avoided.

CR-1a All known archaeological and cultural sites shall be avoided to the maximum extent possible as primary mitigation. If any sites are proposed for direct impact, they must reviewed in consultation with the appropriately affiliated tribe(s) and appropriate mitigation shall be determined prior to project implementation.

CR-2 Archaeological and Native American monitoring would be required during ground disturbance for all projects. The monitoring program, including procedures to be followed in the event of a discovery and locations of monitoring, would be specified in ~~a~~ the Monitoring and Discovery Plan developed in consultation with the appropriately affiliated tribes and approved by the Cultural Resources Branch Head before construction. ~~Monitoring would be limited to archaeological sites, areas adjacent to archaeological sites, and areas of inadvertent discoveries as identified in the executed PA.~~

CR-3 Prior to approval of a final EIS, a Programmatic Agreement and a Historic Properties Treatment Plan will be developed by the Cultural Resources Branch Head in consultation with the appropriately affiliated tribes.

The Pechanga Tribe looks forward to working together with Marine Corps Base Camp Pendleton in protecting the invaluable Luiseño cultural resources found in the Project area and on the Base. Please contact me at 951-770-8104 or at ahoover@pechanga-nsn.gov once you have had a chance to review these comments so that we might address the issues concerning both the evaluation of some of the sites we believe are eligible for listing and with the proposed mitigation language. Thank you.

Sincerely,

Anna M. Hoover
Cultural Analyst

cc: Pechanga Office of the General Counsel
Brenda Tomaras, Tomaras & Ogas, LLP

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

JAN 3 1 2012

Mr. Jesse Martinez
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
Building 1 Central IPT
San Diego, California 92132-5190

Subject: Draft Environmental Impact Statement for the Basewide Water Infrastructure and Stuart Mesa Bridge Replacement at Marine Corps Base Camp Pendleton, California (CEQ # 20110406)

Dear Mr. Martinez:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the Basewide Water Infrastructure and Stuart Mesa Bride Replacement projects pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The EPA recognizes the need to upgrade the drinking water infrastructure and replace the Stuart Mesa Bridge within Marine Corps Base Camp Pendleton (MCBCP). We commend the Marine Corps for developing a preferred alternative, and committing to mitigation measures, that will reduce the impacts of these projects. We would also like to thank you for agreeing, with Jason Gerdes of my staff, to a two-week extension for the EPA to submit comments for this EIS.

Based on our review of the Draft EIS, we have rated the preferred alternative and the document as EC-2, Environmental Concerns – Insufficient Information (see enclosed EPA Rating Definitions). Though we acknowledge the efforts made by the Marine Corps to craft environmentally preferred alternatives for the projects described in this EIS, and to commit to a broad suite of mitigation measures, the EPA is concerned about the preferred alternative's projected impacts to water resources, particularly vernal pools and waters of the U.S. We recommend that the Marine Corps work with the U.S. Army Corps of Engineers to verify jurisdictional waters of the U.S. and to develop the least environmentally damaging practicable alternative to avoid and minimize impacts to such waters. We also recommend that reasonable mitigation measures be implemented for air quality impacts during the construction phase, and that the Final EIS provide additional information on the potential effects of climate change on the proposed projects. Our detailed comments are enclosed.

We appreciate the opportunity to review this DEIS, and are available to discuss our comments. When the FEIS is released for public review, please send one hard copy and one CD-ROM to the address above (Mail Code: CED-2). If you have any questions, please contact me at 415-972-3521, or contact Jason Gerdes, the lead reviewer for this project. Jason can be reached at 415-947-4221 or gerdes.jason@epa.gov.

U.S. Environmental Protection Agency

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Sincerely,

Karen Vitulano for

Kathleen Martyn Goforth, Manager
Environmental Review Office

Enclosure: Summary of the EPA Rating System
EPA Detailed Comments

cc: Peter Beck, U.S. Fish and Wildlife Service
Therese O'Rourke, U.S. Army Corps of Engineers

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SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

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U.S. EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE BASEWIDE WATER INFRASTRUCTURE AND STUART MESA BRIDGE REPLACEMENT, MARINE CORPS BASE CAMP PENDLETON, CALIFORNIA, JANUARY 31, 2012

Compliance with Clean Water Act Section 404

The project will require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (USACE), yet the DEIS does not include the necessary information to determine compliance with this requirement. Information is lacking in the following areas, and we have the following recommendations to help facilitate compliance of the project.

The alternatives analysis does not demonstrate that the Preferred Alternative 5 is the Least Environmentally Damaging Practicable Alternative (LEDPA).
Pursuant to EPA's *Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials* (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the CWA (Guidelines), only the Least Environmentally Damaging Practicable Alternative (LEDPA) that achieves the overall project purpose, while not causing or contributing to significant degradation of the aquatic ecosystem, can be permitted by the USACE. At this time, the EPA believes that the alternatives analysis in the DEIS does not demonstrate compliance with the Guidelines. The DEIS simply states that the project design "would avoid direct and indirect impacts to vernal pools, riparian habitats, jurisdictional waters, and other sensitive wetlands to the greatest extent feasible" (p. 2-81). Identification of the LEDPA is achieved by performing an alternatives analysis that estimates the direct, indirect, and cumulative impacts to jurisdictional waters resulting from each alternative considered. Project alternatives that are not
1 practicable and do not meet the project purpose are eliminated. The LEDPA is the remaining alternative with the fewest impacts to aquatic resources, so long as it does not have other significant adverse environmental consequences. Only when an analysis is correctly structured can there be assurances that the practicable alternative with the least adverse impact on the aquatic ecosystem has been selected (40 CFR 230.10(a)).

> ***Recommendation:*** The FEIS should include a detailed evaluation of the project alternatives in order to demonstrate the project's compliance with the 404(b)(1) Guidelines and support the identification of the LEDPA by the USACE. The alternatives analysis should include additional information that demonstrates the proposed project is avoiding and minimizing damage to waters as required by the Guidelines. If, under the proposed project, dredged or fill material would be discharged into waters of the U.S., the FEIS should discuss alternatives to avoid those discharges.

The DEIS does not demonstrate that the preferred alternative does not result in significant degradation of aquatic resources.
The DEIS indicates that the project will permanently impact vernal pools occupied by the federally endangered Riverside fairy shrimp[1] (20 basins) and San Diego fairy shrimp (71 basins) (Table ES-3). The Guidelines prohibit granting a 404 permit to a project that causes or contributes to significant
2 degradation of aquatic resources. Effects contributing to significant degradation include: 1) loss of fish and wildlife habitat (40 CFR 230.10(c)(3)); 2) reduction of biological productivity caused by smothering wetland habitat (40 CFR 230.41), and 3) impairment or destruction of endangered species habitat (40 CFR 230.30(2)). Much of the anticipated impacts to vernal pools occupied by Riverside fairy shrimp

[1] P-1045 alone would "impact thread-leaved brodiaea, more riparian habitat (permanent plus temporary), vernal pools, and populations of listed vernal pool species." (p. 3.315)

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1 With regard to a LEDPA analysis that fully complies with the Guidelines, the two projects would be processed separately. Applications for 404 permits will not be prepared until 70 percent design is completed. This is the same process followed for the Basewide Utilities Infrastructure project, and the Base expects to follow it for the BWI project also. Currently, ongoing efforts are being made to reduce impacts on all resources but especially aquatic resources. Since these are design/build projects, such modifications may continue as the design is refined. Contractors will be directed and encouraged to minimize or avoid significant resources of all kinds. Because construction is anticipated to begin in different years for each of the MILCONs, no single LEDPA analysis will cover both projects. It has not yet been determined whether an individual permit or nationwide permits will be required for P-1044 and P-1045. Information on comparative impacts of the EIS alternatives on aquatic and other resources has been added to the EIS to demonstrate that the preferred alternative is also the least environmentally damaging alternative at this stage of design.

2 The Navy and MCBCP have worked to minimize and avoid impacts to aquatic resources, particularly vernal pools and listed fairy shrimp species, through project design. This work will continue as project designs are refined. With regard to the particular features mentioned in this comment, for instance, the maintenance and recreation corridors in the P-1045 project described in the DEIS have been eliminated from the 41 Area in Stuart Mesa Road south to the TLS boring pit at the Santa Margarita River, and eliminated from the west side of Stuart Mesa Road in the 41 Area and north to the TLS boring pit at Las Flores Creek. Also, the numbers cited in this comment include potential impacts on both sides of the roads elsewhere, but the corridors will only be placed on one side of the road (where the pipelines are). Because sufficient information on constraints like the presence of other utilities is lacking, looking at impacts on both sides of the road will give the design/build contractor flexibility in placement. At this stage of design, this practice yields a conservative estimate that inflates the potential impacts.

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and San Diego fairy shrimp would come from proposed paved maintenance access and recreation corridors that do not appear to meet the purposes defined for the projects in the DEIS.

2 cont. ***Recommendations:*** We recommend that the FEIS include a description of how the paved maintenance access and recreation corridors, particularly those corridors adjacent to Stuart Mesa Road in the Oscar Two Training Area (corridors that would most impact vernal pools occupied by Riverside and San Dan fairy shrimp), meet the purpose of the project. If these areas are not integral to meeting the purpose and need, they should be removed from the project description. We also recommend that the Marine Corps consult with the U.S. Fish and Wildlife Service to ensure that the preferred alternative avoids, to the greatest extent possible, all direct and indirect impacts to the vernal pools occupied by Riverside fairy shrimp and San Diego fairy shrimp.

The DEIS does not indicate whether the jurisdictional delineation has been verified by the U.S. Army Corps of Engineers or disclose all impacts to waters for each alternative.
The DEIS states on page 3.3-3 that jurisdictional waters of the U.S. (including wetlands) were delineated pursuant to the latest procedural guidelines and criteria in the *Corps of Engineers Wetlands Delineation Manual*, the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*, and the Code of Federal Regulations, but it does not indicate whether the jurisdictional
3 delineation has been verified by the USACE. A jurisdictional determination by the USACE is needed prior to publication of the FEIS in order to provide a determination of potential significant impacts and identify mitigation and avoidance measures in the design of the projects that comprise the preferred alternative.

Recommendation: In the FEIS, include documentation that the delineation of the extent of waters, including wetlands, on the project sites has been verified by the USACE. Update the estimated impacts to waters if applicable. The FEIS should include estimates of acreages of direct (differentiating between permanent and temporary impacts) and indirect impacts to waters for each alternative.

The DEIS does not fully discuss compensatory mitigation or include mitigation for indirect impacts.
Pursuant to the Guidelines, the applicant must mitigate for unavoidable impacts to waters. Based on a review of the DEIS, Table 4.5.3.1-5 "Mitigation for Permanent and Temporary Direct Impacts to Waters of the U.S.," the proposed mitigation ratios are 2:1 for permanent loss of acreage and 1:1 for temporary loss of acreage. There is no discussion regarding compensation for potential indirect impacts to waters.

Recommendations: The FEIS should discuss how all potential impacts would be minimized and
4 mitigated. This discussion should include: (a) acreage and habitat type of waters of the U.S. that would be created, restored, or preserved; (b) water sources to maintain the mitigation area; (c) a revegetation plan utilizing native plants; (d) maintenance and monitoring plans, including performance standards to determine mitigation success; (e) an Adaptive Management Plan; (f) the parties that would be ultimately responsible for the plan's success; and (g) contingency plans that would be enacted if the original plan fails. Mitigation should be implemented in advance of the impacts to avoid habitat losses due to the lag time between the occurrence of the impact and successful mitigation. In addition, the FEIS should include compensatory mitigation for indirect impacts to waters.

3 The Navy and MCBCP have met with USACE to discuss the wetland delineation and the process of verification by USACE has begun. Permanent and temporary impact to Waters of the US for each alternative are presented in the DEIS in Tables 4.1.3.1-5, 4.1.3.1-6, 4.1.3.2 4, 4.1.3.2 5, 4.1.3.3 4, 4.1.3.3 5, 4.1.3.4 4, 4.1.3.4 5, 4.2.3.1 3, 4.2.3.1 4, 4.2.3.2 4, 4.2.3.2 5, 4.2.3.3 4, 4.2.3.3 5, 4.3.3.1 3, 4.3.3.1 4, 4.3.3.2 4, 4.3.3.2 5, 4.3.3.3 4, 4.3.3.3 5, 4.3.3.4 4, 4.3.3.4 5, 4.4.3.1 3, 4.4.3.1 4, 4.4.3.2 4, 4.4.3.2 5, 4.4.3.3 4, 4.4.3.3 5, and 4.5.3.1 4. Indirect impacts are not ordinarily reported in a Section 404 wetlands delineation. The impact tables will be updated in the FEIS as necessary to comply with Section 404 permit requirements.

4 Based on the current design-build analysis, the FEIS presents updated information on the anticipated impacts and expected mitigation that would be required under project Section 404 permits. Refer to Tables 4.1.3.1-5, 4.1.3.1-6, 4.1.3.1-7, 4.1.3.2-4, 4.1.3.2-5, 4.1.3.3-4, 4.1.3.3-5, and comparable tables for the other alternatives. However, the separate MILCONs analyzed in the FEIS will be pursuing project-specific Section 404 permits once 70 percent designs are completed. Therefore, final requirements per these permits could change slightly.

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Air Quality

5a Tables 4.5.9-1 and 4.5.9-2 estimate annual emissions of NO_x, PM_{10}, and other pollutants in the San Diego and South Coast Air Basins during construction of the proposed projects. The EPA agrees that the emissions do not trigger a conformity determination, but because they will occur in areas not in attainment with the National Ambient Air Quality Standards (NAAQS), they should be reduced to the extent practicable.

***Recommendations*:**

5b In addition to the fugitive dust mitigation measures in Section 2.5.4, the EPA recommends that all of the following mitigation measures be adopted in the FEIS to further reduce impacts associated with emissions of particulate matter and other toxics from construction-related activities:

Fugitive Dust Source Controls:

- 5c Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate at active and inactive sites during workdays, weekends, holidays, and windy conditions;
- 5d Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions; and
- 5e Prevent spillage when hauling material and operating non-earthmoving equipment and limit speeds to 15 miles per hour. Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- 5f Plan construction scheduling to minimize vehicle trips;
- 5g Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections (Note: The California Air Resources Board has a number of mobile source anti-idling requirements, see their website at: http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm);
- 5h Maintain and tune engines per manufacturer's specifications to perform at CARB and/or EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are followed;
- 5i If practicable, lease new, clean equipment meeting the most stringent of applicable Federal[2] or State Standards[3]. In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible[4];
- 5j Lacking availability of non-road construction equipment that meets Tier 4 engine standards, the responsible agency should commit to using CARB and EPA-verified particulate traps, oxidation catalysts and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site; and
- 5k Consider alternative fuels such as natural gas and electricity (plug-in or battery).

[2] EPA's website for nonroad mobile sources is http://www.epa.gov/nonroad/.

[3] For ARB emissions standards, see: http://www.arb.ca.gov/msprog/offroad/offroad.htm.

[4] Diesel engines < 25 hp rated power started phasing in Tier 4 Model Years in 2008. Larger Tier 4 diesel engines will be phased in depending on the rated power (e.g., 25 hp - <75 hp: 2013; 75 hp - < 175 hp: 2012-2013; 175 hp - < 750 hp: 2011 - 2013; and ≥ 750 hp 2011 - 2015).

5a Commented acknowledged.

5b Many of the measures recommended in this comment do not differ substantially from measures already included in Section 2.5.4. Those are noted below in this response; those that have been added to the EIS are also noted below.

5c This recommendation substantially corresponds to measure AQ-2.

5d This recommendation substantially corresponds to measure AQ-3.

5e This recommendation substantially corresponds to measure AQ-5.

5f This recommendation substantially corresponds to measure AQ-8.

5g This recommendation substantially corresponds to measure AQ-9.

5h This recommendation substantially corresponds to measures AQ-9 and AQ-10.

5i The first sentence in this recommendation substantially corresponds to measure AQ-11. The second two sentences have been added to measure AQ-11.

5j Measure AQ 12 has been revised to conform to this recommendation.

5k This recommendation has been added as measure AQ-13.

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Administrative controls:

5l
- Prepare an inventory of all equipment prior to construction and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking;

5m
- Develop a construction traffic and parking management plan that maintains traffic flow and plan construction to minimize vehicle trips; and

5n
- Identify sensitive receptors in the project area, such as children, elderly, and infirmed, and specify the means by which you will minimize impacts to these populations (e.g. locate construction equipment and staging zones away from sensitive receptors and building air intakes).

Climate Change

6 The EPA commends the Marine Corps for including an estimate, in Appendix D, of projected greenhouse gas emissions (GHG) associated with implementing the preferred alternative, as well as for providing a very good description of the many efforts on MCBCP to conserve energy, deploy renewable energy technologies, and reduce GHG emissions. There are no detailed descriptions, however, of how climate change may affect MCBCP water resources and the projects planned in the preferred alternative. The plans in Alternative 5 to treat, convey, and control water could be impacted by a water supply altered or diminished by climate change.

Recommendations:
The Marine Corps should describe in the FEIS how climate change may affect the projects planned in the preferred alternative. The FEIS should also include a climate change mitigation and adaptation plan.

5l This recommendation has been added as measure AQ-14.

5m This recommendation has been added as measure AQ-15.

5n This recommendation has been added as measure AQ-16.

6 A discussion of climate change adaptation has been added to Section 5.2.4 of the Final EIS.

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APPENDIX B

B-1 NONFEDERALLY LISTED RARE PLANT SPECIES PRESENCE OR POTENTIAL TO OCCUR WITHIN THE PROJECT CONSTRUCTION LIMITS AND ADJACENT 100-FOOT BUFFERS

B-2 BIOLOGICAL RESOURCES MAP LEGEND

APPENDIX B-1

NONFEDERALLY LISTED RARE PLANT SPECIES PRESENCE OR POTENTIAL TO OCCUR WITHIN THE PROJECT CONSTRUCTION LIMITS AND ADJACENT 100-FOOT BUFFERS

APPENDIX B-1
Nonfederally Listed Rare Plant Species Presence or Potential to Occur within the Project Limits and Adjacent 100-foot Buffers

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	100-foot Buffers[3]
red-sand verbena *Abronia maritima*	4.2	Southern foredunes	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
California adolphia *Adolphia californica*	2.1	Coastal scrub, chaparral, native grassland, non-native grassland	Not detected. Low potential to occur due to marginally suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to marginally suitable habitat within the 100-foot buffers.
aphanisma *Aphanisma blitoides*	1B.2	Southern foredunes, coastal scrub	Not detected. Low potential to occur due to marginally suitable habitat near the brine pipeline at SONGS.	Not detected. Low potential to occur due to marginally suitable habitat near the brine pipeline at SONGS.
Rainbow manzanita *Arctostaphylos rainbowensis*	1B.1	Chaparral	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
Palmer's sagewort *Artemisia palmeri*	4.2	Chaparral, coastal scrub, riparian forest, riparian scrub, riparian woodland	Not detected. Low potential to occur due to marginally suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to marginally suitable habitat within the MILCON corridors.
coastal dunes milk-vetch *Astragalus tener* var. *titi*	1B.1	Southern foredunes	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
Coulter's saltbush *Atriplex coulteri*	1B.2	Southern foredunes, coastal scrub, native grassland, coastal salt marsh/alkali playa	Not detected. Moderate potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Moderate potential to occur due to presence of suitable habitat within the 100-foot buffers.
south coast saltscale *Atriplex pacifica*	1B.2	Southern foredunes, coastal scrub, vernal pools, coastal salt marsh/alkali playa	Not detected. Moderate potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Moderate potential to occur due to presence of suitable habitat within the 100-foot buffers.

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	100-foot Buffers[3]
Davidson's saltbush *Atriplex serenana* var. *davidsonii*	1B.2	coastal scrub, coastal salt marsh/alkali playa	Not detected. Moderate potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Moderate potential to occur due to presence of suitable habitat within the 100-foot buffers.
Encinitas baccharis *Baccharis vanessae*	1B.1	Chaparral	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
golden-spined cereus *Bergerocactus emoryi*	2.2	Closed-cone coniferous forest, chaparral, coastal scrub/sandy	Not detected. Low potential to occur due to marginally suitable habitat near the brine pipeline at SONGS.	Not detected. Low potential to occur due to marginally suitable habitat near the brine pipeline at SONGS.
Orcutt's brodiaea *Brodiaea orcuttii*	1B.1	Coastal scrub, native grassland, non-native grassland, oak woodland, vernal pool	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.
Brewer's calandrinia *Calandrinia breweri*	4.2	Coastal scrub, chaparral	Not detected. Low potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of suitable habitat within the 100-foot buffers.
seaside calandrinia *Calandrinia maritima*	4.2	Coastal scrub, native grassland, non-native grassland	Not detected. Low potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of suitable habitat within the 100-foot buffers.
intermediate mariposa lily *Calochortus weedii* var. *intermedius*	1B.2	Coastal scrub, chaparral, native grassland	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to present of appropriate habitat within the 100-foot buffers.
Payson's jewel-flower *Caulanthus simulans*	4.2	Coastal scrub, chaparral	Not detected. Low potential to occur due to marginally suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to marginally suitable habitat within the 100-foot buffers.
ceanothus *Ceanothus nova* sp.	No listing	Chaparral	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	100-foot Buffers[3]
southern tarplant *Centromadia parryi* ssp. *australis*	1B.1	Native grassland, vernal pool, coastal salt marsh/ alkali playa	Not detected. Low potential to occur due to marginally suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to marginally suitable habitat within the 100-foot buffers.
smooth tarplant *Centromadia pungens* ssp. *laevis*	1B.1	Native grassland, coastal salt marsh/ alkali playa	Not detected. Low potential to occur due to marginally suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to marginally suitable habitat within the 100-foot buffers.
southern mountain misery *Chamaebatia australis*	4.2	Chaparral	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
long-spined spineflower *Chorizanthe polygonoides* var. *longispina*	1B.2	Coastal scrub, chaparral, native grassland, vernal pool	Not detected. Low potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of marginally suitable habitat within the 100-foot buffers.
summer holly *Comarostaphylis diversifolia* var. *diversifolia*	1B.2	Chaparral	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
sea dahlia *Coreopsis maritima*	2.2	Coastal scrub	Not detected. Moderate potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Moderate potential to occur due to presence of appropriate habitat within the 100-foot buffers.
Del Mar sand aster *Corethrogyne filaginifolia* var. *linifolia*	1B.1	Coastal scrub, chaparral, native grassland, non-native grassland	Not detected. Moderate potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Moderate potential to occur due to presence of appropriate habitat within the 100-foot buffers.
western dichondra *Dichondra occidentalis*	4.2	Coastal scrub, chaparral, native grassland, non-native grassland, oak woodland	Detected. Several hundred individuals were detected in MILCON corridor P-1045 Alternatives 1, 3, and 4, in the Wire Mountain area and along El Camino Real.	Detected. Several hundred individuals were detected in the MILCON P-1045 100-foot buffer Alternatives 1, 3, and 4, in the Wire Mountain area and along El Camino Real.

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	100-foot Buffers[3]
San Diego tarplant *Deinandra paniculata*	4.2	Coastal scrub, native grassland, non-native grassland	Detected. Several hundred individuals were detected in MILCON corridor P-1044 Alternatives 1 through 4, north of Basilone Road and along Cristianitos Road in the northern portion of MCBCP.	Detected. Several hundred individuals were detected in the 100-foot buffers of MILCON corridor P-1044 Alternatives 1 through 4, north of Basilone Road and along Cristianitos Road in the northern portion of MCBCP.
Blochman's dudleya *Dudleya blochmaniae* ssp. *blochmaniae*	1B.1	Coastal bluff scrub, chaparral, coastal scrub, valley and foothill grassland/rocky, often clay or serpentinite.	Not detected. Moderate potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Moderate potential to occur due to presence of appropriate habitat within the 100-foot buffers.
many-stemmed dudleya *Dudleya multicaulis*	1B.2	Coastal scrub, chaparral, native grassland	Detected. One-hundred ninety individuals were detected within MILCON corridor P-1045 Alternative 2, along Basilone Road just north of Stagecoach Road. Several individuals were also detected within MILCON corridor P-1044 Alternatives 1 through 4, along Cristianitos Road.	Detected. Several individuals occur within the 100-foot buffers of MILCON P-1045 Alternative 2, along Basilone Road just north of Stagecoach Road and MILCON P-1044 Alternatives 1 through 4, along Cristianitos Road.
variegated dudleya *Dudleya variegata*	1B.2	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland, vernal pools	Not detected. Moderate potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Moderate potential to occur due to presence of appropriate habitat within the 100-foot buffers.
sticky dudleya *Dudleya viscida*	1B.2	Coastal scrub, chaparral	Detected. Several individuals were detected in MILCON corridors P-1045 Alternatives 1, 3, and 4.	Not detected. Moderate potential to occur due to presence of appropriate habitat within the 100-foot buffers.
Pendleton button-celery *Eryngium pendletonense*	1B.1	Coastal scrub, native grassland, non-native grassland, vernal pool	Detected. One individual was detected in MILCON corridor P-1045 Alternatives 1, 3, and 4 along Stuart Mesa Road.	Detected. Several individuals were detected in the 100-foot buffer of MILCON corridor P-1045 1045 Alternatives 1, 3, and 4 along Stuart Mesa Road.
coast wallflower *Erysimum ammophilum*	1B.2	Southern foredunes, coastal scrub, chaparral	Detected. Several individuals were detected within the corridor of MILCON P-1045 Alternatives 1, 3, and 4 in the Wire Mountain area.	Detected. Several individuals were detected within the 100-foot buffer of MILCON P-1045 Alternatives 1, 3, and 4 in the Wire Mountain area.

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	**100-foot Buffers**[3]
cliff spurge *Euphorbia misera*	2.2	Coastal scrub	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.
Palmer's grapplinghook *Harpagonella palmeri*	4.2	Coastal scrub, chaparral, native grassland, non-native grassland	Detected. One individual was detected along Stagecoach Road within MILCON corridor P-1045 Alternative 1.	Not detected. Moderate potential to occur in 100-foot buffers due to presence of suitable habitat.
graceful tarbush *Holocarpha virgata* ssp. *elongata*	4.2	Coastal scrub, chaparral, native grassland, oak woodland	Not detected. Moderate potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Moderate potential to occur in 100-foot buffers due to presence of suitable habitat.
vernal barley *Hordeum intercedens*	3.2	Southern foredunes, coastal scrub, native grassland, vernal pool	Not detected. Moderate potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Moderate potential to occur in 100-foot buffers due to presence of suitable habitat.
mesa horkelia *Horkelia cuneata* ssp. *puberula*	1B.1	Coastal scrub, chaparral	Not detected. Low potential to occur due to marginally suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to marginally suitable habitat within the 100-foot buffers.
Ramona horkelia *Horkelia truncata*	1B	Chaparral	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
decumbent goldenbush *Isocoma menziesii* var. *decumbens*	1B.1	Coastal scrub, chaparral	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat.	Not detected. Moderate potential to occur in the 100-foot buffers of MILCON corridors due to presence of suitable habitat.
southwestern spiny rush *Juncus acutus* ssp. *leopoldii*	4.2	Southern foredunes, riparian scrub, coastal salt marsh/alkali playa	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat within the MILCON corridors.	Not detected. Moderate potential to occur in the 100-foot buffers of MILCON corridors due to presence of suitable habitat.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	1B.1	Vernal pool, coastal salt marsh/alkali playa	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	100-foot Buffers[3]
ocellated Humboldt lily *Lilium humboldtii* ssp. *ocellatum*	4.2	Coniferous forest	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
Nuttall's lotus *Lotus nuttallianus*	1B.1	Southern foredunes, coastal scrub	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
California desert thorn *Lycium californicum*	4.2	Coastal bluff scrub, coastal scrub	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat within the MILCON corridors.	Detected. One individual was detected within the 100-foot buffer of MILCON P-1045 Alternative 1 east of Stuart Mesa Road and north of the Santa Margarita River.
felt-leaved monardella *Monardella hypoleuca* ssp. *lanata*	1B.2	Chaparral	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
little mousetail *Myosurus minimus* ssp. a*pus*	3.1	Native grassland, vernal pool	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.
flat navarretia *Navarretia prostrata*	1B.1	Vernal pool	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.
coast woolly-heads *Nemacaulis denudata* var. *denudata*	1B.2	Southern foredunes	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
short-lobed broomrape *Orobanche parishii* ssp. *brachyloba*	4.2	Southern foredunes, coastal scrub	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.
golden-rayed pentachaeta *Pentachaeta aurea*	4.2	Coastal scrub, native grassland, non-native grassland, oak woodland	Not detected. Low potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of suitable habitat within the 100-foot buffers.

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	100-foot Buffers[3]
Brand's phacelia *Phacelia stellaris*	1B.1	Southern foredunes, coastal scrub	Not detected. . Low potential to occur due to presence of suitable habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of suitable habitat within the 100-foot buffers.
Fish's milkwort *Polygala cornuta* var. *fishiae*	4.3	Chaparral, coastal salt marsh/alkali playa	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat.	Not detected. Moderate potential to occur in the 100-foot buffers of MILCON corridors due to presence of suitable habitat.
Nuttall's scrub oak *Quercus dumosa*	1B.1	Coastal scrub, chaparral, oak woodland, coniferous forest	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat.	Detected. One individual was detected within the 100-foot buffer of MILCON P-1045 Alternatives 1, 3, and 4 in the Wire Mountain area.
Engelmann's oak *Quercus engelmannii*	4.2	Chaparral, native grassland, non-native grassland, oak woodland, coastal salt marsh/alkali playa	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat.	Not detected. Moderate potential to occur in the 100-foot buffers of MILCON corridors due to presence of suitable habitat.
Coulter's matilija poppy *Romneya coulteri*	4.2	Coastal scrub, chaparral	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat.	Not detected. Moderate potential to occur in the 100-foot buffers of MILCON corridors due to presence of suitable habitat.
San Miguel savory *Satureja chandleri*	1B.2	Coastal scrub, chaparral, native grassland, oak woodland, coastal salt marsh/alkali playa	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.
rayless ragwort *Senecio aphanactis*	2.2	Coastal scrub, chaparral, oak woodland, coniferous forest	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.
estuary seablight *Suaeda esteroa*	1B.2	Coastal salt marsh/alkali playa	Not detected. Low potential to occur due to presence of appropriate habitat within the MILCON corridors.	Not detected. Low potential to occur due to presence of appropriate habitat within the 100-foot buffers.
Parry's tetracoccus *Tetracoccus dioicus*	1B.2	Coastal scrub, chaparral, coastal salt marsh/alkali playa	Not detected. Not expected to occur due to a lack of appropriate habitat within the MILCON corridors.	Not detected. Not expected to occur due to a lack of appropriate habitat within the 100-foot buffers.

Species Name	CNPS Sensitivity Status[1]	Habitat Affinities	Presence or Potential for Occurrence	
			Project Limits[2]	100-foot Buffers[3]
San Diego County viguiera *Viguiera laciniata*	4.2	Coastal scrub, chaparral	Not detected. Moderate potential to occur in MILCON corridors due to presence of suitable habitat.	Not detected. Moderate potential to occur in the 100-foot buffers of MILCON corridors due to presence of suitable habitat.

[1] Sensitivity Status Codes

California Native Plant Society (CNPS)

1B: Plants rare, threatened, or endangered in California and elsewhere

2: Plants rare, threatened, or endangered in California, but more common elsewhere

3: Plants more information is needed for

4: Plants of limited distribution – a watch list

[2] Presence or potential for occurrence based on project-specific surveys and available Basewide data.

[3] Presence or potential for occurrence based only on available Basewide data.

APPENDIX B-2

BIOLOGICAL RESOURCES MAP LEGEND

FLORA

Riparian and Wetlands

- AKP Alkali playa
- BCH Beach
- CSM Coastal salt marsh
- DW Disturbed wetland
- FWM Freshwater marsh
- MFS Mulefat scrub
- NVC Non-vegetated channel
- OW Open water
- RS Riparian scrub
- RW Riparian woodland
- SBC Soft bottom channel
- SWS Southern willow scrub
- SARW Sycamore alder riparian woodland
- VP Vernal pool

Uplands

- CLOW Coast live oak woodland
- DCSS Diegan coastal sage scrub
- EW Eucalyptus woodland
- NNG Nonnative grassland
- NEDG Valley needlegrass grassland

Other Cover Types

- DH Disturbed habitat
- DEV Urban/Developed

Federally Listed Plants (MCBCP)

- Thread-leaved brodiaea
- San Diego button-celery
- Spreading navarretia

Federally Listed Plants (AECOM)

- Thread-leaved brodiaea

POTENTIAL IMPACTS

P-1044

- Temporary Construction Area
- TAPS 12/Pump Station
- Pump Station
- Reservoir Improvements
- Trenchless (TLS)
- Northern AWT
- SONGS Outfall Connection
- Injection Well Field
- Above-Ground Pipe

P-1045

- Temporary Construction Area
- AWT South

P-1045 (continued)

- Trenchless (TLS)
- Pump Station
- Reservoir Improvements
- Subalternative AWT
- Subalternative Trenchless (TLS)
- Laydown Area

P-1039

- Construction Area
- Bridge Improvements
- Road Improvements
- Flood Control Improvements

All Indirect Impacts

- 100-foot Indirect Impacts
- 400 -foot Indirect Impacts
- Creek/River

FAUNA

- Arroyo Toad (MCBCP)
- California Least Tern (USFWS)
- California Least Tern Nesting Area (MCBCP)
- Coastal California Gnatcatcher (AECOM)
- Coastal California Gnatcatcher (MCBCP)
- Least Bell's Vireo (MCBCP)
- Light-footed Clapper Rail (MCBCP)
- Light-footed Clapper Rail (USFWS)
- Light-footed Clapper Rail Suitable Habitat (AECOM)
- Pacific Pocket Mouse (AECOM)
- Pacific Pocket Mouse (MCBCP)
- Pacific Pocket Mouse (USFWS)
- Pacific Pocket Mouse Suitable Habitat (AECOM)
- Southwestern Willow Flycatcher (MCBCP)
- Stephens' Kangaroo Rat (AECOM)
- Stephens' Kangaroo Rat (MCBCP)
- Stephens' Kangaroo Rat (USFWS)
- Stephens' Kangaroo Rat Occupied Habitat (AECOM)
- Stephens' Kangaroo Rat Occupied Habitat (MCBCP)
- Tidewater Goby Habitat (MCBCP)
- Western Snowy Plover Nest Site (MCBCP)
- Steelhead Potential Transit Reaches (MCBCP)
- Santa Margarita River Estuary

PONDED AREAS - LISTED SPECIES OCCUPANCY

- San Diego Fairy Shrimp
- Riverside Fairy Shrimp
- Lindahl's Fairy Shrimp
- Riverside, San Diego and Lindahl's Fairy Shrimp
- Riverside and San Diego Fairy Shrimp
- San Diego and Lindahl's Fairy Shrimp
- Riverside and Lindahl's Fairy Shrimp
- Branchinecta sp.
- Unoccupied

JURISDICTIONAL WATERS

- Jurisdictional Vernal Pools
- Nonjurisdictional Vernal Pools

Potential Waters of the U.S. Size:

- < 0.10 acre
- 0.11 - 0.49 acre
- > 0.50 acre

APPENDIX C

TRAFFIC ANALYSIS WORKSHEETS

BWI EIS | Year 2013 Baseline

1: Cristianitos Rd & I-5 SB off-ramp | Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	147	23	83	24	0	0	0	0	84	4	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	160	25	90	26	0	0	0	0	91	4	35
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	26			185			416	379	172	379	391	26
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			185			416	379	172	379	391	26
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	83	99	97
cM capacity (veh/h)	1588			1390			500	517	871	550	509	1050

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	185	90	26	96	35
Volume Left	0	90	0	91	0
Volume Right	25	0	0	0	35
cSH	1700	1390	1700	548	1050
Volume to Capacity	0.11	0.06	0.02	0.17	0.03
Queue Length 95th (ft)	0	5	0	16	3
Control Delay (s)	0.0	7.8	0.0	13.0	8.5
Lane LOS		A		B	A
Approach Delay (s)	0.0	6.0		11.8	
Approach LOS				B	

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

BWI EIS | Year 2013 Baseline

2: Cristianitos Rd & I-5 NB on-ramp | Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	92	123	0	0	89	60	21	3	238	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	134	0	0	97	65	23	3	259	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	162			134			463	496	134	723	463	129
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			134			463	496	134	723	463	129
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	99	72	100	100	100
cM capacity (veh/h)	1417			1451			482	442	915	230	461	920

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	100	134	162	23	262
Volume Left	100	0	0	23	0
Volume Right	0	0	65	0	259
cSH	1417	1700	1700	482	903
Volume to Capacity	0.07	0.08	0.10	0.05	0.29
Queue Length 95th (ft)	6	0	0	4	30
Control Delay (s)	7.7	0.0	0.0	12.8	10.6
Lane LOS	A			B	B
Approach Delay (s)	3.3		0.0	10.8	
Approach LOS				B	

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	57	52	65	470	0	0	0	0	288	15	403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	62	57	71	511	0	0	0	0	313	16	438
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	511			118			722	714	62	714	771	511
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511			118			722	714	62	714	771	511
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	6	95	22
cM capacity (veh/h)	1054			1470			70	339	1003	334	315	563

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	62	57	582	329	438
Volume Left	0	0	71	313	0
Volume Right	0	57	0	0	438
cSH	1700	1700	1470	333	563
Volume to Capacity	0.04	0.03	0.05	0.99	0.78
Queue Length 95th (ft)	0	0	4	273	180
Control Delay (s)	0.0	0.0	1.4	83.2	30.3
Lane LOS			A	F	D
Approach Delay (s)	0.0		1.4	53.0	
Approach LOS				F	

Intersection Summary			
Average Delay	28.2		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	65	279	0	0	77	96	458	2	524	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	303	0	0	84	104	498	2	570	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	188			303			528	633	303	529	528	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188			303			528	633	303	529	528	84
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			0	99	23	100	100	100
cM capacity (veh/h)	1386			1258			443	377	736	100	432	976

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	374	84	104	500	570
Volume Left	71	0	0	498	0
Volume Right	0	0	104	0	570
cSH	1386	1700	1700	443	736
Volume to Capacity	0.05	0.05	0.06	1.13	0.77
Queue Length 95th (ft)	4	0	0	444	188
Control Delay (s)	1.9	0.0	0.0	113.0	24.5
Lane LOS	A			F	C
Approach Delay (s)	1.9	0.0		65.8	
Approach LOS				F	

Intersection Summary			
Average Delay	43.6		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	9	0	0	0	0	0	471	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	10	0	0	0	0	0	512	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			25	20	0	20	20	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			25	20	0	20	20	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	48	99	100
cM capacity (veh/h)	1623			1623			972	869	1085	989	869	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	10	523
Volume Left	0	10	512
Volume Right	0	0	0
cSH	1700	1623	986
Volume to Capacity	0.00	0.01	0.53
Queue Length 95th (ft)	0	0	80
Control Delay (s)	0.0	7.2	12.7
Lane LOS		A	B
Approach Delay (s)	0.0	7.2	12.7
Approach LOS			B

Intersection Summary			
Average Delay	12.6		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	466	0	0	2	23	7	1	578	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	507	0	0	2	25	8	1	628	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	27			507			534	547	507	535	534	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			507			534	547	507	535	534	15
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	0	0	100	100
cM capacity (veh/h)	1587			1058			455	443	566	0	450	1065

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	513	27	9	628
Volume Left	7	0	8	0
Volume Right	0	25	0	628
cSH	1587	1700	454	566
Volume to Capacity	0.00	0.02	0.02	1.11
Queue Length 95th (ft)	0	0	1	493
Control Delay (s)	0.1	0.0	13.1	97.7
Lane LOS	A		B	F
Approach Delay (s)	0.1	0.0	96.5	
Approach LOS			F	

Intersection Summary			
Average Delay	52.3		
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

7: Las Pulgas Rd & Stuart Mesa Rd

Timing Plan: AM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	724	325	64	0	22	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	787	353	70	0	24	208
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			787		926	787
vC1, stage 1 conf vol					787	
vC2, stage 2 conf vol					139	
vCu, unblocked vol			787		926	787
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			92		94	47
cM capacity (veh/h)			832		370	392

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	787	353	70	0	24	208
Volume Left	0	0	70	0	24	0
Volume Right	0	353	0	0	0	208
cSH	1700	1700	832	1700	370	392
Volume to Capacity	0.46	0.21	0.08	0.00	0.06	0.53
Queue Length 95th (ft)	0	0	7	0	5	75
Control Delay (s)	0.0	0.0	9.7	0.0	15.4	24.1
Lane LOS			A		C	C
Approach Delay (s)	0.0		9.7		23.2	
Approach LOS					C	

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

8: Harbor Dr & Harbor Dr

Timing Plan: AM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	121	782	43	76	34	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	850	47	83	37	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		263	0	286	263
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		263	0	286	263
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	92		92	92	93	100
cM capacity (veh/h)	1623		590	1085	543	590

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	132	850	47	83	39
Volume Left	132	0	0	0	37
Volume Right	0	850	0	83	0
cSH	1623	1700	590	1085	545
Volume to Capacity	0.08	0.50	0.08	0.08	0.07
Queue Length 95th (ft)	7	0	6	6	6
Control Delay (s)	7.4	0.0	11.6	8.6	12.1
Lane LOS	A		B	A	B
Approach Delay (s)	1.0		9.7		12.1
Approach LOS			A		B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1778	1583		1781	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1778	1583		1781	1583
Volume (vph)	60	72	28	101	506	690	246	12	152	177	16	104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	78	30	110	550	750	267	13	165	192	17	113
RTOR Reduction (vph)	0	0	23	0	0	554	0	0	128	0	0	91
Lane Group Flow (vph)	65	78	7	110	550	196	0	280	37	0	209	22
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.9	14.1	14.1	4.4	15.6	15.6		13.3	13.3		11.8	11.8
Effective Green, g (s)	2.9	14.1	14.1	4.4	15.6	15.6		13.3	13.3		11.8	11.8
Actuated g/C Ratio	0.05	0.24	0.24	0.07	0.26	0.26		0.22	0.22		0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	86	441	375	131	926	414		397	353		353	313
v/s Ratio Prot	0.04	0.04		c0.06	c0.16			c0.16			c0.12	
v/s Ratio Perm			0.00			0.12			0.02			0.01
v/c Ratio	0.76	0.18	0.02	0.84	0.59	0.47		0.71	0.10		0.59	0.07
Uniform Delay, d1	28.0	18.1	17.4	27.3	19.2	18.5		21.3	18.4		21.7	19.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	30.9	0.2	0.0	35.2	1.0	0.9		5.6	0.1		2.7	0.1
Delay (s)	58.9	18.3	17.5	62.5	20.3	19.4		27.0	18.5		24.4	19.5
Level of Service	E	B	B	E	C	B		C	B		C	B
Approach Delay (s)		33.4			23.1			23.8			22.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	141	9	38	44	2758	4	8	530	79
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	153	10	41	48	2998	4	9	576	86
RTOR Reduction (vph)	0	0	0	0	0	37	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	79	84	4	48	2998	4	9	576	86
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				8.8	8.8	8.8	4.2	61.7	83.3	0.8	58.3	83.3
Effective Green, g (s)				8.8	8.8	8.8	4.2	61.7	83.3	0.8	58.3	83.3
Actuated g/C Ratio				0.11	0.11	0.11	0.05	0.74	1.00	0.01	0.70	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				178	179	167	89	3766	1583	17	2477	1583
v/s Ratio Prot				0.05	c0.05		c0.03	c0.59		0.01	0.16	
v/s Ratio Perm						0.00			0.00			0.05
v/c Ratio				0.44	0.47	0.03	0.54	0.80	0.00	0.53	0.23	0.05
Uniform Delay, d1				35.0	35.1	33.4	38.6	6.8	0.0	41.1	4.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				1.8	1.9	0.1	6.2	1.2	0.0	26.7	0.0	0.1
Delay (s)				36.7	37.0	33.5	44.8	8.1	0.0	67.7	4.5	0.1
Level of Service				D	D	C	D	A	A	E	A	A
Approach Delay (s)		0.0			36.2			8.6			4.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	83.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

11: Wire Mountain Rd & Vandegrift Blvd

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	249	32	41	230	119	81	260	2097	473	30	388	342
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	35	45	250	129	88	283	2279	514	33	422	372
RTOR Reduction (vph)	0	0	29	0	0	38	0	0	197	0	0	185
Lane Group Flow (vph)	152	154	16	250	129	50	283	2279	317	33	422	187
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.4	12.4	29.7	12.0	12.0	15.0	17.3	38.6	50.6	3.0	24.3	36.7
Effective Green, g (s)	12.4	12.4	29.7	12.0	12.0	15.0	17.3	38.6	50.6	3.0	24.3	36.7
Actuated g/C Ratio	0.15	0.15	0.36	0.15	0.15	0.18	0.21	0.47	0.62	0.04	0.30	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	254	247	545	502	273	367	373	2394	977	65	1049	786
v/s Ratio Prot	0.09	c0.09	0.01	c0.07	0.07	0.00	c0.16	c0.45	0.05	0.02	0.12	0.04
v/s Ratio Perm			0.00			0.03			0.15			0.08
v/c Ratio	0.60	0.62	0.03	0.50	0.47	0.14	0.76	0.95	0.32	0.51	0.40	0.24
Uniform Delay, d1	32.5	32.6	16.9	32.2	32.1	28.1	30.4	20.8	7.5	38.8	23.0	14.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	4.8	0.0	0.8	1.3	0.2	8.6	9.5	0.2	6.1	0.3	0.2
Delay (s)	36.2	37.4	16.9	33.0	33.4	28.2	39.0	30.3	7.7	44.9	23.3	14.2
Level of Service	D	D	B	C	C	C	D	C	A	D	C	B
Approach Delay (s)		34.3			32.2			27.3			20.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

12: San Jacinto Rd & Vandegrift Blvd

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.91		1.00	0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1688		1770	1603		1770	3534		1770	3539	1583
Flt Permitted	0.80	1.00		0.80	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2891	1688		1490	1603		1770	3534		1770	3539	1583
Volume (vph)	48	3	5	14	2	24	103	2303	22	37	741	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	3	5	15	2	26	112	2503	24	40	805	53
RTOR Reduction (vph)	0	5	0	0	25	0	0	0	0	0	0	15
Lane Group Flow (vph)	52	3	0	15	3	0	112	2527	0	40	805	38
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	5.0	5.0		5.0	5.0		10.4	78.5		2.5	70.6	70.6
Effective Green, g (s)	5.0	5.0		5.0	5.0		10.4	78.5		2.5	70.6	70.6
Actuated g/C Ratio	0.05	0.05		0.05	0.05		0.11	0.80		0.03	0.72	0.72
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	148	86		76	82		188	2831		45	2550	1140
v/s Ratio Prot		0.00			0.00		c0.06	c0.71		0.02	0.23	
v/s Ratio Perm	c0.02			0.01								0.02
v/c Ratio	0.35	0.04		0.20	0.04		0.60	0.89		0.89	0.32	0.03
Uniform Delay, d1	44.9	44.2		44.6	44.2		41.8	6.8		47.6	5.0	3.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	0.2		1.3	0.2		5.0	4.0		91.4	0.1	0.0
Delay (s)	46.4	44.4		45.9	44.4		46.8	10.8		139.0	5.0	3.9
Level of Service	D	D		D	D		D	B		F	A	A
Approach Delay (s)		46.1			44.9			12.3			10.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1604		1610	3370	1583	3433	3539	1583	3433	3358	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1604		1610	3370	1583	3433	3539	1583	3433	3358	
Volume (vph)	304	28	354	94	138	360	796	1614	23	54	283	146
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	330	30	385	102	150	391	865	1754	25	59	308	159
RTOR Reduction (vph)	0	312	0	0	0	28	0	0	9	0	51	0
Lane Group Flow (vph)	330	103	0	81	171	363	865	1754	16	59	416	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	22.0	22.0		11.5	11.5	20.5	34.0	57.0	68.5	9.0	32.0	
Effective Green, g (s)	22.0	22.0		11.5	11.5	20.5	34.0	57.0	68.5	9.0	32.0	
Actuated g/C Ratio	0.19	0.19		0.10	0.10	0.18	0.29	0.49	0.59	0.08	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	337	306		160	336	336	1011	1747	939	268	930	
v/s Ratio Prot	c0.19	0.06		0.05	0.05	c0.08	0.25	c0.50	0.00	0.02	0.12	
v/s Ratio Perm						0.15			0.01			
v/c Ratio	0.98	0.34		0.51	0.51	1.08	0.86	1.00	0.02	0.22	0.45	
Uniform Delay, d1	46.5	40.4		49.3	49.3	47.5	38.4	29.3	9.7	50.0	34.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	42.9	0.7		2.5	1.2	72.3	7.2	22.5	0.0	0.4	0.3	
Delay (s)	89.4	41.1		51.8	50.5	119.8	45.7	51.7	9.7	50.4	34.8	
Level of Service	F	D		D	D	F	D	D	A	D	C	
Approach Delay (s)		62.5			92.8			49.4			36.5	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM Average Control Delay	56.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	166	1470	290	413	769	263
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	1598	315	449	836	286
RTOR Reduction (vph)	0	133	0	338	0	0
Lane Group Flow (vph)	180	1465	315	111	836	286
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	19.0	41.0	16.0	16.0	18.0	38.0
Effective Green, g (s)	19.0	41.0	16.0	16.0	18.0	38.0
Actuated g/C Ratio	0.29	0.63	0.25	0.25	0.28	0.58
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	517	1758	871	390	951	2069
v/s Ratio Prot		c0.53	c0.09		0.24	0.08
v/s Ratio Perm	0.10			0.07		
v/c Ratio	0.35	0.83	0.36	0.28	0.88	0.14
Uniform Delay, d1	18.1	9.3	20.3	19.9	22.5	6.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	3.6	1.2	1.8	9.3	0.1
Delay (s)	18.5	12.9	21.4	21.7	31.8	6.2
Level of Service	B	B	C	C	C	A
Approach Delay (s)	13.5		21.6			25.3
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

15: Papagallo Dr & Vandegrift Blvd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	54	24	1392	33	3	166
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	26	1513	36	3	180
RTOR Reduction (vph)	0	24	0	9	0	0
Lane Group Flow (vph)	59	2	1513	27	3	180
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	6.9	6.9	60.8	60.8	1.2	66.0
Effective Green, g (s)	6.9	6.9	60.8	60.8	1.2	66.0
Actuated g/C Ratio	0.09	0.09	0.75	0.75	0.01	0.82
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	151	135	2660	1190	26	4148
v/s Ratio Prot	c0.03		c0.43		c0.00	0.04
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.39	0.02	0.57	0.02	0.12	0.04
Uniform Delay, d1	35.0	33.9	4.4	2.5	39.3	1.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.0	0.3	0.0	2.0	0.0
Delay (s)	36.7	33.9	4.6	2.5	41.3	1.4
Level of Service	D	C	A	A	D	A
Approach Delay (s)	35.8		4.6			2.1
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

16: Ammunition Rd & Mission Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1760	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1760	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	71	60	74	307	385	47	289	358	9	43	639	399
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	65	80	334	418	51	314	389	10	47	695	434
RTOR Reduction (vph)	0	0	72	0	0	41	0	0	0	0	0	321
Lane Group Flow (vph)	69	73	8	242	510	10	314	389	10	47	695	113
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	6.7	6.7	6.7	14.3	14.3	14.3	14.6	29.4	69.7	3.3	18.1	18.1
Effective Green, g (s)	6.7	6.7	6.7	14.3	14.3	14.3	14.6	29.4	69.7	3.3	18.1	18.1
Actuated g/C Ratio	0.10	0.10	0.10	0.21	0.21	0.21	0.21	0.42	1.00	0.05	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	162	169	152	330	689	325	371	1493	1583	84	919	411
v/s Ratio Prot	0.04	c0.04		0.15	c0.15		c0.18	0.11		0.03	c0.20	
v/s Ratio Perm			0.00			0.01			0.01			0.07
v/c Ratio	0.43	0.43	0.05	0.73	0.74	0.03	0.85	0.26	0.01	0.56	0.76	0.27
Uniform Delay, d1	29.7	29.7	28.6	25.9	26.0	22.2	26.5	13.1	0.0	32.5	23.8	20.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	1.8	0.1	8.2	4.3	0.0	16.1	0.1	0.0	7.9	3.6	0.4
Delay (s)	31.5	31.5	28.7	34.1	30.2	22.2	42.6	13.2	0.0	40.3	27.4	20.9
Level of Service	C	C	C	C	C	C	D	B	A	D	C	C
Approach Delay (s)		30.5			30.9			26.0			25.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

1: Cristianitos Rd & I-5 SB off-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	114	26	126	58	0	0	0	0	69	3	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	124	28	137	63	0	0	0	0	75	3	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	63			152			541	475	138	475	489	63
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	63			152			541	475	138	475	489	63
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			100	100	100	84	99	94
cM capacity (veh/h)	1540			1429			390	442	910	463	433	1002

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	152	137	63	78	64
Volume Left	0	137	0	75	0
Volume Right	28	0	0	0	64
cSH	1700	1429	1700	462	1002
Volume to Capacity	0.09	0.10	0.04	0.17	0.06
Queue Length 95th (ft)	0	8	0	15	5
Control Delay (s)	0.0	7.8	0.0	14.4	8.8
Lane LOS		A		B	A
Approach Delay (s)	0.0	5.3		11.9	
Approach LOS				B	

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	34.8%	ICU Level of Service		A
Analysis Period (min)	15			

2: Cristianitos Rd & I-5 NB on-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	99	82	0	0	148	77	33	0	110	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	89	0	0	161	84	36	0	120	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	245			89			507	549	89	627	507	203
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			89			507	549	89	627	507	203
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			92	100	88	100	100	100
cM capacity (veh/h)	1322			1506			446	407	969	326	430	838

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	108	89	245	36	120
Volume Left	108	0	0	36	0
Volume Right	0	0	84	0	120
cSH	1322	1700	1700	446	969
Volume to Capacity	0.08	0.05	0.14	0.08	0.12
Queue Length 95th (ft)	7	0	0	7	11
Control Delay (s)	8.0	0.0	0.0	13.8	9.2
Lane LOS	A			B	A
Approach Delay (s)	4.4		0.0	10.3	
Approach LOS				B	

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	34.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	575	338	185	108	0	0	0	0	164	11	128
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	625	367	201	117	0	0	0	0	178	12	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	117			992			1151	1145	625	1145	1512	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			992			1151	1145	625	1145	1512	117
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			71			100	100	100	0	86	85
cM capacity (veh/h)	1471			697			104	142	485	137	85	935

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	625	367	318	190	139
Volume Left	0	0	201	178	0
Volume Right	0	367	0	0	139
cSH	1700	1700	697	132	935
Volume to Capacity	0.37	0.22	0.29	1.44	0.15
Queue Length 95th (ft)	0	0	30	320	13
Control Delay (s)	0.0	0.0	9.1	296.2	9.5
Lane LOS			A	F	A
Approach Delay (s)	0.0		9.1	175.1	
Approach LOS				F	

Intersection Summary			
Average Delay	36.9		
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	557	174	0	0	210	306	77	5	76	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	605	189	0	0	228	333	84	5	83	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	561			189			1628	1961	189	1631	1628	228
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	561			189			1628	1961	189	1631	1628	228
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	40			100			0	79	90	100	100	100
cM capacity (veh/h)	1010			1385			43	25	853	33	41	811

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	795	228	333	89	83
Volume Left	605	0	0	84	0
Volume Right	0	0	333	0	83
cSH	1010	1700	1700	41	853
Volume to Capacity	0.60	0.13	0.20	2.18	0.10
Queue Length 95th (ft)	104	0	0	238	8
Control Delay (s)	12.7	0.0	0.0	752.3	9.7
Lane LOS	B			F	A
Approach Delay (s)	12.7	0.0		395.1	
Approach LOS				F	

Intersection Summary			
Average Delay	51.0		
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

5: Las Pulgas Rd & I-5 SB on-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	699	0	0	0	0	0	88	12	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	760	0	0	0	0	0	96	13	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			1526	1520	0	1520	1520	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			1526	1520	0	1520	1520	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			53			100	100	100	0	79	100
cM capacity (veh/h)	1623			1623			52	63	1085	62	63	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	760	109
Volume Left	0	760	96
Volume Right	0	0	0
cSH	1700	1623	62
Volume to Capacity	0.00	0.47	1.76
Queue Length 95th (ft)	0	64	249
Control Delay (s)	0.0	9.2	509.1
Lane LOS		A	F
Approach Delay (s)	0.0	9.2	509.1
Approach LOS			F

Intersection Summary			
Average Delay	71.7		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

6: Las Pulgas Rd & I-5 NB on-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	79	0	0	687	416	11	2	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	86	0	0	747	452	12	2	55	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1199			86			1083	1309	86	1084	1083	973
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1199			86			1083	1309	86	1084	1083	973
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			94	99	94	100	100	100
cM capacity (veh/h)	582			1510			192	156	973	179	213	306

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	98	1199	14	55
Volume Left	12	0	12	0
Volume Right	0	452	0	55
cSH	582	1700	185	973
Volume to Capacity	0.02	0.71	0.08	0.06
Queue Length 95th (ft)	2	0	6	5
Control Delay (s)	1.6	0.0	26.0	8.9
Lane LOS	A		D	A
Approach Delay (s)	1.6	0.0	12.4	
Approach LOS			B	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	57	74	148	781	284	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	80	161	849	309	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		1233	62
vC1, stage 1 conf vol					62	
vC2, stage 2 conf vol					1171	
vCu, unblocked vol			62		1233	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		0	93
cM capacity (veh/h)			1541		233	1003

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	62	80	161	849	309	68
Volume Left	0	0	161	0	309	0
Volume Right	0	80	0	0	0	68
cSH	1700	1700	1541	1700	233	1003
Volume to Capacity	0.04	0.05	0.10	0.50	1.33	0.07
Queue Length 95th (ft)	0	0	9	0	413	5
Control Delay (s)	0.0	0.0	7.6	0.0	214.8	8.9
Lane LOS			A		F	A
Approach Delay (s)	0.0		1.2		177.4	
Approach LOS					F	

Intersection Summary			
Average Delay	44.6		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	400	47	5	232	660	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	435	51	5	252	717	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		870	0	872	870
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		870	0	872	870
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	73		97	77	0	83
cM capacity (veh/h)	1623		212	1085	162	212

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	435	51	5	252	754
Volume Left	435	0	0	0	717
Volume Right	0	51	0	252	0
cSH	1623	1700	212	1085	164
Volume to Capacity	0.27	0.03	0.03	0.23	4.61
Queue Length 95th (ft)	27	0	2	23	Err
Control Delay (s)	8.0	0.0	22.4	9.3	Err
Lane LOS	A		C	A	F
Approach Delay (s)	7.2		9.6		Err
Approach LOS			A		F

Intersection Summary			
Average Delay	5039.8		
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1785	1583		1802	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1785	1583		1802	1583
Volume (vph)	373	149	335	302	248	2197	157	22	122	97	47	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	405	162	364	328	270	2388	171	24	133	105	51	49
RTOR Reduction (vph)	0	0	194	0	0	277	0	0	118	0	0	44
Lane Group Flow (vph)	405	162	170	328	270	2111	0	195	15	0	156	5
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	18.0	69.8	69.8	31.2	83.0	83.0		17.0	17.0		15.3	15.3
Effective Green, g (s)	18.0	69.8	69.8	31.2	83.0	83.0		17.0	17.0		15.3	15.3
Actuated g/C Ratio	0.12	0.47	0.47	0.21	0.56	0.56		0.11	0.11		0.10	0.10
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	213	871	740	370	1967	880		203	180		185	162
v/s Ratio Prot	c0.23	0.09		0.19	0.08			c0.11			c0.09	
v/s Ratio Perm			0.11			c1.33			0.01			0.00
v/c Ratio	1.90	0.19	0.23	0.89	0.14	2.40		0.96	0.08		0.84	0.03
Uniform Delay, d1	65.7	23.2	23.7	57.3	15.9	33.2		65.8	59.2		65.8	60.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	422.7	0.1	0.2	21.6	0.0	632.9		51.7	0.2		27.9	0.1
Delay (s)	488.4	23.3	23.9	78.9	16.0	666.1		117.5	59.4		93.7	60.4
Level of Service	F	C	C	E	B	F		F	E		F	E
Approach Delay (s)		225.8			542.8			93.9			85.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	422.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.97		
Actuated Cycle Length (s)	149.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	176.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	121	3	16	117	883	37	27	2514	212
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	132	3	17	127	960	40	29	2733	230
RTOR Reduction (vph)	0	0	0	0	0	16	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	66	69	1	127	960	40	29	2733	230
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				11.3	11.3	11.3	11.0	120.1	146.9	3.5	112.6	146.9
Effective Green, g (s)				11.3	11.3	11.3	11.0	120.1	146.9	3.5	112.6	146.9
Actuated g/C Ratio				0.08	0.08	0.08	0.07	0.82	1.00	0.02	0.77	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				129	130	122	133	4157	1583	42	2713	1583
v/s Ratio Prot				0.04	c0.04		c0.07	0.19		0.02	c0.77	
v/s Ratio Perm						0.00			0.03			0.15
v/c Ratio				0.51	0.53	0.01	0.95	0.23	0.03	0.69	1.01	0.15
Uniform Delay, d1				65.1	65.2	62.6	67.7	3.0	0.0	71.2	17.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				3.4	4.1	0.0	63.7	0.0	0.0	39.1	19.1	0.2
Delay (s)				68.5	69.4	62.7	131.4	3.0	0.0	110.3	36.2	0.2
Level of Service				E	E	E	F	A	A	F	D	A
Approach Delay (s)		0.0			68.3			17.4			34.2	
Approach LOS		A			E			B			C	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	146.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS | Year 2013 Baseline

11: Wire Mountain Rd & Vandegrift Blvd

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	248	159	194	591	35	56	97	490	337	89	1991	189
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	173	211	642	38	61	105	533	366	97	2164	205
RTOR Reduction (vph)	0	0	4	0	0	46	0	0	72	0	0	56
Lane Group Flow (vph)	220	223	207	642	38	15	105	533	294	97	2164	149
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	16.0	16.0	23.0	23.0	23.0	35.4	7.0	72.6	95.6	12.4	78.0	94.0
Effective Green, g (s)	16.0	16.0	23.0	23.0	23.0	35.4	7.0	72.6	95.6	12.4	78.0	94.0
Actuated g/C Ratio	0.11	0.11	0.16	0.16	0.16	0.25	0.05	0.52	0.68	0.09	0.56	0.67
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	192	192	247	564	306	446	89	2637	1081	157	1972	1108
v/s Ratio Prot	0.13	c0.13	0.04	c0.19	0.02	0.00	c0.06	0.10	0.04	0.05	c0.61	0.02
v/s Ratio Perm			0.10			0.01			0.14			0.08
v/c Ratio	1.15	1.16	0.84	1.14	0.12	0.03	1.18	0.20	0.27	0.62	1.10	0.13
Uniform Delay, d1	62.0	62.0	56.7	58.5	49.9	39.4	66.5	18.1	8.6	61.5	31.0	8.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	109.7	115.2	21.2	82.1	0.2	0.0	151.7	0.0	0.1	7.1	52.4	0.1
Delay (s)	171.7	177.2	77.9	140.6	50.1	39.5	218.2	18.2	8.8	68.6	83.4	8.4
Level of Service	F	F	E	F	D	D	F	B	A	E	F	A
Approach Delay (s)		143.3			127.7			35.7			76.6	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	84.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS | Year 2013 Baseline

12: San Jacinto Rd & Vandegrift Blvd

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88		1.00	0.86		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1639		1770	1600		1770	3479		1770	3539	1583
Flt Permitted	0.60	1.00		0.73	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2173	1639		1362	1600		1770	3479		1770	3539	1583
Volume (vph)	137	7	29	134	6	98	190	535	68	168	2106	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	8	32	146	7	107	207	582	74	183	2289	87
RTOR Reduction (vph)	0	27	0	0	92	0	0	9	0	0	0	28
Lane Group Flow (vph)	149	13	0	146	22	0	207	647	0	183	2289	59
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	14.0	14.0		14.0	14.0		11.0	57.5		14.6	61.1	61.1
Effective Green, g (s)	14.0	14.0		14.0	14.0		11.0	57.5		14.6	61.1	61.1
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.11	0.59		0.15	0.62	0.62
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	310	234		194	228		198	2039		263	2204	986
v/s Ratio Prot		0.01			0.01		c0.12	0.19		0.10	c0.65	
v/s Ratio Perm	0.07			c0.11								0.04
v/c Ratio	0.48	0.05		0.75	0.10		1.05	0.32		0.70	1.04	0.06
Uniform Delay, d1	38.7	36.3		40.4	36.6		43.5	10.3		39.6	18.5	7.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1		15.2	0.2		76.4	0.1		7.8	30.1	0.0
Delay (s)	39.9	36.4		55.5	36.7		120.0	10.4		47.4	48.6	7.3
Level of Service	D	D		E	D		F	B		D	D	A
Approach Delay (s)		39.1			47.3			36.7			47.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	98.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3462	
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3462	
Volume (vph)	219	133	772	74	44	65	306	371	101	283	1431	243
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	145	839	80	48	71	333	403	110	308	1555	264
RTOR Reduction (vph)	0	135	0	0	0	58	0	0	65	0	9	0
Lane Group Flow (vph)	238	849	0	41	87	13	333	403	45	308	1810	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	51.0	51.0		9.4	9.4	26.8	11.0	49.6	59.0	17.4	56.0	
Effective Green, g (s)	51.0	51.0		9.4	9.4	26.8	11.0	49.6	59.0	17.4	56.0	
Actuated g/C Ratio	0.36	0.36		0.07	0.07	0.19	0.08	0.35	0.41	0.12	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	629	578		106	217	340	263	1224	651	417	1352	
v/s Ratio Prot	0.13	c0.52		0.03	c0.03	0.00	c0.10	0.11	0.00	0.09	c0.52	
v/s Ratio Perm						0.00			0.02			
v/c Ratio	0.38	1.47		0.39	0.40	0.04	1.27	0.33	0.07	0.74	1.34	
Uniform Delay, d1	34.4	46.2		64.2	64.3	47.8	66.2	34.6	25.6	60.8	43.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	220.1		2.3	1.2	0.0	146.4	0.2	0.0	6.7	157.5	
Delay (s)	34.8	266.3		66.6	65.5	47.8	212.6	34.8	25.6	67.5	201.2	
Level of Service	C	F		E	E	D	F	C	C	E	F	
Approach Delay (s)		221.2			59.4			103.6			181.8	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	172.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	143.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	120.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	433	838	286	328	1069	367
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	911	311	357	1162	399
RTOR Reduction (vph)	0	62	0	288	0	0
Lane Group Flow (vph)	471	849	311	69	1162	399
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	26.7	63.5	17.2	17.2	32.8	54.0
Effective Green, g (s)	26.7	63.5	17.2	17.2	32.8	54.0
Actuated g/C Ratio	0.30	0.72	0.19	0.19	0.37	0.61
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	533	1995	686	307	1269	2155
v/s Ratio Prot		0.30	c0.09		c0.34	0.11
v/s Ratio Perm	c0.27			0.04		
v/c Ratio	0.88	0.43	0.45	0.23	0.92	0.19
Uniform Delay, d1	29.5	5.1	31.6	30.1	26.6	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.9	0.1	2.2	1.7	10.4	0.2
Delay (s)	45.4	5.3	33.8	31.8	37.0	7.8
Level of Service	D	A	C	C	D	A
Approach Delay (s)	19.0		32.7			29.5
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	41	5	348	45	5	1351
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	5	378	49	5	1468
RTOR Reduction (vph)	0	5	0	11	0	0
Lane Group Flow (vph)	45	0	378	38	5	1468
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	5.4	5.4	64.3	64.3	2.3	70.6
Effective Green, g (s)	5.4	5.4	64.3	64.3	2.3	70.6
Actuated g/C Ratio	0.06	0.06	0.77	0.77	0.03	0.84
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	114	102	2709	1212	48	4274
v/s Ratio Prot	c0.03		0.11		0.00	c0.29
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.39	0.00	0.14	0.03	0.10	0.34
Uniform Delay, d1	37.7	36.8	2.6	2.4	39.8	1.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.0	0.0	0.0	1.0	0.0
Delay (s)	40.0	36.8	2.6	2.4	40.8	1.6
Level of Service	D	D	A	A	D	A
Approach Delay (s)	39.7		2.6			1.7
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	2.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	601	153	173	333	105	53	125	490	12	48	545	91
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	653	166	188	362	114	58	136	533	13	52	592	99
RTOR Reduction (vph)	0	0	134	0	0	48	0	0	0	0	0	77
Lane Group Flow (vph)	399	420	54	181	295	10	136	533	13	52	592	22
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	20.2	20.2	20.2	12.6	12.6	12.6	5.7	18.5	70.5	3.2	16.0	16.0
Effective Green, g (s)	20.2	20.2	20.2	12.6	12.6	12.6	5.7	18.5	70.5	3.2	16.0	16.0
Actuated g/C Ratio	0.29	0.29	0.29	0.18	0.18	0.18	0.08	0.26	1.00	0.05	0.23	0.23
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	482	492	454	288	588	283	143	929	1583	80	803	359
v/s Ratio Prot	0.24	c0.24		c0.11	0.09		c0.08	0.15		0.03	c0.17	
v/s Ratio Perm			0.03			0.01			c0.01			0.01
v/c Ratio	0.83	0.85	0.12	0.63	0.50	0.04	0.95	0.57	0.01	0.65	0.74	0.06
Uniform Delay, d1	23.5	23.8	18.6	26.8	26.1	23.9	32.3	22.6	0.0	33.1	25.3	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	13.5	0.1	4.2	0.7	0.1	60.2	0.9	0.0	17.3	3.6	0.1
Delay (s)	34.7	37.2	18.7	31.0	26.8	24.0	92.5	23.4	0.0	50.4	28.9	21.4
Level of Service	C	D	B	C	C	C	F	C	A	D	C	C
Approach Delay (s)		32.8			27.9			36.8			29.4	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: Cristianitos Rd & I-5 SB off-ramp

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	147	23	83	24	0	0	0	0	84	4	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	160	25	90	26	0	0	0	0	91	4	35
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	26			185			416	379	172	379	391	26
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			185			416	379	172	379	391	26
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	83	99	97
cM capacity (veh/h)	1588			1390			500	517	871	550	509	1050

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	185	90	26	96	35
Volume Left	0	90	0	91	0
Volume Right	25	0	0	0	35
cSH	1700	1390	1700	548	1050
Volume to Capacity	0.11	0.06	0.02	0.17	0.03
Queue Length 95th (ft)	0	5	0	16	3
Control Delay (s)	0.0	7.8	0.0	13.0	8.5
Lane LOS		A		B	A
Approach Delay (s)	0.0	6.0		11.8	
Approach LOS				B	

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			

2: Cristianitos Rd & I-5 NB on-ramp

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	92	123	0	0	89	60	21	3	238	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	134	0	0	97	65	23	3	259	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	162			134			463	496	134	723	463	129
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			134			463	496	134	723	463	129
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	99	72	100	100	100
cM capacity (veh/h)	1417			1451			482	442	915	230	461	920

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	100	134	162	23	262
Volume Left	100	0	0	23	0
Volume Right	0	0	65	0	259
cSH	1417	1700	1700	482	903
Volume to Capacity	0.07	0.08	0.10	0.05	0.29
Queue Length 95th (ft)	6	0	0	4	30
Control Delay (s)	7.7	0.0	0.0	12.8	10.6
Lane LOS	A			B	B
Approach Delay (s)	3.3		0.0	10.8	
Approach LOS				B	

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			

3: Old Pacific Hwy & I-5 SB off-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	57	52	65	470	0	0	0	0	327	15	403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	62	57	71	511	0	0	0	0	355	16	438
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	511			118			722	714	62	714	771	511
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511			118			722	714	62	714	771	511
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	0	95	22
cM capacity (veh/h)	1054			1470			70	339	1003	334	315	563

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	62	57	582	372	438
Volume Left	0	0	71	355	0
Volume Right	0	57	0	0	438
cSH	1700	1700	1470	333	563
Volume to Capacity	0.04	0.03	0.05	1.12	0.78
Queue Length 95th (ft)	0	0	4	362	180
Control Delay (s)	0.0	0.0	1.4	120.6	30.3
Lane LOS			A	F	D
Approach Delay (s)	0.0		1.4	71.8	
Approach LOS				F	

Intersection Summary				
Average Delay	39.0			
Intersection Capacity Utilization	60.6%	ICU Level of Service		B
Analysis Period (min)	15			

4: Basilone Rd & I-5 NB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	65	318	0	0	77	96	458	2	563	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	346	0	0	84	104	498	2	612	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	188			346			571	675	346	572	571	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188			346			571	675	346	572	571	84
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			0	99	12	100	100	100
cM capacity (veh/h)	1386			1213			415	356	697	50	409	976

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	416	84	104	500	612
Volume Left	71	0	0	498	0
Volume Right	0	0	104	0	612
cSH	1386	1700	1700	415	697
Volume to Capacity	0.05	0.05	0.06	1.21	0.88
Queue Length 95th (ft)	4	0	0	501	268
Control Delay (s)	1.7	0.0	0.0	142.7	35.5
Lane LOS	A			F	E
Approach Delay (s)	1.7	0.0		83.7	
Approach LOS				F	

Intersection Summary				
Average Delay	54.7			
Intersection Capacity Utilization	61.9%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	9	0	0	0	0	0	510	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	10	0	0	0	0	0	554	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			25	20	0	20	20	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			25	20	0	20	20	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	44	99	100
cM capacity (veh/h)	1623			1623			972	869	1085	989	869	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	10	565
Volume Left	0	10	554
Volume Right	0	0	0
cSH	1700	1623	987
Volume to Capacity	0.00	0.01	0.57
Queue Length 95th (ft)	0	0	94
Control Delay (s)	0.0	7.2	13.4
Lane LOS		A	B
Approach Delay (s)	0.0	7.2	13.4
Approach LOS			B

Intersection Summary			
Average Delay	13.3		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	505	0	0	2	23	7	1	617	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	549	0	0	2	25	8	1	671	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	27			549			577	589	549	577	577	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			549			577	589	549	577	577	15
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	0	0	100	100
cM capacity (veh/h)	1587			1021			427	419	536	0	426	1065

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	555	27	9	671
Volume Left	7	0	8	0
Volume Right	0	25	0	671
cSH	1587	1700	426	536
Volume to Capacity	0.00	0.02	0.02	1.25
Queue Length 95th (ft)	0	0	2	660
Control Delay (s)	0.1	0.0	13.6	152.2
Lane LOS	A		B	F
Approach Delay (s)	0.1	0.0	150.5	
Approach LOS			F	

Intersection Summary			
Average Delay	81.1		
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

BWI EIS — Year 2013 Alternative 1

7: Las Pulgas Rd & Stuart Mesa Rd — Timing Plan: AM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	789	337	64	0	22	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	858	366	70	0	24	208
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			858		997	858
vC1, stage 1 conf vol					858	
vC2, stage 2 conf vol					139	
vCu, unblocked vol			858		997	858
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		93	42
cM capacity (veh/h)			783		344	357

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	858	366	70	0	24	208
Volume Left	0	0	70	0	24	0
Volume Right	0	366	0	0	0	208
cSH	1700	1700	783	1700	344	357
Volume to Capacity	0.50	0.22	0.09	0.00	0.07	0.58
Queue Length 95th (ft)	0	0	7	0	6	88
Control Delay (s)	0.0	0.0	10.0	0.0	16.3	28.2
Lane LOS			B		C	D
Approach Delay (s)	0.0		10.0		27.0	
Approach LOS					D	

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

BWI EIS — Year 2013 Alternative 1

8: Harbor Dr & Harbor Dr — Timing Plan: AM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	121	782	43	76	34	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	850	47	83	37	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		263	0	286	263
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		263	0	286	263
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	92		92	92	93	100
cM capacity (veh/h)	1623		590	1085	543	590

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	132	850	47	83	39
Volume Left	132	0	0	0	37
Volume Right	0	850	0	83	0
cSH	1623	1700	590	1085	545
Volume to Capacity	0.08	0.50	0.08	0.08	0.07
Queue Length 95th (ft)	7	0	6	6	6
Control Delay (s)	7.4	0.0	11.6	8.6	12.1
Lane LOS	A		B	A	B
Approach Delay (s)	1.0		9.7		12.1
Approach LOS			A		B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

9: Harbor Dr & I-5 SB on-ramp

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1778	1583		1781	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1778	1583		1781	1583
Volume (vph)	60	72	28	101	506	690	246	12	152	177	16	104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	78	30	110	550	750	267	13	165	192	17	113
RTOR Reduction (vph)	0	0	23	0	0	554	0	0	128	0	0	91
Lane Group Flow (vph)	65	78	7	110	550	196	0	280	37	0	209	22
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.9	14.1	14.1	4.4	15.6	15.6		13.3	13.3		11.8	11.8
Effective Green, g (s)	2.9	14.1	14.1	4.4	15.6	15.6		13.3	13.3		11.8	11.8
Actuated g/C Ratio	0.05	0.24	0.24	0.07	0.26	0.26		0.22	0.22		0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	86	441	375	131	926	414		397	353		353	313
v/s Ratio Prot	0.04	0.04		c0.06	c0.16			c0.16			c0.12	
v/s Ratio Perm			0.00			0.12			0.02			0.01
v/c Ratio	0.76	0.18	0.02	0.84	0.59	0.47		0.71	0.10		0.59	0.07
Uniform Delay, d1	28.0	18.1	17.4	27.3	19.2	18.5		21.3	18.4		21.7	19.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	30.9	0.2	0.0	35.2	1.0	0.9		5.6	0.1		2.7	0.1
Delay (s)	58.9	18.3	17.5	62.5	20.3	19.4		27.0	18.5		24.4	19.5
Level of Service	E	B	B	E	C	B		C	B		C	B
Approach Delay (s)		33.4			23.1			23.8			22.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

10: I-5 NB on-ramp & Vandegrift Blvd

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	141	9	38	44	2758	4	8	530	79
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	153	10	41	48	2998	4	9	576	86
RTOR Reduction (vph)	0	0	0	0	0	37	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	79	84	4	48	2998	4	9	576	86
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				8.8	8.8	8.8	4.2	61.7	83.3	0.8	58.3	83.3
Effective Green, g (s)				8.8	8.8	8.8	4.2	61.7	83.3	0.8	58.3	83.3
Actuated g/C Ratio				0.11	0.11	0.11	0.05	0.74	1.00	0.01	0.70	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				178	179	167	89	3766	1583	17	2477	1583
v/s Ratio Prot				0.05	c0.05		c0.03	c0.59		0.01	0.16	
v/s Ratio Perm						0.00			0.00			0.05
v/c Ratio				0.44	0.47	0.03	0.54	0.80	0.00	0.53	0.23	0.05
Uniform Delay, d1				35.0	35.1	33.4	38.6	6.8	0.0	41.1	4.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				1.8	1.9	0.1	6.2	1.2	0.0	26.7	0.0	0.1
Delay (s)				36.7	37.0	33.5	44.8	8.1	0.0	67.7	4.5	0.1
Level of Service				D	D	C	D	A	A	E	A	A
Approach Delay (s)		0.0			36.2			8.6			4.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	83.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

11: Wire Mountain Rd & Vandegrift Blvd

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	249	32	41	230	119	81	260	2097	473	30	388	342
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	35	45	250	129	88	283	2279	514	33	422	372
RTOR Reduction (vph)	0	0	29	0	0	38	0	0	197	0	0	185
Lane Group Flow (vph)	152	154	16	250	129	50	283	2279	317	33	422	187
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.4	12.4	29.7	12.0	12.0	15.0	17.3	38.6	50.6	3.0	24.3	36.7
Effective Green, g (s)	12.4	12.4	29.7	12.0	12.0	15.0	17.3	38.6	50.6	3.0	24.3	36.7
Actuated g/C Ratio	0.15	0.15	0.36	0.15	0.15	0.18	0.21	0.47	0.62	0.04	0.30	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	254	247	545	502	273	367	373	2394	977	65	1049	786
v/s Ratio Prot	0.09	c0.09	0.01	c0.07	0.07	0.00	c0.16	c0.45	0.05	0.02	0.12	0.04
v/s Ratio Perm			0.00			0.03			0.15			0.08
v/c Ratio	0.60	0.62	0.03	0.50	0.47	0.14	0.76	0.95	0.32	0.51	0.40	0.24
Uniform Delay, d1	32.5	32.6	16.9	32.2	32.1	28.1	30.4	20.8	7.5	38.8	23.0	14.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	4.8	0.0	0.8	1.3	0.2	8.6	9.5	0.2	6.1	0.3	0.2
Delay (s)	36.2	37.4	16.9	33.0	33.4	28.2	39.0	30.3	7.7	44.9	23.3	14.2
Level of Service	D	D	B	C	C	C	D	C	A	D	C	B
Approach Delay (s)		34.3			32.2			27.3			20.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

12: San Jacinto Rd & Vandegrift Blvd

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.91		1.00	0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1688		1770	1603		1770	3534		1770	3539	1583
Flt Permitted	0.80	1.00		0.80	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2891	1688		1490	1603		1770	3534		1770	3539	1583
Volume (vph)	48	3	5	14	2	24	103	2303	22	37	741	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	3	5	15	2	26	112	2503	24	40	805	53
RTOR Reduction (vph)	0	5	0	0	25	0	0	0	0	0	0	15
Lane Group Flow (vph)	52	3	0	15	3	0	112	2527	0	40	805	38
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	5.0	5.0		5.0	5.0		10.4	78.5		2.5	70.6	70.6
Effective Green, g (s)	5.0	5.0		5.0	5.0		10.4	78.5		2.5	70.6	70.6
Actuated g/C Ratio	0.05	0.05		0.05	0.05		0.11	0.80		0.03	0.72	0.72
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	148	86		76	82		188	2831		45	2550	1140
v/s Ratio Prot		0.00			0.00		c0.06	c0.71		0.02	0.23	
v/s Ratio Perm	c0.02			0.01								0.02
v/c Ratio	0.35	0.04		0.20	0.04		0.60	0.89		0.89	0.32	0.03
Uniform Delay, d1	44.9	44.2		44.6	44.2		41.8	6.8		47.6	5.0	3.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	0.2		1.3	0.2		5.0	4.0		91.4	0.1	0.0
Delay (s)	46.4	44.4		45.9	44.4		46.8	10.8		139.0	5.0	3.9
Level of Service	D	D		D	D		D	B		F	A	A
Approach Delay (s)		46.1			44.9			12.3			10.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

13: Stuart Mart Rd & Vandegrift Blvd

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1604		1610	3370	1583	3433	3539	1583	3433	3358	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1604		1610	3370	1583	3433	3539	1583	3433	3358	
Volume (vph)	304	28	354	94	138	360	796	1614	23	54	283	146
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	330	30	385	102	150	391	865	1754	25	59	308	159
RTOR Reduction (vph)	0	312	0	0	0	28	0	0	9	0	51	0
Lane Group Flow (vph)	330	103	0	81	171	363	865	1754	16	59	416	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	22.0	22.0		11.5	11.5	20.5	34.0	57.0	68.5	9.0	32.0	
Effective Green, g (s)	22.0	22.0		11.5	11.5	20.5	34.0	57.0	68.5	9.0	32.0	
Actuated g/C Ratio	0.19	0.19		0.10	0.10	0.18	0.29	0.49	0.59	0.08	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	337	306		160	336	336	1011	1747	939	268	930	
v/s Ratio Prot	c0.19	0.06		0.05	0.05	c0.08	0.25	c0.50	0.00	0.02	0.12	
v/s Ratio Perm						0.15			0.01			
v/c Ratio	0.98	0.34		0.51	0.51	1.08	0.86	1.00	0.02	0.22	0.45	
Uniform Delay, d1	46.5	40.4		49.3	49.3	47.5	38.4	29.2	9.7	50.0	34.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	42.9	0.7		2.5	1.2	72.3	7.2	22.5	0.0	0.4	0.3	
Delay (s)	89.4	41.1		51.8	50.5	119.8	45.7	51.7	9.7	50.4	34.8	
Level of Service	F	D		D	D	F	D	D	A	D	C	
Approach Delay (s)		62.5			92.8			49.4			36.5	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM Average Control Delay	56.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

14: College Blvd & N River Rd

Timing Plan: AM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	166	1470	290	413	769	263
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	1598	315	449	836	286
RTOR Reduction (vph)	0	133	0	338	0	0
Lane Group Flow (vph)	180	1465	315	111	836	286
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	19.0	41.0	16.0	16.0	18.0	38.0
Effective Green, g (s)	19.0	41.0	16.0	16.0	18.0	38.0
Actuated g/C Ratio	0.29	0.63	0.25	0.25	0.28	0.58
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	517	1758	871	390	951	2069
v/s Ratio Prot		c0.53	c0.09		0.24	0.08
v/s Ratio Perm	0.10			0.07		
v/c Ratio	0.35	0.83	0.36	0.28	0.88	0.14
Uniform Delay, d1	18.1	9.3	20.3	19.9	22.5	6.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	3.6	1.2	1.8	9.3	0.1
Delay (s)	18.5	12.9	21.4	21.7	31.8	6.2
Level of Service	B	B	C	C	C	A
Approach Delay (s)	13.5		21.6			25.3
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	54	24	1392	33	3	166
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	26	1513	36	3	180
RTOR Reduction (vph)	0	24	0	9	0	0
Lane Group Flow (vph)	59	2	1513	27	3	180
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	6.9	6.9	60.8	60.8	1.2	66.0
Effective Green, g (s)	6.9	6.9	60.8	60.8	1.2	66.0
Actuated g/C Ratio	0.09	0.09	0.75	0.75	0.01	0.82
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	151	135	2660	1190	26	4148
v/s Ratio Prot	c0.03		c0.43		c0.00	0.04
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.39	0.02	0.57	0.02	0.12	0.04
Uniform Delay, d1	35.0	33.9	4.4	2.5	39.3	1.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.0	0.3	0.0	2.0	0.0
Delay (s)	36.7	33.9	4.6	2.5	41.3	1.4
Level of Service	D	C	A	A	D	A
Approach Delay (s)	35.8		4.6			2.1
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1760	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1760	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	71	60	74	307	385	47	289	358	9	43	639	399
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	65	80	334	418	51	314	389	10	47	695	434
RTOR Reduction (vph)	0	0	72	0	0	41	0	0	0	0	0	321
Lane Group Flow (vph)	69	73	8	242	510	10	314	389	10	47	695	113
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	6.7	6.7	6.7	14.3	14.3	14.3	14.6	29.4	69.7	3.3	18.1	18.1
Effective Green, g (s)	6.7	6.7	6.7	14.3	14.3	14.3	14.6	29.4	69.7	3.3	18.1	18.1
Actuated g/C Ratio	0.10	0.10	0.10	0.21	0.21	0.21	0.21	0.42	1.00	0.05	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	162	169	152	330	689	325	371	1493	1583	84	919	411
v/s Ratio Prot	0.04	c0.04		0.15	c0.15		c0.18	0.11		0.03	c0.20	
v/s Ratio Perm			0.00			0.01			0.01			0.07
v/c Ratio	0.43	0.43	0.05	0.73	0.74	0.03	0.85	0.26	0.01	0.56	0.76	0.27
Uniform Delay, d1	29.7	29.7	28.6	25.9	26.0	22.2	26.5	13.1	0.0	32.5	23.8	20.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	1.8	0.1	8.2	4.3	0.0	16.1	0.1	0.0	7.9	3.6	0.4
Delay (s)	31.5	31.5	28.7	34.1	30.2	22.2	42.6	13.2	0.0	40.3	27.4	20.9
Level of Service	C	C	C	C	C	C	D	B	A	D	C	C
Approach Delay (s)		30.5			30.9			26.0			25.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

1: Cristianitos Rd & I-5 SB off-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	114	26	126	58	0	0	0	0	69	3	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	124	28	137	63	0	0	0	0	75	3	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	63			152			541	475	138	475	489	63
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	63			152			541	475	138	475	489	63
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			100	100	100	84	99	94
cM capacity (veh/h)	1540			1429			390	442	910	463	433	1002

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	152	137	63	78	64
Volume Left	0	137	0	75	0
Volume Right	28	0	0	0	64
cSH	1700	1429	1700	462	1002
Volume to Capacity	0.09	0.10	0.04	0.17	0.06
Queue Length 95th (ft)	0	8	0	15	5
Control Delay (s)	0.0	7.8	0.0	14.4	8.8
Lane LOS		A		B	A
Approach Delay (s)	0.0	5.3		11.9	
Approach LOS				B	

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

2: Cristianitos Rd & I-5 NB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	99	82	0	0	148	77	33	0	110	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	89	0	0	161	84	36	0	120	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	245			89			507	549	89	627	507	203
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			89			507	549	89	627	507	203
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			92	100	88	100	100	100
cM capacity (veh/h)	1322			1506			446	407	969	326	430	838

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	108	89	245	36	120
Volume Left	108	0	0	36	0
Volume Right	0	0	84	0	120
cSH	1322	1700	1700	446	969
Volume to Capacity	0.08	0.05	0.14	0.08	0.12
Queue Length 95th (ft)	7	0	0	7	11
Control Delay (s)	8.0	0.0	0.0	13.8	9.2
Lane LOS	A			B	A
Approach Delay (s)	4.4		0.0	10.3	
Approach LOS				B	

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

3: Old Pacific Hwy & I-5 SB off-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	575	338	224	108	0	0	0	0	164	11	128
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	625	367	243	117	0	0	0	0	178	12	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	117			992			1235	1229	625	1229	1597	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			992			1235	1229	625	1229	1597	117
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			65			100	100	100	0	83	85
cM capacity (veh/h)	1471			697			83	116	485	113	69	935

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	625	367	361	190	139
Volume Left	0	0	243	178	0
Volume Right	0	367	0	0	139
cSH	1700	1700	697	108	935
Volume to Capacity	0.37	0.22	0.35	1.76	0.15
Queue Length 95th (ft)	0	0	39	375	13
Control Delay (s)	0.0	0.0	10.3	443.0	9.5
Lane LOS			B	F	A
Approach Delay (s)	0.0		10.3	259.9	
Approach LOS				F	

Intersection Summary			
Average Delay	53.1		
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

4: Basilone Rd & I-5 NB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	557	174	0	0	249	345	77	5	76	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	605	189	0	0	271	375	84	5	83	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	646			189			1671	2046	189	1673	1671	271
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	646			189			1671	2046	189	1673	1671	271
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	36			100			0	73	90	100	100	100
cM capacity (veh/h)	940			1385			37	20	853	27	34	768

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	795	271	375	89	83
Volume Left	605	0	0	84	0
Volume Right	0	0	375	0	83
cSH	940	1700	1700	35	853
Volume to Capacity	0.64	0.16	0.22	2.54	0.10
Queue Length 95th (ft)	122	0	0	252	8
Control Delay (s)	14.5	0.0	0.0	943.7	9.7
Lane LOS	B			F	A
Approach Delay (s)	14.5	0.0		494.4	
Approach LOS				F	

Intersection Summary			
Average Delay	59.8		
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

5: Las Pulgas Rd & I-5 SB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	738	0	0	0	0	0	88	12	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	802	0	0	0	0	0	96	13	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			1611	1604	0	1604	1604	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			1611	1604	0	1604	1604	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			51			100	100	100	0	76	100
cM capacity (veh/h)	1623			1623			43	53	1085	52	53	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	802	109
Volume Left	0	802	96
Volume Right	0	0	0
cSH	1700	1623	52
Volume to Capacity	0.00	0.49	2.09
Queue Length 95th (ft)	0	71	271
Control Delay (s)	0.0	9.4	672.6
Lane LOS		A	F
Approach Delay (s)	0.0	9.4	672.6
Approach LOS			F

Intersection Summary			
Average Delay	88.5		
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

6: Las Pulgas Rd & I-5 NB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	79	0	0	726	455	11	2	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	86	0	0	789	495	12	2	55	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1284			86			1146	1393	86	1147	1146	1036
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1284			86			1146	1393	86	1147	1146	1036
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			93	98	94	100	100	100
cM capacity (veh/h)	540			1510			173	138	973	161	195	281

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	98	1284	14	55
Volume Left	12	0	12	0
Volume Right	0	495	0	55
cSH	540	1700	167	973
Volume to Capacity	0.02	0.76	0.08	0.06
Queue Length 95th (ft)	2	0	7	5
Control Delay (s)	1.7	0.0	28.6	8.9
Lane LOS	A		D	A
Approach Delay (s)	1.7	0.0	12.9	
Approach LOS			B	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

7: Las Pulgas Rd & Stuart Mesa Rd

Timing Plan: PM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	57	74	148	846	296	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	80	161	920	322	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		1303	62
vC1, stage 1 conf vol					62	
vC2, stage 2 conf vol					1241	
vCu, unblocked vol			62		1303	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		0	93
cM capacity (veh/h)			1541		215	1003

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	62	80	161	920	322	68
Volume Left	0	0	161	0	322	0
Volume Right	0	80	0	0	0	68
cSH	1700	1700	1541	1700	215	1003
Volume to Capacity	0.04	0.05	0.10	0.54	1.49	0.07
Queue Length 95th (ft)	0	0	9	0	487	5
Control Delay (s)	0.0	0.0	7.6	0.0	286.6	8.9
Lane LOS			A		F	A
Approach Delay (s)	0.0		1.1		237.9	
Approach LOS					F	

Intersection Summary			
Average Delay	58.3		
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

8: Harbor Dr & Harbor Dr

Timing Plan: PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	400	47	5	232	660	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	435	51	5	252	717	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		870	0	872	870
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		870	0	872	870
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	73		97	77	0	83
cM capacity (veh/h)	1623		212	1085	162	212

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	435	51	5	252	754
Volume Left	435	0	0	0	717
Volume Right	0	51	0	252	0
cSH	1623	1700	212	1085	164
Volume to Capacity	0.27	0.03	0.03	0.23	4.61
Queue Length 95th (ft)	27	0	2	23	Err
Control Delay (s)	8.0	0.0	22.4	9.3	Err
Lane LOS	A		C	A	F
Approach Delay (s)	7.2		9.6		Err
Approach LOS			A		F

Intersection Summary			
Average Delay	5039.8		
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1785	1583		1802	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1785	1583		1802	1583
Volume (vph)	373	149	335	302	248	2197	157	22	122	97	47	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	405	162	364	328	270	2388	171	24	133	105	51	49
RTOR Reduction (vph)	0	0	194	0	0	277	0	0	118	0	0	44
Lane Group Flow (vph)	405	162	170	328	270	2111	0	195	15	0	156	5
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	18.0	69.8	69.8	31.2	83.0	83.0		17.0	17.0		15.3	15.3
Effective Green, g (s)	18.0	69.8	69.8	31.2	83.0	83.0		17.0	17.0		15.3	15.3
Actuated g/C Ratio	0.12	0.47	0.47	0.21	0.56	0.56		0.11	0.11		0.10	0.10
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	213	871	740	370	1967	880		203	180		185	162
v/s Ratio Prot	c0.23	0.09		0.19	0.08			c0.11			c0.09	
v/s Ratio Perm			0.11			c1.33			0.01			0.00
v/c Ratio	1.90	0.19	0.23	0.89	0.14	2.40		0.96	0.08		0.84	0.03
Uniform Delay, d1	65.7	23.2	23.7	57.3	15.9	33.2		65.8	59.2		65.8	60.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	422.7	0.1	0.2	21.6	0.0	632.9		51.7	0.2		27.9	0.1
Delay (s)	488.4	23.3	23.9	78.9	16.0	666.1		117.5	59.4		93.7	60.4
Level of Service	F	C	C	E	B	F		F	E		F	E
Approach Delay (s)		225.8			542.8			93.9			85.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	422.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.97		
Actuated Cycle Length (s)	149.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	176.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	121	3	16	117	883	37	27	2514	212
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	132	3	17	127	960	40	29	2733	230
RTOR Reduction (vph)	0	0	0	0	0	16	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	66	69	1	127	960	40	29	2733	230
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				11.3	11.3	11.3	11.0	120.1	146.9	3.5	112.6	146.9
Effective Green, g (s)				11.3	11.3	11.3	11.0	120.1	146.9	3.5	112.6	146.9
Actuated g/C Ratio				0.08	0.08	0.08	0.07	0.82	1.00	0.02	0.77	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				129	130	122	133	4157	1583	42	2713	1583
v/s Ratio Prot				0.04	c0.04		c0.07	0.19		0.02	c0.77	
v/s Ratio Perm						0.00			0.03			0.15
v/c Ratio				0.51	0.53	0.01	0.95	0.23	0.03	0.69	1.01	0.15
Uniform Delay, d1				65.1	65.2	62.6	67.7	3.0	0.0	71.2	17.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				3.4	4.1	0.0	63.7	0.0	0.0	39.1	19.1	0.2
Delay (s)				68.5	69.4	62.7	131.4	3.0	0.0	110.3	36.2	0.2
Level of Service				E	E	E	F	A	A	F	D	A
Approach Delay (s)		0.0			68.3			17.4			34.2	
Approach LOS		A			E			B			C	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	146.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	248	159	194	591	35	56	97	490	337	89	1991	189
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	173	211	642	38	61	105	533	366	97	2164	205
RTOR Reduction (vph)	0	0	4	0	0	46	0	0	72	0	0	56
Lane Group Flow (vph)	220	223	207	642	38	15	105	533	294	97	2164	149
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	16.0	16.0	23.0	23.0	23.0	35.4	7.0	72.6	95.6	12.4	78.0	94.0
Effective Green, g (s)	16.0	16.0	23.0	23.0	23.0	35.4	7.0	72.6	95.6	12.4	78.0	94.0
Actuated g/C Ratio	0.11	0.11	0.16	0.16	0.16	0.25	0.05	0.52	0.68	0.09	0.56	0.67
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	192	192	247	564	306	446	89	2637	1081	157	1972	1108
v/s Ratio Prot	0.13	c0.13	0.04	c0.19	0.02	0.00	c0.06	0.10	0.04	0.05	c0.61	0.02
v/s Ratio Perm			0.10			0.01			0.14			0.08
v/c Ratio	1.15	1.16	0.84	1.14	0.12	0.03	1.18	0.20	0.27	0.62	1.10	0.13
Uniform Delay, d1	62.0	62.0	56.7	58.5	49.9	39.4	66.5	18.1	8.6	61.5	31.0	8.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	109.7	115.2	21.2	82.1	0.2	0.0	151.7	0.0	0.1	7.1	52.4	0.1
Delay (s)	171.7	177.2	77.9	140.6	50.1	39.5	218.2	18.2	8.8	68.6	83.4	8.4
Level of Service	F	F	E	F	D	D	F	B	A	E	F	A
Approach Delay (s)		143.3			127.7			35.7			76.6	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	84.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88		1.00	0.86		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1639		1770	1600		1770	3479		1770	3539	1583
Flt Permitted	0.60	1.00		0.73	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2173	1639		1362	1600		1770	3479		1770	3539	1583
Volume (vph)	137	7	29	134	6	98	190	535	68	168	2106	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	8	32	146	7	107	207	582	74	183	2289	87
RTOR Reduction (vph)	0	27	0	0	92	0	0	9	0	0	0	28
Lane Group Flow (vph)	149	13	0	146	22	0	207	647	0	183	2289	59
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	14.0	14.0		14.0	14.0		11.0	57.5		14.6	61.1	61.1
Effective Green, g (s)	14.0	14.0		14.0	14.0		11.0	57.5		14.6	61.1	61.1
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.11	0.59		0.15	0.62	0.62
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	310	234		194	228		198	2039		263	2204	986
v/s Ratio Prot		0.01			0.01		c0.12	0.19		0.10	c0.65	
v/s Ratio Perm	0.07			c0.11								0.04
v/c Ratio	0.48	0.05		0.75	0.10		1.05	0.32		0.70	1.04	0.06
Uniform Delay, d1	38.7	36.3		40.4	36.6		43.5	10.3		39.6	18.5	7.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1		15.2	0.2		76.4	0.1		7.8	30.1	0.0
Delay (s)	39.9	36.4		55.5	36.7		120.0	10.4		47.4	48.6	7.3
Level of Service	D	D		E	D		F	B		D	D	A
Approach Delay (s)		39.1			47.3			36.7			47.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	98.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

13: Stuart Mart Rd & Vandegrift Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3462	
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3462	
Volume (vph)	219	133	772	74	44	65	306	371	101	283	1431	243
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	145	839	80	48	71	333	403	110	308	1555	264
RTOR Reduction (vph)	0	135	0	0	0	58	0	0	65	0	9	0
Lane Group Flow (vph)	238	849	0	41	87	13	333	403	45	308	1810	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	51.0	51.0		9.4	9.4	26.8	11.0	49.6	59.0	17.4	56.0	
Effective Green, g (s)	51.0	51.0		9.4	9.4	26.8	11.0	49.6	59.0	17.4	56.0	
Actuated g/C Ratio	0.36	0.36		0.07	0.07	0.19	0.08	0.35	0.41	0.12	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	629	578		106	217	340	263	1224	651	417	1352	
v/s Ratio Prot	0.13	c0.52		0.03	c0.03	0.00	c0.10	0.11	0.00	0.09	c0.52	
v/s Ratio Perm						0.00			0.02			
v/c Ratio	0.38	1.47		0.39	0.40	0.04	1.27	0.33	0.07	0.74	1.34	
Uniform Delay, d1	34.4	46.2		64.2	64.3	47.8	66.2	34.6	25.6	60.8	43.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	220.1		2.3	1.2	0.0	146.4	0.2	0.0	6.7	157.5	
Delay (s)	34.8	266.3		66.6	65.5	47.8	212.6	34.8	25.6	67.5	201.2	
Level of Service	C	F		E	E	D	F	C	C	E	F	
Approach Delay (s)		221.2			59.4			103.6			181.8	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	172.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	143.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	120.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

14: College Blvd & N River Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	433	838	286	328	1069	367
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	911	311	357	1162	399
RTOR Reduction (vph)	0	62	0	288	0	0
Lane Group Flow (vph)	471	849	311	69	1162	399
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	26.7	63.5	17.2	17.2	32.8	54.0
Effective Green, g (s)	26.7	63.5	17.2	17.2	32.8	54.0
Actuated g/C Ratio	0.30	0.72	0.19	0.19	0.37	0.61
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	533	1995	686	307	1269	2155
v/s Ratio Prot		0.30	c0.09		c0.34	0.11
v/s Ratio Perm	c0.27			0.04		
v/c Ratio	0.88	0.43	0.45	0.23	0.92	0.19
Uniform Delay, d1	29.5	5.1	31.6	30.1	26.6	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.9	0.1	2.2	1.7	10.4	0.2
Delay (s)	45.4	5.3	33.8	31.8	37.0	7.8
Level of Service	D	A	C	C	D	A
Approach Delay (s)	19.0		32.7			29.5
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	41	5	348	45	5	1351
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	5	378	49	5	1468
RTOR Reduction (vph)	0	5	0	11	0	0
Lane Group Flow (vph)	45	0	378	38	5	1468
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	5.4	5.4	64.3	64.3	2.3	70.6
Effective Green, g (s)	5.4	5.4	64.3	64.3	2.3	70.6
Actuated g/C Ratio	0.06	0.06	0.77	0.77	0.03	0.84
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	114	102	2709	1212	48	4274
v/s Ratio Prot	c0.03		0.11		0.00	c0.29
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.39	0.00	0.14	0.03	0.10	0.34
Uniform Delay, d1	37.7	36.8	2.6	2.4	39.8	1.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.0	0.0	0.0	1.0	0.0
Delay (s)	40.0	36.8	2.6	2.4	40.8	1.6
Level of Service	D	D	A	A	D	A
Approach Delay (s)	39.7		2.6			1.7
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	2.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	601	153	173	333	105	53	125	490	12	48	545	91
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	653	166	188	362	114	58	136	533	13	52	592	99
RTOR Reduction (vph)	0	0	134	0	0	48	0	0	0	0	0	77
Lane Group Flow (vph)	399	420	54	181	295	10	136	533	13	52	592	22
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	20.2	20.2	20.2	12.6	12.6	12.6	5.7	18.5	70.5	3.2	16.0	16.0
Effective Green, g (s)	20.2	20.2	20.2	12.6	12.6	12.6	5.7	18.5	70.5	3.2	16.0	16.0
Actuated g/C Ratio	0.29	0.29	0.29	0.18	0.18	0.18	0.08	0.26	1.00	0.05	0.23	0.23
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	482	492	454	288	588	283	143	929	1583	80	803	359
v/s Ratio Prot	0.24	c0.24		c0.11	0.09		c0.08	0.15		0.03	c0.17	
v/s Ratio Perm			0.03			0.01			c0.01			0.01
v/c Ratio	0.83	0.85	0.12	0.63	0.50	0.04	0.95	0.57	0.01	0.65	0.74	0.06
Uniform Delay, d1	23.5	23.8	18.6	26.8	26.1	23.9	32.3	22.6	0.0	33.1	25.3	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	13.5	0.1	4.2	0.7	0.1	60.2	0.9	0.0	17.3	3.6	0.1
Delay (s)	34.7	37.2	18.7	31.0	26.8	24.0	92.5	23.4	0.0	50.4	28.9	21.4
Level of Service	C	D	B	C	C	C	F	C	A	D	C	C
Approach Delay (s)		32.8			27.9			36.8			29.4	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: Cristianitos Rd & I-5 SB off-ramp

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	147	23	83	24	0	0	0	0	84	4	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	160	25	90	26	0	0	0	0	91	4	35
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	26			185			416	379	172	379	391	26
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			185			416	379	172	379	391	26
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	83	99	97
cM capacity (veh/h)	1588			1390			500	517	871	550	509	1050

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	185	90	26	96	35
Volume Left	0	90	0	91	0
Volume Right	25	0	0	0	35
cSH	1700	1390	1700	548	1050
Volume to Capacity	0.11	0.06	0.02	0.17	0.03
Queue Length 95th (ft)	0	5	0	16	3
Control Delay (s)	0.0	7.8	0.0	13.0	8.5
Lane LOS		A		B	A
Approach Delay (s)	0.0	6.0		11.8	
Approach LOS				B	

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			

2: Cristianitos Rd & I-5 NB on-ramp

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	92	123	0	0	89	60	21	3	238	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	134	0	0	97	65	23	3	259	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	162			134			463	496	134	723	463	129
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			134			463	496	134	723	463	129
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	99	72	100	100	100
cM capacity (veh/h)	1417			1451			482	442	915	230	461	920

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	100	134	162	23	262
Volume Left	100	0	0	23	0
Volume Right	0	0	65	0	259
cSH	1417	1700	1700	482	903
Volume to Capacity	0.07	0.08	0.10	0.05	0.29
Queue Length 95th (ft)	6	0	0	4	30
Control Delay (s)	7.7	0.0	0.0	12.8	10.6
Lane LOS	A			B	B
Approach Delay (s)	3.3		0.0	10.8	
Approach LOS				B	

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	57	52	65	470	0	0	0	0	230	15	403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	62	57	71	511	0	0	0	0	250	16	438
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	511			118			722	714	62	714	771	511
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511			118			722	714	62	714	771	511
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	25	95	22
cM capacity (veh/h)	1054			1470			70	339	1003	334	315	563

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	62	57	582	266	438
Volume Left	0	0	71	250	0
Volume Right	0	57	0	0	438
cSH	1700	1700	1470	332	563
Volume to Capacity	0.04	0.03	0.05	0.80	0.78
Queue Length 95th (ft)	0	0	4	167	180
Control Delay (s)	0.0	0.0	1.4	48.0	30.3
Lane LOS			A	E	D
Approach Delay (s)	0.0		1.4	37.0	
Approach LOS				E	

Intersection Summary			
Average Delay	19.1		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	65	221	0	0	77	95	458	2	468	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	240	0	0	84	103	498	2	509	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	187			240			465	568	240	466	465	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	187			240			465	568	240	466	465	84
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			0	99	36	100	100	100
cM capacity (veh/h)	1387			1326			488	410	799	176	469	976

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	311	84	103	500	509
Volume Left	71	0	0	498	0
Volume Right	0	0	103	0	509
cSH	1387	1700	1700	487	799
Volume to Capacity	0.05	0.05	0.06	1.03	0.64
Queue Length 95th (ft)	4	0	0	363	117
Control Delay (s)	2.1	0.0	0.0	76.9	17.1
Lane LOS	A			F	C
Approach Delay (s)	2.1	0.0		46.7	
Approach LOS				E	

Intersection Summary			
Average Delay	31.7		
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

5: Las Pulgas Rd & I-5 SB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	9	0	0	0	0	0	405	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	10	0	0	0	0	0	440	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			25	20	0	20	20	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			25	20	0	20	20	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	56	99	100
cM capacity (veh/h)	1623			1623			972	869	1085	989	869	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	10	451
Volume Left	0	10	440
Volume Right	0	0	0
cSH	1700	1623	986
Volume to Capacity	0.00	0.01	0.46
Queue Length 95th (ft)	0	0	61
Control Delay (s)	0.0	7.2	11.7
Lane LOS		A	B
Approach Delay (s)	0.0	7.2	11.7
Approach LOS			B

Intersection Summary			
Average Delay	11.6		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

6: Las Pulgas Rd & I-5 NB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	400	0	0	2	23	7	1	512	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	435	0	0	2	25	8	1	557	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	27			435			462	475	435	463	462	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			435			462	475	435	463	462	15
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	10	100	100	100
cM capacity (veh/h)	1587			1125			508	486	621	53	494	1065

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	441	27	9	557
Volume Left	7	0	8	0
Volume Right	0	25	0	557
cSH	1587	1700	505	621
Volume to Capacity	0.00	0.02	0.02	0.90
Queue Length 95th (ft)	0	0	1	274
Control Delay (s)	0.1	0.0	12.3	41.1
Lane LOS	A		B	E
Approach Delay (s)	0.1	0.0	40.6	
Approach LOS			E	

Intersection Summary			
Average Delay	22.3		
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

7: Las Pulgas Rd & Stuart Mesa Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	613	305	80	0	22	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	666	332	87	0	24	218
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			666		840	666
vC1, stage 1 conf vol					666	
vC2, stage 2 conf vol					174	
vCu, unblocked vol			666		840	666
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		94	52
cM capacity (veh/h)			923		409	459

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	666	332	87	0	24	218
Volume Left	0	0	87	0	24	0
Volume Right	0	332	0	0	0	218
cSH	1700	1700	923	1700	409	459
Volume to Capacity	0.39	0.20	0.09	0.00	0.06	0.48
Queue Length 95th (ft)	0	0	8	0	5	63
Control Delay (s)	0.0	0.0	9.3	0.0	14.4	19.8
Lane LOS			A		B	C
Approach Delay (s)	0.0		9.3		19.2	
Approach LOS					C	

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

8: Harbor Dr & Harbor Dr

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	123	754	43	78	34	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	134	820	47	85	37	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		267	0	291	267
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		267	0	291	267
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	92		92	92	93	100
cM capacity (veh/h)	1623		586	1085	537	586

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	134	820	47	85	39
Volume Left	134	0	0	0	37
Volume Right	0	820	0	85	0
cSH	1623	1700	586	1085	539
Volume to Capacity	0.08	0.48	0.08	0.08	0.07
Queue Length 95th (ft)	7	0	6	6	6
Control Delay (s)	7.4	0.0	11.7	8.6	12.2
Lane LOS	A		B	A	B
Approach Delay (s)	1.0		9.7		12.2
Approach LOS			A		B

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1778	1583		1782	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1778	1583		1782	1583
Volume (vph)	60	74	28	101	484	733	246	12	152	143	16	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	80	30	110	526	797	267	13	165	155	17	109
RTOR Reduction (vph)	0	0	24	0	0	585	0	0	127	0	0	88
Lane Group Flow (vph)	65	80	6	110	526	212	0	280	38	0	172	21
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.0	10.8	10.8	6.3	15.1	15.1		12.9	12.9		10.7	10.7
Effective Green, g (s)	2.0	10.8	10.8	6.3	15.1	15.1		12.9	12.9		10.7	10.7
Actuated g/C Ratio	0.04	0.19	0.19	0.11	0.27	0.27		0.23	0.23		0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	62	355	302	197	942	422		405	360		336	299
v/s Ratio Prot	c0.04	0.04		c0.06	c0.15			c0.16			c0.10	
v/s Ratio Perm			0.00			0.13			0.02			0.01
v/c Ratio	1.05	0.23	0.02	0.56	0.56	0.50		0.69	0.10		0.51	0.07
Uniform Delay, d1	27.4	19.4	18.6	23.9	17.9	17.6		20.1	17.3		20.7	18.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	128.4	0.3	0.0	3.4	0.7	0.9		5.0	0.1		1.3	0.1
Delay (s)	155.8	19.7	18.7	27.3	18.6	18.6		25.1	17.5		22.0	19.0
Level of Service	F	B	B	C	B	B		C	B		C	B
Approach Delay (s)		70.1			19.3			22.3			20.8	
Approach LOS		E			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	141	9	38	44	2366	4	8	575	89
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	153	10	41	48	2572	4	9	625	97
RTOR Reduction (vph)	0	0	0	0	0	36	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	79	84	5	48	2572	4	9	625	97
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				8.7	8.7	8.7	2.9	53.4	75.0	0.9	51.4	75.0
Effective Green, g (s)				8.7	8.7	8.7	2.9	53.4	75.0	0.9	51.4	75.0
Actuated g/C Ratio				0.12	0.12	0.12	0.04	0.71	1.00	0.01	0.69	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				195	197	184	68	3621	1583	21	2425	1583
v/s Ratio Prot				0.05	c0.05		c0.03	c0.51		0.01	0.18	
v/s Ratio Perm						0.00			0.00			c0.06
v/c Ratio				0.41	0.43	0.03	0.71	0.71	0.00	0.43	0.26	0.06
Uniform Delay, d1				30.7	30.8	29.4	35.6	6.3	0.0	36.8	4.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				1.4	1.5	0.1	28.3	0.7	0.0	13.4	0.1	0.1
Delay (s)				32.1	32.3	29.4	63.9	7.0	0.0	50.2	4.6	0.1
Level of Service				C	C	C	E	A	A	D	A	A
Approach Delay (s)		0.0			31.7			8.0			4.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS

11: Wire Mountain Rd & Vandegrift Blvd

Year 2014 Baseline

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	249	32	41	219	119	81	260	1948	230	30	454	342
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	35	45	238	129	88	283	2117	250	33	493	372
RTOR Reduction (vph)	0	0	29	0	0	39	0	0	98	0	0	185
Lane Group Flow (vph)	152	154	16	238	129	49	283	2117	152	33	493	187
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.3	12.3	29.2	11.2	11.2	14.2	16.9	37.3	48.5	3.0	23.4	35.7
Effective Green, g (s)	12.3	12.3	29.2	11.2	11.2	14.2	16.9	37.3	48.5	3.0	23.4	35.7
Actuated g/C Ratio	0.15	0.15	0.37	0.14	0.14	0.18	0.21	0.47	0.61	0.04	0.29	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	259	252	550	482	261	361	375	2377	962	67	1038	788
v/s Ratio Prot	0.09	c0.09	0.01	c0.07	0.07	0.01	c0.16	c0.42	0.02	0.02	0.14	0.04
v/s Ratio Perm			0.00			0.03			0.07			0.08
v/c Ratio	0.59	0.61	0.03	0.49	0.49	0.13	0.75	0.89	0.16	0.49	0.47	0.24
Uniform Delay, d1	31.4	31.5	16.2	31.7	31.7	27.6	29.5	19.4	6.8	37.7	23.2	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	4.3	0.0	0.8	1.5	0.2	8.4	4.6	0.1	5.6	0.3	0.2
Delay (s)	34.8	35.9	16.2	32.5	33.2	27.8	37.9	24.0	6.9	43.3	23.5	13.8
Level of Service	C	D	B	C	C	C	D	C	A	D	C	B
Approach Delay (s)		32.9			31.8			23.9			20.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS

12: San Jacinto Rd & Vandegrift Blvd

Year 2014 Baseline

Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.91		1.00	0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1688		1770	1603		1770	3534		1770	3539	1583
Flt Permitted	0.82	1.00		0.82	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2950	1688		1521	1603		1770	3534		1770	3539	1583
Volume (vph)	48	3	5	14	2	24	103	2105	22	37	865	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	3	5	15	2	26	112	2288	24	40	940	53
RTOR Reduction (vph)	0	5	0	0	25	0	0	0	0	0	0	16
Lane Group Flow (vph)	52	3	0	15	3	0	112	2312	0	40	940	37
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	4.9	4.9		4.9	4.9		9.3	69.5		2.5	62.7	62.7
Effective Green, g (s)	4.9	4.9		4.9	4.9		9.3	69.5		2.5	62.7	62.7
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.10	0.78		0.03	0.71	0.71
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	163	93		84	88		185	2763		50	2496	1116
v/s Ratio Prot		0.00			0.00		c0.06	c0.65		0.02	0.27	
v/s Ratio Perm	c0.02			0.01								0.02
v/c Ratio	0.32	0.04		0.18	0.04		0.61	0.84		0.80	0.38	0.03
Uniform Delay, d1	40.4	39.8		40.1	39.8		38.0	6.1		43.0	5.3	4.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2		1.0	0.2		5.5	2.4		59.1	0.1	0.0
Delay (s)	41.5	39.9		41.1	40.0		43.5	8.5		102.1	5.4	4.0
Level of Service	D	D		D	D		D	A		F	A	A
Approach Delay (s)		41.3			40.4			10.1			9.0	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1603		1610	3370	1583	3433	3539	1583	3433	3395	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1603		1610	3370	1583	3433	3539	1583	3433	3395	
Volume (vph)	304	28	370	94	138	356	794	1419	23	52	391	146
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	330	30	402	102	150	387	863	1542	25	57	425	159
RTOR Reduction (vph)	0	325	0	0	0	30	0	0	11	0	37	0
Lane Group Flow (vph)	330	107	0	81	171	357	863	1542	14	57	547	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	18.0	18.0		10.4	10.4	16.4	27.1	44.1	54.5	6.0	23.0	
Effective Green, g (s)	18.0	18.0		10.4	10.4	16.4	27.1	44.1	54.5	6.0	23.0	
Actuated g/C Ratio	0.19	0.19		0.11	0.11	0.17	0.29	0.47	0.58	0.06	0.24	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	337	305		177	371	342	984	1652	913	218	826	
v/s Ratio Prot	c0.19	0.07		0.05	0.05	c0.07	0.25	c0.44	0.00	0.02	0.16	
v/s Ratio Perm						0.16			0.01			
v/c Ratio	0.98	0.35		0.46	0.46	1.04	0.88	0.93	0.02	0.26	0.66	
Uniform Delay, d1	38.1	33.2		39.4	39.4	39.0	32.1	23.8	8.5	42.1	32.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	42.9	0.7		1.9	0.9	60.8	8.9	10.1	0.0	0.6	2.0	
Delay (s)	81.0	33.9		41.3	40.3	99.8	41.0	33.9	8.6	42.8	34.3	
Level of Service	F	C		D	D	F	D	C	A	D	C	
Approach Delay (s)		54.3			76.5			36.2			35.0	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	94.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	166	1450	253	413	777	271
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	1576	275	449	845	295
RTOR Reduction (vph)	0	188	0	332	0	0
Lane Group Flow (vph)	180	1388	275	117	845	295
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	18.0	40.0	17.0	17.0	18.0	39.0
Effective Green, g (s)	18.0	40.0	17.0	17.0	18.0	39.0
Actuated g/C Ratio	0.28	0.62	0.26	0.26	0.28	0.60
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	490	1715	926	414	951	2123
v/s Ratio Prot		c0.50	c0.08		0.25	0.08
v/s Ratio Perm	0.10			0.07		
v/c Ratio	0.37	0.81	0.30	0.28	0.89	0.14
Uniform Delay, d1	18.9	9.6	19.2	19.1	22.5	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.9	0.8	1.7	10.1	0.1
Delay (s)	19.4	12.5	20.0	20.9	32.7	5.8
Level of Service	B	B	C	C	C	A
Approach Delay (s)	13.2		20.5			25.7
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	54	26	1336	33	5	181
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	28	1452	36	5	197
RTOR Reduction (vph)	0	26	0	9	0	0
Lane Group Flow (vph)	59	2	1452	27	5	197
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	6.9	6.9	60.0	60.0	1.2	65.2
Effective Green, g (s)	6.9	6.9	60.0	60.0	1.2	65.2
Actuated g/C Ratio	0.09	0.09	0.75	0.75	0.01	0.81
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	136	2651	1186	27	4139
v/s Ratio Prot	c0.03		c0.41		c0.00	0.04
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.39	0.02	0.55	0.02	0.19	0.05
Uniform Delay, d1	34.6	33.5	4.3	2.6	39.0	1.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	0.2	0.0	3.3	0.0
Delay (s)	36.2	33.6	4.5	2.6	42.3	1.4
Level of Service	D	C	A	A	D	A
Approach Delay (s)	35.4		4.5			2.5
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1756	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1756	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	79	60	82	307	385	47	294	352	9	43	639	395
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	65	89	334	418	51	320	383	10	47	695	429
RTOR Reduction (vph)	0	0	80	0	0	41	0	0	0	0	0	319
Lane Group Flow (vph)	74	77	9	242	510	10	320	383	10	47	695	110
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	6.9	6.9	6.9	14.3	14.3	14.3	15.0	29.8	70.3	3.3	18.1	18.1
Effective Green, g (s)	6.9	6.9	6.9	14.3	14.3	14.3	15.0	29.8	70.3	3.3	18.1	18.1
Actuated g/C Ratio	0.10	0.10	0.10	0.20	0.20	0.20	0.21	0.42	1.00	0.05	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	165	172	155	327	683	322	378	1500	1583	83	911	408
v/s Ratio Prot	c0.04	0.04		0.15	c0.15		c0.18	0.11		0.03	c0.20	
v/s Ratio Perm			0.01			0.01			0.01			0.07
v/c Ratio	0.45	0.45	0.06	0.74	0.75	0.03	0.85	0.26	0.01	0.57	0.76	0.27
Uniform Delay, d1	29.9	29.9	28.7	26.3	26.3	22.5	26.5	13.1	0.0	32.8	24.1	20.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	1.9	0.2	8.7	4.5	0.0	15.9	0.1	0.0	8.6	3.8	0.4
Delay (s)	31.8	31.8	28.9	35.0	30.8	22.5	42.4	13.2	0.0	41.4	27.9	21.2
Level of Service	C	C	C	C	C	C	D	B	A	D	C	C
Approach Delay (s)		30.7			31.5			26.1			26.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: Cristianitos Rd & I-5 SB off-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	114	26	126	58	0	0	0	0	69	3	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	124	28	137	63	0	0	0	0	75	3	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	63			152			541	475	138	475	489	63
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	63			152			541	475	138	475	489	63
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			100	100	100	84	99	94
cM capacity (veh/h)	1540			1429			390	442	910	463	433	1002

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	152	137	63	78	64
Volume Left	0	137	0	75	0
Volume Right	28	0	0	0	64
cSH	1700	1429	1700	462	1002
Volume to Capacity	0.09	0.10	0.04	0.17	0.06
Queue Length 95th (ft)	0	8	0	15	5
Control Delay (s)	0.0	7.8	0.0	14.4	8.8
Lane LOS		A		B	A
Approach Delay (s)	0.0	5.3		11.9	
Approach LOS				B	

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	34.8%		ICU Level of Service	A
Analysis Period (min)	15			

2: Cristianitos Rd & I-5 NB on-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	99	82	0	0	148	77	33	0	110	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	89	0	0	161	84	36	0	120	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	245			89			507	549	89	627	507	203
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			89			507	549	89	627	507	203
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			92	100	88	100	100	100
cM capacity (veh/h)	1322			1506			446	407	969	326	430	838

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	108	89	245	36	120
Volume Left	108	0	0	36	0
Volume Right	0	0	84	0	120
cSH	1322	1700	1700	446	969
Volume to Capacity	0.08	0.05	0.14	0.08	0.12
Queue Length 95th (ft)	7	0	0	7	11
Control Delay (s)	8.0	0.0	0.0	13.8	9.2
Lane LOS	A			B	A
Approach Delay (s)	4.4		0.0	10.3	
Approach LOS				B	

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	34.8%		ICU Level of Service	A
Analysis Period (min)	15			

3: Old Pacific Hwy & I-5 SB off-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	575	338	129	108	0	0	0	0	163	11	128
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	625	367	140	117	0	0	0	0	177	12	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	117			992			1029	1023	625	1023	1390	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			992			1029	1023	625	1023	1390	117
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			80			100	100	100	2	89	85
cM capacity (veh/h)	1471			697			141	188	485	181	114	935

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	625	367	258	189	139
Volume Left	0	0	140	177	0
Volume Right	0	367	0	0	139
cSH	1700	1700	697	174	935
Volume to Capacity	0.37	0.22	0.20	1.08	0.15
Queue Length 95th (ft)	0	0	19	235	13
Control Delay (s)	0.0	0.0	7.4	146.8	9.5
Lane LOS			A	F	A
Approach Delay (s)	0.0		7.4	88.6	
Approach LOS				F	

Intersection Summary			
Average Delay	19.6		
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

4: Basilone Rd & I-5 NB on-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	557	173	0	0	154	249	77	5	76	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	605	188	0	0	167	271	84	5	83	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	438			188			1566	1837	188	1569	1566	167
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	438			188			1566	1837	188	1569	1566	167
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	46			100			0	84	90	100	100	100
cM capacity (veh/h)	1122			1386			52	35	854	42	51	877

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	793	167	271	89	83
Volume Left	605	0	0	84	0
Volume Right	0	0	271	0	83
cSH	1122	1700	1700	50	854
Volume to Capacity	0.54	0.10	0.16	1.77	0.10
Queue Length 95th (ft)	84	0	0	218	8
Control Delay (s)	10.8	0.0	0.0	546.6	9.7
Lane LOS	B			F	A
Approach Delay (s)	10.8	0.0		288.3	
Approach LOS				F	

Intersection Summary			
Average Delay	41.4		
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

5: Las Pulgas Rd & I-5 SB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	633	0	0	0	0	0	88	12	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	688	0	0	0	0	0	96	13	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			1383	1376	0	1376	1376	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			1383	1376	0	1376	1376	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			58			100	100	100	0	84	100
cM capacity (veh/h)	1623			1623			72	84	1085	82	84	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	688	109
Volume Left	0	688	96
Volume Right	0	0	0
cSH	1700	1623	82
Volume to Capacity	0.00	0.42	1.32
Queue Length 95th (ft)	0	54	207
Control Delay (s)	0.0	8.8	299.3
Lane LOS		A	F
Approach Delay (s)	0.0	8.8	299.3
Approach LOS			F

Intersection Summary			
Average Delay	48.5		
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

6: Las Pulgas Rd & I-5 NB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	79	0	0	621	350	11	2	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	86	0	0	675	380	12	2	55	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1055			86			975	1165	86	976	975	865
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1055			86			975	1165	86	976	975	865
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			95	99	94	100	100	100
cM capacity (veh/h)	660			1510			228	191	973	212	247	353

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	98	1055	14	55
Volume Left	12	0	12	0
Volume Right	0	380	0	55
cSH	660	1700	221	973
Volume to Capacity	0.02	0.62	0.06	0.06
Queue Length 95th (ft)	1	0	5	5
Control Delay (s)	1.5	0.0	22.4	8.9
Lane LOS	A		C	A
Approach Delay (s)	1.5	0.0	11.7	
Approach LOS			B	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	57	74	159	670	264	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	80	173	728	287	80
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		1136	62
vC1, stage 1 conf vol					62	
vC2, stage 2 conf vol					1074	
vCu, unblocked vol			62		1136	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			89		0	92
cM capacity (veh/h)			1541		257	1003

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	62	80	173	728	287	80
Volume Left	0	0	173	0	287	0
Volume Right	0	80	0	0	0	80
cSH	1700	1700	1541	1700	257	1003
Volume to Capacity	0.04	0.05	0.11	0.43	1.12	0.08
Queue Length 95th (ft)	0	0	9	0	311	7
Control Delay (s)	0.0	0.0	7.6	0.0	133.7	8.9
Lane LOS			A		F	A
Approach Delay (s)	0.0		1.5		106.4	
Approach LOS					F	

Intersection Summary			
Average Delay	28.6		
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	402	47	5	234	632	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	437	51	5	254	687	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		874	0	877	874
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		874	0	877	874
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	73		97	77	0	82
cM capacity (veh/h)	1623		211	1085	160	211

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	437	51	5	254	724
Volume Left	437	0	0	0	687
Volume Right	0	51	0	254	0
cSH	1623	1700	211	1085	162
Volume to Capacity	0.27	0.03	0.03	0.23	4.47
Queue Length 95th (ft)	27	0	2	23	Err
Control Delay (s)	8.0	0.0	22.5	9.3	Err
Lane LOS	A		C	A	F
Approach Delay (s)	7.2		9.6		Err
Approach LOS			A		F

Intersection Summary			
Average Delay	4922.3		
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

BWI EIS
Year 2014 Baseline

9: Harbor Dr & I-5 SB on-ramp

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1785	1583		1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1785	1583		1799	1583
Volume (vph)	349	147	335	302	250	1812	157	22	122	112	47	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	379	160	364	328	272	1970	171	24	133	122	51	49
RTOR Reduction (vph)	0	0	194	0	0	279	0	0	118	0	0	44
Lane Group Flow (vph)	379	160	170	328	272	1691	0	195	15	0	173	5
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	18.0	70.1	70.1	30.9	83.0	83.0		17.0	17.0		15.9	15.9
Effective Green, g (s)	18.0	70.1	70.1	30.9	83.0	83.0		17.0	17.0		15.9	15.9
Actuated g/C Ratio	0.12	0.47	0.47	0.21	0.55	0.55		0.11	0.11		0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	213	871	740	365	1960	877		202	180		191	168
v/s Ratio Prot	c0.21	0.09		0.19	0.08			c0.11			c0.10	
v/s Ratio Perm			0.11			c1.07			0.01			0.00
v/c Ratio	1.78	0.18	0.23	0.90	0.14	1.93		0.97	0.08		0.91	0.03
Uniform Delay, d1	66.0	23.2	23.8	58.0	16.2	33.5		66.2	59.5		66.3	60.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	369.0	0.1	0.2	23.7	0.0	421.9		52.9	0.2		39.4	0.1
Delay (s)	435.0	23.3	24.0	81.7	16.2	455.4		119.1	59.7		105.7	60.2
Level of Service	F	C	C	F	B	F		F	E		F	E
Approach Delay (s)		196.4			361.2			95.0			95.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	287.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	149.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	151.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS
Year 2014 Baseline

10: I-5 NB on-ramp & Vandegrift Blvd

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	121	3	16	113	982	37	27	2119	172
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	132	3	17	123	1067	40	29	2303	187
RTOR Reduction (vph)	0	0	0	0	0	16	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	66	69	1	123	1067	40	29	2303	187
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				8.5	8.5	8.5	7.1	77.7	101.3	3.1	73.7	101.3
Effective Green, g (s)				8.5	8.5	8.5	7.1	77.7	101.3	3.1	73.7	101.3
Actuated g/C Ratio				0.08	0.08	0.08	0.07	0.77	1.00	0.03	0.73	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				141	142	133	124	3900	1583	54	2575	1583
v/s Ratio Prot				0.04	c0.04		c0.07	0.21		0.02	c0.65	
v/s Ratio Perm						0.00			0.03			c0.12
v/c Ratio				0.47	0.49	0.01	0.99	0.27	0.03	0.54	0.89	0.12
Uniform Delay, d1				44.2	44.3	42.5	47.1	3.5	0.0	48.4	10.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				2.4	2.6	0.0	78.1	0.0	0.0	9.9	4.5	0.2
Delay (s)				46.7	46.9	42.6	125.1	3.5	0.0	58.3	15.2	0.2
Level of Service				D	D	D	F	A	A	E	B	A
Approach Delay (s)		0.0			46.3			15.6			14.6	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	101.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

11: Wire Mountain Rd & Vandegrift Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	248	159	194	339	35	56	97	567	360	89	1810	189
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	173	211	368	38	61	105	616	391	97	1967	205
RTOR Reduction (vph)	0	0	9	0	0	48	0	0	85	0	0	63
Lane Group Flow (vph)	220	223	202	368	38	13	105	616	306	97	1967	142
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	17.0	17.0	25.0	15.8	15.8	27.5	8.0	69.3	85.1	11.7	73.0	90.0
Effective Green, g (s)	17.0	17.0	25.0	15.8	15.8	27.5	8.0	69.3	85.1	11.7	73.0	90.0
Actuated g/C Ratio	0.13	0.13	0.19	0.12	0.12	0.21	0.06	0.53	0.66	0.09	0.56	0.69
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	220	220	290	418	227	384	109	2715	1038	160	1990	1146
v/s Ratio Prot	0.13	c0.13	0.04	c0.11	0.02	0.00	c0.06	0.12	0.04	0.05	c0.56	0.02
v/s Ratio Perm			0.09			0.01			0.16			0.07
v/c Ratio	1.00	1.01	0.70	0.88	0.17	0.03	0.96	0.23	0.29	0.61	0.99	0.12
Uniform Delay, d1	56.4	56.4	48.9	56.1	51.1	40.6	60.8	16.0	9.5	56.8	28.0	6.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	60.7	64.2	7.1	18.9	0.4	0.0	74.0	0.0	0.2	6.4	17.3	0.0
Delay (s)	117.1	120.6	56.0	75.0	51.5	40.6	134.8	16.1	9.7	63.2	45.3	6.7
Level of Service	F	F	E	E	D	D	F	B	A	E	D	A
Approach Delay (s)		98.6			68.6			25.0			42.6	
Approach LOS		F			E			C			D	

Intersection Summary			
HCM Average Control Delay	49.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	129.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

12: San Jacinto Rd & Vandegrift Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88		1.00	0.86		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1639		1770	1600		1770	3486		1770	3539	1583
Flt Permitted	0.63	1.00		0.73	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2281	1639		1362	1600		1770	3486		1770	3539	1583
Volume (vph)	137	7	29	134	6	98	190	616	68	168	1929	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	8	32	146	7	107	207	670	74	183	2097	87
RTOR Reduction (vph)	0	27	0	0	91	0	0	8	0	0	0	33
Lane Group Flow (vph)	149	13	0	146	23	0	207	736	0	183	2097	54
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	13.2	13.2		13.2	13.2		11.0	48.5		13.6	51.1	51.1
Effective Green, g (s)	13.2	13.2		13.2	13.2		11.0	48.5		13.6	51.1	51.1
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.13	0.56		0.16	0.59	0.59
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	345	248		206	242		223	1937		276	2072	927
v/s Ratio Prot		0.01			0.01		c0.12	0.21		0.10	c0.59	
v/s Ratio Perm	0.07			c0.11								0.03
v/c Ratio	0.43	0.05		0.71	0.10		0.93	0.38		0.66	1.01	0.06
Uniform Delay, d1	33.6	31.7		35.2	31.9		37.8	10.9		34.7	18.1	7.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1		10.6	0.2		40.4	0.1		5.9	22.8	0.0
Delay (s)	34.5	31.8		45.8	32.1		78.2	11.1		40.6	40.9	7.8
Level of Service	C	C		D	C		E	B		D	D	A
Approach Delay (s)		33.9			39.8			25.7			39.6	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3453	
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3453	
Volume (vph)	219	133	771	74	44	62	317	441	101	280	1255	243
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	145	838	80	48	67	345	479	110	304	1364	264
RTOR Reduction (vph)	0	135	0	0	0	55	0	0	67	0	11	0
Lane Group Flow (vph)	238	848	0	41	87	12	345	479	43	304	1617	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	54.0	54.0		9.4	9.4	26.7	11.0	46.7	56.1	17.3	53.0	
Effective Green, g (s)	54.0	54.0		9.4	9.4	26.7	11.0	46.7	56.1	17.3	53.0	
Actuated g/C Ratio	0.38	0.38		0.07	0.07	0.19	0.08	0.33	0.39	0.12	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	667	612		106	217	339	263	1153	619	414	1276	
v/s Ratio Prot	0.13	c0.52		0.03	c0.03	0.00	c0.10	0.14	0.00	0.09	c0.47	
v/s Ratio Perm						0.00			0.02			
v/c Ratio	0.36	1.39		0.39	0.40	0.04	1.31	0.42	0.07	0.73	1.27	
Uniform Delay, d1	32.2	44.7		64.2	64.3	47.8	66.2	37.7	27.3	60.8	45.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	183.3		2.3	1.2	0.0	164.8	0.2	0.0	6.6	126.7	
Delay (s)	32.5	228.0		66.6	65.5	47.9	231.0	37.9	27.4	67.5	171.9	
Level of Service	C	F		E	E	D	F	D	C	E	F	
Approach Delay (s)		189.9			59.7			108.0			155.5	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	150.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	143.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	433	847	295	328	1046	326
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	921	321	357	1137	354
RTOR Reduction (vph)	0	58	0	287	0	0
Lane Group Flow (vph)	471	863	321	70	1137	354
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	26.7	63.3	17.5	17.5	32.6	54.1
Effective Green, g (s)	26.7	63.3	17.5	17.5	32.6	54.1
Actuated g/C Ratio	0.30	0.71	0.20	0.20	0.37	0.61
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	532	1987	697	312	1260	2156
v/s Ratio Prot		0.31	c0.09		c0.33	0.10
v/s Ratio Perm	c0.27			0.04		
v/c Ratio	0.89	0.43	0.46	0.23	0.90	0.16
Uniform Delay, d1	29.6	5.3	31.5	30.0	26.6	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.1	0.2	2.2	1.7	9.2	0.2
Delay (s)	45.7	5.5	33.7	31.6	35.8	7.7
Level of Service	D	A	C	C	D	A
Approach Delay (s)	19.1		32.6			29.1
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

15: Papagallo Dr & Vandegrift Blvd

Timing Plan: PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	41	7	366	45	7	1287
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	8	398	49	8	1399
RTOR Reduction (vph)	0	7	0	12	0	0
Lane Group Flow (vph)	45	1	398	37	8	1399
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	5.4	5.4	61.7	61.7	2.4	68.1
Effective Green, g (s)	5.4	5.4	61.7	61.7	2.4	68.1
Actuated g/C Ratio	0.07	0.07	0.76	0.76	0.03	0.84
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	117	105	2679	1198	52	4249
v/s Ratio Prot	c0.03		0.11		0.00	c0.28
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.38	0.01	0.15	0.03	0.15	0.33
Uniform Delay, d1	36.5	35.5	2.7	2.5	38.6	1.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.0	0.0	0.0	1.4	0.0
Delay (s)	38.6	35.6	2.7	2.5	39.9	1.6
Level of Service	D	D	A	A	D	A
Approach Delay (s)	38.1		2.7			1.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	3.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

16: Ammunition Rd & Mission Rd

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	593	153	174	333	105	53	134	490	12	48	539	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	645	166	189	362	114	58	146	533	13	52	586	109
RTOR Reduction (vph)	0	0	137	0	0	48	0	0	0	0	0	84
Lane Group Flow (vph)	395	416	52	181	295	10	146	533	13	52	586	25
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	20.5	20.5	20.5	12.6	12.6	12.6	8.0	21.9	74.3	3.3	17.2	17.2
Effective Green, g (s)	20.5	20.5	20.5	12.6	12.6	12.6	8.0	21.9	74.3	3.3	17.2	17.2
Actuated g/C Ratio	0.28	0.28	0.28	0.17	0.17	0.17	0.11	0.29	1.00	0.04	0.23	0.23
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	464	474	437	273	558	268	191	1043	1583	79	819	366
v/s Ratio Prot	0.23	c0.24		c0.11	0.09		c0.08	0.15		0.03	c0.17	
v/s Ratio Perm			0.03			0.01			0.01			0.02
v/c Ratio	0.85	0.88	0.12	0.66	0.53	0.04	0.76	0.51	0.01	0.66	0.72	0.07
Uniform Delay, d1	25.5	25.7	20.1	28.9	28.1	25.8	32.2	21.8	0.0	34.9	26.3	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.0	16.6	0.1	5.9	0.9	0.1	16.5	0.4	0.0	18.1	3.0	0.1
Delay (s)	39.4	42.3	20.3	34.8	29.0	25.8	48.7	22.2	0.0	53.0	29.3	22.4
Level of Service	D	D	C	C	C	C	D	C	A	D	C	C
Approach Delay (s)		37.0			30.7			27.4			29.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	147	23	83	24	0	0	0	0	84	4	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	160	25	90	26	0	0	0	0	91	4	35
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	26			185			416	379	172	379	391	26
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			185			416	379	172	379	391	26
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	83	99	97
cM capacity (veh/h)	1588			1390			500	517	871	550	509	1050

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	185	90	26	96	35
Volume Left	0	90	0	91	0
Volume Right	25	0	0	0	35
cSH	1700	1390	1700	548	1050
Volume to Capacity	0.11	0.06	0.02	0.17	0.03
Queue Length 95th (ft)	0	5	0	16	3
Control Delay (s)	0.0	7.8	0.0	13.0	8.5
Lane LOS		A		B	A
Approach Delay (s)	0.0	6.0		11.8	
Approach LOS				B	

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	92	123	0	0	89	60	21	3	238	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	134	0	0	97	65	23	3	259	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	162			134			463	496	134	723	463	129
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			134			463	496	134	723	463	129
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	99	72	100	100	100
cM capacity (veh/h)	1417			1451			482	442	915	230	461	920

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	100	134	162	23	262
Volume Left	100	0	0	23	0
Volume Right	0	0	65	0	259
cSH	1417	1700	1700	482	903
Volume to Capacity	0.07	0.08	0.10	0.05	0.29
Queue Length 95th (ft)	6	0	0	4	30
Control Delay (s)	7.7	0.0	0.0	12.8	10.6
Lane LOS	A			B	B
Approach Delay (s)	3.3		0.0	10.8	
Approach LOS				B	

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			

BWI EIS | Year 2014 Alternative 1
3: Old Pacific Hwy & I-5 SB off-ramp | Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	57	52	65	470	0	0	0	0	269	15	403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	62	57	71	511	0	0	0	0	292	16	438
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	511			118			722	714	62	714	771	511
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511			118			722	714	62	714	771	511
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	12	95	22
cM capacity (veh/h)	1054			1470			70	339	1003	334	315	563

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	62	57	582	309	438
Volume Left	0	0	71	292	0
Volume Right	0	57	0	0	438
cSH	1700	1700	1470	332	563
Volume to Capacity	0.04	0.03	0.05	0.93	0.78
Queue Length 95th (ft)	0	0	4	234	180
Control Delay (s)	0.0	0.0	1.4	68.9	30.3
Lane LOS			A	F	D
Approach Delay (s)	0.0		1.4	46.2	
Approach LOS				E	

Intersection Summary			
Average Delay	24.4		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

BWI EIS | Year 2014 Alternative 1
4: Basilone Rd & I-5 NB on-ramp | Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	65	260	0	0	77	95	458	2	507	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	283	0	0	84	103	498	2	551	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	187			283			508	611	283	509	508	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	187			283			508	611	283	509	508	84
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			0	99	27	100	100	100
cM capacity (veh/h)	1387			1280			457	388	756	123	444	976

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	353	84	103	500	551
Volume Left	71	0	0	498	0
Volume Right	0	0	103	0	551
cSH	1387	1700	1700	457	756
Volume to Capacity	0.05	0.05	0.06	1.09	0.73
Queue Length 95th (ft)	4	0	0	416	161
Control Delay (s)	1.9	0.0	0.0	100.0	21.4
Lane LOS	A			F	C
Approach Delay (s)	1.9	0.0		58.8	
Approach LOS				F	

Intersection Summary			
Average Delay	39.3		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	9	0	0	0	0	0	444	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	10	0	0	0	0	0	483	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			25	20	0	20	20	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			25	20	0	20	20	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	51	99	100
cM capacity (veh/h)	1623			1623			972	869	1085	989	869	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	10	493
Volume Left	0	10	483
Volume Right	0	0	0
cSH	1700	1623	986
Volume to Capacity	0.00	0.01	0.50
Queue Length 95th (ft)	0	0	72
Control Delay (s)	0.0	7.2	12.2
Lane LOS		A	B
Approach Delay (s)	0.0	7.2	12.2
Approach LOS			B

Intersection Summary			
Average Delay	12.1		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	439	0	0	2	23	7	1	551	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	477	0	0	2	25	8	1	599	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	27			477			505	517	477	505	505	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			477			505	517	477	505	505	15
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	0	0	100	100
cM capacity (veh/h)	1587			1085			476	460	588	0	468	1065

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	484	27	9	599
Volume Left	7	0	8	0
Volume Right	0	25	0	599
cSH	1587	1700	474	588
Volume to Capacity	0.00	0.02	0.02	1.02
Queue Length 95th (ft)	0	0	1	392
Control Delay (s)	0.1	0.0	12.7	68.4
Lane LOS	A		B	F
Approach Delay (s)	0.1	0.0	67.6	
Approach LOS			F	

Intersection Summary			
Average Delay	36.8		
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

7: Las Pulgas Rd & Stuart Mesa Rd

Timing Plan: AM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	678	317	80	0	22	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	737	345	87	0	24	218
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			737		911	737
vC1, stage 1 conf vol					737	
vC2, stage 2 conf vol					174	
vCu, unblocked vol			737		911	737
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		94	48
cM capacity (veh/h)			869		380	418

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	737	345	87	0	24	218
Volume Left	0	0	87	0	24	0
Volume Right	0	345	0	0	0	218
cSH	1700	1700	869	1700	380	418
Volume to Capacity	0.43	0.20	0.10	0.00	0.06	0.52
Queue Length 95th (ft)	0	0	8	0	5	73
Control Delay (s)	0.0	0.0	9.6	0.0	15.1	22.6
Lane LOS			A		C	C
Approach Delay (s)	0.0		9.6		21.9	
Approach LOS					C	

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

8: Harbor Dr & Harbor Dr

Timing Plan: AM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	123	754	43	78	34	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	134	820	47	85	37	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		267	0	291	267
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		267	0	291	267
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	92		92	92	93	100
cM capacity (veh/h)	1623		586	1085	537	586

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	134	820	47	85	39
Volume Left	134	0	0	0	37
Volume Right	0	820	0	85	0
cSH	1623	1700	586	1085	539
Volume to Capacity	0.08	0.48	0.08	0.08	0.07
Queue Length 95th (ft)	7	0	6	6	6
Control Delay (s)	7.4	0.0	11.7	8.6	12.2
Lane LOS	A		B	A	B
Approach Delay (s)	1.0		9.7		12.2
Approach LOS			A		B

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

9: Harbor Dr & I-5 SB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1778	1583		1782	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1778	1583		1782	1583
Volume (vph)	60	74	28	101	484	733	246	12	152	143	16	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	80	30	110	526	797	267	13	165	155	17	109
RTOR Reduction (vph)	0	0	24	0	0	585	0	0	127	0	0	88
Lane Group Flow (vph)	65	80	6	110	526	212	0	280	38	0	172	21
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.0	10.8	10.8	6.3	15.1	15.1		12.9	12.9		10.7	10.7
Effective Green, g (s)	2.0	10.8	10.8	6.3	15.1	15.1		12.9	12.9		10.7	10.7
Actuated g/C Ratio	0.04	0.19	0.19	0.11	0.27	0.27		0.23	0.23		0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	62	355	302	197	942	422		405	360		336	299
v/s Ratio Prot	c0.04	0.04		c0.06	c0.15			c0.16			c0.10	
v/s Ratio Perm			0.00			0.13			0.02			0.01
v/c Ratio	1.05	0.23	0.02	0.56	0.56	0.50		0.69	0.10		0.51	0.07
Uniform Delay, d1	27.4	19.4	18.6	23.9	17.9	17.6		20.1	17.3		20.7	18.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	128.4	0.3	0.0	3.4	0.7	0.9		5.0	0.1		1.3	0.1
Delay (s)	155.8	19.7	18.7	27.3	18.6	18.6		25.1	17.5		22.0	19.0
Level of Service	F	B	B	C	B	B		C	B		C	B
Approach Delay (s)		70.1			19.3			22.3			20.8	
Approach LOS		E			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

10: I-5 NB on-ramp & Vandegrift Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1695	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	141	9	38	44	2366	4	8	575	89
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	153	10	41	48	2572	4	9	625	97
RTOR Reduction (vph)	0	0	0	0	0	36	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	79	84	5	48	2572	4	9	625	97
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				8.7	8.7	8.7	2.9	53.4	75.0	0.9	51.4	75.0
Effective Green, g (s)				8.7	8.7	8.7	2.9	53.4	75.0	0.9	51.4	75.0
Actuated g/C Ratio				0.12	0.12	0.12	0.04	0.71	1.00	0.01	0.69	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				195	197	184	68	3621	1583	21	2425	1583
v/s Ratio Prot				0.05	c0.05		c0.03	c0.51		0.01	0.18	
v/s Ratio Perm						0.00			0.00			c0.06
v/c Ratio				0.41	0.43	0.03	0.71	0.71	0.00	0.43	0.26	0.06
Uniform Delay, d1				30.7	30.8	29.4	35.6	6.3	0.0	36.8	4.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				1.4	1.5	0.1	28.3	0.7	0.0	13.4	0.1	0.1
Delay (s)				32.1	32.3	29.4	63.9	7.0	0.0	50.2	4.6	0.1
Level of Service				C	C	C	E	A	A	D	A	A
Approach Delay (s)		0.0			31.7			8.0			4.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS | Year 2014 Alternative 1

11: Wire Mountain Rd & Vandegrift Blvd | Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1632	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	249	32	41	219	119	81	260	1948	230	30	454	342
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	35	45	238	129	88	283	2117	250	33	493	372
RTOR Reduction (vph)	0	0	29	0	0	39	0	0	98	0	0	185
Lane Group Flow (vph)	152	154	16	238	129	49	283	2117	152	33	493	187
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.3	12.3	29.2	11.2	11.2	14.2	16.9	37.3	48.5	3.0	23.4	35.7
Effective Green, g (s)	12.3	12.3	29.2	11.2	11.2	14.2	16.9	37.3	48.5	3.0	23.4	35.7
Actuated g/C Ratio	0.15	0.15	0.37	0.14	0.14	0.18	0.21	0.47	0.61	0.04	0.29	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	259	252	550	482	261	361	375	2377	962	67	1038	788
v/s Ratio Prot	0.09	c0.09	0.01	c0.07	0.07	0.01	c0.16	c0.42	0.02	0.02	0.14	0.04
v/s Ratio Perm			0.00			0.03			0.07			0.08
v/c Ratio	0.59	0.61	0.03	0.49	0.49	0.13	0.75	0.89	0.16	0.49	0.47	0.24
Uniform Delay, d1	31.4	31.5	16.2	31.7	31.7	27.6	29.5	19.4	6.8	37.7	23.2	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	4.3	0.0	0.8	1.5	0.2	8.4	4.6	0.1	5.6	0.3	0.2
Delay (s)	34.8	35.9	16.2	32.5	33.2	27.8	37.9	24.0	6.9	43.3	23.5	13.8
Level of Service	C	D	B	C	C	C	D	C	A	D	C	B
Approach Delay (s)		32.9			31.8			23.9			20.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS | Year 2014 Alternative 1

12: San Jacinto Rd & Vandegrift Blvd | Timing Plan: AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.91		1.00	0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1688		1770	1603		1770	3534		1770	3539	1583
Flt Permitted	0.82	1.00		0.82	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2950	1688		1521	1603		1770	3534		1770	3539	1583
Volume (vph)	48	3	5	14	2	24	103	2105	22	37	865	49
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	3	5	15	2	26	112	2288	24	40	940	53
RTOR Reduction (vph)	0	5	0	0	25	0	0	0	0	0	0	16
Lane Group Flow (vph)	52	3	0	15	3	0	112	2312	0	40	940	37
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	4.9	4.9		4.9	4.9		9.3	69.5		2.5	62.7	62.7
Effective Green, g (s)	4.9	4.9		4.9	4.9		9.3	69.5		2.5	62.7	62.7
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.10	0.78		0.03	0.71	0.71
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	163	93		84	88		185	2763		50	2496	1116
v/s Ratio Prot		0.00			0.00		c0.06	c0.65		0.02	0.27	
v/s Ratio Perm	c0.02			0.01								0.02
v/c Ratio	0.32	0.04		0.18	0.04		0.61	0.84		0.80	0.38	0.03
Uniform Delay, d1	40.4	39.8		40.1	39.8		38.0	6.1		43.0	5.3	4.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2		1.0	0.2		5.5	2.4		59.1	0.1	0.0
Delay (s)	41.5	39.9		41.1	40.0		43.5	8.5		102.1	5.4	4.0
Level of Service	D	D		D	D		D	A		F	A	A
Approach Delay (s)		41.3			40.4			10.1			9.0	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

13: Stuart Mart Rd & Vandegrift Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1603		1610	3370	1583	3433	3539	1583	3433	3395	
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1603		1610	3370	1583	3433	3539	1583	3433	3395	
Volume (vph)	304	28	370	94	138	356	794	1419	23	52	391	146
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	330	30	402	102	150	387	863	1542	25	57	425	159
RTOR Reduction (vph)	0	325	0	0	0	30	0	0	11	0	37	0
Lane Group Flow (vph)	330	107	0	81	171	357	863	1542	14	57	547	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	18.0	18.0		10.4	10.4	16.4	27.1	44.1	54.5	6.0	23.0	
Effective Green, g (s)	18.0	18.0		10.4	10.4	16.4	27.1	44.1	54.5	6.0	23.0	
Actuated g/C Ratio	0.19	0.19		0.11	0.11	0.17	0.29	0.47	0.58	0.06	0.24	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	337	305		177	371	342	984	1652	913	218	826	
v/s Ratio Prot	c0.19	0.07		0.05	0.05	c0.07	0.25	c0.44	0.00	0.02	0.16	
v/s Ratio Perm						0.16			0.01			
v/c Ratio	0.98	0.35		0.46	0.46	1.04	0.88	0.93	0.02	0.26	0.66	
Uniform Delay, d1	38.1	33.2		39.4	39.4	39.0	32.1	23.8	8.5	42.1	32.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	42.9	0.7		1.9	0.9	60.8	8.9	10.1	0.0	0.6	2.0	
Delay (s)	81.0	33.9		41.3	40.3	99.8	41.0	33.9	8.6	42.8	34.3	
Level of Service	F	C		D	D	F	D	C	A	D	C	
Approach Delay (s)		54.3			76.5			36.2			35.0	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	94.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

14: College Blvd & N River Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	166	1450	253	413	777	271
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	1576	275	449	845	295
RTOR Reduction (vph)	0	188	0	332	0	0
Lane Group Flow (vph)	180	1388	275	117	845	295
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	18.0	40.0	17.0	17.0	18.0	39.0
Effective Green, g (s)	18.0	40.0	17.0	17.0	18.0	39.0
Actuated g/C Ratio	0.28	0.62	0.26	0.26	0.28	0.60
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	490	1715	926	414	951	2123
v/s Ratio Prot		c0.50	c0.08		0.25	0.08
v/s Ratio Perm	0.10			0.07		
v/c Ratio	0.37	0.81	0.30	0.28	0.89	0.14
Uniform Delay, d1	18.9	9.6	19.2	19.1	22.5	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.9	0.8	1.7	10.1	0.1
Delay (s)	19.4	12.5	20.0	20.9	32.7	5.8
Level of Service	B	B	C	C	C	A
Approach Delay (s)	13.2		20.5			25.7
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	54	26	1336	33	5	181
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	28	1452	36	5	197
RTOR Reduction (vph)	0	26	0	9	0	0
Lane Group Flow (vph)	59	2	1452	27	5	197
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	6.9	6.9	60.0	60.0	1.2	65.2
Effective Green, g (s)	6.9	6.9	60.0	60.0	1.2	65.2
Actuated g/C Ratio	0.09	0.09	0.75	0.75	0.01	0.81
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	136	2651	1186	27	4139
v/s Ratio Prot	c0.03		c0.41		c0.00	0.04
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.39	0.02	0.55	0.02	0.19	0.05
Uniform Delay, d1	34.6	33.5	4.3	2.6	39.0	1.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	0.2	0.0	3.3	0.0
Delay (s)	36.2	33.6	4.5	2.6	42.3	1.4
Level of Service	D	C	A	A	D	A
Approach Delay (s)	35.4		4.5			2.5
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1756	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1756	1583	1610	3360	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	79	60	82	307	385	47	294	352	9	43	639	395
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	65	89	334	418	51	320	383	10	47	695	429
RTOR Reduction (vph)	0	0	80	0	0	41	0	0	0	0	0	319
Lane Group Flow (vph)	74	77	9	242	510	10	320	383	10	47	695	110
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	6.9	6.9	6.9	14.3	14.3	14.3	15.0	29.8	70.3	3.3	18.1	18.1
Effective Green, g (s)	6.9	6.9	6.9	14.3	14.3	14.3	15.0	29.8	70.3	3.3	18.1	18.1
Actuated g/C Ratio	0.10	0.10	0.10	0.20	0.20	0.20	0.21	0.42	1.00	0.05	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	165	172	155	327	683	322	378	1500	1583	83	911	408
v/s Ratio Prot	c0.04	0.04		0.15	c0.15		c0.18	0.11		0.03	c0.20	
v/s Ratio Perm			0.01			0.01			0.01			0.07
v/c Ratio	0.45	0.45	0.06	0.74	0.75	0.03	0.85	0.26	0.01	0.57	0.76	0.27
Uniform Delay, d1	29.9	29.9	28.7	26.3	26.3	22.5	26.5	13.1	0.0	32.8	24.1	20.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	1.9	0.2	8.7	4.5	0.0	15.9	0.1	0.0	8.6	3.8	0.4
Delay (s)	31.8	31.8	28.9	35.0	30.8	22.5	42.4	13.2	0.0	41.4	27.9	21.2
Level of Service	C	C	C	C	C	C	D	B	A	D	C	C
Approach Delay (s)		30.7			31.5			26.1			26.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	114	26	126	58	0	0	0	0	69	3	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	124	28	137	63	0	0	0	0	75	3	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	63			152			541	475	138	475	489	63
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	63			152			541	475	138	475	489	63
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			100	100	100	84	99	94
cM capacity (veh/h)	1540			1429			390	442	910	463	433	1002

Direction, Lane #	EB 1	WB 1	WB 2	SB 1	SB 2
Volume Total	152	137	63	78	64
Volume Left	0	137	0	75	0
Volume Right	28	0	0	0	64
cSH	1700	1429	1700	462	1002
Volume to Capacity	0.09	0.10	0.04	0.17	0.06
Queue Length 95th (ft)	0	8	0	15	5
Control Delay (s)	0.0	7.8	0.0	14.4	8.8
Lane LOS		A		B	A
Approach Delay (s)	0.0	5.3		11.9	
Approach LOS				B	

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	34.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	99	82	0	0	148	77	33	0	110	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	89	0	0	161	84	36	0	120	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	245			89			507	549	89	627	507	203
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			89			507	549	89	627	507	203
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			92	100	88	100	100	100
cM capacity (veh/h)	1322			1506			446	407	969	326	430	838

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total	108	89	245	36	120
Volume Left	108	0	0	36	0
Volume Right	0	0	84	0	120
cSH	1322	1700	1700	446	969
Volume to Capacity	0.08	0.05	0.14	0.08	0.12
Queue Length 95th (ft)	7	0	0	7	11
Control Delay (s)	8.0	0.0	0.0	13.8	9.2
Lane LOS	A			B	A
Approach Delay (s)	4.4		0.0	10.3	
Approach LOS				B	

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	34.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	575	338	168	108	0	0	0	0	163	11	128
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	625	367	183	117	0	0	0	0	177	12	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	117			992			1114	1108	625	1108	1475	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			992			1114	1108	625	1108	1475	117
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			74			100	100	100	0	87	85
cM capacity (veh/h)	1471			697			114	155	485	149	93	935

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	625	367	300	189	139
Volume Left	0	0	183	177	0
Volume Right	0	367	0	0	139
cSH	1700	1700	697	144	935
Volume to Capacity	0.37	0.22	0.26	1.31	0.15
Queue Length 95th (ft)	0	0	26	293	13
Control Delay (s)	0.0	0.0	8.6	241.2	9.5
Lane LOS			A	F	A
Approach Delay (s)	0.0		8.6	143.0	
Approach LOS				F	

Intersection Summary				
Average Delay	30.6			
Intersection Capacity Utilization	64.9%	ICU Level of Service		C
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	557	173	0	0	193	288	77	5	76	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	605	188	0	0	210	313	84	5	83	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	523			188			1609	1922	188	1611	1609	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	523			188			1609	1922	188	1611	1609	210
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	42			100			0	81	90	100	100	100
cM capacity (veh/h)	1044			1386			45	28	854	35	44	830

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	793	210	313	89	83
Volume Left	605	0	0	84	0
Volume Right	0	0	313	0	83
cSH	1044	1700	1700	44	854
Volume to Capacity	0.58	0.12	0.18	2.04	0.10
Queue Length 95th (ft)	97	0	0	232	8
Control Delay (s)	12.0	0.0	0.0	680.2	9.7
Lane LOS	B			F	A
Approach Delay (s)	12.0	0.0		357.7	
Approach LOS				F	

Intersection Summary				
Average Delay	47.7			
Intersection Capacity Utilization	72.3%	ICU Level of Service		C
Analysis Period (min)	15			

5: Las Pulgas Rd & I-5 SB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	672	0	0	0	0	0	88	12	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	730	0	0	0	0	0	96	13	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			0			1467	1461	0	1461	1461	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			0			1467	1461	0	1461	1461	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			55			100	100	100	0	82	100
cM capacity (veh/h)	1623			1623			60	71	1085	69	71	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	730	109
Volume Left	0	730	96
Volume Right	0	0	0
cSH	1700	1623	69
Volume to Capacity	0.00	0.45	1.57
Queue Length 95th (ft)	0	60	232
Control Delay (s)	0.0	9.0	413.9
Lane LOS		A	F
Approach Delay (s)	0.0	9.0	413.9
Approach LOS			F

Intersection Summary			
Average Delay	61.5		
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		

6: Las Pulgas Rd & I-5 NB on-ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	79	0	0	660	389	11	2	51	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	86	0	0	717	423	12	2	55	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1140			86			1039	1250	86	1040	1039	929
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1140			86			1039	1250	86	1040	1039	929
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			94	99	94	100	100	100
cM capacity (veh/h)	613			1510			206	169	973	192	226	324

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	98	1140	14	55
Volume Left	12	0	12	0
Volume Right	0	423	0	55
cSH	613	1700	199	973
Volume to Capacity	0.02	0.67	0.07	0.06
Queue Length 95th (ft)	1	0	6	5
Control Delay (s)	1.5	0.0	24.5	8.9
Lane LOS	A		C	A
Approach Delay (s)	1.5	0.0	12.1	
Approach LOS			B	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

7: Las Pulgas Rd & Stuart Mesa Rd

Timing Plan: PM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	57	74	159	735	276	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	80	173	799	300	80
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		1207	62
vC1, stage 1 conf vol					62	
vC2, stage 2 conf vol					1145	
vCu, unblocked vol			62		1207	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			89		0	92
cM capacity (veh/h)			1541		238	1003

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	62	80	173	799	300	80
Volume Left	0	0	173	0	300	0
Volume Right	0	80	0	0	0	80
cSH	1700	1700	1541	1700	238	1003
Volume to Capacity	0.04	0.05	0.11	0.47	1.26	0.08
Queue Length 95th (ft)	0	0	9	0	380	7
Control Delay (s)	0.0	0.0	7.6	0.0	189.4	8.9
Lane LOS			A		F	A
Approach Delay (s)	0.0		1.4		151.2	
Approach LOS					F	

Intersection Summary			
Average Delay	39.4		
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

8: Harbor Dr & Harbor Dr

Timing Plan: PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Volume (veh/h)	402	47	5	234	632	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	437	51	5	254	687	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		874	0	877	874
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		874	0	877	874
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	73		97	77	0	82
cM capacity (veh/h)	1623		211	1085	160	211

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	437	51	5	254	724
Volume Left	437	0	0	0	687
Volume Right	0	51	0	254	0
cSH	1623	1700	211	1085	162
Volume to Capacity	0.27	0.03	0.03	0.23	4.47
Queue Length 95th (ft)	27	0	2	23	Err
Control Delay (s)	8.0	0.0	22.5	9.3	Err
Lane LOS	A		C	A	F
Approach Delay (s)	7.2		9.6		Err
Approach LOS			A		F

Intersection Summary			
Average Delay	4922.3		
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

BWI EIS — Year 2014 Alternative 1

9: Harbor Dr & I-5 SB on-ramp — Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3539	1583		1785	1583		1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3539	1583		1785	1583		1799	1583
Volume (vph)	349	147	335	302	250	1812	157	22	122	112	47	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	379	160	364	328	272	1970	171	24	133	122	51	49
RTOR Reduction (vph)	0	0	194	0	0	279	0	0	118	0	0	44
Lane Group Flow (vph)	379	160	170	328	272	1691	0	195	15	0	173	5
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	18.0	70.1	70.1	30.9	83.0	83.0		17.0	17.0		15.9	15.9
Effective Green, g (s)	18.0	70.1	70.1	30.9	83.0	83.0		17.0	17.0		15.9	15.9
Actuated g/C Ratio	0.12	0.47	0.47	0.21	0.55	0.55		0.11	0.11		0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	213	871	740	365	1960	877		202	180		191	168
v/s Ratio Prot	c0.21	0.09		0.19	0.08			c0.11			c0.10	
v/s Ratio Perm			0.11			c1.07			0.01			0.00
v/c Ratio	1.78	0.18	0.23	0.90	0.14	1.93		0.97	0.08		0.91	0.03
Uniform Delay, d1	66.0	23.2	23.8	58.0	16.2	33.5		66.2	59.5		66.3	60.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	369.0	0.1	0.2	23.7	0.0	421.9		52.9	0.2		39.4	0.1
Delay (s)	435.0	23.3	24.0	81.7	16.2	455.4		119.1	59.7		105.7	60.2
Level of Service	F	C	C	F	B	F		F	E		F	E
Approach Delay (s)		196.4			361.2			95.0			95.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	287.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	149.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	151.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS — Year 2014 Alternative 1

10: I-5 NB on-ramp & Vandegrift Blvd — Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)				1681	1689	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	0	0	0	121	3	16	113	982	37	27	2119	172
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	132	3	17	123	1067	40	29	2303	187
RTOR Reduction (vph)	0	0	0	0	0	16	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	66	69	1	123	1067	40	29	2303	187
Turn Type				Split		Perm	Prot		Free	Prot		Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				8.5	8.5	8.5	7.1	77.7	101.3	3.1	73.7	101.3
Effective Green, g (s)				8.5	8.5	8.5	7.1	77.7	101.3	3.1	73.7	101.3
Actuated g/C Ratio				0.08	0.08	0.08	0.07	0.77	1.00	0.03	0.73	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				141	142	133	124	3900	1583	54	2575	1583
v/s Ratio Prot				0.04	c0.04		c0.07	0.21		0.02	c0.65	
v/s Ratio Perm						0.00			0.03			c0.12
v/c Ratio				0.47	0.49	0.01	0.99	0.27	0.03	0.54	0.89	0.12
Uniform Delay, d1				44.2	44.3	42.5	47.1	3.5	0.0	48.4	10.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2				2.4	2.6	0.0	78.1	0.0	0.0	9.9	4.5	0.2
Delay (s)				46.7	46.9	42.6	125.1	3.5	0.0	58.3	15.2	0.2
Level of Service				D	D	D	F	A	A	E	B	A
Approach Delay (s)		0.0			46.3			15.6			14.6	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	101.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS | Year 2014 Alternative 1

11: Wire Mountain Rd & Vandegrift Blvd | Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.91	0.95	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1676	1504	3433	1863	1583	1770	5085	1583	1770	3539	1583
Volume (vph)	248	159	194	339	35	56	97	567	360	89	1810	189
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	173	211	368	38	61	105	616	391	97	1967	205
RTOR Reduction (vph)	0	0	9	0	0	48	0	0	85	0	0	63
Lane Group Flow (vph)	220	223	202	368	38	13	105	616	306	97	1967	142
Turn Type	Split		pm+ov	Split		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	4	4	5	8	8	1	5	2	8	1	6	4
Permitted Phases			4			8			2			6
Actuated Green, G (s)	17.0	17.0	25.0	15.8	15.8	27.5	8.0	69.3	85.1	11.7	73.0	90.0
Effective Green, g (s)	17.0	17.0	25.0	15.8	15.8	27.5	8.0	69.3	85.1	11.7	73.0	90.0
Actuated g/C Ratio	0.13	0.13	0.19	0.12	0.12	0.21	0.06	0.53	0.66	0.09	0.56	0.69
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	220	220	290	418	227	384	109	2715	1038	160	1990	1146
v/s Ratio Prot	0.13	c0.13	0.04	c0.11	0.02	0.00	c0.06	0.12	0.04	0.05	c0.56	0.02
v/s Ratio Perm			0.09			0.01			0.16			0.07
v/c Ratio	1.00	1.01	0.70	0.88	0.17	0.03	0.96	0.23	0.29	0.61	0.99	0.12
Uniform Delay, d1	56.4	56.4	48.9	56.1	51.1	40.6	60.8	16.0	9.5	56.8	28.0	6.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	60.7	64.2	7.1	18.9	0.4	0.0	74.0	0.0	0.2	6.4	17.3	0.0
Delay (s)	117.1	120.6	56.0	75.0	51.5	40.6	134.8	16.1	9.7	63.2	45.3	6.7
Level of Service	F	F	E	E	D	D	F	B	A	E	D	A
Approach Delay (s)		98.6			68.6			25.0			42.6	
Approach LOS		F			E			C			D	

Intersection Summary			
HCM Average Control Delay	49.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	129.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

BWI EIS | Year 2014 Alternative 1

12: San Jacinto Rd & Vandegrift Blvd | Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88		1.00	0.86		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1639		1770	1600		1770	3486		1770	3539	1583
Flt Permitted	0.63	1.00		0.73	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2281	1639		1362	1600		1770	3486		1770	3539	1583
Volume (vph)	137	7	29	134	6	98	190	616	68	168	1929	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	8	32	146	7	107	207	670	74	183	2097	87
RTOR Reduction (vph)	0	27	0	0	91	0	0	8	0	0	0	33
Lane Group Flow (vph)	149	13	0	146	23	0	207	736	0	183	2097	54
Turn Type	Perm			Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	13.2	13.2		13.2	13.2		11.0	48.5		13.6	51.1	51.1
Effective Green, g (s)	13.2	13.2		13.2	13.2		11.0	48.5		13.6	51.1	51.1
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.13	0.56		0.16	0.59	0.59
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	345	248		206	242		223	1937		276	2072	927
v/s Ratio Prot		0.01			0.01		c0.12	0.21		0.10	c0.59	
v/s Ratio Perm	0.07			c0.11								0.03
v/c Ratio	0.43	0.05		0.71	0.10		0.93	0.38		0.66	1.01	0.06
Uniform Delay, d1	33.6	31.7		35.2	31.9		37.8	10.9		34.7	18.1	7.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1		10.6	0.2		40.4	0.1		5.9	22.8	0.0
Delay (s)	34.5	31.8		45.8	32.1		78.2	11.1		40.6	40.9	7.8
Level of Service	C	C		D	C		E	B		D	D	A
Approach Delay (s)		33.9			39.8			25.7			39.6	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

13: Stuart Mart Rd & Vandegrift Blvd

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3453	
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1625		1610	3316	1583	3433	3539	1583	3433	3453	
Volume (vph)	219	133	771	74	44	62	317	441	101	280	1255	243
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	145	838	80	48	67	345	479	110	304	1364	264
RTOR Reduction (vph)	0	135	0	0	0	55	0	0	67	0	11	0
Lane Group Flow (vph)	238	848	0	41	87	12	345	479	43	304	1617	0
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	54.0	54.0		9.4	9.4	26.7	11.0	46.7	56.1	17.3	53.0	
Effective Green, g (s)	54.0	54.0		9.4	9.4	26.7	11.0	46.7	56.1	17.3	53.0	
Actuated g/C Ratio	0.38	0.38		0.07	0.07	0.19	0.08	0.33	0.39	0.12	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	667	612		106	217	339	263	1153	619	414	1276	
v/s Ratio Prot	0.13	c0.52		0.03	c0.03	0.00	c0.10	0.14	0.00	0.09	c0.47	
v/s Ratio Perm						0.00			0.02			
v/c Ratio	0.36	1.39		0.39	0.40	0.04	1.31	0.42	0.07	0.73	1.27	
Uniform Delay, d1	32.2	44.7		64.2	64.3	47.8	66.2	37.7	27.3	60.8	45.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	183.3		2.3	1.2	0.0	164.8	0.2	0.0	6.6	126.7	
Delay (s)	32.5	228.0		66.6	65.5	47.9	231.0	37.9	27.4	67.5	171.9	
Level of Service	C	F		E	E	D	F	D	C	E	F	
Approach Delay (s)		189.9			59.7			108.0			155.5	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	150.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	143.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

14: College Blvd & N River Rd

Timing Plan: PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.88	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	2787	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	2787	3539	1583	3433	3539
Volume (vph)	433	847	295	328	1046	326
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	921	321	357	1137	354
RTOR Reduction (vph)	0	58	0	287	0	0
Lane Group Flow (vph)	471	863	321	70	1137	354
Turn Type		custom		Perm	Prot	
Protected Phases		8 1	2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	26.7	63.3	17.5	17.5	32.6	54.1
Effective Green, g (s)	26.7	63.3	17.5	17.5	32.6	54.1
Actuated g/C Ratio	0.30	0.71	0.20	0.20	0.37	0.61
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	532	1987	697	312	1260	2156
v/s Ratio Prot		0.31	c0.09		c0.33	0.10
v/s Ratio Perm	c0.27			0.04		
v/c Ratio	0.89	0.43	0.46	0.23	0.90	0.16
Uniform Delay, d1	29.6	5.3	31.5	30.0	26.6	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.1	0.2	2.2	1.7	9.2	0.2
Delay (s)	45.7	5.5	33.7	31.6	35.8	7.7
Level of Service	D	A	C	C	D	A
Approach Delay (s)	19.1		32.6			29.1
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

15: Papagallo Dr & Vandegrift Blvd

Timing Plan: PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	5085
Volume (vph)	41	7	366	45	7	1287
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	8	398	49	8	1399
RTOR Reduction (vph)	0	7	0	12	0	0
Lane Group Flow (vph)	45	1	398	37	8	1399
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	5.4	5.4	61.7	61.7	2.4	68.1
Effective Green, g (s)	5.4	5.4	61.7	61.7	2.4	68.1
Actuated g/C Ratio	0.07	0.07	0.76	0.76	0.03	0.84
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	117	105	2679	1198	52	4249
v/s Ratio Prot	c0.03		0.11		0.00	c0.28
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.38	0.01	0.15	0.03	0.15	0.33
Uniform Delay, d1	36.5	35.5	2.7	2.5	38.6	1.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.0	0.0	0.0	1.4	0.0
Delay (s)	38.6	35.6	2.7	2.5	39.9	1.6
Level of Service	D	D	A	A	D	A
Approach Delay (s)	38.1		2.7			1.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	3.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

16: Ammunition Rd & Mission Rd

Timing Plan: PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1718	1583	1610	3289	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	593	153	174	333	105	53	134	490	12	48	539	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	645	166	189	362	114	58	146	533	13	52	586	109
RTOR Reduction (vph)	0	0	137	0	0	48	0	0	0	0	0	84
Lane Group Flow (vph)	395	416	52	181	295	10	146	533	13	52	586	25
Turn Type	Split		Perm	Split		Perm	Prot		Free	Prot		Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4			Free			6
Actuated Green, G (s)	20.5	20.5	20.5	12.6	12.6	12.6	8.0	21.9	74.3	3.3	17.2	17.2
Effective Green, g (s)	20.5	20.5	20.5	12.6	12.6	12.6	8.0	21.9	74.3	3.3	17.2	17.2
Actuated g/C Ratio	0.28	0.28	0.28	0.17	0.17	0.17	0.11	0.29	1.00	0.04	0.23	0.23
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	464	474	437	273	558	268	191	1043	1583	79	819	366
v/s Ratio Prot	0.23	c0.24		c0.11	0.09		c0.08	0.15		0.03	c0.17	
v/s Ratio Perm			0.03			0.01			0.01			0.02
v/c Ratio	0.85	0.88	0.12	0.66	0.53	0.04	0.76	0.51	0.01	0.66	0.72	0.07
Uniform Delay, d1	25.5	25.7	20.1	28.9	28.1	25.8	32.2	21.8	0.0	34.9	26.3	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.0	16.6	0.1	5.9	0.9	0.1	16.5	0.4	0.0	18.1	3.0	0.1
Delay (s)	39.4	42.3	20.3	34.8	29.0	25.8	48.7	22.2	0.0	53.0	29.3	22.4
Level of Service	D	D	C	C	C	C	D	C	A	D	C	C
Approach Delay (s)		37.0			30.7			27.4			29.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of I-5 SB Ramps (Christianitos Gate)/Christianitos Rd

Project #: 07-4255-008

I-5 SB Ramps (Christianitos Gate)

Christianitos Rd

N

SOUTHBOUND APPROACH LANES

	0.5	0.5	1
TOTAL	91	7	153
PM	59	3	69
NOON	0	0	0
AM	32	4	84

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
1	261	147	0	114
0	49	23	0	26

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
0	0	0	0	0
24	0	58	82	1
83	0	126	209	1

NORTHBOUND APPROACH LANES

PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
	0	0	0

I-5 SB Ramps (Christianitos Gate)

Christianitos Rd

TURNING MOVEMENT COUNT

I-5 SB Ramps (Christianitos Gate) / Christianitos Rd

(Intersection Name)

Tuesday
Day

11/20/07
Date

COUNT PERIODS

am	6:00 AM	-	8:00 AM
noon		-	
pm	2:30 PM	-	4:30 PM

CONTROL: 1-Way Stop Sign (WB)

AM PEAK HOUR 700 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 330 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of I-5 NB Ramps (Christianitos Gate)/Christianitos Rd

Project #: 07-4255-009

I-5 NB Ramps (Christianitos Gate)

Christianitos Rd

Christianitos Rd

N

SOUTHBOUND APPROACH LANES

Lanes	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
1	191	92	0	99
1	205	123	0	82
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
60	0	77	137	1
89	0	148	237	1
0	0	0	0	0

NORTHBOUND APPROACH LANES

PM	33	0	110
NOON	0	0	0
AM	21	3	238
TOTAL	54	3	348
Lanes	1	0.5	0.5

I-5 NB Ramps (Christianitos Gate)

TURNING MOVEMENT COUNT

I-5 NB Ramps (Christianitos Gate) / Christianitos Rd

(Intersection Name)

Tuesday
Day

11/20/07
Date

COUNT PERIODS			
am	6:00 AM	-	8:00 AM
noon		-	
pm	2:30 PM	-	4:30 PM

CONTROL: 1-Way Stop Sign (NB)

AM PEAK HOUR	630 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	330 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of I-5 SB Ramps (San Onofre Gate)/Old Pacific Hwy

Project #: 07-4255-006

North leg: I-5 SB Ramps (San Onofre Gate)
West leg: Old Pacific Hwy
East leg: Old Pacific Hwy
South leg: I-5 SB Ramps (San Onofre Gate)

N

SOUTHBOUND APPROACH LANES

Lanes	1	1	0
TOTAL	531	26	388
PM	128	11	164
NOON	0	0	0
AM	403	15	224

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
1	632	57	0	575
1	390	52	0	338

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
0	0	0	0	0
470	0	108	578	1
65	0	121	186	1

NORTHBOUND APPROACH LANES

PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
Lanes	0	0	0

TURNING MOVEMENT COUNT

I-5 SB Ramps (San Onofre Gate) / Old Pacific Hwy
(Intersection Name)

Tuesday
Day

11/20/07
Date

COUNT PERIODS			
am	6:00 AM	-	8:00 AM
noon		-	
pm	2:30 PM	-	4:30 PM

CONTROL: 1-Way Stop Sign (SB)

AM PEAK HOUR 615 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 300 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of Basilone Rd/I-5 NB Ramps (San Onofre Gate)

Project #: 07-4255-007

Basilone Rd

I-5 NB Ramps (San Onofre Gate)

I-5 NB Ramps (San Onofre Gate)

Basilone Rd

N

SOUTHBOUND APPROACH LANES

	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
1	622	65	0	557
1	389	215	0	174
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
96	0	242	338	0
77	0	146	223	2
0	0	0	0	1

NORTHBOUND APPROACH LANES

PM	77	5	76
NOON	0	0	0
AM	458	2	460
TOTAL	535	7	536
	0	1	1

TURNING MOVEMENT COUNT

Basilone Rd / I-5 NB Ramps (San Onofre Gate)

(Intersection Name)

Tuesday
Day

11/20/07
Date

COUNT PERIODS			
am	6:00 AM	-	8:00 AM
noon		-	
pm	2:30 PM	-	4:30 PM

CONTROL: 1-Way Stop Sign (NB)

AM PEAK HOUR 615 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 300 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of I-5 SB Ramps/El Camino Real

Project #: 09-4189-001

N

I-5 SB Ramps

El Camino Real

El Camino Real

SOUTHBOUND APPROACH LANES

Lanes	0	1	0
TOTAL	0	12	296
PM	0	2	67
NOON	0	0	0
AM	0	10	229

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
0	0	0	0	0
0	0	0	0	1
9	0	480	489	0

NORTHBOUND APPROACH LANES

PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
Lanes	0	0	0

I-5 SB Ramps

TURNING MOVEMENT COUNT

I-5 SB Ramps / El Camino Real

(Intersection Name)

Wednesday
Day

5/13/09
Date

COUNT PERIODS			
am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 1-way stop(SB)

AM PEAK HOUR	615 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of I-5 NB Ramps/El Camino Real

Project #: 09-4189-002

N

I-5 NB Ramps

El Camino Real

El Camino Real

SOUTHBOUND APPROACH LANES

	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
0	17	6	0	11
1	282	224	0	58
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
1	0	166	167	0
2	0	468	470	1
0	0	0	0	0

PM	11	2	51
NOON	0	0	0
AM	7	1	359
TOTAL	18	3	410
	1	0	1

NORTHBOUND APPROACH LANES

I-5 NB Ramps

TURNING MOVEMENT COUNT

I-5 NB Ramps / El Camino Real

(Intersection Name)

Wednesday
Day

5/13/09
Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 1-way stop(NB)

AM PEAK HOUR 615 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Stuart Mesa Rd/Las Pulgas Rd

Project #: 09-4189-003

N

Stuart Mesa Rd

Las Pulgas Rd

Las Pulgas Rd

Stuart Mesa Rd

SOUTHBOUND APPROACH LANES

Lanes	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
1	410	353	0	57
1	289	236	0	53

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
0	0	0	0	0
0	0	410	410	1
50	0	114	164	1

NORTHBOUND APPROACH LANES

PM	187	0	36
NOON	0	0	0
AM	0	0	167
TOTAL	187	0	203
Lanes	1	0	1

TURNING MOVEMENT COUNT

Stuart Mesa Rd / Las Pulgas Rd

(Intersection Name)

Wednesday
Day

5/13/09
Date

COUNT PERIODS			
am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 1-way stop(NB).NL & WT movements were blocked until 8am

AM PEAK HOUR	600 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Santa Fe Ave/Harbor Dr

Project #: 09-4189-009

N

Santa Fe Ave

Harbor Dr

Harbor Dr

Santa Fe Ave

SOUTHBOUND APPROACH LANES

	0	1	0
TOTAL	0	36	521
PM	0	34	487
NOON	0	0	0
AM	0	2	34

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
609	0	47	656	1
0	0	0	0	0
121	0	399	520	1

NORTHBOUND APPROACH LANES

PM	0	5	231
NOON	0	0	0
AM	0	43	76
TOTAL	0	48	307
	0	1	0

TURNING MOVEMENT COUNT

Santa Fe Ave / Harbor Dr

(Intersection Name)

Tuesday	5/12/09
Day	Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 2-way stop(NB/SB)

AM PEAK HOUR	630 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	415 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of I-5 SB On/Off Ramps/Harbor Dr

Project #: 09-4189-008

I-5 SB On/Off Ramps

Harbor Dr

Harbor Dr

N

I-5 SB On/Off Ramps

SOUTHBOUND APPROACH LANES

	1	.5	.5
TOTAL	124	63	214
PM	45	47	94
NOON	0	0	0
AM	79	16	120

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
1	285	60	0	225
1	195	72	0	123
1	363	28	0	335

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
596	0	1609	2205	0
358	0	247	605	2
101	0	302	403	1

NORTHBOUND APPROACH LANES

PM	157	22	122
NOON	0	0	0
AM	246	12	152
TOTAL	403	34	274
	.5	.5	1

TURNING MOVEMENT COUNT

I-5 SB On/Off Ramps / Harbor Dr

(Intersection Name)

Day	Date
Tuesday	5/12/09

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR	645 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/I-5 NB On/Off Ramps

Project #: 09-4189-007

Vandegrift Blvd

SOUTHBOUND APPROACH LANES

	Lanes	TOTAL	PM	NOON	AM
Right	1	229	154	0	75
Through	2	2286	1850	0	436
Left	1	32	25	0	7

N

I-5 NB On/Off Ramps

I-5 NB On/Off Ramps

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
37	0	13	50	.5
9	0	3	12	.5
141	0	121	262	1.5

NORTHBOUND APPROACH LANES

	Left	Through	Right
PM	92	811	37
NOON	0	0	0
AM	44	2051	4
TOTAL	136	2862	41
Lanes	1	3	0

Vandegrift Blvd

TURNING MOVEMENT COUNT

Vandegrift Blvd / I-5 NB On/Off Ramps

(Intersection Name)

Tuesday
Day

5/12/09
Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/Wire Mountain Rd

Project #: 09-4189-006

Vandegrift Blvd

Wire Mountain Rd

Wire Mountain Rd

N

SOUTHBOUND APPROACH LANES

Lanes	1	2	1
TOTAL	477	1862	115
PM	165	1543	86
NOON	0	0	0
AM	312	319	29

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
1.3	448	236	0	212
.3	191	32	0	159
1.3	235	41	0	194

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
79	0	52	131	1
119	0	35	154	2
200	0	316	516	1

NORTHBOUND APPROACH LANES

PM	97	415	337
NOON	0	0	0
AM	260	1679	198
TOTAL	357	2094	535
Lanes	1	3	1

Vandegrift Blvd

TURNING MOVEMENT COUNT

Vandegrift Blvd / Wire Mountain Rd

(Intersection Name)

Tuesday
Day

5/12/09
Date

COUNT PERIODS			
am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/Stuart Mesa Rd

Project #: 09-4189-004

Vandegrift Blvd

Stuart Mesa Rd

Stuart Mesa Rd

N

SOUTHBOUND APPROACH LANES

Lanes	0	2	2
TOTAL	286	1421	345
PM	169	1154	289
NOON	0	0	0
AM	117	267	56

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
1	407	237	0	170
2	161	28	0	133
0	805	252	0	553

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
363	0	70	433	1
138	0	44	182	1.5
90	0	65	155	1.5

NORTHBOUND APPROACH LANES

PM	197	349	92
NOON	0	0	0
AM	621	1358	20
TOTAL	818	1707	112
Lanes	2	2	1

Vandegrift Blvd

TURNING MOVEMENT COUNT

Vandegrift Blvd / Stuart Mesa Rd

(Intersection Name)

Tuesday
Day

5/12/09
Date

COUNT PERIODS			
am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 400 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of N River Rd/College Blvd (San Luis Rey Gate)

Project #: 07-4255-011

N River Rd

College Blvd (San Luis Rey Gate)

N

SOUTHBOUND APPROACH LANES

Lanes	0	2	1
TOTAL	0	584	1835
PM	0	320	1059
NOON	0	0	0
AM	0	264	776

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
1449	0	858	2307	1
0	0	0	0	0
166	0	433	599	1

NORTHBOUND APPROACH LANES

PM	0	290	328
NOON	0	0	0
AM	0	242	413
TOTAL	0	532	741
Lanes	0	2	1

N River Rd

TURNING MOVEMENT COUNT

N River Rd / College Blvd (San Luis Rey Gate)

(Intersection Name)

Tuesday
Day

11/20/07
Date

COUNT PERIODS			
am	6:00 AM	-	8:00 AM
noon		-	
pm	2:30 PM	-	4:30 PM

CONTROL: SIGNALIZED

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 330 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/Papagallo Dr (San Luis Rey Gate)

Project #: 07-4255-010

Vandegrift Blvd

SOUTHBOUND APPROACH LANES

Lanes	0	2	2
TOTAL	0	1469	8
PM	0	1295	5
NOON	0	0	0
AM	0	174	3

N

Papagallo Dr (San Luis Rey Gate)

Papagallo Dr (San Luis Rey Gate)

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
23	0	5	28	2
0	0	0	0	0
54	0	41	95	1

PM	0	373	45
NOON	0	0	0
AM	0	1323	33
TOTAL	0	1696	78
Lanes	0	2	1

NORTHBOUND APPROACH LANES

Vandegrift Blvd

TURNING MOVEMENT COUNT

Vandegrift Blvd / Papagallo Dr (San Luis Rey Gate)

(Intersection Name)

Tuesday
Day

11/20/07
Date

COUNT PERIODS

am	6:00 AM	-	8:00 AM
noon		-	
pm	2:30 PM	-	4:30 PM

CONTROL: Signalized

AM PEAK HOUR	630 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	330 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of S Mission Rd/Ammunition Rd (Fallbrook Gate)

Project #: 07-4255-012

S Mission Rd

SOUTHBOUND APPROACH LANES

	Lane 1	Lane 2	Lane 3
Lanes	1	2	1
TOTAL	471	1147	91
PM	90	508	48
NOON	0	0	0
AM	381	639	43

N

Ammunition Rd (Fallbrook Gate)

Ammunition Rd (Fallbrook Gate)

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
1.5	653	71	0	582
0.5	213	60	0	153
1	238	74	0	164

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
47	0	53	100	1
385	0	105	490	1.5
307	0	333	640	1.5

	Lane 1	Lane 2	Lane 3
PM	124	490	12
NOON	0	0	0
AM	281	321	9
TOTAL	405	811	21
Lanes	1	2	0

NORTHBOUND APPROACH LANES

S Mission Rd

TURNING MOVEMENT COUNT

S Mission Rd / Ammunition Rd (Fallbrook Gate)

(Intersection Name)

Tuesday
Day

11/20/07
Date

COUNT PERIODS

am	6:00 AM	-	8:00 AM
noon		-	
pm	2:30 PM	-	4:30 PM

CONTROL: signalized

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 330 PM

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-001

Location: Vandegrift Blvd btwn Oceanside Gate & San Rafael Dr

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	24		19					12:00	204		204				
00:15	22		24					12:15	220		216				
00:30	18		32					12:30	221		181				
00:45	20	84	11	86			170	12:45	215	860	221	822			1682
01:00	21		12					13:00	221		182				
01:15	12		14					13:15	255		208				
01:30	7		9					13:30	222		212				
01:45	10	50	7	42			92	13:45	221	919	194	796			1715
02:00	6		10					14:00	235		199				
02:15	10		4					14:15	274		255				
02:30	11		8					14:30	176		269				
02:45	9	36	6	28			64	14:45	237	922	257	980			1902
03:00	9		8					15:00	253		266				
03:15	17		5					15:15	246		359				
03:30	12		9					15:30	256		398				
03:45	22	60	17	39			99	15:45	305	1060	426	1449			2509
04:00	33		20					16:00	245		447				
04:15	38		22					16:15	255		484				
04:30	43		26					16:30	248		475				
04:45	74	188	27	95			283	16:45	242	990	500	1906			2896
05:00	97		26					17:00	274		472				
05:15	173		49					17:15	271		470				
05:30	301		61					17:30	256		426				
05:45	368	939	74	210			1149	17:45	256	1057	333	1701			2758
06:00	431		92					18:00	230		315				
06:15	560		111					18:15	202		264				
06:30	573		147					18:30	228		228				
06:45	596	2160	157	507			2667	18:45	234	894	208	1015			1909
07:00	589		168					19:00	193		204				
07:15	367		189					19:15	171		157				
07:30	226		189					19:30	191		119				
07:45	191	1373	155	701			2074	19:45	166	721	112	592			1313
08:00	174		141					20:00	150		115				
08:15	151		165					20:15	153		108				
08:30	142		151					20:30	150		76				
08:45	121	588	129	586			1174	20:45	136	589	74	373			962
09:00	162		154					21:00	148		81				
09:15	175		159					21:15	124		62				
09:30	159		163					21:30	102		66				
09:45	157	653	174	650			1303	21:45	100	474	38	247			721
10:00	145		163					22:00	96		43				
10:15	182		173					22:15	87		42				
10:30	151		162					22:30	73		33				
10:45	210	688	171	669			1357	22:45	73	329	24	142			471
11:00	166		240					23:00	58		24				
11:15	176		229					23:15	63		25				
11:30	175		231					23:30	42		28				
11:45	194	711	236	936			1647	23:45	54	217	35	112			329
Total Vol.		7530		4549			12079			9032		10135			19167

Daily Totals

NB	SB	EB	WB	Combined
16562	14684			31246

	AM			PM		
Split %	62.3%	37.7%	38.7%	47.1%	52.9%	61.3%
Peak Hour	06:15	11:00	06:15	15:30	16:15	16:30
Volume	2318	936	2901	1061	1931	2952
P.H.F.	0.97	0.98	0.96	0.86	0.97	0.99

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-002

Location: Harbor Dr btwn Harbor Dr & Del Mar Gate

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	0		0					12:00	11		142				
00:15	0		0					12:15	21		188				
00:30	0		0					12:30	14		202				
00:45	0	0	0	0				12:45	23	69	111	643			712
01:00	0		0					13:00	15		75				
01:15	0		0					13:15	18		52				
01:30	0		0					13:30	17		38				
01:45	0	0	0	0				13:45	8	58	38	203			261
02:00	0		0					14:00	15		30				
02:15	0		0					14:15	12		85				
02:30	0		0					14:30	10		44				
02:45	0	0	0	0				14:45	13	50	43	202			252
03:00	0		0					15:00	14		25				
03:15	0		0					15:15	17		27				
03:30	0		0					15:30	6		35				
03:45	0	0	0	0				15:45	10	47	26	113			160
04:00	0		0					16:00	7		22				
04:15	0		0					16:15	12		16				
04:30	0		0					16:30	23		40				
04:45	0	0	0	0				16:45	9	51	20	98			149
05:00	2		4					17:00	9		25				
05:15	0		0					17:15	9		10				
05:30	4		5					17:30	17		13				
05:45	20	26	2	11			37	17:45	7	42	13	61			103
06:00	61		1					18:00	0		2				
06:15	65		7					18:15	0		0				
06:30	95		12					18:30	0		0				
06:45	207	428	7	27			455	18:45	1	1	2	4			5
07:00	219		0					19:00	1		1				
07:15	128		10					19:15	0		0				
07:30	76		6					19:30	0		0				
07:45	35	458	20	36			494	19:45	1	2	0	1			3
08:00	16		17					20:00	1		1				
08:15	25		15					20:15	0		0				
08:30	12		25					20:30	1		2				
08:45	20	73	22	79			152	20:45	0	2	0	3			5
09:00	33		13					21:00	0		0				
09:15	27		22					21:15	0		0				
09:30	13		8					21:30	0		0				
09:45	16	89	11	54			143	21:45	0	0	0	0			
10:00	12		11					22:00	0		0				
10:15	15		16					22:15	0		0				
10:30	11		15					22:30	0		0				
10:45	14	52	20	62			114	22:45	2	2	1	1			3
11:00	17		25					23:00	0		0				
11:15	8		22					23:15	0		0				
11:30	8		37					23:30	0		0				
11:45	13	46	45	129			175	23:45	0	0	0	0			
Total Vol.		1172		398			1570			324		1329			1653

Daily Totals

NB	SB	EB	WB	Combined
1496	1727			3223

	AM			PM		
Split %	74.6%	25.4%	48.7%	19.6%	80.4%	51.3%
Peak Hour	06:30	11:45	06:30	12:15	12:00	12:00
Volume	649	577	678	73	643	712
P.H.F.	0.74	0.71	0.77	0.88	0.80	0.82

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-003

Location: Las Pulgas Rd btwn Old Pacific Hwy & Las Pulgas Gate

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			30		0			12:00			32		68		
00:15			5		3			12:15			25		84		
00:30			18		0			12:30			21		96		
00:45			20	73	0	3	76	12:45			23	101	102	350	451
01:00			16		0			13:00			20		86		
01:15			13		2			13:15			23		73		
01:30			19		0			13:30			17		69		
01:45			10	58	2	4	62	13:45			21	81	67	295	376
02:00			4		0			14:00			15		76		
02:15			12		1			14:15			26		83		
02:30			5		3			14:30			29		89		
02:45			4	25	1	5	30	14:45			30	100	94	342	442
03:00			10		2			15:00			21		83		
03:15			6		0			15:15			24		88		
03:30			8		0			15:30			19		79		
03:45			20	44	1	3	47	15:45			23	87	73	323	410
04:00			29		0			16:00			18		67		
04:15			27		0			16:15			20		71		
04:30			34		0			16:30			15		63		
04:45			28	118	0	0	118	16:45			19	72	59	260	332
05:00			66		0			17:00			12		48		
05:15			80		0			17:15			11		54		
05:30			122		0			17:30			13		50		
05:45			178	446	30	30	476	17:45			12	48	57	209	257
06:00			144		16			18:00			14		93		
06:15			166		17			18:15			9		58		
06:30			171		5			18:30			15		53		
06:45			173	654	36	74	728	18:45			12	50	62	266	316
07:00			179		48			19:00			11		37		
07:15			135		20			19:15			10		41		
07:30			94		5			19:30			11		54		
07:45			55	463	43	116	579	19:45			10	42	38	170	212
08:00			87		23			20:00			12		23		
08:15			81		30			20:15			14		16		
08:30			78		47			20:30			13		28		
08:45			51	297	16	116	413	20:45			11	50	21	88	138
09:00			55		34			21:00			13		22		
09:15			54		49			21:15			13		5		
09:30			60		45			21:30			17		23		
09:45			54	223	76	204	427	21:45			12	55	15	65	120
10:00			55		47			22:00			8		21		
10:15			63		49			22:15			14		0		
10:30			58		32			22:30			9		0		
10:45			52	228	31	159	387	22:45			9	40	2	23	63
11:00			58		37			23:00			8		0		
11:15			51		65			23:15			4		7		
11:30			45		58			23:30			5		4		
11:45			42	196	78	238	434	23:45			6	23	4	15	38
Total Vol.				2825		952	3777					749		2406	3155

Daily Totals

NB	SB	EB	WB	Combined
		3574	3358	6932

	AM			PM		
Split %	74.8%	25.2%	54.5%	23.7%	76.3%	45.5%
Peak Hour	06:15	11:45	06:15	14:15	12:15	14:30
Volume	689	326	795	106	368	458
P.H.F.	0.96	0.85	0.88	0.88	0.90	0.92

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-004

Location: Basilone Rd btwn I-5 NB ramps & San Onofre Gate

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			17		7			12:00			58		52		
00:15			13		6			12:15			58		56		
00:30			10		12			12:30			68		61		
00:45			5	45	7	32	77	12:45			55	239	69	238	477
01:00			9		8			13:00			49		86		
01:15			7		3			13:15			54		59		
01:30			4		4			13:30			40		67		
01:45			5	25	1	16	41	13:45			56	199	55	267	466
02:00			4		5			14:00			66		71		
02:15			4		20			14:15			72		78		
02:30			7		0			14:30			66		93		
02:45			7	22	1	26	48	14:45			50	254	98	340	594
03:00			2		2			15:00			88		92		
03:15			7		6			15:15			65		103		
03:30			9		0			15:30			64		106		
03:45			11	29	4	12	41	15:45			51	268	92	393	661
04:00			14		6			16:00			66		95		
04:15			21		1			16:15			61		96		
04:30			17		3			16:30			66		146		
04:45			17	69	5	15	84	16:45			81	274	104	441	715
05:00			48		11			17:00			63		124		
05:15			73		11			17:15			77		95		
05:30			120		4			17:30			68		105		
05:45			144	385	13	39	424	17:45			61	269	89	413	682
06:00			147		26			18:00			75		76		
06:15			151		37			18:15			69		75		
06:30			161		38			18:30			70		76		
06:45			159	618	39	140	758	18:45			49	263	69	296	559
07:00			137		54			19:00			58		39		
07:15			98		51			19:15			51		46		
07:30			113		56			19:30			56		35		
07:45			82	430	62	223	653	19:45			46	211	33	153	364
08:00			55		52			20:00			49		30		
08:15			40		52			20:15			36		26		
08:30			43		31			20:30			43		23		
08:45			40	178	42	177	355	20:45			39	167	29	108	275
09:00			44		23			21:00			39		29		
09:15			53		48			21:15			37		28		
09:30			65		23			21:30			29		16		
09:45			61	223	35	129	352	21:45			21	126	21	94	220
10:00			51		48			22:00			27		16		
10:15			57		33			22:15			26		13		
10:30			43		44			22:30			31		11		
10:45			48	199	76	201	400	22:45			18	102	7	47	149
11:00			60		54			23:00			14		2		
11:15			66		65			23:15			18		3		
11:30			64		67			23:30			10		1		
11:45			71	261	70	256	517	23:45			15	57	4	10	67
Total Vol.				2484		1266	3750					2429		2800	5229

Daily Totals

NB	SB	EB	WB	Combined
		4913	4066	8979

	AM			PM		
Split %	66.2%	33.8%	41.8%	46.5%	53.5%	58.2%
Peak Hour	06:00	10:45	06:15	16:45	16:15	16:30
Volume	618	262	776	289	470	756
P.H.F.	0.96	0.86	0.97	0.89	0.80	0.89

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-005

Location: Christianitos Rd btwn I-5 NB ramps & El Camino Real

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			5		0			12:00			23		90		
00:15			6		0			12:15			23		106		
00:30			4		0			12:30			68		82		
00:45			0	15	0	0	15	12:45			41	155	83	361	516
01:00			0		2			13:00			32		81		
01:15			2		0			13:15			18		64		
01:30			4		0			13:30			42		50		
01:45			4	10	1	3	13	13:45			34	126	57	252	378
02:00			2		0			14:00			42		47		
02:15			0		2			14:15			45		46		
02:30			0		0			14:30			50		58		
02:45			2	4	0	2	6	14:45			61	198	67	218	416
03:00			0		0			15:00			54		61		
03:15			0		0			15:15			51		54		
03:30			0		1			15:30			67		50		
03:45			0	0	0	1	1	15:45			44	216	53	218	434
04:00			1		0			16:00			47		48		
04:15			1		0			16:15			41		41		
04:30			0		1			16:30			38		33		
04:45			0	2	1	2	4	16:45			35	161	36	158	319
05:00			0		0			17:00			44		22		
05:15			1		1			17:15			31		31		
05:30			11		9			17:30			34		37		
05:45			56	68	49	59	127	17:45			17	126	40	130	256
06:00			69		34			18:00			10		10		
06:15			92		44			18:15			12		8		
06:30			90		42			18:30			15		5		
06:45			110	361	50	170	531	18:45			8	45	0	23	68
07:00			98		48			19:00			13		0		
07:15			104		42			19:15			4		1		
07:30			56		28			19:30			9		0		
07:45			42	300	20	138	438	19:45			18	44	0	1	45
08:00			32		41			20:00			10		0		
08:15			40		33			20:15			2		5		
08:30			37		20			20:30			4		0		
08:45			15	124	31	125	249	20:45			8	24	0	5	29
09:00			30		21			21:00			15		0		
09:15			97		0			21:15			11		0		
09:30			28		29			21:30			1		1		
09:45			23	178	24	74	252	21:45			4	31	0	1	32
10:00			16		31			22:00			5		1		
10:15			31		31			22:15			2		6		
10:30			27		29			22:30			2		0		
10:45			34	108	36	127	235	22:45			3	12	0	7	19
11:00			27		57			23:00			0		0		
11:15			40		28			23:15			6		0		
11:30			48		24			23:30			2		0		
11:45			23	138	41	150	288	23:45			2	10	0	0	10
Total Vol.				1308		851	2159					1148		1374	2522

Daily Totals

NB	SB	EB	WB	Combined
		2456	2225	4681

	AM			PM		
	EB	WB	Combined	EB	WB	Combined
Split %	60.6%	39.4%	46.1%	45.5%	54.5%	53.9%
Peak Hour	06:30	11:45	06:30	14:45	12:00	12:00
Volume	402	319	584	233	361	516
P.H.F.	0.91	0.75	0.91	0.87	0.85	0.86

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-006

Location: Christianitos Rd btwn SnOnofre StateBeach Pkg & Christianitos Gate

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			19		15			12:00			46		111		
00:15			9		3			12:15			61		152		
00:30			9		3			12:30			55		136		
00:45			5	42	5	26	68	12:45			48	210	127	526	736
01:00			3		2			13:00			67		118		
01:15			5		3			13:15			55		89		
01:30			7		3			13:30			67		102		
01:45			14	29	7	15	44	13:45			61	250	84	393	643
02:00			5		2			14:00			68		88		
02:15			12		2			14:15			60		85		
02:30			1		4			14:30			52		70		
02:45			5	23	1	9	32	14:45			67	247	74	317	564
03:00			3		0			15:00			64		50		
03:15			5		0			15:15			60		60		
03:30			1		1			15:30			58		60		
03:45			12	21	10	11	32	15:45			49	231	56	226	457
04:00			4		1			16:00			38		58		
04:15			8		3			16:15			35		48		
04:30			14		4			16:30			39		48		
04:45			22	48	10	18	66	16:45			38	150	54	208	358
05:00			17		3			17:00			41		53		
05:15			26		18			17:15			47		58		
05:30			27		12			17:30			34		54		
05:45			59	129	20	53	182	17:45			34	156	51	216	372
06:00			70		31			18:00			22		29		
06:15			90		36			18:15			26		29		
06:30			82		30			18:30			40		16		
06:45			107	349	36	133	482	18:45			42	130	22	96	226
07:00			108		35			19:00			35		20		
07:15			109		42			19:15			29		25		
07:30			70		37			19:30			26		27		
07:45			64	351	41	155	506	19:45			31	121	31	103	224
08:00			96		44			20:00			26		24		
08:15			79		40			20:15			16		21		
08:30			108		46			20:30			19		17		
08:45			79	362	57	187	549	20:45			10	71	9	71	142
09:00			113		56			21:00			21		18		
09:15			125		40			21:15			14		15		
09:30			109		64			21:30			19		13		
09:45			101	448	61	221	669	21:45			21	75	19	65	140
10:00			110		75			22:00			26		22		
10:15			91		59			22:15			12		14		
10:30			74		64			22:30			8		11		
10:45			75	350	72	270	620	22:45			10	56	10	57	113
11:00			79		97			23:00			7		11		
11:15			75		81			23:15			6		6		
11:30			76		78			23:30			8		7		
11:45			71	301	89	345	646	23:45			10	31	16	40	71
Total Vol.				2453		1443	3896					1728		2318	4046

Daily Totals

NB	SB	EB	WB	Combined
		4181	3761	7942

	AM			PM		
Split %	63.0%	37.0%	49.1%	42.7%	57.3%	50.9%
Peak Hour	09:00	11:45	11:45	13:30	12:15	12:15
Volume	448	488	721	256	533	764
P.H.F.	0.90	0.80	0.85	0.94	0.88	0.90

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-007

Location: Vandegrift Blvd btwn Papagallo Dr & San Luis Rey Gate

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	14		10					12:00	105		392				
00:15	16		7					12:15	111		442				
00:30	14		7					12:30	99		432				
00:45	9	53	3	27			80	12:45	125	440	289	1555			1995
01:00	4		10					13:00	91		310				
01:15	4		7					13:15	97		254				
01:30	1		1					13:30	101		281				
01:45	2	11	1	19			30	13:45	92	381	266	1111			1492
02:00	2		7					14:00	108		268				
02:15	4		7					14:15	90		191				
02:30	1		1					14:30	100		279				
02:45	4	11	3	18			29	14:45	91	389	239	977			1366
03:00	5		3					15:00	95		264				
03:15	4		3					15:15	99		236				
03:30	9		2					15:30	109		285				
03:45	10	28	2	10			38	15:45	97	400	200	985			1385
04:00	16		3					16:00	107		233				
04:15	36		2					16:15	101		229				
04:30	49		3					16:30	93		183				
04:45	92	193	7	15			208	16:45	101	402	191	836			1238
05:00	132		9					17:00	82		174				
05:15	135		23					17:15	57		194				
05:30	212		18					17:30	101		114				
05:45	282	761	19	69			830	17:45	73	313	125	607			920
06:00	264		20					18:00	91		93				
06:15	260		50					18:15	67		110				
06:30	337		76					18:30	60		93				
06:45	307	1168	71	217			1385	18:45	60	278	101	397			675
07:00	281		79					19:00	71		90				
07:15	259		46					19:15	60		77				
07:30	219		24					19:30	55		68				
07:45	167	926	17	166			1092	19:45	50	236	48	283			519
08:00	131		50					20:00	34		67				
08:15	124		53					20:15	42		50				
08:30	121		45					20:30	53		65				
08:45	100	476	57	205			681	20:45	52	181	35	217			398
09:00	122		56					21:00	48		35				
09:15	92		67					21:15	46		26				
09:30	96		75					21:30	34		22				
09:45	87	397	72	270			667	21:45	39	167	21	104			271
10:00	93		98					22:00	29		17				
10:15	118		91					22:15	21		22				
10:30	95		126					22:30	25		14				
10:45	86	392	127	442			834	22:45	22	97	15	68			165
11:00	87		158					23:00	17		15				
11:15	96		187					23:15	8		12				
11:30	89		228					23:30	18		12				
11:45	102	374	336	909			1283	23:45	18	61	10	49			110
Total Vol.		4790		2367			7157			3345		7189			10534

Daily Totals

NB	SB	EB	WB	Combined
8135	9556			17691

	AM			PM		
Split %	66.9%	33.1%	40.5%	31.8%	68.2%	59.5%
Peak Hour	06:15	11:45	11:45	12:00	12:00	12:00
Volume	1185	1602	2019	440	1555	1995
P.H.F.	0.88	0.91	0.91	0.93	0.88	0.90

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-008

Location: Ammunition Rd btwn Fallbrook Gate & Alturas Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			3		8			12:00			244		177		
00:15			2		8			12:15			328		100		
00:30			4		14			12:30			286		107		
00:45			5	14	9	39	53	12:45			284	1142	111	495	1637
01:00			1		18			13:00			302		97		
01:15			6		8			13:15			293		74		
01:30			1		7			13:30			329		66		
01:45			0	8	2	35	43	13:45			216	1140	84	321	1461
02:00			0		3			14:00			200		60		
02:15			2		5			14:15			206		66		
02:30			0		3			14:30			194		106		
02:45			2	4	7	18	22	14:45			295	895	103	335	1230
03:00			2		7			15:00			219		71		
03:15			0		3			15:15			242		91		
03:30			1		7			15:30			193		78		
03:45			2	5	9	26	31	15:45			172	826	78	318	1144
04:00			0		10			16:00			205		42		
04:15			0		25			16:15			190		48		
04:30			0		39			16:30			175		43		
04:45			3	3	55	129	132	16:45			158	728	39	172	900
05:00			1		114			17:00			136		52		
05:15			3		141			17:15			171		22		
05:30			5		221			17:30			137		25		
05:45			8	17	283	759	776	17:45			126	570	16	115	685
06:00			6		290			18:00			129		15		
06:15			9		359			18:15			91		13		
06:30			12		339			18:30			82		14		
06:45			11	38	362	1350	1388	18:45			71	373	17	59	432
07:00			15		359			19:00			75		11		
07:15			17		229			19:15			55		8		
07:30			21		137			19:30			79		6		
07:45			24	77	131	856	933	19:45			60	269	3	28	297
08:00			39		101			20:00			74		16		
08:15			43		99			20:15			61		8		
08:30			49		76			20:30			49		5		
08:45			43	174	77	353	527	20:45			33	217	3	32	249
09:00			41		61			21:00			36		8		
09:15			37		69			21:15			24		3		
09:30			41		58			21:30			42		2		
09:45			45	164	68	256	420	21:45			38	140	5	18	158
10:00			58		54			22:00			37		2		
10:15			63		69			22:15			37		3		
10:30			74		77			22:30			39		3		
10:45			81	276	97	297	573	22:45			27	140	2	10	150
11:00			98		107			23:00			21		2		
11:15			128		157			23:15			20		1		
11:30			164		172			23:30			9		0		
11:45			207	597	209	645	1242	23:45			8	58	0	3	61
Total Vol.				1377		4763	6140					6498		1906	8404

Daily Totals

NB	SB	EB	WB	Combined
		7875	6669	14544

	AM			PM		
	EB	WB	Combined	EB	WB	Combined
Split %	22.4%	77.6%	42.2%	77.3%	22.7%	57.8%
Peak Hour	11:45	06:15	11:45	12:45	12:00	12:00
Volume	1065	1419	1658	1208	495	1637
P.H.F.	0.81	0.98	0.97	0.92	0.70	0.96

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-009

Location: Vandegrift Blvd btwn Granite Pl & Doughlas Dr

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	14		11					12:00	134		333				
00:15	12		12					12:15	104		285				
00:30	17		8					12:30	104		322				
00:45	12	55	4	35			90	12:45	117	459	310	1250			1709
01:00	3		8					13:00	122		287				
01:15	4		5					13:15	154		244				
01:30	1		0					13:30	104		269				
01:45	1	9	2	15			24	13:45	108	488	249	1049			1537
02:00	5		6					14:00	88		194				
02:15	3		4					14:15	126		208				
02:30	4		2					14:30	125		372				
02:45	3	15	3	15			30	14:45	129	468	304	1078			1546
03:00	5		4					15:00	93		258				
03:15	3		2					15:15	99		312				
03:30	9		5					15:30	87		227				
03:45	8	25	9	20			45	15:45	111	390	236	1033			1423
04:00	13		4					16:00	101		185				
04:15	23		4					16:15	110		206				
04:30	43		8					16:30	109		174				
04:45	71	150	12	28			178	16:45	115	435	162	727			1162
05:00	97		16					17:00	129		186				
05:15	111		20					17:15	107		200				
05:30	170		25					17:30	118		118				
05:45	219	597	40	101			698	17:45	102	456	100	604			1060
06:00	238		46					18:00	137		150				
06:15	280		50					18:15	109		197				
06:30	393		54					18:30	90		118				
06:45	267	1178	66	216			1394	18:45	72	408	93	558			966
07:00	440		98					19:00	141		121				
07:15	262		65					19:15	72		106				
07:30	139		66					19:30	98		144				
07:45	112	953	72	301			1254	19:45	61	372	79	450			822
08:00	104		107					20:00	48		64				
08:15	113		143					20:15	70		57				
08:30	122		105					20:30	53		56				
08:45	101	440	131	486			926	20:45	76	247	48	225			472
09:00	103		107					21:00	48		34				
09:15	108		101					21:15	60		52				
09:30	104		157					21:30	59		33				
09:45	105	420	140	505			925	21:45	72	239	54	173			412
10:00	83		111					22:00	77		54				
10:15	96		122					22:15	49		68				
10:30	125		150					22:30	64		41				
10:45	93	397	167	550			947	22:45	65	255	26	189			444
11:00	81		215					23:00	39		43				
11:15	99		157					23:15	34		39				
11:30	87		221					23:30	36		21				
11:45	97	364	290	883			1247	23:45	23	132	15	118			250
Total Vol.		4603		3155			7758			4349		7454			11803

Daily Totals

NB	SB	EB	WB	Combined
8952	10609			19561

	AM			PM		
Split %	59.3%	40.7%	39.7%	36.8%	63.2%	60.3%
Peak Hour	06:15	11:45	11:45	12:30	12:00	12:00
Volume	1380	1230	1669	497	1250	1709
P.H.F.	0.78	0.92	0.89	0.95	0.94	0.91

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4256-010

Location: S Mission Rd btwn Ammunition Rd & E Aviation Rd

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	12		17					12:00	244		267				
00:15	16		14					12:15	267		241				
00:30	17		18					12:30	301		232				
00:45	9	54	11	60			114	12:45	293	1105	223	963			2068
01:00	6		12					13:00	287		273				
01:15	12		3					13:15	305		238				
01:30	6		3					13:30	297		207				
01:45	4	28	4	22			50	13:45	265	1154	219	937			2091
02:00	10		1					14:00	241		219				
02:15	10		7					14:15	248		221				
02:30	12		2					14:30	282		168				
02:45	12	44	7	17			61	14:45	271	1042	146	754			1796
03:00	8		8					15:00	246		177				
03:15	2		6					15:15	264		159				
03:30	4		7					15:30	256		162				
03:45	8	22	18	39			61	15:45	235	1001	158	656			1657
04:00	12		25					16:00	240		188				
04:15	16		35					16:15	241		186				
04:30	18		47					16:30	239		167				
04:45	20	66	64	171			237	16:45	194	914	176	717			1631
05:00	34		90					17:00	215		164				
05:15	32		132					17:15	215		157				
05:30	58		155					17:30	196		145				
05:45	58	182	193	570			752	17:45	192	818	122	588			1406
06:00	62		246					18:00	176		122				
06:15	102		271					18:15	138		110				
06:30	104		265					18:30	145		112				
06:45	136	404	260	1042			1446	18:45	117	576	95	439			1015
07:00	140		250					19:00	128		99				
07:15	154		204					19:15	106		102				
07:30	168		193					19:30	108		83				
07:45	196	658	177	824			1482	19:45	108	450	86	370			820
08:00	194		153					20:00	105		77				
08:15	188		149					20:15	85		77				
08:30	149		140					20:30	77		73				
08:45	160	691	163	605			1296	20:45	89	356	66	293			649
09:00	179		199					21:00	85		78				
09:15	151		197					21:15	77		60				
09:30	126		145					21:30	64		58				
09:45	123	579	178	719			1298	21:45	67	293	54	250			543
10:00	105		182					22:00	61		51				
10:15	140		210					22:15	57		36				
10:30	152		239					22:30	53		37				
10:45	184	581	245	876			1457	22:45	32	203	26	150			353
11:00	181		245					23:00	26		26				
11:15	206		206					23:15	31		30				
11:30	190		248					23:30	26		15				
11:45	222	799	218	917			1716	23:45	17	100	16	87			187
Total Vol.		4108		5862			9970			8012		6204			14216

Daily Totals

NB	SB	EB	WB	Combined
12120	12066			24186

	AM			PM		
Split %	41.2%	58.8%	41.2%	56.4%	43.6%	58.8%
Peak Hour	11:45	06:15	11:45	12:30	12:15	12:30
Volume	1034	1046	1992	1186	969	2152
P.H.F.	0.86	0.96	0.93	0.97	0.89	0.96

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-001

Location: Vandegrift Blvd btwn Barnett Circle & 4th St

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	23		12					12:00	113		181				
00:15	16		11					12:15	104		165				
00:30	11		4					12:30	128		143				
00:45	17	67	2	29			96	12:45	150	495	159	648			1143
01:00	8		6					13:00	125		129				
01:15	8		3					13:15	168		149				
01:30	4		4					13:30	169		152				
01:45	4	24	7	20			44	13:45	179	641	147	577			1218
02:00	5		6					14:00	120		155				
02:15	3		1					14:15	94		173				
02:30	1		5					14:30	110		145				
02:45	5	14	2	14			28	14:45	103	427	167	640			1067
03:00	2		2					15:00	90		203				
03:15	2		3					15:15	111		216				
03:30	3		1					15:30	103		259				
03:45	1	8	6	12			20	15:45	88	392	261	939			1331
04:00	3		5					16:00	93		387				
04:15	4		7					16:15	92		378				
04:30	9		5					16:30	89		429				
04:45	10	26	8	25			51	16:45	97	371	415	1609			1980
05:00	9		3					17:00	82		405				
05:15	21		12					17:15	101		317				
05:30	33		15					17:30	88		270				
05:45	63	126	25	55			181	17:45	79	350	227	1219			1569
06:00	81		22					18:00	86		202				
06:15	87		26					18:15	106		139				
06:30	150		29					18:30	101		146				
06:45	212	530	36	113			643	18:45	98	391	138	625			1016
07:00	244		54					19:00	86		112				
07:15	325		69					19:15	69		113				
07:30	451		65					19:30	54		67				
07:45	502	1522	85	273			1795	19:45	49	258	60	352			610
08:00	477		44					20:00	59		51				
08:15	483		64					20:15	70		61				
08:30	361		88					20:30	55		51				
08:45	217	1538	54	250			1788	20:45	61	245	46	209			454
09:00	144		97					21:00	58		30				
09:15	102		81					21:15	41		36				
09:30	110		88					21:30	45		38				
09:45	128	484	88	354			838	21:45	49	193	29	133			326
10:00	94		96					22:00	42		24				
10:15	100		93					22:15	41		23				
10:30	110		93					22:30	41		18				
10:45	101	405	132	414			819	22:45	37	161	19	84			245
11:00	85		183					23:00	25		12				
11:15	112		193					23:15	33		15				
11:30	98		209					23:30	35		26				
11:45	90	385	211	796			1181	23:45	17	110	12	65			175
Total Vol.		5129		2355			7484			4034		7100			11134

Daily Totals

NB	SB	EB	WB	Combined
9163	9455			18618

	AM				PM		
Split %	68.5%	31.5%	40.2%		36.2%	63.8%	59.8%
Peak Hour	07:30	11:00	07:30		13:00	16:15	16:15
Volume	1913	796	2171		641	1627	1987
P.H.F.	0.95	0.94	0.92		0.93	0.95	0.96

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-002

Location: Vandegrift Blvd btwn 15th St & 16th St

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	5		13					12:00	288		216				
00:15	5		12					12:15	253		220				
00:30	7		2					12:30	292		183				
00:45	5	22	7	34			56	12:45	275	1108	204	823			1931
01:00	2		6					13:00	218		184				
01:15	0		3					13:15	220		215				
01:30	2		3					13:30	202		169				
01:45	2	6	4	16			22	13:45	181	821	193	761			1582
02:00	3		7					14:00	190		170				
02:15	1		2					14:15	215		193				
02:30	3		4					14:30	197		170				
02:45	1	8	3	16			24	14:45	201	803	198	731			1534
03:00	1		2					15:00	192		191				
03:15	6		2					15:15	174		244				
03:30	9		4					15:30	163		298				
03:45	11	27	6	14			41	15:45	210	739	261	994			1733
04:00	3		10					16:00	189		327				
04:15	12		8					16:15	179		306				
04:30	24		11					16:30	234		367				
04:45	50	89	19	48			137	16:45	169	771	318	1318			2089
05:00	73		17					17:00	189		301				
05:15	86		18					17:15	155		269				
05:30	112		31					17:30	145		216				
05:45	163	434	59	125			559	17:45	130	619	203	989			1608
06:00	205		72					18:00	133		151				
06:15	269		93					18:15	104		122				
06:30	342		113					18:30	56		82				
06:45	395	1211	150	428			1639	18:45	83	376	91	446			822
07:00	381		163					19:00	79		108				
07:15	367		223					19:15	79		71				
07:30	267		205					19:30	59		67				
07:45	173	1188	186	777			1965	19:45	61	278	49	295			573
08:00	180		161					20:00	56		45				
08:15	147		158					20:15	61		55				
08:30	191		144					20:30	55		37				
08:45	142	660	165	628			1288	20:45	78	250	38	175			425
09:00	153		162					21:00	44		32				
09:15	149		196					21:15	34		23				
09:30	172		165					21:30	35		22				
09:45	195	669	207	730			1399	21:45	34	147	26	103			250
10:00	179		208					22:00	26		28				
10:15	184		175					22:15	24		14				
10:30	207		195					22:30	30		23				
10:45	208	778	203	781			1559	22:45	13	93	12	77			170
11:00	214		271					23:00	17		15				
11:15	247		258					23:15	13		21				
11:30	241		258					23:30	9		25				
11:45	253	955	229	1016			1971	23:45	7	46	15	76			122
Total Vol.		6047		4613			10660			6051		6788			12839

Daily Totals

NB	SB	EB	WB	Combined
12098	11401			23499

	AM			PM		
Split %	56.7%	43.3%	45.4%	47.1%	52.9%	54.6%
Peak Hour	06:30	11:00	06:45	12:00	16:00	16:00
Volume	1485	1016	2151	1108	1318	2089
P.H.F.	0.94	0.94	0.91	0.96	0.90	0.87

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-003

Location: 19th St btwn Marine Dr & Ham Rd (e/o Marine Dr)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	2		2					12:00	61		35				
00:15	4		2					12:15	41		36				
00:30	5		0					12:30	59		44				
00:45	4	15	1	5			20	12:45	48	209	69	184			393
01:00	3		1					13:00	60		51				
01:15	4		0					13:15	65		32				
01:30	2		0					13:30	55		48				
01:45	0	9	0	1			10	13:45	62	242	33	164			406
02:00	1		2					14:00	79		36				
02:15	6		4					14:15	77		35				
02:30	4		2					14:30	75		28				
02:45	0	11	1	9			20	14:45	79	310	29	128			438
03:00	1		1					15:00	111		41				
03:15	0		5					15:15	131		22				
03:30	2		4					15:30	173		26				
03:45	3	6	8	18			24	15:45	199	614	28	117			731
04:00	7		6					16:00	267		31				
04:15	11		13					16:15	228		22				
04:30	8		38					16:30	254		27				
04:45	2	28	44	101			129	16:45	246	995	22	102			1097
05:00	4		73					17:00	239		27				
05:15	4		79					17:15	207		21				
05:30	7		143					17:30	150		28				
05:45	9	24	180	475			499	17:45	126	722	23	99			821
06:00	4		228					18:00	104		20				
06:15	19		290					18:15	94		21				
06:30	5		271					18:30	75		25				
06:45	13	41	280	1069			1110	18:45	77	350	27	93			443
07:00	23		286					19:00	45		13				
07:15	24		269					19:15	59		16				
07:30	29		273					19:30	38		11				
07:45	30	106	115	943			1049	19:45	39	181	15	55			236
08:00	15		64					20:00	22		12				
08:15	23		63					20:15	28		11				
08:30	22		47					20:30	27		12				
08:45	37	97	53	227			324	20:45	27	104	9	44			148
09:00	30		47					21:00	17		7				
09:15	22		39					21:15	13		12				
09:30	25		47					21:30	12		7				
09:45	34	111	40	173			284	21:45	12	54	8	34			88
10:00	27		45					22:00	11		2				
10:15	26		41					22:15	4		3				
10:30	34		38					22:30	11		12				
10:45	44	131	42	166			297	22:45	12	38	5	22			60
11:00	39		39					23:00	13		3				
11:15	52		45					23:15	3		7				
11:30	69		28					23:30	9		5				
11:45	69	229	45	157			386	23:45	2	27	3	18			45
Total Vol.		808		3344			4152			3846		1060			4906

Daily Totals

NB	SB	EB	WB	Combined
4654	4404			9058

	AM				PM			
Split %	19.5%	80.5%		45.8%	78.4%	21.6%		54.2%
Peak Hour	11:15	06:15		06:45	16:00	12:15		16:00
Volume	251	1127		1197	995	200		1097
P.H.F.	0.91	0.97		0.97	0.94	0.72		0.92

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-004

Location: 16th St btwn B St & A St (before the road splits)

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			14		2			12:00			180		185		
00:15			5		4			12:15			159		205		
00:30			4		5			12:30			170		224		
00:45			10	33	5	16	49	12:45			173	682	209	823	1505
01:00			2		0			13:00			144		151		
01:15			6		1			13:15			169		141		
01:30			2		0			13:30			125		171		
01:45			3	13	3	4	17	13:45			143	581	132	595	1176
02:00			4		1			14:00			133		137		
02:15			3		1			14:15			170		147		
02:30			5		2			14:30			166		174		
02:45			2	14	3	7	21	14:45			167	636	144	602	1238
03:00			1		0			15:00			164		170		
03:15			1		4			15:15			214		127		
03:30			4		7			15:30			263		153		
03:45			2	8	10	21	29	15:45			232	873	149	599	1472
04:00			12		13			16:00			268		158		
04:15			7		29			16:15			269		122		
04:30			14		35			16:30			324		167		
04:45			15	48	42	119	167	16:45			281	1142	153	600	1742
05:00			12		72			17:00			274		136		
05:15			18		91			17:15			245		109		
05:30			37		117			17:30			183		91		
05:45			50	117	168	448	565	17:45			161	863	94	430	1293
06:00			45		178			18:00			128		45		
06:15			64		279			18:15			91		67		
06:30			89		327			18:30			87		66		
06:45			125	323	355	1139	1462	18:45			71	377	52	230	607
07:00			154		300			19:00			70		49		
07:15			216		275			19:15			61		49		
07:30			168		224			19:30			62		38		
07:45			137	675	143	942	1617	19:45			44	237	35	171	408
08:00			107		124			20:00			39		34		
08:15			126		131			20:15			38		36		
08:30			117		137			20:30			34		38		
08:45			138	488	131	523	1011	20:45			28	139	35	143	282
09:00			130		119			21:00			31		29		
09:15			153		115			21:15			23		22		
09:30			146		161			21:30			16		31		
09:45			177	606	159	554	1160	21:45			19	89	22	104	193
10:00			170		126			22:00			24		22		
10:15			139		150			22:15			17		16		
10:30			128		176			22:30			20		19		
10:45			163	600	166	618	1218	22:45			12	73	12	69	142
11:00			170		151			23:00			14		7		
11:15			189		184			23:15			16		7		
11:30			194		171			23:30			11		8		
11:45			181	734	192	698	1432	23:45			8	49	5	27	76
Total Vol.				3659		5089	8748					5741		4393	10134

Daily Totals

NB	SB	EB	WB	Combined
		9400	9482	18882

	AM			PM		
Split %	41.8%	58.2%	46.3%	56.7%	43.3%	53.7%
Peak Hour	11:15	06:15	06:30	16:15	12:00	16:00
Volume	744	1261	1841	1148	823	1742
P.H.F.	0.96	0.89	0.94	0.89	0.92	0.89

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-005

Location: Vandegrift Blvd btwn Basilone Rd & Rattlesnake Cyn Rd

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	2		8					12:00	284		287				
00:15	6		7					12:15	246		294				
00:30	11		4					12:30	270		294				
00:45	10	29	5	24			53	12:45	312	1112	309	1184			2296
01:00	7		5					13:00	267		219				
01:15	8		2					13:15	282		231				
01:30	4		2					13:30	246		234				
01:45	5	24	2	11			35	13:45	253	1048	203	887			1935
02:00	6		3					14:00	251		211				
02:15	7		2					14:15	287		217				
02:30	7		8					14:30	272		235				
02:45	3	23	7	20			43	14:45	250	1060	225	888			1948
03:00	3		2					15:00	259		260				
03:15	2		9					15:15	357		237				
03:30	7		8					15:30	393		273				
03:45	4	16	16	35			51	15:45	348	1357	264	1034			2391
04:00	27		22					16:00	393		251				
04:15	17		34					16:15	423		213				
04:30	29		50					16:30	478		219				
04:45	28	101	69	175			276	16:45	454	1748	274	957			2705
05:00	21		125					17:00	440		209				
05:15	35		156					17:15	365		142				
05:30	56		188					17:30	296		112				
05:45	85	197	258	727			924	17:45	263	1364	130	593			1957
06:00	105		309					18:00	204		125				
06:15	168		408					18:15	186		100				
06:30	206		501					18:30	154		82				
06:45	260	739	534	1752			2491	18:45	116	660	85	392			1052
07:00	286		477					19:00	118		66				
07:15	377		454					19:15	89		81				
07:30	310		340					19:30	106		65				
07:45	243	1216	275	1546			2762	19:45	67	380	51	263			643
08:00	219		192					20:00	73		45				
08:15	198		226					20:15	58		48				
08:30	188		237					20:30	60		53				
08:45	226	831	220	875			1706	20:45	48	239	45	191			430
09:00	217		183					21:00	48		39				
09:15	257		200					21:15	34		36				
09:30	226		224					21:30	31		46				
09:45	302	1002	252	859			1861	21:45	40	153	27	148			301
10:00	247		190					22:00	33		36				
10:15	239		222					22:15	29		23				
10:30	240		248					22:30	30		25				
10:45	274	1000	264	924			1924	22:45	27	119	18	102			221
11:00	282		250					23:00	20		12				
11:15	289		268					23:15	20		17				
11:30	318		263					23:30	12		14				
11:45	272	1161	288	1069			2230	23:45	14	66	7	50			116
Total Vol.		6339		8017			14356			9306		6689			15995

Daily Totals

NB	SB	EB	WB	Combined
15645	14706			30351

	AM			PM		
Split %	44.2%	55.8%	47.3%	58.2%	41.8%	52.7%
Peak Hour	06:45	06:30	06:30	16:15	12:00	16:15
Volume	1233	1966	3095	1795	1184	2710
P.H.F.	0.82	0.92	0.93	0.95	0.96	0.93

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-006

Location: Stagecoach Rd btwn Margarita Camp Access & Basilone Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			1		4			12:00			50		46		
00:15			0		1			12:15			52		45		
00:30			1		2			12:30			52		48		
00:45			0	2	1	8	10	12:45			49	203	41	180	383
01:00			1		2			13:00			38		35		
01:15			0		0			13:15			61		34		
01:30			0		0			13:30			26		30		
01:45			0	1	1	3	4	13:45			37	162	29	128	290
02:00			1		0			14:00			32		30		
02:15			0		1			14:15			30		19		
02:30			0		0			14:30			32		22		
02:45			0	1	1	2	3	14:45			46	140	25	96	236
03:00			0		1			15:00			63		27		
03:15			0		0			15:15			65		28		
03:30			0		0			15:30			54		29		
03:45			0	0	3	4	4	15:45			64	246	21	105	351
04:00			1		1			16:00			71		20		
04:15			0		0			16:15			95		20		
04:30			2		8			16:30			95		25		
04:45			1	4	3	12	16	16:45			75	336	23	88	424
05:00			4		10			17:00			58		29		
05:15			6		12			17:15			57		20		
05:30			3		20			17:30			44		25		
05:45			7	20	36	78	98	17:45			41	200	17	91	291
06:00			10		27			18:00			34		24		
06:15			13		50			18:15			19		26		
06:30			9		89			18:30			23		10		
06:45			21	53	116	282	335	18:45			17	93	15	75	168
07:00			37		97			19:00			16		11		
07:15			60		79			19:15			12		18		
07:30			30		71			19:30			14		12		
07:45			14	141	70	317	458	19:45			10	52	16	57	109
08:00			19		46			20:00			10		17		
08:15			31		42			20:15			10		7		
08:30			33		52			20:30			10		9		
08:45			44	127	54	194	321	20:45			10	40	21	54	94
09:00			40		30			21:00			11		15		
09:15			23		38			21:15			4		9		
09:30			38		29			21:30			3		8		
09:45			33	134	31	128	262	21:45			5	23	10	42	65
10:00			27		41			22:00			7		10		
10:15			29		39			22:15			5		11		
10:30			37		39			22:30			6		3		
10:45			38	131	48	167	298	22:45			4	22	7	31	53
11:00			64		48			23:00			2		5		
11:15			48		30			23:15			2		2		
11:30			40		48			23:30			1		1		
11:45			59	211	53	179	390	23:45			2	7	1	9	16
Total Vol.				825		1374	2199					1524		956	2480

Daily Totals

NB	SB	EB	WB	Combined
		2349	2330	4679

	AM			PM		
	EB	WB	Combined	EB	WB	Combined
Split %	37.5%	62.5%	47.0%	61.5%	38.5%	53.0%
Peak Hour	11:45	06:30	06:45	16:00	12:00	16:00
Volume	213	381	511	336	180	424
P.H.F.	0.90	0.82	0.92	0.88	0.94	0.88

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-007

Location: Vandegrift Blvd e/o Stagecoach Rd (w/o the Water Treatment Plan)

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			11		10			12:00			157		188		
00:15			6		13			12:15			151		186		
00:30			11		11			12:30			197		162		
00:45			5	33	5	39	72	12:45			204	709	181	717	1426
01:00			5		15			13:00			191		159		
01:15			3		6			13:15			177		162		
01:30			4		7			13:30			130		144		
01:45			6	18	8	36	54	13:45			143	641	147	612	1253
02:00			7		5			14:00			149		175		
02:15			4		5			14:15			150		193		
02:30			0		12			14:30			164		209		
02:45			3	14	5	27	41	14:45			179	642	196	773	1415
03:00			6		5			15:00			160		236		
03:15			1		6			15:15			146		225		
03:30			9		3			15:30			158		268		
03:45			9	25	6	20	45	15:45			130	594	273	1002	1596
04:00			12		8			16:00			122		304		
04:15			14		14			16:15			116		348		
04:30			25		13			16:30			152		436		
04:45			34	85	19	54	139	16:45			138	528	388	1476	2004
05:00			49		35			17:00			152		362		
05:15			85		55			17:15			120		287		
05:30			118		58			17:30			145		219		
05:45			202	454	61	209	663	17:45			114	531	156	1024	1555
06:00			206		83			18:00			109		126		
06:15			347		117			18:15			84		118		
06:30			451		108			18:30			90		85		
06:45			459	1463	118	426	1889	18:45			72	355	87	416	771
07:00			458		128			19:00			89		78		
07:15			476		118			19:15			61		71		
07:30			303		103			19:30			61		59		
07:45			214	1451	122	471	1922	19:45			59	270	60	268	538
08:00			162		96			20:00			53		46		
08:15			158		114			20:15			47		43		
08:30			135		163			20:30			47		45		
08:45			148	603	124	497	1100	20:45			39	186	47	181	367
09:00			133		155			21:00			36		39		
09:15			160		127			21:15			45		19		
09:30			147		134			21:30			34		31		
09:45			177	617	151	567	1184	21:45			31	146	26	115	261
10:00			111		131			22:00			34		26		
10:15			145		150			22:15			24		20		
10:30			123		173			22:30			20		18		
10:45			171	550	168	622	1172	22:45			15	93	20	84	177
11:00			133		190			23:00			16		6		
11:15			132		203			23:15			10		14		
11:30			149		201			23:30			14		21		
11:45			160	574	201	795	1369	23:45			13	53	17	58	111
Total Vol.				5887		3763	9650					4748		6726	11474

Daily Totals

NB	SB	EB	WB	Combined
		10635	10489	21124

	AM			PM		
Split %	61.0%	39.0%	45.7%	41.4%	58.6%	54.3%
Peak Hour	06:30	11:00	06:30	12:30	16:15	16:15
Volume	1844	795	2316	769	1534	2092
P.H.F.	0.97	0.98	0.97	0.94	0.88	0.89

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-008

Location: A St btwn Vandegrift Rd & I-5 Bridge

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			4		9			12:00			166		105		
00:15			0		7			12:15			142		124		
00:30			0		3			12:30			107		134		
00:45			6	10	8	27	37	12:45			148	563	153	516	1079
01:00			1		5			13:00			141		128		
01:15			1		3			13:15			109		101		
01:30			1		4			13:30			104		105		
01:45			3	6	0	12	18	13:45			144	498	89	423	921
02:00			0		2			14:00			100		84		
02:15			1		2			14:15			117		79		
02:30			1		2			14:30			144		75		
02:45			0	2	3	9	11	14:45			117	478	84	322	800
03:00			0		1			15:00			113		91		
03:15			0		1			15:15			120		96		
03:30			1		0			15:30			120		121		
03:45			0	1	4	6	7	15:45			109	462	71	379	841
04:00			1		4			16:00			104		84		
04:15			3		5			16:15			142		73		
04:30			6		6			16:30			126		77		
04:45			3	13	18	33	46	16:45			174	546	51	285	831
05:00			9		31			17:00			198		81		
05:15			16		53			17:15			109		81		
05:30			25		84			17:30			96		85		
05:45			41	91	95	263	354	17:45			74	477	78	325	802
06:00			35		83			18:00			74		86		
06:15			51		94			18:15			63		79		
06:30			81		118			18:30			46		59		
06:45			99	266	140	435	701	18:45			50	233	68	292	525
07:00			118		185			19:00			41		64		
07:15			118		181			19:15			39		53		
07:30			93		192			19:30			48		45		
07:45			81	410	128	686	1096	19:45			31	159	47	209	368
08:00			87		99			20:00			44		48		
08:15			94		79			20:15			30		33		
08:30			85		88			20:30			26		40		
08:45			69	335	110	376	711	20:45			28	128	56	177	305
09:00			85		78			21:00			24		38		
09:15			65		75			21:15			31		41		
09:30			72		68			21:30			22		25		
09:45			88	310	74	295	605	21:45			46	123	27	131	254
10:00			50		87			22:00			31		21		
10:15			62		56			22:15			31		28		
10:30			88		75			22:30			13		18		
10:45			93	293	101	319	612	22:45			9	84	14	81	165
11:00			96		134			23:00			9		15		
11:15			128		82			23:15			7		18		
11:30			150		114			23:30			2		14		
11:45			132	506	94	424	930	23:45			2	20	7	54	74
Total Vol.				2243		2885	5128					3771		3194	6965

Daily Totals

NB	SB	EB	WB	Combined
		6014	6079	12093

	AM			PM		
Split %	43.7%	56.3%	42.4%	54.1%	45.9%	57.6%
Peak Hour	11:30	06:45	06:45	16:15	12:15	12:00
Volume	590	698	1126	640	539	1079
P.H.F.	0.89	0.91	0.93	0.81	0.88	0.90

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-009

Location: Stuart Mesa Rd btwn Macs Rd & Bloom St

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	10		1					12:00	77		65				
00:15	18		3					12:15	65		55				
00:30	6		8					12:30	76		74				
00:45	6	40	10	22			62	12:45	62	280	88	282			562
01:00	9		5					13:00	63		93				
01:15	4		2					13:15	48		81				
01:30	5		2					13:30	55		62				
01:45	2	20	2	11			31	13:45	46	212	70	306			518
02:00	5		2					14:00	61		59				
02:15	4		3					14:15	39		68				
02:30	4		2					14:30	53		54				
02:45	1	14	1	8			22	14:45	45	198	90	271			469
03:00	5		0					15:00	55		98				
03:15	6		2					15:15	57		80				
03:30	6		2					15:30	66		106				
03:45	2	19	2	6			25	15:45	52	230	123	407			637
04:00	15		4					16:00	65		143				
04:15	6		4					16:15	56		110				
04:30	20		2					16:30	67		121				
04:45	20	61	6	16			77	16:45	87	275	112	486			761
05:00	18		10					17:00	98		139				
05:15	29		19					17:15	102		144				
05:30	46		30					17:30	103		135				
05:45	69	162	46	105			267	17:45	84	387	127	545			932
06:00	96		51					18:00	84		116				
06:15	129		52					18:15	69		100				
06:30	169		96					18:30	78		95				
06:45	166	560	124	323			883	18:45	58	289	81	392			681
07:00	185		108					19:00	62		59				
07:15	130		146					19:15	51		57				
07:30	128		125					19:30	44		42				
07:45	93	536	119	498			1034	19:45	62	219	52	210			429
08:00	84		82					20:00	42		39				
08:15	74		62					20:15	51		36				
08:30	61		87					20:30	33		27				
08:45	51	270	67	298			568	20:45	36	162	26	128			290
09:00	56		48					21:00	42		21				
09:15	62		61					21:15	29		23				
09:30	56		76					21:30	32		27				
09:45	65	239	50	235			474	21:45	25	128	18	89			217
10:00	44		76					22:00	29		10				
10:15	50		66					22:15	14		10				
10:30	49		68					22:30	14		11				
10:45	70	213	64	274			487	22:45	11	68	5	36			104
11:00	64		71					23:00	14		7				
11:15	62		65					23:15	15		8				
11:30	68		84					23:30	11		6				
11:45	89	283	78	298			581	23:45	12	52	5	26			78
Total Vol.		2417		2094			4511			2500		3178			5678

Daily Totals

NB	SB	EB	WB	Combined
4917	5272			10189

	AM			PM		
Split %	53.6%	46.4%	44.3%	44.0%	56.0%	55.7%
Peak Hour	06:30	06:45	06:30	16:45	17:00	17:00
Volume	650	503	1124	390	545	932
P.H.F.	0.88	0.86	0.96	0.95	0.95	0.95

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-010

Location: Macs Rd e/o Stuart Mesa Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			0		0			12:00			5		7		
00:15			0		0			12:15			5		9		
00:30			0		1			12:30			11		2		
00:45			0	0	0	1	1	12:45			15	36	3	21	57
01:00			0		0			13:00			18		14		
01:15			0		0			13:15			13		13		
01:30			0		1			13:30			13		8		
01:45			1	1	0	1	2	13:45			9	53	5	40	93
02:00			0		0			14:00			10		13		
02:15			0		0			14:15			4		6		
02:30			0		0			14:30			4		3		
02:45			0	0	0	0		14:45			5	23	9	31	54
03:00			0		0			15:00			3		18		
03:15			0		0			15:15			6		24		
03:30			0		0			15:30			5		22		
03:45			0	0	0	0		15:45			1	15	17	81	96
04:00			0		0			16:00			1		10		
04:15			0		0			16:15			1		26		
04:30			0		0			16:30			0		25		
04:45			0	0	0	0		16:45			2	4	31	92	96
05:00			1		0			17:00			3		35		
05:15			9		0			17:15			5		33		
05:30			12		1			17:30			0		18		
05:45			17	39	1	2	41	17:45			1	9	4	90	99
06:00			11		1			18:00			0		4		
06:15			2		3			18:15			0		4		
06:30			6		4			18:30			1		1		
06:45			5	24	3	11	35	18:45			0	1	1	10	11
07:00			17		0			19:00			2		0		
07:15			60		1			19:15			0		4		
07:30			68		0			19:30			0		0		
07:45			11	156	5	6	162	19:45			0	2	0	4	6
08:00			11		11			20:00			0		0		
08:15			12		12			20:15			1		1		
08:30			13		6			20:30			0		2		
08:45			9	45	9	38	83	20:45			1	2	0	3	5
09:00			5		3			21:00			0		0		
09:15			5		6			21:15			0		0		
09:30			9		4			21:30			1		0		
09:45			12	31	10	23	54	21:45			0	1	0	0	1
10:00			6		7			22:00			4		0		
10:15			6		5			22:15			0		0		
10:30			7		6			22:30			0		0		
10:45			3	22	2	20	42	22:45			0	4	0	0	4
11:00			5		7			23:00			0		0		
11:15			4		5			23:15			0		0		
11:30			2		11			23:30			0		0		
11:45			4	15	15	38	53	23:45			0	0	0	0	

	AM EB	AM WB	AM Total	PM EB	PM WB	PM Total
Total Vol.	333	140	473	150	372	522

Daily Totals

NB	SB	EB	WB	Combined
		483	512	995

	AM EB	AM WB	AM Combined	PM EB	PM WB	PM Combined
Split %	70.4%	29.6%	47.5%	28.7%	71.3%	52.5%
Peak Hour	07:00	11:30	07:15	12:45	16:30	16:30
Volume	156	42	167	59	124	134
P.H.F.	0.57	0.70	0.61	0.82	0.89	0.88

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-011

Location: Stuart Mesa Rd n/o Aliso Cyn Rd

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	2		2					12:00	66		52				
00:15	3		0					12:15	47		51				
00:30	3		6					12:30	76		45				
00:45	0	8	8	16			24	12:45	61	250	61	209			459
01:00	1		1					13:00	62		59				
01:15	0		4					13:15	52		42				
01:30	0		0					13:30	33		49				
01:45	0	1	2	7			8	13:45	42	189	49	199			388
02:00	1		0					14:00	38		56				
02:15	0		1					14:15	38		56				
02:30	2		0					14:30	27		67				
02:45	0	3	0	1			4	14:45	29	132	89	268			400
03:00	1		2					15:00	44		73				
03:15	2		0					15:15	33		103				
03:30	2		0					15:30	26		95				
03:45	0	5	1	3			8	15:45	44	147	149	420			567
04:00	3		1					16:00	34		107				
04:15	14		1					16:15	23		103				
04:30	22		1					16:30	17		122				
04:45	13	52	2	5			57	16:45	17	91	130	462			553
05:00	28		7					17:00	15		120				
05:15	32		8					17:15	24		120				
05:30	56		13					17:30	27		80				
05:45	78	194	22	50			244	17:45	26	92	67	387			479
06:00	92		24					18:00	23		61				
06:15	150		22					18:15	21		54				
06:30	216		18					18:30	17		42				
06:45	255	713	30	94			807	18:45	17	78	23	180			258
07:00	219		34					19:00	12		16				
07:15	170		36					19:15	15		21				
07:30	132		50					19:30	16		21				
07:45	91	612	56	176			788	19:45	12	55	25	83			138
08:00	78		34					20:00	15		11				
08:15	47		46					20:15	9		19				
08:30	48		56					20:30	6		15				
08:45	60	233	33	169			402	20:45	6	36	6	51			87
09:00	41		44					21:00	10		9				
09:15	39		52					21:15	9		3				
09:30	37		35					21:30	7		4				
09:45	52	169	55	186			355	21:45	7	33	3	19			52
10:00	45		53					22:00	8		6				
10:15	41		53					22:15	2		3				
10:30	33		57					22:30	5		3				
10:45	41	160	48	211			371	22:45	3	18	1	13			31
11:00	44		64					23:00	1		2				
11:15	37		86					23:15	1		2				
11:30	38		67					23:30	2		3				
11:45	53	172	84	301			473	23:45	8	12	3	10			22
Total Vol.		2322		1219			3541			1133		2301			3434

Daily Totals

NB	SB	EB	WB	Combined
3455	3520			6975

	AM			PM		
Split %	65.6%	34.4%	50.8%	33.0%	67.0%	49.2%
Peak Hour	06:30	11:00	06:30	12:30	16:30	15:45
Volume	860	301	978	251	492	599
P.H.F.	0.84	0.88	0.86	0.86	0.95	0.78

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-012

Location: El Camino Real Rd btwn Stuart Mesa Rd & Las Pulgas Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			2		0			12:00			28		41		
00:15			6		1			12:15			26		24		
00:30			4		3			12:30			35		21		
00:45			1	13	0	4	17	12:45			42	131	23	109	240
01:00			1		2			13:00			44		18		
01:15			4		1			13:15			40		35		
01:30			4		2			13:30			48		20		
01:45			3	12	1	6	18	13:45			31	163	19	92	255
02:00			1		1			14:00			25		22		
02:15			3		2			14:15			39		35		
02:30			0		1			14:30			30		24		
02:45			1	5	1	5	10	14:45			34	128	28	109	237
03:00			1		1			15:00			39		36		
03:15			0		1			15:15			42		33		
03:30			1		0			15:30			39		28		
03:45			3	5	0	2	7	15:45			32	152	52	149	301
04:00			1		2			16:00			28		33		
04:15			0		0			16:15			34		23		
04:30			2		0			16:30			39		42		
04:45			1	4	1	3	7	16:45			27	128	49	147	275
05:00			1		1			17:00			25		50		
05:15			5		3			17:15			25		62		
05:30			7		3			17:30			37		50		
05:45			13	26	4	11	37	17:45			46	133	54	216	349
06:00			28		9			18:00			44		56		
06:15			23		17			18:15			33		57		
06:30			39		30			18:30			26		49		
06:45			58	148	27	83	231	18:45			20	123	50	212	335
07:00			53		28			19:00			28		36		
07:15			74		48			19:15			22		24		
07:30			72		56			19:30			17		14		
07:45			113	312	44	176	488	19:45			15	82	14	88	170
08:00			92		63			20:00			12		9		
08:15			103		42			20:15			18		15		
08:30			80		41			20:30			12		10		
08:45			59	334	36	182	516	20:45			9	51	8	42	93
09:00			31		23			21:00			12		7		
09:15			32		21			21:15			15		14		
09:30			40		17			21:30			7		4		
09:45			55	158	31	92	250	21:45			10	44	7	32	76
10:00			30		28			22:00			10		7		
10:15			35		29			22:15			9		9		
10:30			32		19			22:30			8		5		
10:45			27	124	26	102	226	22:45			6	33	3	24	57
11:00			32		25			23:00			8		8		
11:15			37		32			23:15			7		3		
11:30			28		36			23:30			2		2		
11:45			45	142	38	131	273	23:45			5	22	1	14	36
Total Vol.				1283		797	2080					1190		1234	2424

Daily Totals

NB	SB	EB	WB	Combined
		2473	2031	4504

	AM			PM		
Split %	61.7%	38.3%	46.2%	49.1%	50.9%	53.8%
Peak Hour	07:45	07:15	07:30	12:45	17:15	17:30
Volume	388	211	585	174	222	377
P.H.F.	0.86	0.84	0.93	0.91	0.90	0.94

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-013

Location: Las Pulgas Rd btwn C St & El Camino Real about 3/4 mi s/o C St)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	1		1					12:00	34		51				
00:15	8		0					12:15	35		49				
00:30	7		1					12:30	38		54				
00:45	5	21	3	5			26	12:45	36	143	54	208			351
01:00	2		0					13:00	48		51				
01:15	1		0					13:15	42		54				
01:30	2		1					13:30	28		65				
01:45	0	5	2	3			8	13:45	40	158	45	215			373
02:00	2		0					14:00	48		58				
02:15	2		1					14:15	28		53				
02:30	3		0					14:30	31		60				
02:45	2	9	0	1			10	14:45	51	158	58	229			387
03:00	4		1					15:00	40		69				
03:15	1		0					15:15	36		84				
03:30	1		2					15:30	21		114				
03:45	2	8	0	3			11	15:45	27	124	72	339			463
04:00	2		0					16:00	25		83				
04:15	6		1					16:15	26		77				
04:30	7		9					16:30	33		85				
04:45	16	31	2	12			43	16:45	24	108	92	337			445
05:00	29		5					17:00	28		77				
05:15	41		3					17:15	27		72				
05:30	47		9					17:30	26		58				
05:45	73	190	11	28			218	17:45	30	111	40	247			358
06:00	94		15					18:00	22		49				
06:15	99		22					18:15	27		24				
06:30	118		14					18:30	14		30				
06:45	124	435	23	74			509	18:45	23	86	24	127			213
07:00	136		40					19:00	12		19				
07:15	121		36					19:15	12		11				
07:30	137		27					19:30	20		10				
07:45	98	492	35	138			630	19:45	22	66	12	52			118
08:00	46		35					20:00	19		16				
08:15	51		30					20:15	10		9				
08:30	48		51					20:30	17		11				
08:45	31	176	38	154			330	20:45	20	66	7	43			109
09:00	25		24					21:00	17		4				
09:15	49		22					21:15	15		8				
09:30	39		30					21:30	18		5				
09:45	35	148	21	97			245	21:45	17	67	7	24			91
10:00	41		27					22:00	12		5				
10:15	39		41					22:15	14		5				
10:30	40		24					22:30	7		2				
10:45	41	161	28	120			281	22:45	11	44	1	13			57
11:00	59		41					23:00	6		2				
11:15	33		41					23:15	5		4				
11:30	29		42					23:30	7		3				
11:45	38	159	57	181			340	23:45	4	22	1	10			32
Total Vol.		1835		816			2651			1153		1844			2997

Daily Totals

NB	SB	EB	WB	Combined
2988	2660			5648

	AM			PM		
Split %	69.2%	30.8%	46.9%	38.5%	61.5%	53.1%
Peak Hour	06:45	11:45	06:45	12:30	15:15	14:45
Volume	518	211	644	164	353	473
P.H.F.	0.95	0.93	0.91	0.89	0.77	0.88

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-014

Location: Basilone Rd btwn Las Pulgas Rd & Roblar Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			5		5			12:00			69		78		
00:15			4		6			12:15			61		79		
00:30			8		6			12:30			61		69		
00:45			1	18	1	18	36	12:45			67	258	76	302	560
01:00			2		1			13:00			60		68		
01:15			0		1			13:15			53		60		
01:30			1		2			13:30			67		76		
01:45			1	4	3	7	11	13:45			67	247	78	282	529
02:00			1		1			14:00			84		98		
02:15			0		0			14:15			77		87		
02:30			1		1			14:30			81		92		
02:45			1	3	2	4	7	14:45			72	314	88	365	679
03:00			0		3			15:00			71		105		
03:15			1		3			15:15			117		97		
03:30			3		3			15:30			88		86		
03:45			0	4	3	12	16	15:45			81	357	99	387	744
04:00			2		13			16:00			86		125		
04:15			3		8			16:15			86		115		
04:30			2		12			16:30			133		132		
04:45			7	14	24	57	71	16:45			114	419	94	466	885
05:00			11		30			17:00			86		87		
05:15			10		54			17:15			81		74		
05:30			15		81			17:30			66		74		
05:45			23	59	106	271	330	17:45			58	291	83	318	609
06:00			26		110			18:00			37		58		
06:15			44		140			18:15			30		46		
06:30			47		165			18:30			29		47		
06:45			65	182	204	619	801	18:45			19	115	33	184	299
07:00			53		179			19:00			22		31		
07:15			56		154			19:15			16		37		
07:30			56		131			19:30			19		40		
07:45			76	241	126	590	831	19:45			8	65	8	116	181
08:00			46		76			20:00			15		24		
08:15			61		96			20:15			18		12		
08:30			64		127			20:30			11		18		
08:45			53	224	108	407	631	20:45			15	59	14	68	127
09:00			53		95			21:00			12		18		
09:15			57		99			21:15			8		13		
09:30			52		99			21:30			8		14		
09:45			63	225	98	391	616	21:45			9	37	18	63	100
10:00			68		107			22:00			13		23		
10:15			65		78			22:15			5		11		
10:30			78		115			22:30			7		11		
10:45			73	284	117	417	701	22:45			4	29	3	48	77
11:00			73		105			23:00			2		4		
11:15			99		94			23:15			1		5		
11:30			74		84			23:30			1		6		
11:45			85	331	93	376	707	23:45			2	6	6	21	27
Total Vol.				1589		3169	4758					2197		2620	4817

Daily Totals

NB	SB	EB	WB	Combined
		3786	5789	9575

	AM			PM		
Split %	33.4%	66.6%	49.7%	45.6%	54.4%	50.3%
Peak Hour	11:00	06:30	06:30	16:00	15:45	16:00
Volume	331	702	923	419	471	885
P.H.F.	0.84	0.86	0.86	0.79	0.89	0.83

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-015

Location: Basilone Rd btwn San Mateo Rd & Sandpiper Ave

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			3		4			12:00			75		58		
00:15			0		8			12:15			97		54		
00:30			3		4			12:30			71		74		
00:45			1	7	3	19	26	12:45			78	321	76	262	583
01:00			2		2			13:00			73		53		
01:15			5		2			13:15			81		50		
01:30			4		6			13:30			55		46		
01:45			2	13	3	13	26	13:45			84	293	55	204	497
02:00			2		9			14:00			54		49		
02:15			2		3			14:15			84		51		
02:30			3		0			14:30			89		56		
02:45			1	8	2	14	22	14:45			70	297	38	194	491
03:00			2		2			15:00			51		55		
03:15			2		8			15:15			64		44		
03:30			3		8			15:30			88		34		
03:45			1	8	2	20	28	15:45			68	271	34	167	438
04:00			4		4			16:00			113		37		
04:15			6		12			16:15			131		33		
04:30			2		11			16:30			109		37		
04:45			7	19	11	38	57	16:45			114	467	54	161	628
05:00			9		21			17:00			96		41		
05:15			13		42			17:15			72		35		
05:30			16		63			17:30			87		41		
05:45			22	60	97	223	283	17:45			64	319	28	145	464
06:00			33		101			18:00			54		20		
06:15			38		147			18:15			41		33		
06:30			38		156			18:30			48		19		
06:45			33	142	198	602	744	18:45			43	186	27	99	285
07:00			58		174			19:00			42		26		
07:15			36		133			19:15			26		27		
07:30			39		90			19:30			30		32		
07:45			70	203	73	470	673	19:45			21	119	24	109	228
08:00			48		51			20:00			24		14		
08:15			44		50			20:15			24		27		
08:30			37		50			20:30			30		23		
08:45			45	174	57	208	382	20:45			21	99	20	84	183
09:00			50		64			21:00			15		24		
09:15			45		53			21:15			13		19		
09:30			56		50			21:30			6		21		
09:45			59	210	41	208	418	21:45			18	52	15	79	131
10:00			49		48			22:00			10		11		
10:15			73		65			22:15			9		11		
10:30			61		49			22:30			8		13		
10:45			62	245	48	210	455	22:45			7	34	6	41	75
11:00			61		71			23:00			10		6		
11:15			78		65			23:15			4		14		
11:30			71		90			23:30			6		8		
11:45			74	284	51	277	561	23:45			7	27	8	36	63
Total Vol.				1373		2302	3675					2485		1581	4066

Daily Totals

NB	SB	EB	WB	Combined
		3858	3883	7741

	AM EB	AM WB	AM Combined	PM EB	PM WB	PM Combined
Split %	37.4%	62.6%	47.5%	61.1%	38.9%	52.5%
Peak Hour	11:30	06:15	06:15	16:00	12:00	16:00
Volume	317	675	842	467	262	628
P.H.F.	0.82	0.85	0.91	0.89	0.86	0.93

Volumes for: Tuesday, November 20, 2007 City: Camp Pendleton Project #: 07-4257-016

Location: San Mateo Rd e/o 8th St

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			7		4			12:00			25		27		
00:15			7		2			12:15			25		31		
00:30			4		4			12:30			32		38		
00:45			5	23	1	11	34	12:45			18	100	25	121	221
01:00			5		3			13:00			34		21		
01:15			6		5			13:15			25		23		
01:30			3		0			13:30			20		28		
01:45			4	18	6	14	32	13:45			18	97	34	106	203
02:00			1		0			14:00			22		27		
02:15			6		0			14:15			22		19		
02:30			2		0			14:30			25		16		
02:45			2	11	0	0	11	14:45			22	91	22	84	175
03:00			0		1			15:00			17		14		
03:15			2		2			15:15			14		17		
03:30			3		0			15:30			26		18		
03:45			5	10	1	4	14	15:45			25	82	16	65	147
04:00			3		0			16:00			30		14		
04:15			5		1			16:15			25		23		
04:30			11		2			16:30			25		18		
04:45			13	32	2	5	37	16:45			14	94	14	69	163
05:00			21		9			17:00			11		28		
05:15			35		7			17:15			24		22		
05:30			43		17			17:30			10		12		
05:45			37	136	7	40	176	17:45			11	56	23	85	141
06:00			28		11			18:00			14		30		
06:15			12		8			18:15			21		27		
06:30			24		21			18:30			16		45		
06:45			26	90	26	66	156	18:45			22	73	52	154	227
07:00			28		28			19:00			19		49		
07:15			22		31			19:15			25		25		
07:30			25		21			19:30			20		31		
07:45			31	106	30	110	216	19:45			21	85	31	136	221
08:00			34		24			20:00			15		24		
08:15			20		27			20:15			24		17		
08:30			22		20			20:30			16		19		
08:45			24	100	23	94	194	20:45			20	75	23	83	158
09:00			21		18			21:00			14		8		
09:15			26		18			21:15			17		10		
09:30			22		27			21:30			12		10		
09:45			34	103	20	83	186	21:45			16	59	6	34	93
10:00			32		22			22:00			9		10		
10:15			25		30			22:15			16		5		
10:30			33		27			22:30			19		3		
10:45			32	122	30	109	231	22:45			7	51	4	22	73
11:00			31		31			23:00			7		7		
11:15			27		37			23:15			7		3		
11:30			20		26			23:30			7		8		
11:45			28	106	24	118	224	23:45			11	32	4	22	54
Total Vol.				857		654	1511					895		981	1876

Daily Totals

NB	SB	EB	WB	Combined
		1752	1635	3387

	AM			PM		
	EB	WB	Combined	EB	WB	Combined
Split %	56.7%	43.3%	44.6%	47.7%	52.3%	55.4%
Peak Hour	05:15	10:30	10:30	12:15	18:15	18:30
Volume	143	125	248	109	173	253
P.H.F.	0.83	0.84	0.97	0.80	0.83	0.85

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of I-5 SB Ramps/El Camino Real

Project #: 09-4189-001

N

I-5 SB Ramps

El Camino Real

El Camino Real

SOUTHBOUND APPROACH LANES

Lanes	0	1	0
TOTAL	0	12	296
PM	0	2	67
NOON	0	0	0
AM	0	10	229

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
0	0	0	0	0
0	0	0	0	1
9	0	480	489	0

PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
Lanes	0	0	0

NORTHBOUND APPROACH LANES

I-5 SB Ramps

TURNING MOVEMENT COUNT

I-5 SB Ramps / El Camino Real

(Intersection Name)

Wednesday
Day

5/13/09
Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 1-way stop(SB)

AM PEAK HOUR 615 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of I-5 NB Ramps/El Camino Real

Project #: 09-4189-002

N

I-5 NB Ramps

El Camino Real

El Camino Real

SOUTHBOUND APPROACH LANES

Lanes	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	17	6	0	11
1	282	224	0	58
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
1	0	166	167	0
2	0	468	470	1
0	0	0	0	0

NORTHBOUND APPROACH LANES

PM	11	2	51
NOON	0	0	0
AM	7	1	359
TOTAL	18	3	410
Lanes	1	0	1

I-5 NB Ramps

TURNING MOVEMENT COUNT

I-5 NB Ramps / El Camino Real

(Intersection Name)

Wednesday
Day

5/13/09
Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 1-way stop(NB)

AM PEAK HOUR 615 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Stuart Mesa Rd/Las Pulgas Rd

Project #: 09-4189-003

N

Stuart Mesa Rd

Las Pulgas Rd

Las Pulgas Rd

Stuart Mesa Rd

SOUTHBOUND APPROACH LANES

Lanes	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
1	410	353	0	57
1	289	236	0	53

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
0	0	0	0	0
0	0	410	410	1
50	0	114	164	1

NORTHBOUND APPROACH LANES

PM	187	0	36
NOON	0	0	0
AM	0	0	167
TOTAL	187	0	203
Lanes	1	0	1

TURNING MOVEMENT COUNT

Stuart Mesa Rd / Las Pulgas Rd

(Intersection Name)

Day	Date
Wednesday	5/13/09

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 1-way stop(NB).NL & WT movements were blocked until 8am

AM PEAK HOUR	600 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/Stuart Mesa Rd

Project #: 09-4189-004

N

Vandegrift Blvd

Stuart Mesa Rd

Stuart Mesa Rd

Vandegrift Blvd

SOUTHBOUND APPROACH LANES

Lanes	0	2	2
TOTAL	286	1421	345
PM	169	1154	289
NOON	0	0	0
AM	117	267	56

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
1	407	237	0	170
2	161	28	0	133
0	805	252	0	553

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
363	0	70	433	1
138	0	44	182	1.5
90	0	65	155	1.5

NORTHBOUND APPROACH LANES

PM	197	349	92
NOON	0	0	0
AM	621	1358	20
TOTAL	818	1707	112
Lanes	2	2	1

TURNING MOVEMENT COUNT

Vandegrift Blvd / Stuart Mesa Rd

(Intersection Name)

Tuesday — Day

5/12/09 — Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 400 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/Lemon Grove Rd

Project #: 09-4189-005

N

Vandegrift Blvd

Lemon Grove Rd

Lemon Grove Rd

Vandegrift Blvd

SOUTHBOUND APPROACH LANES

Lanes	0	2	0
TOTAL	164	2230	0
PM	115	1632	0
NOON	0	0	0
AM	49	598	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	266	106	0	160
1	0	0	0	0
0	90	8	0	82

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

NORTHBOUND APPROACH LANES

PM	203	491	0
NOON	0	0	0
AM	138	1942	0
TOTAL	341	2433	0
Lanes	1	2	0

TURNING MOVEMENT COUNT

Vandegrift Blvd / Lemon Grove Rd

(Intersection Name)

Day	Date
Tuesday	5/12/09

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: No Control

AM PEAK HOUR	630 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	400 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/Wire Mountain Rd

Project #: 09-4189-006

Vandegrift Blvd

Wire Mountain Rd

N

SOUTHBOUND APPROACH LANES

Lanes	1	2	1
TOTAL	477	1862	115
PM	165	1543	86
NOON	0	0	0
AM	312	319	29

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
1.3	448	236	0	212
.3	191	32	0	159
1.3	235	41	0	194

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
79	0	52	131	1
119	0	35	154	2
200	0	316	516	1

NORTHBOUND APPROACH LANES

PM	97	415	337
NOON	0	0	0
AM	260	1679	198
TOTAL	357	2094	535
Lanes	1	3	1

Vandegrift Blvd

TURNING MOVEMENT COUNT

Vandegrift Blvd / Wire Mountain Rd

(Intersection Name)

Tuesday
Day

5/12/09
Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/I-5 NB On/Off Ramps

Project #: 09-4189-007

N

Vandegrift Blvd (north leg) | Vandegrift Blvd (south leg) | I-5 NB On/Off Ramps (west leg) | I-5 NB On/Off Ramps (east leg)

SOUTHBOUND APPROACH LANES

	Lane 1	Lane 2	Lane 3
Lanes	0	0	0
TOTAL	0	0	0
PM	0	0	0
NOON	0	0	0
AM	0	0	0

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
1	623	414	0	209

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
1783	0	655	2438	2
0	0	0	0	0
0	0	0	0	0

NORTHBOUND APPROACH LANES

	Lane 1	Lane 2	Lane 3
PM	0	0	0
NOON	0	0	0
AM	0	0	0
TOTAL	0	0	0
Lanes	0	0	0

TURNING MOVEMENT COUNT

Vandegrift Blvd / I-5 NB On/Off Ramps

(Intersection Name)

Day: Tuesday

Date: 5/12/09

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR	615 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	445 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Vandegrift Blvd/I-5 NB On/Off Ramps

Project #: 09-4189-007

N

Vandegrift Blvd

I-5 NB On/Off Ramps

I-5 NB On/Off Ramps

Vandegrift Blvd

SOUTHBOUND APPROACH LANES

Lanes	1	2	1
TOTAL	229	2286	32
PM	154	1850	25
NOON	0	0	0
AM	75	436	7

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
37	0	13	50	.5
9	0	3	12	.5
141	0	121	262	1.5

NORTHBOUND APPROACH LANES

PM	92	811	37
NOON	0	0	0
AM	44	2051	4
TOTAL	136	2862	41
Lanes	1	3	0

TURNING MOVEMENT COUNT

Vandegrift Blvd / I-5 NB On/Off Ramps

(Intersection Name)

Tuesday
Day

5/12/09
Date

COUNT PERIODS			
am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of I-5 SB On/Off Ramps/Harbor Dr

Project #: 09-4189-008

N

I-5 SB On/Off Ramps

Harbor Dr

Harbor Dr

I-5 SB On/Off Ramps

SOUTHBOUND APPROACH LANES

Lanes	1	.5	.5
TOTAL	124	63	214
PM	45	47	94
NOON	0	0	0
AM	79	16	120

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
1	285	60	0	225
1	195	72	0	123
1	363	28	0	335

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
596	0	1609	2205	0
358	0	247	605	2
101	0	302	403	1

NORTHBOUND APPROACH LANES

PM	157	22	122
NOON	0	0	0
AM	246	12	152
TOTAL	403	34	274
Lanes	.5	.5	1

TURNING MOVEMENT COUNT

I-5 SB On/Off Ramps / Harbor Dr

(Intersection Name)

Tuesday
Day

5/12/09
Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: Signalized

AM PEAK HOUR 645 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Santa Fe Ave/Harbor Dr

Project #: 09-4189-009

SOUTHBOUND APPROACH LANES

Santa Fe Ave

N

	Lanes	TOTAL	PM	NOON	AM
	0	0	0	0	0
	1	36	34	0	2
	0	521	487	0	34

Harbor Dr

Harbor Dr

EASTBOUND APPROACH LANES

Lanes	TOTAL	AM	NOON	PM
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	Lanes
609	0	47	656	1
0	0	0	0	0
121	0	399	520	1

	PM	NOON	AM	TOTAL	Lanes
	0	0	0	0	0
	5	0	43	48	1
	231	0	76	307	0

NORTHBOUND APPROACH LANES

Santa Fe Ave

TURNING MOVEMENT COUNT

Santa Fe Ave / Harbor Dr

(Intersection Name)

Tuesday
Day

5/12/09
Date

COUNT PERIODS

am	6:00 AM	-	9:00 AM
noon		-	
pm	2:30 PM	-	6:00 PM

CONTROL: 2-way stop(NB/SB)

AM PEAK HOUR 630 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 415 PM

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals				
			NB	SB	EB	WB	Total
Location: Las Pulgas Rd btwn I-5 & Old Pacific Hwy	Project:	09-4190-001	0	0	2,287	2,853	5,140

AM Period	NB		SB		EB		WB			PM Period	NB		SB		EB		WB		
00:00					3		1			12:00					26		32		
00:15					9		0			12:15					22		22		
00:30					7		3			12:30					25		27		
00:45					0	19	3	7	26	12:45					17	90	24	105	195
01:00					5		2			13:00					19		36		
01:15					4		0			13:15					17		34		
01:30					5		1			13:30					12		27		
01:45					4	18	0	3	21	13:45					22	70	34	131	201
02:00					2		1			14:00					13		42		
02:15					2		2			14:15					11		61		
02:30					0		0			14:30					17		97		
02:45					2	6	1	4	10	14:45					18	59	65	265	324
03:00					3		0			15:00					12		82		
03:15					3		0			15:15					18		85		
03:30					2		1			15:30					17		84		
03:45					4	12	1	2	14	15:45					17	64	91	342	406
04:00					4		1			16:00					24		91		
04:15					8		2			16:15					25		136		
04:30					9		4			16:30					21		112		
04:45					35	56	6	13	69	16:45					16	86	152	491	577
05:00					46		7			17:00					14		123		
05:15					126		6			17:15					22		113		
05:30					148		11			17:30					24		96		
05:45					48	368	16	40	408	17:45					20	80	80	412	492
06:00					72		15			18:00					24		73		
06:15					44		17			18:15					21		53		
06:30					42		15			18:30					23		63		
06:45					42	200	18	65	265	18:45					18	86	52	241	327
07:00					73		20			19:00					24		44		
07:15					98		20			19:15					18		30		
07:30					70		20			19:30					27		35		
07:45					44	285	20	80	365	19:45					17	86	43	152	238
08:00					51		21			20:00					22		24		
08:15					43		14			20:15					16		20		
08:30					43		23			20:30					27		17		
08:45					25	162	18	76	238	20:45					21	86	9	70	156
09:00					34		19			21:00					12		17		
09:15					24		24			21:15					14		10		
09:30					29		12			21:30					17		8		
09:45					16	103	16	71	174	21:45					10	53	12	47	100
10:00					22		29			22:00					14		10		
10:15					26		21			22:15					17		9		
10:30					24		24			22:30					11		8		
10:45					23	95	23	97	192	22:45					16	58	5	32	90
11:00					30		22			23:00					11		0		
11:15					24		26			23:15					10		3		
11:30					21		24			23:30					13		4		
11:45					27	102	25	97	199	23:45					9	43	3	10	53
Total Vol.						1426		555	1981							861		2298	3159

	NB	SB	EB	WB	Total
Daily Totals :	0	0	2,287	2,853	5,140

	AM					PM		
Split %		72.0%	28.0%	38.5%		27.3%	72.7%	61.5%
AM Peak Hr.		05:15	11:15	05:15	PM Peak Hr.	12:00	16:15	16:15
Volume		394	107	442	Volume	90	523	599
P.H.F.		0.666	0.836	0.695	P.H.F.	0.865	0.860	0.891
7 - 9 Vol.		447	156	603	4 - 6 Vol.	166	903	1069
Peak Hr.		07:00	07:15	07:00	Peak Hr.	16:00	16:15	16:15
Volume		285	81	365	Volume	86	523	599
P.H.F.		0.727	0.964	0.773	P.H.F.	0.860	0.860	0.891

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City: Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Stuart Mesa Rd W/o Vandegrift Blvd	Project: 09-4190-002	0	0	6,830	6,755	13,585

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			3		5			12:00			134		97		
00:15			2		7			12:15			127		106		
00:30			2		6			12:30			112		103		
00:45			2	9	11	29	38	12:45			97	470	137	443	913
01:00			1		10			13:00			91		117		
01:15			5		4			13:15			95		76		
01:30			0		4			13:30			72		75		
01:45			5	11	4	22	33	13:45			81	339	71	339	678
02:00			5		7			14:00			74		60		
02:15			5		0			14:15			82		69		
02:30			4		4			14:30			96		68		
02:45			6	20	3	14	34	14:45			104	356	101	298	654
03:00			0		3			15:00			103		98		
03:15			1		4			15:15			208		62		
03:30			2		6			15:30			156		67		
03:45			4	7	4	17	24	15:45			194	661	73	300	961
04:00			4		4			16:00			200		71		
04:15			6		15			16:15			210		92		
04:30			5		16			16:30			221		99		
04:45			5	20	19	54	74	16:45			231	862	107	369	1231
05:00			7		29			17:00			197		117		
05:15			15		33			17:15			167		108		
05:30			31		72			17:30			163		117		
05:45			49	102	151	285	387	17:45			143	670	98	440	1110
06:00			61		204			18:00			130		111		
06:15			65		255			18:15			115		76		
06:30			89		275			18:30			108		77		
06:45			127	342	213	947	1289	18:45			71	424	82	346	770
07:00			109		217			19:00			59		62		
07:15			148		188			19:15			65		51		
07:30			143		231			19:30			70		48		
07:45			112	512	149	785	1297	19:45			35	229	56	217	446
08:00			85		136			20:00			46		63		
08:15			97		109			20:15			39		47		
08:30			96		85			20:30			33		57		
08:45			74	352	74	404	756	20:45			41	159	44	211	370
09:00			85		66			21:00			26		30		
09:15			75		71			21:15			33		43		
09:30			63		67			21:30			23		22		
09:45			67	290	79	283	573	21:45			14	96	42	137	233
10:00			77		70			22:00			17		29		
10:15			69		89			22:15			18		25		
10:30			72		76			22:30			11		19		
10:45			83	301	86	321	622	22:45			30	76	22	95	171
11:00			84		87			23:00			4		10		
11:15			93		75			23:15			10		10		
11:30			161		83			23:30			3		11		
11:45			162	500	106	351	851	23:45			5	22	17	48	70
Total Vol.				2466		3512	5978					4364		3243	7607

	NB	SB	EB	WB	Total
Daily Totals :	0	0	6,830	6,755	13,585

	AM				PM		
Split %	41.3%	58.7%	44.0%		57.4%	42.6%	56.0%
AM Peak Hr.	11:30	06:15	06:45	PM Peak Hr.	16:00	12:15	16:15
Volume	584	960	1376	Volume	862	463	1274
P.H.F.	0.901	0.873	0.920	P.H.F.	0.933	0.845	0.942
7 - 9 Vol.	864	1189	2053	4 - 6 Vol.	1532	809	2341
Peak Hr.	07:00	07:00	07:00	Peak Hr.	16:00	16:45	16:15
Volume	512	785	1297	Volume	862	449	1274
P.H.F.	0.865	0.850	0.867	P.H.F.	0.933	0.959	0.942

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Ash Rd E/o Vandergrift Blvd	Project:	09-4190-003	0	0	2,874	3,611	6,485

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			2		2			12:00			48		66		
00:15			0		1			12:15			45		44		
00:30			3		1			12:30			37		75		
00:45			5	10	2	6	16	12:45			34	164	79	264	428
01:00			0		7			13:00			19		94		
01:15			5		0			13:15			26		54		
01:30			0		0			13:30			25		48		
01:45			1	6	1	8	14	13:45			25	95	56	252	347
02:00			1		0			14:00			37		53		
02:15			0		0			14:15			16		51		
02:30			4		3			14:30			54		34		
02:45			3	8	3	6	14	14:45			44	151	30	168	319
03:00			0		0			15:00			56		37		
03:15			0		0			15:15			66		86		
03:30			0		2			15:30			61		62		
03:45			1	1	2	4	5	15:45			54	237	48	233	470
04:00			0		3			16:00			75		43		
04:15			4		8			16:15			85		48		
04:30			0		7			16:30			108		50		
04:45			1	5	5	23	28	16:45			139	407	55	196	603
05:00			1		12			17:00			163		48		
05:15			2		9			17:15			135		51		
05:30			5		43			17:30			107		41		
05:45			17	25	60	124	149	17:45			87	492	56	196	688
06:00			40		71			18:00			46		51		
06:15			23		86			18:15			49		49		
06:30			28		111			18:30			43		40		
06:45			25	116	147	415	531	18:45			32	170	24	164	334
07:00			20		147			19:00			31		29		
07:15			26		152			19:15			32		30		
07:30			31		123			19:30			33		38		
07:45			27	104	96	518	622	19:45			25	121	25	122	243
08:00			36		67			20:00			16		27		
08:15			58		62			20:15			25		17		
08:30			43		39			20:30			11		22		
08:45			37	174	45	213	387	20:45			35	87	10	76	163
09:00			26		44			21:00			21		11		
09:15			21		52			21:15			17		18		
09:30			20		31			21:30			9		16		
09:45			26	93	45	172	265	21:45			6	53	6	51	104
10:00			23		45			22:00			7		8		
10:15			24		45			22:15			8		8		
10:30			23		36			22:30			11		7		
10:45			27	97	44	170	267	22:45			7	33	2	25	58
11:00			34		39			23:00			3		4		
11:15			40		36			23:15			6		6		
11:30			56		51			23:30			8		7		
11:45			73	203	59	185	388	23:45			5	22	3	20	42
Total Vol.				842		1844	2686					2032		1767	3799

	NB	SB	EB	WB	Total
Daily Totals :	0	0	2,874	3,611	6,485

	AM			PM			
Split %	31.3%	68.7%	41.4%		53.5%	46.5%	58.6%
AM Peak Hr.	11:30	06:45	06:45	PM Peak Hr.	16:30	12:30	16:30
Volume	222	569	671	Volume	545	302	749
P.H.F.	0.760	0.936	0.942	P.H.F.	0.836	0.803	0.887
7 - 9 Vol.	278	731	1009	4 - 6 Vol.	899	392	1291
Peak Hr.	08:00	07:00	07:00	Peak Hr.	16:30	16:30	16:30
Volume	174	518	622	Volume	545	204	749
P.H.F.	0.750	0.852	0.874	P.H.F.	0.836	0.927	0.887

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Vandegrift Blvd N/o Stuart Mesa Rd	Project:	09-4190-004	####	####	0	0	22,028

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	9		20					12:00	140		209				
00:15	11		14					12:15	161		159				
00:30	10		16					12:30	210		191				
00:45	10	40	12	62			102	12:45	206	717	188	747			1464
01:00	8		15					13:00	194		146				
01:15	7		22					13:15	188		138				
01:30	6		8					13:30	174		154				
01:45	10	31	18	63			94	13:45	182	738	160	598			1336
02:00	4		8					14:00	126		187				
02:15	4		7					14:15	142		176				
02:30	4		17					14:30	128		213				
02:45	9	21	7	39			60	14:45	124	520	215	791			1311
03:00	3		4					15:00	139		222				
03:15	8		2					15:15	181		212				
03:30	6		5					15:30	145		235				
03:45	15	32	6	17			49	15:45	150	615	293	962			1577
04:00	14		4					16:00	144		333				
04:15	26		8					16:15	138		366				
04:30	25		4					16:30	157		339				
04:45	29	94	12	28			122	16:45	125	564	430	1468			2032
05:00	40		9					17:00	145		411				
05:15	46		28					17:15	124		338				
05:30	97		44					17:30	133		317				
05:45	177	360	69	150			510	17:45	130	532	229	1295			1827
06:00	213		105					18:00	87		181				
06:15	298		92					18:15	98		168				
06:30	389		102					18:30	73		130				
06:45	483	1383	115	414			1797	18:45	61	319	122	601			920
07:00	512		113					19:00	70		112				
07:15	498		114					19:15	59		91				
07:30	437		132					19:30	53		84				
07:45	342	1789	128	487			2276	19:45	61	243	88	375			618
08:00	200		122					20:00	69		72				
08:15	179		148					20:15	66		67				
08:30	149		124					20:30	53		55				
08:45	183	711	118	512			1223	20:45	54	242	50	244			486
09:00	113		130					21:00	51		50				
09:15	134		109					21:15	63		41				
09:30	129		135					21:30	64		48				
09:45	146	522	123	497			1019	21:45	21	199	41	180			379
10:00	123		133					22:00	32		24				
10:15	119		172					22:15	31		32				
10:30	125		125					22:30	35		27				
10:45	147	514	167	597			1111	22:45	39	137	19	102			239
11:00	120		178					23:00	19		13				
11:15	110		174					23:15	26		20				
11:30	146		247					23:30	20		15				
11:45	135	511	222	821			1332	23:45	16	81	15	63			144
Total Vol.		6008		3687			9695			4907		7426			12333

					NB	SB	EB	WB	Total
				Daily Totals :	####	####	0	0	22,028
	AM				PM				
Split %	62.0%	38.0%	44.0%		39.8%	60.2%			56.0%
AM Peak Hr.	06:45	11:15	06:45	PM Peak Hr.	12:30	16:15			16:15
Volume	1930	852	2404	Volume	798	1546			2111
P.H.F.	0.942	0.862	0.962	P.H.F.	0.950	0.899			0.949
7 - 9 Vol.	2500	999	3499	4 - 6 Vol.	1096	2763			3859
Peak Hr.	07:00	07:30	07:00	Peak Hr.	16:15	16:15			16:15
Volume	1789	530	2276	Volume	565	1546			2111
P.H.F.	0.874	0.895	0.910	P.H.F.	0.900	0.899			0.949

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Vandegrift Blvd btwn Stuart Mesa Rd & Lemon Grove Rd	Project:	09-4190-005	####	####	0	0	27,140

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	16		21					12:00	214		255				
00:15	20		15					12:15	235		254				
00:30	15		18					12:30	238		266				
00:45	8	59	9	63			122	12:45	199	886	288	1063			1949
01:00	8		8					13:00	198		211				
01:15	6		11					13:15	209		188				
01:30	11		12					13:30	180		258				
01:45	9	34	25	56			90	13:45	139	726	255	912			1638
02:00	2		21					14:00	158		266				
02:15	4		15					14:15	165		255				
02:30	3		9					14:30	176		274				
02:45	9	18	8	53			71	14:45	173	672	273	1068			1740
03:00	9		4					15:00	148		366				
03:15	9		5					15:15	152		311				
03:30	12		2					15:30	151		377				
03:45	15	45	4	15			60	15:45	135	586	423	1477			2063
04:00	25		2					16:00	137		438				
04:15	40		9					16:15	182		446				
04:30	40		11					16:30	159		438				
04:45	51	156	15	37			193	16:45	154	632	400	1722			2354
05:00	57		35					17:00	180		365				
05:15	146		55					17:15	219		332				
05:30	252		54					17:30	175		293				
05:45	281	736	78	222			958	17:45	157	731	273	1263			1994
06:00	472		64					18:00	162		244				
06:15	504		87					18:15	138		188				
06:30	521		118					18:30	112		154				
06:45	487	1984	151	420			2404	18:45	124	536	144	730			1266
07:00	500		140					19:00	110		145				
07:15	462		216					19:15	103		155				
07:30	334		183					19:30	111		165				
07:45	246	1542	143	682			2224	19:45	111	435	122	587			1022
08:00	218		148					20:00	103		101				
08:15	160		153					20:15	102		99				
08:30	186		151					20:30	91		75				
08:45	129	693	140	592			1285	20:45	94	390	66	341			731
09:00	145		148					21:00	87		65				
09:15	152		158					21:15	84		55				
09:30	171		166					21:30	54		53				
09:45	130	598	188	660			1258	21:45	55	280	35	208			488
10:00	146		158					22:00	49		45				
10:15	148		154					22:15	49		28				
10:30	157		150					22:30	45		33				
10:45	142	593	154	616			1209	22:45	28	171	35	141			312
11:00	148		155					23:00	33		22				
11:15	152		215					23:15	30		21				
11:30	192		211					23:30	35		15				
11:45	185	677	255	836			1513	23:45	22	120	18	76			196
Total Vol.		7135		4252			11387			6165		9588			15753

	NB	SB	EB	WB	Total
Daily Totals :	####	####	0	0	27,140

	AM NB	AM SB	AM Total		PM NB	PM SB	PM Total
Split %	62.7%	37.3%	42.0%		39.1%	60.9%	58.0%
AM Peak Hr.	06:15	11:45	06:30	PM Peak Hr.	12:00	15:45	15:45
Volume	2012	1030	2595	Volume	886	1745	2358
P.H.F.	0.965	0.968	0.957	P.H.F.	0.931	0.978	0.939
7 - 9 Vol.	2235	1274	3509	4 - 6 Vol.	1363	2985	4348
Peak Hr.	07:00	07:15	07:00	Peak Hr.	17:00	16:00	16:00
Volume	1542	690	2224	Volume	731	1722	2354
P.H.F.	0.771	0.799	0.820	P.H.F.	0.834	0.965	0.937

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals				Total
			NB	SB	EB	WB	
Location: Vandegrift Blvd btwn Lemon Grove Rd & Wire Mountain Rd	Project:	09-4190-006	####	####	0	0	26,959

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	15		16					12:00	154		209				
00:15	15		17					12:15	244		212				
00:30	15		8					12:30	250		253				
00:45	8	53	17	58			111	12:45	233	881	227	901			1782
01:00	8		22					13:00	199		194				
01:15	6		7					13:15	222		188				
01:30	10		24					13:30	201		189				
01:45	9	33	11	64			97	13:45	123	745	209	780			1525
02:00	2		12					14:00	155		236				
02:15	5		17					14:15	157		227				
02:30	3		9					14:30	147		259				
02:45	9	19	6	44			63	14:45	177	636	254	976			1612
03:00	5		5					15:00	158		359				
03:15	8		4					15:15	154		305				
03:30	13		8					15:30	154		373				
03:45	15	41	2	19			60	15:45	154	620	417	1454			2074
04:00	24		7					16:00	188		411				
04:15	39		11					16:15	184		418				
04:30	38		9					16:30	154		434				
04:45	55	156	14	41			197	16:45	158	684	415	1678			2362
05:00	58		31					17:00	201		391				
05:15	169		50					17:15	188		337				
05:30	255		53					17:30	198		312				
05:45	299	781	74	208			989	17:45	125	712	259	1299			2011
06:00	488		64					18:00	144		253				
06:15	488		90					18:15	154		215				
06:30	500		135					18:30	121		173				
06:45	488	1964	122	411			2375	18:45	132	551	175	816			1367
07:00	457		185					19:00	121		146				
07:15	458		201					19:15	101		135				
07:30	355		171					19:30	111		144				
07:45	266	1536	163	720			2256	19:45	108	441	116	541			982
08:00	201		164					20:00	99		107				
08:15	188		136					20:15	98		95				
08:30	154		139					20:30	84		74				
08:45	144	687	136	575			1262	20:45	87	368	72	348			716
09:00	154		140					21:00	88		68				
09:15	177		156					21:15	87		56				
09:30	144		150					21:30	78		53				
09:45	154	629	148	594			1223	21:45	55	308	35	212			520
10:00	124		183					22:00	59		28				
10:15	124		143					22:15	44		36				
10:30	154		167					22:30	45		16				
10:45	144	546	184	677			1223	22:45	48	196	25	105			301
11:00	147		202					23:00	44		17				
11:15	154		278					23:15	48		16				
11:30	125		271					23:30	25		17				
11:45	199	625	262	1013			1638	23:45	28	145	18	68			213
Total Vol.		7070		4424			11494			6287		9178			15465

	AM			PM					
Daily Totals :					NB	SB	EB	WB	Total
					####	####	0	0	26,959
Split %	61.5%	38.5%	42.6%		40.7%	59.3%			57.4%
AM Peak Hr.	06:00	11:15	06:30	PM Peak Hr.	12:15	15:45			16:00
Volume	1964	1020	2546	Volume	926	1680			2362
P.H.F.	0.982	0.917	0.966	P.H.F.	0.926	0.968			0.981
7 - 9 Vol.	2223	1295	3518	4 - 6 Vol.	1396	2977			4373
Peak Hr.	07:00	07:00	07:00	Peak Hr.	16:45	16:00			16:00
Volume	1536	720	2256	Volume	745	1678			2362
P.H.F.	0.838	0.896	0.856	P.H.F.	0.927	0.967			0.981

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Vandegrift Blvd btwn Wire Mountain Rd & I-5 NB On Ramp	Project:	09-4190-007	####	####	0	0	32,094

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	25		23					12:00	197		260				
00:15	32		17					12:15	233		217				
00:30	27		13					12:30	224		234				
00:45	19	103	18	71			174	12:45	226	880	212	923			1803
01:00	15		21					13:00	203		210				
01:15	11		10					13:15	195		225				
01:30	18		22					13:30	158		205				
01:45	21	65	16	69			134	13:45	165	721	224	864			1585
02:00	3		16					14:00	167		249				
02:15	11		15					14:15	186		280				
02:30	11		9					14:30	188		270				
02:45	16	41	9	49			90	14:45	160	701	279	1078			1779
03:00	12		5					15:00	169		406				
03:15	10		4					15:15	155		391				
03:30	23		12					15:30	183		460				
03:45	40	85	2	23			108	15:45	185	692	493	1750			2442
04:00	47		7					16:00	235		490				
04:15	48		17					16:15	212		574				
04:30	63		22					16:30	196		534				
04:45	96	254	27	73			327	16:45	179	822	495	2093			2915
05:00	115		29					17:00	208		440				
05:15	271		40					17:15	228		510				
05:30	365		49					17:30	231		418				
05:45	358	1109	83	201			1310	17:45	208	875	371	1739			2614
06:00	527		85					18:00	246		393				
06:15	570		82					18:15	248		306				
06:30	533		101					18:30	230		272				
06:45	538	2168	119	387			2555	18:45	184	908	235	1206			2114
07:00	516		170					19:00	175		234				
07:15	483		162					19:15	138		215				
07:30	368		180					19:30	179		186				
07:45	287	1654	159	671			2325	19:45	180	672	160	795			1467
08:00	221		157					20:00	200		154				
08:15	154		147					20:15	160		158				
08:30	156		151					20:30	130		113				
08:45	140	671	140	595			1266	20:45	185	675	100	525			1200
09:00	137		140					21:00	132		133				
09:15	155		144					21:15	122		97				
09:30	136		150					21:30	95		106				
09:45	149	577	165	599			1176	21:45	96	445	73	409			854
10:00	151		174					22:00	81		82				
10:15	164		156					22:15	79		48				
10:30	180		161					22:30	78		53				
10:45	149	644	171	662			1306	22:45	41	279	28	211			490
11:00	158		198					23:00	62		34				
11:15	180		250					23:15	43		28				
11:30	183		290					23:30	65		20				
11:45	187	708	310	1048			1756	23:45	38	208	14	96			304
Total Vol.		8079		4448			12527			7878		11689			19567

	NB	SB	EB	WB	Total
Daily Totals :	####	####	0	0	32,094

	AM				PM		
Split %	64.5%	35.5%	39.0%		40.3%	59.7%	61.0%
AM Peak Hr.	06:00	11:15	06:15	PM Peak Hr.	17:30	16:00	15:45
Volume	2168	1110	2629	Volume	933	2093	2919
P.H.F.	0.951	0.895	0.958	P.H.F.	0.941	0.912	0.928
7 - 9 Vol.	2325	1266	3591	4 - 6 Vol.	1697	3832	5529
Peak Hr.	07:00	07:00	07:00	Peak Hr.	17:00	16:00	16:00
Volume	1654	671	2325	Volume	875	2093	2915
P.H.F.	0.801	0.932	0.847	P.H.F.	0.947	0.912	0.927

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City: Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Harbor Dr btwn I-5 NB Off Ramp Loop & I-5 SB On Ramp Loop	Project: 09-4190-008	0	0	4,648	18,879	23,527

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			10		31			12:00			62		343		
00:15			6		27			12:15			71		292		
00:30			16		21			12:30			90		260		
00:45			13	45	16	95	140	12:45			67	290	247	1142	1432
01:00			8		20			13:00			62		255		
01:15			6		18			13:15			76		238		
01:30			10		14			13:30			65		239		
01:45			11	35	21	73	108	13:45			59	262	241	973	1235
02:00			9		23			14:00			58		235		
02:15			3		17			14:15			61		277		
02:30			3		17			14:30			71		328		
02:45			6	21	8	65	86	14:45			68	258	277	1117	1375
03:00			5		9			15:00			57		306		
03:15			5		5			15:15			61		394		
03:30			4		5			15:30			59		454		
03:45			0	14	17	36	50	15:45			69	246	461	1615	1861
04:00			1		9			16:00			74		532		
04:15			8		8			16:15			70		541		
04:30			9		18			16:30			76		583		
04:45			10	28	15	50	78	16:45			84	304	566	2222	2526
05:00			18		25			17:00			85		581		
05:15			20		43			17:15			84		479		
05:30			49		36			17:30			107		510		
05:45			49	136	70	174	310	17:45			85	361	514	2084	2445
06:00			61		90			18:00			75		404		
06:15			68		127			18:15			79		401		
06:30			103		159			18:30			88		345		
06:45			109	341	219	595	936	18:45			79	321	325	1475	1796
07:00			114		261			19:00			78		271		
07:15			72		278			19:15			50		263		
07:30			78		285			19:30			55		244		
07:45			76	340	270	1094	1434	19:45			67	250	212	990	1240
08:00			55		233			20:00			75		174		
08:15			47		224			20:15			60		189		
08:30			44		212			20:30			59		164		
08:45			45	191	215	884	1075	20:45			54	248	142	669	917
09:00			42		188			21:00			47		122		
09:15			39		168			21:15			42		147		
09:30			45		175			21:30			61		106		
09:45			45	171	179	710	881	21:45			39	189	122	497	686
10:00			61		203			22:00			32		88		
10:15			29		200			22:15			31		94		
10:30			44		201			22:30			34		59		
10:45			57	191	195	799	990	22:45			29	126	68	309	435
11:00			41		208			23:00			25		32		
11:15			55		227			23:15			25		51		
11:30			50		269			23:30			16		66		
11:45			53	199	304	1008	1207	23:45			15	81	54	203	284
Total Vol.				1712		5583	7295					2936		13296	16232

	NB	SB	EB	WB	Total
Daily Totals :	0	0	4,648	18,879	23,527

	AM			PM			
Split %	23.5%	76.5%	31.0%		18.1%	81.9%	69.0%
AM Peak Hr.	06:30	11:30	11:45	PM Peak Hr.	17:00	16:15	16:15
Volume	398	1208	1475	Volume	361	2271	2586
P.H.F.	0.873	0.880	0.910	P.H.F.	0.843	0.974	0.971
7 - 9 Vol.	531	1978	2509	4 - 6 Vol.	665	4306	4971
Peak Hr.	07:00	07:00	07:00	Peak Hr.	17:00	16:15	16:15
Volume	340	1094	1434	Volume	361	2271	2586
P.H.F.	0.746	0.960	0.956	P.H.F.	0.843	0.974	0.971

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals				
			NB	SB	EB	WB	Total
Location: Harbor Dr btwn Camelo Dr & Santa Fe Ave	Project:	09-4190-009	0	0	4,250	5,050	9,300

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			4		7			12:00			60		91		
00:15			8		4			12:15			86		99		
00:30			5		2			12:30			75		106		
00:45			5	22	4	17	39	12:45			68	289	102	398	687
01:00			4		3			13:00			73		104		
01:15			1		1			13:15			62		85		
01:30			2		3			13:30			63		79		
01:45			1	8	1	8	16	13:45			65	263	77	345	608
02:00			2		0			14:00			54		69		
02:15			1		0			14:15			60		64		
02:30			2		1			14:30			92		68		
02:45			0	5	0	1	6	14:45			61	267	66	267	534
03:00			0		0			15:00			72		75		
03:15			1		2			15:15			66		80		
03:30			2		2			15:30			100		75		
03:45			0	3	1	5	8	15:45			79	317	95	325	642
04:00			0		1			16:00			116		91		
04:15			2		1			16:15			115		85		
04:30			0		0			16:30			145		105		
04:45			4	6	1	3	9	16:45			172	548	118	399	947
05:00			4		6			17:00			180		121		
05:15			5		12			17:15			171		126		
05:30			10		12			17:30			179		101		
05:45			13	32	19	49	81	17:45			122	652	125	473	1125
06:00			13		29			18:00			78		86		
06:15			15		84			18:15			57		70		
06:30			28		105			18:30			59		60		
06:45			26	82	169	387	469	18:45			50	244	48	264	508
07:00			29		178			19:00			44		60		
07:15			32		206			19:15			62		52		
07:30			31		186			19:30			36		46		
07:45			40	132	133	703	835	19:45			54	196	25	183	379
08:00			39		96			20:00			67		25		
08:15			45		66			20:15			50		23		
08:30			50		47			20:30			33		16		
08:45			49	183	65	274	457	20:45			40	190	29	93	283
09:00			31		49			21:00			26		22		
09:15			40		47			21:15			38		25		
09:30			41		41			21:30			25		21		
09:45			44	156	38	175	331	21:45			23	112	13	81	193
10:00			44		64			22:00			22		11		
10:15			36		46			22:15			21		11		
10:30			57		51			22:30			10		18		
10:45			37	174	53	214	388	22:45			15	68	5	45	113
11:00			46		70			23:00			6		12		
11:15			79		77			23:15			12		9		
11:30			55		69			23:30			12		5		
11:45			80	260	94	310	570	23:45			11	41	5	31	72
Total Vol.				1063		2146	3209					3187		2904	6091

	NB	SB	EB	WB	Total
Daily Totals :	0	0	4,250	5,050	9,300

	AM				PM		
Split %	33.1%	66.9%	34.5%		52.3%	47.7%	65.5%
AM Peak Hr.	11:45	06:45	06:45	PM Peak Hr.	16:45	17:00	16:45
Volume	301	739	857	Volume	702	473	1168
P.H.F.	0.875	0.897	0.900	P.H.F.	0.975	0.938	0.970
7 - 9 Vol.	315	977	1292	4 - 6 Vol.	1200	872	2072
Peak Hr.	08:00	07:00	07:00	Peak Hr.	16:45	17:00	16:45
Volume	183	703	835	Volume	702	473	1168
P.H.F.	0.915	0.853	0.877	P.H.F.	0.975	0.938	0.970

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City: Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Santa Fe Ave N/o Harbor Dr (Del Mar Gate)	Project: 09-4190-010	1,931	1,672	0	0	3,603

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	0		0					12:00	39		27				
00:15	0		0					12:15	40		31				
00:30	1		1					12:30	42		27				
00:45	0	1	0	1			2	12:45	40	161	17	102			263
01:00	0		0					13:00	45		20				
01:15	0		0					13:15	38		8				
01:30	0		0					13:30	27		12				
01:45	0		0					13:45	20	130	18	58			188
02:00	0		0					14:00	24		13				
02:15	0		0					14:15	21		16				
02:30	0		0					14:30	12		23				
02:45	0		0					14:45	18	75	17	69			144
03:00	0		0					15:00	13		19				
03:15	0		0					15:15	17		25				
03:30	1		1					15:30	10		37				
03:45	0	1	0	1			2	15:45	16	56	24	105			161
04:00	1		1					16:00	12		66				
04:15	0		0					16:15	20		75				
04:30	0		0					16:30	15		118				
04:45	0	1	0	1			2	16:45	15	62	155	414			476
05:00	1		1					17:00	23		141				
05:15	0		0					17:15	13		128				
05:30	1		0					17:30	16		150				
05:45	1	3	4	5			8	17:45	13	65	41	460			525
06:00	9		1					18:00	14		19				
06:15	65		4					18:15	7		8				
06:30	89		10					18:30	1		2				
06:45	164	327	13	28			355	18:45	5	27	3	32			59
07:00	169		15					19:00	3		2				
07:15	199		12					19:15	6		5				
07:30	168		11					19:30	1		1				
07:45	123	659	13	51			710	19:45	1	11	2	10			21
08:00	59		14					20:00	0		1				
08:15	28		14					20:15	0		0				
08:30	29		10					20:30	0		0				
08:45	25	141	12	50			191	20:45	0		0	1			1
09:00	20		12					21:00	1		2				
09:15	17		14					21:15	1		1				
09:30	11		14					21:30	0		0				
09:45	13	61	15	55			116	21:45	0	2	1	4			6
10:00	18		12					22:00	0		0				
10:15	16		15					22:15	0		0				
10:30	12		16					22:30	1		0				
10:45	13	59	22	65			124	22:45	0	1	0				1
11:00	18		20					23:00	0		0				
11:15	23		52					23:15	0		0				
11:30	18		33					23:30	0		0				
11:45	29	88	53	158			246	23:45	0		2	2			2
Total Vol.		1341		415			1756			590		1257			1847

	NB	SB	EB	WB	Total
Daily Totals :	1,931	1,672	0	0	3,603

AM	NB	SB	Total	PM	NB	SB	Total
Split %	76.4%	23.6%	48.7%		31.9%	68.1%	51.3%
Peak Hr.	06:45	11:15	06:45	Peak Hr.	12:15	16:45	16:45
Volume	700	165	751	Volume	167	574	641
P.H.F.	0.879	0.778	0.890	P.H.F.	0.928	0.926	0.943
7 - 9 Vol.	800	101	901	4 - 6 Vol.	127	874	1001
Peak Hr.	07:00	07:30	07:00	Peak Hr.	16:15	16:45	16:45
Volume	659	52	710	Volume	73	574	641
P.H.F.	0.828	0.929	0.841	P.H.F.	0.793	0.926	0.943

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: I-5 NB Off Ramp N/o Capistrano Dr	Project:	09-4190-011	####	0	0	0	11,999

AM Period	NB	SB	EB	WB		PM Period	NB	SB	EB	WB	
00:00	13					12:00	150				
00:15	14					12:15	163				
00:30	11					12:30	160				
00:45	9	47			47	12:45	177	650			650
01:00	7					13:00	146				
01:15	5					13:15	135				
01:30	9					13:30	118				
01:45	11	32			32	13:45	132	531			531
02:00	1					14:00	119				
02:15	9					14:15	135				
02:30	4					14:30	148				
02:45	9	23			23	14:45	125	527			527
03:00	6					15:00	116				
03:15	8					15:15	120				
03:30	20					15:30	113				
03:45	33	67			67	15:45	123	472			472
04:00	28					16:00	153				
04:15	37					16:15	140				
04:30	51					16:30	149				
04:45	69	185			185	16:45	137	579			579
05:00	105					17:00	165				
05:15	215					17:15	178				
05:30	338					17:30	167				
05:45	435	1093			1093	17:45	140	650			650
06:00	452					18:00	164				
06:15	441					18:15	135				
06:30	471					18:30	116				
06:45	420	1784			1784	18:45	105	520			520
07:00	423					19:00	118				
07:15	389					19:15	109				
07:30	313					19:30	114				
07:45	239	1364			1364	19:45	135	476			476
08:00	150					20:00	96				
08:15	133					20:15	120				
08:30	126					20:30	102				
08:45	117	526			526	20:45	105	423			423
09:00	143					21:00	96				
09:15	131					21:15	73				
09:30	105					21:30	65				
09:45	117	496			496	21:45	60	294			294
10:00	111					22:00	54				
10:15	100					22:15	56				
10:30	120					22:30	33				
10:45	123	454			454	22:45	31	174			174
11:00	128					23:00	30				
11:15	124					23:15	23				
11:30	133					23:30	21				
11:45	159	544			544	23:45	14	88			88
Total Vol.		6615			6615			5384			5384

	NB	SB	EB	WB	Total
Daily Totals :	####	0	0	0	11,999

	AM			PM	
Split %	100.0%	55.1%		100.0%	44.9%
AM Peak Hr.	05:45	05:45	PM Peak Hr.	12:00	12:00
Volume	1799	1799	Volume	650	650
P.H.F.	0.955	0.955	P.H.F.	0.918	0.918
7 - 9 Vol.	1890	1890	4 - 6 Vol.	1229	1229
Peak Hr.	07:00	07:00	Peak Hr.	17:00	17:00
Volume	1364	1364	Volume	650	650
P.H.F.	0.806	0.806	P.H.F.	0.913	0.913

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals				
			NB	SB	EB	WB	Total
Location: I-5 NB Off Ramp S/o Capistrano Dr	Project:	09-4190-012	####	0	0	0	13,562

AM Period	NB		SB	EB	WB		PM Period	NB		SB	EB	WB	
00:00	19						12:00	175					
00:15	15						12:15	174					
00:30	14						12:30	186					
00:45	9	57				57	12:45	193	728				728
01:00	8						13:00	171					
01:15	6						13:15	156					
01:30	8						13:30	133					
01:45	12	34				34	13:45	146	606				606
02:00	2						14:00	138					
02:15	9						14:15	155					
02:30	5						14:30	183					
02:45	9	25				25	14:45	159	635				635
03:00	7						15:00	153					
03:15	7						15:15	150					
03:30	20						15:30	158					
03:45	33	67				67	15:45	144	605				605
04:00	30						16:00	174					
04:15	37						16:15	176					
04:30	45						16:30	179					
04:45	64	176				176	16:45	192	721				721
05:00	103						17:00	195					
05:15	211						17:15	211					
05:30	329						17:30	195					
05:45	439	1082				1082	17:45	187	788				788
06:00	468						18:00	190					
06:15	446						18:15	170					
06:30	496						18:30	158					
06:45	442	1852				1852	18:45	143	661				661
07:00	412						19:00	140					
07:15	418						19:15	133					
07:30	339						19:30	141					
07:45	258	1427				1427	19:45	158	572				572
08:00	192						20:00	124					
08:15	141						20:15	126					
08:30	170						20:30	139					
08:45	144	647				647	20:45	129	518				518
09:00	154						21:00	114					
09:15	150						21:15	92					
09:30	123						21:30	83					
09:45	127	554				554	21:45	76	365				365
10:00	133						22:00	71					
10:15	106						22:15	65					
10:30	134						22:30	46					
10:45	132	505				505	22:45	39	221				221
11:00	140						23:00	31					
11:15	143						23:15	30					
11:30	155						23:30	26					
11:45	174	612				612	23:45	17	104				104
Total Vol.		7038				7038			6524				6524

	NB	SB	EB	WB	Total
Daily Totals :	####	0	0	0	13,562

	AM			PM	
Split %	100.0%	51.9%		100.0%	48.1%
AM Peak Hr.	06:00	06:00	PM Peak Hr.	16:45	16:45
Volume	1852	1852	Volume	793	793
P.H.F.	0.933	0.933	P.H.F.	0.940	0.940
7 - 9 Vol.	2074	2074	4 - 6 Vol.	1509	1509
Peak Hr.	07:00	07:00	Peak Hr.	16:45	16:45
Volume	1427	1427	Volume	793	793
P.H.F.	0.853	0.853	P.H.F.	0.940	0.940

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City: Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: San Rafael Dr N/o Sunset Dr	Project: 09-4190-013	2,013	504	0	0	2,517

AM Period	NB		SB		EB		WB			PM Period	NB		SB		EB		WB		
00:00	5		3							12:00	41		5						
00:15	2		1							12:15	17		5						
00:30	4		0							12:30	25		3						
00:45	2	13	0	4					17	12:45	22	105	9	22					127
01:00	2		1							13:00	28		11						
01:15	1		1							13:15	31		11						
01:30	1		4							13:30	20		9						
01:45	1	5	1	7					12	13:45	22	101	8	39					140
02:00	1		0							14:00	21		7						
02:15	1		0							14:15	28		4						
02:30	0		0							14:30	38		8						
02:45	0	2	1	1					3	14:45	26	113	7	26					139
03:00	1		1							15:00	25		6						
03:15	2		0							15:15	20		10						
03:30	1		0							15:30	21		9						
03:45	6	10	0	1					11	15:45	43	109	15	40					149
04:00	2		0							16:00	43		12						
04:15	3		1							16:15	32		10						
04:30	6		0							16:30	34		16						
04:45	6	17	1	2					19	16:45	23	132	15	53					185
05:00	10		1							17:00	49		19						
05:15	5		0							17:15	24		18						
05:30	10		1							17:30	34		12						
05:45	25	50	1	3					53	17:45	28	135	17	66					201
06:00	17		1							18:00	27		15						
06:15	40		2							18:15	26		6						
06:30	37		2							18:30	42		14						
06:45	38	132	6	11					143	18:45	37	132	9	44					176
07:00	49		2							19:00	32		10						
07:15	53		2							19:15	19		8						
07:30	52		4							19:30	17		6						
07:45	54	208	7	15					223	19:45	21	89	5	29					118
08:00	44		5							20:00	21		9						
08:15	39		4							20:15	25		5						
08:30	43		7							20:30	21		6						
08:45	43	169	4	20					189	20:45	19	86	3	23					109
09:00	40		7							21:00	16		3						
09:15	29		8							21:15	8		3						
09:30	26		3							21:30	16		2						
09:45	28	123	4	22					145	21:45	6	46	4	12					58
10:00	32		5							22:00	7		0						
10:15	21		4							22:15	8		3						
10:30	35		8							22:30	7		2						
10:45	27	115	3	20					135	22:45	6	28	3	8					36
11:00	22		3							23:00	7		5						
11:15	19		11							23:15	1		2						
11:30	24		4							23:30	1		1						
11:45	19	84	10	28					112	23:45	0	9	0	8					17
Total Vol.		928		134					1062			1085		370					1455

				NB	SB	EB	WB	Total
			Daily Totals :	2,013	504	0	0	2,517

	AM				PM		
Split %	87.4%	12.6%	42.2%		74.6%	25.4%	57.8%
AM Peak Hr.	07:00	11:15	07:00	PM Peak Hr.	15:45	16:30	15:45
Volume	208	30	223	Volume	152	68	205
P.H.F.	0.963	0.682	0.914	P.H.F.	0.884	0.895	0.884
7 - 9 Vol.	377	35	412	4 - 6 Vol.	267	119	386
Peak Hr.	07:00	07:45	07:00	Peak Hr.	16:15	16:30	17:00
Volume	208	23	223	Volume	138	68	201
P.H.F.	0.963	0.821	0.914	P.H.F.	0.704	0.895	0.739

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals				
			NB	SB	EB	WB	Total
Location: Capistrano Dr W/o San Rafael Dr	Project:	09-4190-014	0	0	1,732	110	1,842

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			1		1			12:00			25		1		
00:15			1		0			12:15			22		2		
00:30			1		0			12:30			21		3		
00:45			0	3	0	1	4	12:45			15	83	3	9	92
01:00			0		0			13:00			22		2		
01:15			0		0			13:15			24		4		
01:30			1		0			13:30			30		3		
01:45			0	1	0		1	13:45			34	110	0	9	119
02:00			0		0			14:00			35		0		
02:15			1		0			14:15			36		2		
02:30			1		1			14:30			43		1		
02:45			1	3	0	1	4	14:45			41	155	3	6	161
03:00			0		0			15:00			26		1		
03:15			0		0			15:15			38		2		
03:30			1		0			15:30			32		4		
03:45			0	1	0		1	15:45			48	144	1	8	152
04:00			2		1			16:00			51		1		
04:15			1		0			16:15			35		3		
04:30			1		0			16:30			35		1		
04:45			6	10	0	1	11	16:45			41	162	1	6	168
05:00			8		1			17:00			36		2		
05:15			7		0			17:15			32		1		
05:30			8		0			17:30			41		2		
05:45			10	33	0	1	34	17:45			37	146	0	5	151
06:00			22		0			18:00			34		2		
06:15			13		0			18:15			29		3		
06:30			22		0			18:30			36		3		
06:45			23	80	3	3	83	18:45			18	117	1	9	126
07:00			27		0			19:00			35		2		
07:15			25		0			19:15			19		5		
07:30			30		0			19:30			29		3		
07:45			33	115	0		115	19:45			25	108	1	11	119
08:00			21		3			20:00			22		0		
08:15			21		3			20:15			15		1		
08:30			13		0			20:30			19		0		
08:45			14	69	3	9	78	20:45			16	72	0	1	73
09:00			20		0			21:00			17		0		
09:15			18		1			21:15			16		0		
09:30			9		1			21:30			16		5		
09:45			13	60	0	2	62	21:45			6	55	1	6	61
10:00			17		2			22:00			15		2		
10:15			19		0			22:15			6		4		
10:30			19		1			22:30			1		1		
10:45			22	77	1	4	81	22:45			0	22	1	8	30
11:00			20		2			23:00			4		1		
11:15			22		1			23:15			4		0		
11:30			33		5			23:30			2		1		
11:45			19	94	0	8	102	23:45			2	12	0	2	14
Total Vol.				546		30	576					1186		80	1266

	NB	SB	EB	WB	Total
Daily Totals :	0	0	1,732	110	1,842

	AM			PM			
Split %	94.8%	5.2%	31.3%		93.7%	6.3%	68.7%
AM Peak Hr.	07:00	08:00	07:00	PM Peak Hr.	15:15	12:30	15:15
Volume	115	9	115	Volume	169	12	177
P.H.F.	0.871	0.750	0.871	P.H.F.	0.828	0.750	0.851
7 - 9 Vol.	184	9	193	4 - 6 Vol.	308	11	319
Peak Hr.	07:00	08:00	07:00	Peak Hr.	16:00	16:15	16:00
Volume	115	9	115	Volume	162	7	168
P.H.F.	0.871	0.750	0.871	P.H.F.	0.794	0.583	0.808

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Wire Mountain Rd W/o Vandegrift Blvd	Project:	09-4190-015	0	0	5,962	6,578	12,540

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			4		8			12:00			178		110		
00:15			3		4			12:15			104		124		
00:30			3		6			12:30			110		152		
00:45			4	14	6	24	38	12:45			122	514	152	538	1052
01:00			1		2			13:00			75		180		
01:15			2		3			13:15			84		123		
01:30			4		6			13:30			80		99		
01:45			1	8	3	14	22	13:45			74	313	72	474	787
02:00			2		7			14:00			73		82		
02:15			1		1			14:15			70		90		
02:30			0		6			14:30			117		87		
02:45			0	3	3	17	20	14:45			71	331	64	323	654
03:00			3		5			15:00			79		86		
03:15			4		2			15:15			87		85		
03:30			1		3			15:30			85		90		
03:45			2	10	2	12	22	15:45			136	387	85	346	733
04:00			2		9			16:00			94		85		
04:15			5		7			16:15			158		93		
04:30			8		9			16:30			173		76		
04:45			6	21	10	35	56	16:45			167	592	78	332	924
05:00			6		26			17:00			170		113		
05:15			8		35			17:15			189		98		
05:30			9		91			17:30			182		76		
05:45			25	48	161	313	361	17:45			85	626	78	365	991
06:00			36		118			18:00			128		85		
06:15			52		81			18:15			127		94		
06:30			75		99			18:30			88		105		
06:45			66	229	132	430	659	18:45			92	435	71	355	790
07:00			64		137			19:00			62		52		
07:15			80		187			19:15			82		64		
07:30			77		219			19:30			76		43		
07:45			79	300	177	720	1020	19:45			73	293	63	222	515
08:00			67		144			20:00			43		62		
08:15			70		103			20:15			47		66		
08:30			75		82			20:30			50		58		
08:45			67	279	93	422	701	20:45			39	179	40	226	405
09:00			61		82			21:00			34		56		
09:15			73		77			21:15			43		44		
09:30			78		91			21:30			40		40		
09:45			86	298	61	311	609	21:45			44	161	39	179	340
10:00			66		80			22:00			36		40		
10:15			90		98			22:15			30		22		
10:30			95		65			22:30			16		23		
10:45			73	324	71	314	638	22:45			11	93	27	112	205
11:00			83		93			23:00			12		16		
11:15			133		90			23:15			9		14		
11:30			110		154			23:30			9		11		
11:45			147	473	110	447	920	23:45			1	31	6	47	78
Total Vol.				2007		3059	5066					3955		3519	7474

	NB	SB	EB	WB	Total
Daily Totals :	0	0	5,962	6,578	12,540

	AM			PM			
Split %	39.6%	60.4%	40.4%		52.9%	47.1%	59.6%
AM Peak Hr.	11:15	07:15	11:30	PM Peak Hr.	16:45	12:15	16:45
Volume	568	727	1037	Volume	708	608	1073
P.H.F.	0.798	0.830	0.900	P.H.F.	0.937	0.844	0.935
7 - 9 Vol.	579	1142	1721	4 - 6 Vol.	1218	697	1915
Peak Hr.	07:15	07:15	07:15	Peak Hr.	16:45	16:30	16:45
Volume	303	727	1030	Volume	708	365	1073
P.H.F.	0.947	0.830	0.870	P.H.F.	0.937	0.808	0.935

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009	City:	Camp Pendleton	Daily Totals NB	SB	EB	WB	Total
Location: Wire Mountain Rd E/o Vandegrift Blvd	Project:	09-4190-016	0	0	5,289	4,886	10,175

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			1		3			12:00			69		80		
00:15			6		1			12:15			71		97		
00:30			3		2			12:30			93		100		
00:45			6	16	1	7	23	12:45			93	326	98	375	701
01:00			0		0			13:00			79		102		
01:15			1		2			13:15			70		92		
01:30			3		1			13:30			63		60		
01:45			7	11	3	6	17	13:45			64	276	63	317	593
02:00			1		2			14:00			56		53		
02:15			3		1			14:15			85		53		
02:30			3		2			14:30			101		63		
02:45			2	9	3	8	17	14:45			71	313	62	231	544
03:00			3		1			15:00			98		136		
03:15			1		1			15:15			73		147		
03:30			2		3			15:30			87		116		
03:45			1	7	0	5	12	15:45			95	353	88	487	840
04:00			2		4			16:00			125		91		
04:15			2		11			16:15			135		92		
04:30			2		10			16:30			144		124		
04:45			4	10	12	37	47	16:45			148	552	102	409	961
05:00			8		14			17:00			175		122		
05:15			16		33			17:15			144		103		
05:30			47		49			17:30			121		108		
05:45			93	164	42	138	302	17:45			109	549	91	424	973
06:00			100		64			18:00			116		80		
06:15			74		72			18:15			77		62		
06:30			62		99			18:30			101		74		
06:45			55	291	104	339	630	18:45			82	376	53	269	645
07:00			74		144			19:00			65		46		
07:15			64		93			19:15			63		46		
07:30			61		88			19:30			84		42		
07:45			82	281	80	405	686	19:45			72	284	30	164	448
08:00			55		74			20:00			69		30		
08:15			54		76			20:15			61		43		
08:30			38		58			20:30			36		27		
08:45			47	194	69	277	471	20:45			50	216	16	116	332
09:00			36		54			21:00			39		63		
09:15			54		59			21:15			39		25		
09:30			41		48			21:30			41		30		
09:45			51	182	58	219	401	21:45			28	147	17	135	282
10:00			48		53			22:00			27		16		
10:15			50		53			22:15			12		12		
10:30			60		58			22:30			13		10		
10:45			55	213	43	207	420	22:45			12	64	6	44	108
11:00			85		48			23:00			11		8		
11:15			96		62			23:15			10		6		
11:30			121		72			23:30			13		7		
11:45			111	413	61	243	656	23:45			8	42	3	24	66
Total Vol.				1791		1891	3682					3498		2995	6493

	NB	SB	EB	WB	Total
Daily Totals :	0	0	5,289	4,886	10,175

	AM EB	AM WB	AM Total		PM EB	PM WB	PM Total
Split %	48.6%	51.4%	36.2%		53.9%	46.1%	63.8%
AM Peak Hr.	11:00	06:30	06:30	PM Peak Hr.	16:30	15:00	16:30
Volume	413	440	695	Volume	611	487	1062
P.H.F.	0.853	0.764	0.797	P.H.F.	0.873	0.828	0.894
7 - 9 Vol.	475	682	1157	4 - 6 Vol.	1101	833	1934
Peak Hr.	07:00	07:00	07:00	Peak Hr.	16:30	16:30	16:30
Volume	281	405	686	Volume	611	451	1062
P.H.F.	0.857	0.703	0.787	P.H.F.	0.873	0.909	0.894

Prepared by NDS/ATD

Volumes for: Tuesday, May 12, 2009		City:	Camp Pendleton	Daily Totals				
				NB	SB	EB	WB	Total
Location: San Jacinto Rd N/o Wire Mountain Rd		Project:	09-4190-017	1,572	1,420	0	0	2,992

AM Period	NB		SB		EB		WB			PM Period	NB		SB		EB		WB		
00:00	0		0							12:00	50		23						
00:15	0		0							12:15	19		19						
00:30	0		0							12:30	26		29						
00:45	0		0							12:45	32	127	37	108					235
01:00	0		0							13:00	28		34						
01:15	1		0							13:15	15		55						
01:30	1		0							13:30	18		37						
01:45	0	2	1	1					3	13:45	19	80	17	143					223
02:00	0		0							14:00	20		24						
02:15	0		0							14:15	15		8						
02:30	1		0							14:30	9		17						
02:45	1	2	0						2	14:45	18	62	19	68					130
03:00	0		1							15:00	18		29						
03:15	0		0							15:15	16		50						
03:30	1		0							15:30	23		46						
03:45	1	2	0	1					3	15:45	9	66	29	154					220
04:00	0		0							16:00	23		22						
04:15	2		2							16:15	22		44						
04:30	0		1							16:30	36		25						
04:45	1	3	3	6					9	16:45	48	129	30	121					250
05:00	2		0							17:00	75		28						
05:15	7		1							17:15	67		37						
05:30	5		1							17:30	32		38						
05:45	48	62	1	3					65	17:45	33	207	38	141					348
06:00	64		4							18:00	20		21						
06:15	52		15							18:15	15		17						
06:30	45		24							18:30	19		11						
06:45	37	198	22	65					263	18:45	8	62	2	51					113
07:00	39		27							19:00	16		7						
07:15	31		27							19:15	5		5						
07:30	28		19							19:30	4		12						
07:45	15	113	24	97					210	19:45	3	28	13	37					65
08:00	25		32							20:00	4		8						
08:15	33		19							20:15	4		3						
08:30	27		21							20:30	2		15						
08:45	17	102	15	87					189	20:45	3	13	4	30					43
09:00	18		19							21:00	4		4						
09:15	15		8							21:15	4		59						
09:30	17		11							21:30	8		10						
09:45	15	65	15	53					118	21:45	0	16	17	90					106
10:00	23		13							22:00	2		7						
10:15	17		16							22:15	1		5						
10:30	18		23							22:30	2		7						
10:45	12	70	21	73					143	22:45	4	9	9	28					37
11:00	20		10							23:00	3		3						
11:15	39		12							23:15	1		5						
11:30	31		18							23:30	1		2						
11:45	59	149	13	53					202	23:45	0	5	0	10					15
Total Vol.		768		439					1207			804		981					1785

	NB	SB	EB	WB	Total
Daily Totals :	1,572	1,420	0	0	2,992

	AM			PM			
Split %	63.6%	36.4%	40.3%		45.0%	55.0%	59.7%
AM Peak Hr.	05:45	07:15	06:00	PM Peak Hr.	16:30	12:45	16:45
Volume	209	102	263	Volume	226	163	355
P.H.F.	0.816	0.797	0.953	P.H.F.	0.753	0.741	0.853
7 - 9 Vol.	215	184	399	4 - 6 Vol.	336	262	598
Peak Hr.	07:00	07:15	07:00	Peak Hr.	16:30	17:00	16:45
Volume	113	102	210	Volume	226	141	355
P.H.F.	0.724	0.797	0.795	P.H.F.	0.753	0.928	0.853

TABLE X-X

PERMANENT PROJECTS CONSTRUCTION BY YEAR AND ZONE

Year	Zone	# of Projects	Acres	Trucks/ day	Workers/d ay	Daily Trips	Peak-Hour Trips
2013	1	3	19.84	40	40	320	80
	2	6	47.73	96	96	768	192
	3	3	10.60	22	22	176	44
	4	4	47.16	110	145	985	247
	5	2	20.97	42	42	336	84
	TOTAL	18	146.31	310	345	2,585	647
2014	1	0	0.00	0	0	0	0
	2	1	2.21	5	5	40	10
	3	0	0.00	0	0	0	0
	4	3	54.06	87	131	828	207
	5	1	147.86	8	8	64	16
	TOTAL	5	204.13	100	144	932	233
SUMMARY		44	585.44	883	962	7,301	1,826

Notes:

parts

Trucks: Average of 2 trucks per day per acre and 2 trips per truck (one inbound, one outbound)

Workers: Average of 2 workers per day per acre and 3 trips per worker

Daily Trips = # Trucks x passenger car equivalent factor (used 2.5) x # trips per truck + # Workers x # trips per worker

Peak-Hour Trips = Daily Trips x 0.25 (assume 25% in each of AM and PM peak hour)

All AM peak-hour trips are inbound, all PM peak-hour trips are outbound

For Years 2013 and 2014, assumption for P-1040 in Zone 4 includes a higher trip generation. 15 trucks and 50 workers per day are assumed. The acreage for this project only is tabulated in Year 2013.

For Year 2014, assumptions for P-1058 in Zone 5 include 1 truck per day per 40 acres and 2 trips per truck (one inbound, one outbound); and 1 worker per day per 40 acres and 3 trips per worker. This project covers a large area but does not require many construction workers or raw materials.

For Year 2014, assumption for SMV (Stuart Mesa Rd/Vandegrift Boulevard improvements) in Zone 4 includes a higher trip generation. 6 trucks and 15 workers per day are assumed.

GTF Initiative for MCBCP and MCAS Camp Pendleton	
Number of new uniformed personnel	3,728
Number of new adult family members (spouses)	1,738
Number of new minor family members (children)	5,306
Total number of new personnel	10,772
Total number of new commuters	**5,466**

Assumptions:
60% of new personnel live on-base, 40% of new personnel live off-base
25% of spouses living on-base work off-base
Children would not be commuters

Total new uniformed personnel	***3,728***		
Number living on-base	2,237	Morning home to work peak-hour trips (internal trips only)	0
		Afternoon work to home peak-hour trips (internal trips only)	0
		Off-peak external daily trips (1.5 per day)	3,355
		Total daily trips	3,355
Number living off-base	1,491	Morning inbound trips (home to work)	1,491
		67% occur during the highest peak-hour	*994*
		Afternoon outbound trips (work to home)	1,491
		67% occur during the highest peak-hour	*994*
		Off-peak external daily trips (occur out of study area)	0
		Total daily trips	2,982

Total new spouses	***1,738***		
Spouses living on-base	1,043	Morning home to work peak-hour trips (outbound, 25% of spouses)	261
		67% occur during the highest peak-hour	*174*
		Afternoon work to home peak-hour trips (inbound, 25% of spouses)	261
		67% occur during the highest peak-hour	*174*
		Off-peak external daily trips (1.5 per day, 75% of spouses)	1,173
		Total daily trips	1,695
Spouses living off-base	695	Morning home to work peak-hour trips (occur out of study area)	0
		Afternoon work to home peak-hour trips (occur out of study area)	0
		Off-peak external daily trips (occur out of study area)	0
		Total daily trips	0

Summary	
Morning inbound peak-hour trips	994
Morning outbound peak-hour trips	174
Afternoon inbound peak-hour trips	174
Afternoon outbound peak-hour trips	994
Total daily trips	8,032

TABLE X
STUART MESA PPV HOUSING (PHASES 8 AND 9) CONSTRUCTION TRAFFIC

Type	Daily Trips	Peak-Hour Trips			
		AM		PM	
		In	Out	In	Out
Construction Workers	100	50	0	0	50
Construction Deliveries	375	25	10	0	35
Total	475	75	10	0	85

Notes:

Daily and Peak-Hour trips were estimated based on similar construction activities at MCB Camp Pendleton. Construction Deliveries trips were converted to passerger cars using a passenger car equivalent (PCE) of 2.5.

TABLE 8
STUART MESA HOUSING TRIP GENERATION SUMMARY

Land Use	Units[1]	Trip Rate[2]	Daily Trips	AM Peak-Hour % of ADT[2]	AM In:Out Ratio[2]	AM In	AM Out	AM Total	PM Peak-Hour % of ADT[2]	PM In:Out Ratio[2]	PM In	PM Out	PM Total
Driveway Trips[3]													
Stuart Mesa (Phase 6)													
PPV Family Housing	186 du	6 / du	1,116	7%	3.00 : 7.00	23	55	78	9%	6.00 : 4.00	60	40	100
Stuart Mesa (Phase 6) Total			**1,116**			**23**	**55**	**78**			**60**	**40**	**100**
Stuart Mesa (Phase 7)													
PPV Family Housing	351 du	8 / du	2,808	7%	3.00 : 7.00	59	138	197	9%	6.00 : 4.00	152	101	253
Stuart Mesa (Phases 7-9) Total			**2,808**			**59**	**138**	**197**			**152**	**101**	**253**
Stuart Mesa (Phases 8-9)													
PPV Family Housing	711 du	6 / du	4,266	7%	3.00 : 7.00	90	209	299	9%	6.00 : 4.00	230	154	384
Stuart Mesa (Phases 8-9) Total			**4,266**			**90**	**209**	**299**			**230**	**154**	**384**
Total Stuart Mesa			**8,190**			**172**	**402**	**574**			**442**	**295**	**737**

Note:
1. du = Dwelling Unit
2. Trip rates referenced from the Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, SANDAG, April 2002.
3. Driveway trips are the total number of trips generated by a site.

K:\SND_TPTO\095381016\Excel\Stuart Mesa PPV\[381008TG01-PPV.xlsm]Stuart Mesa (Alternative 2)

TABLE X
NAVAL HOSPITAL CONSTRUCTION TRAFFIC

Type	Daily Trips	Peak-Hour Trips			
		AM		PM	
		In	Out	In	Out
Construction Workers	400	200	0	0	200
Construction Deliveries	1,500	75	30	0	75
Total	1,900	275	30	0	275

Notes:

Daily and Peak-Hour trips were taken from the Traffic Impact Analysis Naval Hospital Camp Pendleton Project prepared by URS and dated October 6, 2009. Construction Deliveries trips were converted to passenger cars using a passenger car equivalent (PCE) of 2.5.

TABLE 13-1
NAVAL HOSPITAL
TRIP GENERATION SUMMARY

Land Use	Land Use as listed in ITE	Units[1]	Trip Rate[2]	Daily Trips	AM Peak-Hour % of ADT[2]	AM In:Out Ratio[2]	AM In	AM Out	AM Total	PM Peak-Hour % of ADT[2]	PM In:Out Ratio[2]	PM In	PM Out	PM Total
Proposed Site														
Naval Hospital Camp Pendleton	Hospital	511 ksf	16.5 / ksf	8,435	6.11%	0.62 : 0.38	321	194	515	5.36%	0.50 : 0.50	226	226	452
Proposed Site Total				**8,435**			**321**	**194**	**515**			**226**	**226**	**452**
Existing Site														
Naval Hospital Camp Pendleton	Hospital	428 ksf	16.5 / ksf	7,061	6.11%	0.62 : 0.38	268	163	431	5.36%	0.50 : 0.50	189	189	378
Operational Reduction (25% credit)				-1,765		:	-67	-41	-108			-47	-47	-95
Existing Site Total				**5,296**			**201**	**122**	**323**			**142**	**142**	**284**

Note:
1. ksf = thousand square feet
2. Trip rates references from ITE Trip Generation, 8th Edition.

K:\SND_TPTO\095381016\Excel\Hospital\[381012TG01-Hospital- ksf.xlsm]Summary

TABLE 9-1
EXCHANGE COMPLEX
TRIP GENERATION SUMMARY

Land Use	Land Use as listed in ITE	Units[1]	Trip Rate[2]	Daily Trips	AM Peak-Hour % of ADT[2]	AM In:Out Ratio[2]	AM In	AM Out	AM Total	PM Peak-Hour % of ADT[2]	PM In:Out Ratio[2]	PM In	PM Out	PM Total
Proposed Site														
Exchange MCB Camp Pendleton	Shopping Center	150 ksf	42.94 / ksf	6,441	2%	0.61 : 0.39	92	58	150	9%	0.49 : 0.51	274	286	560
	Quality Restaurant	5.5 ksf	89.95 / ksf	495	1%	0.82 : 0.18	4	0	4	8%	0.67 : 0.33	28	13	41
	Specialty Retail Center	15 ksf	44.32 / ksf	643	2%	0.48 : 0.52	6	7	13	6%	0.44 : 0.56	17	22	39
Proposed Site Total				**7,578**			**102**	**65**	**167**			**319**	**321**	**640**
Pass-by Trips (Proposed)			Pass-By %											
Exchange MCB Camp Pendleton	Shopping Center	150 ksf	35%	2,235	Not Applicable					9%	0.50 : 0.50	97	97	194
	Quality Restaurant	5.5 ksf	40%	198						8%	0.50 : 0.50	8	8	16
	Specialty Retail Center	15 ksf	35%	223						6%	0.50 : 0.50	7	7	14
Total Pass-by Trips (Proposed)				**2,656**			**0**	**0**	**0**			**112**	**112**	**224**
Existing Site Reduction														
Exchange MCB Camp Pendleton	Shopping Center	(65) ksf	42.94 / ksf	-2,798	2%	0.61 : 0.39	-40	-25	-65	9%	0.49 : 0.51	-119	-124	-243
Existing Site Total				**-2,798**			**-40**	**-25**	**-65**			**-119**	**-124**	**-243**
Pass-by Trips (Existing)			Pass-By %											
Exchange MCB Camp Pendleton	Shopping Center	(65) ksf	35%	-971	Not Applicable					9%	0.50 : 0.50	-42	-42	-84
Total Pass-by Trips (Existing)				**-971**			**0**	**0**	**0**			**-42**	**-42**	**-84**
NET TRIP GENERATION =				**3,095**			**62**	**40**	**102**			**130**	**127**	**257**

Note:
1. ksf = Thousand square feet
2. Trip rates references from ITE Trip Generation, 8th Edition.

K:\SND_TPTO\095381016\Excel\Exchange\[381012TG01-MX.xlsm]Summary

TABLE 1
UTILITY INFRASTRUCTURE TRIP GENERATION BY YEAR

Year	Project Number	Trucks/ day	Workers/d ay	Daily Trips	Peak-Hour Trips
2013	P-1043	15	33	174	44
	P-1048	30	66	348	87
	P-1049	35	77	406	102
	P-1094	30	72	366	92
	P-1099	48	192	816	204
	TOTAL	158	440	2,110	529
2014	P-1049	35	77	406	102
	P-1099	48	192	816	204
	TOTAL	83	269	1,222	306
SUMMARY		361	979	4,742	1,189

Notes:

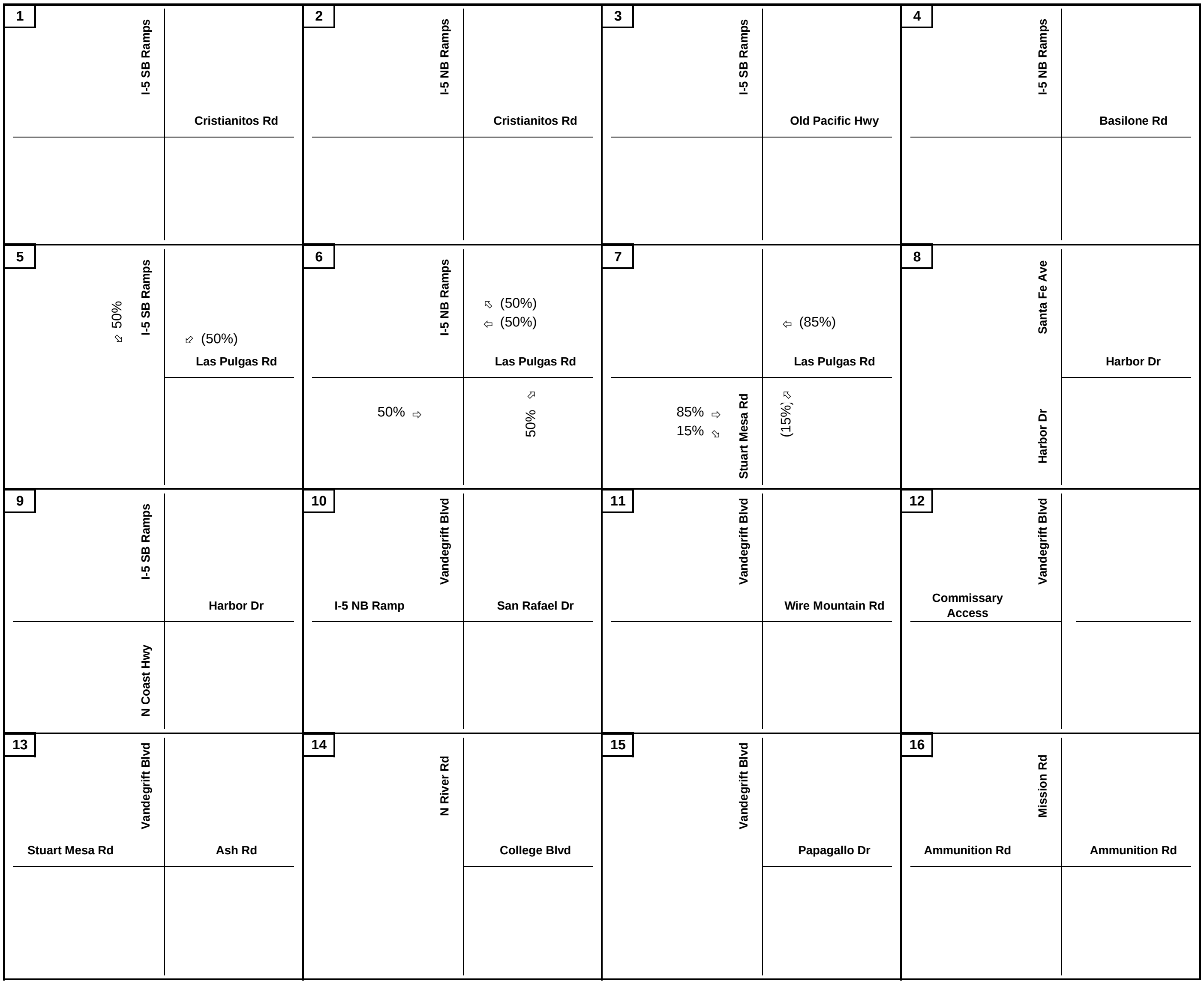
Trucks: Average of 2 trips per truck (one inbound, one outbound)

Workers: Average of 3 trips per worker

Daily Trips = (# Trucks x passenger car equivalent factor of 2.5 x # trips per truck) + (# Workers x # trips per worker)

Peak-Hour Trips = Daily Trips x 0.25 (assume 25% in each of AM and PM peak hour)

All AM peak-hour trips are inbound, all PM peak-hour trips are outbound



Legend

X% / (Y%) = IN / OUT PERCENT DISTRIBUTION

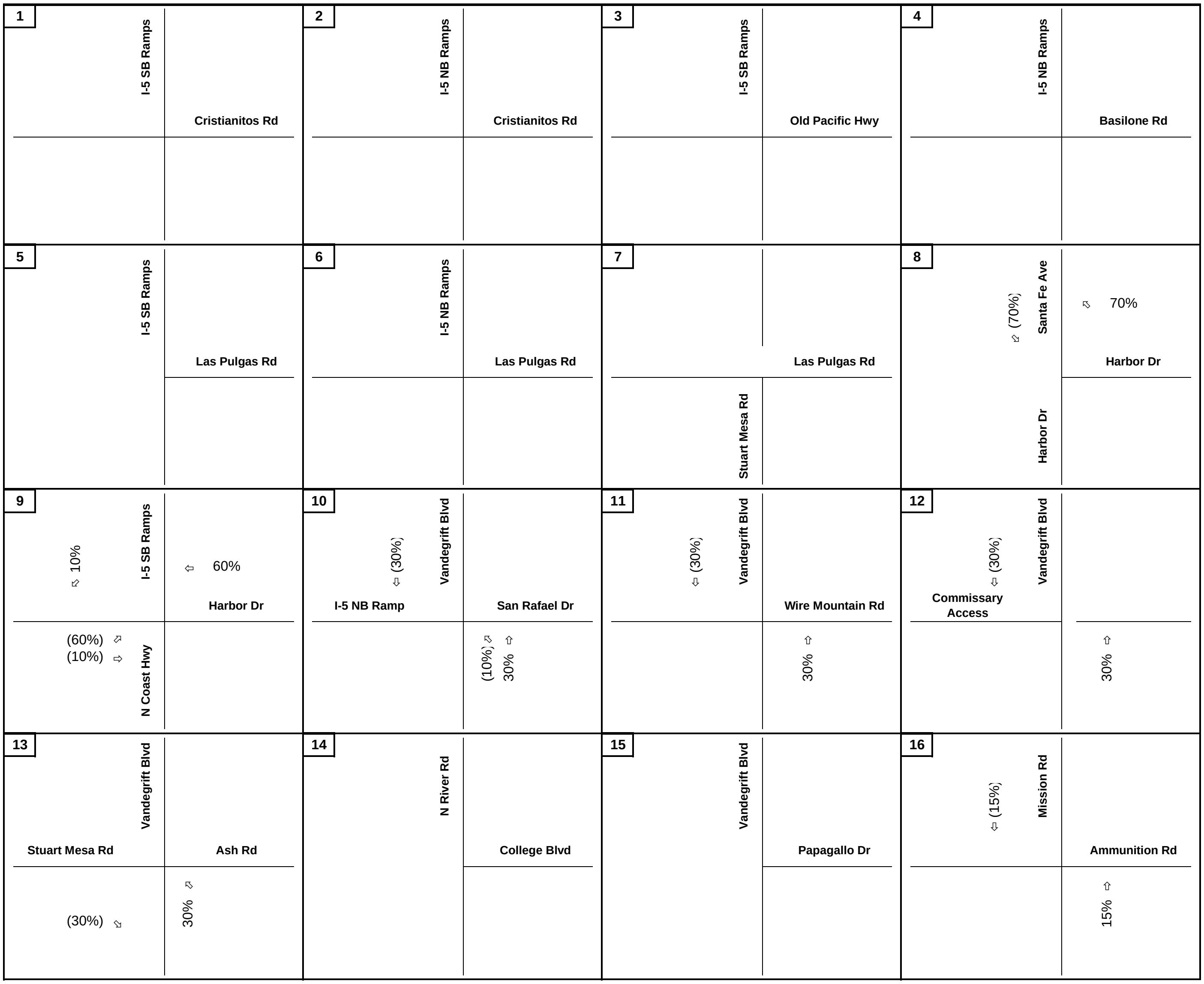
NOT TO SCALE

Kimley-Horn and Associates, Inc.

FIGURE C.1

Zone 3 Project Trip Distribution - Study Intersections

BWI EIS



Legend

X% / (Y%) = IN / OUT PERCENT DISTRIBUTION

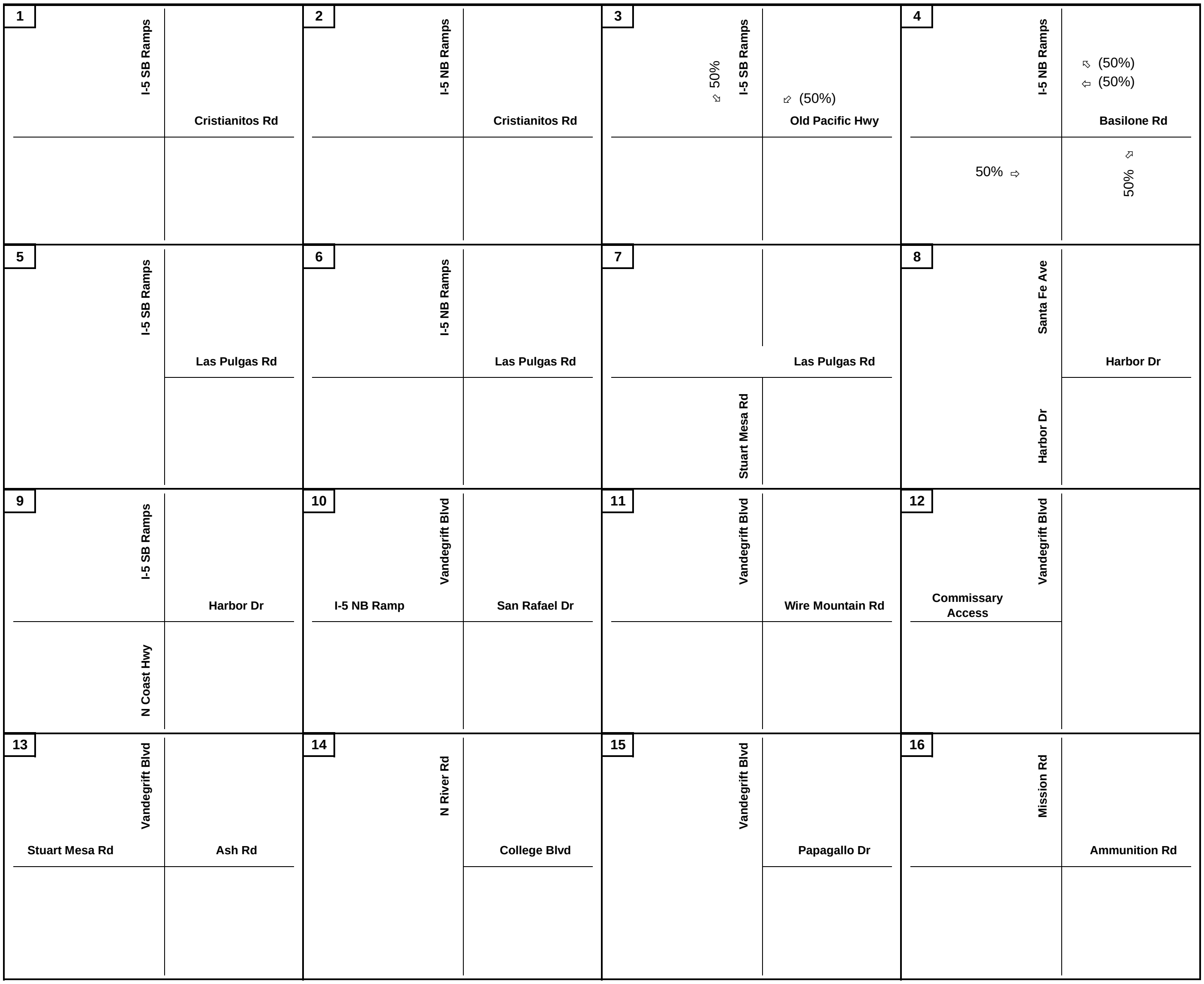
Kimley-Horn and Associates, Inc.

FIGURE C.2

Zone 4 Project Trip Distribution - Study Intersections

K:\SND_TPTO\095381016\Excel\[381016TA01-Option A Construction by Zone.xls]Area21 (Z4) Dist 1-12

BWI EIS



Legend

X% / (Y%) = IN / OUT PERCENT DISTRIBUTION

NOT TO SCALE

Kimley-Horn and Associates, Inc.

FIGURE C.3

Zone 5 Project Trip Distribution - Study Intersections

APPENDIX D

GREENHOUSE GAS EMISSIONS CALCULATIONS

BWI & SMBR

Construction GHG emissions (CO2 and CO2e) of Prefered Alternative (Alternative 5)

MILCON	AIR BASIN	Year 2013	Year 2014	Year 2015		
P-1044 Alt 1	SDAB	2,679	3,328	0		
P-1044 Alt 1	SCAB	80	0	0		
P-1045 Alt 3	SDAB	0	3,065	4,091		
P-1039 Alt 2	SDAB	0	244	736		
TOTAL CO2 (in tons)		**2,759**	**6,637**	**4,827**		
CO2e conversion factor		0.907	0.907	0.907		
TOTAL CO2e (in metric tons)		**2,502**	**6,020**	**4,378**	**12,900**	**Prefered Alternative TOTAL**

APPENDIX E

MARINE RESOURCES TECHNICAL REPORT

Nautilus Environmental

Marine Environmental Assessment for the Northern Advanced Water Treatment Plant, Marine Corps Base Camp Pendleton, California

Technical Report

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Submitted October 2011

1.0 INTRODUCTION AND BACKGROUND

The U.S. Navy (Navy) has proposed constructing the Northern Advanced Water Treatment (AWT) facility on Marine Corps Base Camp Pendleton (MCBCP), under Military Construction (MILCON) project number P-1044, as part of a basewide water infrastructure upgrading effort. The facility, located in the lower San Onofre Creek watershed, would demineralize and treat groundwater through a reverse osmosis (RO) process to improve the quality and increase the availability of potable water on MCBCP. RO concentrate (brine) would be routed via pipeline to the Southern California Edison (SCE) San Onofre Nuclear Generating Station (SONGS) Unit 1 intake conduit, where it would be discharged in the marine environment.

Potential offshore impacts resulting from both the construction of treatment facility infrastructure, as well as those caused by the discharge of brine from the AWT facility into the marine environment, are summarized here. Nautilus Environmental (Nautilus) has been tasked to evaluate the potential impacts of this project on the marine environment seaward of the intertidal zone. Mitigation measures are proposed when appropriate to minimize potential project impacts.

1.1 Project Summary

The AWT facility would treat groundwater using RO and discharge the resulting brine solution offshore into the Pacific Ocean. The approximate effluent volume would be 0.9 million gallons per day (gpd). This effluent would be discharged through a 12-inch-diameter pipe that would extend approximately 3,200 feet from the shoreline. This pipeline would be inserted into the existing 12-foot-diameter cooling water intake conduit structure at SONGS (previously used for Unit 1, which was permanently shut down in November 1992). The effluent pipe would extend an additional 150 feet past the intake conduit structure terminus and discharge brine via six 2-inch-diameter diffuser ports. The proposed brine discharge pipe would be installed at a depth of approximately 25 feet. The brine discharge pipeline would run south of the AWT, beneath I-5, and connect to the SONGS intake conduit structure in one of the following ways:

1. Landward Connection — connection north of the SONGS seawall, downstream of the concrete plug used to decommission the power plant cooling system.
2. Beach Connection — connection south of the SONGS seawall in the shoreline area.
3. Ocean Connection — connection to the SONGS intake conduit beyond the surf zone (burying the discharge line under the seafloor).

For assessing the potential marine environment impacts associated with the proposed project, a region of influence (ROI) has been defined relative to construction and operational phases. The ROI, where construction-related impacts would be expected to occur, is defined as the perimeter area extending around the existing conduit structure, including the proposed 150-foot brine discharge diffuser system extension (Figure 1). Initial dilution modeling of the brine discharge (Brown and Caldwell 2011) has shown that the brine discharge will comply with California Ocean Plan receiving water limitations (State Water Resources Control Board 2009) within the operational ROI, defined as the distance and extent from the proposed diffuser system where the brine discharge plume would be indiscernible from the surrounding seawater. Although these limits would not be exceeded (per modeling results), impacts and mitigation measures have been developed and are summarized here relative to all four P-1044 project build alternatives as currently designed.

2.0 EXISTING ENVIRONMENT

2.1 Regional Setting

The discharge point associated with the proposed AWT brine line is located within the region known as the Southern California Bight (SCB). The SCB covers an area of approximately 78,000 square kilometers (km^2), extending from Point Conception past the Mexican border, and encompassing the Channel Islands to the east. The primary currents in this region are the California Current, which flows southerly along the western portion of the bight, and the Southern California Countercurrent, which generally flows northerly along the southern California coastline. These currents combine to form a counterclockwise rotating gyre. Local longshore currents are relatively fine-scale currents, which predominate in the surf zone, and are affected by wave direction, wind, tides, and other factors; longshore currents in the project area generally flow southerly (Dailey, et. al. 1993).

The SCB is defined as a transitional zone between warm and cold water habitats, and multiple valuable biological resources are present in this region. Abundance and distribution of organisms within the SCB vary seasonally. Upwelling during the spring and summer months brings nutrient-rich waters in to the area, allowing for increased productivity (Dailey et. al. 1993).

2.2 Conventional Water Quality Conditions

SCE is required to monitor water quality offshore of SONGS as part of their National Pollutant Discharge Elimination System (NPDES) permit for cooling water discharges from their Unit 2 and Unit 3 diffuser systems. A large amount of data is therefore available which describe current water quality conditions in the proposed project area. The 2009 NPDES monitoring data (SCE/MBC 2010) were reviewed and are considered representative of existing conditions.

Temperature is continuously recorded by SCE at multiple stations in the area surrounding their discharge. It is recorded at the surface, as well as at depths of 4 and 10 meters. During 2009, temperatures at the 10-meter depth in the waters off San Onofre (slightly deeper than the proposed discharge depth) ranged from a low of approximately 14°C in the winter to 17°C in the summer. Surface temperatures were close to 15°C in the winter and reached approximately 21°C in the summer (SCE/MBC 2010).

Salinity in the SCB and proposed project area is typical of that observed in the open ocean, at approximately 33.5 to 34 parts per thousand (ppt). Slight variation in surface salinities can occur as a result of evaporation caused by high temperatures in the summer, as well as by freshwater runoff introduced during winter rain events (Dailey et. al. 1993).

Dissolved oxygen (DO) levels in the receiving environment (at the surface) are also measured as a part of the SONGS NPDES monitoring program. Mean DO at the SONGS downcoast control monitoring stations during 2009 was 8.0 milligrams per liter (mg/L), ranging from 7.4 mg/L in the summer to 8.7 mg/L in the spring (SCE/MBC 2010).

Surface pH values at the SONGS downcoast control monitoring stations was fairly constant throughout 2009, ranging from 7.98 to 8.08 (SCE/MBC 2010).

Background seawater concentrations of heavy metals that have the potential to affect the marine environment have been established by the SWRCB in the California Ocean Plan (State Water Resources Control Board 2009). Background concentrations of these metals, which are also anthropogenically generated by a variety of processes, are summarized in Table 1.

Table 1. Background Seawater Concentrations of Metals

Constituent	Background Seawater Concentration (µg/L)
Arsenic	3
Copper	2
Mercury	0.0005
Silver	0.16
Zinc	8

Note: From SWRCB (2009).
µg/L – micrograms per Liter

2.3 Biological Resources

2.3.1 Intertidal Habitats

The intertidal habitat within the ROI consists of sandy beach and cobble. Sandy beach habitat typically supports invertebrates such as sand crabs (*Emerita analoga*), mollusks (e.g., *Donax gouldii*), and other invertebrates (Ricketts et al. 1985), while the cobble is less rich biologically due to the physically dynamic movement of cobble when the habitat is inundated during high tide. Kelp wrack is a common feature of both intertidal habitats within ROI; the wrack functions as an additional habitat type which supports kelp flies and other invertebrates, which in turn serve as forage for shorebirds.

2.3.2 Subtidal Soft Bottom

The majority of the seafloor within the ROI consists of subtidal soft bottom habitat, primarily made up of fine-grained sediments (Figure 1). Subtidal soft bottom habitat consists primarily of sand; larger particles such as rocks and cobbles are frequently dispersed throughout. This habitat is typically exposed to wave surge and currents, and the sandy bottom is unstable, with frequent shifting of sediments. These unfavorable biological habitat conditions result in low productivity, and relatively low abundance and diversity of species. Subtidal soft bottom habitats are not considered highly sensitive by the scientific community.

Macroinvertebrates are generally the most common organisms in soft bottom habitats. These include epifaunal organisms living on the surface, as well as burrowing infaunal organisms. Polychaete worms and crustaceans are common examples. Other invertebrates, including sand stars, sea pens, sea pansies, and sand dollars are also found in soft bottom habitats.

2.3.3 Subtidal Hard Bottom

A small portion of the seafloor within the ROI consists of subtidal hard bottom substrate, consisting of rocks and rocky outcrop (Figure 1). A portion of this habitat is man-made, including the Unit 1 intake and discharge conduits, the intake Vertical Conduit Terminal Structure, and surrounding rip-rap. Hard bottom habitats can support a large abundance and diversity of species, and are therefore highly productive. They are considered more sensitive than soft bottom habitats. A large number of fish and invertebrate species inhabit hard bottom habitats, using them as nurseries and food sources.

SCE has conducted assessments of the hard bottom communities in the vicinity of the Unit 1 intake and discharge conduits. Both the naturally occurring habitat and the man-made conduits and surrounding rip rap are home to a variety of flora and fauna. Multiple species of both brown and red algae are found, as well as up to five species of bryozoans and four tunicate species. Sponges and hydroids are also found, as well as a few polychaete species. Several species of mollusks are common, including bivalves, gastropods, and octopus. Sea urchins and crustaceans are also found in the ROI (SCE 2005), among which are the black urchin (*Strongylocentrotus franciscanus*) and the California spiny lobster (*Panuliris interruptus*). These two species are important commercial and recreational fisheries in California, and are fished in the vicinity of the project site. The finfish species found in the ROI are discussed in Section 2.4 below.

Giant kelp (*Macrocystis pyrifera*) canopies can form in hard bottom habitats, creating a highly productive habitat for a multitude of organisms due to the protection provided by the kelp plants. Giant kelp forests are considered some of the richest and most productive habitats on earth, on par with rainforests and coral reefs. The proposed ROI does not currently support any giant kelp communities, primarily because it is close to shore in waters too shallow to support a kelp canopy habitat. Individual giant kelp plants have been observed in the area, but they are uncommon. There are kelp forests in the vicinity of the ROI, south of the SONGS Unit 3 conduits (SCE 2005, 2010).

2.4 Fish

SCE is required to monitor fish populations as part of NPDES permit compliance, and has done so since 1979. Otter trawls are conducted quarterly in the vicinity of the SONGS discharges, as well as at north and south control sites. Each site has three trawl stations, covering multiple depths of 6, 12, and 18 meters. Due to the monitoring method, which consists of a 5-minute trawl parallel with the shoreline, trawl data is representative of organisms inhabiting soft bottom areas that are outside, but within the vicinity of, the ROI. Multiple fish species are common in the ROI; however, fish biomass is generally low (SCE 2005).

In 2009, a total of 30 fish species were collected in otter trawls at the SONGS site, and a total of 40 were collected overall. Since 1995, a total of 85 species have been collected over all three sites. The most abundant species observed at the SONGS site in 2009 were the speckled sanddab (*Citharichthys stigmaeus*), queenfish (*Seriphus politus*), California lizardfish (*Synodus lucioceps*), and walleye surfperch (*Hyperprosopon argenteum*). The white croaker (*Genyonemus lineatus*) and northern anchovy (*Engraulis mordax*) are also commonly observed in trawls collected during this monitoring. In general, abundance is higher at the most-shallow station (SCE 2010).

SCE has also surveyed the hard bottom habitats surrounding the Unit 1 intake and discharge conduits. Common fish species found on the natural and man-made hard bottom substrates include blacksmith chromis (*Chromis punctipinnis*), black perch (*Embiotoca jacksoni*), spotted kelpfish, (*Gibbonsia elegans*), rock wrasse, (*Halichores semicinctus*), garibaldi (*Hypsopops rubicundus*), señorita (*Oxyjulis californicus*), sand bass (*Paralabrax nebulifer*), California scorpionfish (S*corpeana guttata*), and California sheephead (*Semicossyphus pulcher*) (SCE 2005).

Multiple fish species important to California commercial and recreational fisheries have been observed in the project area, either via monitoring, or impingement in the SONGS intake system. These species include the California halibut (*Paralichthys californicus*), Cabezon (*Scorpaenichthys marmoratus*), Bocaccio (*Sebastes paucispinis*), giant seabass (*Stereolepis gigas*), kelp bass (*Paralabrax clathratus*), and white seabass (*Atractoscion nobilis*) (SCE 2009).

2.4.1 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) regulates fishery resources off the coast of the United States. The development of Fishery Management Plans (FMPs) is a part of this regulation. A 1996 amendment to the MSA includes requirements for FMPs to describe and identify essential fish habitat (EFH) for each fishery and to identify conservation measures for this habitat in order to minimize impacts from fishing and other anthropogenic sources. EFH is defined by the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The ROI includes EFH for two fisheries; Coastal Pelagic species and Pacific Coast Groundfish.

The Coastal Pelagic fishery includes four finfish; Pacific sardine (*Sardinops sagax caerulea*), Pacific mackerel (*Scomber japonicaus*), northern anchovy, and jack mackerel (*Trachurus symmetricus*), as well as one invertebrate, the market squid (*Loligo opalescens*). All of the finfish regulated by the Coastal Pelagic FMP have been observed in the project area. These fish are pelagic, and therefore are generally present above the thermocline. The EFH for these Coastal Pelagic finfish is designated as all marine and estuarine waters along the Pacific Coast of the United States, to the limits of the exclusive economic zone (EEZ), which extends 200 nautical miles offshore. The EFH for pelagic fishes is further limited to waters above the thermocline where sea surface temperatures range from 10 to 26°C, and therefore varies seasonally (PFMC 1998). The market squid FMP has been relegated to the California Department of Fish and Game, which incorporates management goals through commercial fishery regulations; EFH has not been established for market squid (NOAA website, accessed 9/21/10).

The Pacific Coast Groundfish FMP manages over 80 species, and covers all Pacific United States coastal waters and substrates at depths less than or equal to 3,500 meters. The fishes managed under the Groundfish FMP include flatfishes, rockfishes, and groundfish, as well as several sharks, skates, and chimaeras. Eleven of these species have been observed in trawls collected in the vicinity of the project area during SCE monitoring efforts. One of these, the California scorpionfish (*Scorpaena guttata*), is also common in the hard substrate habitats in the ROI (PFMC 2008, SCE 2005).

2.4.1.1 Habitat Areas of Particular Concern

Additional habitat areas within the Groundfish EFH have been designated based on ecological function, sensitivity to anthropogenic degradation, susceptibility to stresses from development activities, and rarity of the habitat. These habitat areas, designated as Habitat Areas of Particular Concern (HAPCs), should be given specific consideration when addressing nonfishing impacts (PFMC 2008). There are two HAPCs within the vicinity of the project area (seagrass and kelp canopy habitats), but neither are located within the ROI.

2.5 Marine Mammals

Several species of marine mammals may occur in the waters of the SCB. Some of the most common species in the SCB that are observed in the nearshore waters between Los Angeles and San Diego and that are most likely to occur in the ROI include the California sea lion (*Zalophus californianus*), harbor seals (*Phoca vitulina*), bottlenose dolphins (*Tursiops truncatus*), and common dolphins (*Delphinus delphis*). Gray whales (*Eshrichtius robustus*) may also be found in the ROI during their migration through the SCB in the winter and spring (SCE 2005). California sea lions and harbor seals were impinged in the SCE conduit systems during 2009, and therefore may be expected to transit the ROI (SCE/MBC 2010).

All marine mammals are protected under the Marine Mammal Protection Act of 1972 (MMPA). This act prohibits intentional taking, import, or export of marine mammals without a permit. Amendments to the MMPA also include provisions against harassment of marine mammals. This includes Level A Harassment, which refers to injury of marine mammals, and Level B Harassment, which includes activities that may disturb behavioral patterns. A list of marine mammal species that have recently been observed in the SCB, including status under applicable federal and California state endangered species legislation, is provided in Table 2.

Table 2. Marine Mammal Species Observed in the SCB

Species		Federal Status	State Status
Cetaceans:			
Baird's Beaked Whale	*Berardius bairdii*	Not Listed	Not Listed
Blue Whale	*Balaenoptera musculus*	FE, MMPA D,S	Not Listed
Bottlenose Dolphin	*Tursiops truncatus*	Not Listed	Not Listed
Cuvier's Beaked Whale	*Ziphius cavirostris*	Not Listed	Not Listed
Dall's Porpoise	*Phocoenoides dalli*	Not Listed	Not Listed
Dwarf Sperm Whale	*Kogia sima*	Not Listed	Not Listed
Fin Whale	*Balaenoptera physalus*	FE, MMPA D,S	Not Listed
Humpback Whale	*Megaptera novaeangliae*	FE, MMPA D,S	Not Listed
Killer Whale	*Orcinus orca*	Not Listed	Not Listed
Long-Beaked Common Dolphin	*Delphinus capensis*	Not Listed	Not Listed
Minke Whale	*Balaenoptera acutorostrata*	Not Listed	Not Listed
Mesoplodont Beaked Whales	*Mesoplodon spp.*	Not Listed	Not Listed
Northern Right-Whale Dolphin	*Lissodelphis borealis*	Not Listed	Not Listed
Pacific White-Sided Dolphin	*Lagenorhynchus obliquidens*	Not Listed	Not Listed
Pygmy Sperm Whale	*Kogia breviceps*	Not Listed	Not Listed
Risso's Dolphin	*Grampus griseus*	Not Listed	Not Listed
Sei Whale	*Balaenoptera borealis borealis*	FE, MMPA D,S	Not Listed
Short-Finned Pilot Whale	*Globicephala macrorhynchus*	Not Listed	Not Listed
Short-Beaked Common Dolphin	*Delphinus delphis*	Not Listed	Not Listed
Sperm Whale	*Physeter macrocephalus*	FE, MMPA D,S	Not Listed
Striped Dolphin	*Stenella coeruleoalba*	Not Listed	Not Listed
Pinnipeds:			
California Sea Lion	*Zalophus californianus californianus*	Not Listed	Not Listed
Harbor Seal	*Phoca vitulina richardsi*	Not Listed	Not Listed
Northern Elephant Seal	*Mirounga angustirostris*	Not Listed	Not Listed
Guadalupe Fur Seal	*Arctocephalus townsendi*	FT, MMPA D,S	ST
Northern Fur Seal	*Callorhinus ursinus*	Not Listed	Not Listed

Species		Federal Status	State Status
Fissipeds:			
Southern Sea Otter	*Enhydra lutris nereis*	Not Listed	Not Listed

Source: California Department of Fish and Game 2010, Caretta, et. al. 2010 and 2011.
FE – Federally endangered species
FT – Federally threatened species
SE – State endangered species
ST – State threatened species
MMPA D – Depleted under the Marine Mammal Protection Act
MMPA S – A Strategic stock under the Marine Mammal Protection Act

2.6 Birds

There are over 200 bird species located within the SCB, with some seasonal inhabitants and others that remain year round. Commonly observed species that may be found in the ROI include the brown pelican (*Pelecanus occidentalis californicus*), double-crested cormorant (*Phalacrocorax auritus*), western snowy plover (*Charadrius alexandrinus nivosus*), California gull (*Larus californicus*), elegant tern (*Sterna elegans*), California least tern (*Sterna antillarum browni*), and the common loon (*Gavia immer*) (SCE 2005). Status of birds reasonably expected to transit or forage within the ROI under the federal Endangered Species Act and the California Endangered Species Act are summarized in Table 3.

Table 3. Special Status Listings of Bird Species of Concern

Species		Federal Status	State Status
Western snowy plover	*Charadrius alexandrinus nivosus*	FT	Not Listed
California least tern	*Sterna antillarum browni*	FE	SE

Source: California Department of Fish and Game 2010.
FE – Federally endangered species
FT – Federally threatened species
SE – State endangered species

2.7 Sea Turtles

Sea turtles have been observed in the ROI, though they are not frequently sighted in the SCB. One green sea turtle and one olive Ridley sea turtle were impinged in SCE conduits in 2009, and may reasonably be expected to transit the ROI (SCE/MBC 2010). Leatherback sea turtles and loggerhead sea turtles have also been observed in the SCB (SCE 2005; SCE/MBC 2010). Special status species of marine reptiles listed under the federal Endangered Species Act and the California Endangered Species Act reasonably expected to transit the ROI are summarized in Table 4.

Table 4. Special Status Listings for Marine Reptiles Species of Concern

Species		Federal Status	State Status
Green sea turtle	*Chelonia mydas*	FT	Not Listed
Loggerhead sea turtle	*Caretta caretta*	FT, FPE[a]	Not Listed
Olive (=Pacific) Ridley sea turtle	*Lepidochelys olivacea*	FT	Not Listed
Leatherback sea turtle	*Dermochelys coriacea*	FE	Not Listed

Source: California Department of Fish and Game and National Marine Fisheries Service 2011.
FE – Federally endangered species
FPE – Listing as Federally endangered species listing proposed
FT – Federally threatened species
[a] The North Pacific Ocean Loggerhead turtle distinct population segment (DPS) is currently proposed federally endangered.

3.0 POTENTIAL IMPACTS AND MITIGATION MEASURES

The following discussion of potential impacts to the marine environment is relative to the ROI.

3.1 Significance Criteria

The following is a list of criteria used to evaluate potential project impacts. Project activities would be considered impacts requiring mitigation if they would result in any of the following:

- Impact on fisheries protected under EFH designation, including Habitats Areas of Particular Concern (seagrass, kelp canopy).
- A substantial effect on the habitat of a rare, threatened, or endangered species or species of concern. This includes marine mammals, sea turtles, and seabirds.
- A substantial effect on the movement of fish and/or marine wildlife.
- A substantial impact on the seafloor biological communities within the ROI.
- Changes to the physical and chemical properties of the water column resulting in exceedance of water quality objectives and/or criteria for the receiving environment.
- Discharge of pollutants into the ocean; exceedance of applicable water quality criteria for point-source discharges or criteria of the California Ocean Plan and California Thermal Plan.

3.2 Construction Activities

The area of potential impact that may occur during construction activities (i.e., the construction ROI) is illustrated in Figure 1. The primary boundaries include a 350-foot perimeter around the Unit 1 intake conduit and the anticipated brine diffuser system, with an additional 550-foot perimeter anchoring zone. All required permits for underwater construction would be obtained from appropriate regulatory agencies (e.g., Clean Water Act Section 401 Water Quality Certification from the Regional Water Quality Control Board; Rivers and Harbors Act Section 10, and Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers) and complied with fully.

3.2.1 Ship/ Barge Anchoring

All construction for the proposed project would occur via ship and/or derrick/dredge barge. Anchoring of construction vessels has the potential to destroy soft and hard bottom habitats as anchors and chains are dragged along the sea floor. Multiple seabed disruptions from vessel anchoring during reconnaissance, dredging, demolition, and construction activities could potentially result in impacts. Multiple mooring arrangements in multiple-point anchorages would be expected, including the possibility of beach anchoring.

Mitigation Measure 1

Anchor placement would be limited to soft-bottom habitats, to limit impacts on the more sensitive and biologically rich hard-bottom communities. Anchoring protocols and plans would be developed to minimize benthic damage from deploying, utilizing, and recovering anchorages. An anchoring plan would serve to establish anchor zones to avoid or minimize turbidity and biological impacts, avoid hard rock resources and kelp beds, and avoid impacts to recreational or commercial boaters.

Differential geographic positioning system (DGPS) equipment with submeter accuracy would be employed to accurately locate anchoring positions. All bathymetric and geophysical survey data, and diver verification would be preprogrammed into this DGPS system before work begins.

Anchoring impacts would be minimized by lowering the initial anchor of each anchor set to the seafloor at the predesignated anchor location. Once the first anchor is lowered, a support vessel may "fly" other anchors to the predesignated anchor locations specified via a crown line. The anchor would be lowered by the crown line into place at the predesignated site during deployment and raised vertically by the crown line when the anchors are "weighed" (lifted off of the seafloor). Flying anchors to and from location eliminates unnecessary anchor wire contact with the seafloor. Dragging anchors across the seabed would be prohibited.

3.2.2 Pipeline Construction

While a majority of the brine discharge pipeline for the AWT facility would be constructed inside the existing Unit 1 intake structure under any of the three alternative connection scenarios described in Section 1.1, approximately 150 feet of the diffuser line would be constructed beyond the intake conduit terminal structure. The third (ocean) connection alternative differs substantially in that it would involve approximately 600 feet of pipeline from the shore through the surf zone. Construction of this additional length of pipeline would require dredging, placement of the pipeline within a trench, and armoring of the pipeline with quarry run rock. Although the exact location of the second (beach) connection alternative is not known, construction activities under this option could occur in intertidal habitat and also include excavation and armoring.

Dredging of sediments and the placement and burial of the connection line and diffuser system would have a permanent impact on the soft bottom habitat in the immediate area, and depending on location of the second connection option, on intertidal habitat. This would include the removal and/or death of any organisms living on the bottom of these habitats. However, the habitats would be replaced by hard-bottom substrate (see Section 3.3 below).

Sediments removed to allow for pipe placement would be placed on the adjacent sea floor. No sediment would be removed from inside the intake conduit. Dredged benthic sediments would be placed on the sea floor within pivoting distance of the dredging equipment and be confined to the ROI. Thus, direct construction impacts (e.g., sediment placement) would occur within a limited distance of the dredging equipment, and other potential construction impacts (e.g., temporary effects of anchoring, temporary increases in turbidity) would be expected within the ROI.

Placement of dredged sediments on the sea floor would cause an increase in suspended sediments and turbidity. Increased turbidity can contribute to a reduction in light penetration, which can result in reduced primary production, as well as influence the ability of predators to see their prey. Additionally, fine suspended sediments can clog the feeding structures of filter feeders. It is also likely that some organisms would be permanently buried. However, these impacts would primarily be temporary. Those areas of permanent burial would be eventually be re-colonized, and turbidity would return to typical levels after project completion.

Aerial surveys conducted by SCE as a part of the SONGS monitoring indicate the presence of increased turbidity along the coastline adjacent to SONGS. The area of increased turbidity is compounded by natural variability, varies in space and time due to changing coastal currents and wave conditions, and generally extends well beyond the project ROI. This is similar to patterns observed at various coastal locations, including the Dana Point reference site used in the SONGS monitoring program (SCE/MBC 2010). Since the ROI is located within a half-mile of the shoreline, it is likely that an increase in turbidity from construction activities would be within the range of turbidity within the ROI, and be temporary in terms of duration. Furthermore, biological communities located in this area are presumed to be tolerant of turbidity since it is a natural coastal feature.

Sediment quality in the ROI is presumed to lack the substantial presence of contaminants, since SONGS operations consist of once-through cooling waters, and no other sources of contaminants exist in the vicinity of the ROI. Furthermore, sediments would be dredged and placed in the immediate vicinity of their current location, and thus not present any increase in contaminant loading on a regional basis. Therefore, mitigation measures to address disturbance of hazardous sediments are not necessary.

Mitigation Measure 2

All construction activities would be limited to soft bottom habitats, and hard bottom substrates would be avoided to the maximum extent practicable.

Mitigation Measure 3

Best Available Technology and Best Control Technology for construction Best Management Practices (BMPs) would be utilized where appropriate to minimize impacts.

Mitigation Measure 4

Dredge spoil would be placed in a limited area to reduce the amount of habitat impacted. Placement would also occur from a lower drop point using a closed or specially constructed dredging bucket to reduce disturbance of the surrounding sediment and minimize turbidity. Spoil would not be placed over hard bottom substrates or over other potentially sensitive areas, thus avoiding impacts to habitat resources in the ROI.

3.2.3 Dismantling of Vertical Conduit Terminal Structure

The proposed project would include dismantling most of the existing Vertical Conduit Terminal Structure (VCTS), which currently extends approximately 5.5 feet above the ocean floor. Once removed to the sea floor elevation, the brine diffuser would extend from the structure approximately 150 feet (as a diffuser system) to its terminus. A marine mammal barrier would be installed at the point of daylighting (i.e., the new top of the VCTS), and prevent access to marine mammals. Suction dredging of the surrounding sediments would also be required.

The potential impacts of the removal of this portion of the Unit 1 VCTS have been assessed by SCE in an Environmental Impact Report (EIR) prepared for the disposition of the Unit 1 intake and discharge conduits (SCE 2005). Impacts to marine biological resources identified in this report are similar to those outlined here for the construction activities applicable to this project. Mitigation measures identified in the EIR were consistent with Mitigation Measures 1 through 4 herein and would minimize impacts due to turbidity and the physical modification of soft- and hard-bottom substrate habitats.

3.2.4 Pipeline Burial

All project alternatives include burial of the pipeline from the terminus of the VCTS and armoring with rock. Only the third connection alternative involves burial of the brine pipeline from the shore to a connection point approximately 600 feet offshore. For the connection alignment, benthic substrate is largely comprised of coarse-grained sands which would be replaced in kind, thereby maintaining bottom composition. However, temporary disturbance of the soft bottom habitat along the outfall alignment (i.e., dredging removal, temporary staging, and subsequent re-burial with dredge spoils) would include a loss of original soft-bottom habitat organisms, which would be expected to re-colonize following construction.

While there would be loss of soft-bottom habitat along the diffuser system alignment (and extending several feet on either side), it is expected that this section would be replaced by hard bottom habitat (armor rock) that induces higher productivity and promotes the habitation of a large variety of organisms, generally in high abundance. It is highly likely that the added substrate would be colonized as have the other man-made structures at SONGS, and therefore would contribute to increased production and species diversity in the area.

The addition of the armor rock hard substrate to a previously soft-bottom habitat would have some influences on the surrounding sea floor. Changes in grain size distribution have been observed in similar situations; sediments closest to the VCTS can be coarser, primarily due to a change in water movements around the hard substrate. Colonization of the hard substrate may also lead to increased predation on those organisms inhabiting the surrounding soft bottom. Colonization of the hard bottom may also contribute additional food sources for these organisms. Generally, these effects are limited to a small area immediately adjacent to the structure (Ambrose and Anderson 1990).

Mitigation Measure 5

Care would be taken in the placement of material, and material would be placed from a low drop point. This would minimize impacts on the habitat surrounding the placement area.

Mitigation Measure 2 will also reduce impacts of pipeline burial.

3.3 Facility Operations

The characteristics of the brine discharge from the proposed AWT facility is described in a technical memorandum that also provides estimated initial dilution rates and brine concentrations within the discharge plume (Brown and Caldwell 2011). According to the modeling conducted, the current brine diffuser design would result in a 95:1 dilution, which would allow the discharge to meet California Ocean Plan standards (SWRCB 2009). Based on this analysis of the conceptual diffuser design, the brine discharge would remain positively buoyant throughout seasonal water column changes.

The physical turbulence caused by the momentum of the brine discharge plume has the potential to entrain suspended particulates into the water column. However, the diffuser system proposed for this project, by incorporating multiple diffuser ports, has design elements which reduce discharge velocity and minimized entrainment. The rock armoring used to bury the pipeline in the vicinity of the pipeline terminus would also buffer discharge-related turbulence by physically isolating the stream from adjacent sediments.

Although the Navy would be required to apply for an NPDES permit for the brine discharge, and likely be required to meet a variety of pre-dilution effluent limitations (e.g., oil and grease, suspended and settleable solids, turbidity, and pH), early analysis of the projected brine chemistry and conceptual diffuser design indicates the discharge would meet California Ocean Plan limits. However, the California Ocean Plan has requirements for both “end of pipe,” (undiluted) conditions, as well as requirements for water quality beyond the initial zone of dilution (i.e., subsequent dilution).

As stated above, the potential impacts of the brine discharge on the surrounding marine environment would be minimal based on modeling data (Brown and Caldwell 2011). A summary of projected heavy metal data for the discharge after integration with background levels is provided in Table 5. Copper is a constituent of particular concern due to the narrow range between the modeled discharge concentration and the Ocean Plan limit, above which deleterious effects (e.g., toxicity) may be observed.

Table 5. AWT Discharge Projected Heavy Metal Concentrations

Constituent	Background Seawater Concentration (µg/L)[1]	Brine Concentration Maximum After 95:1 Dilution	Total Maximum Concentration	State of California Ocean Plan Limit[1]
Arsenic	3	0.08	3.05	8
Cadmium	0	0.00	0.00	1
Chromium	0	0.00	0.00	2
Copper	2	0.83	2.80	3
Lead	0	0.00	0.00	2
Mercury	0.0005	0.00	0.00	0
Nickel	0	0.05	0.06	5
Selenium	0	0.09	0.12	15
Silver	0.16	0.00	0.16	0.7
Zinc	8	0.15	8.11	20

Note: Table data obtained from Brown and Caldwell, 2011
[1] From SWRCB 2009

The concentration of copper in the undiluted brine discharge is estimated to be approximately 60 µg/L, which would be diluted at a ratio of 95:1 by the offshore diffuser system, resulting in a copper concentration of 0.8 µg/L in the water column in the immediate vicinity of the diffuser. When this is added to the current ocean copper concentration of 2 µg/L, the resulting concentration is 2.8 µg/L, which is just below the Ocean Plan limit of 3 µg/L. While the modeling does incorporate buffers and may be characterized as conservative, deviation in actual copper values from model predictions could result in a discharge that does not meet the copper criterion, and would therefore be more likely to impact organisms inhabiting the ROI.

Since copper is of particular concern, an investigation into potential copper sources could lead to reduced copper loadings if sources are addressed in the design phase to the extent practicable (e.g., replacing copper fittings or equipment with alternative materials). Furthermore, monitoring conducted as part of the required NPDES permit would enable the Navy to assess ROI water quality conditions and provide opportunity for AWTP adjustment based on the constituents of concern.

Mitigation Measure 6

The final facility design would be reviewed to minimize incorporation of copper fittings and equipment coming in contact with the process stream.

3.4 Essential Fish Habitat

As described above, EFH for the ROI includes that for coastal pelagic and groundfish species. No impacts to coastal pelagic species are anticipated since potential project impacts are likely to be within the range of natural variability of turbidity. Additionally, the proposed project work would be conducted on the sea floor, with limited impact to the water column.

Construction activities could impact some groundfish EFH by reducing available foraging areas for those species that feed on invertebrates living in soft bottom habitats. Fish may also be directly impacted by construction activities; however, since groundfish species are motile, it is likely that organisms in the area would temporarily vacate the area during construction and re-inhabit the area following project completion. The addition of hard bottom substrate would provide additional habitat for groundfish EFH species, particularly for species such as the California scorpionfish.

Deviations in brine discharge chemistry resulting in water quality parameters exceeding applicable water quality criteria could result in impacts on EFH species. Potential impacts of operational discharge would be addressed by the implementation of a monitoring program, and addressed through the NPDES permitting process.

Mitigation Measures

Mitigation Measures 1-6 are applicable to minimizing impacts on EFH.

3.5 Marine Mammals, Sea Turtles, Seabirds

The proposed project could affect marine mammals and sea turtles through collision with water craft, direct injury from proposed activities, effects related to turbidity, exposure to contaminants, and interference with foraging. Tugboats with barges would transport equipment for disposition, at speeds less than 9 miles per hour (8 knots). At such slow speeds, marine mammals and turtles within the transit route would easily avoid potential collision by moving out of the way of the oncoming craft. Crew boats that would transport divers and other personnel would travel at a greater speed, but the risk of collision with marine mammals and turtles would still be extremely low, the same as with any other water craft. Marine mammals and turtles are highly mobile and can avoid boat traffic, which is common in the area.

The mobility of these organisms is also important in addressing concern from direct injury from project activities and influence from increased turbidity. The activity will be localized and limited in extent and time. The initiation of activities may result in a startle response from marine mammals present in the project area, and they would be expected to avoid the immediate vicinity. California sea lions and bottlenose dolphins are known to be curious and may investigate the activities but likely in a transitory manner. Pacific harbor seals are more wary and would likely stay well away. Although turbidity is expected to increase locally due to the project, the turbidity is likely to increase in proximity to the sea floor, where turbidity is naturally high due to the presence of fine sediments that are readily resuspended by wave action. Local marine mammals are familiar with the magnitude and variability in turbidity in the nearshore habitat; greater-than-ambient turbidity due to the project is expected to be limited to the immediate project vicinity and will dissipate rapidly following project activities.

The proposed activities may result in marine mammals leaving the project area temporarily. There are extensive alternative foraging areas adjacent to the project area, and the marine mammals can be expected to return to the area upon completion of the project.

Project activities are also expected to generate noise from mechanical equipment, generators, boat activities, and other project functions, and noise may affect marine mammals, which are dependent on the production of sounds for various biological functions including social interaction, foraging, orientation, and predator detection. Recent permits obtained for underwater construction indicate that the National Marine Fisheries Service (NMFS) considers sounds above 180 decibels (dB) to cause injury to cetaceans and those above 190 dB to cause injury to pinnipeds. Additionally, behavioral harassment (Level B under MMPA) may occur at levels above 120 dB for non-pulse noise and 160 dB for pulsing noises (NOAA 2011). The expected noise levels for this project are currently unknown, as construction plans have not been developed in detail.

Due to the limited impact area of this project, and the high motility of these organisms, no impacts to seabirds are anticipated.

Mitigation Measure 7

To the maximum extent practicable, over-water construction activities will not take place during the Gray whale migration season.

Mitigation Measure 8

If construction occurs during the migration season, trained Marine Mammal Observers will also be present during construction activities, and plans for halting activities while sensitive species are observed in the project area will be developed as needed to ensure compliance with permit provisions. The current project description includes reference to work stoppage when marine mammals are present within 500 feet of barge or ship operations to avoid impacts above noise impact thresholds cited above. This condition may be refined, with regard to marine mammal and sea turtle protection, during the permit consultation process. Consultation with NMFS will occur throughout plan development and project execution to ensure appropriate prevention measures are appropriately protective of marine mammals.

Mitigation Measure 9

Following development of detailed construction plans, expected underwater noise levels will be calculated from available equipment noise data, including expected travelling distance of project-related sounds. If noise levels above the aforementioned thresholds are expected, work stoppage areas will be expanded as necessary, following consultation with NMFS. Noise monitoring equipment and/or Marine Mammal Observers will also be utilized during construction as needed.

3.6 Impact Assessment Summary

As stated in Section 2 above, a majority of the habitat in the proposed ROI is soft bottom habitat, and these habitats in the SCB are not considered highly productive. The impacts on this habitat caused by the construction activities associated with this project would be temporary, minimal, and limited to a small area. There is a large abundance of soft bottom habitats throughout the SCB, so the overall impact on this habitat would be slight. Impacts to hard bottom habitats and EFH are also possible, but the mitigation measures proposed would minimize these impacts.

Discharge of the RO brine has the potential to impact biological resources if water quality criteria are exceeded. The diffuser system, however, would be designed such that the discharge complies with California Ocean Plan limitations and therefore would not result in a significant impact to marine resources.

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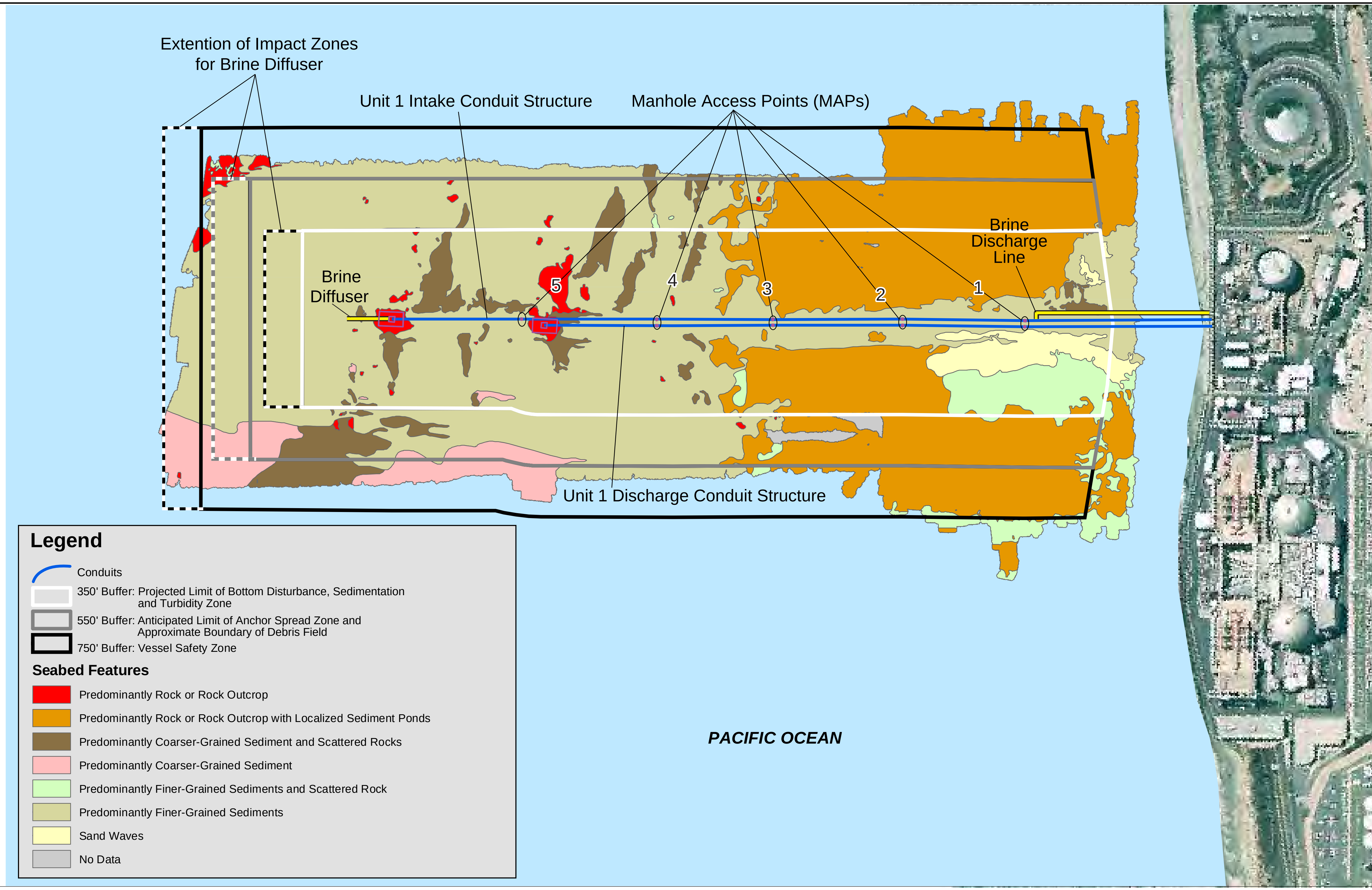

Source: AMEC, 2004; MCB Camp Pendleton, 2003

NORTH

6 0 0 300 0 00 Feet

Figure 1
Marine Resources Region of Influence

APPENDIX F

SOCIOECONOMIC EMPLOYMENT AND ECONOMIC OUTPUT TABLES

APPENDIX F
SOCIOECONOMIC EMPLOYMENT AND ECONOMIC OUTPUT TABLES

Total funding for all three MILCONs included in the proposed action are estimated to be from $205 to $246 million, depending on alternative, with funding occurring in FY 2012. Total funding by project and alternative is presented in Table F-1.

Table F-1
Projects Addressed per Alternative, Funding Year, Funding Level, and Construction Years

Project (Funding Year)	Build Alternative Number (funding level $m [millions])					Construction (All Build Alternatives)		No Action Alternative
	1	2	3	4	5	Start Date	Duration (months)	
P-1044 (FY 2012)	Alt 1 ($101m)	Alt 2 ($101m)	Alt 3 ($100m)	Alt 4 ($106m)	Alt 1 ($101m)	Jan 2013	24	No development
P-1045 (FY 2012)	Alt 1 ($145m)	Alt 2 ($112m)	Alt 3 ($105m)	Alt 4 ($125m)	Alt 3 ($105m)	Apr 2013	18	No development
Total	**$246m**	**$213m**	**$205m**	**$231m**	**$206m**	**Jan 2013**	**36**	N/A

Total funding varies considerably from year to year. Fiscal year of funding, however, differs from calendar year of project expenditures. Funding by fiscal year, and expenditures by calendar year, based on estimated start dates and estimated duration of construction by project, are shown by project and alternative in Tables F-2 through F-11 below. For the purposes of economic modeling, it was assumed that (1) all funding would be spent on construction, (2) construction schedules would be as noted in the project descriptions included in Section 2 of the EIS, and (3) monthly construction expenditures would remain even across all months of the construction period. As both the level of funding and the timing of construction are subject to revision, the purpose of the modeling is to facilitate an order-of-magnitude economic output and employment impact assessment rather than an exact projection of economic output and employment levels.

Table F-2
Funding by Fiscal Year: P-1044 and P-1045
($ Millions) – Alternative 1

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$101	$145	$246
All Years	**$101**	**$145**	**$246**

Note: All Years total may vary from sum of FY subtotals due to rounding.
Source: 1391 project packages supplied by PWO.

Table F-3
Construction Schedule and Expenditures
by Project, Month, and Year – Alternative 1

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.21	$50.5	$50.5	$101
P-1045	April 2013	18	$8.06	$72.5	$72.5	$145
Total				**$123.0**	**$123.0**	**$246**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table F-4
Funding by Fiscal Year ($ Millions) - Alternative 2

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$101	$112	$213
All Years	**$101**	**$112**	**$213**

Note: All Years total may vary from sum of FY subtotals due to rounding.
Source: Personal communication, PWO estimates (Eich 2011).

Table F-5
Construction Schedule and Expenditures by Project, Month, and Year – Alternative 2

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.21	$50.5	$50.5	$101
P-1045	April 2013	18	$6.22	$56.0	$56.0	$112
Total				**$106.5**	**$106.5**	**$213**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table F-6
Funding by Fiscal Year ($ Millions) – Alternative 3

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$100	$105	$205
All Years	**$100**	**$105**	**$205**

Note: All Years total may vary from sum of FY subtotals due to rounding.
Source: Personal communication, PWO estimates (Eich 2011).

Table F-7
Construction Schedule and Expenditures by Project, Month, and Year – Alternative 3

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.17	$50.0	$50.0	$100
P-1045	April 2013	18	$5.83	$52.5	$52.5	$105
Total				**$102.5**	**$102.5**	**$205**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table F-8
Funding by Fiscal Year ($ Millions) – Alternative 4

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$106	$125	$231
All Years	**$106**	**$125**	**$231**

Note: All Years total may vary from sum of FY subtotals due to rounding.
Source: Personal communication, PWO estimates (Eich 2011).

Table F-9
Construction Schedule and Expenditures by Project, Month, and Year – Alternative 4

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.42	$53.0	$53.0	$106
P-1045	April 2013	18	$6.94	$62.5	$62.5	$125
Total				**$115.5**	**$115.5**	**$231**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

Table F-10
Funding by Fiscal Year ($ Millions) – Alternative 5

Funding Year	Project Number		Total Funding per Year
	P-1044	P-1045	
FY 2012	$101	$105	$206
All Years	**$101**	**$105**	**$206**

Note: All Years total may vary from sum of FY subtotals due to rounding.
Source: Personal communication, PWO estimates (Eich 2011).

Table F-11
Construction Schedule and Expenditures
by Project, Month, and Year – Alternative 5

Project	Construction Start Date	Construction Duration (Months)	Construction-Related Expenditures ($ Millions)			
			Expenditures per Month	Expenditures per Calendar Year		Total Expenditures
				2013	2014	
P-1044	January 2013	24	$4.21	$50.5	$50.5	$101
P-1045	April 2013	18	$5.83	$52.5	$52.5	$105
Total				**$103.0**	**$103.0**	**$206**

Note: Assumes all project funding is utilized for construction-related expenditures. Total may vary from sum of project subtotals due to rounding.

The next set of tables (Tables F-12 through F-81) presented in this appendix represents the economic output and employment output modeling results of IMPLAN input-output analysis for construction-related activities for each of the projects, by alternative, included in the proposed action. Data are first presented by alternative by construction year for each project by industry sector on a three-county (San Diego, Orange, and Riverside) and on a six-county (San Diego, Orange, Riverside, Los Angeles, San Bernardino, and Imperial) regional basis. Economic output and employment are further broken down into direct, indirect, and induced categories. Following each series of individual project output tables by alternative, a pair of summary of all MILCONs combined tables are presented, one for the three-county region and one for the six-county region, detailing combined project alternative economic output and employment impacts by construction year.

Table F-12
Alternative 1: P-1044 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.4	$0.1	$0.1	$40.6	0.08%	337,572	228.0	0.4	0.6	229.0	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.4	0.00%	341,197	0.0	7.4	1.3	8.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	4.0	2.6	6.6	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.2	16.8	23.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.4	$1.9	0.00%	226,444	0.0	2.2	5.4	7.6	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.5	$3.9	0.01%	391,226	0.0	23.7	3.0	26.6	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.4	3.5	11.9	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.6	13.6	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.6	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.8	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.0	8.4	12.3	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$40.4**	**$12.0**	**$11.6**	**$64.0**	**0.01%**	**4,806,509**	**228.0**	**67.5**	**79.4**	**374.9**	**0.01%**

Table F-13
Alternative 1: P-1044 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.4	$0.1	$0.1	$40.6	0.08%	337,572	228.0	0.4	0.6	229.0	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.4	0.00%	341,197	0.0	7.4	1.3	8.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	4.0	2.6	6.6	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.2	16.8	23.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.4	$1.9	0.00%	226,444	0.0	2.2	5.4	7.6	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.5	$3.9	0.01%	391,226	0.0	23.7	3.0	26.6	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.4	3.5	11.9	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.6	13.6	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.6	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.8	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.0	8.4	12.3	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$40.4**	**$12.0**	**$11.6**	**$64.0**	**0.01%**	**4,806,509**	**228.0**	**67.5**	**79.4**	**374.9**	**0.01%**

Table F-14
Alternative 1: P-1045 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.00%	32,988	0.0	0.6	0.6	1.3	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.5	0.0	0.5	0.02%
Utilities	$15,558.8	$0.0	$0.3	$0.3	$0.6	0.00%	12,432	0.0	0.2	0.2	0.4	0.00%
Construction	$51,446.2	$58.1	$0.1	$0.1	$58.3	0.11%	337,572	327.3	0.6	0.8	328.8	0.10%
Manufacturing	$135,386.5	$0.0	$3.9	$0.9	$4.8	0.00%	341,197	0.0	10.6	1.9	12.6	0.00%
Wholesale Trade	$39,026.3	$0.0	$1.3	$0.9	$2.2	0.01%	181,370	0.0	5.7	3.8	9.5	0.01%
Retail Trade	$39,116.0	$0.0	$0.8	$2.0	$2.8	0.01%	488,360	0.0	8.9	24.2	33.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$0.4	$0.2	$0.5	0.01%	86,583	0.0	2.6	1.5	4.1	0.00%
Information	$44,927.0	$0.0	$0.9	$0.8	$1.7	0.00%	89,139	0.0	1.5	1.5	3.0	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.8	$1.9	$2.7	0.01%	226,444	0.0	3.2	7.8	10.9	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.5	$3.7	$5.2	0.01%	366,409	0.0	5.7	7.1	12.8	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$5.0	$0.6	$5.7	0.01%	391,226	0.0	34.0	4.3	38.2	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.3	0.00%	48,580	0.0	1.1	0.5	1.6	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.8	$0.4	$1.1	0.00%	369,193	0.0	12.0	5.1	17.1	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.3	$0.3	0.01%	76,953	0.0	0.0	4.3	4.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$2.0	$2.0	0.01%	342,697	0.0	0.0	19.6	19.6	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.5	$0.5	0.00%	125,303	0.0	0.5	4.6	5.1	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.2	$0.8	$1.0	0.00%	357,882	0.0	2.7	12.8	15.6	0.00%
Other	$19,513.1	$0.0	$0.8	$0.8	$1.5	0.01%	271,933	0.0	5.7	12.0	17.7	0.01%
Government	$64,451.0	$0.0	$0.1	$0.3	$0.4	0.00%	656,931	0.0	0.7	1.4	2.1	0.00%
Total	**$745,750.4**	**$58.1**	**$17.2**	**$16.7**	**$91.9**	**0.01%**	**4,806,509**	**327.3**	**96.9**	**114.0**	**538.2**	**0.01%**

Table F-15
Alternative 1: P-1045 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.00%	32,988	0.0	0.6	0.6	1.3	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.5	0.0	0.5	0.02%
Utilities	$15,558.8	$0.0	$0.3	$0.3	$0.6	0.00%	12,432	0.0	0.2	0.2	0.4	0.00%
Construction	$51,446.2	$58.1	$0.1	$0.1	$58.3	0.11%	337,572	327.3	0.6	0.8	328.8	0.10%
Manufacturing	$135,386.5	$0.0	$3.9	$0.9	$4.8	0.00%	341,197	0.0	10.6	1.9	12.6	0.00%
Wholesale Trade	$39,026.3	$0.0	$1.3	$0.9	$2.2	0.01%	181,370	0.0	5.7	3.8	9.5	0.01%
Retail Trade	$39,116.0	$0.0	$0.8	$2.0	$2.8	0.01%	488,360	0.0	8.9	24.2	33.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$0.4	$0.2	$0.5	0.01%	86,583	0.0	2.6	1.5	4.1	0.00%
Information	$44,927.0	$0.0	$0.9	$0.8	$1.7	0.00%	89,139	0.0	1.5	1.5	3.0	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.8	$1.9	$2.7	0.01%	226,444	0.0	3.2	7.8	10.9	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.5	$3.7	$5.2	0.01%	366,409	0.0	5.7	7.1	12.8	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$5.0	$0.6	$5.7	0.01%	391,226	0.0	34.0	4.3	38.2	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.3	0.00%	48,580	0.0	1.1	0.5	1.6	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.8	$0.4	$1.1	0.00%	369,193	0.0	12.0	5.1	17.1	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.3	$0.3	0.01%	76,953	0.0	0.0	4.3	4.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$2.0	$2.0	0.01%	342,697	0.0	0.0	19.6	19.6	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.5	$0.5	0.00%	125,303	0.0	0.5	4.6	5.1	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.2	$0.8	$1.0	0.00%	357,882	0.0	2.7	12.8	15.6	0.00%
Other	$19,513.1	$0.0	$0.8	$0.8	$1.5	0.01%	271,933	0.0	5.7	12.0	17.7	0.01%
Government	$64,451.0	$0.0	$0.1	$0.3	$0.4	0.00%	656,931	0.0	0.7	1.4	2.1	0.00%
Total	**$745,750.4**	**$58.1**	**$17.2**	**$16.7**	**$91.9**	**0.01%**	**4,806,509**	**327.3**	**96.9**	**114.0**	**538.2**	**0.01%**

Table F-16
Alternative 1: P-1044 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$50.0	$0.1	$0.2	$50.3	0.10%	337,572	283.2	1.1	1.6	285.9	0.08%
Manufacturing	$135,386.5	$0.0	$8.9	$3.1	$12.0	0.01%	341,197	0.0	19.0	5.9	24.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.4	7.0	15.4	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.9	0.01%	488,360	0.0	10.1	34.9	45.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.2	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.5	6.0	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.1	17.8	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.5	0.01%	366,409	0.0	7.1	11.2	18.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.5	$7.6	0.01%	391,226	0.0	40.4	9.1	49.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	16.5	10.5	27.0	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.2	7.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	32.1	32.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.7	0.01%	125,303	0.0	0.9	6.2	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.3	20.2	24.5	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	18.0	25.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.8	0.00%	656,931	0.0	1.3	2.5	3.8	0.00%
Total	**$745,750.4**	**$50.0**	**$27.5**	**$29.7**	**$107.2**	**0.01%**	**4,806,509**	**283.2**	**134.6**	**190.6**	**608.5**	**0.01%**

Table F-17
Alternative 1: P-1044 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$50.0	$0.1	$0.2	$50.3	0.10%	337,572	283.2	1.1	1.6	285.9	0.08%
Manufacturing	$135,386.5	$0.0	$8.9	$3.1	$12.0	0.01%	341,197	0.0	19.0	5.9	24.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.4	7.0	15.4	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.9	0.01%	488,360	0.0	10.1	34.9	45.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.2	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.5	6.0	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.1	17.8	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.5	0.01%	366,409	0.0	7.1	11.2	18.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.5	$7.6	0.01%	391,226	0.0	40.4	9.1	49.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	16.5	10.5	27.0	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.2	7.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	32.1	32.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.7	0.01%	125,303	0.0	0.9	6.2	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.3	20.2	24.5	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	18.0	25.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.8	0.00%	656,931	0.0	1.3	2.5	3.8	0.00%
Total	**$745,750.4**	**$50.0**	**$27.5**	**$29.7**	**$107.2**	**0.01%**	**4,806,509**	**283.2**	**134.6**	**190.6**	**608.5**	**0.01%**

Table F-18
Alternative 1: P-1045 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.2	$0.3	0.01%	32,988	0.0	0.6	1.0	1.6	0.00%
Mining	$1,241.7	$0.0	$0.8	$0.2	$1.0	0.08%	3,318	0.0	1.6	0.2	1.8	0.05%
Utilities	$15,558.8	$0.0	$0.5	$0.6	$1.2	0.01%	12,432	0.0	0.4	0.6	1.0	0.01%
Construction	$51,446.2	$71.7	$0.2	$0.3	$72.2	0.14%	337,572	406.6	1.5	2.3	410.4	0.12%
Manufacturing	$135,386.5	$0.0	$12.8	$4.4	$17.3	0.01%	341,197	0.0	27.2	8.4	35.7	0.01%
Wholesale Trade	$39,026.3	$0.0	$2.5	$2.1	$4.5	0.01%	181,370	0.0	12.1	10.1	22.2	0.01%
Retail Trade	$39,116.0	$0.0	$1.2	$4.3	$5.6	0.01%	488,360	0.0	14.5	50.2	64.7	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.5	$1.0	$2.5	0.02%	86,583	0.0	10.3	7.3	17.6	0.02%
Information	$44,927.0	$0.0	$2.1	$2.6	$4.8	0.01%	89,139	0.0	3.6	5.0	8.6	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.7	$4.8	$6.5	0.01%	226,444	0.0	6.8	18.8	25.6	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.7	$8.0	$10.8	0.01%	366,409	0.0	10.1	16.0	26.2	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$8.8	$2.1	$10.9	0.02%	391,226	0.0	58.0	13.1	71.1	0.02%
Management	$9,482.5	$0.0	$0.6	$0.4	$0.9	0.01%	48,580	0.0	2.5	1.7	4.2	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.5	$1.0	$2.5	0.01%	369,193	0.0	23.7	15.0	38.7	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.7	$0.7	0.01%	76,953	0.0	0.1	10.3	10.5	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$4.7	$4.7	0.01%	342,697	0.0	0.0	46.1	46.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.9	$1.0	0.01%	125,303	0.0	1.3	8.9	10.2	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.4	$1.8	$2.2	0.01%	357,882	0.0	6.1	29.0	35.2	0.01%
Other	$19,513.1	$0.0	$1.5	$1.7	$3.2	0.02%	271,933	0.0	11.0	25.9	36.9	0.01%
Government	$64,451.0	$0.0	$0.3	$0.8	$1.1	0.00%	656,931	0.0	1.8	3.6	5.4	0.00%
Total	**$745,750.4**	**$71.7**	**$39.5**	**$42.7**	**$153.9**	**0.02%**	**4,806,509**	**406.6**	**193.3**	**273.7**	**873.5**	**0.02%**

Table F-19
Alternative 1: P-1045 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.2	$0.3	0.01%	32,988	0.0	0.6	1.0	1.6	0.00%
Mining	$1,241.7	$0.0	$0.8	$0.2	$1.0	0.08%	3,318	0.0	1.6	0.2	1.8	0.05%
Utilities	$15,558.8	$0.0	$0.5	$0.6	$1.2	0.01%	12,432	0.0	0.4	0.6	1.0	0.01%
Construction	$51,446.2	$71.7	$0.2	$0.3	$72.2	0.14%	337,572	406.6	1.5	2.3	410.4	0.12%
Manufacturing	$135,386.5	$0.0	$12.8	$4.4	$17.3	0.01%	341,197	0.0	27.2	8.4	35.7	0.01%
Wholesale Trade	$39,026.3	$0.0	$2.5	$2.1	$4.5	0.01%	181,370	0.0	12.1	10.1	22.2	0.01%
Retail Trade	$39,116.0	$0.0	$1.2	$4.3	$5.6	0.01%	488,360	0.0	14.5	50.2	64.7	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.5	$1.0	$2.5	0.02%	86,583	0.0	10.3	7.3	17.6	0.02%
Information	$44,927.0	$0.0	$2.1	$2.6	$4.8	0.01%	89,139	0.0	3.6	5.0	8.6	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.7	$4.8	$6.5	0.01%	226,444	0.0	6.8	18.8	25.6	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.7	$8.0	$10.8	0.01%	366,409	0.0	10.1	16.0	26.2	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$8.8	$2.1	$10.9	0.02%	391,226	0.0	58.0	13.1	71.1	0.02%
Management	$9,482.5	$0.0	$0.6	$0.4	$0.9	0.01%	48,580	0.0	2.5	1.7	4.2	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.5	$1.0	$2.5	0.01%	369,193	0.0	23.7	15.0	38.7	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.7	$0.7	0.01%	76,953	0.0	0.1	10.3	10.5	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$4.7	$4.7	0.01%	342,697	0.0	0.0	46.1	46.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.9	$1.0	0.01%	125,303	0.0	1.3	8.9	10.2	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.4	$1.8	$2.2	0.01%	357,882	0.0	6.1	29.0	35.2	0.01%
Other	$19,513.1	$0.0	$1.5	$1.7	$3.2	0.02%	271,933	0.0	11.0	25.9	36.9	0.01%
Government	$64,451.0	$0.0	$0.3	$0.8	$1.1	0.00%	656,931	0.0	1.8	3.6	5.4	0.00%
Total	**$745,750.4**	**$71.7**	**$39.5**	**$42.7**	**$153.9**	**0.02%**	**4,806,509**	**406.6**	**193.3**	**273.7**	**873.5**	**0.02%**

Table F-20
Alternative 1: MILCONs Combined (3-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.3	$0.3	32,988	2.1	2.1
Mining	$1,241.7	$0.2	$0.2	3,318	0.9	0.9
Utilities	$15,558.8	$1.0	$1.0	12,432	0.7	0.7
Construction	$51,446.2	$98.8	$98.8	337,572	587.8	587.8
Manufacturing	$135,386.5	$8.2	$8.2	341,197	21.3	21.3
Wholesale Trade	$39,026.3	$3.7	$3.7	181,370	16.1	16.1
Retail Trade	$39,116.0	$4.7	$4.7	488,360	56.1	56.1
Transportation and Warehousing	$10,754.6	$0.9	$0.9	86,583	6.9	6.9
Information	$44,927.0	$2.8	$2.8	89,139	5.1	5.1
Finance and Insurance	$51,476.1	$4.6	$4.6	226,444	18.6	18.6
Real Estate and Rental	$102,950.6	$8.8	$8.8	366,409	21.7	21.7
Professional, Scientific, and Technical Services	$57,707.5	$9.6	$9.6	391,226	64.9	64.9
Management	$9,482.5	$0.5	$0.5	48,580	2.7	2.7
Administrative and Waste Services	$23,778.3	$1.9	$1.9	369,193	29.0	29.0
Educational Services	$4,463.9	$0.4	$0.4	76,953	7.4	7.4
Health and Social Services	$34,208.9	$3.4	$3.4	342,697	33.2	33.2
Arts, Entertainment, and Recreation	$12,255.8	$0.8	$0.8	125,303	8.7	8.7
Accommodation and Food Services	$24,417.9	$1.7	$1.7	357,882	26.4	26.4
Other	$19,513.1	$2.6	$2.6	271,933	30.0	30.0
Government	$64,451.0	$0.7	$0.7	656,931	3.6	3.6
Total	**$745,750.4**	**$155.9**	**$155.9**	**4,806,509**	**943.1**	**943.1**

Table F-21
Alternative 1: MILCONs Combined (6-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.5	$0.5	32,988	2.7	2.7
Mining	$1,241.7	$1.6	$1.6	3,318	3.0	3.0
Utilities	$15,558.8	$2.0	$2.0	12,432	1.7	1.7
Construction	$51,446.2	$122.6	$122.6	337,572	696.3	696.3
Manufacturing	$135,386.5	$29.3	$29.3	341,197	60.5	60.5
Wholesale Trade	$39,026.3	$7.7	$7.7	181,370	37.6	37.6
Retail Trade	$39,116.0	$9.4	$9.4	488,360	109.8	109.8
Transportation and Warehousing	$10,754.6	$4.2	$4.2	86,583	29.8	29.8
Information	$44,927.0	$8.1	$8.1	89,139	14.6	14.6
Finance and Insurance	$51,476.1	$11.0	$11.0	226,444	43.4	43.4
Real Estate and Rental	$102,950.6	$18.3	$18.3	366,409	44.4	44.4
Professional, Scientific, and Technical Services	$57,707.5	$18.5	$18.5	391,226	120.6	120.6
Management	$9,482.5	$1.6	$1.6	48,580	7.1	7.1
Administrative and Waste Services	$23,778.3	$4.3	$4.3	369,193	65.7	65.7
Educational Services	$4,463.9	$1.1	$1.1	76,953	17.8	17.8
Health and Social Services	$34,208.9	$8.0	$8.0	342,697	78.2	78.2
Arts, Entertainment, and Recreation	$12,255.8	$1.8	$1.8	125,303	17.3	17.3
Accommodation and Food Services	$24,417.9	$3.8	$3.8	357,882	59.6	59.6
Other	$19,513.1	$5.4	$5.4	271,933	62.5	62.5
Government	$64,451.0	$1.8	$1.8	656,931	9.2	9.2
Total	**$745,750.4**	**$261.0**	**$261.0**	**4,806,509**	**1,482.0**	**1,482.0**

Table F-22
Alternative 2: P-1044 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.4	$0.1	$0.1	$40.6	0.08%	337,572	228.0	0.4	0.6	229.0	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.4	0.00%	341,197	0.0	7.4	1.3	8.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	4.0	2.6	6.6	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.2	16.8	23.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.4	$1.9	0.00%	226,444	0.0	2.2	5.4	7.6	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.5	$3.9	0.01%	391,226	0.0	23.7	3.0	26.6	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.4	3.5	11.9	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.6	13.6	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.6	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.8	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.0	8.4	12.3	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$40.4**	**$12.0**	**$11.6**	**$64.0**	**0.01%**	**4,806,509**	**228.0**	**67.5**	**79.4**	**374.9**	**0.01%**

Table F-23
Alternative 2: P-1044 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.4	$0.1	$0.1	$40.6	0.08%	337,572	228.0	0.4	0.6	229.0	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.4	0.00%	341,197	0.0	7.4	1.3	8.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	4.0	2.6	6.6	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.2	16.8	23.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.4	$1.9	0.00%	226,444	0.0	2.2	5.4	7.6	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.5	$3.9	0.01%	391,226	0.0	23.7	3.0	26.6	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.4	3.5	11.9	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.6	13.6	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.6	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.8	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.0	8.4	12.3	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$40.4**	**$12.0**	**$11.6**	**$64.0**	**0.01%**	**4,806,509**	**228.0**	**67.5**	**79.4**	**374.9**	**0.01%**

Table F-24
Alternative 2: P-1045 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.5	1.0	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.4	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$44.8	$0.1	$0.1	$45.0	0.09%	337,572	252.8	0.5	0.7	254.0	0.08%
Manufacturing	$135,386.5	$0.0	$3.0	$0.7	$3.7	0.00%	341,197	0.0	8.2	1.5	9.7	0.00%
Wholesale Trade	$39,026.3	$0.0	$1.0	$0.7	$1.7	0.00%	181,370	0.0	4.4	2.9	7.3	0.00%
Retail Trade	$39,116.0	$0.0	$0.6	$1.6	$2.2	0.01%	488,360	0.0	6.9	18.7	25.6	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	2.0	1.1	3.1	0.00%
Information	$44,927.0	$0.0	$0.7	$0.6	$1.3	0.00%	89,139	0.0	1.1	1.2	2.3	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.5	$2.1	0.00%	226,444	0.0	2.5	6.0	8.5	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.9	$4.0	0.00%	366,409	0.0	4.4	5.5	9.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.9	$0.5	$4.4	0.01%	391,226	0.0	26.2	3.3	29.5	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.2	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.9	0.00%	369,193	0.0	9.3	3.9	13.2	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.3	3.4	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.6	$1.6	0.00%	342,697	0.0	0.0	15.1	15.1	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.4	$0.4	0.00%	125,303	0.0	0.4	3.5	4.0	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.8	0.00%	357,882	0.0	2.1	9.9	12.0	0.00%
Other	$19,513.1	$0.0	$0.6	$0.6	$1.2	0.01%	271,933	0.0	4.4	9.3	13.7	0.01%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.6	1.1	1.6	0.00%
Total	**$745,750.4**	**$44.8**	**$13.3**	**$12.9**	**$71.0**	**0.01%**	**4,806,509**	**252.8**	**74.9**	**88.0**	**415.7**	**0.01%**

Table F-25
Alternative 2: P-1045 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.5	1.0	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.4	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$44.8	$0.1	$0.1	$45.0	0.09%	337,572	252.8	0.5	0.7	254.0	0.08%
Manufacturing	$135,386.5	$0.0	$3.0	$0.7	$3.7	0.00%	341,197	0.0	8.2	1.5	9.7	0.00%
Wholesale Trade	$39,026.3	$0.0	$1.0	$0.7	$1.7	0.00%	181,370	0.0	4.4	2.9	7.3	0.00%
Retail Trade	$39,116.0	$0.0	$0.6	$1.6	$2.2	0.01%	488,360	0.0	6.9	18.7	25.6	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	2.0	1.1	3.1	0.00%
Information	$44,927.0	$0.0	$0.7	$0.6	$1.3	0.00%	89,139	0.0	1.1	1.2	2.3	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.5	$2.1	0.00%	226,444	0.0	2.5	6.0	8.5	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.9	$4.0	0.00%	366,409	0.0	4.4	5.5	9.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.9	$0.5	$4.4	0.01%	391,226	0.0	26.2	3.3	29.5	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.2	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.9	0.00%	369,193	0.0	9.3	3.9	13.2	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.3	3.4	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.6	$1.6	0.00%	342,697	0.0	0.0	15.1	15.1	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.4	$0.4	0.00%	125,303	0.0	0.4	3.5	4.0	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.8	0.00%	357,882	0.0	2.1	9.9	12.0	0.00%
Other	$19,513.1	$0.0	$0.6	$0.6	$1.2	0.01%	271,933	0.0	4.4	9.3	13.7	0.01%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.6	1.1	1.6	0.00%
Total	**$745,750.4**	**$44.8**	**$13.3**	**$12.9**	**$71.0**	**0.01%**	**4,806,509**	**252.8**	**74.9**	**88.0**	**415.7**	**0.01%**

Table F-26
Alternative 2: P-1044 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$50.0	$0.1	$0.2	$50.3	0.10%	337,572	283.2	1.1	1.6	285.9	0.08%
Manufacturing	$135,386.5	$0.0	$8.9	$3.1	$12.0	0.01%	341,197	0.0	19.0	5.9	24.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.4	7.0	15.4	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.9	0.01%	488,360	0.0	10.1	34.9	45.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.2	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.5	6.0	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.1	17.8	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.5	0.01%	366,409	0.0	7.1	11.2	18.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.5	$7.6	0.01%	391,226	0.0	40.4	9.1	49.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	16.5	10.5	27.0	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.2	7.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	32.1	32.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.7	0.01%	125,303	0.0	0.9	6.2	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.3	20.2	24.5	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	18.0	25.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.8	0.00%	656,931	0.0	1.3	2.5	3.8	0.00%
Total	**$745,750.4**	**$50.0**	**$27.5**	**$29.7**	**$107.2**	**0.01%**	**4,806,509**	**283.2**	**134.6**	**190.6**	**608.5**	**0.01%**

Table F-27
Alternative 2: P-1044 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$50.0	$0.1	$0.2	$50.3	0.10%	337,572	283.2	1.1	1.6	285.9	0.08%
Manufacturing	$135,386.5	$0.0	$8.9	$3.1	$12.0	0.01%	341,197	0.0	19.0	5.9	24.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.4	7.0	15.4	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.9	0.01%	488,360	0.0	10.1	34.9	45.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.2	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.5	6.0	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.1	17.8	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.5	0.01%	366,409	0.0	7.1	11.2	18.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.5	$7.6	0.01%	391,226	0.0	40.4	9.1	49.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	16.5	10.5	27.0	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.2	7.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	32.1	32.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.7	0.01%	125,303	0.0	0.9	6.2	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.3	20.2	24.5	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	18.0	25.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.8	0.00%	656,931	0.0	1.3	2.5	3.8	0.00%
Total	**$745,750.4**	**$50.0**	**$27.5**	**$29.7**	**$107.2**	**0.01%**	**4,806,509**	**283.2**	**134.6**	**190.6**	**608.5**	**0.01%**

Table F-28
Alternative 2: P-1045 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.2	0.2	1.4	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.9	0.01%	12,432	0.0	0.3	0.4	0.8	0.01%
Construction	$51,446.2	$55.4	$0.2	$0.3	$55.8	0.11%	337,572	314.0	1.2	1.8	317.0	0.09%
Manufacturing	$135,386.5	$0.0	$9.9	$3.4	$13.3	0.01%	341,197	0.0	21.0	6.5	27.5	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.9	$1.6	$3.5	0.01%	181,370	0.0	9.3	7.8	17.1	0.01%
Retail Trade	$39,116.0	$0.0	$1.0	$3.3	$4.3	0.01%	488,360	0.0	11.2	38.7	50.0	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.8	$1.9	0.02%	86,583	0.0	7.9	5.7	13.6	0.02%
Information	$44,927.0	$0.0	$1.6	$2.0	$3.7	0.01%	89,139	0.0	2.8	3.9	6.6	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.7	$5.0	0.01%	226,444	0.0	5.2	14.5	19.7	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.1	$6.2	$8.3	0.01%	366,409	0.0	7.8	12.4	20.2	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.8	$1.6	$8.4	0.01%	391,226	0.0	44.8	10.1	54.9	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.9	1.3	3.2	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.2	$0.8	$2.0	0.01%	369,193	0.0	18.3	11.6	29.9	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	8.0	8.1	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.7	$3.7	0.01%	342,697	0.0	0.0	35.6	35.6	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.9	7.9	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.4	$1.7	0.01%	357,882	0.0	4.7	22.4	27.2	0.01%
Other	$19,513.1	$0.0	$1.2	$1.3	$2.5	0.01%	271,933	0.0	8.5	20.0	28.5	0.01%
Government	$64,451.0	$0.0	$0.3	$0.6	$0.8	0.00%	656,931	0.0	1.4	2.8	4.2	0.00%
Total	**$745,750.4**	**$55.4**	**$30.5**	**$33.0**	**$118.9**	**0.02%**	**4,806,509**	**314.0**	**149.3**	**211.4**	**674.7**	**0.01%**

Table F-29
Alternative 2: P-1045 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.2	0.2	1.4	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.9	0.01%	12,432	0.0	0.3	0.4	0.8	0.01%
Construction	$51,446.2	$55.4	$0.2	$0.3	$55.8	0.11%	337,572	314.0	1.2	1.8	317.0	0.09%
Manufacturing	$135,386.5	$0.0	$9.9	$3.4	$13.3	0.01%	341,197	0.0	21.0	6.5	27.5	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.9	$1.6	$3.5	0.01%	181,370	0.0	9.3	7.8	17.1	0.01%
Retail Trade	$39,116.0	$0.0	$1.0	$3.3	$4.3	0.01%	488,360	0.0	11.2	38.7	50.0	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.8	$1.9	0.02%	86,583	0.0	7.9	5.7	13.6	0.02%
Information	$44,927.0	$0.0	$1.6	$2.0	$3.7	0.01%	89,139	0.0	2.8	3.9	6.6	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.7	$5.0	0.01%	226,444	0.0	5.2	14.5	19.7	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.1	$6.2	$8.3	0.01%	366,409	0.0	7.8	12.4	20.2	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.8	$1.6	$8.4	0.01%	391,226	0.0	44.8	10.1	54.9	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.9	1.3	3.2	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.2	$0.8	$2.0	0.01%	369,193	0.0	18.3	11.6	29.9	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	8.0	8.1	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.7	$3.7	0.01%	342,697	0.0	0.0	35.6	35.6	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.9	7.9	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.4	$1.7	0.01%	357,882	0.0	4.7	22.4	27.2	0.01%
Other	$19,513.1	$0.0	$1.2	$1.3	$2.5	0.01%	271,933	0.0	8.5	20.0	28.5	0.01%
Government	$64,451.0	$0.0	$0.3	$0.6	$0.8	0.00%	656,931	0.0	1.4	2.8	4.2	0.00%
Total	**$745,750.4**	**$55.4**	**$30.5**	**$33.0**	**$118.9**	**0.02%**	**4,806,509**	**314.0**	**149.3**	**211.4**	**674.7**	**0.01%**

Table F-30
Alternative 2: MILCONs Combined (3-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.3	$0.3	32,988	1.8	1.8
Mining	$1,241.7	$0.2	$0.2	3,318	0.8	0.8
Utilities	$15,558.8	$0.8	$0.8	12,432	0.6	0.6
Construction	$51,446.2	$85.6	$85.6	337,572	483.0	483.0
Manufacturing	$135,386.5	$7.1	$7.1	341,197	18.5	18.5
Wholesale Trade	$39,026.3	$3.2	$3.2	181,370	13.9	13.9
Retail Trade	$39,116.0	$4.1	$4.1	488,360	48.6	48.6
Transportation and Warehousing	$10,754.6	$0.8	$0.8	86,583	6.0	6.0
Information	$44,927.0	$2.5	$2.5	89,139	4.4	4.4
Finance and Insurance	$51,476.1	$4.0	$4.0	226,444	16.1	16.1
Real Estate and Rental	$102,950.6	$7.6	$7.6	366,409	18.8	18.8
Professional, Scientific, and Technical Services	$57,707.5	$8.3	$8.3	391,226	56.2	56.2
Management	$9,482.5	$0.5	$0.5	48,580	2.3	2.3
Administrative and Waste Services	$23,778.3	$1.7	$1.7	369,193	25.1	25.1
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.4	6.4
Health and Social Services	$34,208.9	$3.0	$3.0	342,697	28.7	28.7
Arts, Entertainment, and Recreation	$12,255.8	$0.7	$0.7	125,303	7.5	7.5
Accommodation and Food Services	$24,417.9	$1.4	$1.4	357,882	22.9	22.9
Other	$19,513.1	$2.3	$2.3	271,933	26.0	26.0
Government	$64,451.0	$0.6	$0.6	656,931	3.1	3.1
Total	**$745,750.4**	**$135.0**	**$135.0**	**4,806,509**	**790.5**	**790.5**

Table F-31
Alternative 2: MILCONs Combined (6-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.4	$0.4	32,988	2.4	2.4
Mining	$1,241.7	$1.4	$1.4	3,318	2.6	2.6
Utilities	$15,558.8	$1.7	$1.7	12,432	1.5	1.5
Construction	$51,446.2	$106.1	$106.1	337,572	602.9	602.9
Manufacturing	$135,386.5	$25.4	$25.4	341,197	52.4	52.4
Wholesale Trade	$39,026.3	$6.6	$6.6	181,370	32.6	32.6
Retail Trade	$39,116.0	$8.2	$8.2	488,360	95.1	95.1
Transportation and Warehousing	$10,754.6	$3.7	$3.7	86,583	25.8	25.8
Information	$44,927.0	$7.0	$7.0	89,139	12.6	12.6
Finance and Insurance	$51,476.1	$9.6	$9.6	226,444	37.5	37.5
Real Estate and Rental	$102,950.6	$15.9	$15.9	366,409	38.4	38.4
Professional, Scientific, and Technical Services	$57,707.5	$16.0	$16.0	391,226	104.4	104.4
Management	$9,482.5	$1.4	$1.4	48,580	6.2	6.2
Administrative and Waste Services	$23,778.3	$3.7	$3.7	369,193	56.9	56.9
Educational Services	$4,463.9	$1.0	$1.0	76,953	15.4	15.4
Health and Social Services	$34,208.9	$6.9	$6.9	342,697	67.7	67.7
Arts, Entertainment, and Recreation	$12,255.8	$1.5	$1.5	125,303	15.0	15.0
Accommodation and Food Services	$24,417.9	$3.3	$3.3	357,882	51.6	51.6
Other	$19,513.1	$4.7	$4.7	271,933	54.1	54.1
Government	$64,451.0	$1.6	$1.6	656,931	8.0	8.0
Total	**$745,750.4**	**$226.0**	**$226.0**	**4,806,509**	**1,283.2**	**1,283.2**

Table F-32
Alternative 3: P-1044 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.0	$0.1	$0.1	$40.2	0.08%	337,572	225.7	0.4	0.6	226.7	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.3	0.00%	341,197	0.0	7.3	1.3	8.7	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	3.9	2.6	6.5	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.1	16.7	22.8	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.5	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.3	$1.9	0.00%	226,444	0.0	2.2	5.4	7.5	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.8	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.4	$3.9	0.01%	391,226	0.0	23.4	2.9	26.4	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.3	3.5	11.8	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.5	13.5	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.5	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.7	0.00%
Other	$19,513.1	$0.0	$0.5	$0.5	$1.1	0.01%	271,933	0.0	3.9	8.3	12.2	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	0.9	1.5	0.00%
Total	**$745,750.4**	**$40.0**	**$11.8**	**$11.5**	**$63.4**	**0.01%**	**4,806,509**	**225.7**	**66.8**	**78.6**	**371.1**	**0.01%**

Table F-33
Alternative 3: P-1044 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.0	$0.1	$0.1	$40.2	0.08%	337,572	225.7	0.4	0.6	226.7	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.3	0.00%	341,197	0.0	7.3	1.3	8.7	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	3.9	2.6	6.5	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.1	16.7	22.8	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.5	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.3	$1.9	0.00%	226,444	0.0	2.2	5.4	7.5	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.8	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.4	$3.9	0.01%	391,226	0.0	23.4	2.9	26.4	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.3	3.5	11.8	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.5	13.5	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.5	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.7	0.00%
Other	$19,513.1	$0.0	$0.5	$0.5	$1.1	0.01%	271,933	0.0	3.9	8.3	12.2	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	0.9	1.5	0.00%
Total	**$745,750.4**	**$40.0**	**$11.8**	**$11.5**	**$63.4**	**0.01%**	**4,806,509**	**225.7**	**66.8**	**78.6**	**371.1**	**0.01%**

Table F-34
Alternative 3: P-1045 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$42.0	$0.1	$0.1	$42.2	0.08%	337,572	237.0	0.5	0.6	238.1	0.07%
Manufacturing	$135,386.5	$0.0	$2.8	$0.7	$3.5	0.00%	341,197	0.0	7.7	1.4	9.1	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.6	0.00%	181,370	0.0	4.1	2.7	6.9	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.5	$2.0	0.01%	488,360	0.0	6.5	17.5	24.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	1.9	1.1	2.9	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.1	1.1	2.2	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.4	$2.0	0.00%	226,444	0.0	2.3	5.6	7.9	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.7	$3.8	0.00%	366,409	0.0	4.1	5.1	9.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.6	$0.5	$4.1	0.01%	391,226	0.0	24.6	3.1	27.7	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.8	0.00%	369,193	0.0	8.7	3.7	12.4	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.1	3.1	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.5	$1.5	0.00%	342,697	0.0	0.0	14.2	14.2	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.4	0.00%	125,303	0.0	0.4	3.3	3.7	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	2.0	9.3	11.3	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.1	8.7	12.8	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$42.0**	**$12.4**	**$12.1**	**$66.5**	**0.01%**	**4,806,509**	**237.0**	**70.2**	**82.5**	**389.7**	**0.01%**

Table F-35
Alternative 3: P-1045 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$42.0	$0.1	$0.1	$42.2	0.08%	337,572	237.0	0.5	0.6	238.1	0.07%
Manufacturing	$135,386.5	$0.0	$2.8	$0.7	$3.5	0.00%	341,197	0.0	7.7	1.4	9.1	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.6	0.00%	181,370	0.0	4.1	2.7	6.9	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.5	$2.0	0.01%	488,360	0.0	6.5	17.5	24.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	1.9	1.1	2.9	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.1	1.1	2.2	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.4	$2.0	0.00%	226,444	0.0	2.3	5.6	7.9	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.7	$3.8	0.00%	366,409	0.0	4.1	5.1	9.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.6	$0.5	$4.1	0.01%	391,226	0.0	24.6	3.1	27.7	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.8	0.00%	369,193	0.0	8.7	3.7	12.4	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.1	3.1	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.5	$1.5	0.00%	342,697	0.0	0.0	14.2	14.2	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.4	0.00%	125,303	0.0	0.4	3.3	3.7	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	2.0	9.3	11.3	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.1	8.7	12.8	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$42.0**	**$12.4**	**$12.1**	**$66.5**	**0.01%**	**4,806,509**	**237.0**	**70.2**	**82.5**	**389.7**	**0.01%**

Table F-36
Alternative 3: P-1044 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.2	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$49.5	$0.1	$0.2	$49.8	0.10%	337,572	280.4	1.1	1.6	283.1	0.08%
Manufacturing	$135,386.5	$0.0	$8.8	$3.1	$11.9	0.01%	341,197	0.0	18.8	5.8	24.6	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.3	7.0	15.3	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.8	0.01%	488,360	0.0	10.0	34.6	44.6	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.1	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.4	5.9	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.0	17.6	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.4	0.01%	366,409	0.0	7.0	11.0	18.0	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.4	$7.5	0.01%	391,226	0.0	40.0	9.0	49.0	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.0	$0.7	$1.8	0.01%	369,193	0.0	16.3	10.4	26.7	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.1	7.2	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	31.8	31.8	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.6	$0.7	0.01%	125,303	0.0	0.9	6.1	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.5	0.01%	357,882	0.0	4.2	20.0	24.2	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	17.8	25.4	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.7	0.00%	656,931	0.0	1.2	2.5	3.8	0.00%
Total	**$745,750.4**	**$49.5**	**$27.2**	**$29.4**	**$106.1**	**0.01%**	**4,806,509**	**280.4**	**133.3**	**188.7**	**602.4**	**0.01%**

Table F-37
Alternative 3: P-1044 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	**Direct**	**Indirect**	**Induced**	**Total Impact**	**Percent Increase**	**Existing**	**Direct**	**Indirect**	**Induced**	**Total Impact**	**Percent Increase**
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.2	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$49.5	$0.1	$0.2	$49.8	0.10%	337,572	280.4	1.1	1.6	283.1	0.08%
Manufacturing	$135,386.5	$0.0	$8.8	$3.1	$11.9	0.01%	341,197	0.0	18.8	5.8	24.6	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.3	7.0	15.3	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.8	0.01%	488,360	0.0	10.0	34.6	44.6	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.1	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.4	5.9	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.0	17.6	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.4	0.01%	366,409	0.0	7.0	11.0	18.0	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.4	$7.5	0.01%	391,226	0.0	40.0	9.0	49.0	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.0	$0.7	$1.8	0.01%	369,193	0.0	16.3	10.4	26.7	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.1	7.2	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	31.8	31.8	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.6	$0.7	0.01%	125,303	0.0	0.9	6.1	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.5	0.01%	357,882	0.0	4.2	20.0	24.2	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	17.8	25.4	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.7	0.00%	656,931	0.0	1.2	2.5	3.8	0.00%
Total	**$745,750.4**	**$49.5**	**$27.2**	**$29.4**	**$106.1**	**0.01%**	**4,806,509**	**280.4**	**133.3**	**188.7**	**602.4**	**0.01%**

Table F-38
Alternative 3: P-1045 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$51.9	$0.2	$0.2	$52.3	0.10%	337,572	294.4	1.1	1.7	297.2	0.09%
Manufacturing	$135,386.5	$0.0	$9.3	$3.2	$12.5	0.01%	341,197	0.0	19.7	6.1	25.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.8	$1.5	$3.3	0.01%	181,370	0.0	8.7	7.3	16.1	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.1	$4.0	0.01%	488,360	0.0	10.5	36.3	46.9	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.7	$1.8	0.02%	86,583	0.0	7.4	5.3	12.7	0.01%
Information	$44,927.0	$0.0	$1.5	$1.9	$3.4	0.01%	89,139	0.0	2.6	3.6	6.2	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.5	$4.7	0.01%	226,444	0.0	4.9	13.6	18.5	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.0	$5.8	$7.8	0.01%	366,409	0.0	7.3	11.6	18.9	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.4	$1.5	$7.9	0.01%	391,226	0.0	42.0	9.5	51.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.8	1.2	3.0	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	17.2	10.9	28.1	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.5	7.6	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.4	$3.4	0.01%	342,697	0.0	0.0	33.4	33.4	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.4	7.4	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.5	21.0	25.5	0.01%
Other	$19,513.1	$0.0	$1.1	$1.2	$2.3	0.01%	271,933	0.0	7.9	18.7	26.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.6	$0.8	0.00%	656,931	0.0	1.3	2.6	3.9	0.00%
Total	**$745,750.4**	**$51.9**	**$28.6**	**$30.9**	**$111.4**	**0.01%**	**4,806,509**	**294.4**	**140.0**	**198.2**	**632.6**	**0.01%**

Table F-39
Alternative 3: P-1045 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$51.9	$0.2	$0.2	$52.3	0.10%	337,572	294.4	1.1	1.7	297.2	0.09%
Manufacturing	$135,386.5	$0.0	$9.3	$3.2	$12.5	0.01%	341,197	0.0	19.7	6.1	25.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.8	$1.5	$3.3	0.01%	181,370	0.0	8.7	7.3	16.1	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.1	$4.0	0.01%	488,360	0.0	10.5	36.3	46.9	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.7	$1.8	0.02%	86,583	0.0	7.4	5.3	12.7	0.01%
Information	$44,927.0	$0.0	$1.5	$1.9	$3.4	0.01%	89,139	0.0	2.6	3.6	6.2	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.5	$4.7	0.01%	226,444	0.0	4.9	13.6	18.5	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.0	$5.8	$7.8	0.01%	366,409	0.0	7.3	11.6	18.9	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.4	$1.5	$7.9	0.01%	391,226	0.0	42.0	9.5	51.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.8	1.2	3.0	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	17.2	10.9	28.1	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.5	7.6	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.4	$3.4	0.01%	342,697	0.0	0.0	33.4	33.4	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.4	7.4	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.5	21.0	25.5	0.01%
Other	$19,513.1	$0.0	$1.1	$1.2	$2.3	0.01%	271,933	0.0	7.9	18.7	26.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.6	$0.8	0.00%	656,931	0.0	1.3	2.6	3.9	0.00%
Total	**$745,750.4**	**$51.9**	**$28.6**	**$30.9**	**$111.4**	**0.01%**	**4,806,509**	**294.4**	**140.0**	**198.2**	**632.6**	**0.01%**

Table F-40
Alternative 3: MILCONs Combined (3-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.2	$0.2	32,988	1.8	1.8
Mining	$1,241.7	$0.2	$0.2	3,318	0.7	0.7
Utilities	$15,558.8	$0.8	$0.8	12,432	0.6	0.6
Construction	$51,446.2	$82.4	$82.4	337,572	464.8	464.8
Manufacturing	$135,386.5	$6.8	$6.8	341,197	17.8	17.8
Wholesale Trade	$39,026.3	$3.1	$3.1	181,370	13.4	13.4
Retail Trade	$39,116.0	$4.0	$4.0	488,360	46.8	46.8
Transportation and Warehousing	$10,754.6	$0.8	$0.8	86,583	5.7	5.7
Information	$44,927.0	$2.4	$2.4	89,139	4.2	4.2
Finance and Insurance	$51,476.1	$3.9	$3.9	226,444	15.5	15.5
Real Estate and Rental	$102,950.6	$7.3	$7.3	366,409	18.1	18.1
Professional, Scientific, and Technical Services	$57,707.5	$8.0	$8.0	391,226	54.0	54.0
Management	$9,482.5	$0.4	$0.4	48,580	2.2	2.2
Administrative and Waste Services	$23,778.3	$1.6	$1.6	369,193	24.2	24.2
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.1	6.1
Health and Social Services	$34,208.9	$2.9	$2.9	342,697	27.7	27.7
Arts, Entertainment, and Recreation	$12,255.8	$0.7	$0.7	125,303	7.3	7.3
Accommodation and Food Services	$24,417.9	$1.4	$1.4	357,882	22.0	22.0
Other	$19,513.1	$2.2	$2.2	271,933	25.0	25.0
Government	$64,451.0	$0.6	$0.6	656,931	3.0	3.0
Total	**$745,750.4**	**$129.9**	**$129.9**	**4,806,509**	**760.8**	**760.8**

Table F-41
Alternative 3: MILCONs Combined (6-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.4	$0.4	32,988	2.3	2.3
Mining	$1,241.7	$1.3	$1.3	3,318	2.5	2.5
Utilities	$15,558.8	$1.6	$1.6	12,432	1.4	1.4
Construction	$51,446.2	$102.1	$102.1	337,572	580.3	580.3
Manufacturing	$135,386.5	$24.4	$24.4	341,197	50.4	50.4
Wholesale Trade	$39,026.3	$6.4	$6.4	181,370	31.3	31.3
Retail Trade	$39,116.0	$7.9	$7.9	488,360	91.5	91.5
Transportation and Warehousing	$10,754.6	$3.5	$3.5	86,583	24.9	24.9
Information	$44,927.0	$6.7	$6.7	89,139	12.2	12.2
Finance and Insurance	$51,476.1	$9.2	$9.2	226,444	36.1	36.1
Real Estate and Rental	$102,950.6	$15.3	$15.3	366,409	37.0	37.0
Professional, Scientific, and Technical Services	$57,707.5	$15.4	$15.4	391,226	100.5	100.5
Management	$9,482.5	$1.3	$1.3	48,580	5.9	5.9
Administrative and Waste Services	$23,778.3	$3.6	$3.6	369,193	54.8	54.8
Educational Services	$4,463.9	$0.9	$0.9	76,953	14.8	14.8
Health and Social Services	$34,208.9	$6.7	$6.7	342,697	65.2	65.2
Arts, Entertainment, and Recreation	$12,255.8	$1.5	$1.5	125,303	14.5	14.5
Accommodation and Food Services	$24,417.9	$3.2	$3.2	357,882	49.7	49.7
Other	$19,513.1	$4.5	$4.5	271,933	52.1	52.1
Government	$64,451.0	$1.5	$1.5	656,931	7.7	7.7
Total	**$745,750.4**	**$217.5**	**$217.5**	**4,806,509**	**1,235.0**	**1,235.0**

Table F-42
Alternative 4: P-1044 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.5	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.4	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$42.4	$0.1	$0.1	$42.6	0.08%	337,572	239.3	0.5	0.6	240.3	0.07%
Manufacturing	$135,386.5	$0.0	$2.8	$0.7	$3.5	0.00%	341,197	0.0	7.8	1.4	9.2	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.6	0.00%	181,370	0.0	4.1	2.8	6.9	0.00%
Retail Trade	$39,116.0	$0.0	$0.6	$1.5	$2.0	0.01%	488,360	0.0	6.5	17.7	24.2	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	1.9	1.1	3.0	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.1	1.1	2.2	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.4	$2.0	0.00%	226,444	0.0	2.3	5.7	8.0	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.7	$3.8	0.00%	366,409	0.0	4.1	5.2	9.3	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.7	$0.5	$4.1	0.01%	391,226	0.0	24.8	3.1	27.9	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.8	0.00%	369,193	0.0	8.8	3.7	12.5	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.1	3.2	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.5	$1.5	0.00%	342,697	0.0	0.0	14.3	14.3	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.4	0.00%	125,303	0.0	0.4	3.4	3.8	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	2.0	9.4	11.4	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.2	8.8	12.9	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$42.4**	**$12.6**	**$12.2**	**$67.2**	**0.01%**	**4,806,509**	**239.3**	**70.9**	**83.3**	**393.4**	**0.01%**

Table F-43
Alternative 4: P-1044 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.5	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.4	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$42.4	$0.1	$0.1	$42.6	0.08%	337,572	239.3	0.5	0.6	240.3	0.07%
Manufacturing	$135,386.5	$0.0	$2.8	$0.7	$3.5	0.00%	341,197	0.0	7.8	1.4	9.2	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.6	0.00%	181,370	0.0	4.1	2.8	6.9	0.00%
Retail Trade	$39,116.0	$0.0	$0.6	$1.5	$2.0	0.01%	488,360	0.0	6.5	17.7	24.2	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	1.9	1.1	3.0	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.1	1.1	2.2	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.4	$2.0	0.00%	226,444	0.0	2.3	5.7	8.0	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.7	$3.8	0.00%	366,409	0.0	4.1	5.2	9.3	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.7	$0.5	$4.1	0.01%	391,226	0.0	24.8	3.1	27.9	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.8	0.00%	369,193	0.0	8.8	3.7	12.5	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.1	3.2	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.5	$1.5	0.00%	342,697	0.0	0.0	14.3	14.3	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.4	0.00%	125,303	0.0	0.4	3.4	3.8	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	2.0	9.4	11.4	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.2	8.8	12.9	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$42.4**	**$12.6**	**$12.2**	**$67.2**	**0.01%**	**4,806,509**	**239.3**	**70.9**	**83.3**	**393.4**	**0.01%**

Table F-44
Alternative 4: P-1045 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.5	1.1	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.4	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.3	$0.5	0.00%	12,432	0.0	0.2	0.2	0.3	0.00%
Construction	$51,446.2	$50.0	$0.1	$0.1	$50.2	0.10%	337,572	282.1	0.6	0.7	283.4	0.08%
Manufacturing	$135,386.5	$0.0	$3.3	$0.8	$4.1	0.00%	341,197	0.0	9.2	1.7	10.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$1.1	$0.7	$1.9	0.00%	181,370	0.0	4.9	3.3	8.2	0.00%
Retail Trade	$39,116.0	$0.0	$0.6	$1.8	$2.4	0.01%	488,360	0.0	7.7	20.8	28.5	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.2	$0.5	0.00%	86,583	0.0	2.2	1.3	3.5	0.00%
Information	$44,927.0	$0.0	$0.8	$0.7	$1.4	0.00%	89,139	0.0	1.3	1.3	2.6	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.7	$1.7	$2.4	0.00%	226,444	0.0	2.7	6.7	9.4	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.3	$3.2	$4.5	0.00%	366,409	0.0	4.9	6.1	11.0	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$4.3	$0.6	$4.9	0.01%	391,226	0.0	29.3	3.7	33.0	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.3	0.00%	48,580	0.0	0.9	0.4	1.4	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.7	$0.3	$1.0	0.00%	369,193	0.0	10.4	4.4	14.7	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.7	3.7	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.7	$1.7	0.01%	342,697	0.0	0.0	16.9	16.9	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.4	$0.4	0.00%	125,303	0.0	0.5	4.0	4.4	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.2	$0.7	$0.8	0.00%	357,882	0.0	2.3	11.1	13.4	0.00%
Other	$19,513.1	$0.0	$0.7	$0.6	$1.3	0.01%	271,933	0.0	4.9	10.3	15.3	0.01%
Government	$64,451.0	$0.0	$0.1	$0.3	$0.4	0.00%	656,931	0.0	0.6	1.2	1.8	0.00%
Total	**$745,750.4**	**$50.0**	**$14.8**	**$14.4**	**$79.2**	**0.01%**	**4,806,509**	**282.1**	**83.6**	**98.2**	**463.9**	**0.01%**

Table F-45
Alternative 4: P-1045 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	**Direct**	**Indirect**	**Induced**	**Total Impact**	**Percent Increase**	**Existing**	**Direct**	**Indirect**	**Induced**	**Total Impact**	**Percent Increase**
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.5	1.1	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.4	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.3	$0.5	0.00%	12,432	0.0	0.2	0.2	0.3	0.00%
Construction	$51,446.2	$50.0	$0.1	$0.1	$50.2	0.10%	337,572	282.1	0.6	0.7	283.4	0.08%
Manufacturing	$135,386.5	$0.0	$3.3	$0.8	$4.1	0.00%	341,197	0.0	9.2	1.7	10.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$1.1	$0.7	$1.9	0.00%	181,370	0.0	4.9	3.3	8.2	0.00%
Retail Trade	$39,116.0	$0.0	$0.6	$1.8	$2.4	0.01%	488,360	0.0	7.7	20.8	28.5	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.2	$0.5	0.00%	86,583	0.0	2.2	1.3	3.5	0.00%
Information	$44,927.0	$0.0	$0.8	$0.7	$1.4	0.00%	89,139	0.0	1.3	1.3	2.6	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.7	$1.7	$2.4	0.00%	226,444	0.0	2.7	6.7	9.4	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.3	$3.2	$4.5	0.00%	366,409	0.0	4.9	6.1	11.0	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$4.3	$0.6	$4.9	0.01%	391,226	0.0	29.3	3.7	33.0	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.3	0.00%	48,580	0.0	0.9	0.4	1.4	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.7	$0.3	$1.0	0.00%	369,193	0.0	10.4	4.4	14.7	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.7	3.7	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.7	$1.7	0.01%	342,697	0.0	0.0	16.9	16.9	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.4	$0.4	0.00%	125,303	0.0	0.5	4.0	4.4	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.2	$0.7	$0.8	0.00%	357,882	0.0	2.3	11.1	13.4	0.00%
Other	$19,513.1	$0.0	$0.7	$0.6	$1.3	0.01%	271,933	0.0	4.9	10.3	15.3	0.01%
Government	$64,451.0	$0.0	$0.1	$0.3	$0.4	0.00%	656,931	0.0	0.6	1.2	1.8	0.00%
Total	**$745,750.4**	**$50.0**	**$14.8**	**$14.4**	**$79.2**	**0.01%**	**4,806,509**	**282.1**	**83.6**	**98.2**	**463.9**	**0.01%**

Table F-46
Alternative 4: P-1044 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$52.4	$0.2	$0.2	$52.8	0.10%	337,572	297.2	1.1	1.7	300.0	0.09%
Manufacturing	$135,386.5	$0.0	$9.4	$3.2	$12.6	0.01%	341,197	0.0	19.9	6.2	26.1	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.8	$1.5	$3.3	0.01%	181,370	0.0	8.8	7.4	16.2	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.1	$4.1	0.01%	488,360	0.0	10.6	36.7	47.3	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.7	$1.8	0.02%	86,583	0.0	7.5	5.4	12.9	0.01%
Information	$44,927.0	$0.0	$1.6	$1.9	$3.5	0.01%	89,139	0.0	2.6	3.6	6.3	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.5	$4.8	0.01%	226,444	0.0	4.9	13.7	18.7	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.0	$5.9	$7.9	0.01%	366,409	0.0	7.4	11.7	19.1	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.4	$1.5	$8.0	0.01%	391,226	0.0	42.4	9.6	52.0	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.8	1.2	3.1	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.8	$1.9	0.01%	369,193	0.0	17.3	11.0	28.3	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.6	7.7	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.5	$3.5	0.01%	342,697	0.0	0.0	33.7	33.7	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.5	7.5	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.5	21.2	25.7	0.01%
Other	$19,513.1	$0.0	$1.1	$1.2	$2.3	0.01%	271,933	0.0	8.0	18.9	26.9	0.01%
Government	$64,451.0	$0.0	$0.2	$0.6	$0.8	0.00%	656,931	0.0	1.3	2.7	4.0	0.00%
Total	**$745,750.4**	**$52.4**	**$28.9**	**$31.2**	**$112.5**	**0.02%**	**4,806,509**	**297.2**	**141.3**	**200.1**	**638.6**	**0.01%**

Table F-47
Alternative 4: P-1044 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$52.4	$0.2	$0.2	$52.8	0.10%	337,572	297.2	1.1	1.7	300.0	0.09%
Manufacturing	$135,386.5	$0.0	$9.4	$3.2	$12.6	0.01%	341,197	0.0	19.9	6.2	26.1	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.8	$1.5	$3.3	0.01%	181,370	0.0	8.8	7.4	16.2	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.1	$4.1	0.01%	488,360	0.0	10.6	36.7	47.3	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.7	$1.8	0.02%	86,583	0.0	7.5	5.4	12.9	0.01%
Information	$44,927.0	$0.0	$1.6	$1.9	$3.5	0.01%	89,139	0.0	2.6	3.6	6.3	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.5	$4.8	0.01%	226,444	0.0	4.9	13.7	18.7	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.0	$5.9	$7.9	0.01%	366,409	0.0	7.4	11.7	19.1	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.4	$1.5	$8.0	0.01%	391,226	0.0	42.4	9.6	52.0	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.8	1.2	3.1	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.8	$1.9	0.01%	369,193	0.0	17.3	11.0	28.3	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.6	7.7	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.5	$3.5	0.01%	342,697	0.0	0.0	33.7	33.7	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.5	7.5	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.5	21.2	25.7	0.01%
Other	$19,513.1	$0.0	$1.1	$1.2	$2.3	0.01%	271,933	0.0	8.0	18.9	26.9	0.01%
Government	$64,451.0	$0.0	$0.2	$0.6	$0.8	0.00%	656,931	0.0	1.3	2.7	4.0	0.00%
Total	**$745,750.4**	**$52.4**	**$28.9**	**$31.2**	**$112.5**	**0.02%**	**4,806,509**	**297.2**	**141.3**	**200.1**	**638.6**	**0.01%**

Table F-48
Alternative 4: P-1045 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.5	0.9	1.4	0.00%
Mining	$1,241.7	$0.0	$0.7	$0.1	$0.8	0.07%	3,318	0.0	1.3	0.2	1.5	0.05%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$1.0	0.01%	12,432	0.0	0.4	0.5	0.9	0.01%
Construction	$51,446.2	$61.8	$0.2	$0.3	$62.3	0.12%	337,572	350.5	1.3	2.0	353.8	0.10%
Manufacturing	$135,386.5	$0.0	$11.1	$3.8	$14.9	0.01%	341,197	0.0	23.5	7.3	30.7	0.01%
Wholesale Trade	$39,026.3	$0.0	$2.1	$1.8	$3.9	0.01%	181,370	0.0	10.4	8.7	19.1	0.01%
Retail Trade	$39,116.0	$0.0	$1.1	$3.7	$4.8	0.01%	488,360	0.0	12.5	43.2	55.8	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.3	$0.9	$2.1	0.02%	86,583	0.0	8.8	6.3	15.2	0.02%
Information	$44,927.0	$0.0	$1.8	$2.3	$4.1	0.01%	89,139	0.0	3.1	4.3	7.4	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.5	$4.1	$5.6	0.01%	226,444	0.0	5.8	16.2	22.0	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.4	$6.9	$9.3	0.01%	366,409	0.0	8.7	13.8	22.6	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$7.6	$1.8	$9.4	0.02%	391,226	0.0	50.0	11.3	61.3	0.02%
Management	$9,482.5	$0.0	$0.5	$0.3	$0.8	0.01%	48,580	0.0	2.2	1.5	3.6	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.3	$0.9	$2.2	0.01%	369,193	0.0	20.4	13.0	33.4	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.6	$0.6	0.01%	76,953	0.0	0.1	8.9	9.0	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$4.1	$4.1	0.01%	342,697	0.0	0.0	39.7	39.7	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.8	$0.9	0.01%	125,303	0.0	1.1	7.7	8.8	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.6	$1.9	0.01%	357,882	0.0	5.3	25.0	30.3	0.01%
Other	$19,513.1	$0.0	$1.3	$1.5	$2.7	0.01%	271,933	0.0	9.5	22.3	31.8	0.01%
Government	$64,451.0	$0.0	$0.3	$0.7	$0.9	0.00%	656,931	0.0	1.6	3.1	4.7	0.00%
Total	**$745,750.4**	**$61.8**	**$34.0**	**$36.8**	**$132.6**	**0.02%**	**4,806,509**	**350.5**	**166.6**	**235.9**	**753.0**	**0.02%**

Table F-49
Alternative 4: P-1045 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.5	0.9	1.4	0.00%
Mining	$1,241.7	$0.0	$0.7	$0.1	$0.8	0.07%	3,318	0.0	1.3	0.2	1.5	0.05%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$1.0	0.01%	12,432	0.0	0.4	0.5	0.9	0.01%
Construction	$51,446.2	$61.8	$0.2	$0.3	$62.3	0.12%	337,572	350.5	1.3	2.0	353.8	0.10%
Manufacturing	$135,386.5	$0.0	$11.1	$3.8	$14.9	0.01%	341,197	0.0	23.5	7.3	30.7	0.01%
Wholesale Trade	$39,026.3	$0.0	$2.1	$1.8	$3.9	0.01%	181,370	0.0	10.4	8.7	19.1	0.01%
Retail Trade	$39,116.0	$0.0	$1.1	$3.7	$4.8	0.01%	488,360	0.0	12.5	43.2	55.8	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.3	$0.9	$2.1	0.02%	86,583	0.0	8.8	6.3	15.2	0.02%
Information	$44,927.0	$0.0	$1.8	$2.3	$4.1	0.01%	89,139	0.0	3.1	4.3	7.4	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.5	$4.1	$5.6	0.01%	226,444	0.0	5.8	16.2	22.0	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.4	$6.9	$9.3	0.01%	366,409	0.0	8.7	13.8	22.6	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$7.6	$1.8	$9.4	0.02%	391,226	0.0	50.0	11.3	61.3	0.02%
Management	$9,482.5	$0.0	$0.5	$0.3	$0.8	0.01%	48,580	0.0	2.2	1.5	3.6	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.3	$0.9	$2.2	0.01%	369,193	0.0	20.4	13.0	33.4	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.6	$0.6	0.01%	76,953	0.0	0.1	8.9	9.0	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$4.1	$4.1	0.01%	342,697	0.0	0.0	39.7	39.7	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.8	$0.9	0.01%	125,303	0.0	1.1	7.7	8.8	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.6	$1.9	0.01%	357,882	0.0	5.3	25.0	30.3	0.01%
Other	$19,513.1	$0.0	$1.3	$1.5	$2.7	0.01%	271,933	0.0	9.5	22.3	31.8	0.01%
Government	$64,451.0	$0.0	$0.3	$0.7	$0.9	0.00%	656,931	0.0	1.6	3.1	4.7	0.00%
Total	**$745,750.4**	**$61.8**	**$34.0**	**$36.8**	**$132.6**	**0.02%**	**4,806,509**	**350.5**	**166.6**	**235.9**	**753.0**	**0.02%**

Table F-50
Alternative 4: MILCONs Combined (3-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.3	$0.3	32,988	2.0	2.0
Mining	$1,241.7	$0.2	$0.2	3,318	0.8	0.8
Utilities	$15,558.8	$0.9	$0.9	12,432	0.6	0.6
Construction	$51,446.2	$92.8	$92.8	337,572	523.8	523.8
Manufacturing	$135,386.5	$7.7	$7.7	341,197	20.0	20.0
Wholesale Trade	$39,026.3	$3.5	$3.5	181,370	15.1	15.1
Retail Trade	$39,116.0	$4.5	$4.5	488,360	52.7	52.7
Transportation and Warehousing	$10,754.6	$0.9	$0.9	86,583	6.5	6.5
Information	$44,927.0	$2.7	$2.7	89,139	4.8	4.8
Finance and Insurance	$51,476.1	$4.3	$4.3	226,444	17.4	17.4
Real Estate and Rental	$102,950.6	$8.3	$8.3	366,409	20.3	20.3
Professional, Scientific, and Technical Services	$57,707.5	$9.0	$9.0	391,226	60.9	60.9
Management	$9,482.5	$0.5	$0.5	48,580	2.5	2.5
Administrative and Waste Services	$23,778.3	$1.8	$1.8	369,193	27.2	27.2
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.9	6.9
Health and Social Services	$34,208.9	$3.2	$3.2	342,697	31.2	31.2
Arts, Entertainment, and Recreation	$12,255.8	$0.8	$0.8	125,303	8.2	8.2
Accommodation and Food Services	$24,417.9	$1.6	$1.6	357,882	24.8	24.8
Other	$19,513.1	$2.5	$2.5	271,933	28.2	28.2
Government	$64,451.0	$0.7	$0.7	656,931	3.4	3.4
Total	**$745,750.4**	**$146.4**	**$146.4**	**4,806,509**	**857.3**	**857.3**

Table F-51
Alternative 4: MILCONs Combined (6-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	**2013 Total**	**2014 Total**	**Existing**	**2013 Total**	**2014 Total**
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.5	$0.5	32,988	2.6	2.6
Mining	$1,241.7	$1.5	$1.5	3,318	2.9	2.9
Utilities	$15,558.8	$1.8	$1.8	12,432	1.6	1.6
Construction	$51,446.2	$115.1	$115.1	337,572	653.8	653.8
Manufacturing	$135,386.5	$27.5	$27.5	341,197	56.8	56.8
Wholesale Trade	$39,026.3	$7.2	$7.2	181,370	35.3	35.3
Retail Trade	$39,116.0	$8.9	$8.9	488,360	103.1	103.1
Transportation and Warehousing	$10,754.6	$4.0	$4.0	86,583	28.0	28.0
Information	$44,927.0	$7.6	$7.6	89,139	13.7	13.7
Finance and Insurance	$51,476.1	$10.4	$10.4	226,444	40.7	40.7
Real Estate and Rental	$102,950.6	$17.2	$17.2	366,409	41.7	41.7
Professional, Scientific, and Technical Services	$57,707.5	$17.4	$17.4	391,226	113.3	113.3
Management	$9,482.5	$1.5	$1.5	48,580	6.7	6.7
Administrative and Waste Services	$23,778.3	$4.0	$4.0	369,193	61.7	61.7
Educational Services	$4,463.9	$1.1	$1.1	76,953	16.7	16.7
Health and Social Services	$34,208.9	$7.5	$7.5	342,697	73.4	73.4
Arts, Entertainment, and Recreation	$12,255.8	$1.7	$1.7	125,303	16.3	16.3
Accommodation and Food Services	$24,417.9	$3.6	$3.6	357,882	56.0	56.0
Other	$19,513.1	$5.1	$5.1	271,933	58.7	58.7
Government	$64,451.0	$1.7	$1.7	656,931	8.7	8.7
Total	**$745,750.4**	**$245.1**	**$245.1**	**4,806,509**	**1,391.6**	**1,391.6**

Table F-52
Alternative 5: P-1044 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.4	$0.1	$0.1	$40.6	0.08%	337,572	228.0	0.4	0.6	229.0	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.4	0.00%	341,197	0.0	7.4	1.3	8.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	4.0	2.6	6.6	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.2	16.8	23.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.4	$1.9	0.00%	226,444	0.0	2.2	5.4	7.6	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.5	$3.9	0.01%	391,226	0.0	23.7	3.0	26.6	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.4	3.5	11.9	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.6	13.6	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.6	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.8	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.0	8.4	12.3	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$40.4**	**$12.0**	**$11.6**	**$64.0**	**0.01%**	**4,806,509**	**228.0**	**67.5**	**79.4**	**374.9**	**0.01%**

Table F-53
Alternative 5: P-1044 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	**Direct**	**Indirect**	**Induced**	**Total Impact**	**Percent Increase**	**Existing**	**Direct**	**Indirect**	**Induced**	**Total Impact**	**Percent Increase**
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.4	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$40.4	$0.1	$0.1	$40.6	0.08%	337,572	228.0	0.4	0.6	229.0	0.07%
Manufacturing	$135,386.5	$0.0	$2.7	$0.6	$3.4	0.00%	341,197	0.0	7.4	1.3	8.8	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.5	0.00%	181,370	0.0	4.0	2.6	6.6	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.4	$1.9	0.00%	488,360	0.0	6.2	16.8	23.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.2	$0.1	$0.4	0.00%	86,583	0.0	1.8	1.0	2.8	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.0	1.1	2.1	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.5	$1.4	$1.9	0.00%	226,444	0.0	2.2	5.4	7.6	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.0	$2.6	$3.6	0.00%	366,409	0.0	3.9	4.9	8.9	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.5	$0.5	$3.9	0.01%	391,226	0.0	23.7	3.0	26.6	0.01%
Management	$9,482.5	$0.0	$0.1	$0.1	$0.2	0.00%	48,580	0.0	0.7	0.3	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.5	$0.2	$0.8	0.00%	369,193	0.0	8.4	3.5	11.9	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.0	3.0	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.4	$1.4	0.00%	342,697	0.0	0.0	13.6	13.6	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.3	0.00%	125,303	0.0	0.4	3.2	3.6	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	1.9	8.9	10.8	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.0	8.4	12.3	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$40.4**	**$12.0**	**$11.6**	**$64.0**	**0.01%**	**4,806,509**	**228.0**	**67.5**	**79.4**	**374.9**	**0.01%**

Table F-54
Alternative 5: P-1045 2013 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$42.0	$0.1	$0.1	$42.2	0.08%	337,572	237.0	0.5	0.6	238.1	0.07%
Manufacturing	$135,386.5	$0.0	$2.8	$0.7	$3.5	0.00%	341,197	0.0	7.7	1.4	9.1	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.6	0.00%	181,370	0.0	4.1	2.7	6.9	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.5	$2.0	0.01%	488,360	0.0	6.5	17.5	24.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	1.9	1.1	2.9	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.1	1.1	2.2	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.4	$2.0	0.00%	226,444	0.0	2.3	5.6	7.9	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.7	$3.8	0.00%	366,409	0.0	4.1	5.1	9.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.6	$0.5	$4.1	0.01%	391,226	0.0	24.6	3.1	27.7	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.8	0.00%	369,193	0.0	8.7	3.7	12.4	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.1	3.1	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.5	$1.5	0.00%	342,697	0.0	0.0	14.2	14.2	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.4	0.00%	125,303	0.0	0.4	3.3	3.7	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	2.0	9.3	11.3	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.1	8.7	12.8	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$42.0**	**$12.4**	**$12.1**	**$66.5**	**0.01%**	**4,806,509**	**237.0**	**70.2**	**82.5**	**389.7**	**0.01%**

Table F-55
Alternative 5: P-1045 2014 (3-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.1	0.00%	32,988	0.0	0.5	0.4	0.9	0.00%
Mining	$1,241.7	$0.0	$0.1	$0.0	$0.1	0.01%	3,318	0.0	0.3	0.0	0.4	0.01%
Utilities	$15,558.8	$0.0	$0.2	$0.2	$0.4	0.00%	12,432	0.0	0.1	0.2	0.3	0.00%
Construction	$51,446.2	$42.0	$0.1	$0.1	$42.2	0.08%	337,572	237.0	0.5	0.6	238.1	0.07%
Manufacturing	$135,386.5	$0.0	$2.8	$0.7	$3.5	0.00%	341,197	0.0	7.7	1.4	9.1	0.00%
Wholesale Trade	$39,026.3	$0.0	$0.9	$0.6	$1.6	0.00%	181,370	0.0	4.1	2.7	6.9	0.00%
Retail Trade	$39,116.0	$0.0	$0.5	$1.5	$2.0	0.01%	488,360	0.0	6.5	17.5	24.0	0.00%
Transportation and Warehousing	$10,754.6	$0.0	$0.3	$0.1	$0.4	0.00%	86,583	0.0	1.9	1.1	2.9	0.00%
Information	$44,927.0	$0.0	$0.6	$0.6	$1.2	0.00%	89,139	0.0	1.1	1.1	2.2	0.00%
Finance and Insurance	$51,476.1	$0.0	$0.6	$1.4	$2.0	0.00%	226,444	0.0	2.3	5.6	7.9	0.00%
Real Estate and Rental	$102,950.6	$0.0	$1.1	$2.7	$3.8	0.00%	366,409	0.0	4.1	5.1	9.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$3.6	$0.5	$4.1	0.01%	391,226	0.0	24.6	3.1	27.7	0.01%
Management	$9,482.5	$0.0	$0.2	$0.1	$0.2	0.00%	48,580	0.0	0.8	0.4	1.1	0.00%
Administrative and Waste Services	$23,778.3	$0.0	$0.6	$0.3	$0.8	0.00%	369,193	0.0	8.7	3.7	12.4	0.00%
Educational Services	$4,463.9	$0.0	$0.0	$0.2	$0.2	0.00%	76,953	0.0	0.0	3.1	3.1	0.00%
Health and Social Services	$34,208.9	$0.0	$0.0	$1.5	$1.5	0.00%	342,697	0.0	0.0	14.2	14.2	0.00%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.0	$0.3	$0.4	0.00%	125,303	0.0	0.4	3.3	3.7	0.00%
Accommodation and Food Services	$24,417.9	$0.0	$0.1	$0.6	$0.7	0.00%	357,882	0.0	2.0	9.3	11.3	0.00%
Other	$19,513.1	$0.0	$0.6	$0.5	$1.1	0.01%	271,933	0.0	4.1	8.7	12.8	0.00%
Government	$64,451.0	$0.0	$0.1	$0.2	$0.3	0.00%	656,931	0.0	0.5	1.0	1.5	0.00%
Total	**$745,750.4**	**$42.0**	**$12.4**	**$12.1**	**$66.5**	**0.01%**	**4,806,509**	**237.0**	**70.2**	**82.5**	**389.7**	**0.01%**

Table F-56
Alternative 5: P-1044 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$50.0	$0.1	$0.2	$50.3	0.10%	337,572	283.2	1.1	1.6	285.9	0.08%
Manufacturing	$135,386.5	$0.0	$8.9	$3.1	$12.0	0.01%	341,197	0.0	19.0	5.9	24.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.4	7.0	15.4	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.9	0.01%	488,360	0.0	10.1	34.9	45.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.2	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.5	6.0	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.1	17.8	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.5	0.01%	366,409	0.0	7.1	11.2	18.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.5	$7.6	0.01%	391,226	0.0	40.4	9.1	49.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	16.5	10.5	27.0	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.2	7.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	32.1	32.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.7	0.01%	125,303	0.0	0.9	6.2	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.3	20.2	24.5	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	18.0	25.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.8	0.00%	656,931	0.0	1.3	2.5	3.8	0.00%
Total	**$745,750.4**	**$50.0**	**$27.5**	**$29.7**	**$107.2**	**0.01%**	**4,806,509**	**283.2**	**134.6**	**190.6**	**608.5**	**0.01%**

Table F-57
Alternative 5: P-1044 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.7	1.1	0.00%
Mining	$1,241.7	$0.0	$0.5	$0.1	$0.7	0.05%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.4	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$50.0	$0.1	$0.2	$50.3	0.10%	337,572	283.2	1.1	1.6	285.9	0.08%
Manufacturing	$135,386.5	$0.0	$8.9	$3.1	$12.0	0.01%	341,197	0.0	19.0	5.9	24.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.7	$1.4	$3.1	0.01%	181,370	0.0	8.4	7.0	15.4	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.0	$3.9	0.01%	488,360	0.0	10.1	34.9	45.1	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.0	$0.7	$1.7	0.02%	86,583	0.0	7.1	5.1	12.2	0.01%
Information	$44,927.0	$0.0	$1.5	$1.8	$3.3	0.01%	89,139	0.0	2.5	3.5	6.0	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.2	$3.3	$4.5	0.01%	226,444	0.0	4.7	13.1	17.8	0.01%
Real Estate and Rental	$102,950.6	$0.0	$1.9	$5.6	$7.5	0.01%	366,409	0.0	7.1	11.2	18.2	0.00%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.1	$1.5	$7.6	0.01%	391,226	0.0	40.4	9.1	49.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.6	0.01%	48,580	0.0	1.7	1.2	2.9	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	16.5	10.5	27.0	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.2	7.3	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.3	$3.3	0.01%	342,697	0.0	0.0	32.1	32.1	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.7	0.01%	125,303	0.0	0.9	6.2	7.1	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.3	20.2	24.5	0.01%
Other	$19,513.1	$0.0	$1.0	$1.2	$2.2	0.01%	271,933	0.0	7.6	18.0	25.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.5	$0.8	0.00%	656,931	0.0	1.3	2.5	3.8	0.00%
Total	**$745,750.4**	**$50.0**	**$27.5**	**$29.7**	**$107.2**	**0.01%**	**4,806,509**	**283.2**	**134.6**	**190.6**	**608.5**	**0.01%**

Table F-58
Alternative 5: P-1045 2013 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$51.9	$0.2	$0.2	$52.3	0.10%	337,572	294.4	1.1	1.7	297.2	0.09%
Manufacturing	$135,386.5	$0.0	$9.3	$3.2	$12.5	0.01%	341,197	0.0	19.7	6.1	25.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.8	$1.5	$3.3	0.01%	181,370	0.0	8.7	7.3	16.1	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.1	$4.0	0.01%	488,360	0.0	10.5	36.3	46.9	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.7	$1.8	0.02%	86,583	0.0	7.4	5.3	12.7	0.01%
Information	$44,927.0	$0.0	$1.5	$1.9	$3.4	0.01%	89,139	0.0	2.6	3.6	6.2	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.5	$4.7	0.01%	226,444	0.0	4.9	13.6	18.5	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.0	$5.8	$7.8	0.01%	366,409	0.0	7.3	11.6	18.9	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.4	$1.5	$7.9	0.01%	391,226	0.0	42.0	9.5	51.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.8	1.2	3.0	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	17.2	10.9	28.1	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.5	7.6	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.4	$3.4	0.01%	342,697	0.0	0.0	33.4	33.4	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.4	7.4	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.5	21.0	25.5	0.01%
Other	$19,513.1	$0.0	$1.1	$1.2	$2.3	0.01%	271,933	0.0	7.9	18.7	26.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.6	$0.8	0.00%	656,931	0.0	1.3	2.6	3.9	0.00%
Total	**$745,750.4**	**$51.9**	**$28.6**	**$30.9**	**$111.4**	**0.01%**	**4,806,509**	**294.4**	**140.0**	**198.2**	**632.6**	**0.01%**

Table F-59
Alternative 5: P-1045 2014 (6-County)

Industry Sector	Economic Output ($ Millions)						Employment (number of FTEs)					
	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase	Existing	Direct	Indirect	Induced	Total Impact	Percent Increase
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.0	$0.1	$0.1	$0.2	0.01%	32,988	0.0	0.4	0.8	1.2	0.00%
Mining	$1,241.7	$0.0	$0.6	$0.1	$0.7	0.06%	3,318	0.0	1.1	0.2	1.3	0.04%
Utilities	$15,558.8	$0.0	$0.4	$0.5	$0.8	0.01%	12,432	0.0	0.3	0.4	0.7	0.01%
Construction	$51,446.2	$51.9	$0.2	$0.2	$52.3	0.10%	337,572	294.4	1.1	1.7	297.2	0.09%
Manufacturing	$135,386.5	$0.0	$9.3	$3.2	$12.5	0.01%	341,197	0.0	19.7	6.1	25.8	0.01%
Wholesale Trade	$39,026.3	$0.0	$1.8	$1.5	$3.3	0.01%	181,370	0.0	8.7	7.3	16.1	0.01%
Retail Trade	$39,116.0	$0.0	$0.9	$3.1	$4.0	0.01%	488,360	0.0	10.5	36.3	46.9	0.01%
Transportation and Warehousing	$10,754.6	$0.0	$1.1	$0.7	$1.8	0.02%	86,583	0.0	7.4	5.3	12.7	0.01%
Information	$44,927.0	$0.0	$1.5	$1.9	$3.4	0.01%	89,139	0.0	2.6	3.6	6.2	0.01%
Finance and Insurance	$51,476.1	$0.0	$1.3	$3.5	$4.7	0.01%	226,444	0.0	4.9	13.6	18.5	0.01%
Real Estate and Rental	$102,950.6	$0.0	$2.0	$5.8	$7.8	0.01%	366,409	0.0	7.3	11.6	18.9	0.01%
Professional, Scientific, and Technical Services	$57,707.5	$0.0	$6.4	$1.5	$7.9	0.01%	391,226	0.0	42.0	9.5	51.5	0.01%
Management	$9,482.5	$0.0	$0.4	$0.3	$0.7	0.01%	48,580	0.0	1.8	1.2	3.0	0.01%
Administrative and Waste Services	$23,778.3	$0.0	$1.1	$0.7	$1.8	0.01%	369,193	0.0	17.2	10.9	28.1	0.01%
Educational Services	$4,463.9	$0.0	$0.0	$0.5	$0.5	0.01%	76,953	0.0	0.1	7.5	7.6	0.01%
Health and Social Services	$34,208.9	$0.0	$0.0	$3.4	$3.4	0.01%	342,697	0.0	0.0	33.4	33.4	0.01%
Arts, Entertainment, and Recreation	$12,255.8	$0.0	$0.1	$0.7	$0.8	0.01%	125,303	0.0	1.0	6.4	7.4	0.01%
Accommodation and Food Services	$24,417.9	$0.0	$0.3	$1.3	$1.6	0.01%	357,882	0.0	4.5	21.0	25.5	0.01%
Other	$19,513.1	$0.0	$1.1	$1.2	$2.3	0.01%	271,933	0.0	7.9	18.7	26.7	0.01%
Government	$64,451.0	$0.0	$0.2	$0.6	$0.8	0.00%	656,931	0.0	1.3	2.6	3.9	0.00%
Total	**$745,750.4**	**$51.9**	**$28.6**	**$30.9**	**$111.4**	**0.01%**	**4,806,509**	**294.4**	**140.0**	**198.2**	**632.6**	**0.01%**

Table F-60
Alternative 5: MILCONs Combined (3-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.2	$0.2	32,988	1.8	1.8
Mining	$1,241.7	$0.2	$0.2	3,318	0.7	0.7
Utilities	$15,558.8	$0.8	$0.8	12,432	0.6	0.6
Construction	$51,446.2	$82.8	$82.8	337,572	467.1	467.1
Manufacturing	$135,386.5	$6.8	$6.8	341,197	17.9	17.9
Wholesale Trade	$39,026.3	$3.1	$3.1	181,370	13.5	13.5
Retail Trade	$39,116.0	$4.0	$4.0	488,360	47.0	47.0
Transportation and Warehousing	$10,754.6	$0.8	$0.8	86,583	5.8	5.8
Information	$44,927.0	$2.4	$2.4	89,139	4.3	4.3
Finance and Insurance	$51,476.1	$3.9	$3.9	226,444	15.6	15.6
Real Estate and Rental	$102,950.6	$7.4	$7.4	366,409	18.1	18.1
Professional, Scientific, and Technical Services	$57,707.5	$8.0	$8.0	391,226	54.3	54.3
Management	$9,482.5	$0.4	$0.4	48,580	2.2	2.2
Administrative and Waste Services	$23,778.3	$1.6	$1.6	369,193	24.3	24.3
Educational Services	$4,463.9	$0.4	$0.4	76,953	6.2	6.2
Health and Social Services	$34,208.9	$2.9	$2.9	342,697	27.8	27.8
Arts, Entertainment, and Recreation	$12,255.8	$0.7	$0.7	125,303	7.3	7.3
Accommodation and Food Services	$24,417.9	$1.4	$1.4	357,882	22.1	22.1
Other	$19,513.1	$2.2	$2.2	271,933	25.2	25.2
Government	$64,451.0	$0.6	$0.6	656,931	3.0	3.0
Total	**$745,750.4**	**$130.5**	**$130.5**	**4,806,509**	**764.6**	**764.6**

Table F-61
Alternative 5: MILCONs Combined (6-County)

Industry Sector	Economic Output ($ millions)			Employment (number of FTEs)		
	Existing	2013 Total	2014 Total	Existing	2013 Total	2014 Total
Agriculture, Forestry, Fishing, and Hunting	$3,587.7	$0.4	$0.4	32,988	2.3	2.3
Mining	$1,241.7	$1.4	$1.4	3,318	2.6	2.6
Utilities	$15,558.8	$1.6	$1.6	12,432	1.4	1.4
Construction	$51,446.2	$102.6	$102.6	337,572	583.1	583.1
Manufacturing	$135,386.5	$24.5	$24.5	341,197	50.7	50.7
Wholesale Trade	$39,026.3	$6.4	$6.4	181,370	31.5	31.5
Retail Trade	$39,116.0	$7.9	$7.9	488,360	91.9	91.9
Transportation and Warehousing	$10,754.6	$3.5	$3.5	86,583	25.0	25.0
Information	$44,927.0	$6.8	$6.8	89,139	12.2	12.2
Finance and Insurance	$51,476.1	$9.2	$9.2	226,444	36.3	36.3
Real Estate and Rental	$102,950.6	$15.3	$15.3	366,409	37.2	37.2
Professional, Scientific, and Technical Services	$57,707.5	$15.5	$15.5	391,226	101.0	101.0
Management	$9,482.5	$1.3	$1.3	48,580	6.0	6.0
Administrative and Waste Services	$23,778.3	$3.6	$3.6	369,193	55.0	55.0
Educational Services	$4,463.9	$0.9	$0.9	76,953	14.9	14.9
Health and Social Services	$34,208.9	$6.7	$6.7	342,697	65.5	65.5
Arts, Entertainment, and Recreation	$12,255.8	$1.5	$1.5	125,303	14.5	14.5
Accommodation and Food Services	$24,417.9	$3.2	$3.2	357,882	49.9	49.9
Other	$19,513.1	$4.5	$4.5	271,933	52.4	52.4
Government	$64,451.0	$1.5	$1.5	656,931	7.7	7.7
Total	**$745,750.4**	**$218.6**	**$218.6**	**4,806,509**	**1,241.0**	**1,241.0**

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APPENDIX G

RECORD OF NON-APPLICABILITY (RONA) AND AIR EMISSIONS CALCULATIONS (URBEMIS OUTPUT)

RECORD OF NON-APPLICABILITY (RONA)
FOR CLEAN AIR ACT CONFORMITY

INTRODUCTION

The U.S. Environmental Protection Agency published "Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule," in the 27 February 2009, Federal Register (40 C.F.R. §§ 6, 51, and 93). The U.S. Marine Corps published "Environmental Compliance and Protection Manual" in Marine Corps Order (MCO) P5090.2A, dated 21 May 2009. Chapters 6 and 12 of this manual provide implementing guidance to document General Conformity Determination requirements under Section 176(c) of the Clean Air Act. This Record of Non-Applicability (RONA) is provided to document compliance of the proposed action.

Federal regulations state that "no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity that does not conform to an applicable implementation plan." It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable implementation plan before the action is taken (40 C.F.R. § 51.850(a)).

Federal actions may be exempt from conformity determinations if their emissions do not exceed designated *de minimis* levels for the criteria pollutants of nonattainment or maintenance in the areas of the federal action (40 C.F.R. § 51.853(b)). Applicable d*e minimis* levels (in tons/year) for the proposed action in the San Diego Air Basin (SDAB) and the South Coast Air Basin (SCAB) are listed in Tables 1 and 2, respectively.

Table 1
Applicable *de minimis* Levels of the Nonattainment and Maintenance Criteria Pollutants for the Proposed Action in the SDAB

Criteria Pollutant - Precursor	*de minimis* levels (tons/year)
Carbon Monoxide (CO)	100[1]
Ozone (O_3) – Oxides of Nitrogen (NO_X)	100[2]
Ozone (O_3) – Volatile Organic Compounds (VOCs)	100[2]

[1] Attainment/Maintenance Area for CO.
[2] Basic nonattainment area for 8-hour O_3 precursors: NO_X and VOCs.
Source: 40 C.F.R. § 93, U.S. Marine Corps 2009.

Table 2
Applicable *de minimis* Levels of the Nonattainment and Maintenance Criteria Pollutants for the Proposed Action in the SCAB

Criteria Pollutant - Precursor	*de minimis* levels (tons/year)
Carbon Monoxide (CO)	100[1]
Ozone (O_3) – Oxides of Nitrogen (NO_X)	10[2]
Ozone (O_3) – Volatile Organic Compounds (VOCs)	10[2]
Coarse Particulate Matter (PM_{10})	70[3]
Fine Particulate Matter ($PM_{2.5}$)	100[4]

[1] Attainment/Maintenance Area for CO.
[2] Extreme nonattainment area for 8-hour O_3 precursors: NO_X and VOCs.
[3] Serious nonattainment area for PM_{10}.
[4] Nonattainment area for $PM_{2.5}$.
Source: 40 C.F.R. § 93, U.S. Marine Corps 2009.

PROPOSED ACTION

Activity: The U.S. Marine Corps is proposing to upgrade and improve the Basewide water, systems at Marine Corps Base Camp Pendleton (MCBCP), California.

Proposed Action Name: Basewide Water Infrastructure Improvements at Marine Corps Base Camp Pendleton.

Proposed Action Summary: The proposed action would include the construction and operation of two Military Construction (MILCON) projects entirely within MCBCP. These projects would include an Advanced Water Treatment (AWT) plant and associated facilities (P-1044) and redundancy and connection of the Base's northern and southern water systems (P-1045). Four alternatives to the proposed action, including the No Action Alternative, are evaluated in the project's Environmental Impact Statement (EIS).

Air Emissions Summary: Based on the air quality analysis for the proposed action in the project's EIS, the maximum estimated emissions would be below conformity *de minimis* levels in the SDAB and SCAB. The estimated 2012 through 2015 annual emissions for the proposed action in the SDAB and the SCAB are shown in Tables 3 and 4, respectively.

Date RONA prepared: 30 March 2011 (revised 30 June 2011and 13 October 2011).

EMISSIONS EVALUATION AND CONCLUSION

Construction emissions have been evaluated using URBEMIS 2007, version 9.2.4, a computer software package developed for the California Air Resources Board (CARB) for modeling air emissions for land use developments. (URBEMIS 2007 air emissions output sheets are provided as an attachment to this RONA.) Although the CARB does not have jurisdiction over the proposed action, the emissions factors and calculation methodologies contained in URBEMIS 2007 are applicable because the construction emissions factors are for the same types of construction equipment that would be used for site preparation and construction of the proposed action (Rimpo 2007).

The U.S. Marine Corps concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded for the proposed action. The emissions data supporting that conclusion are shown in Table 3 and 4, which summarize the results of the calculations, methodology, and references included in the EIS for construction and operation of the proposed action. Therefore, the U.S. Marine Corps concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate and I concur in the finding that the proposed action is not subject to the General Conformity Rule.

_____________________________________ ____________________

Brigadier General Vincent A. Coglianese Date
Commanding General
Marine Corps Installations West-Marine Corps Base, Camp Pendleton

Table 3
Estimated Annual Air Pollutant Emissions of All MILCONs (Alternative 5*) in SDAB

MILCON Projects (by year)	Air Pollutant Emissions (tons/year)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 1	2	14	13	0	19	4
P-1045 Alternative 3	2	15	15	0	25	6
Total 2013 Emissions	**4**	**29**	**28**	**0**	**44**	**10**
2014						
P-1044 Alternative 1	2	15	15	0	19	4
P-1045 Alternative 3	2	17	18	0	25	6
Total 2014 Emissions	**4**	**32**	**31**	**0**	**44**	**10**
General Conformity Thresholds	*100*	*100*	*100*	*NA*	*NA*	*NA*
Exceed thresholds each year?	No	No	No	No	No	No

Totals rounded to the nearest whole number.
*Note: Alternative 5, the preferred alternative, includes P-1044 Alternative 1 and P-1045 Alternative 3.

Table 4
Estimated Air Pollutant Emissions of All MILCONs (Alternative 5*) in SCAB

MILCON Projects (by year)	Annual Air Pollutant Emissions (tons/year)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2013						
P-1044 Alternative 1	<1	<1	<1	0	<1	<1
Total 2013 Annual Emissions	**<1**	**<1**	**<1**	**0**	**<1**	**<1**
General Conformity Thresholds	10	*10*	*100*	*NA*	*70*	*100*
Exceed Conformity Thresholds?	No	No	No	No	No	No

Totals rounded to the nearest whole number.
*Note: Alternative 5, the preferred alternative, includes P-1044 Alternative 1 and P-1045 Alternative 3.

REFERENCES

Rimpo Associates (Rimpo)

2007 *URBEMIS 2007 for Windows, Version 9.2.4*. Available at http://www.urbemis.com/software/Urbemis2007v9_4.html.

U.S. Marine Corps (U.S. Marines)

2009 Headquarters, U.S. Marine Corps, Marine Corps Order (MCO) 5090.2A, Chapter 6 - Air Quality Management. 21 May.

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011 June\URBEMIS\P-1044\P-1044 Alt 1.urb924

Project Name: P-1044 Alt 1

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	1.88	14.01	13.07	0.02	17.98	0.75	18.73	3.76	0.69	4.45	2,679.57
2013 TOTALS (tons/year mitigated)	1.88	14.01	13.07	0.02	17.98	0.75	18.73	3.76	0.69	4.45	2,679.57
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	2.02	14.83	15.14	0.02	17.94	0.77	18.72	3.76	0.71	4.47	3,328.23
2014 TOTALS (tons/year mitigated)	2.02	14.83	15.14	0.02	17.94	0.77	18.72	3.76	0.71	4.47	3,328.23
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2013	1.88	14.01	13.07	0.02	17.98	0.75	18.73	3.76	0.69	4.45	2,679.57
Demolition 01/01/2013-12/01/2014	0.38	2.87	1.90	0.00	0.66	0.16	0.82	0.14	0.15	0.29	318.01
Fugitive Dust	0.00	0.00	0.00	0.00	410,575.13	0.00	410,575.13	85,399.63	0.00	85,399.63	0.00
Demo Off Road Diesel	0.38	2.86	1.77	0.00	0.00	0.16	0.16	0.00	0.15	0.15	297.72
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.29
Mass Grading 01/01/2013-03/01/2013	0.08	0.61	0.37	0.00	3.15	0.03	3.18	0.66	0.03	0.69	69.58
Mass Grading Dust	0.00	0.00	0.00	0.00	3.15	0.00	3.15	0.66	0.00	0.66	0.00
Mass Grading Off Road Diesel	0.08	0.61	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	66.16
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42
Asphalt 04/01/2013-12/01/2014	0.22	1.29	0.95	0.00	0.00	0.11	0.11	0.00	0.10	0.10	138.46
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.21	1.26	0.79	0.00	0.00	0.11	0.11	0.00	0.10	0.10	111.49
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.46
Paving Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50
Fine Grading 04/01/2013-12/03/2014	0.35	2.74	1.64	0.00	14.11	0.14	14.25	2.95	0.13	3.07	311.55
Fine Grading Dust	0.00	0.00	0.00	0.00	14.11	0.00	14.11	2.95	0.00	2.95	0.00
Fine Grading Off Road Diesel	0.35	2.73	1.54	0.00	0.00	0.14	0.14	0.00	0.13	0.13	296.24
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31

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Trenching 04/01/2013-12/01/2014	0.17	1.39	0.86	0.00	0.00	0.07	0.07	0.00	0.06	0.06	181.14
Trenching Off Road Diesel	0.17	1.39	0.78	0.00	0.00	0.07	0.07	0.00	0.06	0.06	168.89
Trenching Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.25
Building 05/01/2013-12/01/2014	0.68	5.11	7.35	0.02	0.06	0.24	0.30	0.02	0.22	0.24	1,660.82
Building Off Road Diesel	0.25	1.22	0.89	0.00	0.00	0.08	0.08	0.00	0.07	0.07	141.85
Building Vendor Trips	0.33	3.69	2.81	0.01	0.03	0.14	0.18	0.01	0.13	0.14	948.51
Building Worker Trips	0.11	0.20	3.64	0.01	0.03	0.02	0.04	0.01	0.01	0.02	570.46
2014	2.02	14.83	15.14	0.02	17.94	0.77	18.72	3.76	0.71	4.47	3,328.23
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.13	0.00	0.00	0.12	0.13	0.00	0.11	0.11	167.97
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.46	0.95	0.00	0.00	0.12	0.12	0.00	0.11	0.11	135.26
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.99
Paving Worker Trips	0.01	0.01	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.72
Building 05/01/2013-12/01/2014	0.85	6.22	9.35	0.02	0.08	0.29	0.37	0.03	0.27	0.29	2,268.16
Building Off Road Diesel	0.31	1.55	1.18	0.00	0.00	0.10	0.10	0.00	0.09	0.09	193.73
Building Vendor Trips	0.40	4.41	3.53	0.01	0.04	0.17	0.22	0.02	0.16	0.17	1,295.42
Building Worker Trips	0.13	0.25	4.64	0.01	0.04	0.02	0.06	0.01	0.02	0.03	779.01
Demolition 01/01/2013-12/01/2014	0.33	2.46	1.68	0.00	0.60	0.14	0.74	0.13	0.12	0.25	291.20
Fugitive Dust	0.00	0.00	0.00	0.00	375,967.27	0.00	375,967.27	78,201.19	0.00	78,201.19	0.00
Demo Off Road Diesel	0.32	2.45	1.57	0.00	0.00	0.13	0.13	0.00	0.12	0.12	272.63
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58

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Fine Grading 04/01/2013-12/03/2014	0.40	3.12	1.94	0.00	17.26	0.15	17.41	3.60	0.14	3.74	381.13
Fine Grading Dust	0.00	0.00	0.00	0.00	17.26	0.00	17.26	3.60	0.00	3.60	0.00
Fine Grading Off Road Diesel	0.40	3.11	1.83	0.00	0.00	0.15	0.15	0.00	0.14	0.14	362.40
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.73
Trenching 04/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

Phase Assumptions

Phase: Demolition 1/1/2013 - 12/1/2014 - Default Mass Site Grading/Excavation Description

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 0

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 4/1/2013 - 12/3/2014 - Type Your Description Here

Total Acres Disturbed: 28.65

Maximum Daily Acreage Disturbed: 7.16

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

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1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/1/2013 - 3/1/2013 - Default Building Construction Description

Total Acres Disturbed: 28.65

Maximum Daily Acreage Disturbed: 7.16

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 4/1/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 4/1/2013 - 12/1/2014 - Type Your Description Here

Acres to be Paved: 7.16

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

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Phase: Building Construction 5/1/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	1.88	14.01	13.07	0.02	17.98	0.75	18.73	3.76	0.69	4.45	2,679.57
Demolition 01/01/2013-12/01/2014	0.38	2.87	1.90	0.00	0.66	0.16	0.82	0.14	0.15	0.29	318.01
Fugitive Dust	0.00	0.00	0.00	0.00	410,575.13	0.00	410,575.13	85,399.63	0.00	85,399.63	0.00
Demo Off Road Diesel	0.38	2.86	1.77	0.00	0.00	0.16	0.16	0.00	0.15	0.15	297.72
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.29
Mass Grading 01/01/2013-03/01/2013	0.08	0.61	0.37	0.00	3.15	0.03	3.18	0.66	0.03	0.69	69.58
Mass Grading Dust	0.00	0.00	0.00	0.00	3.15	0.00	3.15	0.66	0.00	0.66	0.00
Mass Grading Off Road Diesel	0.08	0.61	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	66.16
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42

Asphalt 04/01/2013-12/01/2014	0.22	1.29	0.95	0.00	0.00	0.11	0.11	0.00	0.10	0.10	138.46
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.21	1.26	0.79	0.00	0.00	0.11	0.11	0.00	0.10	0.10	111.49
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.46
Paving Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50
Fine Grading 04/01/2013-12/03/2014	0.35	2.74	1.64	0.00	14.11	0.14	14.25	2.95	0.13	3.07	311.55
Fine Grading Dust	0.00	0.00	0.00	0.00	14.11	0.00	14.11	2.95	0.00	2.95	0.00
Fine Grading Off Road Diesel	0.35	2.73	1.54	0.00	0.00	0.14	0.14	0.00	0.13	0.13	296.24
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Trenching 04/01/2013-12/01/2014	0.17	1.39	0.86	0.00	0.00	0.07	0.07	0.00	0.06	0.06	181.14
Trenching Off Road Diesel	0.17	1.39	0.78	0.00	0.00	0.07	0.07	0.00	0.06	0.06	168.89
Trenching Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.25
Building 05/01/2013-12/01/2014	0.68	5.11	7.35	0.02	0.06	0.24	0.30	0.02	0.22	0.24	1,660.82
Building Off Road Diesel	0.25	1.22	0.89	0.00	0.00	0.08	0.08	0.00	0.07	0.07	141.85
Building Vendor Trips	0.33	3.69	2.81	0.01	0.03	0.14	0.18	0.01	0.13	0.14	948.51
Building Worker Trips	0.11	0.20	3.64	0.01	0.03	0.02	0.04	0.01	0.01	0.02	570.46
2014	2.02	14.83	15.14	0.02	17.94	0.77	18.72	3.76	0.71	4.47	3,328.23
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.13	0.00	0.00	0.12	0.13	0.00	0.11	0.11	167.97
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.46	0.95	0.00	0.00	0.12	0.12	0.00	0.11	0.11	135.26
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.99
Paving Worker Trips	0.01	0.01	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.72

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Building 05/01/2013-12/01/2014	0.85	6.22	9.35	0.02	0.08	0.29	0.37	0.03	0.27	0.29	2,268.16
Building Off Road Diesel	0.31	1.55	1.18	0.00	0.00	0.10	0.10	0.00	0.09	0.09	193.73
Building Vendor Trips	0.40	4.41	3.53	0.01	0.04	0.17	0.22	0.02	0.16	0.17	1,295.42
Building Worker Trips	0.13	0.25	4.64	0.01	0.04	0.02	0.06	0.01	0.02	0.03	779.01
Demolition 01/01/2013-12/01/2014	0.33	2.46	1.68	0.00	0.60	0.14	0.74	0.13	0.12	0.25	291.20
Fugitive Dust	0.00	0.00	0.00	0.00	375,967.27	0.00	375,967.27	78,201.19	0.00	78,201.19	0.00
Demo Off Road Diesel	0.32	2.45	1.57	0.00	0.00	0.13	0.13	0.00	0.12	0.12	272.63
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Fine Grading 04/01/2013-12/03/2014	0.40	3.12	1.94	0.00	17.26	0.15	17.41	3.60	0.14	3.74	381.13
Fine Grading Dust	0.00	0.00	0.00	0.00	17.26	0.00	17.26	3.60	0.00	3.60	0.00
Fine Grading Off Road Diesel	0.40	3.11	1.83	0.00	0.00	0.15	0.15	0.00	0.14	0.14	362.40
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.73
Trenching 04/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: P:\2009\09080431 MCBCP MILCONs 3P EIS\4.0 Documents_Refs\4.7 Draft Docs\Work Folder\EIS Ch 3 & 4 Working Files\9 Air Quality\URBEMIS\Feb 2010 URB re-runs\P-1044 SCAB new.urb924

Project Name: P-1044 SCAB

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49
2012 TOTALS (tons/year mitigated)	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49

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Demolition 07/01/2012-08/01/2012	0.01	0.08	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	9.50
Fugitive Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Demo Off Road Diesel	0.01	0.08	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.05
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Demo Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Fine Grading 08/01/2012-09/01/2012	0.03	0.25	0.14	0.00	0.00	0.01	0.02	0.00	0.01	0.01	27.27
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.03	0.25	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	25.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Trenching 09/01/2012-10/01/2012	0.02	0.16	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.31
Trenching Off Road Diesel	0.02	0.16	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	18.00
Trenching Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.31
Building 10/01/2012-11/01/2012	0.01	0.10	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.22
Building Off Road Diesel	0.01	0.09	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.72
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
Asphalt 11/01/2012-12/01/2012	0.02	0.12	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	13.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.12	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.77
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39

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Phase Assumptions

Phase: Demolition 7/1/2012 - 8/1/2012 - Default Trenching Description

Building Volume Total (cubic feet): 1500

Building Volume Daily (cubic feet): 30

On Road Truck Travel (VMT): 0.42

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 8/1/2012 - 9/1/2012 - Default Building Construction Description

Total Acres Disturbed: 0.07

Maximum Daily Acreage Disturbed: 0.02

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 9/1/2012 - 10/1/2012 - Default Fine Site Grading/Excavation Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 11/1/2012 - 12/1/2012 - Type Your Description Here

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Acres to be Paved: 0.02

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 10/1/2012 - 11/1/2012 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49
Demolition 07/01/2012-08/01/2012	0.01	0.08	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	9.50
Fugitive Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Demo Off Road Diesel	0.01	0.08	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.05
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Demo Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43

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Fine Grading 08/01/2012-09/01/2012	0.03	0.25	0.14	0.00	0.00	0.01	0.02	0.00	0.01	0.01	27.27
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.03	0.25	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	25.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Trenching 09/01/2012-10/01/2012	0.02	0.16	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.31
Trenching Off Road Diesel	0.02	0.16	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	18.00
Trenching Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.31
Building 10/01/2012-11/01/2012	0.01	0.10	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.22
Building Off Road Diesel	0.01	0.09	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.72
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
Asphalt 11/01/2012-12/01/2012	0.02	0.12	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	13.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.12	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.77
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011 June\URBEMIS\P-1044\P-1044 Alt 2.urb924

Project Name: P-1044 ALT 2

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	1.82	13.55	12.54	0.01	16.93	0.73	17.66	3.54	0.67	4.21	2,564.99
2013 TOTALS (tons/year mitigated)	1.82	13.55	12.54	0.01	16.93	0.73	17.66	3.54	0.67	4.21	2,564.99
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	1.67	12.11	12.98	0.02	16.35	0.63	16.98	3.43	0.58	4.00	2,917.18
2014 TOTALS (tons/year mitigated)	1.67	12.11	12.98	0.02	16.35	0.63	16.98	3.43	0.58	4.00	2,917.18
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2013	1.82	13.55	12.54	0.01	16.93	0.73	17.66	3.54	0.67	4.21	2,564.99
Demolition 01/01/2013-12/01/2013	0.35	2.63	1.74	0.00	0.60	0.15	0.75	0.13	0.14	0.26	291.20
Fugitive Dust	0.00	0.00	0.00	0.00	1,935.36	0.00	1,935.36	402.55	0.00	402.55	0.00
Demo Off Road Diesel	0.35	2.62	1.62	0.00	0.00	0.15	0.15	0.00	0.14	0.14	272.63
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Mass Grading 01/01/2013-03/01/2013	0.08	0.61	0.37	0.00	2.97	0.03	3.00	0.62	0.03	0.65	69.58
Mass Grading Dust	0.00	0.00	0.00	0.00	2.97	0.00	2.97	0.62	0.00	0.62	0.00
Mass Grading Off Road Diesel	0.08	0.61	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	66.16
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42
Asphalt 04/01/2013-12/01/2014	0.22	1.28	0.95	0.00	0.00	0.11	0.11	0.00	0.10	0.10	138.32
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.21	1.26	0.79	0.00	0.00	0.11	0.11	0.00	0.10	0.10	111.49
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Paving Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50
Fine Grading 04/01/2013-12/03/2014	0.35	2.74	1.64	0.00	13.30	0.14	13.44	2.78	0.13	2.91	311.55
Fine Grading Dust	0.00	0.00	0.00	0.00	13.30	0.00	13.30	2.78	0.00	2.78	0.00
Fine Grading Off Road Diesel	0.35	2.73	1.54	0.00	0.00	0.14	0.14	0.00	0.13	0.13	296.24
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31

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Trenching 04/01/2013-12/01/2014	0.17	1.39	0.86	0.00	0.00	0.07	0.07	0.00	0.06	0.06	181.14
Trenching Off Road Diesel	0.17	1.39	0.78	0.00	0.00	0.07	0.07	0.00	0.06	0.06	168.89
Trenching Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.25
Building 05/01/2013-12/01/2014	0.66	4.89	6.97	0.01	0.06	0.23	0.29	0.02	0.21	0.23	1,573.19
Building Off Road Diesel	0.25	1.22	0.89	0.00	0.00	0.08	0.08	0.00	0.07	0.07	141.85
Building Vendor Trips	0.31	3.48	2.65	0.01	0.03	0.14	0.17	0.01	0.12	0.14	893.79
Building Worker Trips	0.10	0.19	3.43	0.01	0.03	0.01	0.04	0.01	0.01	0.02	537.55

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2014	1.67	12.11	12.98	0.02	16.35	0.63	16.98	3.43	0.58	4.00	2,917.18
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.13	0.00	0.00	0.12	0.12	0.00	0.11	0.11	167.80
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.46	0.95	0.00	0.00	0.12	0.12	0.00	0.11	0.11	135.26
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81
Paving Worker Trips	0.01	0.01	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.72
Building 05/01/2013-12/01/2014	0.82	5.95	8.87	0.02	0.08	0.28	0.36	0.03	0.26	0.28	2,148.48
Building Off Road Diesel	0.31	1.55	1.18	0.00	0.00	0.10	0.10	0.00	0.09	0.09	193.73
Building Vendor Trips	0.38	4.16	3.32	0.01	0.04	0.16	0.20	0.01	0.15	0.16	1,220.68
Building Worker Trips	0.12	0.24	4.37	0.01	0.03	0.02	0.05	0.01	0.02	0.03	734.07
Fine Grading 04/01/2013-12/03/2014	0.40	3.12	1.94	0.00	16.27	0.15	16.42	3.40	0.14	3.54	381.13
Fine Grading Dust	0.00	0.00	0.00	0.00	16.27	0.00	16.27	3.40	0.00	3.40	0.00
Fine Grading Off Road Diesel	0.40	3.11	1.83	0.00	0.00	0.15	0.15	0.00	0.14	0.14	362.40
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.73
Trenching 04/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

Phase Assumptions

Phase: Demolition 1/1/2013 - 12/1/2013 - Default Mass Site Grading/Excavation Description

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 0

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 4/1/2013 - 12/3/2014 - Type Your Description Here

Total Acres Disturbed: 27

Maximum Daily Acreage Disturbed: 6.75

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/1/2013 - 3/1/2013 - Default Building Construction Description

Total Acres Disturbed: 27

Maximum Daily Acreage Disturbed: 6.75

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 4/1/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 4/1/2013 - 12/1/2014 - Type Your Description Here

Acres to be Paved: 6.75

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 5/1/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	1.82	13.55	12.54	0.01	16.93	0.73	17.66	3.54	0.67	4.21	2,564.99

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Demolition 01/01/2013-12/01/2013	0.35	2.63	1.74	0.00	0.60	0.15	0.75	0.13	0.14	0.26	291.20
Fugitive Dust	0.00	0.00	0.00	0.00	1,935.36	0.00	1,935.36	402.55	0.00	402.55	0.00
Demo Off Road Diesel	0.35	2.62	1.62	0.00	0.00	0.15	0.15	0.00	0.14	0.14	272.63
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Mass Grading 01/01/2013-03/01/2013	0.08	0.61	0.37	0.00	2.97	0.03	3.00	0.62	0.03	0.65	69.58
Mass Grading Dust	0.00	0.00	0.00	0.00	2.97	0.00	2.97	0.62	0.00	0.62	0.00
Mass Grading Off Road Diesel	0.08	0.61	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	66.16
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42
Asphalt 04/01/2013-12/01/2014	0.22	1.28	0.95	0.00	0.00	0.11	0.11	0.00	0.10	0.10	138.32
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.21	1.26	0.79	0.00	0.00	0.11	0.11	0.00	0.10	0.10	111.49
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Paving Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50
Fine Grading 04/01/2013-12/03/2014	0.35	2.74	1.64	0.00	13.30	0.14	13.44	2.78	0.13	2.91	311.55
Fine Grading Dust	0.00	0.00	0.00	0.00	13.30	0.00	13.30	2.78	0.00	2.78	0.00
Fine Grading Off Road Diesel	0.35	2.73	1.54	0.00	0.00	0.14	0.14	0.00	0.13	0.13	296.24
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Trenching 04/01/2013-12/01/2014	0.17	1.39	0.86	0.00	0.00	0.07	0.07	0.00	0.06	0.06	181.14
Trenching Off Road Diesel	0.17	1.39	0.78	0.00	0.00	0.07	0.07	0.00	0.06	0.06	168.89
Trenching Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.25

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Building 05/01/2013-12/01/2014	0.66	4.89	6.97	0.01	0.06	0.23	0.29	0.02	0.21	0.23	1,573.19
Building Off Road Diesel	0.25	1.22	0.89	0.00	0.00	0.08	0.08	0.00	0.07	0.07	141.85
Building Vendor Trips	0.31	3.48	2.65	0.01	0.03	0.14	0.17	0.01	0.12	0.14	893.79
Building Worker Trips	0.10	0.19	3.43	0.01	0.03	0.01	0.04	0.01	0.01	0.02	537.55
2014	1.67	12.11	12.98	0.02	16.35	0.63	16.98	3.43	0.58	4.00	2,917.18
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.13	0.00	0.00	0.12	0.12	0.00	0.11	0.11	167.80
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.46	0.95	0.00	0.00	0.12	0.12	0.00	0.11	0.11	135.26
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81
Paving Worker Trips	0.01	0.01	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.72
Building 05/01/2013-12/01/2014	0.82	5.95	8.87	0.02	0.08	0.28	0.36	0.03	0.26	0.28	2,148.48
Building Off Road Diesel	0.31	1.55	1.18	0.00	0.00	0.10	0.10	0.00	0.09	0.09	193.73
Building Vendor Trips	0.38	4.16	3.32	0.01	0.04	0.16	0.20	0.01	0.15	0.16	1,220.68
Building Worker Trips	0.12	0.24	4.37	0.01	0.03	0.02	0.05	0.01	0.02	0.03	734.07
Fine Grading 04/01/2013-12/03/2014	0.40	3.12	1.94	0.00	16.27	0.15	16.42	3.40	0.14	3.54	381.13
Fine Grading Dust	0.00	0.00	0.00	0.00	16.27	0.00	16.27	3.40	0.00	3.40	0.00
Fine Grading Off Road Diesel	0.40	3.11	1.83	0.00	0.00	0.15	0.15	0.00	0.14	0.14	362.40
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.73
Trenching 04/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: P:\2009\09080431 MCBCP MILCONs 3P EIS\4.0 Documents_Refs\4.7 Draft Docs\Work Folder\EIS Ch 3 & 4 Working Files\9 Air Quality\URBEMIS\March 2011\P-1044 Alt 5 SCAB.urb924

Project Name: P-1044 SCAB

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49
2012 TOTALS (tons/year mitigated)	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49

Demolition 07/01/2012-08/01/2012	0.01	0.08	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	9.50
Fugitive Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Demo Off Road Diesel	0.01	0.08	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.05
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Demo Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Fine Grading 08/01/2012-09/01/2012	0.03	0.25	0.14	0.00	0.00	0.01	0.02	0.00	0.01	0.01	27.27
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.03	0.25	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	25.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Trenching 09/01/2012-10/01/2012	0.02	0.16	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.31
Trenching Off Road Diesel	0.02	0.16	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	18.00
Trenching Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.31
Building 10/01/2012-11/01/2012	0.01	0.10	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.22
Building Off Road Diesel	0.01	0.09	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.72
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
Asphalt 11/01/2012-12/01/2012	0.02	0.12	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	13.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.12	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.77
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39

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Phase Assumptions

Phase: Demolition 7/1/2012 - 8/1/2012 - Default Trenching Description

Building Volume Total (cubic feet): 1500

Building Volume Daily (cubic feet): 30

On Road Truck Travel (VMT): 0.42

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 8/1/2012 - 9/1/2012 - Default Building Construction Description

Total Acres Disturbed: 0.07

Maximum Daily Acreage Disturbed: 0.02

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 9/1/2012 - 10/1/2012 - Default Fine Site Grading/Excavation Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 11/1/2012 - 12/1/2012 - Type Your Description Here

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Acres to be Paved: 0.02

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 10/1/2012 - 11/1/2012 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.09	0.71	0.45	0.00	0.01	0.04	0.05	0.00	0.04	0.04	80.49
Demolition 07/01/2012-08/01/2012	0.01	0.08	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	9.50
Fugitive Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Demo Off Road Diesel	0.01	0.08	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.05
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Demo Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43

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Fine Grading 08/01/2012-09/01/2012	0.03	0.25	0.14	0.00	0.00	0.01	0.02	0.00	0.01	0.01	27.27
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.03	0.25	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	25.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Trenching 09/01/2012-10/01/2012	0.02	0.16	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.31
Trenching Off Road Diesel	0.02	0.16	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	18.00
Trenching Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.31
Building 10/01/2012-11/01/2012	0.01	0.10	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.22
Building Off Road Diesel	0.01	0.09	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.72
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
Asphalt 11/01/2012-12/01/2012	0.02	0.12	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	13.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.12	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.77
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011 June\URBEMIS\P-1045\P-1045 Alt 1.urb924

Project Name: P-1045 Alt 1

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	2.18	16.75	17.27	0.03	31.46	0.87	32.34	6.58	0.80	7.38	3,670.30
2013 TOTALS (tons/year mitigated)	2.18	16.75	17.27	0.03	31.46	0.87	32.34	6.58	0.80	7.38	3,670.30
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	2.49	18.82	21.73	0.04	31.58	0.95	32.53	6.62	0.87	7.49	5,000.34
2014 TOTALS (tons/year mitigated)	2.49	18.82	21.73	0.04	31.58	0.95	32.53	6.62	0.87	7.49	5,000.34
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2013	2.18	16.75	17.27	0.03	31.46	0.87	32.34	6.58	0.80	7.38	3,670.30
Demolition 01/01/2013-12/01/2014	0.37	2.81	1.85	0.00	0.66	0.16	0.82	0.14	0.15	0.29	306.98
Fugitive Dust	0.00	0.00	0.00	0.00	26,677.12	0.00	26,677.12	5,548.84	0.00	5,548.84	0.00
Demo Off Road Diesel	0.37	2.81	1.74	0.00	0.00	0.16	0.16	0.00	0.15	0.15	290.75
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.23
Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	30.70	0.17	30.87	6.41	0.15	6.57	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	30.70	0.00	30.70	6.41	0.00	6.41	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.00	0.00	0.00	0.13	0.13	0.00	0.12	0.12	145.08
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.45	0.90	0.00	0.00	0.13	0.13	0.00	0.12	0.12	125.33
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.43
Paving Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Building 05/22/2013-12/01/2014	0.95	7.61	11.48	0.02	0.10	0.34	0.44	0.03	0.31	0.35	2,641.39
Building Off Road Diesel	0.24	1.19	0.85	0.00	0.00	0.08	0.08	0.00	0.07	0.07	139.71
Building Vendor Trips	0.54	6.09	4.63	0.01	0.05	0.24	0.29	0.02	0.22	0.24	1,562.16
Building Worker Trips	0.17	0.33	6.00	0.01	0.04	0.03	0.07	0.02	0.02	0.04	939.53

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2014	2.49	18.82	21.73	0.04	31.58	0.95	32.53	6.62	0.87	7.49	5,000.34
Asphalt 04/01/2013-12/01/2014	0.29	1.70	1.20	0.00	0.00	0.14	0.15	0.00	0.13	0.13	176.01
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.27	1.67	1.08	0.00	0.00	0.14	0.14	0.00	0.13	0.13	152.05
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.38
Paving Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Building 05/22/2013-12/01/2014	1.29	10.06	15.94	0.04	0.15	0.45	0.60	0.05	0.41	0.46	3,945.49
Building Off Road Diesel	0.33	1.66	1.24	0.00	0.00	0.10	0.10	0.00	0.09	0.09	208.69
Building Vendor Trips	0.73	7.95	6.36	0.02	0.08	0.31	0.39	0.03	0.28	0.31	2,333.52
Building Worker Trips	0.24	0.45	8.35	0.01	0.07	0.04	0.10	0.02	0.03	0.06	1,403.29
Demolition 01/01/2013-12/01/2014	0.32	2.41	1.63	0.00	0.60	0.13	0.74	0.13	0.12	0.25	281.10
Fugitive Dust	0.00	0.00	0.00	0.00	24,428.48	0.00	24,428.48	5,081.12	0.00	5,081.12	0.00
Demo Off Road Diesel	0.32	2.40	1.55	0.00	0.00	0.13	0.13	0.00	0.12	0.12	266.24
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	30.83	0.15	30.98	6.44	0.14	6.58	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	30.83	0.00	30.83	6.44	0.00	6.44	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

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Phase Assumptions

Phase: Demolition 1/1/2013 - 12/1/2014 - Default Fine Site Grading/Excavation Description

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 0

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 2/1/2013 - 12/1/2014 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 51.61

Maximum Daily Acreage Disturbed: 12.9

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 3/1/2013 - 12/1/2014 - Default Building Construction Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 4/1/2013 - 12/1/2014 - Default Paving Description

Acres to be Paved: 12.9

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Off-Road Equipment:

1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 5/22/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 7 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	2.18	16.75	17.27	0.03	31.46	0.87	32.34	6.58	0.80	7.38	3,670.30
Demolition 01/01/2013-12/01/2014	0.37	2.81	1.85	0.00	0.66	0.16	0.82	0.14	0.15	0.29	306.98
Fugitive Dust	0.00	0.00	0.00	0.00	26,677.12	0.00	26,677.12	5,548.84	0.00	5,548.84	0.00
Demo Off Road Diesel	0.37	2.81	1.74	0.00	0.00	0.16	0.16	0.00	0.15	0.15	290.75
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.23

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Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	30.70	0.17	30.87	6.41	0.15	6.57	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	30.70	0.00	30.70	6.41	0.00	6.41	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.00	0.00	0.00	0.13	0.13	0.00	0.12	0.12	145.08
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.45	0.90	0.00	0.00	0.13	0.13	0.00	0.12	0.12	125.33
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.43
Paving Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Building 05/22/2013-12/01/2014	0.95	7.61	11.48	0.02	0.10	0.34	0.44	0.03	0.31	0.35	2,641.39
Building Off Road Diesel	0.24	1.19	0.85	0.00	0.00	0.08	0.08	0.00	0.07	0.07	139.71
Building Vendor Trips	0.54	6.09	4.63	0.01	0.05	0.24	0.29	0.02	0.22	0.24	1,562.16
Building Worker Trips	0.17	0.33	6.00	0.01	0.04	0.03	0.07	0.02	0.02	0.04	939.53
2014	2.49	18.82	21.73	0.04	31.58	0.95	32.53	6.62	0.87	7.49	5,000.34
Asphalt 04/01/2013-12/01/2014	0.29	1.70	1.20	0.00	0.00	0.14	0.15	0.00	0.13	0.13	176.01
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.27	1.67	1.08	0.00	0.00	0.14	0.14	0.00	0.13	0.13	152.05
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.38
Paving Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58

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Building 05/22/2013-12/01/2014	1.29	10.06	15.94	0.04	0.15	0.45	0.60	0.05	0.41	0.46	3,945.49
Building Off Road Diesel	0.33	1.66	1.24	0.00	0.00	0.10	0.10	0.00	0.09	0.09	208.69
Building Vendor Trips	0.73	7.95	6.36	0.02	0.08	0.31	0.39	0.03	0.28	0.31	2,333.52
Building Worker Trips	0.24	0.45	8.35	0.01	0.07	0.04	0.10	0.02	0.03	0.06	1,403.29
Demolition 01/01/2013-12/01/2014	0.32	2.41	1.63	0.00	0.60	0.13	0.74	0.13	0.12	0.25	281.10
Fugitive Dust	0.00	0.00	0.00	0.00	24,428.48	0.00	24,428.48	5,081.12	0.00	5,081.12	0.00
Demo Off Road Diesel	0.32	2.40	1.55	0.00	0.00	0.13	0.13	0.00	0.12	0.12	266.24
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	30.83	0.15	30.98	6.44	0.14	6.58	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	30.83	0.00	30.83	6.44	0.00	6.44	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011 June\URBEMIS\P-1045\P-1045 Alt 2.urb924

Project Name: P-1045 Alt 2

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	2.08	15.81	15.72	0.02	26.97	0.84	27.81	5.64	0.77	6.41	3,304.54
2013 TOTALS (tons/year mitigated)	2.08	15.81	15.72	0.02	26.97	0.84	27.81	5.64	0.77	6.41	3,304.54
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	2.35	17.59	19.58	0.03	27.07	0.90	27.97	5.67	0.82	6.49	4,454.18
2014 TOTALS (tons/year mitigated)	2.35	17.59	19.58	0.03	27.07	0.90	27.97	5.67	0.82	6.49	4,454.18
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2013	2.08	15.81	15.72	0.02	26.97	0.84	27.81	5.64	0.77	6.41	3,304.54
Demolition 01/01/2013-12/01/2014	0.37	2.81	1.85	0.00	0.66	0.16	0.82	0.14	0.15	0.29	306.98
Fugitive Dust	0.00	0.00	0.00	0.00	21,793.55	0.00	21,793.55	4,533.06	0.00	4,533.06	0.00
Demo Off Road Diesel	0.37	2.81	1.74	0.00	0.00	0.16	0.16	0.00	0.15	0.15	290.75
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.23
Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	26.23	0.17	26.40	5.48	0.15	5.63	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	26.23	0.00	26.23	5.48	0.00	5.48	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.25	1.47	1.00	0.00	0.00	0.13	0.13	0.00	0.12	0.12	144.43
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.45	0.90	0.00	0.00	0.13	0.13	0.00	0.12	0.12	125.33
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.79
Paving Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Building 05/22/2013-12/01/2014	0.85	6.67	9.93	0.02	0.08	0.30	0.39	0.03	0.28	0.31	2,276.28
Building Off Road Diesel	0.24	1.19	0.85	0.00	0.00	0.08	0.08	0.00	0.07	0.07	139.71
Building Vendor Trips	0.46	5.20	3.96	0.01	0.05	0.20	0.25	0.02	0.19	0.20	1,334.17
Building Worker Trips	0.15	0.28	5.12	0.01	0.04	0.02	0.06	0.01	0.02	0.03	802.40

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2014	2.35	17.59	19.58	0.03	27.07	0.90	27.97	5.67	0.82	6.49	4,454.18
Asphalt 04/01/2013-12/01/2014	0.28	1.69	1.20	0.00	0.00	0.14	0.15	0.00	0.13	0.13	175.23
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.27	1.67	1.08	0.00	0.00	0.14	0.14	0.00	0.13	0.13	152.05
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.60
Paving Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Building 05/22/2013-12/01/2014	1.15	8.84	13.79	0.03	0.13	0.40	0.53	0.04	0.36	0.41	3,400.12
Building Off Road Diesel	0.33	1.66	1.24	0.00	0.00	0.10	0.10	0.00	0.09	0.09	208.69
Building Vendor Trips	0.62	6.79	5.43	0.02	0.07	0.26	0.33	0.02	0.24	0.27	1,992.95
Building Worker Trips	0.20	0.39	7.13	0.01	0.06	0.03	0.09	0.02	0.03	0.05	1,198.48
Demolition 01/01/2013-12/01/2014	0.32	2.41	1.63	0.00	0.60	0.13	0.74	0.13	0.12	0.25	281.10
Fugitive Dust	0.00	0.00	0.00	0.00	19,956.55	0.00	19,956.55	4,150.96	0.00	4,150.96	0.00
Demo Off Road Diesel	0.32	2.40	1.55	0.00	0.00	0.13	0.13	0.00	0.12	0.12	266.24
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	26.34	0.15	26.49	5.50	0.14	5.64	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	26.34	0.00	26.34	5.50	0.00	5.50	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

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Phase Assumptions

Phase: Demolition 1/1/2013 - 12/1/2014 - Default Fine Site Grading/Excavation Description

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 0

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 2/1/2013 - 12/1/2014 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 44.08

Maximum Daily Acreage Disturbed: 11.02

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 3/1/2013 - 12/1/2014 - Default Building Construction Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 4/1/2013 - 12/1/2014 - Default Paving Description

Acres to be Paved: 11.02

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Off-Road Equipment:

1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 5/22/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 7 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	2.08	15.81	15.72	0.02	26.97	0.84	27.81	5.64	0.77	6.41	3,304.54
Demolition 01/01/2013-12/01/2014	0.37	2.81	1.85	0.00	0.66	0.16	0.82	0.14	0.15	0.29	306.98
Fugitive Dust	0.00	0.00	0.00	0.00	21,793.55	0.00	21,793.55	4,533.06	0.00	4,533.06	0.00
Demo Off Road Diesel	0.37	2.81	1.74	0.00	0.00	0.16	0.16	0.00	0.15	0.15	290.75
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.23

Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	26.23	0.17	26.40	5.48	0.15	5.63	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	26.23	0.00	26.23	5.48	0.00	5.48	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.25	1.47	1.00	0.00	0.00	0.13	0.13	0.00	0.12	0.12	144.43
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.45	0.90	0.00	0.00	0.13	0.13	0.00	0.12	0.12	125.33
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.79
Paving Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Building 05/22/2013-12/01/2014	0.85	6.67	9.93	0.02	0.08	0.30	0.39	0.03	0.28	0.31	2,276.28
Building Off Road Diesel	0.24	1.19	0.85	0.00	0.00	0.08	0.08	0.00	0.07	0.07	139.71
Building Vendor Trips	0.46	5.20	3.96	0.01	0.05	0.20	0.25	0.02	0.19	0.20	1,334.17
Building Worker Trips	0.15	0.28	5.12	0.01	0.04	0.02	0.06	0.01	0.02	0.03	802.40
2014	2.35	17.59	19.58	0.03	27.07	0.90	27.97	5.67	0.82	6.49	4,454.18
Asphalt 04/01/2013-12/01/2014	0.28	1.69	1.20	0.00	0.00	0.14	0.15	0.00	0.13	0.13	175.23
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.27	1.67	1.08	0.00	0.00	0.14	0.14	0.00	0.13	0.13	152.05
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.60
Paving Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58

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Building 05/22/2013-12/01/2014	1.15	8.84	13.79	0.03	0.13	0.40	0.53	0.04	0.36	0.41	3,400.12
Building Off Road Diesel	0.33	1.66	1.24	0.00	0.00	0.10	0.10	0.00	0.09	0.09	208.69
Building Vendor Trips	0.62	6.79	5.43	0.02	0.07	0.26	0.33	0.02	0.24	0.27	1,992.95
Building Worker Trips	0.20	0.39	7.13	0.01	0.06	0.03	0.09	0.02	0.03	0.05	1,198.48
Demolition 01/01/2013-12/01/2014	0.32	2.41	1.63	0.00	0.60	0.13	0.74	0.13	0.12	0.25	281.10
Fugitive Dust	0.00	0.00	0.00	0.00	19,956.55	0.00	19,956.55	4,150.96	0.00	4,150.96	0.00
Demo Off Road Diesel	0.32	2.40	1.55	0.00	0.00	0.13	0.13	0.00	0.12	0.12	266.24
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	26.34	0.15	26.49	5.50	0.14	5.64	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	26.34	0.00	26.34	5.50	0.00	5.50	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011 June\URBEMIS\P-1045\P-1045 Alt 3.urb924

Project Name: P-1045 Alt 3

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	1.98	15.00	14.69	0.02	24.06	0.79	24.85	5.04	0.73	5.76	3,064.69
2013 TOTALS (tons/year mitigated)	1.98	15.00	14.69	0.02	24.06	0.79	24.85	5.04	0.73	5.76	3,064.69
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	2.22	16.53	18.13	0.03	24.14	0.84	24.98	5.06	0.77	5.83	4,090.96
2014 TOTALS (tons/year mitigated)	2.22	16.53	18.13	0.03	24.14	0.84	24.98	5.06	0.77	5.83	4,090.96
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2013	1.98	15.00	14.69	0.02	24.06	0.79	24.85	5.04	0.73	5.76	3,064.69
Demolition 01/01/2013-12/01/2014	0.38	2.87	1.90	0.00	0.66	0.16	0.82	0.14	0.15	0.29	318.01
Fugitive Dust	0.00	0.00	0.00	0.00	13,506.28	0.00	13,506.28	2,809.31	0.00	2,809.31	0.00
Demo Off Road Diesel	0.38	2.86	1.77	0.00	0.00	0.16	0.16	0.00	0.15	0.15	297.72
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.29
Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	23.32	0.17	23.49	4.87	0.15	5.03	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	23.32	0.00	23.32	4.87	0.00	4.87	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.22	1.29	0.95	0.00	0.00	0.11	0.11	0.00	0.10	0.10	139.37
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.21	1.26	0.79	0.00	0.00	0.11	0.11	0.00	0.10	0.10	111.49
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.37
Paving Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50
Building 05/22/2013-12/01/2014	0.77	5.99	8.89	0.02	0.07	0.28	0.35	0.03	0.25	0.28	2,030.47
Building Off Road Diesel	0.23	1.11	0.82	0.00	0.00	0.07	0.07	0.00	0.07	0.07	129.70
Building Vendor Trips	0.41	4.62	3.52	0.01	0.04	0.18	0.22	0.01	0.17	0.18	1,186.92
Building Worker Trips	0.13	0.25	4.56	0.01	0.03	0.02	0.05	0.01	0.02	0.03	713.85

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2014	2.22	16.53	18.13	0.03	24.14	0.84	24.98	5.06	0.77	5.83	4,090.96
Asphalt 04/01/2013-12/01/2014	0.25	1.49	1.14	0.00	0.00	0.12	0.13	0.00	0.11	0.11	169.07
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.46	0.95	0.00	0.00	0.12	0.12	0.00	0.11	0.11	135.26
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.09
Paving Worker Trips	0.01	0.01	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.72
Building 05/22/2013-12/01/2014	1.05	7.94	12.35	0.03	0.11	0.36	0.47	0.04	0.33	0.37	3,032.95
Building Off Road Diesel	0.31	1.55	1.18	0.00	0.00	0.10	0.10	0.00	0.09	0.09	193.73
Building Vendor Trips	0.55	6.04	4.83	0.02	0.06	0.24	0.30	0.02	0.22	0.24	1,773.00
Building Worker Trips	0.18	0.35	6.34	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,066.21
Demolition 01/01/2013-12/01/2014	0.33	2.46	1.68	0.00	0.60	0.14	0.74	0.13	0.12	0.25	291.20
Fugitive Dust	0.00	0.00	0.00	0.00	12,367.82	0.00	12,367.82	2,572.51	0.00	2,572.51	0.00
Demo Off Road Diesel	0.32	2.45	1.57	0.00	0.00	0.13	0.13	0.00	0.12	0.12	272.63
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	23.42	0.15	23.57	4.89	0.14	5.03	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	23.42	0.00	23.42	4.89	0.00	4.89	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

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Phase Assumptions

Phase: Demolition 1/1/2013 - 12/1/2014 - Default Fine Site Grading/Excavation Description

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 0

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 2/1/2013 - 12/1/2014 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 39.21

Maximum Daily Acreage Disturbed: 9.8

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 3/1/2013 - 12/1/2014 - Default Building Construction Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 4/1/2013 - 12/1/2014 - Default Paving Description

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Acres to be Paved: 9.8

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 5/22/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	1.98	15.00	14.69	0.02	24.06	0.79	24.85	5.04	0.73	5.76	3,064.69
Demolition 01/01/2013-12/01/2014	0.38	2.87	1.90	0.00	0.66	0.16	0.82	0.14	0.15	0.29	318.01
Fugitive Dust	0.00	0.00	0.00	0.00	13,506.28	0.00	13,506.28	2,809.31	0.00	2,809.31	0.00
Demo Off Road Diesel	0.38	2.86	1.77	0.00	0.00	0.16	0.16	0.00	0.15	0.15	297.72
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.29

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Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	23.32	0.17	23.49	4.87	0.15	5.03	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	23.32	0.00	23.32	4.87	0.00	4.87	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.22	1.29	0.95	0.00	0.00	0.11	0.11	0.00	0.10	0.10	139.37
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.21	1.26	0.79	0.00	0.00	0.11	0.11	0.00	0.10	0.10	111.49
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.37
Paving Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50
Building 05/22/2013-12/01/2014	0.77	5.99	8.89	0.02	0.07	0.28	0.35	0.03	0.25	0.28	2,030.47
Building Off Road Diesel	0.23	1.11	0.82	0.00	0.00	0.07	0.07	0.00	0.07	0.07	129.70
Building Vendor Trips	0.41	4.62	3.52	0.01	0.04	0.18	0.22	0.01	0.17	0.18	1,186.92
Building Worker Trips	0.13	0.25	4.56	0.01	0.03	0.02	0.05	0.01	0.02	0.03	713.85
2014	2.22	16.53	18.13	0.03	24.14	0.84	24.98	5.06	0.77	5.83	4,090.96
Asphalt 04/01/2013-12/01/2014	0.25	1.49	1.14	0.00	0.00	0.12	0.13	0.00	0.11	0.11	169.07
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.46	0.95	0.00	0.00	0.12	0.12	0.00	0.11	0.11	135.26
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.09
Paving Worker Trips	0.01	0.01	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.72

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Building 05/22/2013-12/01/2014	1.05	7.94	12.35	0.03	0.11	0.36	0.47	0.04	0.33	0.37	3,032.95
Building Off Road Diesel	0.31	1.55	1.18	0.00	0.00	0.10	0.10	0.00	0.09	0.09	193.73
Building Vendor Trips	0.55	6.04	4.83	0.02	0.06	0.24	0.30	0.02	0.22	0.24	1,773.00
Building Worker Trips	0.18	0.35	6.34	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,066.21
Demolition 01/01/2013-12/01/2014	0.33	2.46	1.68	0.00	0.60	0.14	0.74	0.13	0.12	0.25	291.20
Fugitive Dust	0.00	0.00	0.00	0.00	12,367.82	0.00	12,367.82	2,572.51	0.00	2,572.51	0.00
Demo Off Road Diesel	0.32	2.45	1.57	0.00	0.00	0.13	0.13	0.00	0.12	0.12	272.63
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	23.42	0.15	23.57	4.89	0.14	5.03	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	23.42	0.00	23.42	4.89	0.00	4.89	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011 June\URBEMIS\P-1045\P-1045 Alt 4.urb924

Project Name: P-1045 Alt 4

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	2.18	16.68	17.16	0.03	31.13	0.87	32.00	6.51	0.80	7.31	3,643.54
2013 TOTALS (tons/year mitigated)	2.18	16.68	17.16	0.03	31.13	0.87	32.00	6.51	0.80	7.31	3,643.54
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	2.48	18.73	21.57	0.04	31.25	0.95	32.19	6.55	0.87	7.41	4,960.39
2014 TOTALS (tons/year mitigated)	2.48	18.73	21.57	0.04	31.25	0.95	32.19	6.55	0.87	7.41	4,960.39
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2013	2.18	16.68	17.16	0.03	31.13	0.87	32.00	6.51	0.80	7.31	3,643.54
Demolition 01/01/2013-12/01/2014	0.37	2.81	1.85	0.00	0.66	0.16	0.82	0.14	0.15	0.29	306.98
Fugitive Dust	0.00	0.00	0.00	0.00	25,997.48	0.00	25,997.48	5,407.48	0.00	5,407.48	0.00
Demo Off Road Diesel	0.37	2.81	1.74	0.00	0.00	0.16	0.16	0.00	0.15	0.15	290.75
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.23
Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	30.37	0.17	30.54	6.34	0.15	6.50	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	30.37	0.00	30.37	6.34	0.00	6.34	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.00	0.00	0.00	0.13	0.13	0.00	0.12	0.12	145.03
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.45	0.90	0.00	0.00	0.13	0.13	0.00	0.12	0.12	125.33
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.39
Paving Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Building 05/22/2013-12/01/2014	0.94	7.54	11.37	0.02	0.10	0.34	0.44	0.03	0.31	0.34	2,614.68
Building Off Road Diesel	0.24	1.19	0.85	0.00	0.00	0.08	0.08	0.00	0.07	0.07	139.71
Building Vendor Trips	0.53	6.02	4.58	0.01	0.05	0.24	0.29	0.02	0.22	0.23	1,545.48
Building Worker Trips	0.17	0.33	5.93	0.01	0.04	0.03	0.07	0.02	0.02	0.04	929.50

2014	2.48	18.73	21.57	0.04	31.25	0.95	32.19	6.55	0.87	7.41	4,960.39
Asphalt 04/01/2013-12/01/2014	0.28	1.69	1.20	0.00	0.00	0.14	0.15	0.00	0.13	0.13	175.95
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.27	1.67	1.08	0.00	0.00	0.14	0.14	0.00	0.13	0.13	152.05
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.32
Paving Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Building 05/22/2013-12/01/2014	1.28	9.97	15.78	0.04	0.15	0.45	0.59	0.05	0.41	0.46	3,905.60
Building Off Road Diesel	0.33	1.66	1.24	0.00	0.00	0.10	0.10	0.00	0.09	0.09	208.69
Building Vendor Trips	0.72	7.87	6.29	0.02	0.08	0.31	0.39	0.03	0.28	0.31	2,308.61
Building Worker Trips	0.24	0.45	8.26	0.01	0.07	0.04	0.10	0.02	0.03	0.06	1,388.30
Demolition 01/01/2013-12/01/2014	0.32	2.41	1.63	0.00	0.60	0.13	0.74	0.13	0.12	0.25	281.10
Fugitive Dust	0.00	0.00	0.00	0.00	23,806.12	0.00	23,806.12	4,951.67	0.00	4,951.67	0.00
Demo Off Road Diesel	0.32	2.40	1.55	0.00	0.00	0.13	0.13	0.00	0.12	0.12	266.24
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	30.50	0.15	30.65	6.37	0.14	6.51	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	30.50	0.00	30.50	6.37	0.00	6.37	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

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Phase Assumptions

Phase: Demolition 1/1/2013 - 12/1/2014 - Default Fine Site Grading/Excavation Description

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 0

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 2/1/2013 - 12/1/2014 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 51.06

Maximum Daily Acreage Disturbed: 12.76

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 3/1/2013 - 12/1/2014 - Default Building Construction Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 4/1/2013 - 12/1/2014 - Default Paving Description

Acres to be Paved: 12.76

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Off-Road Equipment:

1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 5/22/2013 - 12/1/2014 - Type Your Description Here

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 7 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	2.18	16.68	17.16	0.03	31.13	0.87	32.00	6.51	0.80	7.31	3,643.54
Demolition 01/01/2013-12/01/2014	0.37	2.81	1.85	0.00	0.66	0.16	0.82	0.14	0.15	0.29	306.98
Fugitive Dust	0.00	0.00	0.00	0.00	25,997.48	0.00	25,997.48	5,407.48	0.00	5,407.48	0.00
Demo Off Road Diesel	0.37	2.81	1.74	0.00	0.00	0.16	0.16	0.00	0.15	0.15	290.75
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.23

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Fine Grading 02/01/2013-12/01/2014	0.42	3.31	1.98	0.00	30.37	0.17	30.54	6.34	0.15	6.50	376.39
Fine Grading Dust	0.00	0.00	0.00	0.00	30.37	0.00	30.37	6.34	0.00	6.34	0.00
Fine Grading Off Road Diesel	0.42	3.30	1.87	0.00	0.00	0.17	0.17	0.00	0.15	0.15	357.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Trenching 03/01/2013-12/01/2014	0.19	1.54	0.96	0.00	0.00	0.07	0.07	0.00	0.07	0.07	200.45
Trenching Off Road Diesel	0.19	1.54	0.87	0.00	0.00	0.07	0.07	0.00	0.07	0.07	186.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.56
Asphalt 04/01/2013-12/01/2014	0.25	1.48	1.00	0.00	0.00	0.13	0.13	0.00	0.12	0.12	145.03
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.24	1.45	0.90	0.00	0.00	0.13	0.13	0.00	0.12	0.12	125.33
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.39
Paving Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Building 05/22/2013-12/01/2014	0.94	7.54	11.37	0.02	0.10	0.34	0.44	0.03	0.31	0.34	2,614.68
Building Off Road Diesel	0.24	1.19	0.85	0.00	0.00	0.08	0.08	0.00	0.07	0.07	139.71
Building Vendor Trips	0.53	6.02	4.58	0.01	0.05	0.24	0.29	0.02	0.22	0.23	1,545.48
Building Worker Trips	0.17	0.33	5.93	0.01	0.04	0.03	0.07	0.02	0.02	0.04	929.50
2014	2.48	18.73	21.57	0.04	31.25	0.95	32.19	6.55	0.87	7.41	4,960.39
Asphalt 04/01/2013-12/01/2014	0.28	1.69	1.20	0.00	0.00	0.14	0.15	0.00	0.13	0.13	175.95
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.27	1.67	1.08	0.00	0.00	0.14	0.14	0.00	0.13	0.13	152.05
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.32
Paving Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58

Building 05/22/2013-12/01/2014	1.28	9.97	15.78	0.04	0.15	0.45	0.59	0.05	0.41	0.46	3,905.60
Building Off Road Diesel	0.33	1.66	1.24	0.00	0.00	0.10	0.10	0.00	0.09	0.09	208.69
Building Vendor Trips	0.72	7.87	6.29	0.02	0.08	0.31	0.39	0.03	0.28	0.31	2,308.61
Building Worker Trips	0.24	0.45	8.26	0.01	0.07	0.04	0.10	0.02	0.03	0.06	1,388.30
Demolition 01/01/2013-12/01/2014	0.32	2.41	1.63	0.00	0.60	0.13	0.74	0.13	0.12	0.25	281.10
Fugitive Dust	0.00	0.00	0.00	0.00	23,806.12	0.00	23,806.12	4,951.67	0.00	4,951.67	0.00
Demo Off Road Diesel	0.32	2.40	1.55	0.00	0.00	0.13	0.13	0.00	0.12	0.12	266.24
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86
Fine Grading 02/01/2013-12/01/2014	0.40	3.09	1.93	0.00	30.50	0.15	30.65	6.37	0.14	6.51	377.97
Fine Grading Dust	0.00	0.00	0.00	0.00	30.50	0.00	30.50	6.37	0.00	6.37	0.00
Fine Grading Off Road Diesel	0.40	3.08	1.82	0.00	0.00	0.15	0.15	0.00	0.14	0.14	359.39
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.58
Trenching 03/01/2013-12/01/2014	0.19	1.56	1.03	0.00	0.00	0.07	0.07	0.00	0.07	0.07	219.76
Trenching Off Road Diesel	0.19	1.56	0.94	0.00	0.00	0.07	0.07	0.00	0.06	0.06	204.90
Trenching Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.86

<u>Construction Related Mitigation Measures</u>

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011\URB\March 2011\P-1039 Alt 1.urb924

Project Name: P-1039 Alt 1

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014 TOTALS (tons/year unmitigated)	0.16	1.11	0.82	0.00	1.16	0.07	1.23	0.24	0.06	0.30	145.75
2014 TOTALS (tons/year mitigated)	0.16	1.11	0.82	0.00	1.16	0.07	1.23	0.24	0.06	0.30	145.75
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015 TOTALS (tons/year unmitigated)	0.25	1.73	2.68	0.00	0.02	0.10	0.12	0.01	0.09	0.09	612.19
2015 TOTALS (tons/year mitigated)	0.25	1.73	2.68	0.00	0.02	0.10	0.12	0.01	0.09	0.09	612.19
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2014	0.16	1.11	0.82	0.00	1.16	0.07	1.23	0.24	0.06	0.30	145.75
Mass Grading 01/01/2014-03/01/2014	0.05	0.41	0.25	0.00	1.14	0.02	1.16	0.24	0.02	0.26	50.99
Mass Grading Dust	0.00	0.00	0.00	0.00	1.14	0.00	1.14	0.24	0.00	0.24	0.00
Mass Grading Off Road Diesel	0.05	0.41	0.23	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.67
Asphalt 04/01/2014-05/01/2014	0.03	0.16	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.50
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.15	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.63
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.02
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.86
Demolition 04/01/2014-12/01/2014	0.08	0.54	0.45	0.00	0.02	0.03	0.06	0.00	0.03	0.04	75.25
Fugitive Dust	0.00	0.00	0.00	0.00	3.63	0.00	3.63	0.75	0.00	0.75	0.00
Demo Off Road Diesel	0.07	0.52	0.38	0.00	0.00	0.03	0.03	0.00	0.03	0.03	61.28
Demo On Road Diesel	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.09
Demo Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.88

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2015	0.25	1.73	2.68	0.00	0.02	0.10	0.12	0.01	0.09	0.09	612.19
Building 01/01/2015-12/01/2015	0.20	1.45	2.45	0.00	0.02	0.07	0.09	0.01	0.07	0.07	576.72
Building Off Road Diesel	0.10	0.72	0.52	0.00	0.00	0.04	0.04	0.00	0.04	0.04	106.76
Building Vendor Trips	0.06	0.65	0.57	0.00	0.01	0.03	0.03	0.00	0.02	0.03	223.21
Building Worker Trips	0.04	0.07	1.37	0.00	0.01	0.01	0.02	0.00	0.01	0.01	246.75
Asphalt 09/01/2015-11/01/2015	0.05	0.27	0.23	0.00	0.00	0.02	0.02	0.00	0.02	0.02	35.47
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.04	0.27	0.19	0.00	0.00	0.02	0.02	0.00	0.02	0.02	27.98
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.02
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.47

<u>Phase Assumptions</u>

Phase: Demolition 4/1/2014 - 12/1/2014 - Demo existing bridge

Building Volume Total (cubic feet): 1094400

Building Volume Daily (cubic feet): 600

On Road Truck Travel (VMT): 8.33

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 3/1/2014 - 3/1/2014 - fine grade widened road

Total Acres Disturbed: 10.61

Maximum Daily Acreage Disturbed: 2.65

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/1/2014 - 3/1/2014 - mass grade widened road

Total Acres Disturbed: 10.61

Maximum Daily Acreage Disturbed: 2.65

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 9/1/2015 - 11/1/2015 - Pave new bridge

Acres to be Paved: 2.65

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Paving 4/1/2014 - 5/1/2014 - pave widened road

Acres to be Paved: 2.65

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/1/2015 - 12/1/2015 - build new bridge and levees

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2014	0.16	1.11	0.82	0.00	1.16	0.07	1.23	0.24	0.06	0.30	145.75
Mass Grading 01/01/2014-03/01/2014	0.05	0.41	0.25	0.00	1.14	0.02	1.16	0.24	0.02	0.26	50.99
Mass Grading Dust	0.00	0.00	0.00	0.00	1.14	0.00	1.14	0.24	0.00	0.24	0.00
Mass Grading Off Road Diesel	0.05	0.41	0.23	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.67
Asphalt 04/01/2014-05/01/2014	0.03	0.16	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.50
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.15	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.63
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.02
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.86
Demolition 04/01/2014-12/01/2014	0.08	0.54	0.45	0.00	0.02	0.03	0.06	0.00	0.03	0.04	75.25
Fugitive Dust	0.00	0.00	0.00	0.00	3.63	0.00	3.63	0.75	0.00	0.75	0.00
Demo Off Road Diesel	0.07	0.52	0.38	0.00	0.00	0.03	0.03	0.00	0.03	0.03	61.28
Demo On Road Diesel	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.09
Demo Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.88

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2015	0.25	1.73	2.68	0.00	0.02	0.10	0.12	0.01	0.09	0.09	612.19
Building 01/01/2015-12/01/2015	0.20	1.45	2.45	0.00	0.02	0.07	0.09	0.01	0.07	0.07	576.72
Building Off Road Diesel	0.10	0.72	0.52	0.00	0.00	0.04	0.04	0.00	0.04	0.04	106.76
Building Vendor Trips	0.06	0.65	0.57	0.00	0.01	0.03	0.03	0.00	0.02	0.03	223.21
Building Worker Trips	0.04	0.07	1.37	0.00	0.01	0.01	0.02	0.00	0.01	0.01	246.75
Asphalt 09/01/2015-11/01/2015	0.05	0.27	0.23	0.00	0.00	0.02	0.02	0.00	0.02	0.02	35.47
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.04	0.27	0.19	0.00	0.00	0.02	0.02	0.00	0.02	0.02	27.98
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.02
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.47

Construction Related Mitigation Measures

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\PROJECTS\BWI & SMBR EIS\2011\URB\March 2011\P-1039 Alt 5.urb924

Project Name: P-1039 Alt 5

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014 TOTALS (tons/year unmitigated)	0.27	1.91	1.33	0.00	4.06	0.11	4.17	0.85	0.10	0.95	244.68
2014 TOTALS (tons/year mitigated)	0.27	1.91	1.33	0.00	3.35	0.11	3.46	0.70	0.10	0.80	244.68
Percent Reduction	0.00	0.00	0.00	0.00	17.44	0.00	16.98	17.43	0.00	15.57	0.00
2015 TOTALS (tons/year unmitigated)	0.28	1.92	3.30	0.01	0.03	0.11	0.14	0.01	0.10	0.11	736.03
2015 TOTALS (tons/year mitigated)	0.28	1.92	3.30	0.01	0.03	0.11	0.14	0.01	0.10	0.11	736.03
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2014	0.27	1.91	1.33	0.00	4.06	0.11	4.17	0.85	0.10	0.95	244.68
Mass Grading 01/01/2014-04/01/2014	0.08	0.62	0.37	0.00	2.41	0.03	2.43	0.50	0.03	0.53	77.08
Mass Grading Dust	0.00	0.00	0.00	0.00	2.41	0.00	2.41	0.50	0.00	0.50	0.00
Mass Grading Off Road Diesel	0.08	0.62	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	73.04
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.04
Fine Grading 03/01/2014-05/01/2014	0.05	0.42	0.25	0.00	1.63	0.02	1.65	0.34	0.02	0.36	52.18
Fine Grading Dust	0.00	0.00	0.00	0.00	1.63	0.00	1.63	0.34	0.00	0.34	0.00
Fine Grading Off Road Diesel	0.05	0.42	0.24	0.00	0.00	0.02	0.02	0.00	0.02	0.02	49.44
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.74
Asphalt 04/01/2014-06/01/2014	0.06	0.33	0.26	0.00	0.00	0.03	0.03	0.00	0.02	0.03	40.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.32	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.21
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.16
Demolition 04/01/2014-12/01/2014	0.08	0.54	0.45	0.00	0.02	0.03	0.06	0.00	0.03	0.04	75.25
Fugitive Dust	0.00	0.00	0.00	0.00	3.63	0.00	3.63	0.75	0.00	0.75	0.00
Demo Off Road Diesel	0.07	0.52	0.38	0.00	0.00	0.03	0.03	0.00	0.03	0.03	61.28
Demo On Road Diesel	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.09
Demo Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.88

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2015	0.28	1.92	3.30	0.01	0.03	0.11	0.14	0.01	0.10	0.11	736.03
Building 01/01/2015-12/01/2015	0.22	1.54	2.99	0.01	0.02	0.08	0.10	0.01	0.07	0.08	685.55
Building Off Road Diesel	0.10	0.72	0.52	0.00	0.00	0.04	0.04	0.00	0.04	0.04	106.76
Building Vendor Trips	0.07	0.72	0.63	0.00	0.01	0.03	0.04	0.00	0.03	0.03	245.49
Building Worker Trips	0.05	0.10	1.85	0.00	0.02	0.01	0.02	0.01	0.01	0.01	333.30
Asphalt 09/01/2015-11/01/2015	0.06	0.31	0.25	0.00	0.00	0.03	0.03	0.00	0.02	0.02	40.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.30	0.22	0.00	0.00	0.02	0.02	0.00	0.02	0.02	31.21
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.16
Demolition 12/01/2015-12/31/2015	0.01	0.07	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.01	10.30
Fugitive Dust	0.00	0.00	0.00	0.00	0.30	0.00	0.30	0.06	0.00	0.06	0.00
Demo Off Road Diesel	0.01	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.05
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81
Demo Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43

Phase Assumptions

Phase: Demolition 4/1/2014 - 12/1/2014 - Demo existing bridge

Building Volume Total (cubic feet): 1094400

Building Volume Daily (cubic feet): 600

On Road Truck Travel (VMT): 8.33

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

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Phase: Demolition 12/1/2015 - 12/31/2015 - demo temp crossing

Building Volume Total (cubic feet): 91200

Building Volume Daily (cubic feet): 1200

On Road Truck Travel (VMT): 16.67

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 3/1/2014 - 5/1/2014 - mass grade temp crossing and widened road

Total Acres Disturbed: 14.79

Maximum Daily Acreage Disturbed: 3.7

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/1/2014 - 4/1/2014 - mass grade temp crossing and widened road

Total Acres Disturbed: 14.79

Maximum Daily Acreage Disturbed: 3.7

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

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1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2014 - 6/1/2014 - pave temp crossing and widened road

Acres to be Paved: 3.7

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Paving 9/1/2015 - 11/1/2015 - Pave new bridge

Acres to be Paved: 3.7

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/1/2015 - 12/1/2015 - build new bridge and levees

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

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CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014	0.27	1.91	1.33	0.00	3.35	0.11	3.46	0.70	0.10	0.80	244.68
Mass Grading 01/01/2014-04/01/2014	0.08	0.62	0.37	0.00	2.41	0.03	2.43	0.50	0.03	0.53	77.08
Mass Grading Dust	0.00	0.00	0.00	0.00	2.41	0.00	2.41	0.50	0.00	0.50	0.00
Mass Grading Off Road Diesel	0.08	0.62	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	73.04
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.04
Fine Grading 03/01/2014-05/01/2014	0.05	0.42	0.25	0.00	0.92	0.02	0.94	0.19	0.02	0.21	52.18
Fine Grading Dust	0.00	0.00	0.00	0.00	0.92	0.00	0.92	0.19	0.00	0.19	0.00
Fine Grading Off Road Diesel	0.05	0.42	0.24	0.00	0.00	0.02	0.02	0.00	0.02	0.02	49.44
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.74
Asphalt 04/01/2014-06/01/2014	0.06	0.33	0.26	0.00	0.00	0.03	0.03	0.00	0.02	0.03	40.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.32	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.21
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.16

Demolition 04/01/2014-12/01/2014	0.08	0.54	0.45	0.00	0.02	0.03	0.06	0.00	0.03	0.04	75.25
Fugitive Dust	0.00	0.00	0.00	0.00	3.63	0.00	3.63	0.75	0.00	0.75	0.00
Demo Off Road Diesel	0.07	0.52	0.38	0.00	0.00	0.03	0.03	0.00	0.03	0.03	61.28
Demo On Road Diesel	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.09
Demo Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.88
2015	0.28	1.92	3.30	0.01	0.03	0.11	0.14	0.01	0.10	0.11	736.03
Building 01/01/2015-12/01/2015	0.22	1.54	2.99	0.01	0.02	0.08	0.10	0.01	0.07	0.08	685.55
Building Off Road Diesel	0.10	0.72	0.52	0.00	0.00	0.04	0.04	0.00	0.04	0.04	106.76
Building Vendor Trips	0.07	0.72	0.63	0.00	0.01	0.03	0.04	0.00	0.03	0.03	245.49
Building Worker Trips	0.05	0.10	1.85	0.00	0.02	0.01	0.02	0.01	0.01	0.01	333.30
Asphalt 09/01/2015-11/01/2015	0.06	0.31	0.25	0.00	0.00	0.03	0.03	0.00	0.02	0.02	40.18
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.30	0.22	0.00	0.00	0.02	0.02	0.00	0.02	0.02	31.21
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.16
Demolition 12/01/2015-12/31/2015	0.01	0.07	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.01	10.30
Fugitive Dust	0.00	0.00	0.00	0.00	0.30	0.00	0.30	0.06	0.00	0.06	0.00
Demo Off Road Diesel	0.01	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.05
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81
Demo Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/1/2014 - 5/1/2014 - mass grade temp crossing and widened road

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

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PM10: 55% PM25: 55%

	ROG	CO	NOX	CO2	SOX	PM10	PM2.5			
Miles	0.095	2.245	0.63	401.997	0.004	0.24	0.022	Grams/Mile		
57885	5499.1	129951.8	36467.6	23269596.3	231.5	13892.4	1273.5	Grams		
	12.1	286.2	80.3	51,254.6	0.5	30.6	2.8	Pounds	day	
	2.2	52.2	14.7	9354.0	0.1	5.6	0.5	Tons	Year	2014

	ROG	CO	NOX	CO2	SOX	PM10	PM2.5			
Miles	0.095	2.245	0.63	401.997	0.004	0.24	0.022	Grams/Mile		
65421	6215.0	146870.1	41215.2	26299045.7	261.7	15701.0	1439.3	Grams		
	13.7	323.5	90.8	57,927.4	0.6	34.6	3.2	Pounds	day	
	2.5	59.0	16.6	10571.8	0.1	6.3	0.6	Tons	Year	2015

Title   : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season   : Annual
Area   : San Diego
****

Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.049	0.051	0.078	0.370	0.431	3.233	0.095

Pollutant Name: Carbon Monoxide   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	1.585	2.025	2.383	3.540	3.703	38.533	2.245

Pollutant Name: Oxides of Nitrogen   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.193	0.304	0.710	8.000	18.180	1.323	0.630

Pollutant Name: Carbon Dioxide   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	306.312	384.060	522.322	1395.570	2213.833	145.124	401.997

Pollutant Name: Sulfur Dioxide   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.003	0.004	0.005	0.013	0.021	0.002	0.004

Pollutant Name: PM10   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.008	0.018	0.019	0.294	0.138	0.031	0.024

Pollutant Name: PM10 - Tire Wear   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.008	0.008	0.009	0.023	0.009	0.004	0.009

Pollutant Name: PM10 - Brake Wear   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.013	0.013	0.013	0.020	0.013	0.006	0.013

Pollutant Name: Gasoline - mi/gal   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	28.708	22.858	16.825	16.952	16.942	41.005	25.283

Pollutant Name: Diesel - mi/gal   Temperature: 60F Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	28.230	29.048	19.666	6.336	3.802	0.000	10.601

Title   : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season   : Annual
Area   : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

Table 2: Starting Emissions (grams/trip)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.072	0.073	0.158	0.402	0.229	1.302	0.116
10	0.128	0.128	0.288	0.592	0.344	1.429	0.191
20	0.231	0.230	0.529	0.946	0.557	1.693	0.332
30	0.325	0.324	0.749	1.267	0.749	1.968	0.460
40	0.409	0.410	0.946	1.553	0.921	2.255	0.576
50	0.484	0.486	1.120	1.806	1.072	2.554	0.679
60	0.547	0.552	1.269	2.004	1.190	2.746	0.765
120	0.698	0.712	1.464	1.774	1.098	2.463	0.904
180	0.549	0.575	1.359	1.888	1.168	2.407	0.780
240	0.581	0.610	1.439	1.999	1.236	2.575	0.826
300	0.613	0.643	1.518	2.107	1.303	2.741	0.872
360	0.644	0.677	1.595	2.212	1.367	2.904	0.916
420	0.674	0.709	1.670	2.314	1.430	3.066	0.960
480	0.704	0.742	1.744	2.413	1.490	3.226	1.003
540	0.733	0.773	1.816	2.509	1.549	3.383	1.044
600	0.761	0.804	1.887	2.601	1.606	3.539	1.085
660	0.789	0.834	1.955	2.691	1.660	3.692	1.125
720	0.816	0.863	2.023	2.778	1.713	3.844	1.163

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.750	0.842	1.825	4.921	1.905	4.512	1.198
10	1.393	1.563	3.410	8.068	3.092	4.965	2.143
20	2.612	2.935	6.408	13.980	5.323	5.858	3.932
30	3.744	4.215	9.178	19.384	7.363	6.735	5.589
40	4.788	5.402	11.718	24.279	9.212	7.594	7.113
50	5.745	6.496	14.030	28.665	10.869	8.437	8.504
60	6.613	7.496	16.112	32.542	12.335	9.263	9.763
120	9.276	10.400	17.746	26.766	10.564	11.925	11.926
180	6.607	7.665	15.069	28.157	11.121	10.811	9.441
240	7.013	8.180	15.909	29.505	11.659	12.413	10.012
300	7.386	8.647	16.689	30.810	12.180	13.854	10.538
360	7.725	9.067	17.409	32.071	12.683	15.134	11.020
420	8.030	9.439	18.069	33.289	13.168	16.253	11.458
480	8.302	9.763	18.669	34.464	13.635	17.211	11.852
540	8.540	10.040	19.208	35.596	14.084	18.007	12.201
600	8.744	10.268	19.687	36.685	14.515	18.642	12.506
660	8.914	10.449	20.105	37.730	14.928	19.116	12.767
720	9.050	10.583	20.463	38.733	15.324	19.429	12.983

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.203	0.360	0.898	0.626	0.470	0.203	0.391
10	0.233	0.401	1.051	0.934	0.704	0.237	0.458
20	0.286	0.473	1.323	1.476	1.115	0.298	0.578
30	0.330	0.533	1.547	1.918	1.450	0.349	0.677
40	0.365	0.581	1.724	2.260	1.710	0.390	0.755
50	0.391	0.617	1.854	2.501	1.893	0.421	0.812
60	0.408	0.642	1.936	2.642	2.000	0.442	0.848
120	0.429	0.684	2.036	2.683	2.030	0.449	0.890
180	0.444	0.707	2.051	2.672	2.022	0.444	0.906
240	0.441	0.702	2.038	2.656	2.010	0.434	0.900
300	0.436	0.694	2.017	2.635	1.994	0.421	0.890
360	0.430	0.683	1.989	2.608	1.974	0.407	0.878
420	0.422	0.669	1.954	2.576	1.950	0.389	0.862
480	0.412	0.652	1.912	2.538	1.923	0.369	0.843
540	0.401	0.633	1.863	2.495	1.891	0.347	0.822
600	0.388	0.611	1.806	2.447	1.855	0.322	0.796
660	0.373	0.586	1.743	2.393	1.815	0.295	0.768
720	0.357	0.558	1.673	2.334	1.771	0.265	0.737

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	11.273	14.048	18.302	5.925	3.288	20.637	13.174
10	13.289	16.503	22.528	9.015	5.266	23.095	15.760
20	17.723	21.921	31.571	15.133	9.185	27.898	21.372
30	22.695	28.017	41.402	21.166	13.053	32.551	27.571
40	28.205	34.791	52.022	27.117	16.870	37.053	34.356
50	34.252	42.242	63.430	32.983	20.636	41.405	41.729
60	40.836	50.371	75.627	38.766	24.351	45.607	49.688
120	89.101	110.407	158.379	63.958	40.507	64.831	106.081
180	101.701	125.977	181.690	74.172	47.216	67.637	121.215
240	114.128	141.345	204.490	83.784	53.529	70.279	136.090
300	126.382	156.513	226.780	92.793	59.446	72.758	150.704
360	138.463	171.479	248.558	101.200	64.968	75.073	165.058
420	150.371	186.243	269.826	109.004	70.093	77.226	179.152
480	162.106	200.806	290.583	116.205	74.823	79.215	192.986
540	173.668	215.168	310.829	122.804	79.157	81.040	206.560
600	185.058	229.328	330.565	128.801	83.095	82.703	219.874
660	196.274	243.288	349.789	134.195	86.638	84.202	232.927
720	207.318	257.045	368.503	138.987	89.784	85.538	245.720

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SDC 2013 PM10

30	0.000	0.000	0.001	0.001	0.000	0.000	0.000
40	0.000	0.000	0.001	0.001	0.000	0.001	0.000
50	0.000	0.001	0.001	0.001	0.000	0.001	0.001
60	0.001	0.001	0.001	0.001	0.000	0.001	0.001
120	0.001	0.001	0.002	0.001	0.001	0.001	0.001
180	0.001	0.001	0.002	0.001	0.001	0.001	0.001
240	0.001	0.001	0.002	0.001	0.001	0.001	0.001
300	0.001	0.002	0.002	0.001	0.001	0.001	0.002
360	0.001	0.002	0.003	0.002	0.001	0.001	0.002
420	0.002	0.002	0.003	0.002	0.001	0.001	0.002
480	0.002	0.002	0.003	0.002	0.001	0.001	0.002
540	0.002	0.002	0.003	0.002	0.001	0.001	0.002
600	0.002	0.002	0.004	0.002	0.001	0.001	0.002
660	0.002	0.003	0.004	0.002	0.001	0.001	0.002
720	0.002	0.003	0.004	0.002	0.001	0.001	0.003

Pollutant Name: PM10 Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.001	0.001	0.001	0.001	0.000	0.011	0.001
10	0.001	0.003	0.002	0.001	0.001	0.010	0.002
20	0.003	0.005	0.005	0.002	0.001	0.008	0.004
30	0.004	0.008	0.007	0.002	0.002	0.006	0.006
40	0.005	0.010	0.009	0.003	0.002	0.005	0.007
50	0.006	0.012	0.010	0.003	0.003	0.004	0.009
60	0.007	0.014	0.012	0.004	0.003	0.003	0.010
120	0.011	0.022	0.018	0.005	0.004	0.008	0.015
180	0.012	0.024	0.020	0.006	0.004	0.012	0.017
240	0.013	0.026	0.021	0.006	0.004	0.016	0.018
300	0.013	0.028	0.022	0.006	0.004	0.019	0.019
360	0.014	0.029	0.023	0.006	0.005	0.022	0.020
420	0.015	0.031	0.024	0.007	0.005	0.025	0.021
480	0.015	0.032	0.025	0.007	0.005	0.027	0.022
540	0.015	0.033	0.026	0.007	0.005	0.028	0.022
600	0.016	0.033	0.026	0.007	0.005	0.029	0.023
660	0.016	0.034	0.027	0.007	0.005	0.030	0.023
720	0.016	0.034	0.027	0.008	0.005	0.030	0.023

Title : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 4: Hot Soak Emissions (grams/trip)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.047	0.049	0.031	0.008	0.022	0.089	0.044
10	0.087	0.091	0.058	0.014	0.041	0.165	0.081
20	0.148	0.156	0.099	0.025	0.070	0.284	0.138
30	0.190	0.200	0.128	0.032	0.090	0.367	0.177
40	0.206	0.217	0.139	0.035	0.097	0.400	0.192

Hot soak results are scaled to reflect zero emissions for trip lengths of less than 5 minutes (about 25% of in-use trips).

Title : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 5a: Partial Day Diurnal Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.052	0.055	0.041	0.004	0.001	0.128	0.053

Title : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 5b: Multi-Day Diurnal Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.004	0.004	0.003	0.000	0.000	0.012	0.004

Title : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 6a: Partial Day Resting Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.024	0.027	0.022	0.002	0.000	0.048	0.025

Title : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 6b: Multi-Day Resting Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.002	0.002	0.002	0.000	0.000	0.005	0.002

Title : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 7: Estimated Travel Fractions

Pollutant Name: Temperature: ALL Relative Humidity: ALL

	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
%VMT	0.497	0.329	0.125	0.038	0.001	0.009	1.000
%TRIP	0.471	0.298	0.174	0.046	0.000	0.011	1.000
%VEH	0.505	0.320	0.113	0.026	0.000	0.036	1.000

Title : San Diego Air Basin Avg Annual CYr 2013 PM10
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/13 11:36:17
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 8: Evaporative Running Loss Emissions (grams/minute)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
1	0.018	0.360	0.290	0.253	0.161	0.026	0.174
2	0.019	0.185	0.150	0.133	0.086	0.064	0.095
3	0.022	0.129	0.106	0.094	0.061	0.083	0.071
4	0.025	0.103	0.085	0.074	0.050	0.094	0.061
5	0.027	0.087	0.073	0.063	0.043	0.101	0.054
10	0.031	0.058	0.050	0.040	0.029	0.117	0.043
15	0.032	0.051	0.044	0.033	0.025	0.122	0.041
20	0.033	0.049	0.042	0.029	0.024	0.125	0.040
25	0.033	0.049	0.042	0.027	0.023	0.127	0.040
30	0.033	0.048	0.042	0.027	0.023	0.127	0.040
35	0.033	0.048	0.042	0.027	0.023	0.126	0.040
40	0.033	0.048	0.042	0.027	0.023	0.125	0.039
45	0.033	0.048	0.042	0.027	0.023	0.124	0.039
50	0.032	0.047	0.041	0.027	0.023	0.123	0.039
55	0.032	0.047	0.041	0.027	0.023	0.121	0.039
60	0.031	0.047	0.041	0.027	0.022	0.120	0.038

Title   : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season   : Annual
Area   : San Diego

****

Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.049	0.051	0.078	0.370	0.431	3.233	0.095

Pollutant Name: Carbon Monoxide   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	1.585	2.025	2.383	3.540	3.703	38.533	2.245

Pollutant Name: Oxides of Nitrogen   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.193	0.304	0.710	8.000	18.180	1.323	0.630

Pollutant Name: Carbon Dioxide   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	306.312	384.060	522.322	1395.570	2213.833	145.124	401.997

Pollutant Name: Sulfur Dioxide   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.003	0.004	0.005	0.013	0.021	0.002	0.004

Pollutant Name: PM2.5   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.008	0.017	0.018	0.270	0.127	0.024	0.022

Pollutant Name: PM2.5 - Tire Wear   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.002	0.002	0.002	0.006	0.002	0.001	0.002

Pollutant Name: PM2.5 - Brake Wear   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	0.005	0.005	0.005	0.009	0.005	0.003	0.005

Pollutant Name: Gasoline - mi/gal   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	28.708	22.858	16.825	16.952	16.942	41.005	25.283

Pollutant Name: Diesel - mi/gal   Temperature: 60F   Relative Humidity: 70%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
55	28.230	29.048	19.666	6.336	3.802	0.000	10.601

Title   : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season   : Annual
Area   : San Diego

****

Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 2: Starting Emissions (grams/trip)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.072	0.073	0.158	0.402	0.229	1.302	0.116
10	0.128	0.128	0.288	0.592	0.344	1.429	0.191
20	0.231	0.230	0.529	0.946	0.557	1.693	0.332
30	0.325	0.324	0.749	1.267	0.749	1.968	0.460
40	0.409	0.410	0.946	1.553	0.921	2.255	0.576
50	0.484	0.486	1.120	1.806	1.072	2.554	0.679
60	0.547	0.552	1.269	2.004	1.190	2.746	0.765
120	0.698	0.712	1.464	1.774	1.098	2.463	0.904
180	0.549	0.575	1.359	1.888	1.168	2.407	0.780
240	0.581	0.610	1.439	1.999	1.236	2.575	0.826
300	0.613	0.643	1.518	2.107	1.303	2.741	0.872
360	0.644	0.677	1.595	2.212	1.367	2.904	0.916
420	0.674	0.709	1.670	2.314	1.430	3.066	0.960
480	0.704	0.742	1.744	2.413	1.490	3.226	1.003
540	0.733	0.773	1.816	2.509	1.549	3.383	1.044
600	0.761	0.804	1.887	2.601	1.606	3.539	1.085
660	0.789	0.834	1.955	2.691	1.660	3.692	1.125
720	0.816	0.863	2.023	2.778	1.713	3.844	1.163

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.750	0.842	1.825	4.921	1.905	4.512	1.198
10	1.393	1.563	3.410	8.068	3.092	4.965	2.143
20	2.612	2.935	6.408	13.980	5.323	5.858	3.932
30	3.744	4.215	9.178	19.384	7.363	6.735	5.589
40	4.788	5.402	11.718	24.279	9.212	7.594	7.113
50	5.745	6.496	14.030	28.665	10.869	8.437	8.504
60	6.613	7.496	16.112	32.542	12.335	9.263	9.763
120	9.276	10.400	17.746	26.766	10.564	11.925	11.926
180	6.607	7.665	15.069	28.157	11.121	10.811	9.441
240	7.013	8.180	15.909	29.505	11.659	12.413	10.012
300	7.386	8.647	16.689	30.810	12.180	13.854	10.538
360	7.725	9.067	17.409	32.071	12.683	15.134	11.020
420	8.030	9.439	18.069	33.289	13.168	16.253	11.458
480	8.302	9.763	18.669	34.464	13.635	17.211	11.852
540	8.540	10.040	19.208	35.596	14.084	18.007	12.201
600	8.744	10.268	19.687	36.685	14.515	18.642	12.506
660	8.914	10.449	20.105	37.730	14.928	19.116	12.767
720	9.050	10.583	20.463	38.733	15.324	19.429	12.983

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.203	0.360	0.898	0.626	0.470	0.203	0.391
10	0.233	0.401	1.051	0.934	0.704	0.237	0.458
20	0.286	0.473	1.323	1.476	1.115	0.298	0.578
30	0.330	0.533	1.547	1.918	1.450	0.349	0.677
40	0.365	0.581	1.724	2.260	1.710	0.390	0.755
50	0.391	0.617	1.854	2.501	1.893	0.421	0.812
60	0.408	0.642	1.936	2.642	2.000	0.442	0.848
120	0.429	0.684	2.036	2.683	2.030	0.449	0.890
180	0.444	0.707	2.051	2.672	2.022	0.444	0.906
240	0.441	0.702	2.038	2.656	2.010	0.434	0.900
300	0.436	0.694	2.017	2.635	1.994	0.421	0.890
360	0.430	0.683	1.989	2.608	1.974	0.407	0.878
420	0.422	0.669	1.954	2.576	1.950	0.389	0.862
480	0.412	0.652	1.912	2.538	1.923	0.369	0.843
540	0.401	0.633	1.863	2.495	1.891	0.347	0.822
600	0.388	0.611	1.806	2.447	1.855	0.322	0.796
660	0.373	0.586	1.743	2.393	1.815	0.295	0.768
720	0.357	0.558	1.673	2.334	1.771	0.265	0.737

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	11.273	14.048	18.302	5.925	3.288	20.637	13.174
10	13.289	16.503	22.528	9.015	5.266	23.095	15.760
20	17.723	21.921	31.571	15.133	9.185	27.898	21.372
30	22.695	28.017	41.402	21.166	13.053	32.551	27.571
40	28.205	34.791	52.022	27.117	16.870	37.053	34.356
50	34.252	42.242	63.430	32.983	20.636	41.405	41.729
60	40.836	50.371	75.627	38.766	24.351	45.607	49.688
120	89.101	110.407	158.379	63.958	40.507	64.831	106.081
180	101.701	125.977	181.690	74.172	47.216	67.637	121.215
240	114.128	141.345	204.490	83.784	53.529	70.279	136.090
300	126.382	156.513	226.780	92.793	59.446	72.758	150.704
360	138.463	171.479	248.558	101.200	64.968	75.073	165.058
420	150.371	186.243	269.826	109.004	70.093	77.226	179.152
480	162.106	200.806	290.583	116.205	74.823	79.215	192.986
540	173.668	215.168	310.829	122.804	79.157	81.040	206.560
600	185.058	229.328	330.565	128.801	83.095	82.703	219.874
660	196.274	243.288	349.789	134.195	86.638	84.202	232.927
720	207.318	257.045	368.503	138.987	89.784	85.538	245.720

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000

30	0.000	0.000	0.001	0.001	0.000	0.000	0.000
40	0.000	0.000	0.001	0.001	0.000	0.001	0.000
50	0.000	0.001	0.001	0.001	0.000	0.001	0.001
60	0.001	0.001	0.001	0.001	0.000	0.001	0.001
120	0.001	0.001	0.002	0.001	0.001	0.001	0.001
180	0.001	0.001	0.002	0.001	0.001	0.001	0.001
240	0.001	0.001	0.002	0.001	0.001	0.001	0.001
300	0.001	0.002	0.002	0.001	0.001	0.001	0.002
360	0.001	0.002	0.003	0.002	0.001	0.001	0.002
420	0.002	0.002	0.003	0.002	0.001	0.001	0.002
480	0.002	0.002	0.003	0.002	0.001	0.001	0.002
540	0.002	0.002	0.003	0.002	0.001	0.001	0.002
600	0.002	0.002	0.004	0.002	0.001	0.001	0.002
660	0.002	0.003	0.004	0.002	0.001	0.001	0.002
720	0.002	0.003	0.004	0.002	0.001	0.001	0.003

Pollutant Name: PM2.5 Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.001	0.001	0.001	0.001	0.000	0.009	0.001
10	0.001	0.003	0.002	0.001	0.001	0.008	0.002
20	0.002	0.005	0.004	0.002	0.001	0.006	0.004
30	0.004	0.007	0.006	0.002	0.002	0.005	0.005
40	0.005	0.010	0.008	0.003	0.002	0.004	0.007
50	0.006	0.012	0.010	0.003	0.002	0.003	0.008
60	0.006	0.013	0.011	0.004	0.003	0.003	0.009
120	0.010	0.021	0.017	0.005	0.004	0.006	0.014
180	0.011	0.023	0.018	0.005	0.004	0.009	0.015
240	0.012	0.024	0.020	0.005	0.004	0.012	0.017
300	0.012	0.026	0.021	0.006	0.004	0.015	0.018
360	0.013	0.027	0.022	0.006	0.004	0.017	0.018
420	0.013	0.028	0.023	0.006	0.004	0.019	0.019
480	0.014	0.029	0.023	0.006	0.005	0.020	0.020
540	0.014	0.030	0.024	0.006	0.005	0.021	0.020
600	0.015	0.031	0.024	0.007	0.005	0.022	0.021
660	0.015	0.031	0.025	0.007	0.005	0.023	0.021
720	0.015	0.032	0.025	0.007	0.005	0.023	0.021

Title : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 4: Hot Soak Emissions (grams/trip)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.047	0.049	0.031	0.008	0.022	0.089	0.044
10	0.087	0.091	0.058	0.014	0.041	0.165	0.081
20	0.148	0.156	0.099	0.025	0.070	0.284	0.138
30	0.190	0.200	0.128	0.032	0.090	0.367	0.177
40	0.206	0.217	0.139	0.035	0.097	0.400	0.192

Hot soak results are scaled to reflect zero emissions for trip lengths of less than 5 minutes (about 25% of in-use trips).

Title : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 5a: Partial Day Diurnal Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.052	0.055	0.041	0.004	0.001	0.128	0.053

Title : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 5b: Multi-Day Diurnal Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.004	0.004	0.003	0.000	0.000	0.012	0.004

Title : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 6a: Partial Day Resting Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.024	0.027	0.022	0.002	0.000	0.048	0.025

Title : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 6b: Multi-Day Resting Loss Emissions (grams/hour)

Pollutant Name: Reactive Org Gases Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.002	0.002	0.002	0.000	0.000	0.005	0.002

Title : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 7: Estimated Travel Fractions

Pollutant Name: Temperature: ALL Relative Humidity: ALL

	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
%VMT	0.497	0.329	0.125	0.038	0.001	0.009	1.000
%TRIP	0.471	0.298	0.174	0.046	0.000	0.011	1.000
%VEH	0.505	0.320	0.113	0.026	0.000	0.036	1.000

Title : San Diego Air Basin Avg Annual CYr 2013 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/12 18:44:47
Scen Year: 2013 -- All model years in the range 1969 to 2013 selected
Season : Annual
Area : San Diego
****
Year: 2013 -- Model Years 1969 to 2013 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 8: Evaporative Running Loss Emissions (grams/minute)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
1	0.018	0.360	0.290	0.253	0.161	0.026	0.174
2	0.019	0.185	0.150	0.133	0.086	0.064	0.095
3	0.022	0.129	0.106	0.094	0.061	0.083	0.071
4	0.025	0.103	0.085	0.074	0.050	0.094	0.061
5	0.027	0.087	0.073	0.063	0.043	0.101	0.054
10	0.031	0.058	0.050	0.040	0.029	0.117	0.043
15	0.032	0.051	0.044	0.033	0.025	0.122	0.041
20	0.033	0.049	0.042	0.029	0.024	0.125	0.040
25	0.033	0.049	0.042	0.027	0.023	0.127	0.040
30	0.033	0.048	0.042	0.027	0.023	0.127	0.040
35	0.033	0.048	0.042	0.027	0.023	0.126	0.040
40	0.033	0.048	0.042	0.027	0.023	0.125	0.039
45	0.033	0.048	0.042	0.027	0.023	0.124	0.039
50	0.032	0.047	0.041	0.027	0.023	0.123	0.039
55	0.032	0.047	0.041	0.027	0.023	0.121	0.039
60	0.031	0.047	0.041	0.027	0.022	0.120	0.038