

Final

**Supplemental Environmental Assessment
Operations Access Points (P-159 Red Beach)**



**Marine Corps Base Camp Pendleton, California
April 2012**

Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation	mg/m ³	milligrams per cubic meter
AC/S ES	Assistant Chief of Staff – Environmental Security	µg/m ³	micrograms per cubic meter
APE	Area of Potential Effects	MBTA	Migratory Bird Treaty Act
BMP	best management practice(s)	MCB	Marine Corps Base
BNSF	Burlington Northern Santa Fe Railway	MG	mixed grass
BO	Biological Opinion	NAAQS	National Ambient Air Quality Standards
BRFI	<i>Brodiaea filifolia</i>	NAVFAC SW	Naval Facilities Engineering Command Southwest
CAA	Clean Air Act	NCTD	North County Transit District
CAAQS	California Ambient Air Quality Standards	NEPA	National Environmental Policy Act
CAGN	California gnatcatcher (coastal)	NHPA	National Historic Preservation Act
CARB	California Air Resources Board	NO ₂	nitrogen dioxide
CASHPO	California State Historic Preservation Office	NO _x	nitrogen oxides
CBS	Coyote Brush Scrub	N ₂ O	nitrous oxide
CCC	California Coastal Commission	NOA	Notice of Availability
CCND	Coastal Consistency Negative Determination	NRHP	National Register of Historic Places
CEQ	Council on Environmental Quality	NWP	Nationwide Permit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	O ₃	ozone
CFR	Code of Federal Regulations	P-159	Red Beach Operations Access Points Project
CIDH	Cast-in-drilled-hole	PCN	Pre-construction Notice
CNPS	California Native Plant Society	PM ₁₀	particulate matter less than 10 microns in diameter
CO	carbon monoxide	PM _{2.5}	particulate matter less than 2.5 microns in diameter
CO ₂	carbon dioxide	ppm	parts per million
CO _{2e}	carbon dioxide equivalent	PPV	Public-Private Venture
CH ₄	methane	PSD	Prevention of Significant Deterioration
CSS	coastal sage scrub	RAQS	Regional Air Quality Strategy
CWA	Clean Water Act	RCRA	Resource Conservation Recovery Act
CZMA	Coastal Zone Management Act	ROI	Region of Influence
D	developed/disturbed	RONA	Record of Non-Applicability
DOD	Department of Defense	RWQCB	Regional Water Quality Control Board
DON	Department of the Navy	SANDAG	San Diego Association of Governments
EA	Environmental Assessment	SCM	Special Conservation Measures
EIS	Environmental Impact Statement	SCRRA	Southern California Regional Rail Authority
EO	Executive Order	SDAB	San Diego Air Basin
ESA	Endangered Species Act	SDCAPCD	San Diego County Air Pollution Control District
ft	foot (feet)	SDFS	San Diego Fairy Shrimp
FONSI	Finding of No Significant Impact	SEA	Supplemental Environmental Assessment
FY	fiscal year	SIP	State Implementation Plan
GHG	greenhouse gases	SO ₂	sulfur dioxide
GIS	geographic information sciences	SO _x	sulfur oxides
GWP	global warming potential	SWPPP	Stormwater Pollution Prevention Plan
I-5/I-15	Interstate-5/Interstate-15	SWFL	southwestern willow flycatcher
INRMP	Integrated Natural Resource Management Plan	SWS	southwestern willow scrub
IR	Installation Restoration	TWG	tidewater goby
km	kilometer(s)	U.S.	United States
LBVI	least Bell's vireo	USACE	U.S. Army Corps of Engineers
LFCR	light-footed clapper rail	U.S.C.	U.S. Code
LOSSAN	Los Angeles-San Diego-San Luis Obispo Rail Corridor (Pacific Surfliner)	USDA	U.S. Department of Agriculture
m	meter(s)	USEPA	U.S. Environmental Protection Agency
m ³	cubic meter(s)	USFWS	U.S. Fish and Wildlife Service
mg/L	milligrams per liter	USMC	U.S. Marine Corps
		VOC	volatile organic compound(s)



UNITED STATES MARINE CORPS
MARINE CORPS BASE
BOX 555008
CAMP PENDLETON, CALIFORNIA 92055-5008

5090
ENVSEC
APR 4 2012

MEMORANDUM FOR THE RECORD

From: Commanding Officer
To: Assistant Chief of Staff, Environmental Security

Subj: FINDING OF NO SIGNIFICANT IMPACT FOR NEPA 20020013; RED BEACH OPERATIONS ACCESS POINTS (P-159), CAMP PENDLETON

Ref: (a) National Environmental Policy Act of 1969 (42 U.S.C. §§ 4321-4370h)
(b) Council on Environmental Quality NEPA Regulations (40 C.F.R. Parts 1500-1508)
(c) Environmental Assessment for Red Beach Operations Access Points (P-159), April 2010
(d) Supplemental Environmental Assessment for Red Beach Operations Access Points (P-159), March 2012

1. Per references (a) and (b), the United States Marine Corps gives notice that a Supplemental Environmental Assessment (SEA) has been prepared and that an Environmental Impact Statement (EIS) will not be prepared for the construction and operation of the Red Beach Operations Access Points (P-159) project at Marine Corps Base Camp Pendleton (MCB CamPen), California. Since preparation of the initial P-159 Environmental Assessment (EA), reference (c), more detailed information for proposed bridge design/construction and the access road within the North County Transit District (NCTD) rail easement has become available, necessitating the preparation of the P-159 SEA, reference (d). The P-159 SEA focuses only on the proposed bridge construction and access roads within the NCTD easement. Based on the analysis provided in reference (d), I have selected the Proposed Action/Preferred Alternative, and find that this action will not have a significant impact on the human environment. Therefore, preparation of an EIS is not necessary.

2. The primary purpose of the Proposed Action is to improve the tactical vehicle and troop transit between Red Beach and inland training areas at MCB CamPen. The secondary purpose is to construct a bridge system that would facilitate an increase in capacity and reliability by allowing trains to pass in the congested Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail

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Subj: FINDING OF NO SIGNIFICANT IMPACT FOR NEPA 20020013; RED
BEACH OPERATIONS ACCESS POINTS (P-159), CAMP PENDLETON

corridor. The Proposed Action is needed to support the current and future MCB CamPen operations and training requirements. Increasing the flexibility and accessibility of operational access routes is integral to gaining and maintaining the training corridors required to support the certification and readiness of Marine Expeditionary Force units. In addition, the Proposed Action is needed to ensure that the future railway system is capable of moving passengers and freight in an efficient and timely manner.

3. The Proposed Action and the No-Action Alternative were evaluated in the SEA. Other design alternatives were considered but not carried forward for analysis for reasons set forth in the SEA. Under initial phases of the Proposed Action, MCB CamPen would demolish and replace the existing single-track concrete double-arch bridge with a new single-track multi-span steel and concrete structure within the NCTD easement. In later phases, at a time to be determined, NCTD will construct the matching second-track bridge immediately/alongside and within the NCTD easement.

4. The Proposed Action will be implemented in the west-central portion of MCB CamPen, where the LOSSAN rail line crosses Las Flores Creek. The project limits are between Mile Post 217.5 and Mile Post 218.5 adjacent to the I-5 freeway. All required bridge work will occur within the limits of the NCTD easement. Elevated track work to tie in portions of new track will extend slightly further than these proposed ground level boundaries.

5. The SEA analyzes the potential environmental impacts resulting from implementation of the Proposed Action. The resources most likely to be affected by this action are topography, geology, and soils; hydrology; biological resources; cultural resources; air quality; and hazardous materials/hazardous wastes. The potential environmental impacts of the Proposed Action on these resources were analyzed. Conversely, impacts to the following resources were considered to be negligible or non-existent and were not further analyzed in the SEA: transportation; noise; land use; socioeconomic; environmental justice; aesthetics; utilities; and public health and safety. The Proposed Action will have negligible direct, indirect, or cumulative impacts on the quality of the local environment and will comply with all regulatory requirements. With incorporation of the Special Conservation Measures, impacts to all resources will be less than significant for the Proposed

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BEACH OPERATIONS ACCESS POINTS (P-159), CAMP PENDLETON

Action and the No-Action Alternative. Resource impacts will be mitigated either on-site or in existing Pilgrim Creek and Santa Margarita River restoration areas, resulting in no new loss of MCB CamPen training lands.

6. There will not be any disproportionately high and adverse human health or environmental effects from the selected alternative on minority or low-income populations. Furthermore, there will not be any impacts associated with the protection of children from environmental health and safety risks. The SEA and FONSI addressing this action are on file and may be reviewed at the place of origin: Commanding Officer, Marine Corps Base (Attn: Assistant Chief of Staff, Environmental Security), Camp Pendleton, California 92055-5010, telephone (760) 725-4512.



N. F. MARANO

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Final

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

Lead Agency for the EA: United States Marine Corps
Title of Proposed Action: Red Beach Operations Access Points (P-159)
Affected Jurisdiction: San Diego County
Designation: Environmental Assessment

Abstract

The United States Marine Corps has prepared this Supplemental Environmental Assessment (SEA) in accordance with the National Environmental Policy Act of 1969, 42 United States Code §§ 4321-4370h, as implemented by the Council on Environmental Quality Regulations, 40 Code of Federal Regulations Parts 1500-1508.

The P-159 Environmental Assessment (EA) that was completed in April 2010 (Naval Facilities Engineering Command Southwest 2010a) described the potential environmental consequences that would result from the proposed construction and modification of new and existing transit and maneuver corridors. Transit and maneuver corridors are avenues or roads that facilitate the transit of troops and tactical vehicles between Red Beach and inland training areas at Marine Corps Base (MCB) Camp Pendleton, California. The MCB Camp Pendleton Environmental Impact Review Board approved the project on 22 March 2010. The Finding of No Significant Impact for the P-159 EA was signed on 02 April 2010. The P-159 EA did not analyze the replacement of the railway double arch bridge due to its location within the North County Transit District (NCTD) rail easement or right-of-way. In addition, since completion of the P-159 NEPA process, more detailed information for proposed bridge design/construction and the access roads within the NCTD rail easement or right-of-way has become available, necessitating an expanded analysis of these project components. Therefore, this SEA focuses only on the proposed bridge construction, retaining walls, and access roads within the project footprint (i.e., the NCTD easement). This SEA evaluates the potential environmental impacts of the Proposed Action and the No-Action Alternative on the following resource areas: topography, geology, and soils; hydrology; biological resources; cultural resources; air quality; and hazardous materials and wastes.

Prepared By: United States Marine Corps

Point of Contact: Department of the Navy
Attn: Jesse Martinez, NAVFAC Project Manager
1220 Pacific Highway
Bldg. 1, Central IPT
San Diego, California 92132-5190
E-mail: jesse.w.martinez1@navy.mil
Tel: (619) 532-3844
Fax: (619) 532-4160

April 2012

EXECUTIVE SUMMARY

The United States Marine Corps (USMC) has prepared this Supplemental Environmental Assessment (SEA) pursuant to the National Environmental Policy Act of 1969, the Council on Environmental Quality regulations under 40 Code of Federal Regulations Parts 1500-1508, and Marine Corps Order P5090.2A, Change 2, Dated 21 May 2009, Environmental Compliance and Protection Manual.

The primary purpose of the Proposed Action is to improve the tactical vehicle and troop transit between Red Beach and inland training areas at Marine Corps Base (MCB) Camp Pendleton. The secondary purpose of the Proposed Action is to construct a bridge system that would facilitate an increase in capacity and reliability by allowing trains to pass in the congested Los Angeles-San Diego-San Luis Obispo rail corridor.

The Proposed Action is needed to support the current and future MCB Camp Pendleton operations/training requirements. Increasing the flexibility and accessibility of operational access routes is integral to gaining and maintaining the training corridors required to support the certification and readiness of Marine Expeditionary Force demands. In addition, the Proposed Action is needed to ensure that the future railway system is capable of moving passengers and freight in an efficient and timely manner.

This SEA focuses only on the proposed bridge construction, retaining walls, and access roads within the project footprint (i.e., the North County Transit District [NCTD] easement). This SEA evaluates the potential environmental impacts of the Proposed Action and the No-Action Alternative on the following resource areas: topography, geology, and soils; hydrology; biological resources; cultural resources; air quality; and hazardous materials and wastes. Special conservation measures (SCMs) would be incorporated into the final design of the Proposed Action to minimize or eliminate environmental impacts. The No-Action Alternative does not meet the purpose of and need for the Proposed Action, but it does provide a measure of the baseline conditions against which the impacts of the Proposed Action can be compared.

Table ES-1 provides a summary of impacts by resource area for the Proposed Action and the No-Action Alternative. With the incorporation of the SCMs, impacts to all resources would be less than significant for the Proposed Action and the No-Action Alternative. The USMC has identified the Proposed Action as the Preferred Alternative.

Table ES-1. Summary of Environmental Consequences

Resource Area	Proposed Action (Preferred Alternative)	No-Action Alternative
Topography, Geology, and Soils	•	•
Hydrology	•	•
Biological Resources	•	•
Cultural Resources	•	•
Air Quality	•	•
Hazardous Materials and Wastes	•	•

Note: • indicates that no significant impacts would occur.

FINAL

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
FOR RED BEACH OPERATIONS ACCESS POINTS (P-159)

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CHAPTER 1

PURPOSE AND NEED FOR PROPOSED ACTION

1.1 INTRODUCTION

This Supplemental Environmental Assessment (SEA) has been prepared by the United States Marine Corps (USMC) in accordance with the National Environmental Policy Act (NEPA) of 1969. The P-159 Environmental Assessment (EA) that was completed in April 2010 (Naval Facilities Engineering Command Southwest [NAVFAC SW] 2010a) described the potential environmental consequences that would result from the proposed construction and modification of new and existing transit and maneuver corridors. Transit and maneuver corridors are avenues or roads that facilitate the transit of troops and tactical vehicles between Red Beach and inland training areas at Marine Corps Base (MCB) Camp Pendleton, California. The MCB Camp Pendleton Environmental Impact Review Board approved the project on 22 March 2010. The Finding of No Significant Impact (FONSI) for the P-159 EA was signed on 02 April 2010.

The P-159 EA did not analyze the replacement of the railway double arch bridge due to its location within the North County Transit District (NCTD) rail easement or right-of-way. In addition, since preparation of the P-159 EA more detailed information for proposed bridge design/construction and the access roads within the NCTD rail easement or right-of-way has become available, necessitating an expanded analysis of these project components. Therefore, the SEA focuses only on the demolition of the existing dual arch bridge and construction of the proposed bridge, retaining walls, and access roads illustrated in Figure 2-1.

1.2 BACKGROUND

As described above, MCB Camp Pendleton prepared a Final EA for the Red Beach Operations Access Points Project (P-159) in 2010. The Final EA analyzed the potential impacts associated with construction and modification of the existing transit and maneuver corridors that would facilitate and improve tactical vehicle and troop transit between Red Beach and inland training areas at MCB Camp Pendleton. Since then, more detailed information for proposed bridge design/construction and the access roads has become available. These supplemental project components are located in the NCTD rail right-of-way related to the maintenance of interstate commerce, so additional NEPA documentation and regulatory consultation by NCTD/San Diego Association of Governments (SANDAG) is required before initiating bridge demolition and replacement bridge construction. It was determined that a SEA to the Red Beach Operations Access Points Project (P-159) was the appropriate level of analysis to address the replacement of the existing Red Beach Bridge with a new multi-span bridge. All necessary environmental clearances and resource agency permits would be obtained before construction activities. For the purposes of analysis in this SEA, the NCTD railway easement footprint width at Red Beach extends 100 feet (ft) (30.5 meters [m]), or 50 ft (15.2 m) on each side from the existing center lane track (NAVFAC SW 2010b). The footprint length extends 825 ft (251 m) north and 905 ft (276 m) south of the centerline of the existing dual arch bridge, for a total footprint length of 1,730 ft (527 m) (refer to Figure 2-1). Elevated track work to tie in portions of new track would extend slightly further than these proposed ground level boundaries. This footprint length was extended compared with the original footprint length (500 ft north and 350 ft south of the bridge centerline) in response to the bridge design. The design requires retaining walls for a temporary construction pad for the Mainline Track 2 to Mainline Track 1 crossover, and the need to Realign Mainline Track 2 to permit a 60-90 mile per hour crossover speed.

The Department of the Navy (DON)/USMC objectives are to achieve a suitable access corridor for military vehicles to travel for training operations, connect this crossing with adjacent road work projects, and provide a functional and lasting bridge system for continued and safe operations. The training route between Red Beach and inland training areas east of Interstate 5 (I-5) is currently provided through an existing bridge that is approximately 50 ft (15 m) long and provides east-west access underneath to vehicles via one 20 ft (6 m) wide unreinforced concrete arch. The existing arch bridge is insufficient for current and future training exercises, requiring interruptions to training while vehicles are transported around inadequate corridors of passage. Two 25 ft (8 m) wide by 15 ft (5 m) vertical clearances are required below existing or proposed bridges to provide sufficient clearance for training vehicles. This would allow bi-directional passing of the larger vehicles and equipment from Red Beach landing areas to the inland sections of the installation and decrease frequency or potential of vehicle accidents.

NCTD/SANDAG's objectives are to ensure that the proposed bridge system would take into account a future two-track system, either limit or eliminate rail traffic closures during construction, and provide a functional and lasting bridge system for continued and safe operations (NCTD 2010). The existing access point is a two-span unreinforced concrete arch bridge constructed in 1913 with 18 ft (5 m) high and 20 ft (6 m) wide arches. This bridge system is old and deteriorating and does not conform to current seismic and structural standards. All required existing bridge demolition and new bridge construction would occur within the limits of the NCTD easement.

Another important objective is to continue mainline Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor capacity sufficient to handle existing and future freight and passenger service. The proposed bridge and associated double track would increase capacity by allowing trains to pass each other in the congested LOSSAN rail corridor. The replacement bridge is vital to maintain mainline LOSSAN rail corridor capacity sufficiently to handle long term passenger service, Port of San Diego demand, cross border bulk goods movement, and regional demand for heavy bulk commodities. There is a strong regional demand for bulk commodities including lumber, steel, cement and paper. Inadequate rail capacity and reliability could limit long-term Port growth, with new customers and jobs moving to other west coast ports. Maintaining the movement of bulk goods on rail would avoid additional highway pavement damage and reduce emissions.

The following companies/agencies provide rail service on this portion of the LOSSAN corridor:

- Burlington Northern Santa Fe (BNSF) Railway: The BNSF Railway operates freight rail service throughout the San Diego portion of the LOSSAN corridor seven days per week. Typically four to six freight trains per day are operated. BNSF freight service is both local and national in scope. The current constrained one-track Red Beach crossing negatively impacts BNSF's ability to conduct their goods movement services.
- Southern California Regional Rail Authority (SCRRA): SCRRA operates Metrolink commuter services from Orange County to Oceanside. The service currently provides 16 Metrolink trains per day Monday through Friday, 10 trains per day on Saturday, and 8 per day on Sunday.
- Amtrak: Amtrak operates 22 Pacific Surfliner trains per day on weekdays and 24 per day on weekends. Major cities served are San Diego, Solana Beach, Oceanside, Los Angeles, Santa Barbara, and San Luis Obispo. The LOSSAN corridor is Amtrak's second busiest in the nation.

Implementation of the Proposed Action would achieve the objectives of both the DON/USMC and NCTD/SANDAG.

1.3 PROJECT LOCATION

The Proposed Action would be implemented at MCB Camp Pendleton, the USMC's premier amphibious training center for the west coast (Figure 1-1). MCB Camp Pendleton is a 200-square mile (518-square kilometer [km]) area located primarily within the northern portion of San Diego County and is 40 miles (64 km) north of downtown San Diego. The MCB Camp Pendleton boundary is bordered to the northwest by Orange County, north and east by the City of San Clemente and the Cleveland National Forest, east by the community of Fallbrook and the Naval Weapons Station–Seal Beach/Fallbrook Annex, and to the south by the City of Oceanside. Riverside County is north of - but not adjacent to - the MCB Camp Pendleton boundary. Regional access to MCB Camp Pendleton is provided by I-5 from the west and I-15 from the east via State Route 78 from the south.

More specifically, the proposed project is located in the west-central portion of MCB Camp Pendleton where the LOSSAN rail line crosses Las Flores Creek. The project limits are between Mile Post 217.5 and Mile Post 218.5 adjacent to the I-5 freeway. Figures 1-2 and 1-3 include photographs of the Red Beach project site and existing double arch bridge.

1.4 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

As previously discussed, the P-159 EA focused on the potential impacts associated with construction and modification of the existing transit and maneuver corridors that would facilitate and improve tactical vehicle and troop transit between Red Beach and inland training areas at MCB Camp Pendleton. This SEA focuses only on the proposed bridge replacement construction, supporting retaining walls, and access roads.

The primary purpose of the Proposed Action is to improve the tactical vehicle and troop transit between Red Beach and inland training areas at Marine Corps Base (MCB) Camp Pendleton. The secondary purpose of the Proposed Action is to construct a bridge system that would facilitate an increase in capacity and reliability by allowing trains to pass in the congested LOSSAN rail corridor.

The Proposed Action is needed to support the current and future MCB Camp Pendleton operations/training requirements. Increasing the flexibility and accessibility of operational access routes is integral to gaining and maintaining the training corridors required to support the certification and readiness of Marine Expeditionary Force demands. In addition, the Proposed Action is needed to ensure that the future railway system is capable of moving passengers and freight in an efficient and timely manner.

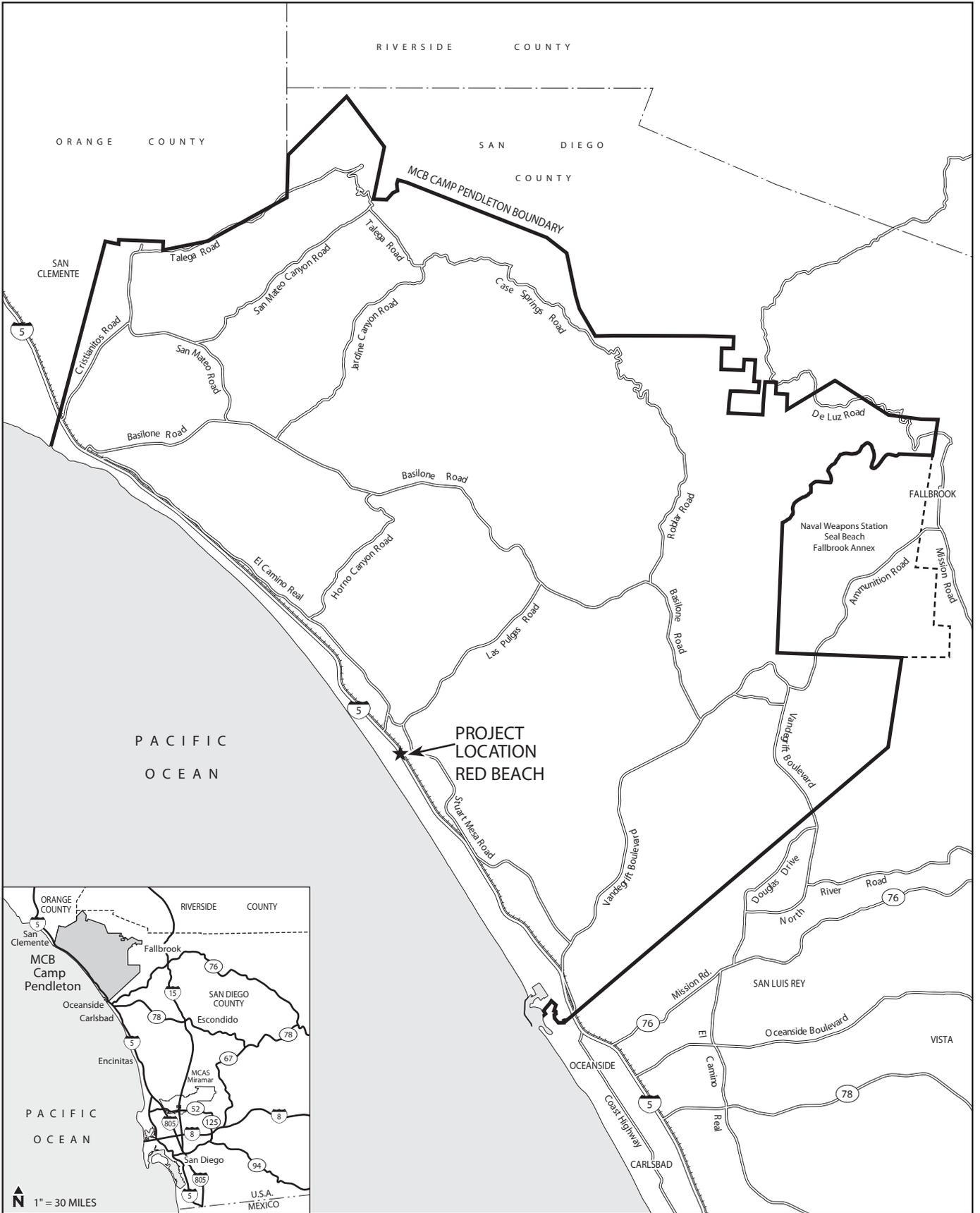


Figure 1-1
Regional Location
MCB Camp Pendleton





a) Overlook View of the Red Beach Double Arch Railroad Bridge and I-5



b) View of Las Flores Creek Channel and Floodplain Facing West under the I-5 Overpass

Figure 1-2
Views of the Red Beach Project Site



a) View of Red Beach Double Arch Bridge Facing East



b) View of Red Beach Double Arch Bridge Facing West

Figure 1-3
Views of the Existing Red Beach Double Arch Bridge to be Demolished

1.5 REGULATORY SETTING

The preparation of this SEA is based on NEPA requirements, as outlined in the following guidance documents:

- NEPA of 1969 [42 United States Code (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
- Council on Environmental Quality (CEQ) Regulations [40 Code of Federal Regulations (CFR) Parts 1500-1508], which implement the requirements of NEPA
- DON procedures for implementing NEPA (32 CFR Part 775), which provide DON policy for implementing the CEQ regulations and NEPA
- Marine Corps Order P5090.2A, Change 2, Dated 21 May 2009, Environmental Compliance and Protection Manual, which establishes procedures for implementing NEPA

This SEA has also been prepared to address the following requirements:

- National Historic Preservation Act (NHPA), 16 U.S.C. §§ 470-470x-6
- Archeological Resource Protection Act, 16 U.S.C. §§ 470aa-470mm
- Clean Water Act (CWA), 33 U.S.C. §§ 1251-1387
- Clean Air Act (CAA), as amended, 42 U.S.C. §§ 7401-7671q, including 1990 General Conformity Rule
- Endangered Species Act (ESA), 16 U.S.C. §§ 1531-1544
- Migratory Bird Treaty Act (MBTA), 16 U.S.C. §§ 703-712
- Coastal Zone Management Act (CZMA), 16 U.S.C. §§ 1451-1466
- Resource Conservation Recovery Act (RCRA), 42 U.S.C. §§ 6901-6992k
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601-9675
- Executive Order (EO) 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds
- EO 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
- EO 13045 – Protection of Children from Environmental Health Risks and Safety Risks
- EO 13148 – Greening the Government through Leadership in Environmental Management
- EO 11990 – Protection of Wetlands
- EO 11988 – Floodplain Management

1.6 PERMITS AND AGENCY CONCURRENCES REQUIRED

The following permits and agency concurrences are anticipated with implementation of the Proposed Action:

- CWA Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) and Section 404 Permit from the U.S. Army Corps of Engineers (USACE). The Section 401 and Section 404 Permit Applications prepared for the P-159 EA have been modified to include the P-159 Supplemental EA. This will be a Nationwide Permit (NWP) #14-Linear Transportation Project
- California Coastal Commission – CZMA Consistency Provisions
- NHPA Section 106 – California State Historic Preservation Office (CASHPO) concurrence
- Informal Section 7, ESA consultation with U.S. Fish and Wildlife Service (USFWS)
- Real Estate Permits (e.g., Right of Entry permit and highway/railway construction permit)

1.7 ORGANIZATION OF EA

Following Chapter 1, this SEA is organized as follows: Chapter 2 describes the Proposed Action and alternatives, Chapter 3 describes the affected environment, Chapter 4 describes the environmental consequences of each alternative, Chapter 5 describes the cumulative impacts of the action alternatives in conjunction with other projects in the area, and Chapter 6 addresses various other considerations required by NEPA. This is followed by references (Chapter 7), list of preparers and contributors (Chapter 8), and a list of agencies consulted (Chapter 9).

CHAPTER 2

PROPOSED ACTION AND ALTERNATIVES

Chapter 2 describes the Proposed Action, No-Action Alternative, and alternatives considered but eliminated from detailed analysis. A brief summary of the environmental impacts of each alternative is given.

2.1 ALTERNATIVES CONSIDERED

Two alternatives are carried forward for detailed analysis in this EA: the Proposed Action (Preferred Alternative), and the No-Action Alternative. These alternatives are described below. Alternatives considered but eliminated from further consideration in this SEA are discussed in Section 2.1.3.

2.1.1 Proposed Action (Preferred Alternative)

The Proposed Action is the Preferred Alternative and consists of demolishing the existing single-track double-span concrete arch bridge and replacing it with a new double-track multi-span steel and concrete structure (Figure 2-1). Although design details and drawings are currently in progress, several preliminary additional design drawings are included in Appendix A. As noted herein, the design is being developed in close coordination with the environmental team to avoid significant impacts to environmental resources, particularly known cultural and biological resources.

To achieve the objectives for both DON/USMC and NCTD/SANDAG, a bridge system with multiple span structures using a shoofly design is proposed. A shoofly bridge is a temporary bridge used to take trains around construction while the permanent bridge is being demolished and rebuilt. This system would provide an acceptable operations access point for military training and transportation, reduce rail operation interruptions, and enable the second track expansion of the existing railway at a later date to be determined by NCTD/SANDAG. The advantages of the proposed design are that the extension of the existing east second line expansion located immediately south of the existing arch bridge would require less track re-alignment, less imported earth fill for the new south abutments, fewer retaining walls and retaining wall lengths, and no construction proximity conflicts with the I-5 freeway. It is anticipated that no track closures would be required under the Proposed Action, with the exception of minor railway traffic delays required for track alignment work once the bridge structures have been constructed. Approximately six temporary delays would be necessary, each lasting approximately one to two hours. In the unlikely event that extended closure of the railway was required, bus service would be on-call and ready to shuttle rail passengers appropriately.

The disadvantages of the east expansion include extending a portion of the second track within the railway easement adjacent to a location of jurisdictional wetlands to the north and east of the existing arch bridge, and proximity to known cultural resources sites. However, to achieve the project objectives the design team, consisting of AC/S Environmental Security, all of its branches, and the NAVFAC/NCTD team, has worked closely with the installation's natural and cultural resources staff to design the project so that the natural and cultural resources would be avoided and protected.



Figure 2-1
Proposed Action - Aerial View
Red Beach



2.1.1.1 Access Roads and Construction Laydown Area

Along the dirt training/access road (southern access road) leading from Stuart Mesa Road to an embankment south of the Las Flores Creek are locations of rare plants, wetlands, and National Register of Historic Places (NRHP) eligible cultural resources sites. Two main construction staging areas would be located outside of the railway easement, on both sides of the project footprint, and construction equipment and materials for the southern abutments would be brought in along the southern access road or along the railway easement (Figure 2-1). In addition, minor material stacking, construction activities, or construction vehicle parking may occur within the railway easement and within the project footprint. Vehicle and pedestrian traffic, and equipment and construction staging would be strictly confined to the existing roads, staging areas, and project footprint analyzed in this SEA. No road improvements such as capping or grading would occur on the access road through archaeological site SDI-10728.

The access roads would serve as a “one-way” hauling or vehicle access to or from the railway easement where the construction activity would occur. Natural and cultural resources adjacent to the access roads would be clearly identified, avoided, and protected in place from haul road activities. Erosion control procedures would also be implemented to prevent damage to areas outside the limits of the existing access roads, and to prevent any ground disturbance within archaeological site SDI-10728.

It is anticipated that the proposed construction would begin in fiscal year (FY) 2012 and be completed in FY 2013. Implementation of the Proposed Action is expected to be completed within approximately 12 months with up to 40 construction workers on-site at any given time (NAVFAC SW 2010b). Construction activities would occur within four phases as described below.

2.1.1.2 Phase One: Construction of the Shoofly Bridge

The first phase would consist of construction of the shoofly bridge. Earthwork associated with construction of access roads and laydown areas would occur first. After then performing the preliminary abutment earth excavation and fill, installation of the substructures supporting cast-in-drilled-hole (CIDH) piles at the abutments and the piers would follow. The abutment and the pier caps would be cast-in-place concrete. Also during this phase, construction of retaining walls would be required on the north-east side of the creek to construct the abutment. The superstructure of precast/prestressed concrete or steel deck girders would be lowered onto the abutments and pier caps. The shoofly deck would then be installed and the ballast, ties, and track work would be constructed and adjoined with the existing second mainline track to the south and the existing mainline track to the north (refer to Appendix A).

The equipment mix for this phase would include earth movers and/or excavators, pile drivers, CIDH pile drills, cranes, and material haulers. The duration of phase one construction activities would be approximately five months, beginning in May 2012 (NAVFAC SW 2010b).

2.1.1.3 Phase Two: Demolition of the Existing Arch Bridge

Phase two construction activities would occur after all of the shoofly CIDH pilings have been installed, and would consist of re-routing railway traffic from the existing arch bridge to the new permanent shoofly bridge, described in phase one. The existing arch bridge track work, ties, and ballast would be removed. Excavation of the fill to the north of the existing bridge would occur and portions of the existing arch bridge would be demolished to provide the necessary vertical clearance for the new bridge. The majority of the walls for the existing arches would be demolished. For the small area identified in the P-159 EA where the new access road infringes on jurisdictional wetlands, impacts would be mitigated at a 2:1 ratio and are proposed at the offsite Pilgrim Creek mitigation site (refer to Section 2.4).

The existing spillway would be left in place and would not be affected by the design and construction of the railway bridge within the easement. Appendix A includes the results of the hydrology and hydraulics analysis of the Las Flores Creek for the Proposed Action as discussed in this SEA.

As previously discussed in the P-159 EA, the project would also include a vegetated bioswale to treat stormwater runoff from the roadway following project completion, minimizing potential effects of the project on the federally listed species and their habitat. A retaining wall would be used to accommodate the grade separation between the existing creek and the proposed southerly access road. The edge of the road would be offset from the retaining wall and would have a concrete curb. The curb would include periodic openings to allow surface runoff to drain towards the creek and into the vegetated bioswale, which would be constructed between the back of the retaining wall and curb to collect stormwater along the paved surfaces of the new roadways. No direct impacts to Las Flores Creek would occur due to usage of the new infrastructure.

The equipment mix for this phase would include earth movers and/or excavators, cranes, material haulers, and hydraulic demolition equipment. Demolition and construction debris would be recycled to the maximum extent possible. No unauthorized demolition or construction debris would be disposed of in any existing waterway. The duration of the phase two construction activities would be approximately four months (NAVFAC SW 2010b).

2.1.1.4 Phase Three: Construction of the Western Stage Bridge Substructure

Phase three construction activities would consist of the preliminary excavation and backfill, and installation of the CIDH piles for the western stages of the bridge substructure. Construction of the new western portion of the new bridge middle bents would also occur. The abutments and pier caps would be cast in place, and the final grading would occur.

The equipment mix for this phase would include earth movers and/or excavators, cranes, soil nail wall installers, pile drivers, and material haulers. The duration of the phase three construction activities would be approximately three months (NAVFAC SW 2010b).

2.1.1.5 Phase Four: Completion of the Western Stage Bridge Superstructure

The fourth and final phase would occur at a later date determined by NCTD/SANDAG. This phase would complete the second track expansion project. At a later date, NCTD/SANDAG would install the precast, prestressed concrete or steel girders, deck, ballast, ties, and track to complete the superstructure of the western stage bridge. The bridge track would then be aligned with the second track expansion work to the north and the existing mainline track to the south for a complete two-track system. Additional design details and drawings are provided in Appendix A. This final phase to complete the second track expansion project would take approximately three months (NAVFAC SW 2010b).

2.1.2 No-Action Alternative

Under the No-Action Alternative, the DON/USMC and NCTD/SANDAG would not replace the existing double arch bridge with a new multiple-span shoofly bridge system with a second track option to facilitate the transit of tactical vehicles and troops between Red Beach and inland training areas at MCB Camp Pendleton and future use of the LOSSAN railway corridor.

Although the No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose of and need for the Proposed Action as required under CEQ regulations (40 CFR § 1502.14[d]), it does provide a measure of the baseline conditions against which the potential adverse impacts of the Proposed Action can be compared. As such, the No-Action Alternative is carried forward

for analysis. The No-Action Alternative for this EA represents the baseline conditions described in Chapter 3, Affected Environment.

2.1.3 Alternatives Considered but Eliminated

Alternative 1: New Concrete Box Structure Alternative

Under Alternative 1, a new concrete cast-in-place box structure would be constructed, including construction of one new span, and the existing two spans from the double arch bridge would be left in place. A shoofly bridge would also be constructed to minimize disruption of train service. The existing arch bridge is a two-span cast-in-place unreinforced concrete structure built on driven piles in 1913. This bridge does not meet current seismic and structural requirements. Based on the existing poor condition of this unreinforced bridge it is not recommended to tie any new structure to it or to disturb the consolidated backfill around it. It is not structurally recommended since the double arch bridge does not currently support the existing track. Additionally, this alternative does not align with SANDAG's Double Track Project goals. Therefore, this alternative was considered but eliminated from detailed analysis.

Alternative 2: New Precast/Prestressed Box Girder Structure Alternative

Under Alternative 2, a new Precast/Prestressed Box Girder structure would be constructed. The new one span Precast/Prestressed box girder structure would be constructed with the existing arch bridge left in place. A shoofly bridge would also be constructed to minimize disruption of train service. This project is in not line with SANDAG's Double Track Project and would not meet NCTD/SANDAG's purpose and need for the Proposed Action (SANDAG 2010). In addition, for the same reasons described under Alternative 1, it is not structurally recommended since the double arch bridge does not currently support the existing track. Therefore, this alternative was considered but eliminated from detailed analysis.

Alternative 3: New Short Bridge at MP 218 on MT2

This alternative would include the addition of a second track west of the existing mainline track. The new bridge would be a single span bridge located adjacent to the existing concrete arch bridge. The concrete arch bridge would remain in place as the bridge to be used for the existing track. Under this alternative, the north abutment would conflict with the northern half (westbound traffic) of the proposed Red Beach Access Corridor. This Alternative would not meet the USMC's purpose and need for the Proposed Action since it would not accommodate a suitable access corridor for training operations. While there are possibilities for future access corridor construction, they would come at a higher cost to the government and greater difficulty in construction and demolition. Therefore, this alternative was considered but eliminated from detailed analysis.

Alternative 4: Two New Long Bridges

This alternative would include the addition of a second track to be located to the east of the existing mainline track. The new bridges would be independent, and parallel with two spans per bridge. The existing concrete arch bridge would be completely demolished. This alternative permits a phased construction schedule allowing the first track to remain open while the second track bridge is being constructed. Once the second track bridge is complete, it would serve as a shoofly for uninterrupted service while the existing concrete arch bridge is demolished and replaced with the new long bridge.

The advantages of this alternative are that it meets both the objectives for SANDAG's future second line addition and a suitable access corridor for the USMC, as well as a favorable phased construction schedule (SANDAG 2010). The disadvantages of this alternative are higher overall construction impacts (e.g., labor, time, resources, and area of disturbance) resulting from installation of two separate and longer

spanning bridges. Although this alternative meets the dual purpose and need for the Proposed Action, the additional project track work, drainage work, civil engineering work, utilities relocation, and additional retaining walls significantly exceeds the project impacts associated with the Preferred Alternative; therefore, this alternative was considered but eliminated from detailed analysis.

Alternative 5 Second Track Expansion West of the Double Arch Bridge

This Alternative would be similar to Alternative 4, with the exception that the second track expansion would occur to the west of the existing double arch bridge and adjacent to the I-5 freeway.

The advantage of this alternative is an avoidance of most of the environmentally sensitive area to the east of the existing track. Potential impacts to smaller wetland areas on the west may occur. The disadvantages of this alternative include requiring more extensive track re-alignment, the need to import greater amounts of earth fill for the south abutment, additional retaining walls and retaining wall lengths, and a constricted area for construction due to the proximity to the I-5 freeway. Although this alternative meets the dual purpose and need for the Proposed Action, the project impacts (e.g., labor, time, and resources) significantly exceeds the project impacts associated with the Preferred Alternative; therefore, this alternative was considered but eliminated from detailed analysis.

2.2 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The following resource areas are analyzed in this SEA: topography, geology, and soils; hydrology; biological resources; cultural resources; air quality; and hazardous materials and wastes. Table 2-1 provides a summary of environmental consequences, by resource, for the Proposed Action and the No-Action Alternative. Chapter 4 provides a detailed discussion of the environmental consequences.

Table 2-1. Summary of Environmental Consequences

Resource Area	Proposed Action (Preferred Alternative)	No-Action Alternative
Topography, Geology, and Soils	•	•
Hydrology	•	•
Biological Resources	•	•
Cultural Resources	•	•
Air Quality	•	•
Hazardous Materials and Wastes	•	•

Note: • indicates that no significant impacts would occur.

2.3 PREFERRED ALTERNATIVE

Based on the analysis presented in this SEA, the USMC has identified the Proposed Action as the Preferred Alternative.

2.4 SPECIAL CONSERVATION MEASURES

Implementation of the Red Beach Operations Access Points as proposed would include incorporation of the same conservation measures as listed in the P-159 EA to avoid, minimize, and compensate for potential effects on listed species, as well as avoid and minimize effects on other environmental resources. These measures are included in Section 2.4.1 below and were based upon review of potential project effects and the incorporation of relevant measures from other projects on MCB Camp Pendleton (refer to Section 5.2 for a list of relevant past and present projects), including terms and conditions from

previous consultations with USFWS and informal consultation with USFWS for the EA (refer to Appendix C of the P-159 EA). Section 2.4.2 includes additional SCMs developed for this SEA.

In February 2012, MCB Camp Pendleton revised the Habitat Mitigation Plan for the P-159 project which will be submitted to the USACE as part of the NWP application. It has been determined that as much as 0.064 acre of jurisdictional wetlands and 0.013 acre of a non-wetland water of the U.S. could be permanently impacted and 0.116 acre of jurisdictional wetlands could be temporarily impacted by implementation of the Proposed Action. This acreage includes the permanent jurisdictional wetland impacts identified in the original P-159 EA for the access road construction. The Habitat Mitigation Plan proposes mitigation at the Pilgrim Creek mitigation site at a 2:1 ratio for wetland and non-wetland waters of the U.S. impacts. It is anticipated that at least 0.154 acre of wetland habitat would be created and restored at the proposed Pilgrim Creek mitigation site.

2.4.1 Special Conservation Measures Included in the P-159 EA

2.4.1.1 General Conservation Measures

1. All mechanized clearing and grading, vehicle traffic, equipment staging, and the deposition of soil would be confined to the footprints analyzed in this EA or to other disturbed or developed land.
2. At least 7 days before project initiation, the project boundary, including temporary features such as staging areas and access roads, would be clearly marked with flagging, fencing, or signposts. All project-related activities would occur within the project boundary. The installation of this fence would be monitored by the project biologist.
3. Heavy equipment and construction activities would be restricted to existing roads and disturbed areas to the maximum extent practicable. Staging areas would be located in disturbed habitats and would be delineated on the grading plans. Vehicle operation and laydown areas would be defined by staking and flagging between stakes to prevent operations outside these areas. MCB Camp Pendleton Assistant Chief of Staff – Environmental Security (AC/S ES) would review and approve the defined laydown areas.
4. A Hazardous Waste Management Plan would be prepared for the project. The contractor, in consultation with AC/S ES, would evaluate, before shipment of any materials offsite, whether the material is regulated as a hazardous waste or material. The contractor would minimize the generation of hazardous waste to the maximum extent practicable and would take all necessary precautions to avoid mixing clean and contaminated wastes. The contractor would identify and evaluate recycling and reclamation options as alternatives to land disposal.
5. Construction trucks would carry water and shovels or fire extinguishers in the field. The use of shields, protective mats, or other fire prevention equipment would be used during grinding and welding to prevent or minimize the potential for fire, and vehicles would not be driven or parked in areas where catalytic converters could ignite dry vegetation. No smoking or disposal of cigarette butts would take place within vegetated areas.
6. The contractor would obtain coverage under the General Construction Stormwater Permit, State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ. The contractor would prepare a Stormwater Pollution Prevention Plan (SWPPP) in conjunction with the final design. The contractor would submit a Notice of Intent and fee, and a Waste Discharge Identification number would be received from the SWRCB before initiation of any soil disturbance. The project would comply with all provisions described in the Permit and would

strictly follow the SWPPP. The SWPPP would be maintained at the project site and updated as necessary to track modifications, Best Management Practice (BMP) location and implementation, training, etc. After completion of construction activities, a Notice of Termination would be submitted to the SWRCB. To terminate coverage, the project would need to meet permanent stabilization requirements specified within the Permit.

7. The SWPPP would include permanent erosion and pollution control measures such as bioswales and stabilization and replanting of the bank adjacent to Las Flores Creek with native species. The SWPPP would include two years of post-project monitoring to ensure that erosion is being effectively controlled.
8. Any discharges of slurries or drilling muds to land would comply with Conditional Waiver No. 9 of the San Diego Basin Plan WDR Waiver Program (Regional Water Quality Control Board Resolution No. R9-2007-0104).
9. Groundwater dewatering activities may require permitting, coordination, sampling and/or treatment and is the responsibility of the contractor performing the work. For small volumes, dewatered groundwater 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. Alternatively, small volumes of dewatered groundwater may be discharged to the sanitary sewer system, if approved by the AC/S ES Waste Water Branch at 725-9761 and AC/S Facilities Wastewater Operation Supervisor at 725-4018. 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 must be submitted 60 days before the planned commencement of the discharge.
10. Grading during the rainy season (November 1 to May 1) would be avoided or minimized if practical. Where it is impractical to avoid grading during the rainy season, erosion and sedimentation BMPs would be installed immediately downslope of work areas and along Las Flores Creek and its drainages. Erosion and sedimentation controls would be monitored and maintained during construction and for 12 months thereafter to ensure stabilization of the site.
11. No excavated or fill material would be placed in a delineated CWA Section 404 water of the U.S. except as authorized by a permit from the USACE. Concreting operations would be conducted to ensure discharge water associated with these operations does not reach surrounding water bodies or pools unless specifically authorized in a CWA discharge permit.
12. Dust migration in or adjacent to riparian areas would be minimized by lightly spraying areas of exposed soil with water during excavation and grading activities when weather conditions require the use of dust control measures.
13. Fueling of equipment would not occur within 100 ft (30 m) of Las Flores Creek. An appropriate fueling area would be marked on construction plans. Emergency provisions would be in place at all crossings before the onset of construction to prevent accidental spills from contaminating downstream habitats.
14. The action proponent, or their contractor, would ensure that construction and demolition debris (including asphalt or concrete) resulting from construction activities be properly disposed of and would not be discarded onsite. In the event of excavation of asphalt or concrete, excess material would be disposed of in accordance with California Code of Regulations Title 14, Division 3, Article 5.9. At least fifty percent of the construction and demolition debris generated would be

diverted from placement in a landfill through recycling or reuse (Marine Corps Order P5090.2A, Change 2, Dated 21 May 2009).

15. An Environmental Protection Plan would be submitted for approval by AC/S ES before the start of construction activity. Before submittal of the plan, the contractor would meet with the Contracting Officer or designated representative to discuss implementation of the plan, possible subsequent revisions and additions to the plan, including reporting requirements, and methods for administering the plan.
16. All trash would be disposed of properly. All food-related trash would be placed in sealed bins and removed from the site regularly. All equipment and waste would be removed from the site, and the soil would be re-contoured before habitat restoration. The site would be restored to as near the original biological condition as possible once the project is completed.
17. Disturbed soils would be re-contoured, stabilized and re-planted with native species that are consistent with pre-existing vegetation. Restoration would be conducted consistent with a restoration plan that has been reviewed and approved by AC/S ES Land Management Branch and the USFWS before initiation of the project.
18. The revegetated areas would be posted for future avoidance by military traffic, inspected bi-annually to document results, and weeded or re-seeded as necessary until native species are reestablished within the affected area(s). AC/S ES Land Management Branch would review and approve the replanting strategy, monitoring methods, and performance criteria to satisfy restoration requirements.
19. The topsoil from native habitats within the proposed impact areas would be salvaged, stockpiled, and maintained in a manner that would facilitate survival of the mycorrhizal organisms and seed bank within the soil. Topsoil stockpile areas would be delineated on the grading plans and reviewed by AC/S ES Land Management Branch. This topsoil would be used as the surface horizon during the revegetation of native habitats.
20. Non-native plants, including noxious weeds (as listed by the California Invasive Plant Council), would be prevented from establishing in disturbed sites for a minimum period of three years, either by hand-weeding or the selective application of herbicide to the target species, using a U.S. Environmental Protection Agency (USEPA)-approved herbicide and manner of application which would not have toxic effects on fish and wildlife or non-target plant species. The control of noxious weeds in temporarily disturbed areas of this riparian ground is mandated by the Riparian/Estuarine Biological Opinion (BO) (USFWS 1995a).
21. To comply with Executive Order 13112, National Invasive Species Act, Federal Noxious Weed Act, and the Noxious Plant Control Act, all equipment and/or vehicles would be power-washed before entering Camp Pendleton 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. Weeds with overall moderate and high ranking in the most current California Invasive Plant Council Inventory would be considered as weeds for purposes of this measure. The biological monitor, who would be knowledgeable on weed species and the California Invasive Plant Inventory, would be concerned about new weed species that show up on the project site; non-native invasive plant species that are in and near the project site before construction would not need to be as much of a concern. Weeds that are new to the region may be identified by their invasive growth pattern and lack of visibility on other areas on Base. New weeds to the area, whether they are new to Camp Pendleton, or new to the specific area of the project site, need to be reported to AC/S ES Land Management Branch for control.

22. The use of any straw wattles, straw bales or hay bales utilized during and post construction would be certified weed-free. All erosion control seed mixes would consist of native plant species.
23. No off-road vehicle use would occur outside of the project boundary. Off-road construction vehicle operations within the project boundary would be conducted in such a manner as to minimize the impact on the existing vegetation, wildlife, and terrain in accordance with Marine Corps Order P5090.2A, Change 2, Dated 21 May 2009.
24. No night work is anticipated for this project. However, if night work and consequent lighting are required, a qualified biologist would monitor all night-time construction activities in and adjacent to sensitive habitat to avoid disturbance to listed species. Any night lighting used would be shielded and directed away from sensitive habitat.
25. Contractors would be responsible for compensation for direct impacts to biological resources that occur as a direct result of construction activities outside the project boundary at a rate determined by USFWS. These ratios are typically two to three times higher than the ratios for permanent impacts.
26. Construction workers would use portable chemical toilets, with secondary containment basins to prevent spillage. Chemical toilets would not be placed within 100 ft (30 m) of riparian habitat.
27. Construction workers would be prohibited from bringing pets to the construction site to ensure pets would not affect wildlife through harassment or predation in adjacent natural habitats.
28. To comply with the Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act, the project design would follow the raptor protection guidelines, as stated in Section 4.3.5 of the Integrated Natural Resources Management Plan (INRMP) (USMC 2007). The nest of any bird species covered under the MBTA cannot be harmed or destroyed during construction.
29. A qualified biological monitor would be present as needed to ensure that the project is adhering to the SCMs outlined in this EA, and as set forth in the USFWS concurrence letter. The biologist would be familiar with the federally listed species affected by this project; familiar with the native and invasive plant species of the Base; have a bachelor's degree with an emphasis in ecology, natural resource management, wildlife biology, or related science; and have previous experience with applying the terms and conditions of a Biological Opinion. The biological monitor would keep MCB Camp Pendleton AC/S ES Land and Wildlife Management Branches and the project engineer informed of construction activities that may threaten significant biological resources. The monitor would ensure that incidental disturbance is minimized and limited to activities essential to the project. The qualified biologist would record their daily activities and provide electronic versions of their weekly biological monitoring reports to AC/S ES Land and Wildlife Management Branches.

2.4.1.2 Avoidance, Minimization, and Compensation Measures for Protected Species

The Proposed Action would employ protective measures for the coastal California gnatcatcher (CAGN), least Bell's vireo (LBVI), southwestern willow flycatcher (SWFL), tidewater goby (TWG), and the habitats that support these species. The project would be implemented consistently with the programmatic Riparian/Estuarine and the NCTD Double-Track BOs (USFWS 1995a, USFWS 2005a). Additional avoidance and minimization measures for CAGN, LBVI, SWFL, and TWG are based upon relevant measures from other projects on MCB Camp Pendleton such as the 2004 BO regarding CAGN at the Tertiary Treatment Plant and Associated Facilities (USFWS 2004), and from the INRMP (USMC 2007), and from informal consultation with the USFWS for the Proposed Action (USFWS 2009, 2012).

- Since project designs are not yet finalized, the project footprint, including staging areas and temporary access roads, would be sited to avoid and minimize impacts to native habitats with listed species. Final construction designs for the project would be provided to the AC/S ES for distribution to the USFWS at least 30 days before project initiation. These designs would include the final footprint of all facilities relative to federally listed species and their habitat and a table showing the final permanent and temporary impacts by habitat type.
- A contractor education program would be conducted by a qualified biologist with oversight by MCB Camp Pendleton AC/S ES personnel. It would be conducted during all project phases and cover the potential presence of listed species, the requirements and boundaries of the project, the importance of complying with avoidance, minimization, and compensation measures; and problem reporting and resolution methods. MCB Camp Pendleton would ensure the placement of signs indicating the necessity for all activities to be strictly confined to the project site.
- A qualified biologist or biologists familiar with CAGN, SWFL, LBVI, and TWG would be responsible for overseeing construction to ensure compliance with the conservation measures and for preventing unanticipated impacts to federally listed species. The qualified biologist would be on site during vegetation removal and other construction activities with the potential to impact federally listed species. The qualified biologist would conduct pre-construction surveys for listed and migratory birds before construction. The qualified biologist would be a trained ornithologist with at least 40 hours in the field observing CAGN, LBVI, and SWFL, and documented experience locating and monitoring nests.

Coastal California Gnatcatcher (CAGN), Least Bell's Vireo (LBVI), Southwestern Willow Flycatcher (SWFL)

- Final construction design would incorporate fencing, signage, and pathways to direct traffic away from coastal sage scrub (CSS) and riparian habitat that may support CAGN, LBVI, or SWFL near the project site.
- Initial site clearing of CSS vegetation would take place only outside of the CAGN breeding season. The breeding season for CAGN is from 15 February to 31 August. Construction activities in or adjacent to CSS habitats would occur outside of the CAGN breeding season. CSS habitat that is temporarily cleared for construction would be revegetated immediately following project completion (i.e., in-place mitigation). Permanent impacts would be compensated by restoration at a location approved by AC/S ES Land Management Branch and the USFWS before project initiation using a 2:1 mitigation ratio according to Marine Corps/USFWS project consultation precedent.
- Clearing of riparian vegetation would take place only outside of the LBVI and SWFL breeding season. The breeding season for LBVI and SWFL is from 15 March to 31 August. After initial site clearing, ongoing construction activities in or adjacent to riparian vegetation would occur outside of the breeding season when practicable.
- Any riparian habitat that is cleared for construction would be revegetated (i.e., in-place mitigation) or, if that is not possible, would be compensated for in accordance with the Riparian/Estuarine BO and NCTD Double-Track BO (USFWS 1995a, 2005a). The compensation strategy may include exotic plant control and habitat restoration, or may draw from the positive balance of MCB Camp Pendleton's established riparian mitigation bank.

- Any temporarily cleared areas of CSS or riparian habitat would be re-planted with local native species (species and quantities to be approved by AC/S ES Land Management Branch) immediately following completion of construction activities.
- The final acreages of riparian vegetation (woody or herbaceous) that are temporarily and permanently cleared would be reported to AC/S ES Wildlife and Land Management Branch's NEPA specialists for recording into the Riparian Biological Opinion Yearly report.
- If breeding season avoidance is not practicable, the following additional measures would be applied for CAGN, LBVI, and SWFL, subject to review by USFWS:
 - Within 7 days before clearing habitat, a qualified biologist would conduct pre-construction surveys for CAGN, LBVI, and SWFL and for active nests in all suitable habitats within 250 ft (76 m) of the proposed construction area.
 - If an active CAGN, LBVI, or SWFL nest occurs within 250 ft (76 m) of the proposed construction corridor, the qualified biologist would report the nest to the AC/S ES Wildlife Management Branch. A weekly nest status report would be sent to the branch as well.
 - Construction activities, other than the use of existing roads, would not be conducted within 250 ft (76 m) of an active nest. The area within 250 ft (76 m) would be avoided until the nest fails or until at least 10 days after young fledge from the nest, unless the Marine Corps and USFWS mutually agree that disturbance is not likely.
 - Construction noise levels would be monitored by the qualified biologist, and if construction levels exceed preconstruction ambient noise levels within the nesting territories during the breeding season, noise attenuation measures would be implemented.

Tidewater Goby (TWG)

The following design objectives developed by AC/S ES Land Management Branch would be incorporated into the engineering design to protect Las Flores Creek and the TWG from potential indirect environmental impacts:

- Construction equipment, vehicles, and workers would remain outside of the wetted channel and wetland/estuary habitat.
- A retaining wall would be constructed between the widened Red Beach Road and Las Flores Creek to minimize intrusion into the Las Flores Creek floodplain. The retaining wall would be constructed to support and stabilize the roadway, but would not intrude into the Las Flores Creek wetted channel.
- Bank stabilization structures would be used to reduce runoff speed and erosion from the project site. The reduction in floodwater flows would limit bank erosion downstream, retain embankments along Las Flores Creek, and decrease erosion and sedimentation. Erosion control measures would be reviewed by AC/S ES Land Management Branch personnel.
- Construction BMPs would be implemented to limit sediment transport from disturbed soils and substrate.

2.4.2 Special Conservation Measures Developed for this Supplemental EA

1. NCTD would coordinate with other rail operators, Metrolink, Amtrak, and BNSF during design and construction of the new Red Beach Bridge.
2. NCTD would provide flagging services during construction of the new Red Beach Bridge.
3. If the southern access road is used to transport construction equipment, protective fencing or staking would be installed to avoid sensitive biological resources, and biological monitoring would be performed. Installation of fencing would not include post holes, trenching, or any other ground disturbing activities within the boundaries of archaeological sites SDI-811 and SDI-10731.
4. The southern access road and construction staging areas would only be used during the dry season and steel plates would be placed over depressions to avoid sensitive biological resources. No grading would occur; if necessary for vehicle access, ruts or depressions would be temporarily covered with steel plates.
5. Due to the archaeologically sensitive nature of the project area, a professional archaeologist and a Native American representative would monitor all construction activity to ensure that the project does not adversely affect cultural resources that may be discovered during construction. A monitoring and discovery plan must be submitted 30 days before construction for approval by the AC/S Cultural Resources Branch Head. A technical monitoring report would be prepared and submitted to the CASHPO upon the project's completion.

To reduce impacts for the southern access road through SDI-10728 to a level of insignificance, no improvements, such as grading or capping, to the access road through SDI-10728 would take place. Instead, temporary fencing or staking would be erected along the edges of the road, to confine access to the existing roads. Installation of fencing would not include post holes, trenching, or any other ground disturbing activities within the boundaries of SDI-10728. Monitoring by a qualified archaeologist would be conducted for all ground disturbing activities (i.e. grubbing, clearing, fence installation, etc.) to ensure protective measures are being implemented and to examine the effectiveness of those measures.

6. Regarding jurisdictional waters of the U.S. and wetlands, the biological monitor must have completed a CWA permitting class, have a Natural Resource degree, and at least one year of experience with permit monitoring.
7. **USACE Jurisdictional Waters of the U.S. and Wetlands.**

The USACE NWP General Conditions listed below would be implemented during construction:

1. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.
2. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.
3. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

4. **Suitable Material.** No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
5. **Water Supply Intakes.** No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.
6. **Adverse Effects from Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.
7. **Management of Water Flows.** To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).
8. **Fills Within 100-Year Floodplains.** The activity must comply with applicable FEMA approved state or local floodplain management requirements.
9. **Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.
10. **Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
11. **Removal of Temporary Fills.** Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.
12. **Proper Maintenance.** Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.
13. **Endangered Species.**
 - (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.
 - (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have “no effect” on listed species or critical habitat, or until Section 7 consultation has been completed.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWP.

(e) Authorization of an activity by a NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal “takes” of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their worldwide Web pages at <http://www.fws.gov/> and <http://www.noaa.gov/fisheries.html> respectively.

14. Historic Properties.

(a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted

and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

15. Designated Critical Resource Waters. Critical resource waters include, NOAA designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWP 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

16. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWP. For example, if a NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWP.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a

permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

17. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of a NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

18. Coastal Zone Management. In coastal states where a NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

19. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

20. Use of Multiple NWPs. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

21. Transfer of NWP Verifications. If the permittee sells the property associated with a NWP verification, the permittee may transfer the NWP verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the NWP verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this NWP are still in existence at the time the property is transferred, the terms and conditions of this NWP, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this NWP and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below." (Transferee) (Date)

22. Compliance Certification. Each permittee who received a NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:

- (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;
- (b) A statement that any required mitigation was completed in accordance with the permit conditions; and
- (c) The signature of the permittee certifying the completion of the work and mitigation.

23. Pre-Construction Notification.

(a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) Forty-five calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of a NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (sketches usually clarify the project and when provided result in a quicker decision);

(4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current

method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination:

(1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWP's and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring pre-construction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may

proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination. (5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

(e) District Engineer's Decision: In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either:

- (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit;
- (2) That the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or
- (3) That the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on

the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

24. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

8. Rare Plants including *Brodiaea filifolia* (BRFI)

- Known occurrences of rare plants within 300 feet of project boundaries would be identified on project construction plans.
- The biological monitor would be a trained botanist that is familiar with the four rare plants occurring along the southern access road.
- The rare plant populations would be avoided and would be clearly identified in the field with markers or temporary exclusion fencing.
- The temporary fence installation would be monitored by the biological monitor.
- The biological monitor would conduct a contractor education program during all project phases and cover the presence of listed rare plant species, the requirements and boundaries of the project, the importance of complying with avoidance, minimization, and compensation measures; and problem reporting and resolution methods.
- The known rare plant populations along the southern access road would be monitored by the biological monitor during construction.

9. Vernal Pools and San Diego Fairy Shrimp (SDFS)

A small pool occupied by SDFS exists at the entrance to the southern access road from Stuart Mesa Road. The following measures would be incorporated into the project to avoid impacts to SDFS:

- SDFS – occupied pools would be avoided to the greatest extent feasible. Known occurrences within the project boundaries or within 150m (500 ft) of project boundaries would be identified on project construction plans, and as determined by the qualified biologist. Occupied habitats would be clearly marked and avoided during construction activities.
- During the dry season, the SDFS occupied vernal pool in close proximity to the road would be covered with metal plates to avoid impacts.

CHAPTER 3

EXISTING ENVIRONMENT

This chapter describes the existing environmental conditions in and around MCB Camp Pendleton for resources potentially affected by implementation of the Proposed Action described in Chapter 2. Information presented in this chapter represents baseline conditions against which the Proposed Action and No-Action Alternative are evaluated to identify potential impacts (refer to Chapter 4). In compliance with NEPA, CEQ regulations, and DON and USMC procedures for implementing NEPA, the description of the affected environment focuses only on those resources potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of impact. Accordingly, the discussion of the affected environment (and associated environmental analyses) focuses on topography, geology, and soils; hydrology; biological resources; cultural resources; air quality; and hazardous materials and wastes within the affected area for each resource. Conversely, the following resource areas were not carried forward for analysis in this SEA, as potential impacts were considered to be negligible or non-existent:

Transportation. Upon completion of construction, the roads in the project area would not be subject to significantly higher traffic volumes. Although construction and modification to existing transit and maneuver corridors would occur, the improvements would increase flexibility and accessibility of operational access routes for tactical vehicles traveling between Red Beach and inland training areas at MCB Camp Pendleton. However, no increase in operational tempo (i.e., frequency and magnitude of vehicular use) of the training corridor would occur with implementation of the Proposed Action or No-Action Alternative. The advantages of the proposed design are that the extension of the existing east second line expansion located immediately south of the existing arch bridge would require less track re-alignment, less imported earth fill for the new south abutments, fewer retaining walls and retaining wall lengths, and no construction proximity conflicts with the I-5 freeway. It is anticipated that no track closures would be required under the Proposed Action, with the exception of minor railway traffic delays required for track alignment work once the bridge structures have been constructed. Approximately six temporary delays would be necessary, each lasting approximately one to two hours. In the unlikely event that extended closure of the railway was required, bus service would be on-call and ready to shuttle rail passengers appropriately. Therefore, no significant impacts to transportation would occur with implementation of the Proposed Action.

The No-Action Alternative would maintain the status quo and would not accommodate the USMC tactical training transit and would continue to cause delays along the LOSSAN rail corridor.

Noise. The project site is subject to high levels of noise due to the I-5 overpasses and frequent commuter and cargo train trips along the railway. Noise levels at the site are likely highest during rush hour traffic. Construction noise associated with the Proposed Action and No-Action Alternative would be neither extreme nor unusual. There are no sensitive noise receptors (residences, biological resources) in the vicinity of the site. Therefore, no significant impacts related to noise would occur under the Proposed Action or No-Action Alternative. Noise-related impacts specific to wildlife are addressed in Biological Resources.

Land Use and Recreation. The project site is a training area at MCB Camp Pendleton. The Proposed Action has been sited in accordance with the Base Master Plan, base land and facilities use, and the Base Exterior Architectural Plan land use development guidelines addressing safety,

functionality, and environmental protection zones. In addition, much of the project would occur over existing roads and previously disturbed sites. The proposed project would not change the nature of land use at the project site or surrounding training facilities.

Project construction would not have any permanent effect on public access to, or commercial or recreational use of the coastal zone. MCB Camp Pendleton as a whole is restricted from public access. The project area is not authorized for commercial use. The USMC consulted with the California Coastal Commission (CCC) during the 2010 P-159 EA process to request concurrence with its Coastal Consistency Negative Determination (CCND). At that time, the CCC provided a letter to the USMC concurring with the determination that the Proposed Action would not adversely affect coastal resources (refer to Appendix C of the P-159 EA). The SEA Proposed Action focuses on the additional bridge design/construction components described in Chapter 2. None of these components would affect coastal resources. A supplemental CCND was prepared by the USMC and submitted to the CCC as part of this SEA. The CCC provided a letter to the USMC concurring with the determination that the Proposed Action would not adversely affect coastal zone resources (refer to Appendix B of this SEA).

Socioeconomics. Construction of this project would not result in the displacement of people or businesses and would not change the economic character or stability of the surroundings. Construction contractors would be drawn from the neighboring communities. Therefore, no significant impacts to socioeconomics would occur under the Proposed Action or No-Action Alternative.

Environmental Justice. Implementation of the Proposed Action or No-Action Alternative would not result in the disproportionate impact to minority populations or low-income populations nor would it result in environmental health risks or safety risks to children.

Aesthetics. Implementation of the Proposed Action would not adversely affect aesthetics or visual resources as the proposed road improvements and bridge replacement system would be consistent with existing land uses within MCB Camp Pendleton and the NCTD railway easement. The proposed project would follow approved guidelines in the Base Exterior Architectural Plan and would be consistent with the existing I-5 and railway overpasses. Due to the small number of potential viewers, and the moderate visual quality of the location, effects to the overall visual quality of the site are low. Implementation of the Proposed Action or No-Action Alternative would not adversely affect the visual setting. Therefore, no significant impacts related to aesthetics would occur under the Proposed Action or No-Action Alternative.

Utilities. An existing fiber optic line west of the railway and within the railway easement would be relocated around the new bridge structure. The existing gas line located east of the railway would be clearly marked and protected with a reinforced encasement furnished by the construction contractor, and/or protected by a retaining wall system to protect the pipe from exposure. Utility upgrades would not be required to accommodate the access road improvements or bridge replacement system. Therefore, no significant impacts related to utilities would occur. In addition, no significant impacts to utilities would occur under the No-Action Alternative.

Public Health and Safety. The Proposed Action would be sited in accordance with established land use development guidelines addressing safety, functionality, and environmental protection zones. The project site is not located close to any population centers or public facilities. Access to the project area is restricted to military personnel during training operations, and NCTD personnel within the railway easement area. Implementation of the Proposed Action would comply with

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risk*, as construction areas would be fenced to prevent access by unauthorized persons, including children. Proposed operation of the access lanes would not pose a risk to public health or safety and no changes to existing safety procedures or guidelines would occur. Therefore, no significant impacts related to public health or safety would occur. In addition, no significant impacts to public health and safety would occur under the No-Action Alternative.

3.1 TOPOGRAPHY, GEOLOGY, AND SOILS

3.1.1 Definition of Resource

Topography describes the surface characteristics of the land such as slope and elevation. The geology of an area includes bedrock materials, mineral deposits, and fossil remains. The primary geologic factors influencing the stability of structures are soil and bedrock depth, stability and seismic properties.

Bedrock refers to consolidated material composed of interlocking crystals (igneous or metamorphic rocks) or sedimentary rocks consisting of particles compacted and cemented together over time (sandstone, shale). Soil refers to unconsolidated earthen materials overlying bedrock (sand, silt, clay). Soil structure, elasticity, strength, shrink-swell potential, liquefaction potential, and erodibility all determine the ability for the ground to support structures and facilities.

3.1.2 Existing Conditions

MCB Camp Pendleton is located within the Peninsular Ranges Geomorphic Province of California, characterized by a series of northwest trending ranges of mountains and hills. Coastal plateaus extend inland a short distance to foothill ranges, beyond which is the higher Peninsular Range.

The region is characterized by deep marine sedimentation followed by regional uplift, subsequent stream and marine erosion, and fluvial deposition. The project area is located in the fluvial outwash of Las Flores Creek and its tributary, Piedra de Lumbre Creek. Las Flores Creek originates in the foothills of the Santa Margarita Mountains and flows in Las Pulgas Canyon westward through the San Onofre Hills and onto the coastal plateau, where it is joined by Piedra de Lumbre Creek, forming a wide floodplain.

The United States Department of Agriculture (USDA) classifies soil types according to their locations, physical properties, steepness of slopes on which they occur, and relative compatibility or limitations with regard to particular construction activities and types of land use. The soil types are grouped into associations that are generally found in similar physical settings. The project footprint is within an area mapped as Tujunga sand, which consists of deep, well-drained sands located on alluvial fans and flood plains. Adjacent to the project area are terrace escarpments to the south, Salinas clay to the north, and steep, gullied land to the west. However, much of the project area, including the I-5 and railway overpasses, and sections of Red Beach Road have been disturbed and modified such that imported fill dirt, gravel, and rock overlay the native soils.

Table 3.1-1 lists the soil types found within and near the project area boundaries based on the USDA Soil Conservation Service (USDA 1973, 2006).

Table 3.1-1. Project Area Soils

Soil Name	Symbol	Occurrence	Susceptibility to Erosion	Shrink-Swell Behavior
Tujunga sand	TuB	0 to 5 percent	Slight	High
Salinas clay	ScA	0 to 2 percent	Severe	High
Steep gullied land	StG	Varies	Severe	High
Terrace escarpments	TeF	Varies	Severe	High

Source: USDA 1973, 2006.

Faulting and Seismicity

The California Division of Mines and Geology classifies faults as active or potentially active, according to the Alquist-Priolo Special Studies Zone Act of 1972 (Hart 1997). The California Division of Mines and Geology defines an active fault as a fault that has exhibited sediment displacement within the Holocene Epoch (the last 11,000 years). A fault that has exhibited sediment displacement during the Pleistocene Epoch (which began about 1.6 million years ago and ended about 11,000 years ago) is defined as potentially active. Earthquake magnitude is described by the Richter scale.

Fault activity causes damage in a variety of ways. Hazards can include landslides, ground shaking, surface displacement and rupture, and the triggering of tsunamis. In general, the type of damage caused at a particular location depends on (a) the proximity to an active fault, (b) the frequency and severity of the earthquake, (c) the potential for surface rupture, (d) the composition of the surface, and (e) topography.

MCB Camp Pendleton is not underlain by any active or potentially active faults, but is located in an active seismic region, characterized primarily by the San Jacinto, Elsinore, and Coronado Bank fault zones in the surrounding region of southern California. These regional faults do not pass within the boundaries of MCB Camp Pendleton; however, numerous active faults that could cause ground motion or produce secondary effects are located within 60 miles (97 km) of the base. The project area is not included within an Earthquake Fault Zone as created by the Alquist-Priolo Act (Hart 1997).

Figure 3.1-1 shows the locations of regional fault zones. Several of the faults and the fault zones in the region surrounding the project area are considered to be active by the California Division of Mines and Geology. Table 3.1-2 lists the active regional faults closest to the project site.

Table 3.1-2. Major Active Faults in Vicinity of Project Area

Fault Name	Approximate Distance from Fault to Study Area (in miles)
Offshore Zone of Deformation	6
Whittier-Elsinore Fault	25
Rose Canyon Fault Zone	28
Newport-Inglewood Fault	38

Source: Association of Engineering Geologists 1973.

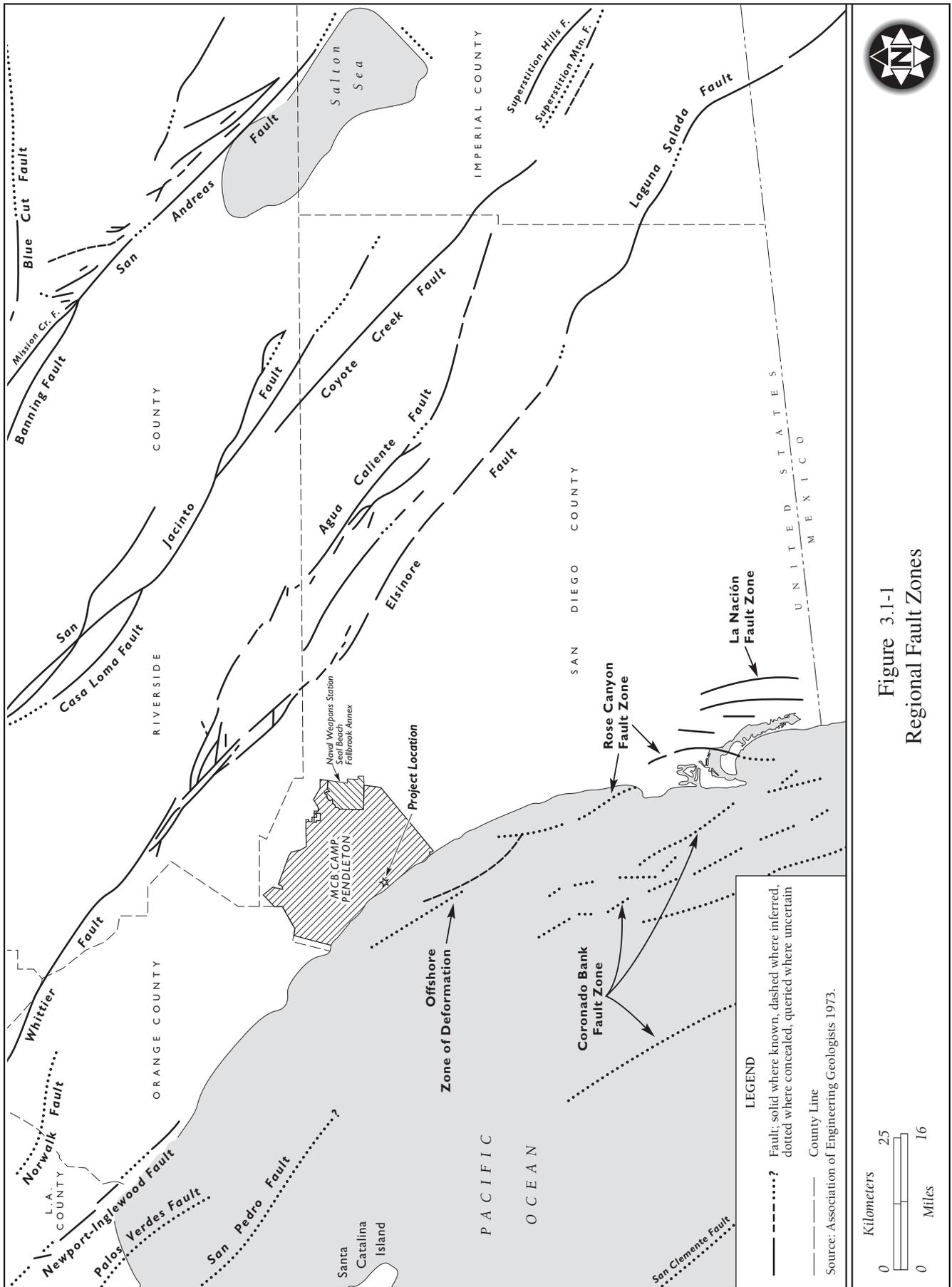


Figure 3.1-1
Regional Fault Zones

3.2 HYDROLOGY

3.2.1 Definition of Resource

General hydrology, water supply, water quality, and flooding are discussed in this section. Hydrology is the science that deals with global water, its properties, circulation, and distribution, on and under the surface of the earth and in the atmosphere, from the moment of precipitation until it returns to the atmosphere through evapo-transpiration or is discharged into the ocean. Water supply includes surface and groundwater resources that are potentially available for consumption. Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities. For the purposes of this analysis, freshwater quality is evaluated with respect to possible releases of hazardous material and erosion-induced sedimentation resulting from the action alternatives. Floodplains are located adjacent to rivers. A 100-year floodplain is an area that is subject to a 1 percent chance of flooding in any particular year, or, on average, once every 100 years. A detailed hydrologic study for this project is provided in Appendix A of this SEA.

3.2.2 Existing Conditions

3.2.2.1 Surface Water Resources

MCB Camp Pendleton is divided by mountain ranges into seven watersheds: San Mateo, San Onofre, Las Flores, Aliso, San Luis Rey, Horno/Coastal, and Santa Margarita. Water flows southwestward via these streams to discharge in the Pacific Ocean. The project is located in the Las Flores watershed, which encompasses approximately 16,900 acres (6,830 hectares) in the central portion of MCB Camp Pendleton (USMC 2007).

The Las Flores watershed contains two smaller component basins: Las Pulgas Canyon and Piedra De La Lumbre Creek (USMC 2007). The Las Flores watershed is completely contained within MCB Camp Pendleton. The upper portion of the watershed drains coastal hills, San Onofre Hills, and portions of the Santa Margarita Mountains. After passing through Las Pulgas Canyon, the lower part of the watershed drains an alluvial valley and empties to the Pacific Ocean at Red Beach, where dunes restrict outflow, forming a lagoon and coastal wetlands.

Flow in Las Flores Creek varies widely in response to seasonal rainfall (USMC 2007). In 21 years of record, a maximum of 20.54 inches (52.17 centimeters) and a minimum of 3.46 inches (8.78 centimeters) of rainfall per year were recorded at a Base weather station at Las Flores Creek. During the dry season and times of drought, Las Flores Creek may be dry from July through October (USMC 2007). Conversely, flow level will rise to flood stage, especially in the lower reaches, in heavy rainfall years. The supplemental hydrologic study of the Las Flores Creek system prepared for this project calculated the 100-year flow rate for Las Flores Creek during peak conditions at the I-5/NCTD crossing to be 7,163 cubic feet per second (RBF Consulting 2011, refer to Appendix A). The project site is located within the 100-year floodplain mapped for Las Flores Creek (MCB Camp Pendleton 2011).

Limited water quality data is available for the Las Flores watershed. However, surface water samples indicate that Las Flores Creek has had levels of total dissolved solids that at some point exceeded the RWQCB objectives. While surface water samples from Las Flores Creek met groundwater drinking water standards for most constituents, recurring problems have been noted for total dissolved solids, conductivity, nitrate, sodium, and coliform bacteria (*E. coli*). The data have not indicated any long-term trends. The frequent low-flow volumes in the streams can intensify water quality problems resulting from

human activity or natural conditions. Surface water from Las Flores Creek is not used as a source of potable water supply (USMC 2007).

Las Flores Creek flows toward the west along the south side of Red Beach Road, adjacent to the south of the project area (Figure 2-1). The creek is conveyed under the railway in a large concrete arched culvert (approximately 15 ft [4.6 m] in width and 20 ft [6 m] tall), which constricts the flow of the river. Beneath I-5, the sides of the stream channel are lined with riprap and filled soils. The stream channel bottom below both the railway underpass and I-5 is unlined, consisting of sandy mud, with layers of sand and road fill material that have been washed down into the creek channel.

Upstream (east) of the arched culvert, the creek channel is a wide swale. North of Red Beach Road, embankment filling for the railway tracks and highway forces surface water into a drainage tributary that runs parallel to the railway tracks. The tributary maintains a small perennial flow that moves slowly southward toward Las Flores Creek. Red Beach Road lies in the natural flow path of the tributary, and its outflow is conveyed to Las Flores Creek through three undersized metal pipe culverts under Red Beach Road. As a result, surface water from the tributary water seeps through the railway platform embankment, forming small pools in the existing dirt road.

The southern bank of the creek is connected to drainage along the west side of I-5 by a ditch and vegetated swales. The drainage ditch is relatively narrow along the interstate, but becomes flatter and wider as the topography drops into the Las Flores Creek channel. Multiple runoff channels are intertwined through riparian vegetation where the ditch outwashes into the Creek. Flow in these drainages is intermittent, with some depressed basins holding water into the summer months.

3.2.2.2 Groundwater

MCB Camp Pendleton has four groundwater basins that correspond to, and are connected with, the four major surface drainage basins (Santa Margarita, San Onofre, Las Flores and San Mateo). Most of the groundwater at MCB Camp Pendleton is contained in the alluvial materials and shallow sedimentary rock units of these four major groundwater basins. The aquifers are generally unconfined, due to the interfingering and discontinuous nature of these reservoir materials. The regional flow of groundwater is suspected to be toward the southwest, from the slopes of the mountains toward the ocean. Overall, localized water tables can be expected at similar elevations to those of observed nearby flowing streams, or below the elevations of dry stream channels.

The alluvial valleys formed by the downstream portion of all four major creeks, including Las Flores Creek, contain the primary source of water for MCB Camp Pendleton. The project site is located within the Las Flores groundwater basin. Three groundwater wells located near Las Flores Creek supply drinking water for Camp Pulgas and Camp Las Flores (USMC 2007). The safe yield of the Las Flores groundwater basin is estimated at 600 acre-feet per year (USMC 2007). The water supply wells are located upstream of the project site approximately 0.9 mile (1.4 km) to the north.

3.3 BIOLOGICAL RESOURCES

3.3.1 Definition of Resource

This section describes native and naturalized plants and animals and their habitats that are known or expected to occur in areas affected by the Proposed Action. For the purpose of this SEA, biological resources are divided into three major categories: plant communities and aquatic habitats, the latter including CWA Section 404 jurisdictional waters of the U.S.; wildlife, including migratory birds; and special-status species, including federally-listed or proposed species and other special concern species.

Fieldwork conducted for the P-159 Red Beach project is referenced in this SEA and was used for the analysis of impacts to biological resources (NAVFAC SW 2010a). Throughout this section and Section 4.3, the term “project area” is used to describe the NCTD easement along the proposed railway bridge improvements (Figure 3.3-1). Additional vehicle access would be confined to existing roads. The term “action area” encompasses the potential direct and indirect effects of the action on biological resources. The term “footprint” is used where applicable to describe an area of ground disturbance or modification by the project.

3.3.2 Existing Conditions

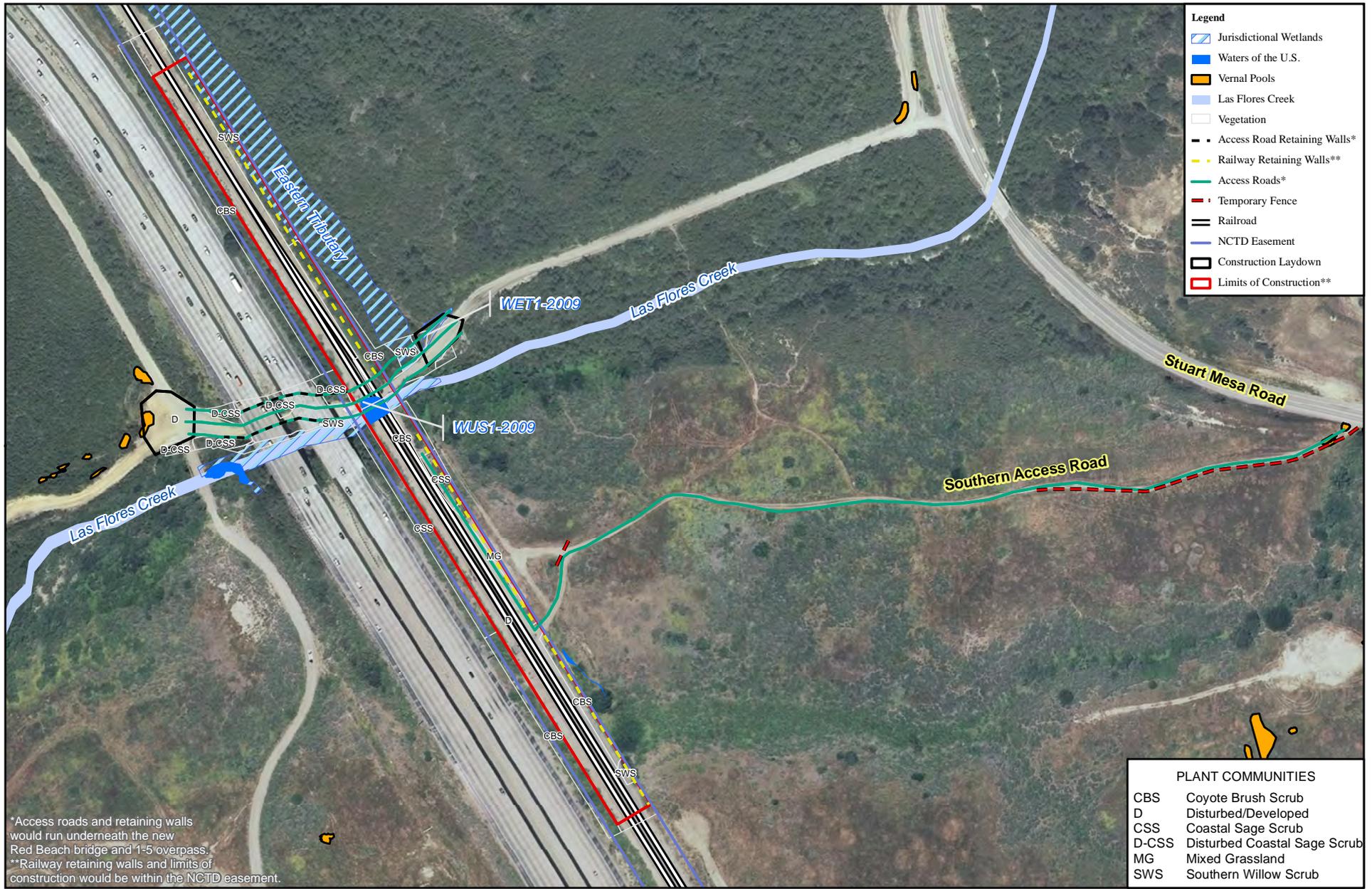
3.3.2.1 Plant Communities and Aquatic Habitats

Plant Communities

Plant communities within the project area (Figure 3.3-1) were delineated based on fieldwork conducted by Cardno TEC, Inc. during several site visits in spring 2006 and verified in winter 2010/2011. Plant communities were classified using the Holland (1986) system as adapted to San Diego County (Oberbauer et al. 2008), modified for consistency with local circumstances and previous plant community mapping on MCB Camp Pendleton (USMC 2007), and mapped digitally onto aerial photographs at a scale of 1:2400 (1 inch equals 200 ft [61 m]).

The following plant communities are recognized, often in combination, in the project area. For convenience, alternative designations based on Sawyer et al. (2009) are included in parentheses. Table 3.3-1 lists the acreages of each plant community within the project area and Figure 3.3-1 presents the plant communities.

- *Diegan Coastal Sage Scrub (California Sagebrush Scrub) (CSS)*. CSS is a type of coastal scrub in which the most abundant and characteristic shrub species is California sagebrush (*Artemisia californica*); although, other shrubs or succulents are often present. This community occurs primarily on open hillsides and dry flats.
- *Diegan Coastal Sage Scrub-Baccharis Dominated (Coyote Brush Scrub) (CBS)*. This shrub-dominated community is common in coastal southern California and on MCB Camp Pendleton. Within the project area, as elsewhere on MCB Camp Pendleton, it occurs in mesic transitional areas on slopes and in swales and floodplains bordering drainages. Coyote brush and Mexican elderberry (*Sambucus mexicana*) are the dominant species. Other coastal sage scrub and chaparral species are present, including laurel sumac (*Malosma laurina*), lemonadeberry (*Rhus integrifolia*), toyon (*Heteromeles arbutifolia*), nightshade (*Solanum douglasii*), and poison oak (*Toxicodendron diversilobum*). Scattered arroyo willow (*Salix lasiolepis*), mulefat (*Baccharis salicifolia*), sweet fennel (*Foeniculum vulgare*), and poison hemlock (*Conium maculatum*) are also common components.
- *Southern Willow Scrub-Coastal and Valley Freshwater Marsh (Mixed Willow-Bulrush-Cattail) (SWS)*. Riparian scrub is associated with temporarily flooded streambeds and floodplain areas. The riparian community in the project area is dominated by a mixture of woody riparian species including several species of willow (*Salix* spp.) and mulefat that occur along streambeds (NAVFAC SW 2010a).



0 100 200 400 Feet
 0 25 50 100 Meters

Figure 3.3-1
 Plant Communities and Aquatic Habitats
 Red Beach

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 N

The freshwater marsh associated with Las Flores Creek was analyzed in the original P-159 EA and consists of Olney's bulrush (*Schoenoplectus americanus*), spike-rush (*Eleocharis* spp.), southern cattail (*Typha domingensis*), leather root (*Hoita macrostachya*), seep monkey flower (*Mimulus guttatus*), water-cress (*Nasturtium officinale*), water-pimpernel (*Samolus parviflorus*), great marsh primrose (*Oenothera elata*), and horsetail (*Equisetum* spp.) (NAVFAC SW 2010a).

The SWS in the northeast portion of the project area is dense, high quality riparian habitat. A small section of high quality SWS also occurs in the southeast edge of the project area. High quality habitat is described as "riparian woodland dominated by willow species with a well-developed canopy and dense understory of shrub and herbaceous vegetation" (USFWS 1995a).

- *Mixed Grassland (Purple Needlegrass – California Annual Grassland) (MG)*. This is a mixed community dominated by both native and non-native grasses. Conspicuous native species include one or more species of needlegrass (*Nassella* spp.), fascicled tarweed (*Deinandra fasciculata*), and doveweed (*Croton setigerus*). Non-native annual grasses, especially bromes (*Bromus* spp.), ryegrass (*Lolium multiflorum*), and wild oats (*Avena* spp.), and forbs such as filaree (*Erodium* spp.) and African woodsorrel (*Oxalis pes-caprae*) are abundant. Regionally rare native species found in this community east of the project area include Pendleton button-celery (*Eryngium pendletonense*) and Coulter's saltbush (*Atriplex coulteri*). This community is prevalent on dry flats and gently sloping hillsides and is commonly associated with areas of previous and/or continual disturbance.
- *Developed/Disturbed Areas (D)*. Developed and disturbed areas include paved, graded, or barren areas on roads, paths, and eroded slopes, as well as the railway and I-5 embankments. The majority of the project area is developed/disturbed.

Table 3.3-1. Plant Community Acreages

Plant Community	Proposed Action (acres)
Coastal Sage Scrub (Diegan) (CSS) (CAGN Habitat)	0.08
Coyote Brush Scrub (CBS)	0.37
Southern Willow Scrub-Coastal and Valley Freshwater Marsh (SWS)	0.28
Mixed Grassland (MG)	0.07
Developed /Disturbed Areas (D)	2.17
Total	2.97

Vernal pool habitat, including basins and road ruts, was mapped in winter 2006/2007 (NAVFAC SW 2010a). Vernal pool habitat that has been mapped within the Proposed Action footprint occurs within the disturbed construction staging area (see Figure 3.3-1). This basin is void of vegetation, yet is known to be Lindahl's fairy shrimp habitat (see Section 3.3.2.2 [Wildlife]). Additional vernal pool habitat occurs in the vicinity and at the entrance of the southern access road.

MCB Camp Pendleton has designated a riparian protection zone in Las Flores Creek from upstream of the action area downstream to the I-5 crossing. A special estuarine protection zone extends from the mouth of Las Flores Creek (at the Pacific Ocean) upstream to the I-5 crossing. Marine Corps training use of these zones is restricted to existing roads and creek crossings during the breeding season for federally listed threatened and endangered bird species, 15 March to 31 August (USFWS 1995a).

Jurisdictional Waters of the U.S.

Aquatic habitats in the project area include wetlands and perennial, ephemeral, and intermittent (seasonal) streams that drain to Las Flores Creek. These areas are subject to regulatory jurisdiction of the USACE under Section 404 of the CWA (33 CFR, Parts 320-330). The jurisdictional limits of Section 404 of the CWA extend to traditional navigable waters and their adjacent wetlands and tributaries, conditional upon a “significant nexus” to the functions and values of the navigable water body. Wetlands and potential waters of the U.S. within or in the vicinity of the project area were delineated by Cardno TEC during surveys in 2006 and again in 2009 (Cardno TEC 2009). Two general areas in the project vicinity contain wetlands and jurisdictional waters of the U.S. (refer to Figure 3.3-1):

- *Las Flores Creek.* Las Flores Creek flows from the east parallel to Red Beach Road. The creek is conveyed under the railway in a concrete arched culvert. Las Flores Creek and portions of its channel are jurisdictional waters of the U.S. and wetlands. Under I-5, the creek banks are poorly defined with degraded concrete storm walls and riprap. Part of the floodplain has filled with soil and sediment, supporting wetland vegetation. The existing roadway is located on a small terrace above the edge of the floodplain. The embankments along Las Flores Creek west of the project site were revegetated after an asphalt spill several years ago.

South of Las Flores Creek, runoff from I-5 drains west into a ditch which flows north to Las Flores Creek. The drainage ditch is relatively narrow along the interstate, but becomes flatter and wider as the topography drops into the Las Flores Creek channel. The narrow drainage is a wetland and a jurisdictional water of the U.S. It appears that the drainage channel migrates periodically, presumably in response to the dense riparian willow vegetation.

The majority of Las Flores Creek is just south of the P-159 access road project area and the proposed project area for the widening of the railway tracks (refer to Figure 3.3-1). As part of the Proposed Action the railway bridge over Las Flores Creek would be replaced and the concrete arches just east of Las Flores Creek would be removed. The construction would avoid the creek.

- *Eastern Tributary.* This tributary collects water from springs to the northeast of the project area and supports jurisdictional wetlands between the north side of Red Beach Road and the railway berm. Surface water is conveyed by culvert under Red Beach Road into Las Flores Creek just upstream of the railway bridge. Runoff from the railway platform and the old dirt roadway collects in the eastern tributary. Drainage appears to be inadequate and groundwater seepage is evident at the culvert crossing. Water seeps through the railway embankment and pools in road ruts at Red Beach Road. The seeping water flows through the arch culvert and forms puddles in the roadway under the I-5 overpasses. The southern portion of the eastern tributary is overlapped by the proposed P-159 access road footprint, while the northwestern portion edge is overlapped by the area proposed for the widening of the railway tracks (refer to Figure 3.3-1).

The Proposed Action footprint overlaps approximately 0.129 acre (0.052 hectare) of jurisdictional wetlands along the eastern tributary. In the 2009 jurisdictional delineation for the original P-159 EA footprint it was determined that impacts could occur to 0.051 acre (0.021 hectare) of jurisdictional wetlands and 0.013 acre (0.005 hectare) of a non-wetland water of the U.S. (NAVFAC SW 2010a) from access road construction. The Habitat Mitigation Plan proposes mitigation for permanent impacts at the proposed Pilgrim Creek mitigation site at a 2:1 ratio for wetland impacts from the original P-159 footprint and the additional impacts from this Proposed Action.

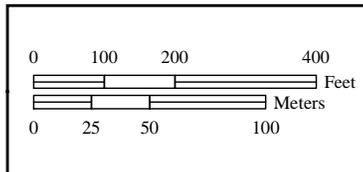
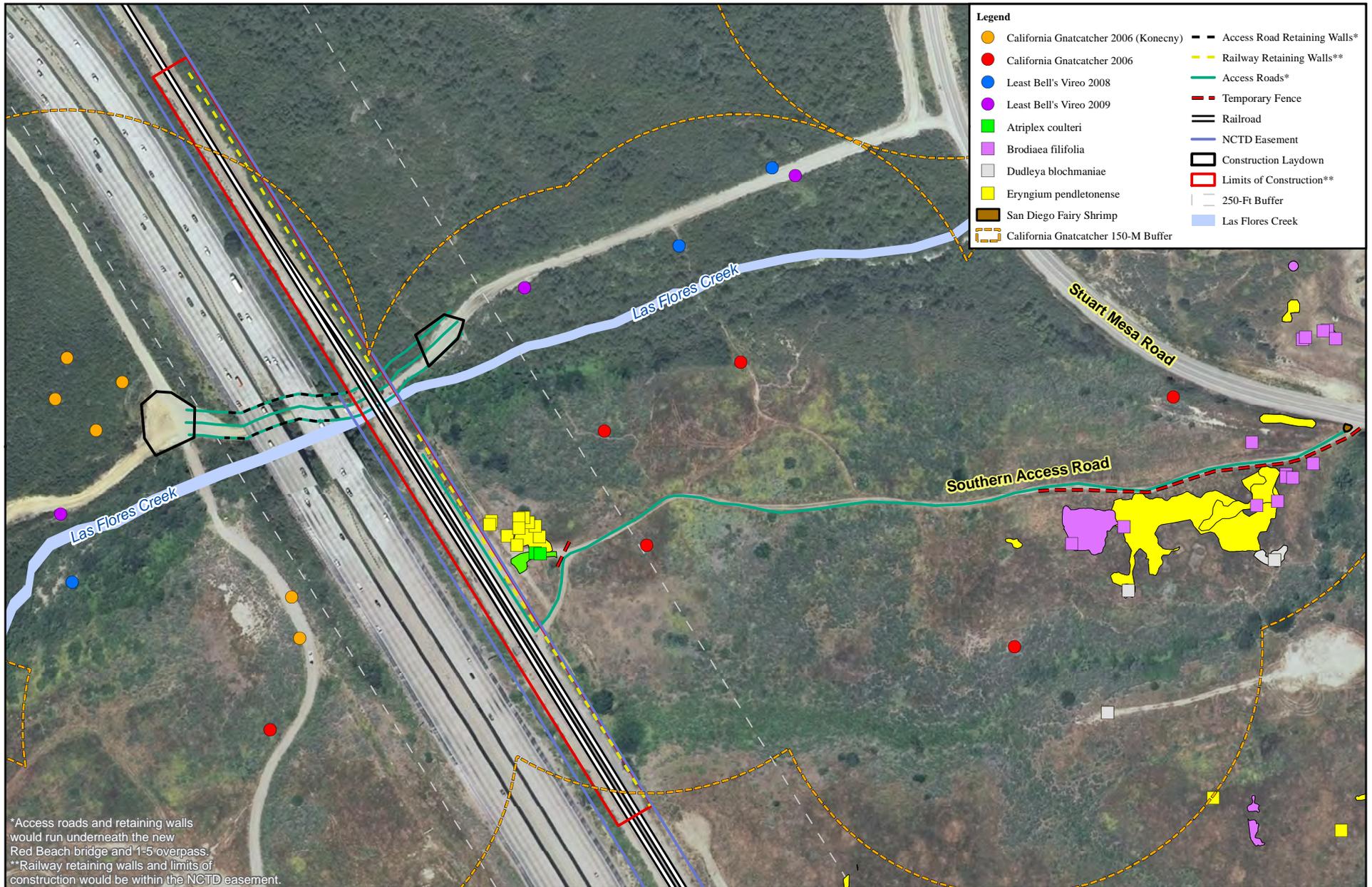


Figure 3.3-2
 Special Status Species
 Red Beach



3.3.2.2 Wildlife

A diverse assemblage of mammals, birds, reptiles, amphibians, fish, and invertebrates occur within MCB Camp Pendleton. In addition to hundreds of invertebrates, MCB Camp Pendleton has documented the presence of more than 50 mammalian, 30 reptilian, 10 amphibian, 300 avian, and 60 fish species (USMC 2007). Many wildlife species on MCB Camp Pendleton can be found throughout the year. Other wildlife species visit MCB Camp Pendleton seasonally, such as migratory birds. A majority (97 percent) of avian species on MCB Camp Pendleton are included on the list of migratory birds (50 CFR 10.13) protected by the MBTA and EO 13186.

Mammalian species observed or inferred (on the basis of burrows or other signs) to be present during 2006 surveys for the Red Beach access road project and likely to occur in the project area include California ground squirrel (*Spermophilus beecheyi*), Audubon's cottontail (*Sylvilagus audubonii*), long-tailed weasel (*Mustela frenata*), dusky-footed woodrat (*Neotoma fuscipes*), and coyote (*Canis latrans*). Other common mammals in grasslands and coastal sage scrub habitats at MCB Camp Pendleton include the California vole (*Microtus californicus*), pocket gopher (*Thomomys bottae*), deer mouse (*Peromyscus maniculatus*), and mule deer (*Odocoileus hemionus*).

Two reptile species were observed in or near the project area: southern Pacific rattlesnake (*Crotalus oreganus helleri*) and western fence lizard (*Sceloporus occidentalis*). The San Diego gopher snake (*Pituophis catenifer annectens*) and western whiptail (*Cnemidophorus tigris*) are common in grassland and shrub habitats and are likely to occur in the project area.

Non-native crayfish (*Procambarus clarkii*) were observed in the eastern tributary along the railway embankment.

Forty-four bird species were observed during 2006 site visits and are likely to occur in the project area. Observed species from Konecny (2006) include red-tailed hawk (*Buteo lineatus*), western scrub jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), Anna's hummingbird (*Calypte anna*), California thrasher (*Toxostoma redivivum*), bushtit (*Psaltriparus minimus*), wrenit (*Chamaea fasciata*), California towhee (*Pipilo crissalis*), blue grosbeak (*Passerina caerulea*), spotted towhee (*Pipilo maculatus*), Cooper's hawk (*Accipiter cooperii*), downy woodpecker (*Picoides pubescens*), yellow warbler (*Dendroica petechia*), yellow-breasted chat (*Icteria virens*), and rufous-crowned sparrow (*Aimophila ruficeps*). Cliff swallows (*Petrochelidon pyrrhonota*) have built many nests along the Red Beach Road underpasses.

3.3.2.3 Special Status Species

Federally Listed Species

Eighteen federally threatened, endangered, or candidate terrestrial and aquatic species are found on, transit through, or have the potential to occur on MCB Camp Pendleton (Table 3.3-2). Descriptions of all threatened and endangered species known or likely to occur on MCB Camp Pendleton are included in the INRMP (USMC 2007).

Table 3.3-2. Federally Listed or Candidate Plant and Animal Species Known to Occur or Potentially Occurring on MCB Camp Pendleton

Common Name	Scientific Name	Federal Status	Habitat	Occurrence in Project Area
Plants				
San Diego button-celery	<i>Eryngium aristulatum</i> var. <i>parishii</i>	Endangered	Vernal pools	Not known or likely to occur due to lack of habitat
spreading navarretia	<i>Navarretia fossalis</i>	Threatened	Vernal pools	Not known or likely to occur due to lack of habitat
thread-leaved brodiaea	<i>Brodiaea filifolia</i>	Threatened	Grasslands	Occurs east of the project area along the southern access road
Brand's phacelia	<i>Phacelia stellaris</i>	Candidate	Coastal dunes	Not known or likely to occur due to lack of habitat
Invertebrates				
Riverside fairy shrimp	<i>Streptocephalus woottoni</i>	Endangered	Vernal pools	Not known or likely to occur due to lack of habitat
San Diego fairy shrimp	<i>Branchinecta sandiegonensis</i>	Endangered	Vernal pools	Occurs at the entrance to the southern access road.
Fish				
southern steelhead	<i>Oncorhynchus mykiss</i>	Endangered	Rivers and major streams	Not known or likely to occur due to lack of habitat
tidewater goby	<i>Eucyclogobius newberryi</i>	Endangered	Estuaries/coastal brackish lagoons	Occurs in Las Flores Creek downstream of the NCTD easement
Amphibians				
arroyo toad	<i>Anaxyrus californicus</i>	Endangered	Rivers, major streams, surrounding uplands	Not known to occur in the Las Flores watershed
Birds				
California least tern	<i>Sterna antillarum browni</i>	Endangered	Sandy beaches and coastal dunes	Occurs downstream of project area, on beach and foraging in lagoon, but not known or likely in project area due to lack of habitat
coastal California gnatcatcher	<i>Poliophtila californica californica</i>	Threatened	CSS	Occurs in CSS habitats adjacent to project area
least Bell's vireo	<i>Vireo bellii pusillus</i>	Endangered	Riparian	Occurs in riparian habitat along Las Flores Creek
light-footed clapper rail	<i>Rallus longirostris levipes</i>	Endangered	Coastal fresh and salt water marshes	Not known to occur but possible in lagoon and salt marsh downstream
southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Willow dominated riparian	Potential to occur in riparian habitat along Las Flores Creek
western snowy plover	<i>Charadrius alexandrinus nivosus</i>	Threatened	Sandy beaches	Occurs downstream of project area on beach, but not known or likely in project area due to lack of habitat
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	Candidate	Riparian	Not known or likely to occur due to lack of habitat
Mammals				
Pacific pocket mouse	<i>Perognathus longimembris pacificus</i>	Endangered	Coastal mesas, in sparse grassland with sandy soil	Not known or likely to occur due to lack of habitat. The nearest population is approximately 2 miles away in the Edson Range Impact Area
Stephens' kangaroo rat	<i>Dipodomys stephensi</i>	Endangered	Sparse CSS & grassland	Not known or likely to occur due to lack of habitat. The nearest population is approximately 2 miles away in the Las Pulgas area

Note: **Bold** indicates listed species present in or adjacent to the project area and addressed in this SEA.

Based on review of MCB Camp Pendleton's current geographic information system (GIS) information, site conditions, and field surveys conducted in 2006, CAGN, LBVI, SWFL, TWG, San Diego fairy shrimp (SDFS), and *Brodiaea filifolia* (BRFI) (thread-leaved brodiaea) or suitable habitat for these species are known to occur within or in the vicinity of the project area (MCB Camp Pendleton 2011). Federally listed species in the vicinity of the project area are presented on Figure 3.3-2.

Light-footed clapper rail (LFCR) was not detected during 2006 avian surveys and no LFCR habitat occurs in the project area. The small patches of cattail in the Las Flores Creek channel are not suitable to support LFCR (Konecny 2006). The nearest potential LFCR habitat is located approximately 2,000 ft (607 m) west and downstream of the project area where the creek forms a larger pond close to the shoreline of the Pacific Ocean. However, the species has never been detected at this location.

Basins and road ruts were surveyed for federally listed branchiopods in winter 2006/2007 (NAVFAC SW 2010a). Only Lindahl's fairy shrimp (*Branchinecta lindahli*), a relatively common and non-listed species, was detected in the basins along the edge of the potential laydown area west of the project area (refer to Figure 3.3-1). Additionally, federally endangered San Diego fairy shrimp (SDFS) (*Branchinecta sandiegonensis*) were found in 2005 in a depression on the southern access road near its entrance from Stuart Mesa Road (Black 2005) (refer to Figure 3.3-2).

No federally listed plant species were detected during a series of vegetation surveys of the project site in 2006 (NAVFAC SW 2010a) and no previous records indicate federally listed plants in the project area (NAVFAC SW 2010a) (MCB Camp Pendleton 2011); however, BRFI occurs north and south of the southern access road (refer to Figure 3.3-2).

Coastal California Gnatcatcher (CAGN)

CAGN is a small gray songbird that is an obligate, permanent resident of coastal sage scrub vegetation, but they will make limited use of adjacent habitats outside of the breeding season. The breeding season extends from February 15 through August 31, with peak nesting activities occurring from mid-March through May, as identified by the USFWS Carlsbad office (USFWS 2007a). CAGN usually begin to molt into breeding plumage in early February. Males select the site for nesting, and nest building begins two to four weeks after the molt. The nest is constructed primarily by the male, and takes between four and eleven days to complete. Eggs are incubated for 12 days, and nestlings fledge at 13 days. Young remain with their parents for three to five weeks after fledging. If there is persistent predation of eggs and young, up to ten nests can be constructed during the breeding season.

The USFWS designated CAGN as threatened in March 1993 (USFWS 1993). Currently there is no recovery plan for the CAGN. Since the time of listing, MCB Camp Pendleton has developed several conservation management programs and policies to protect the CAGN.

Critical habitat was designated in 2000 (USFWS 2000a), but was remanded for reconsideration based on litigation. The USFWS re-proposed critical habitat on 24 April 2003 (USFWS 2003a), which was subsequently revised, resulting in the final designation of critical habitat on 19 December 2007 (USFWS 2007b). All areas of MCB Camp Pendleton, including railway and freeway corridors across the Base as well as leased lands such as San Onofre State Beach, were excluded from designation based on ongoing conservation measures implemented at the Base.

The population of CAGN on MCB Camp Pendleton has expanded greatly with protective management of the species and its habitat under the INRMP (USMC 2007). Surveys in 2006 detected approximately 640 nesting pairs of the species on MCB Camp Pendleton, a substantial increase from 2003 but similar to 1998. Under the Base's INRMP and Range and Training Regulations, the removal of or damage to CSS

is prohibited, and training activities in the vicinity of occupied habitat are required to remain on existing roads during the breeding season.

Basewide survey data from 2006 indicate the presence of CAGN east and west of and outside of the project area (MCB Camp Pendleton 2011). In addition, targeted surveys for CAGN were conducted at the project site according to the breeding season protocol approved by the USFWS in 2006 which detected additional CAGN territories west of the project area (refer to Figure 3.3-2) (Konecny 2006). The additional CAGN territories are west of I-5 and more than 250 ft (76 m) from the project area. There are not any documented CAGN within 250 ft (76 m) of the project area (MCB Camp Pendleton 2011). The CSS within the project area is suitable CAGN habitat and is likely used by foraging or dispersing CAGN.

Least Bell's Vireo (LBVI)

LBVI is a small migratory songbird. The LBVI arrives at Camp Pendleton as early as mid-March and leaves for its wintering grounds in Baja California in August. The breeding season is from 15 March through 31 August. LBVI primarily inhabits dense willow-dominated riparian habitats with lush understory vegetation. LBVI forage and nest primarily in willows. The decline of LBVI is mainly due to loss of riparian habitat and nest parasitism by cowbirds (USMC 2007).

The USFWS listed the LBVI as an endangered species on 2 May 1986 (USFWS 1986). A draft recovery plan is available for this species (USFWS 1998a). Critical habitat for the LBVI was designated in six southern California counties on 2 February 1994 (USFWS 1994a). MCB Camp Pendleton was excluded from this designation due to a Memorandum of Understanding with the USFWS in response to the ongoing management of LBVI and riparian habitat on Base.

The riparian vegetation occurring along Las Flores Creek and in the eastern tributary provides suitable habitat for LBVI. Base-wide survey data for LBVI from 1981 to 2009 show LBVI in riparian habitat along Las Flores Creek, along both sides of the I-5/railway crossing, although LBVI have been detected more frequently in the dense riparian area on the inland side of the overpasses compared to the western side. In 2008 and 2009, LBVI territories were located along the riparian area between the Las Flores Creek channel and the dirt access road. However, no LBVI territories have been documented within 250 ft (76 m) of the project area (refer to Figure 3.3-2) (MCB Camp Pendleton 2011).

Southwestern Willow Flycatcher (SWFL)

The SWFL is a Neotropical migrant bird. Its breeding range extends from southern California, east to western Texas, north to extreme southern Utah and Nevada, and south to extreme northern Baja California, Mexico. The flycatcher inhabits riparian areas along rivers, streams, and other wetlands. It typically nests in even-aged, structurally homogeneous, dense stands of trees and shrubs approximately 13-23 ft (4-7 m) tall with a high percentage of canopy cover and dense foliage. Nesting flycatchers prefer willow and mulefat thickets and invariably nest near surface water or saturated soil, which increases the production of flying insects, SWFL's primary food. Threats to the species are habitat loss, human disturbance, and nest parasitism by cowbirds (USFWS 1995b).

The SWFL was federally listed as an endangered species by the USFWS on 27 February 1995 (USFWS 1995b). On 22 July 1997, the USFWS designated critical habitat for this species (USFWS 1997a). Critical habitat was designated along the Santa Margarita River. The ruling was vacated and remanded in May 2002. A final rule designating critical habitat was issued on 19 October 2005; land owned by MCB Camp Pendleton was exempted from the designation because areas are managed through the INRMP and the Riparian Conservation Plan (USFWS 2005b). A recovery plan is available for this species (USFWS 2002).

Basewide surveys have been conducted annually along Las Flores Creek in accordance with the Riparian/Estuarine BO. These surveys have shown sporadic occurrences of willow flycatchers but no established breeding territories of SWFL in the project area (USMC 2007). From 2004 through 2009, the only nesting by SWFL on MCB Camp Pendleton has been along the middle section of the Santa Margarita River near the Air Station. As of 2009, eight males, eight females, and one non-territorial “floater” bird were detected as residents on MCB Camp Pendleton. The most recent observation of territorial SWFL along Las Flores Creek was in 2003. Transient willow flycatchers observed elsewhere on the Base, including Las Flores Creek, are probably members of the other non-federally listed subspecies (Howell and Kus 2009). The riparian habitat associated with Las Flores Creek appears suitable for SWFL and may be used by dispersing or foraging individuals of this subspecies but does not currently support breeding.

Tidewater Goby (TWG)

The TWG was federally-listed as endangered on 4 February 1994 (USFWS 1994b). A recovery plan has been prepared describing the conservation needs of the species, including the protection of populations in the coastal lagoons of MCB Camp Pendleton (USFWS 2005c). Coastal streams supporting the TWG on MCB Camp Pendleton, including Las Flores Creek from the ocean to just inland of I-5, were designated as critical habitat in 2000 (USFWS 2000b). In the final revision to critical habitat, streams in mission-critical training areas of MCB Camp Pendleton, including Las Flores Creek are exempted due to the protection to the species that is provided through the INRMP and the Estuarine Conservation Plan and Riparian/Estuarine BO (USFWS 2008).

TWGs are small (usually less than 2 inches long) fish that live and reproduce in coastal lagoons. TWG are benthic (living on the bottom substrate) and inhabit shallow waters (less than 3 ft [0.9 m] deep) that are slow moving to still but not stagnant (Irwin and Soltz 1984). The coastal lagoons where these fish reside are typically closed off from the ocean by sand bars during summer. The substrate is generally sand, mud, and gravel with abundant emergent and submerged vegetation (Moyle 1976). In addition to living in coastal lagoons, these fish have been documented to move upstream, in one case more than five miles (Irwin and Soltz 1984). TWG regularly range up into freshwater in summer and fall as sub-adults and adults, although there is little evidence of reproduction in upper areas. Threats to this species include loss of estuarine habitat, degradation in water quality, and predation by invasive fishes and bullfrogs (*Lithobates catesbeianus*).

Unlike other goby species in California, the TWG does not exhibit a marine life history phase (Swift et al. 1989). This limits the frequency of genetic exchange between populations and lowers the potential for recolonization of a habitat once a population has been lost. Recolonization, however, has been documented to occur at distances up to 20 km (12 miles) from a source population (Lafferty et al. 1996). Flood events may function as agents of dispersal by washing gobies out of lagoons into coastal current patterns (Lafferty et al. 1999).

Spawning in southern California takes place primarily from late April to July, when males dig a vertical burrow approximately 4-8 inches (10 to 20 centimeters) into clean coarse sand for nesting. The eggs are attached to the walls of the burrow by the female and are guarded by the male until they hatch in 9 to 10 days. Larval gobies inhabit the water column and seek shelter near vegetation for a short time before adopting a benthic life style as adults (Swift et al. 1989).

This species formerly inhabited lower stream reaches and coastal lagoons from the Del Norte County to San Diego County (Lee et al. 1980). Of the 13 historic sites in Orange and San Diego Counties, only 7 populations of TWG remain; all are within MCB Camp Pendleton (USFWS 2000b). TWG populations at

MCB Camp Pendleton fluctuate seasonally. Localized extirpations and recolonization events may occur between lagoons on MCB Camp Pendleton (USMC 2007).

Annual surveys from 1987 to 2004 have detected TWG in Las Flores Creek and lagoon during 15 of the 18 sampling periods (Swift et al. 1994, USMC 2007). Only presence/absence information has been collected for TWG; therefore, no reasonable estimation of local population growth or decline can be made. However, Las Flores Creek is considered by USFWS to support one of the largest and most persistent populations of TWG in southern California (USMC 2007).

The Las Flores Lagoon is designated an “estuarine protection zone” (USMC 2007). The special management zone runs from the tidal zone up to the I-5 overpass. The Base’s Estuarine and Beach Ecosystem Conservation Plan addresses the TWG (USMC 2007). MCB Camp Pendleton’s conservation goal for tidewater gobies is to maintain quality habitat through conservation, silt removal, control of exotic predatory fish species, research, and monitoring.

San Diego Fairy Shrimp

The SDFS is a small freshwater crustacean that occurs in vernal pools in coastal southern California and northwestern Baja California. Vernal pools are seasonal shallow pools that are filled by winter and spring rains that usually begin in November and continue into April or May. SDFS is found in both natural and manmade ephemeral pools that range in depth from approximately 2 to 12 inches (5 to 30 cm). Hatching from cysts occurs following prolonged inundation during the winter rainy season, and individuals mature in 7 to 14 days (USFWS 2003b). Adults are usually seen between January and March, but the hatching period is highly variable depending on rainfall. Some cysts appear to remain dormant despite inundation, and repeat cycles of hatching and reproduction occur within a season in response to episodic rainfall (USFWS 2003b).

The SDFS was listed as federally endangered in February 1997 (USFWS 1997b). Critical habitat proposed in 2003 for SDFS included some non-training areas of MCB Camp Pendleton, subunits 2A-2F. MCB Camp Pendleton including subunits 2A-2F was exempt from 2007 final critical habitat designation due to the effectiveness of the INRMP in providing for the conservation of the species (USFWS 2007c).

On MCB Camp Pendleton, SDFS appears to be locally abundant in natural vernal pools and in manmade pools that have not been disturbed in several seasons. Vernal pools of high natural quality would generally be occupied by SDFS while more degraded pools have a greater likelihood of containing non-listed Lindahl’s fairy shrimp; however, SDFS also occur in unvegetated road ruts in some training areas on MCB Camp Pendleton. SDFS occur on relatively flat coastal mesas on the western and southwestern portions of MCB Camp Pendleton primarily in Victor, Oscar One, and Oscar Two training areas and the Wire Mountain housing area (MCB Camp Pendleton 2011). SDFS occur in a depression on the southern access road near its entrance from Stuart Mesa Road (Black 2005) (refer to Figure 3.3-2).

Brodiaea filifolia (BRFI) (Thread-leaved Brodiaea)

BRFI is a perennial herb with several long, narrow leaves growing from underground corms. Flowers typically bloom from mid-April through June, with a short flowering season. The size and extent of BRFI populations vary in response to temperature and the timing and amount of rainfall. This species grows from a corm in clay or clay loam soils, usually in grasslands on level to gradually (< 10 percent) sloping sites. The elevational range of occurrence for BRFI is from 100 ft (30 m) to 2,500 ft (765 m) depending on soil series (USFWS 2009a).

The USFWS listed BRFI as federally threatened in October 1998 (USFWS 1998b). No lands on MCB Camp Pendleton are designated critical habitat for BRFI (USFWS 2011, USMC 2007). In 2009, the USFWS reviewed the status of the BRFI and decided that no change was needed to the threatened status (USFWS 2009a).

The historical range of BRFI is from the foothills of the San Gabriel Mountains in Los Angeles County, east to Arrowhead Hot Springs in the western foothills of the San Bernardino Mountains (San Bernardino County), and south through eastern Orange and western Riverside Counties to Rancho Santa Fe in central San Diego County (USFWS 2009a). BRFI occurs on MCB Camp Pendleton and occurs in the vicinity of the southern access road (refer to Figure 3.3-2) (MCB Camp Pendleton 2011).

Other Special Concern Species

Five bird species observed in the project vicinity are listed by the California Department of Fish and Game as species of concern: Cooper's hawk, downy woodpecker, yellow warbler, yellow-breasted chat, and rufous-crowned sparrow.

Rare plant surveys for plant species of regional concern, as well as federally listed species, were conducted for the project during 2006 (NAVFAC SW 2010a). BRFI protocol surveys were conducted throughout the project area in 2006 (NAVFAC SW 2010a). No rare plant species were found within the project study area (NAVFAC SW 2010a).

Pendleton button-celery and Coulter's saltbush, both listed as 1B (rare) by the California Native Plant Society (CNPS) (CNPS 2011a, b), were found on the coastal terrace east of the NCTD easement and north of the southern access road (refer to Figure 3.3-2). Pendleton button-celery also occurs on the south of the southern access road (refer to Figure 3.3-2) (MCB Camp Pendleton 2011, NAVFAC SW 2010a).

3.4 CULTURAL RESOURCES

3.4.1 Definition of Resource

The National Historic Preservation Act (NHPA) establishes guidelines for the protection, enhancement, and preservation of any property that possesses significant archaeological, architectural, historical, or cultural characteristics. Section 106 of the NHPA mandates that federal agencies take into account the effect of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places (NRHP). Section 110 mandates that federal agencies establish a program to locate, inventory, and nominate all their properties that might qualify for inclusion on the NRHP.

3.4.2 Existing Conditions

At Red Beach, there are six known archaeological sites near the project area, three of which, SDI-811, SDI-10731, and SDI-10728 are potentially within the Area of Potential Effects (APE). The other three sites (SDI-4536, SDI-15254, and SDI-10726) are located outside of the APE (ASM 2007, 2011). Sites SDI-811 and SDI-10731 exist within the study area, while SDI-10728 is immediately outside of the NCTD easement. Therefore, the following discussion is limited to sites SDI-811 and SDI-10731. The APE for the project includes the entire construction footprint for the Proposed Action. However, new design information does not indicate the project's APE would encroach on undisturbed portions of the three archaeological sites (ASM 2011).

3.4.2.1 Previous Studies

Over 85 years of archaeological investigations along the southern California coast have yielded a long sequence of prehistoric occupation (Moratto 1984). This occupation is well documented both north and

south of MCB Camp Pendleton, and extends from the early Holocene into the ethnohistoric period (e.g., Hines and Rivers 1991; Meighan 1954; True 1958; Vanderpot et al. 1993; Warren 1964). Concerning MCB Camp Pendleton, there was little systematic research until the 1960s (ASM 2007, 2011).

SDI-811

SDI-811 is a very large shell and artifact scatter located on the Las Flores floodplain. The first detailed archaeological and paleoenvironmental investigations were conducted by ASM in the southeast portion of the site (Byrd 1996). Moderate densities of artifacts (including debitage, cores, utilized flakes, a drilled stone disk, a polishing stone, manos, mortar fragments, and ceramics), and vertebrate and invertebrate remains (primarily *Donax*, *Chione* and *Argopecten*) were recovered. SDI-811 was recommended as eligible for the NRHP (ASM 2007, 2011).

Various studies across the site have identified buried deposits, assessed the depositional history and integrity of the site, and delineated archaeological and geomorphological deposits within the site. These studies indicate that buried deposits are found in definable concentrations between the surface up to depths of 570 centimeters below the surface encompassing the Late Prehistoric to Early Archaic Periods (ASM 2007, 2011).

SDI-10731

SDI-10731 is a large shell and artifact scatter found next to Las Flores Creek. In 1974, two human burials were exposed by grading at this site (Bull and Ezell 1975; Ezell 1975). These were thought to be associated with the Las Flores Cemetery site (SDI-4536). However, there is no documentation on the specific locations of these two burials within the site (ASM 2007, 2011).

The most recent investigations at this site were conducted by EDAW in 2003. While the site did not produce rich deposits of cultural material, excavations indicate an intact subsurface horizon. In conjunction with the potential for burials, and the site's ability to answer specific research questions, it was recommended as eligible for the NRHP (EDAW 2003).

SDI-10728

Site SDI-10728 is located on the bluff above the new Red Beach Bridge construction area. Through previous studies, the site was found to have lower components dating from the early Holocene period (ASM 2011). Archaeological finds from this period are rare in Camp Pendleton, and are found on bluff tops (such as SDI-10728) or on riverine terraces. The lower components in SDI-10728 were found to have a ground stone assemblage reflective of regular and intensive plant food processing.

3.4.2.2 Recent Studies

The Red Beach project area was surveyed by ASM Affiliates in August of 2007 (ASM 2007). The objective of this survey was to gather information to help better define the boundaries and the nature of any archaeological deposits of two eligible sites, SDI-811 and SDI-10731, which are potentially within the APE for the P-159 EA project. The survey consisted of the excavation of five mechanical cores, three controlled backhoe trenches, 12 shovel test pits, and one mechanically excavated pit. Excavation efforts resulted in the recovery of only six lithic artifacts and 47.6 grams (1.7 ounces) of shell and bone. The results of the survey suggest that only sparse and disturbed portions of each site exist within the study area, and that the two sites were probably not connected, at least within the APE. The majority of the cultural deposit within the APE is extremely sparse and/or substantially disturbed, and does not appear to represent a significant or unique portion of the site (ASM 2007).

As part of this SEA, ASM Affiliates prepared a Supplemental Historic Property Evaluation for the revised project footprint (ASM 2011). The purpose of this study was to determine whether portions of SDI-811 and SDI-10731 extend into the new project footprint illustrated in this SEA. Based on this evaluation it was determined that the new project APE would not encroach on undisturbed portions of these two prehistoric sites.

Also identified near the project APE, but not within the area of direct effect, and immediately outside of the NCTD easement is NRHP eligible prehistoric site SDI-10728. In 2001 ASM conducted a field survey of the O'Neil to Flores Second Main Track project area, in preparation for the NCTD double track, part of which is being considered for this project. Relevant to this project is the NRHP eligible prehistoric site SDI-10728. This site lies on the bluff just above the construction area for the new Red Beach Bridge (ASM 2011). The dirt road which runs through this site would be used for access to the tracks by construction equipment and personnel.

An historic evaluation of the Las Flores Railway Bridge was completed in June of 2009 (ASM 2009). The historic evaluation indicated that the bridge likely replaced an earlier bridge and is not associated with any significant historical events or trends and it is not considered unique or exceptional. The historic evaluation recommended the Las Flores Creek Railway Bridge as *not* eligible for listing in the NRHP.

3.5 AIR QUALITY

3.5.1 Definition of Resource

The concentration of pollutants (typically expressed in units of parts per million (ppm) or micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]) in the atmosphere generally describe air quality for a given location. One aspect of significance is a pollutant's local concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards, established by the USEPA, are termed the National Ambient Air Quality Standards (NAAQS). The NAAQS represent maximum acceptable concentrations for pollutants of concern. State standards, established by the California Air Resources Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are equal to or more stringent than the NAAQS and include pollutants for which national standards do not exist (CARB 2011a). Figure 3.5-1 presents the applicable NAAQS and CAAQS for the project area.

The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter less than or equal to 10 microns in diameter (PM_{10}), and particulate matter less than or equal to 2.5 microns in diameter ($\text{PM}_{2.5}$). Although VOCs and NO_x (other than nitrogen dioxide) have no established ambient standards, they are important as precursors to O_3 formation.

Identifying the region of influence (ROI) for air quality requires knowledge of the types of pollutants, emission rates, topography, and meteorological conditions associated with a Proposed Action. The ROI for inert pollutants (pollutants other than O_3 and its precursors) is generally limited to a few miles downwind from a source. The ROI for photochemical pollutants, such as O_3 , can extend much farther downwind than for inert pollutants. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. Ozone precursors are mainly VOCs and NO_x . In the presence of solar radiation, the maximum effect of VOCs and NO_x emissions on O_3 levels usually occurs several hours following emission and several miles from the source(s).

Therefore, the ROI for air quality analysis is the entire San Diego Air Basin (SDAB), which encompasses all of San Diego County.

3.5.2 Regulatory Setting

Under the Federal Clean Air Act (CAA), as amended, states are responsible for enforcing the established air quality regulations. The CARB enforces air pollution regulations and sets guidelines, as contained in the California State Implementation Plan (SIP), to attain and maintain the NAAQS and CAAQS within the state of California. The CAA Amendments of 1990 established new federal nonattainment classifications, new emission control requirements, and new compliance dates for nonattainment areas.

The severity of the nonattainment classification drives the associated requirements and compliance dates. The following section provides a summary of the federal, state, and local air quality rules and regulations that apply to the Proposed Action.

3.5.2.1 Federal Requirements

Section 176(c) of the CAA, as amended, requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The USEPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year) vary from pollutant to pollutant and are also subject to the severity of the nonattainment status. For those air pollutants in the SDAB which are in attainment of the NAAQS (SO_x, PM₁₀, PM_{2.5}), the general conformity requirements and thresholds do not apply. The applicable *de minimis* levels for the project area are listed in Table 3.5-1.

Table 3.5-1. Applicable Criteria Pollutant *de minimis* Levels (tons/year)

VOCs ¹	NO _x ¹	CO ²	SO _x ²	PM ₁₀ ^{2,3}	PM _{2.5} ^{2,3}
100	100	100	NA	NA	NA

Notes: ¹ SDAB is a basic nonattainment area for the 8-hour federal and state O₃ standard; VOCs and NO_x are precursors to the formation of O₃.

² SDAB is considered a maintenance area for the federal CO standard and in attainment of the federal sulfur oxides (SO_x), PM₁₀ and PM_{2.5} standards.

³ SDAB is in nonattainment of the state PM₁₀ and PM_{2.5} standards.

NA = *de minimis* thresholds are not applicable since the SDAB is in attainment of the federal SO_x, PM₁₀ and PM_{2.5} standards.

Sources: CARB 2011b; USEPA 2011.

The USEPA conformity rule establishes a process that is intended to demonstrate that a proposed federal action would not: 1) cause or contribute to new violations of federal air quality standards; 2) increase the frequency or severity of existing violations of federal air quality standards; and 3) delay the timely attainment of federal air quality standards. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level. However, if the increase in emissions for a nonattainment pollutant exceeds *de minimis* levels, a formal conformity determination process must be implemented. For the purposes of this air quality analysis, project emissions would be potentially significant if they exceed federal *de minimis* levels. If emissions exceed their respective *de minimis* levels, further analysis of the emissions and their consequences would be performed to assess whether there is a likelihood of a significant impact to air quality.

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS ⁽¹⁾	NATIONAL STANDARDS ⁽²⁾	
			Primary	Secondary
Ozone (O ₃)	8 Hour	0.070 ppm (137 µg/m ³)	0.075 ppm (147 µg/m ³)	Same as Primary Standards
	1 Hour	0.09 ppm (180 µg/m ³)	•	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	•
	1 Hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as Primary Standard
	1 Hour	0.18 ppm (339 µg/m ³)	0.100 ppm	•
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	•	0.030 ppm (80 µg/m ³)	•
	24 Hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	•
	3 Hour	•	•	0.5 ppm (1300 µg/m ³)
	1 Hour	0.25 ppm (655 µg/m ³)	0.075 ppm (196 µg/m ³)	•
Respirable Particulate Matter ≤10 Microns in Diameter (PM ₁₀)	Annual Arithmetic Mean	20 µg/m ³	•	Same as Primary Standards
	24 Hour	50 µg/m ³	150 µg/m ³	
Respirable Particulate Matter ≤2.5 Microns in Diameter (PM _{2.5})	Annual Arithmetic Mean	12 µg/m ³	15.0 µg/m ³	Same as Primary Standards
	24 Hour	No Separate Standard	35 µg/m ³	
Sulfates	24 Hour	25 g/m ³	•	•
Lead (Pb)	30 Day Average	1.5 µg/m ³	•	•
	Calendar Quarter	•	1.5 µg/m ³	Same as Primary Standard
	Rolling 3-Month Average	•	0.15 µg/m ³	
Hydrogen Sulfide (H ₂ S)	1 Hour	0.03 ppm (42 µg/m ³)	•	•
Vinyl Chloride (chloroethene)	24 Hour	0.01 ppm (26 µg/m ³)	•	•
Visibility Reducing Particles	8 Hour (10:00 A.M. to 6:00 P.M.)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with California Air Resources Board (CARB) Method V.	•	•

ppm – parts per million µg/m³ – micrograms per cubic meter mg/m³ – milligrams per cubic meter • – no standard established

(1) CO, SO₂ (1- and 24-hour), NO₂, O₃, PM₁₀, and visibility reducing particles standards are not to be exceeded.

All other California Standards are not to be equaled or exceeded.

(2) Not to be exceeded more than once a year except for annual standards.

Source: CARB 2011a.

Figure 3.5-1
California and National Ambient Air Quality Standards

3.5.2.2 State Requirements

The California CAA of 1988, as amended in 1992, outlines a program to attain the CAAQS for O₃, nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter, and CO by the earliest practical date. As shown in Figure 3-5, the CAAQS are more stringent than the NAAQS. CARB delegates the authority to regulate stationary source emissions to local air quality management districts. The CARB requires these agencies to develop their own strategies for achieving compliance with the NAAQS and CAAQS, but maintains regulatory authority over these strategies, as well as all mobile source emissions throughout the state. The San Diego County Air Pollution Control District (SDCAPCD) is the local air quality management district responsible for enforcement of air quality regulations in the project area.

3.5.2.3 Local Regulations

The SDCAPCD is responsible for regulating stationary sources of air emissions in the SDAB. The SDCAPCD Rules and Regulations (SDCAPCD 2011) establish emission limitations and control requirements for stationary sources, based on their source type and magnitude. In addition, SDCAPCD Conformity Rule 1501 provides general conformity guidance to ensure that Federal actions are consistent with the efforts of the SDCAPCD to achieve its NAAQS attainment goals.

The SDCAPCD and the San Diego Association of Governments are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The San Diego County Regional Air Quality Strategy (RAQS) was initially adopted in 1991, and is updated on a triennial basis. This plan includes all feasible control measures that can be implemented for the reduction of O₃ precursor emissions. To be consistent with the RAQS, a project must conform to emission growth factors outlined in this plan. Control measures for stationary sources proposed in the RAQS and adopted by the SDCAPCD are incorporated into the SDCAPCD Rules and Regulations.

The SDCAPCD has also developed the air basin's input to the SIP. The SIP includes the SDCAPCD's plans and control measures for attaining the O₃ NAAQS. The SIP is also updated on a triennial basis. The CARB adopted its 2007 State Strategy for California's 2007 State Implementation Plan on September 27, 2007. As part of that State Strategy, the SDCAPCD developed its *Eight-Hour Ozone Attainment Plan for San Diego County*, which provides plans for attaining and maintaining the 8-hour NAAQS for O₃ (SDCAPCD 2007).

Air Quality Permitting Requirements

Air quality permits are required for activities or equipment that emit air contaminants. The SDCAPCD requires air permits before construction or installation and again before any operational activities begin. An "Authority to Construct" permit is used to authorize construction or installation activities. A "Permit to Operate" is used to authorize operation of specific equipment. All necessary construction or operationally-related permits must be authorized by the SDCAPCD before project implementation occurs.

3.5.3 Existing Conditions

3.5.3.1 Climate and Meteorology

The climate of the project region is classified as Mediterranean, characterized by dry summers and wet winters. The major influences on the regional climate are the Eastern Pacific high-pressure system, topography, and the moderating effects of the Pacific Ocean.

The Eastern Pacific High is a persistent anticyclone that attains its greatest strength and most northerly position during summer, when positioned west of northern California. In this position, the High effectively shelters southern California from the effects of polar storm systems. As winter approaches, the Eastern Pacific High weakens and shifts to the south, allowing polar storm systems to pass through the region. Subsiding air associated with the High warms the upper levels of the atmosphere and produces an elevated temperature inversion (temperature increases with height) along the west coast. The base of this temperature inversion is generally from 1,000 to 3,000 ft (305 to 914 m) above mean sea level during the summer. The subsidence inversion acts like a lid on the lower atmosphere and traps air pollutants near the surface of the earth by limiting vertical dispersion. Mountain ranges in eastern San Diego County constrain the horizontal movement of air and inhibit the ventilation of air pollutants out of the region. These two factors, combined with the emission sources from over three million people, help to create the high pollutant conditions sometimes experienced in San Diego County.

Marine air trapped below the base of the subsidence inversion and over the relatively cool Pacific Ocean often results in fog and stratus clouds during warmer months of the year. Marine stratus usually forms offshore and moves into the coastal plains and valleys during the evening hour; when the land heats up the following morning, the clouds burn off to the immediate coastline and re-form the following evening.

Concurrent with the presence of the Eastern Pacific High, a thermal low-pressure system often persists in the interior desert region. The resulting pressure gradient between these two systems produces a southwest to west onshore gradient at MCB Camp Pendleton for most of the year. Sea breezes usually occur during the daytime and disperse air pollutants toward the interior regions. During the evening hours and colder months of the year, the gradient reverses and land breezes blow offshore.

During the colder months, the Eastern Pacific High can combine with high pressure over the continent to produce extended periods of light winds and low-level inversion conditions in the region. These atmospheric conditions can create an environment susceptible to adverse air quality. Excessive build-up of high pressure over the continent can produce a “Santa Ana” condition, characterized by warm, dry, northeasterly winds. Santa Ana winds help to ventilate the air basin of locally generated emissions. However, Santa Ana conditions can also transport air pollutants from the Los Angeles metropolitan area into the project region. When stagnant atmospheric conditions occur during a weak Santa Ana, local emissions combined with pollutants transported from the Los Angeles area can lead to significant O₃ impacts in the region.

3.5.3.2 Regional and Local Air Pollutant Sources

An emission rate represents the mass of a pollutant released into the atmosphere by a given source over a specified period of time. Emission rates can vary considerably depending on type of source, time of day, and schedule of operation. The SDCAPCD periodically updates emissions for the entire SDAB for purposes of forecasting future emissions, analyzing emission control measures, and for use in regional air quality modeling. The largest regional sources of air emissions are on-road vehicles. The 2010 inventory estimated that on-road vehicles emitted 30 percent of the VOCs, 57 percent of the NO_x, and 61 percent of

the CO emissions within the SDAB (CARB 2011c). Another large source of VOCs is the use of surface coatings and solvents. Combustion sources produce both primary fine particulate matter and fine particulate precursor pollutants, such as NO_x, which react in the atmosphere to produce secondary fine particulates. Coarser particles mainly occur from soil-disturbing activities, such as construction, mining, agriculture, and vehicular road dust.

3.5.3.3 Baseline Air Quality

Representative air quality data for MCB Camp Pendleton for the period 2007-2009 are shown in Table 3.5-2. The USEPA designates all areas of the U.S. as having air quality better than or equal to (attainment) or worse than (nonattainment) the NAAQS. The criteria for nonattainment designation vary by pollutant. An area is in nonattainment for O₃ if its NAAQS has been exceeded more than three discontinuous times in three years and an area is generally in nonattainment for any other pollutant if its NAAQS have been exceeded more than once per year. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. The SDAB is in basic nonattainment for the federal O₃ standard, is considered a maintenance area for the CO standard, and is in attainment of the federal NO_x, SO_x, PM₁₀ and PM_{2.5} standards. The SDAB is in nonattainment of the state O₃, PM₁₀ and PM_{2.5} standards (CARB 2011b; USEPA 2011).

Ozone concentrations are generally the highest during the summer months and coincide with the period of maximum insolation (maximum exposure to solar radiation energy). Maximum O₃ concentrations tend to be regionally distributed, since precursor emissions become homogeneously dispersed in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

Table 3.5-2. Representative Air Quality Data for MCB Camp Pendleton (2007-2009)

Air Quality Indicator	2007	2008	2009
Ozone (O₃)⁽¹⁾			
Peak 8-hour value (ppm)	0.074	0.077	0.077
Days above federal standard (0.075 ppm) ^(2, 7)	0	2	1
Days above state standard (0.070 ppm)	4	3	5
Carbon monoxide (CO)⁽³⁾			
Peak 8-hour value (ppm)	3.01	2.60	2.77
Days above federal standard (9.0 ppm)	0	0	0
Days above state standard (9.0 ppm)	0	0	0
Particulate matter less than or equal to 10 microns in diameter (PM₁₀)⁽⁴⁾			
Peak 24-hour value (µg/m ³)	65.0	41.0	50.0
Days above federal standard (150 µg/m ³)	0	0	0
Days above state standard (50 µg/m ³)	1	0	0
Particulate matter less than or equal to 2.5 microns in diameter (PM_{2.5})⁽⁴⁾			
Peak 24-hour value (µg/m ³)	30.6	27.2	25.1
Days above federal/state standard (35 µg/m ³) ⁽⁵⁾	0	0	0
Sulfur Dioxide (SO₂)⁽³⁾			
Peak 24-hour value (ppm)	0.006	0.007	0.006
Days above federal standard (0.14 ppm)	0	0	0
Days above state standard (0.04 ppm)	0	0	0
Nitrogen Dioxide (NO₂)⁽¹⁾			
Peak 1-hour value (ppm)	0.068	0.089	0.068
Days above state standard (0.18 ppm)	0	0	0

Notes: ⁽¹⁾ Data from the Camp Pendleton Monitoring Station.

⁽²⁾ The federal O₃ standard was revised downward in 2008 from 0.08 to 0.075 ppm.

⁽³⁾ Data from the San Diego-1110 Beardsley Street Monitoring Station.

⁽⁴⁾ Data from the San Diego-Overland Avenue Monitoring Station.

⁽⁵⁾ The federal PM_{2.5} standard was revised downward in 2007 from 65 to 35 µg/m³.

⁽⁶⁾ Data from the San Francisco-Arkansas Street Monitoring Station.

⁽⁷⁾ The federal eight-hour ozone standard was previously defined as 0.08 ppm (1 significant digit).

Measurements are rounded up or down to determine compliance with the standard; therefore a measurement of 0.084 ppm is rounded to 0.08 ppm. The 8-hour ozone ambient air quality standards are met at an ambient air quality monitoring site when the average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to the standard.

ppm = parts per million; µg/m³ = micrograms per cubic meter

Source: CARB 2011d.

3.5.3.4 MCB Camp Pendleton Emissions

Emission sources associated with the existing use of MCB Camp Pendleton include civilian and military personal vehicles, commercial and military vehicles, aircraft engines, tactical support equipment, small stationary sources, and ongoing construction activities. Emissions associated with the use of the operations access points would be confined to vehicular emissions from tactical vehicles utilizing the transit routes between the shoreline and beach areas to inland training sites.

3.5.3.5 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere by absorbing infrared radiation. Without this natural greenhouse effect, the average surface temperature of the Earth would be about 60°F (15.5°C) colder (U.S. Global Change Research Program 2009). Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce environmental, economic, and social consequences across the globe.

Greenhouse gas emissions occur from natural processes and human activities. Water vapor is the most important and abundant GHG in the atmosphere. However, human activities produce only a very small amount of the total atmospheric water vapor. The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). The main source of GHGs from human activities is the combustion of fossil fuels, including crude oil and coal. Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride. The six GHGs mentioned above are regulated by the State of California.

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 CO₂, which has a value of one. For example, CH₄ has a GWP of 21, which means that it has a global warming effect 21 times greater than CO₂ on an equal-mass basis (Intergovernmental Panel on Climate Change 2007). To simplify GHG analyses, total GHG emissions from a source are often expressed as a CO₂ equivalent (CO₂e). The CO₂e is calculated by multiplying the emissions of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. While CH₄ and N₂O have much higher GWPs than CO₂, CO₂ is emitted in such higher quantities that it is the overwhelming contributor to CO₂e from both natural processes and human activities.

Recent observed changes due to global warming include rising temperatures, shrinking glaciers and sea ice, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges. International, national, and state organizations independently confirm these findings (Intergovernmental Panel on Climate Change 2007, U.S. Global Change Research Program 2009, and California Energy Commission 2009).

The most recent *California Climate Change Scenarios Assessment* predicts that temperatures in California will increase between 3°F to 10.5°F (1.7°C to 5.8°C) by 2100, based upon low and high GHG emission scenarios (California Energy Commission 2009). 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 substantial 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 snowpack, a rise in sea level that would displace coastal businesses and residences, an increase in wild fires, damage to marine and terrestrial ecosystems, and an increase in the incidence of infectious diseases, asthma, and other human health problems (California Energy Commission 2009).

Federal agencies on a national scale address emissions of GHGs by reporting and meeting reductions mandated in federal laws, EOs, and agency policies. The most recent of these are EOs 13423 and 13514 and the *USEPA Final Mandatory Reporting of Greenhouse Gases Rule*. Several states have promulgated laws as a means of reducing statewide levels of GHG emissions. In particular, the California Global Warming Solutions Act of 2006 (AB32) directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020. Groups of states also have formed regionally-based collectives (such as the Western Climate Initiative) 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 EOs and the Energy Policy Act of 2005, the Marine Corps and Department of Defense (DOD) have implemented a number of renewable energy projects. The types of projects currently in operation within the southwest 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 and continues to promote and install new renewable energy projects within the southwest region.

On February 18, 2010, the CEQ initially proposed draft guidance on how federal agencies should evaluate the effects of climate change and GHG emissions for NEPA documentation (CEQ 2010). The CEQ does not propose a reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment. In the analysis of the direct effects of a Proposed Action, the CEQ proposes that it would be appropriate to 1) quantify cumulative emissions over the life of the project; 2) discuss measures to reduce GHG emissions, including consideration of reasonable alternatives; and 3) qualitatively discuss the link between such GHG emissions and climate change. The CEQ accepted public comments on the draft guidance through May 24, 2010 and is expected to issue final guidance in the near future.

On November 10, 2010, the DOD issued a desk reference for implementation of the USEPA's Final Rule for Mandatory Reporting of GHG's. This guide is designed to assist installations in GHG reporting and compliance (DOD 2010). MCB Camp Pendleton is not subject to the reporting requirements under the *USEPA's Final Rule for Mandatory Reporting of GHG's* or the *CARB's Regulation for the Mandatory Reporting of GHG Emissions* since there are no stationary source emissions that exceed the applicable reporting thresholds.

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 project-induced GHG emissions to global climate change is discussed in the context of cumulative impacts in Chapter 5 of this SEA. Chapter 5 and Appendix C present estimates of GHG emissions generated by the Proposed Action.

3.6 HAZARDOUS MATERIALS AND WASTES

3.6.1 Definition of Resource

Hazardous materials addressed in this SEA are chemical substances that pose a substantial hazard to human health or the environment. For purposes of this SEA, a hazardous material is any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Types of hazardous materials include hazardous substances, hazardous chemicals, and toxic chemicals. Hazardous materials are characterized by their ignitability, corrosiveness, reactivity, and toxicity. In general, these materials pose hazards because of their quantity, concentration, physical, chemical, or infectious characteristics. Hazardous materials are regulated by CFR Title 49, the Toxic Substances Control Act of 1976, and the Emergency Planning and Community Right to Know Act of 1986. Hazardous materials at MCB Camp Pendleton are managed in accordance with all federal, state, and MCB Camp Pendleton requirements for use and storage of hazardous materials.

A *hazardous waste* may be a solid, liquid, semi-solid, or contained gaseous material that alone or in combination may: 1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous wastes are regulated by the Solid Waste Disposal Act, CERCLA, and RCRA. Hazardous wastes are also controlled under the California Code of Regulations and these regulations are implemented by the California Department of Toxic Substances Control and the local Certified Unified

Program Agency. The USMC is required to comply with these acts and all DOD requirements, as well as management plans specific to Camp Pendleton.

3.6.2 Existing Conditions

3.6.2.1 Hazardous Materials and Petroleum Substances and Wastes

The proposed project area consists of graded roadways that are mainly dirt-surfaced, except for the section beneath the railway bridge. No hazardous materials or wastes are stored at the site. The only hazardous materials used in connection with current site activities are fuels, oils, and hydraulic fluids contained within the tactical vehicles training on the dirt roads. Civilian traffic passing through the proposed project area on highway I-5 and the railway contain fuels as well as bulk quantities of hazardous materials and wastes. Hazardous materials and wastes present in civilian vehicles temporarily passing through the site represent a potential for accidental release, but are not considered an existing environmental condition. In addition, the historic use of lead-containing fuels in vehicles travelling along the highway corridor creates the potential for aerielly-deposited lead in the soils within the project area. There are no hazardous waste storage facilities in the immediate vicinity of the project area. The nearest hazardous waste storage facility is located approximately 0.7 mile (1.2 km) northeast of the project site.

3.6.2.2 Installation Restoration Program Sites

In 1990, the DON, USEPA and the State of California executed a Federal Facilities Agreement that provided the process for remediation of contaminated sites at MCB Camp Pendleton. Sites are identified and assessed for cleanup under the Installation Restoration (IR [CERCLA]), RCRA, and underground storage tank programs. There are no IR program sites located at the project area, or on the adjacent surrounding land (USMC 2010). The nearest IR site to the project locations is about 0.8 mile (1.3 km) to the southeast. The closest petroleum release sites in the vicinity of the proposed project area are located about 0.3 mile (0.5 km) and 0.5 mile (0.75 km) to the northeast (USMC 2010). Due to site assessment and cleanup in accordance with the above-referenced guidance, conditions at the petroleum release sites in the surrounding area are not expected to have adversely affected soil, surface water or groundwater conditions within the project footprint.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides an assessment of the potential environmental consequences of implementing the Proposed Action and the No-Action Alternative within the designated project area. Direct impacts are associated with ground-disturbing activities resulting from demolition of the existing bridge, construction of the proposed bridge system, and construction of the access roads and retaining walls. Direct impacts are associated with the project footprint (the area of potential ground disturbance) and may be either temporary (reversible) or permanent (irreversible).

Indirect impacts are caused by or result from project-related activities, but occur later in time. Indirect impacts are diffuse, resource-specific, and less amenable to quantification or mapping than direct impacts, but still need to be considered.

Impacts would be either temporary (reversible) or permanent (irreversible). Impacts would be permanent within the area of the new bridge substructure and new roadwork, and are considered temporary in other areas subject to ground disturbance (i.e., construction laydown areas).

4.1 TOPOGRAPHY, GEOLOGY, AND SOILS

4.1.1 Proposed Action

The soil embankments below I-5 and the railway overpass would be cut and graded to accommodate the bridge system and new traffic lanes. Retaining wall systems would be installed to support the new openings. Construction impacts would include erosion and sedimentation from disturbed soil and soil stockpiles. Native soil would be replaced, where practicable, and imported soil material and road base would be used to stabilize the new engineering features.

The construction contractor would be required to prepare a construction SWPPP in accordance with San Diego RWQCB and MCB Camp Pendleton requirements. During the construction activities, BMPs established in the SWPPP would be implemented to reduce impacts to soils, including the use of silt curtains, fencing, and sediment traps and the application of water sprays and revegetation of disturbed soils when applicable. The construction contractor would also prepare and implement an erosion and sediment control plan before initiating construction activities. The new bridge design would comply with all federal, state, local and MCB Camp Pendleton requirements for slope and seismic stability. Design would also consider the geotechnical investigation and structural foundation report prepared for the P-159 EA. An addendum to this report is currently being prepared to include an analysis of the construction activities proposed in the NCTD easement. Although the design details and drawings are currently in progress, several design drawings are provided in Appendix A.

Site drainage would also be designed to maintain surface integrity. Following construction, stormwater runoff would be managed in accordance with the project-specific SWPPP to minimize soil loss from erosion. Special conservation measures (Section 2.4) would be implemented to minimize grading during the rainy season and to control soil erosion. Revegetation along the roadside would provide long-term soil stabilization.

The project area is located over low sloping land. Road improvements would not modify the regional topography. With the incorporation of SCMs to stabilize exposed slopes during and after construction,

and to minimize erosion and sedimentation downslope from the project footprint, indirect impacts outside of the project footprint are expected to be minimal and not significant.

The road improvements would provide a more stable surface that is less prone to erosion. When completed, the project would provide for improved drainage and sediment control at the I-5 and railway overpasses.

Temporary impacts due to dust and the alteration of runoff during construction would be largely confined to the project footprint and would be minimized and less than significant with the incorporation of SCMs and implementation of the SWPPP. Therefore, implementation of the Proposed Action would not significantly impact topography, geology, and soils.

4.1.2 Mitigation Measures

Implementation of the Proposed Action would not result in significant impacts to topography, geology, and soils; therefore, no mitigation measures are proposed.

4.1.3 No-Action Alternative

Under the No-Action Alternative, the DON/USMC and NCTD/SANDAG would not implement the new Red Beach bridge construction and modification of access points. Existing conditions (as described in Section 3.1) would remain unchanged and no significant impacts to topography, geology, and soils would occur.

4.2 HYDROLOGY

4.2.1 Proposed Action

4.2.1.1 Surface Water

The Proposed Action would require the construction of a new two-lane roadway. To accomplish this, soil would be excavated and removed from the filled embankments under the I-5 bridges. East of the railway tracks, the new roadway would cross the eastern tributary to Las Flores Creek, which is a source of seepage into the one-lane roadway in the existing condition. The Proposed Action design concept would accommodate the outflow from the eastern drainage tributary to Las Flores Creek and prevent seepage into the roadbed. The surface water modifications would be minor and would preserve the underlying natural drainage conveyance to Las Flores Creek from the tributary. Hydrologic modeling conducted for the P-159 EA and this SEA indicate that the project would not create any significant level of change to channel flow rate or hydraulic characteristics (specifically depth and velocity) or modify the natural sediment transport levels of Las Flores Creek. Therefore, the Proposed Action would not impact the surface water hydrology of the stream or estuary (refer to Appendix A). As previously discussed the concrete spillway would be left in place and design and construction activities would not affect the existing hydrology of Las Flores Creek (refer to Appendix A).

Slope protection for the new bridge would be constructed to reduce or eliminate disturbance to Las Flores Creek, located adjacent to the existing access road. A retaining wall would be used to accommodate the grade separation between the existing creek and the access road. The edge of the road would be offset from the retaining wall and would have a concrete curb. The curb would include periodic openings to allow surface runoff to drain toward the creek and into a vegetated bioswale for stormwater treatment, which would be constructed between the back of the retaining wall and curb to collect stormwater along the paved surfaces of the new roadways. No direct impacts to Las Flores Creek would occur due to usage of the new infrastructure.

The construction contractor would prepare and implement a Stormwater Management Plan, a project-specific SWPPP, a detailed erosion control plan, and BMPs designed to minimize impacts to surface waters. The construction contractor would be required to file a Notice of Intent with the SWRCB to obtain coverage under the National Pollutant Discharge Elimination System General Permit for stormwater discharges associated with construction activities. At the completion of construction, the contractor would prepare a Notice of Termination. Construction of culverts leading into Las Flores Creek would be subject to prior authorization by the USACE and the RWQCB and would meet all applicable requirements of the CWA.

Upon completion of the construction phase, tactical vehicles would operate on both lanes of the new roadway. The operation of additional tactical vehicle trips on the new two-lane roadway would not represent significant impacts to existing surface water hydrology. Therefore, implementation of the Proposed Action would have no significant impacts on surface water quality or flow patterns in the project area.

4.2.1.2 Groundwater

The depth of construction required for the Proposed Action is estimated to be up to 40 ft (12 m) below ground surface due to installation of the bridge CIDH piles. The groundwater table in the project area would be encountered at the elevation of Las Flores Creek, or below the channel floor elevation if the creek is dry. Thus, depending on the time of year, excavation adjacent to Las Flores Creek would be likely to encounter groundwater.

Before construction, geotechnical borings would be completed at the project site to allow engineering controls to determine subsurface conditions, including groundwater elevation, and incorporate engineering controls as needed for proper underground dewatering and drainage into the project design and construction site procedures. Material excavated below grade would be replaced with soil and road base material. As discussed under Special Conservation Measures (Section 2.5), any discharges of slurries or drilling muds to land would comply with Conditional Waiver No. 9 of the San Diego Basin Plan Waste Discharge Requirement Waiver Program (Regional Water Quality Control Board Resolution No. R9-2007-0104).

Groundwater dewatering activities may require permitting, coordination, sampling and/or treatment and is the responsibility of the contractor performing the work. For small volumes, dewatered groundwater 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. Alternatively, small volumes of dewatered groundwater may be discharged to the sanitary sewer system, if approved by the AC/S ES Waste Water Branch and AC/S Facilities Wastewater Operation Supervisor. 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 must be submitted 60 days before the planned commencement of the discharge.

In the immediate project area, the direction of groundwater flow is southeastward, towards Las Flores Creek. The Proposed Action would include construction of a new shoofly bridge, second bridge substructure, and an above-grade east-west trending retaining wall in embankment fill beneath the highway I-5 overpass. These new construction features would not interfere with the natural flow of groundwater in the subsurface alluvium. Thus, there would be no significant impacts to groundwater from implementation of the Proposed Action.

4.2.2 Mitigation Measures

Implementation of the Proposed Action would not result in significant impacts to hydrology (surface water and groundwater resources); therefore, no mitigation measures are proposed.

4.2.3 No-Action Alternative

Under the No-Action Alternative, the DON/USMC and NCTD/SANDAG would not implement the new Red Beach bridge construction and modification of access points. Existing conditions (as described in Section 3.2) would remain unchanged and no significant impacts to hydrology would occur.

4.3 BIOLOGICAL RESOURCES

This section describes the potential permanent and temporary impacts to biological resources that would result from implementation of the Proposed Action as compared to the No-Action Alternative. Permanent impacts would result from the complete removal of vegetation, habitat, or individuals of a species. Temporary impacts would result from project construction disturbance. A primary factor used to determine whether impacts would be significant is the severity of any effects on individuals or habitats of threatened and endangered species.

4.3.1 Proposed Action

4.3.1.1 Plant and Aquatic Communities

Table 4.3-1 shows the acreages of plant and aquatic communities that would be impacted by the Proposed Action. Temporary impacts could occur in the construction staging areas and within the NCTD easement east and west of the project footprint. Permanent impacts would occur where vegetation/habitat is replaced by permanent structures (railway bridge and retaining walls).

Table 4.3-1. Temporary and Permanent Impacts to Plant Communities and Aquatic Habitats under the Proposed Action

Plant Community	Temporary Impacts (acres)	Permanent Impacts (acres)	Total (acres)
Coastal Sage Scrub (Diegan) (CSS) (CAGN habitat)	0.02	0.06	0.08
Coyote Brush Scrub (CBS)	0.12	0.25	0.37
Southern Willow Scrub-Coastal and Valley Freshwater Marsh (SWS)	0.13	0.15	0.28
Mixed Grassland (MG)	0.04	0.03	0.07
Developed/Disturbed Areas (D)	0.01	2.16	2.17
Total	0.32	2.65	2.97

Construction of the new Red Beach double track multi-span steel and concrete bridge and retaining walls could impact up to 2.97 acres (1.20 hectares) of native habitat and existing disturbed/developed areas. As much as 0.49 acre (0.20 hectare) of permanent impacts could occur to native vegetation within the project footprint which includes 0.06 acre (0.02 hectare) of CAGN CSS and 0.15 acre (0.06 hectare) of LBVI SWS habitat. Permanent impacts to CAGN CSS would be compensated at a 2:1 ratio at an offsite location and permanent impacts to LBVI SWS would be compensated for in accordance with the Riparian/Estuarine BO and NCTD Programmatic Double-Track BO (USFWS 1995a, 2005a) (Refer to the SCMs in Section 2.4). Cleared and temporarily disturbed areas that are part of the Proposed Action would be recontoured, stabilized, and revegetated with an appropriate mix of native species, as approved

by AC/S ES Land Management Branch, after construction. Restored sites would be maintained until the native vegetation is reestablished, which may require several years.

Any riparian habitat outside of the permanent bridge footprint within the NCTD that is temporarily cleared would be revegetated (i.e., in-place mitigation). Other impacts to the riparian area (SWS) could include temporary noise, dust, and incidental disturbance due to vehicle and/or foot traffic during construction. Permanent impacts to riparian habitat would be compensated following the Riparian/Estuarine BO and NCTD Double-Track BO (USFWS 1995a, 2005a) such that the impact would not be significant (refer to the SCMs in Section 2.4).

Jurisdictional Waters of the U.S.

Table 4.3-2 presents potential temporary and permanent impacts to jurisdictional wetlands from the implementation of the Proposed Action. Table 4.3-3 presents potential permanent impacts to non-wetland waters of the U.S. and jurisdictional wetlands from the implementation of the original P-159 access road construction and the additional impacts from the implementation of the expanded railway track presented in this document. As much as 0.013 acre (0.005 hectare) of the eastern tributary wetland could be permanently impacted by the Proposed Action which includes construction along the northeastern portion of the NCTD easement. SCMs (Section 2.4) incorporate the necessary authorization via a NWP for construction, and require BMPs to minimize impacts on aquatic habitats. Measures included in the SWPPP and sediment control BMPs would minimize negative effects to the wetland and protect the remainder of the eastern tributary wetland. In addition, permanent impacts to jurisdictional wetlands and waters would be mitigated at the proposed Pilgrim Creek mitigation site; thus, no significant impacts to jurisdictional waters of the U.S. or wetlands would occur.

Table 4.3-2. Potential Temporary and Permanent Impacts to Jurisdictional Wetlands from the Implementation of the Proposed Action

Proposed Action	Temporary (acres)	Permanent (acres)	Total (acres)
Jurisdictional Wetlands	0.116	0.013	0.129

Table 4.3-3. Jurisdictional Waters and Wetlands Potentially Permanently Impacted by P-159 and the Proposed Action

Location	NEPA	Jurisdictional Area	Linear Distance (feet)	Area (acres)
Las Flores Creek	P-159 EA	Wetland	49	0.002
Las Flores Creek- WUS1-2009	P-159 EA	WUS	21	0.013
Eastern Tributary-South	P-159 EA	Wetland	51	0.045
Eastern Tributary-West	Proposed Action	Wetland	430	0.013
Eastern Tributary- WET1-2009	P-159 EA	Wetland	66	0.004
Total	-		617	0.077

4.3.1.2 Wildlife

Construction of bridge replacement and supporting retaining walls at Red Beach would eliminate or displace wildlife from the immediate areas of construction and potentially from adjacent areas subject to incidental disturbance, which would be minimized. Individuals of the smaller, less mobile and burrowing species would likely be killed by construction, whereas mobile species would probably disperse to surrounding areas. High quality habitat is present in the adjacent area; however, affected individuals are likely to experience energetic costs, higher risks of predation, or increased competition as a result of displacement. Cliff swallow nests on the railway overpass would be removed during the non-nesting season (as required by the MBTA). Since there are other structures and nest locations nearby, including the new railway bridge when complete, the impact on this relatively common species would not be significant.

Indirect impacts such as noise and visual disturbance, vehicle access, dust, and runoff may occur beyond the project footprint, but the confinement of construction activities to specified areas and requirements for erosion control and revegetation (Section 2.4) would in most respects ensure that these types of indirect effects are temporary and less than significant in terms of wildlife species and habitat.

Increased sound levels associated with excavation and compaction equipment may occur during construction. This activity would be short-term and minor; no long-term construction impacts would occur. Vehicle noise is common in the area due to traffic along I-5 and frequent trips along the railway. Any noise introduced through construction would neither be abnormal nor extreme. There are no sensitive receptors around the vicinity of the Proposed Action, and wildlife in the area is presumed to be acclimated and tolerant of some level of vehicle activity. Temporary noise impacts from construction activities would not be significant. Given the small area affected, impacts to wildlife would not be significant.

4.3.1.3 Special Status Species

The federally listed species or habitats that are known to occur within or adjacent to the Proposed Action footprint and access roads are CAGN, LBVI, SWFL, TWG, SDFS, and BRFI. Through implementation of avoidance and minimization measures and specific mitigation measures (refer to Section 2.4 SCMs), direct and indirect effects on listed species and their habitats would be avoided, minimized, and compensated for in a manner consistent with established precedents (1995 Riparian BO [USFWS 1995a], NCTD Double-Track BO [USFWS 2005a]), and informal consultation with USFWS (USFWS 2009b, 2012).

For this SEA, the USMC prepared a Supplemental Biological Evaluation. The USMC provided a letter and a copy of the Supplemental Biological Evaluation to the USFWS on 13 December 2011 to reinstate an informal consultation as required by the ESA for additional impacts which could occur from implementation of the Proposed Action. The USFWS provided a Class II Reinitiation/Concurrence Letter to the USMC for the SEA (USFWS 2012) (refer to Appendix B of this SEA).

The USFWS 2009 Class II Concurrence Letter and 2012 Reinitiation Letter to the USMC (USFWS 2009b, 2012) confirmed that by following the proposed avoidance and minimization measures the project would not be likely to adversely affect any federally listed species. In addition, the USFWS agreed that the project is consistent with the Riparian/Estuarine BO and the NCTD Double-Track BO (USFWS 1995a, USFWS 2005a). The avoidance and minimization measures in the P-159 EA and SEA Concurrence Letters would be implemented (USFWS 2009b, 2012). Effects on each species are summarized below.

CAGN

Construction associated with the Proposed Action could impact the edges of documented CAGN territories, habitat that could support foraging or dispersing individuals, as well as nesting in the future. CAGN has been detected in CSS habitat near the western border of the project area, where the vegetation is more continuous, but has not been detected within the project area which covers semi-disturbed habitat patches along the existing roadway. CSS habitat that is temporarily cleared for construction would be revegetated immediately following project completion (i.e., in-place mitigation). Permanent impacts would be compensated by restoration at a location approved by AC/S ES Land Management Branch and the USFWS before project initiation using a 2:1 mitigation ratio according to Marine Corps/USFWS project consultation precedent. As part of the SCMs, initial site clearing of CSS vegetation would take place only outside of the CAGN breeding season (the breeding season for CAGN is from 15 February to 31 August).

Construction activities may displace or disperse transient CAGN individuals to adjacent habitat, but this impact would not significantly impact the species or its local survival. A pre-construction nest survey would be conducted and any CAGN nests would be marked with protective fencing. Site clearing of vegetation occupied by CAGN would be delayed until nesting fails or until at least 10 days after the young fledge from the nest, unless MCB Camp Pendleton and USFWS assess the circumstances and mutually agree that activities can proceed without likely disturbance of CAGN and their nests.

The CSS and CBS habitat that would be disturbed under the Proposed Action are patchy areas immediately adjacent to Red Beach Road, I-5, and the railway. These areas are semi-disturbed and do not provide high quality CAGN habitat due to several interlacing roadways in a small geographic area. Temporary disturbance would be revegetated with appropriate CSS species and would be returned to pre-construction state. The topographic slope would not be significantly altered and the regional dispersal corridor along I-5 would not be adversely modified. As a result, the Proposed Action may affect, but is not likely to adversely affect the CAGN, and no significant impacts on the species would occur.

LBVI

Disturbance to the riparian habitat at Las Flores Creek and the eastern tributary may cause local LBVI to disperse from the project area into surrounding habitat. SCMs would prevent clearing during the breeding season (15 March to 31 August), and after initial site clearing, ongoing construction activities in or adjacent to riparian vegetation would occur outside of the breeding season when practicable. Temporary disturbance to riparian habitat would be revegetated with appropriate species. Any unavoidable impact to the riparian ecosystem would be compensated according to the MCB Camp Pendleton Riparian/Estuarine BO and NCTD Double-Track BO (USFWS 1995a, 2005a) such that the impact to LBVI would not be significant. The compensation strategy may include measures such as exotic plant control and offsite habitat restoration. As a result, the Proposed Action may affect, but is not likely to adversely affect LBVI, and no significant impacts on the species would occur.

SWFL

The riparian habitat associated with Las Flores Creek may temporarily be used by dispersing or migrating SWFL individuals or the non-listed subspecies for a short period of time but does not currently support SWFL breeding. No impacts to SWFL are expected from implementation of the Proposed Action, for the species has not been known to breed in the area since 2003 (Howell and Kus 2009).

TWG

Potential disturbance to the Las Flores Creek estuarine protection zone would be managed according to the Riparian/Estuarine BO (USFWS 1995a). The Proposed Action would include protective measures to contain silt and sediment. Hydrologic modeling indicated that the Proposed Action would not create any significant level of change to channel flow rate or hydraulic characteristics (specifically depth and velocity) through or near TWG habitat. It also determined that the Proposed Action would not significantly modify the natural sediment transport levels of Las Flores Creek or present any sediment related risk (beyond natural levels) to the TWG (RBF Consulting 2009, 2011). In addition, no direct impacts to Las Flores Creek would occur due to usage of the new infrastructure.

Construction of culverts leading into Las Flores Creek would be subject to prior authorization by the USACE and RWQCB and would meet all applicable requirements of the CWA.

Any unavoidable impacts to TWG or wetland habitat would be compensated following the Riparian/Estuarine BO (USFWS 1995a), such that the impact would not be significant. As a result, the Proposed Action may affect, but is not likely to adversely affect the TWG, and no significant impacts on the species would occur.

SDFS

SDFS occur in a basin at the entrance to the southern access road. If the road is used to transport construction equipment it would only be used during the dry season and the basin would be covered with steel plates as described in the SCMs (Section 2.4). Thus, no impacts to SDFS would occur from implementation of the Proposed Action.

BRFI

BRFI occurs along the southern access road and would be fenced and avoided as described in the SCMs (Section 2.4). Thus, no impacts to BRFI would occur from implementation of the Proposed Action.

Other Special Concern Species

As described in Section 3.3, several special concern wildlife species have the potential to occur in the project area. These species are wide ranging and occur in many areas of MCB Camp Pendleton and are not dependent on or especially concentrated in the project area. SCMs to protect riparian and wetland habitat would protect these species as well. Pendleton button-celery and Coulter's salt bush occur along the southern access road and would be fenced and avoided as described in the SCMs. Thus, no impacts to those rare plants species would occur. No significant impacts on populations or the overall availability of habitat for these species would occur from implementation of the Proposed Action.

4.3.2 Mitigation Measures

Implementation of the Proposed Action and associated SCMs would not result in significant impacts to biological resources. Any LBVI occupied riparian habitat, as well as suitable CAGN habitat, that is cleared for construction would be revegetated (i.e., in-place mitigation) or, if that is not possible, would be mitigated offsite. Impacts to Section 404 jurisdictional wetlands and waters would be mitigated at a 2:1 ratio at the proposed Pilgrim Creek mitigation site.

4.3.3 No-Action Alternative

Under the No-Action Alternative, the DON/USMC and NCTD/SANDAG would not implement the new Red Beach bridge construction and modification of access points. Existing conditions (as described in Section 3.3) would remain unchanged and no significant impacts to biological resources would occur.

4.4 CULTURAL RESOURCES

4.4.1 Proposed Action

As discussed in Section 3.4, ASM Affiliates conducted an archaeological survey of the Red Beach project area in August of 2007 (ASM 2007) and a historical evaluation of the Las Flores Creek Railway Bridge was completed in June of 2009 (ASM 2009). The USMC prepared and submitted a cultural resources survey report and a Historic Resource Inventory and Evaluation Report to the CASHPO. The CASHPO provided a letter to the USMC (refer to Appendix C of the P-159 EA) concurring that a finding of no adverse effect is appropriate and that documentation supporting this finding has been provided pursuant to 36 CFR Part 800.11(d).

As part of this SEA, ASM Affiliates prepared a Supplemental Historic Property Evaluation for the revised project footprint (ASM 2011). Based on this evaluation, there would be no adverse effects to archaeological sites or historic properties with implementation of the Proposed Action. The USMC submitted the Supplemental Historic Property Evaluation to the CASHPO. The CASHPO provided a letter (refer to Appendix B of this SEA) concurring that a finding of no adverse effect is appropriate and that documentation supporting this finding has been provided pursuant to 36 CFR Part 800.11(d).

The results of the above mentioned surveys suggest that only sparse and disturbed portions of SDI-811 and SDI-10731 sites exist within the APE, and that the two sites were probably not connected, at least within the APE. The majority of the cultural deposit within the APE is extremely sparse and/or substantially disturbed, and does not appear to represent a significant or unique portion of the site. Therefore, construction activities associated with the APE would not impact contributing elements within the upper strata or lower strata of SDI-811 or SDI-10731. In addition, the new design information provided in this SEA does not suggest that the project would encroach on undisturbed portions of these two prehistoric sites (ASM 2011). Nonetheless, due to the archaeologically sensitive nature of the area, including the potential for burials and/or human remains (in situ or a disturbed context), an archaeological monitoring team would be present during construction activities associated with the Proposed Action and would consist of a professional archaeologist and a Native American monitor approved by the AC/S ES Cultural Resources Branch. In addition, an archaeological monitoring and discovery plan would be prepared and approved by the AC/S ES Cultural Resources Branch before the start of construction activities.

Also within the APE, but not within the area of direct effect, and immediately outside of the NCTD easement is prehistoric site SDI-10728. Site SDI-10728 lies on the bluff just above the construction area for the new Red Beach Bridge. The dirt road that runs through the site would be used for access to the tracks by construction equipment and personnel. Therefore, to reduce impacts to a level of insignificance, no improvements, such as grading or capping, to the portion of the access road through SDI-10728 would take place. Instead, temporary fencing or staking along the edges of the road would be installed to prevent impacts to the site; and periodic inspections by a qualified archaeologist would be conducted to ensure protective measures are being implemented and to examine the effectiveness of those measures. One potentially sensitive area is the bluff below SDI-10728, but the placement of a retaining wall at the toe of this bluff along with the overall design plan would help stabilize the bluff and add protection to this portion of the site. Should the design of the bluff retaining wall require work behind the toe, the NCTD easement in which all work would be performed is still at least six feet below the bluff top.

The Las Flores Creek Railway Bridge has been recommended as *not* eligible for listing in the NRHP and no effects to historic properties would occur. Therefore, no significant impacts to cultural resources would occur with implementation of the Proposed Action.

4.4.2 Mitigation Measures

Implementation of the Proposed Action would not result in significant impacts to cultural resources; therefore, no mitigation measures are proposed.

4.4.3 No-Action Alternative

Under the No-Action Alternative, the DON/USMC and NCTD/SANDAG would not implement the new Red Beach bridge construction and modification of access points. Existing conditions (as described in Section 3.4) would remain unchanged and no significant impacts to cultural resources would occur.

4.5 AIR QUALITY

Emission thresholds associated with federal CAA conformity requirements are the primary means of assessing the significance of potential air quality impacts associated with implementation of a Proposed Action under NEPA. A formal conformity determination is required for federal actions occurring in nonattainment or maintenance areas when the total direct and indirect stationary and mobile source emissions of nonattainment pollutants or their precursors exceed *de minimis* thresholds. For those air pollutants which are in attainment of the NAAQS, the general conformity requirements and thresholds do not apply. For these air pollutants, the USEPA Prevention of Significant Deterioration (PSD) permitting program would only apply if new major stationary sources of emissions or major modifications at existing stationary sources would be implemented in the vicinity of a PSD Class I Area.

Significant air quality impacts would occur if implementation of any of the alternatives would directly or indirectly:

- 1) expose people to localized (as opposed to regional) air pollutant concentrations that violate state or federal ambient air quality standards;
- 2) cause a net increase in pollutant or pollutant precursor emissions that exceeds relevant emission significance thresholds (such as CAA conformity *de minimis* levels or the numerical values of major source thresholds for nonattainment pollutants); or
- 3) conflicts with adopted air quality management plans, policies, or programs.

Impacts would also be potentially significant within the MCB Camp Pendleton region if project emissions exceed the thresholds that trigger a conformity determination under Section 176(c) of the 1990 CAA (100 tons per year of VOC, NO_x, or CO). If emissions exceed this threshold, further analysis of the emissions and their consequences would be performed to assess whether there was likelihood of a significant impact to air quality. The nature and extent of such analysis would depend on the specific circumstances. The analysis could range from a more detailed and precise examination of the likely emitting activities and equipment, to air dispersion modeling analyses. Section 4.5.3 presents the Conformity Applicability Analysis for actions within the SDAB and Appendix C contains the Record of Non-Applicability (RONA) for CAA Conformity and supporting air quality data.

4.5.1 Proposed Action

4.5.1.1 Construction Assumptions

Air quality impacts from proposed construction activities would occur from (1) combustion emissions due to the use of fossil fuel-powered equipment; (2) fugitive dust emissions (PM₁₀) during construction activities, earth-moving activities, and the operation of equipment on bare soil; and (3) VOC emissions from application of asphalt materials during paving operations.

A list of estimated equipment required for construction activities, estimates of workforce requirements, and haul truck travel are provided in Appendix C, along with the emission calculations for all construction activities. It has been estimated that all construction activities would be completed over the course of one year.

Total emissions resulting from construction activities have been estimated using data presented in Chapter 2, general air quality assumptions, and emission factors compiled from the following sources: *OFFROAD Emission Factors* and *CARB EMFAC2007 Model* (CARB 2007), and *Compilation of Air Pollutant Emission Factors, AP-42* (USEPA 1995, 2006).

After PM₁₀ is estimated, the fraction of fugitive dust emitted as PM_{2.5} is estimated, based on the Southern California Air Quality Management District’s (SCAQMD) Final Methodology to Calculate PM_{2.5} and PM_{2.5} significance thresholds (SCAQMD 2006). This guidance document indicates that fugitive dust PM₁₀ is 21% PM_{2.5}, heavy equipment PM₁₀ is 89% PM_{2.5}, and vehicular emissions of PM₁₀ are 99% PM_{2.5} (SCAQMD 2006).

4.5.1.2 Construction Impacts

Estimated construction emissions due to implementation of the Proposed Action are shown in Table 4.5-1. For the purposes of this analysis, it has been assumed that Phases one, two, and three construction activities would occur within one calendar year. Phase four construction activities would occur at a later date determined by NCTD/SANDAG, and is therefore not included in the annual subtotal for the Proposed Action. Estimated emissions associated with construction activities would be below the *de minimis* threshold levels for CAA conformity; therefore, no significant impacts to air quality would occur. In addition, the PSD permitting program and significance criteria would not be applicable for the Proposed Action since no stationary sources of emissions would be implemented and there are no PSD Class I areas in the vicinity of the Proposed Action. Furthermore, when compared to the PSD threshold of 250 tons per year, the estimated construction emissions of these criteria pollutants would be well below these levels.

Table 4.5-1. Estimated Emissions Resulting from Implementation of the Proposed Action

Estimated Emissions Per Construction Phase	Emissions ¹ (tons/year)					
	CO	VOCs	NO _x	SO _x	PM ₁₀	PM _{2.5}
Phase One Construction Emissions	2.47	0.47	3.94	0.00	0.86	0.20
Phase Two Construction Emissions	1.42	0.31	2.73	0.00	0.23	0.14
Phase Three Construction Emissions	1.25	0.25	2.17	0.00	0.17	0.10
Subtotal	5.14	1.03	8.84	0.00	1.26	0.44
Phase Four Construction Emissions ²	0.71	0.13	1.14	0.00	0.12	0.06
<i>de minimis</i> threshold ³	100	100	100	NA	NA	NA
Exceeds <i>de minimis</i> threshold?	No	No	No	No	No	No

Note: ¹ SDAB is a basic nonattainment area for the 8-hour O₃ NAAQS (VOCs and NO_x are precursors to the formation of O₃), is a maintenance area for CO NAAQS, and is in attainment of the NAAQS for all other criteria pollutants.

² Phase four construction activities would occur at a later date determined by NCTD/SANDAG, and is therefore not included in the annual subtotal for the Proposed Action. Estimated emissions for Phase four activities would be below *de minimis* thresholds.

³ *de minimis* thresholds are developed from SDCAPCD major source thresholds; *de minimis* thresholds are not applicable (NA) to NAAQS attainment areas (i.e., SO₂, PM₁₀ and PM_{2.5}).

Sources: CARB 2011c; USEPA 2011.

4.5.2 Conformity Applicability Analysis

The estimated construction emissions associated with the Proposed Action would be below the *de*

minimis threshold levels for CAA conformity. Therefore, the Proposed Action would conform to the SDAB SIP and would not trigger a conformity determination under Section 176(c) of the CAA. The DON/USMC has prepared a RONA for CAA conformity (refer to Appendix C of this SEA).

4.5.3 Mitigation Measures

Implementation of the Proposed Action would not result in significant air quality impacts; therefore, no mitigation measures are proposed.

4.5.4 No-Action Alternative

Under the No-Action Alternative, the DON/USMC and NCTD/SANDAG would not implement the new Red Beach bridge construction and modification of access points. Existing conditions (as described in Section 3.5) would remain unchanged and no significant impacts to air quality would occur.

4.6 HAZARDOUS MATERIALS AND WASTES

4.6.1 Proposed Action

Hazardous materials involved in bridge and roadway construction projects typically include fuels, hydraulic fluid, and paving materials. Construction contractors would be required to comply with all federal, state, and MCB Camp Pendleton requirements for use and storage of hazardous materials and hazardous wastes at the site and for proper offsite disposal of hazardous materials. Contractors would also be required to prepare and implement hazardous materials/hazardous wastes management plans that include contingencies for accidental releases. Construction equipment would be equipped with spill containment kits. All contractors' vehicle fueling and repairs would take place at offsite locations. Construction contractors would be required to prepare and implement a SWPPP and follow BMPs for hazardous materials and hazardous wastes associated with the construction activities. There would be no storage of hazardous materials or waste on-site. Construction contractors would evaluate, before shipment of any material offsite, whether the material is regulated as a hazardous waste. The construction contractors would also identify and evaluate recycling and reclamation options to the maximum extent practical as alternatives to land disposal.

Upon completion of the construction phase, operations at the site would be the same as those occurring before construction of the new bridge and access points. There would be no increase in the quantity or type of hazardous materials present at the site.

Therefore, no increase in human health risk or environmental exposure to hazardous materials or hazardous wastes would result from implementation of the Proposed Action and significant hazardous materials or hazardous wastes impacts would not occur.

4.6.2 Mitigation Measures

Implementation of the Proposed Action would not result in significant hazardous materials or hazardous wastes impacts; therefore, no mitigation measures are proposed.

4.6.3 No-Action Alternative

Under the No-Action Alternative, the DON/USMC and NCTD/SANDAG would not implement the new Red Beach bridge construction and modification of access points. Existing conditions (as described in Section 3.6) would remain unchanged and no significant hazardous materials and wastes impacts would occur.

CHAPTER 5

CUMULATIVE EFFECTS

5.1 CUMULATIVE EFFECTS

The analysis of cumulative impacts (or cumulative effects)¹ follows the objectives of NEPA of 1969 and CEQ regulations (40 CFR Parts 1500-1508) that provide the implementing procedures for NEPA. The CEQ regulations define cumulative impacts 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 non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR 1508.7).

The CEQ also provides guidance on cumulative impacts analysis in *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997). Noting that environmental impacts result from a diversity of sources and processes, this CEQ guidance observes that “no universally accepted framework for cumulative effects analysis exists,” while noting that certain general principles have gained acceptance. One such principle provides that “cumulative effects analysis should be conducted within the context of resource, ecosystem, and community thresholds—levels of stress beyond which the desired condition degrades.” Thus, “each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate additional effects, based on its own time and space parameters.” Therefore, cumulative effects analysis normally encompasses geographic boundaries beyond the immediate area of the Proposed Action, and a time frame including past actions and foreseeable future actions, to capture these additional effects. Bounding the cumulative effects analysis is a complex undertaking, appropriately limited by practical considerations. Thus, CEQ guidelines observe, “[i]t is not practical to analyze cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.”

5.1.1 Geographic Boundaries for Cumulative Impacts Analysis

Geographic boundaries for analyses of cumulative impacts in this SEA vary for different environmental resources. For example, for air quality, the potentially affected air basin is the appropriate boundary for assessment of cumulative impacts from releases of pollutants into the atmosphere. For resources such as wildlife, impacts from the Proposed Action might combine with impacts from distant sources to affect the resource species, necessitating a wider geographic scope for the analysis.

Cumulative effects may occur when there is a relationship between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. This relationship may or may not be obvious. Actions overlapping with or in close proximity to the Proposed Action can have more potential for cumulative effects on “shared resources” than actions that may be geographically separated. Similarly, actions that coincide temporally would tend to offer a higher potential for cumulative effects.

¹ CEQ Regulations provide that the terms “cumulative impacts” and “cumulative effects” are synonymous and can be used interchangeably (40 CFR § 1508.8(b)).

In this SEA, an effort has been made to identify all actions in or near the action area that is being considered, and that are in the planning stage at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action outlined in this SEA, these actions are included in the cumulative effects analysis.

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

This EA applies a stepped approach to provide decision-makers with not only the cumulative effects of the action alternatives, but also the incremental contribution of the following past, present, and reasonably foreseeable actions.

5.2.1 MCB Camp Pendleton Military Family Housing PPV (Camp Pendleton Phase VI)

A new Public-Private Venture (PPV) military family housing development on 77 acres (31 hectares) at the Stuart Mesa agricultural field is under construction abutting the existing Stuart Mesa Housing to the east. The development includes the construction of up to 172 military family housing units, off-street parking spaces for each dwelling unit, one full-size basketball court, one half-size basketball court, three tot lots, one play lot, and a chain-link fence surrounding the site on all sides except on the eastern boundary. NAVFAC SW prepared an EA for the project, and a FONSI was published in September 2009. This project is currently under construction.

5.2.2 New Naval Hospital

A new Naval Hospital to replace the existing facility in the 27 Area is under construction in the 20 Area, just north of the MCB Camp Pendleton Main Gate. The hospital is planned as a four-story facility with up to three parking structures that are each not to exceed five stories. The hospital will provide emergency services, in-patient services, out-patient clinics, ancillary services, surgical services, logistics, and meet other medical needs. An EA for this project has been completed, and a FONSI was signed in January 2010. This project is currently under construction.

5.2.3 New Main Exchange and Service Mall

A new Main Exchange and Service Mall is under construction in the 20 Area, just north of the MCB Camp Pendleton Main Gate (north of the site for the new Naval Hospital). The Exchange and Service Mall will include a large one story "big box" retail building and up to four smaller buildings to support the following potential services: a military clothing store; service vendors; a restaurant; a credit union; a warehouse, administration and support; an outdoor lawn and garden shop; and surface parking for approximately 580 vehicles. An EA for this project has been completed, and a FONSI was signed in January 2010.

5.2.4 Operations Access Points (P-159A Green Beach)

The USMC proposes to construct and modify new and existing transit and maneuver corridors to facilitate the transit of troops and tactical vehicles between Green Beach and inland training areas at MCB Camp Pendleton. A FONSI was signed on 08 January 2010. Since preparation of the Green Beach EA more detailed information for proposed bridge design/construction and the access roads within the NCTD rail easement or right-of-way has become available, necessitating an expanded analysis of these project components. Therefore, a Green Beach SEA is currently underway to address these additional components and is expected to be completed in 2011.

5.2.5 NCTD Santa Margarita River Bridge Replacement and Second Track Project

This project includes the replacement of the existing single-track Santa Margarita River Railway Bridge with a new two-track bridge, construction of a 0.8-mile (1.3-km) second rail track, and an upgrade and realignment of the existing Fallbrook Junction Passing Track (1.7 miles [2.7 km]) for higher speed. Completion of the new double-track segment portion of the project would connect the Stuart Mesa Passing Track with the Fallbrook Junction Passing Track to provide a 4.5 mile (7.2 km) segment of continuous double-track with maximum speeds between 75 and 90 miles per hour (121 and 145 km per hour). An EA is being prepared to analyze potential environmental impacts of the project.

5.2.6 Interstate 5 North Coast Corridor Project

I-5 North Coast Corridor Project proposed improvements include one or two High Occupancy Vehicle Managed Lanes in each direction, auxiliary lanes where needed, and possibly one general purpose lane in each direction. The main purpose of the project is to maintain or improve the existing and future traffic operations in the I-5 North coast corridor so as to improve the safe and efficient regional movement of people and goods for the design year of 2030. An Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for this project is currently in progress.

5.2.7 Basewide Utility Infrastructure Improvements Project

The USMC will implement six utility projects in various locations throughout MCB Camp Pendleton. The purpose of these actions are to provide reliable, new, expanded, compliant utility systems to support military training and operations, as well as the delivery of life support and quality of life services. These improvements will also provide system redundancy that will enable the delivery of utility services during periods of scheduled and unscheduled/emergency outages. The utility infrastructure projects are needed to modernize and expand MCB Camp Pendleton's aging (1940s/50s era) utility systems and infrastructure. Utilities included are electrical, water, waste water, natural gas, and communications. An EIS was completed and the Record of Decision was signed in September 2010.

5.2.8 Repair of 24 Access Roads

The purpose of this project is to repair and stabilize 24 existing dirt roads throughout MCB Camp Pendleton. The roads are used to provide access to ranges in support of amphibious and inland training activities. An estimated 54 miles (87 km) of roads are involved in the project. The roads proposed for repair are located on sloping coastal terraces, hillsides, and valleys dissected by gullies, ravines, and swales. The soils underlying the roads are susceptible to erosion. The EA is in progress.

5.2.9 Grow the Force

The Marine Corps 202k Plus Up, also known as "Grow the Force" includes an increase of approximately 3,000 personnel at MCB Camp Pendleton and the placement and use of temporary and permanent facilities. At present, the Grow the Force project includes approximately 60 construction projects at MCB Camp Pendleton. An EA evaluating the potential impacts of 39 projects has been completed and the FONSI signed. The remaining 21 projects have received Categorical Exclusions under NEPA.

5.2.10 MCB Camp Pendleton MFH PPV (Camp Pendleton Phase VII)

A new PPV military family housing development on up to approximately 132.17 acres (53.48 hectares) of former agricultural land for a maximum of 351 military family housing units and supporting infrastructure was recently approved. The site design for the proposed residential housing would consist of multi-family residential three- and four-bedroom units. Utility connections for potable water, sewer, and

electrical services are all part of the project. Access to the new housing area would be provided via a new two-lane road that would extend from existing Cockleburr Canyon Road, west of the site, through the project site, to join existing Mitchel Boulevard, southeast of the site. An EA for this project was completed and a FONSI was signed in June 2011.

5.3 POTENTIAL CUMULATIVE IMPACTS BY ENVIRONMENTAL RESOURCE AREA

This section addresses the potential cumulative impacts with implementation of the Proposed Action in conjunction with the projects identified above. These projects represent past, present, and reasonably foreseeable actions with the potential for resulting in cumulative impacts when considered in conjunction with potential impacts from implementation of the Red Beach Operations Access Points project.

5.3.1 Topography, Geology, and Soils

Implementation of the Proposed Action would not result in significant impacts to geological resources. Construction activities may cause a temporary increase in erosion; however, BMPs established in the SWPPP would be implemented to reduce impacts to soils, including the use of silt curtains, fencing, and sediment traps and the application of water sprays and revegetation of disturbed soils when applicable. Cumulatively, the projects described in Section 5.2 would have only very minor, temporary and localized effects on soils. The incremental effects of the Proposed Action would not add appreciably to any existing or future erosion associated with other anthropogenic activities. Therefore, the Proposed Action, in conjunction with the projects described in Section 5.2, would not result in significant cumulative impacts to topography, geology, and soils.

5.3.2 Hydrology

Implementation of the Proposed Action would not result in significant impacts to the quality or quantity of surface water or groundwater resources, or to floodplains and wetlands at MCB Camp Pendleton. The Proposed Action would include a vegetated bioswale to be installed near the new southerly access road, to maintain the quality of water entering Las Flores Creek from the new roadway. Continuing adherence to the state and federal regulations would further ensure that the Proposed Action, in conjunction with the projects described in Section 5.2, would not result in significant cumulative impacts to surface water and groundwater resources.

5.3.3 Biological Resources

Implementation of the Proposed Action would not result in significant impacts to biological resources. The USMC prepared a Biological Assessment for the P-159 EA and determined that the project would not be likely to adversely affect any threatened or endangered species. The USFWS provided a Class II Concurrence Letter and Reinitiation Letter to the USMC (USFWS 2009b, 2012) for the P-159 Red Beach project which confirmed that by following the proposed avoidance and minimization measures the project would not be likely to adversely affect any federally listed species. In addition, the USFWS agreed that the project is consistent with the Riparian/Estuarine BO and NCTD Double Track BO (refer to Appendix C of the P-159 EA). Avoidance and minimization measures in the P-159 Concurrence Letter and Reinitiation Letter would be implemented as SCMs, which are included and described in Section 2.4.1 of this SEA.

Past, present, and future projects have been and would be similarly required to follow the requirements of the CWA and ESA, thereby avoiding or minimizing potential cumulative effects. Through the INRMP (USMC 2007), a number of measures have been identified to monitor the combined effects of USMC activities on the lands and biological resources of MCB Camp Pendleton, and to identify and correct

potential problems. As a result, the Proposed Action, in conjunction with other projects described in Section 5.2, would not result in significant cumulative impacts to biological resources.

5.3.4 Cultural Resources

There are no cultural resources, including historic districts, buildings, or objects that would be impacted under the Proposed Action. The USMC prepared and submitted a cultural resources survey report to the CASHPO. The CASHPO provided a letter to the USMC (refer to Appendix C of the P-159 EA) concurring that a finding of No Adverse Effect with conditions is appropriate pursuant to 36 CFR Part 800.5(b) for this project and that the documentation supporting this finding has been provided pursuant to 36 CFR Part 800.11 (d). As part of this SEA, the USMC prepared a Supplemental Historic Properties Evaluation to address the extended portion of the APE. The conclusions of this report determined that there would be no adverse effects to historic properties by the Proposed Action. The Proposed Action and projects listed in Section 5.2 are not expected to disturb identified cultural resource sites. Mitigation strategies developed under any Programmatic Agreement with the CASHPO, such as avoidance or data recovery, would reduce impacts to below a level of significance. Any Government-to-Government communication process with Native American Indian Tribes would continue during project implementation and any impacts would be avoided or minimized. Any activities with the potential for significant impacts to cultural resources would require Section 106 consultation with the CASHPO, and would be mitigated as required. These requirements would reduce impacts of the Proposed Action and other past, present, and reasonably foreseeable projects to below a level of significance. Therefore, the Proposed Action, in conjunction with the projects described in Section 5.2, would not result in significant cumulative impacts to cultural resources.

5.3.5 Air Quality

Criteria Pollutants

The ROI considered in this air quality cumulative analysis for criteria pollutants includes the entire SDAB. Cumulative impacts resulting from the Proposed Action, in conjunction with impacts from other projects discussed in Section 5.2, would potentially occur during proposed construction activities.

Air quality impacts from proposed construction activities would occur from combustive emissions due to the use of fossil fuel-fired construction equipment and fugitive dust (PM₁₀/PM_{2.5}) emissions due to the use of vehicles on bare soils. Proposed construction activities would produce emissions that would remain below applicable conformity emission significance thresholds. Any concurrent emissions-generating action that occurs in the vicinity of proposed construction activities would potentially contribute to the ambient impact of these emissions. However, since proposed construction would produce minor amounts of emissions, the combination of proposed construction and future project air quality impacts would not contribute to an exceedance of an ambient air quality standard. Implementation of recommended fugitive dust control measures would ensure that air emissions from proposed construction activities would produce less than significant cumulative air quality impacts.

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 for GHG emissions. On 18 February 2010, the CEQ released draft guidance for addressing climate change in NEPA documents (CEQ 2010). The draft guidance, which has been issued for public review and comment, recommends quantification of GHG emissions, and proposes a reference point of 25,000 metric tons of CO₂e emissions. The CEQ indicates that use of 25,000 metric tons of CO₂e emissions as a reference point would provide federal agencies with a useful indicator, rather than an absolute standard of significance, for agencies to provide action-specific evaluation of GHG emissions and disclosure of potential impacts.

Formulating such thresholds is problematic, as it is difficult to determine what level of proposed emissions would substantially contribute to global climate change. In the absence of formally-adopted thresholds of significance, this SEA compares GHG emissions that would occur from the Proposed Action with the 25,000 metric ton level, as well as comparing the net GHG emissions associated with the Proposed Action to the U.S. GHG baseline inventory of 2006 (USEPA 2008) to determine the relative increase in proposed GHG emissions.

Table 5.3-1 summarizes the annual GHG emissions associated with implementation of the Proposed Action. Appendix C presents estimates of GHG emissions generated by the Proposed Action. These data show that the CO₂e emissions associated with the Proposed Action would amount to approximately 0.0000190% of the total CO₂e emissions generated by the U.S. Emissions under the Proposed Action are also below the 25,000 metric tons of CO₂e level proposed in the draft NEPA guidance by the CEQ. Under the Proposed Action, cumulative impacts to global climate change would not be significant.

Table 5.3-1. Estimated GHG Emissions from Implementation of the Proposed Action

Scenario/Activity	Metric Tons per Year ¹			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Phase One Construction Emissions	423.63	0.04	0.34	530
Phase Two Construction Emissions	296.04	0.03	0.24	369
Phase Three Construction Emissions	226.61	0.02	0.19	285
Phase Four Construction Emissions ²	127.93	0.01	0.10	159
TOTAL	1074.21	0.10	0.86	1343
Draft NEPA Threshold ³				25,000
U.S. 2006 Baseline Emissions (10 ⁶ metric tons) ⁴	-	-	-	7,054.2
Proposed Emissions as a % of U.S. Emissions	-	-	-	0.0000190

Notes: ¹CO₂e = (CO₂ * 1) + (CH₄* 21) + (N₂O * 310)

² Although Phase four construction activities would occur at a later date determined by NCTD/SANDAG, GHG emissions for Phase four are included in the Proposed Action total, since GHG emissions are cumulative by nature.

Source: ³CEQ 2010; ⁴USEPA 2008.

Although the Proposed Action would only cause negligible cumulative impacts associated with global climate change, this important topic warrants discussion of DON and USMC leadership in broad-based programs to reduce energy consumption and shift to renewable and alternative fuels, thereby reducing emissions of carbon dioxide and other greenhouse gases.

Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, was adopted in October 2009, and provides early strategic guidance to Federal agencies in the management of greenhouse gas emissions. The early strategy directs the agencies to increase renewable energy use to achieve general greenhouse gas emission reductions. According to the provisions of Executive Order 13514, Federal agencies will be required to develop a 2008 baseline for scope 1 and 2 GHG emissions, and to develop a percentage reduction target for agency-wide reductions of scope 1 and 2 GHG emissions by fiscal year 2020. As part of this effort, Federal agencies will evaluate sources of GHG emissions, and

develop, implement, and annually update an integrated Strategic Sustainability Performance Plan that will prioritize agency actions based on lifecycle return on investment. The intent is to evaluate greenhouse gas emissions on a lifecycle basis and to identify feasibility of sustainability strategies on that basis. The Department of Defense is currently developing its Strategic Sustainability Performance Plan that will guide Marine Corps initiatives to reduce greenhouse gas emissions.

The Commandant of the Marine Corps' *Facilities Energy and Water Management Program Campaign Plan* (2009) declares the intent to implement measures to conserve energy and to reduce greenhouse gas emissions and dependence on foreign oil. The campaign plan identifies long-term goals to reduce energy intensity and increase the percentage of renewable electrical energy consumed. This plan requires 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.

Marine Corps Installations West has undertaken a study to evaluate and address GHG emissions, documented in the draft *Greenhouse Gas Assessment for Marine Corps Installations West* (USMC 2009). The study provides the basis for recommended GHG management policies at Marine Corps Installations West.

5.3.6 Hazardous Materials and Wastes

Implementation of the Proposed Action would not result in significant impacts to hazardous materials and wastes. The Proposed Action and projects listed in Section 5.2 would require that construction contractors comply with all federal, state, and MCB Camp Pendleton requirements for use and storage of hazardous materials and hazardous wastes at the site and for proper offsite disposal of hazardous waste. In addition, construction contractors would be required to follow BMPs for hazardous materials and hazardous wastes associated with other construction activities. These requirements would reduce impacts of the Proposed Action and other past, present, and reasonably foreseeable projects to below a level of significance. Therefore, the Proposed Action, in conjunction with the projects described in Section 5.2, would not result in significant cumulative hazardous materials or wastes impacts.

5.4 CONCLUSION

Implementation of the Proposed Action would not result in significant impacts to any environmental resource area. The Proposed Action, in conjunction with the projects described in Section 5.2, would comply with established policies, regulations and directives to ensure that project-specific impacts are minimized or avoided. Therefore, cumulative impacts from the Proposed Action, in conjunction with other past, present, and reasonably foreseeable future actions, would not be significant.

CHAPTER 6

OTHER CONSIDERATIONS REQUIRED BY NEPA

6.1 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF NATURAL OR DEPLETABLE RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and other natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Under the Proposed Action, construction would require the consumption of limited amounts of materials typically associated with construction (e.g., concrete, etc.). In addition, the use of construction vehicles at the locations would result in the consumption of additional fuel, oil, and lubricants. However, this is not considered a significant irreversible or irretrievable commitment of resources.

6.2 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF THE HUMAN ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM NATURAL RESOURCE PRODUCTIVITY

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use often eliminates the possibility of other uses being performed at that site.

The Proposed Action would, reversibly, dedicate land and a small amount of other resources to a particular use for the life of the project. That land and those resources would not be available for other productive uses. However, these impacts are not significant. Therefore, implementation of the Proposed Action would not result in any impacts that would reduce environmental productivity, permanently narrow the range of beneficial uses of the environment, or pose long-term risks to health, safety or the general welfare of the public.

6.3 MEANS TO MITIGATE AND/OR MONITOR ADVERSE ENVIRONMENTAL IMPACTS

Implementation of the Proposed Action would not result in any significant adverse environmental impacts. Therefore, no mitigation and/or monitoring measures would be implemented, other than what has already been described in this SEA.

6.4 ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED AND ARE NOT AMENABLE TO MITIGATION

This SEA has determined that implementation of the Proposed Action would not result in any significant impacts; therefore, there are no probable adverse environmental effects that cannot be avoided or are not amenable to mitigation.

CHAPTER 7

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CHAPTER 8

LIST OF PREPARERS AND CONTRIBUTORS

This Supplemental Environmental Assessment was prepared for, and under the direction of NAVFAC SW by Cardno TEC, Inc. Members of the professional staff are listed below:

Project Management and Quality Assurance

Douglas Billings, Program/Project Manager, 29 years experience

B.S., Physical Geography/Geologic Sciences

Christine Davis, Deputy Project Manager, 12 years experience

M.S., Environmental Management

Technical Analysts

Selena Buoni, Environmental Analyst, 6 years experience

MPL (Master of Planning), Sustainable Land Use concentration

Christine Davis, Environmental Analyst, 12 years experience

M.S., Environmental Management

Mike Dungan, Senior Biologist, 28 years experience

Ph.D., Ecology and Evolutionary Biology

Clint Scheuerman, Biologist, 5 years experience

B.S., Biological Science

Melissa Tu, Biologist, 15 years experience

B.A., Environmental Science-Biology

GIS & Graphic Design

Jason Harshman, GIS Specialist, 5 years experience

B.S., Biological Science

Subcontractors

Mark Becker, ASM Affiliates (Cultural Resources Technical Report)

Contributors

Mark Anderson, USMC, MCB Camp Pendleton, AC/S ES

Manuel Alvarez, USMC, MCB Camp Pendleton, Public Works Office

Danielle Page, USMC, MCB Camp Pendleton, AC/S ES, Cultural Resources Management Head

Jim Dowd, USMC, MCB Camp Pendleton, Operations and Training

Carol Evans, USMC, MCB Camp Pendleton, AC/S ES, Wildlife Management Branch

Matthew Lorne, USMC, MCB Camp Pendleton, AC/S ES, Land Management Branch

Kelly Higelmire, *USMC, MCB Camp Pendleton, AC/S ES, Cultural Resources Management Branch*

Jesse Martinez, *NAVFAC Southwest, Project Manager/Community Planner*

Alert Owen, *NAVFAC Southwest*

Rob Barton, *Parsons/NAVFAC Southwest*

Justin Fornelli, *NCTD*

Cheryle Hodge, *SANDAG*

Erich Lathers, *BRG Consulting*

Albert Rocha, *RBF Consulting*

CHAPTER 9

LIST OF AGENCIES CONSULTED

U.S. Fish and Wildlife Service – *Jonathan Snyder, Division Chief*

California Coastal Commission – *Charles Lester, Executive Director*

State Historic Preservation Office – *Milford Wayne Donaldson, State Historic Preservation Officer*

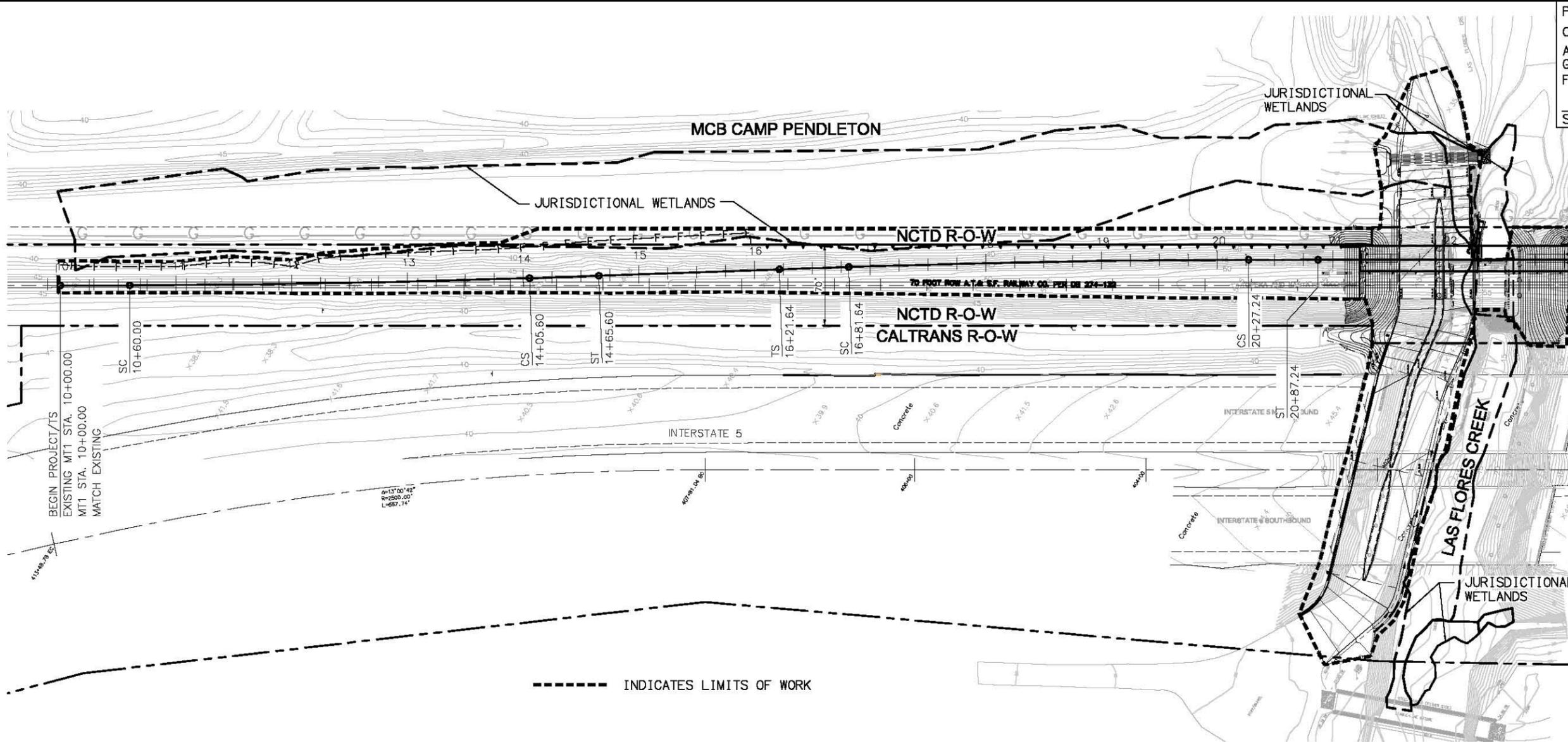
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APPENDIX A

*Project Design Documentation and
Hydrology, Stream Hydraulics, & Stormwater Protection Report*

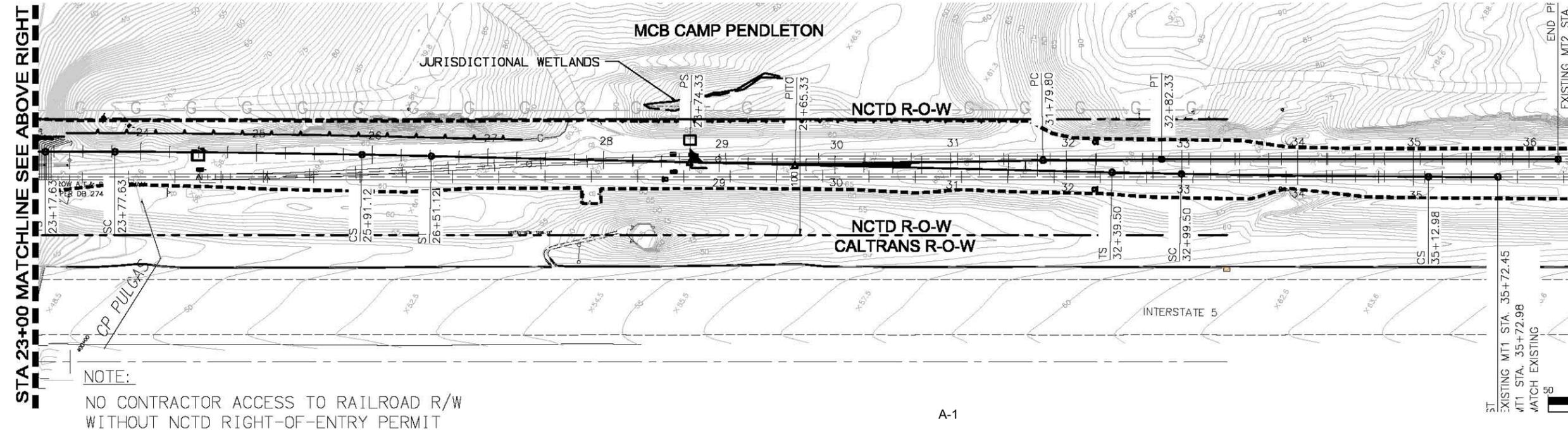
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 NAVAL FACILITIES ENGINEERING COMMAND
 SOUTHWEST DIVISION
 CALIFORNIA
 SAN DIEGO
 MCB CAMP PENDLETON, CALIFORNIA
 P-159 OPERATIONS ACCESS POINTS, RED BEACH
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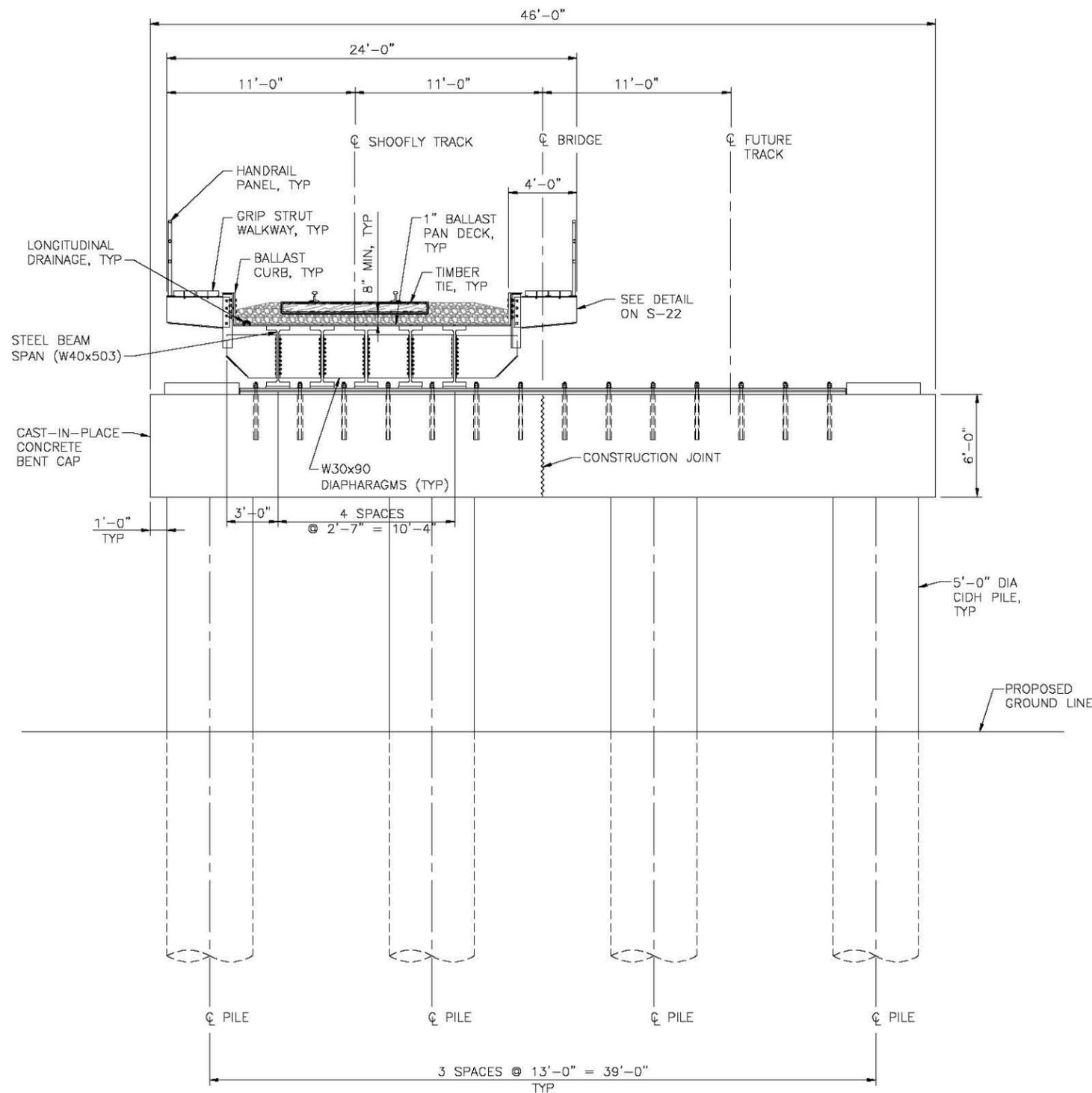
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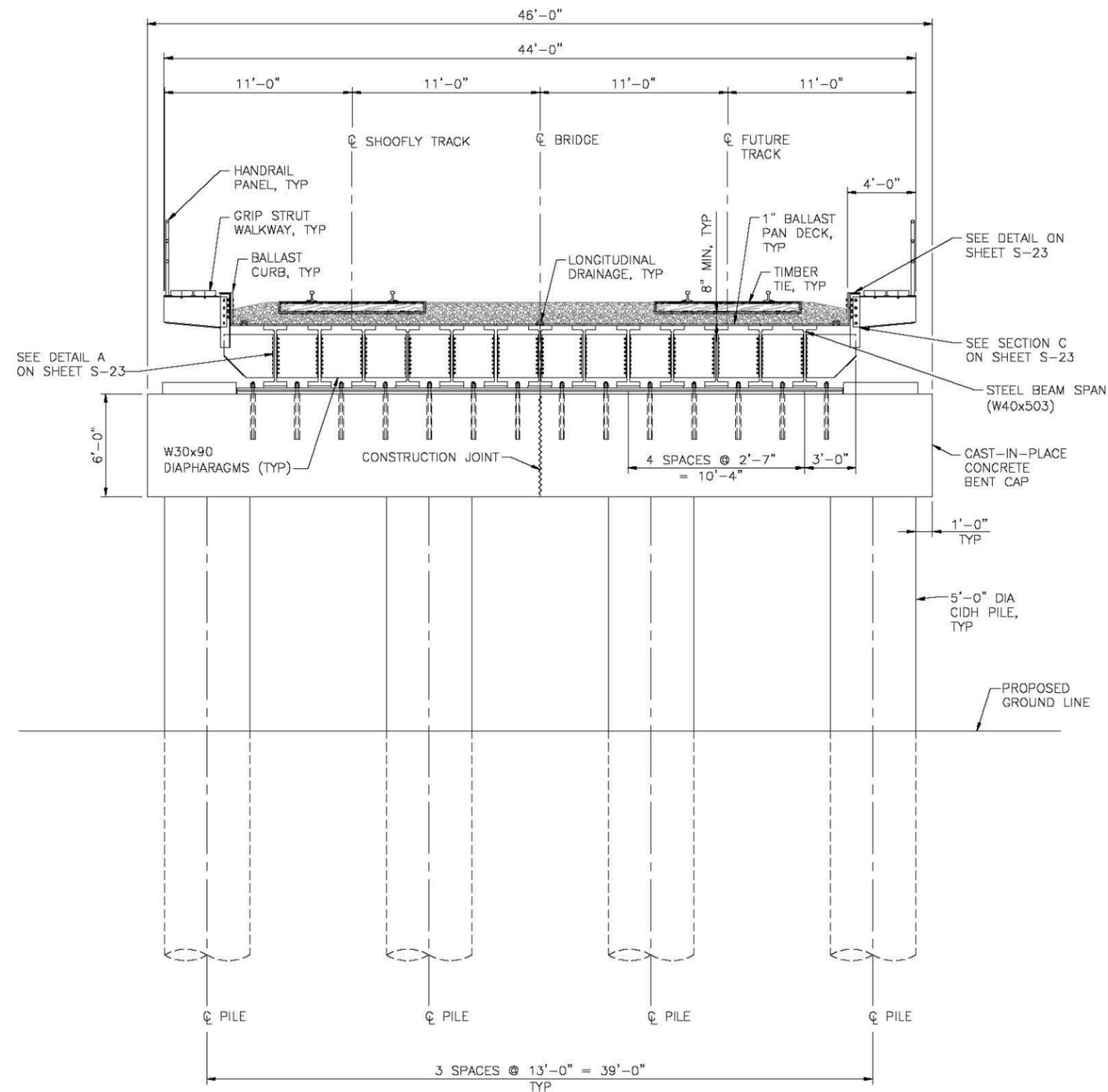


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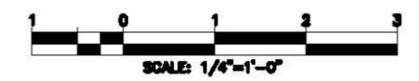
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Prepared by: RBF Consulting | 9755 Clairemont Mesa Blvd., San Diego, CA 92124 | 858.614.5000

Contact: Richard A. Lucera PE, CFM, CPESC | Braeden MacGuire, PE, CFM

RBF Job Number: 25-104707.001 | www.RBF.com

HYDROLOGY, STREAM HYDRAULICS, AND STORM WATER PROTECTION REPORT FOR LAS FLORES CREEK NEAR RED BEACH

March 31, 2011



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Appendix C	Steady State Hydraulic Analysis
Appendix D	Unsteady State Hydraulic Analysis
Appendix E	Mobile Boundary Hydraulic Analysis (Sediment Transport)
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Section 1 Executive Summary

The purpose of this study is to investigate the hydrology and hydraulic impacts to Las Flores Creek resultant from the planned widening and improvement of existing crossings under Interstate Highway 5 (I-5) and the North County Transit District (NCTD) railroad within Camp Pendleton. The study has been tailored to answer specific questions raised during initial environmental review by the United States Fish and Wildlife Service (USFWS), as well as to develop the necessary design recommendations for construction plan preparation.

Hydrology within the project area of Las Flores Creek was determined by 2 separate methods:

- “Event-based” unit hydrograph for the 100-year event, as well as the 5-year event, and
- Long-term stream gage information provided by the base environmental department.

The resulting compilation of hydrology data was incorporated into 3 separate hydraulic models, each of which was created to analyze different aspects of the project.

- “Steady State” models (constant flow rate) that incorporate the peak conditions of the 5-year and 100-year event-based unit hydrographs. These models were created specifically to ascertain general, contraction, and local scour. The results will be incorporated into design of the necessary stream stabilization measures to be undertaken as part of the proposed improvements, as well as the design of bridge piers at the NCTD railroad crossing.
- “Unsteady” models (varying flow rates) that incorporate the full range of flows developed from the 5-year and 100-year 24-hour hydrograph. The 5-year flow model was developed as a “proxy” to represent the normal condition of “bank-full” discharge, which statistically reflects the vast majority of flow conditions within the creek. The results have been used to address specific questions from the USFWS relating to potential changes in flow rate, flow velocity, and depth resultant from the project.
- “Sediment Transport” models (mixture of constant and varying flow rates) that incorporate long-term stream gage data, and were used specifically to predict general trends related to long-term scour and impacts to sediment concentrations through the sediment-sensitive tidewater goby habitat. Models were developed for the “Do Nothing” (starting with existing conditions geometry) and “Proposed Project” (starting with the proposed project geometry) alternatives. The model was developed specifically at the request of Base environmental staff to address questions posed by USFWS relating to impacts associated with increased sediment scour or deposition to the tidewater goby. The soil parameters and related grain size distribution used in the analysis were taken from sieve analyses of two soil samples collected on February 22, 2010 at the project site. No soil gradation data was collected in other reaches of Las Flores Creek, so interpretation of the results requires consideration of the other model results, calculations, and field observation.

The results of the various hydrology and hydraulic modeling efforts allow us to draw the following conclusions:

- The 100-year flow rate within Las Flores Creek during peak conditions at the I-5/NCTD crossings is approximately 7,163 cfs. Despite some differences in methodology and parameter assumptions, this result is very consistent with previous analysis done by WEST Consultants for the United States Army Corps of Engineers.
- The project will not create any significant level of change to channel flow rate or hydraulic characteristics (specifically depth and velocity) through or near the goby habitat. Flow depths will decrease and flow velocity will increase between the NCTD railroad embankment and Stuart Mesa Road in the post-project condition.
- The total design scour – the maximum of local abutment or pier scour, contraction scour, general scour, and an assumed 1-foot deep low flow channel – at the NCTD railroad crossing extends to an elevation of approximately sea level. Additional pier/support depth required for structural stability of the proposed NCTD railroad crossing should be provided at an elevation below sea level. The total design scour applies equally to all supports of the NCTD railroad bridge.
- Las Flores Creek between the NCTD railroad crossing and the Pacific Ocean is a reach undergoing long-term degradation (erosion) for both the “Do Nothing” and “Proposed Project” alternatives. Based upon a comparison of the long-term sediment transport analysis bed profiles through the goby habitat, the proposed improvements may result in some additional scour. However, sediment concentrations through the goby habitat are approximately the same for the “Do Nothing” and “Proposed Project” alternatives. Because the native soils are largely sand- and gravel-sized particles and because the project does not propose any changes to land use or cover within the watershed, the proposed project should not pose sediment related risk (in excess of natural levels) to the downstream tidewater goby habitat or species.
- A sheetpile retaining wall with a design height of 14.5 feet is proposed to protect the improved Red Beach access road. The proposed wall is estimated to provide sufficient scour protection for a flood with a return period of approximately 20 years (5% annual chance of that the peak flow rate is exceeded). Additional protection may be provided with a larger wall or revetment, but such additional protection will require funding beyond the project’s originally indicated construction cost limitation (CCL).
- Las Flores Creek channel bed elevation adjacent to the retaining wall should be monitored on an annual basis as well as after large storm events to ensure that the exposed height of the retaining wall does not exceed 14.5 feet (channel bed elevation of 11 feet above mean sea level). If the exposed retaining wall height approaches 14.5 feet, additional corrective action should be taken to ensure continued retaining wall stability.

Section 2 General Description

2.1 Project Description & Site Area

The project, P-159 Red Beach Access, proposes to expand the capacity of and improve the existing single-lane earthen roadway that passes beneath Interstate 5 and the North County Transit District (NCTD) commuter rail line. The roadway is located adjacent to Los Flores Creek, approximately 2,400 feet upstream from Red Beach and within the limits of Marine Corps Base Camp Pendleton. Figure 2-1 shows the location of the project. Figure 2-2 shows the boundary of Las Flores Creek watershed superimposed on a recent aerial photograph.

The existing route is not properly sized to accommodate all the tracked and heavy vehicles that must participate in training at Red Beach. The vehicles requiring access include: Amphibious Assault Vehicles (AAV's), Expeditionary Fighting Vehicles (EFV's), Assault Breacher Vehicles (ABV's), Expeditionary Bridge Vehicles (EBV's), a number of Combat Engineering Equipment such as the D-7 and D-9 bulldozer, Landing Assault Vehicles (LAV-25's), and numerous wheeled vehicles and trailers (e.g., the M-198 Howitzer). Tank platoons from the Marine Corps Air Ground Combat Center at Twentynine Palms, California also participate in semi-annual training at MCB Camp Pendleton, and must also have access to the training facilities at Red Beach. Under existing conditions, many vehicles must be transported around the existing crossing, an activity that impairs operations at Red Beach. The purpose of the proposed project is to improve the efficiency of training activities at Red Beach by improving the existing route under I-5 and the NCTD rail line to accommodate all vehicles needed for training purposes.

In addition to route widening, the project also calls for replacing the existing NCTD railroad crossing. The existing double arch railroad bridge will be removed down to the existing upstream grade, the abutments will be graded back to match downstream topography, and a new railroad bridge and piers will be constructed. The existing spillway will be retained.

The Federal Emergency Management Agency (FEMA) has not mapped any Special Flood Hazard Areas on the project site. The project site is located within Zone D which corresponds to areas of undetermined but possible flood hazards.

The most immediate receiving water for the project site is Las Flores Creek. According to the California 2008 303(d) list published by the State Water Resource Control Board (SWRCB), Las Flores Creek is not listed as impaired by any pollutants. **Table 2-1** below summarizes the receiving waters and their classification by the RWQCB Region 9.

Table 2-1 Receiving Surface Waters

Receiving Water	Hydrologic Unit Code	Approximate Distance from Site	303(d) Impairment(s)
Pueblo Hydrologic Unit (908.00)			
San Diego Mesa Hydrologic Area (908.20)			
Las Flores Creek	901.52	Adjacent	N/A
Pacific Ocean	901.52	Approximately 0.5 Miles	N/A

2.2 Study Description

This study was commissioned to address concerns of the United States Fish and Wildlife Service¹ and to provide design recommendations related to scour potential in Las Flores Creek near the project site. To address these concerns and issues, this report provides the following:

Watershed Hydrology

Hydrologic calculations were developed for the 5-year and 100-year 24-hour design storm events in order to determine design flow rates and hydrographs for hydraulic analyses of Las Flores Creek. In addition, to facilitate the long-term sediment transport analysis a flow series was developed based upon existing stream gage data for Las Flores Creek.

Steady State Hydraulics

Steady state hydraulic calculations for the existing and proposed conditions were developed for peak flow rates from the 5-year and 100-year storm events. These calculations provide hydraulic data (flow depth, velocity, bed shear stress, etc.) required for calculation of general, contraction, and local pier and abutment scour.

Unsteady State Hydraulics

Unsteady state hydraulic calculations for the existing and proposed conditions were developed for the 5-year, and 100-year 24-hour flow hydrographs. The proposed widening of the travel route through the NCTD commuter rail embankment reduces the hydraulic head necessary to pass the peak flow at that location. Ultimately, the increase in hydraulic efficiency at the crossing could potentially lead to an increase in the peak flow that reaches the goby habitat for any given storm event. The unsteady state hydraulic analysis was conducted to isolate the impact of the proposed improvements upon flow rate, velocity, and depth through the goby habitat for given storm events.

Long-term Sediment Transport

Long-term sediment transport modeling was developed for the "Do Nothing" (starting from existing conditions) and "Proposed Project" (starting from the proposed conditions) conditions to identify long-term scour associated with aggradation/degradation of the stream bed in Las Flores Creek. These analyses indicate the extent to which Las Flores Creek will experience degradation or aggradation from its present condition with or without the proposed improvements. Sediment transport calculations involve a high degree of inherent uncertainty, so results should be viewed comparatively between alternatives, and in the context of other calculations and engineering judgment.

¹ See United State Fish and Wildlife Service letter dated June 2, 2009, provided in Appendix A.

Scour

Scour calculations were developed to assist in the design of retaining walls, NCTD railroad bridge piers, and other project features that may be subject to scour caused by exposure to flow in Las Flores Creek. Design scour depths for the retaining walls were determined based upon the following:

- Long-term scour
- General scour
- Contraction scour
- Local scour (pier and abutment)
- Budgetary constraints
- Other physical constraints (influence of the Pacific Ocean)

Given that the project is in close proximity to the Pacific Ocean, the design scour depth for retaining walls at the project site was not permitted to exceed the depth to mean sea level. Design scour depth for the NCTD railroad bridge was determined based upon a more rigorous performance criteria due to the nature of the use. The scour analysis for the NCTD railroad bridge excluded budgetary constraints that were considered for project retaining walls and appurtenances.

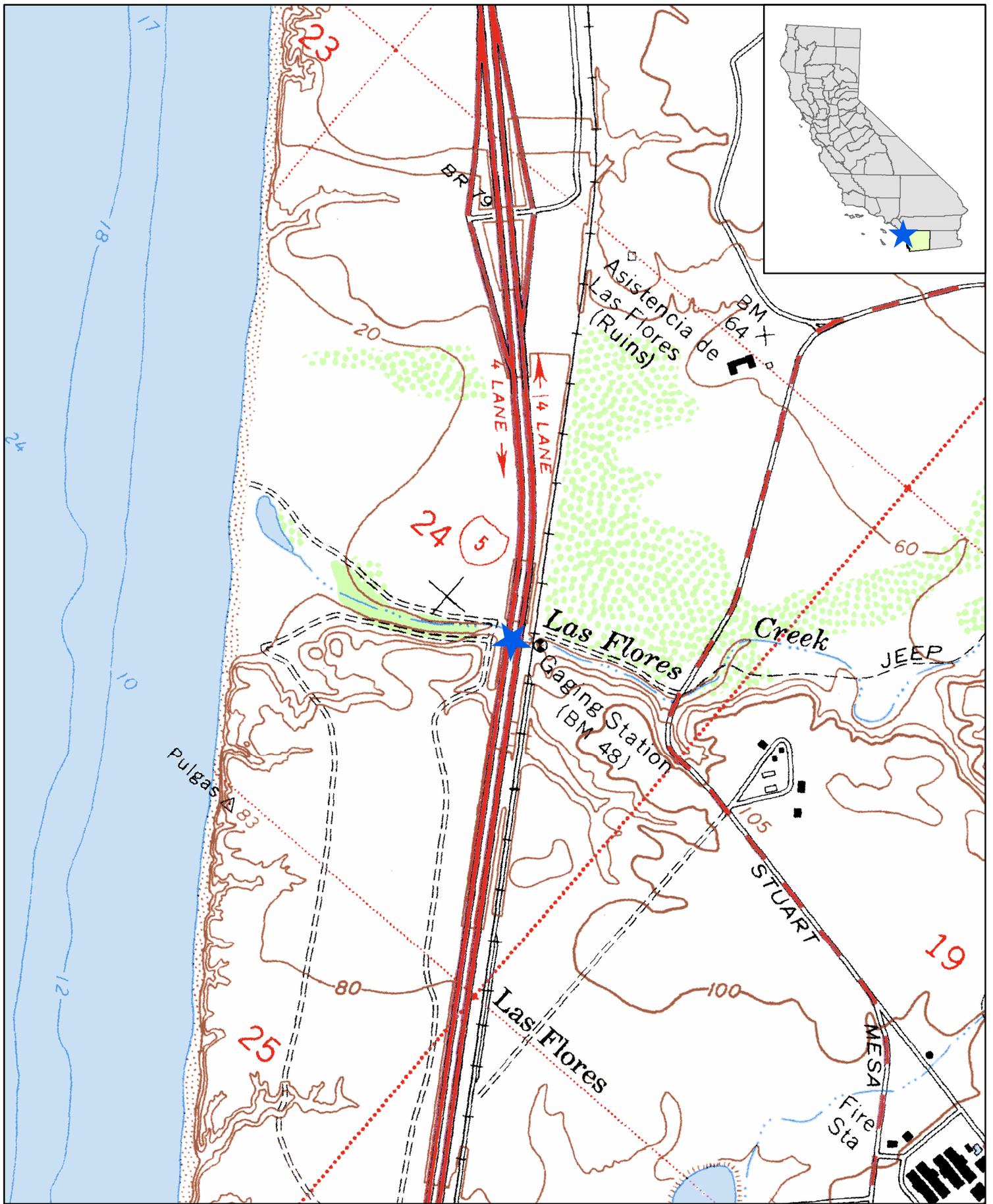


Figure 2-1
 Project Vicinity Map
 Red Beach Access P-159, MCB Camp Pendleton



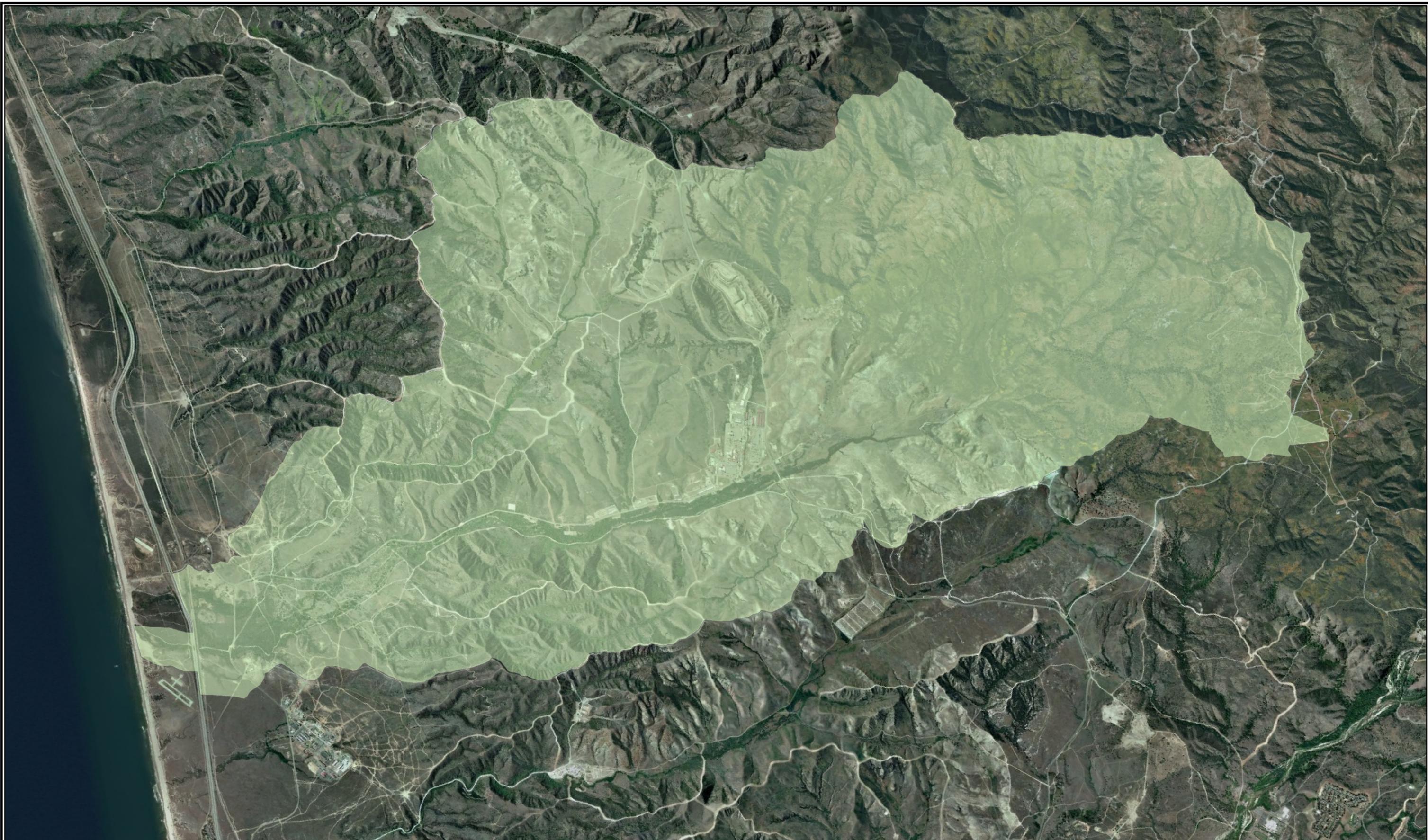


Figure 2-2
Las Flores Creek Watershed Aerial Photograph
Red Beach Access P-159, MCB Camp Pendleton



1" = 4,000 ft

ESRI I3 Imagery Prime World 2D

Section 3 Methodology

3.1 Hydrology

Flow rates hydrographs were developed for the Las Flores Creek watershed for the 5-year and 100-year 24-hour storm events. The 5-year event was used as a proxy for the bank-full flow and represents a typical stream response to storm events that would occur on an annual basis. The 100-year event is the largest design storm typically used in flood control and design analyses. In addition to developing event-based flow rates, a long-term flow series was developed from United State Geological Survey (USGS) stream gage data to provide hydrology for a long-term sediment transport analysis.

3.1.1. Event-Based Unit Hydrograph Analysis

The Las Flores Creek watershed drains approximately 27 square miles (mi²) tributary to the project site, so design peak flows and hydrographs were developed using the Soil Conservation Service (SCS) – formerly the Natural Resources Conservation Service, NRCS – unit hydrograph method, as prescribed by Section Four of the San Diego County Hydrology Manual (SDCHM).

County rainfall isopluvial maps were used to determine the precipitation depth in inches for the 100-year storm event. The maps indicate that 100-year 6-hour rainfall depths within the Las Flores Creek watershed range from 2.5 inches (in) at the coast to 3.5 inches in the northeasterly portions of the watershed. For the 100-year 24-hour storm, rainfall depths range from 4.0 inches to 8.0 inches with approximately the same spatial distribution.

The design storm distribution – or rainfall pattern – was calculated according to the SDCHM. The SDCHM methodology creates a nested 24-hour hyetograph with a two-third, one-third distribution. The term “nested” refers to the hyetograph, which contains both the 6-hour storm and the 24-hour storm, with the 6-hour storm centered at the peak and the remaining volume difference up to the 24-hour storm distributed around the 6-hour storm. The two-third, one-third distribution means that two-thirds of the storm volume occurs prior to the peak rainfall. Figure 3-1 presents the 100-year 24-hour design storm hyetograph.

The Las Flores Creek watershed is comprised of coastal mountainous terrain, located entirely within Marine Corps Base Camp Pendleton. The creek flows from its headwaters at an elevation of 2,250 feet, through Las Pulgas Canyon for approximately 12 miles, and then discharges into the Pacific Ocean at Red Beach. While the slope of the mountains and canyon walls are quite steep, Las Flores Creek flows along the floor of Las Pulgas Canyon, where the average channel slope is approximately 0.8 percent. Similar to other major coastal streams within MCB Camp Pendleton, the main channel of Las Flores Creek is densely vegetated. As with many small coastal streams in Southern California, Las Flores Creek flows intermittently, primarily during the winter and spring months when the majority of precipitation events occur.

The unit hydrograph method uses runoff curve numbers (CN) to calculate the precipitation losses due to infiltration, evapotranspiration, and interception for each pairing of land use or vegetation and soil. San Diego Geographic Information Source (SanGIS) geographic information system (GIS) databases for geology and vegetation

were used to establish all the unique pairings of soil type and vegetation, which were then assigned an appropriate CN value according to the SDCHM. Watershed soils are comprised of a wide variety of soil types, including fine sands, sandy loams, clay loams, Huerhuero loam, broken land, terraced escarpments, Olivenhain cobbly loam, Diablo clay, and minor contributions from several other soils. Approximately 58% of watershed soils are NRCS hydrologic soil Type D, with 16% Type C, 24% Type B, and only 2% Type A. Figure 3-3 presents the existing soil types within the Las Flores Creek watershed.

Vegetation within the watershed varies throughout the Las Flores Creek watershed. Coastal slopes and foothills are primarily covered in Diegan Coastal Sage Scrub, while inland valleys transition from Valley Needlegrass Grassland to Southern Mixed Chaparral and Dense Engelmann Oak Woodland in the easternmost mountains. Most stream channels in the watershed are classified as Southern Cottonwood-Willow Riparian Forest and Southern Willow Scrub; a few small channels in the mountains are classified as Coast Live Oak Woodland and Southern Sycamore-Alder Riparian Woodland. The in-stream vegetation delineation is consistent with field observations of very dense vegetation growing from the stream bed.

The precipitation zone number (PZN) is an indicator of antecedent soil moisture condition (i.e., the saturation level of the soil from prior rainfall). The SDCHM uses PZN in two ways:

- 1) To adjust CN values such that they are representative of soil moisture conditions typical of different rainfall events (i.e., 5-year, 50-year, and 100-year storm events), and
- 2) To further adjust CN to represent orographic effects on rainfall intensity in the coastal, foothill, and mountainous environments within San Diego County.

The Las Flores Creek watershed encompasses coastal, foothill, and mountain environments with PZN value ranges of 1.0 to 1.5, 1.5 to 2.5, and 2.5 to 3.5, respectively.

Appendix B contains output from the soil and vegetation GIS databases, as well as complete calculations of the weighted runoff CN for each sub-basin. Table 3-1 presents a summary of sub-basin watershed characteristics used to calculate the runoff hydrograph for the 100-year 24-hour storm event.

Hydrologic calculations were performed using Intellisolve Hydraflow Hydrographs 2007 software. Individual sub-basin hydrographs were developed based upon the sub-basin composite runoff CN, sub-basin drainage area, and a time of concentration. Time of concentration was developed using the United States Army Corps "Corps Lag" equation, which was then converted to a time of concentration. The Corps Lag equation is:

$$T_1 = 24n \left[\frac{L \times L_c}{s^{0.5}} \right]^m \quad (\text{SDCHM, Eq. 4-17})$$

- where: T_1 Corps lag time (hours)
 L Length to longest watercourse (miles)
 L_c Length along the longest watercourse to a point

- opposite the watershed centroid (miles)
- s Overall slope of the drainage area between the headwaters and the collection point (feet/mile)
 - m A constant determined by regional flood reconstitution studies (0.38 for San Diego County)
 - \bar{n} Average of the Manning's n values for the watercourse and its tributaries

To convert Corps lag to a time of concentration for each sub-basin, the following relationship was applied:

$$T_1 = 0.8T_c \quad (\text{SDCHM, Eq. 4-24})$$

Time of concentration was checked against the resultant flow rate, flow length, and a flow velocity calculated using Manning's Equation to confirm that the calculated time of concentrations were reasonable.

With hydrographs developed for each sub-basin outlet (Node), sub-basin contributions were combined at the sub-basin outlet and then routed through the next downstream sub-basin. The Las Flores Creek watershed contains two major branches. The main stem of Las Flores Creek flows through Las Pulgas Canyon in a southwesterly direction, while a major tributary stream flows through Piedre de Lumbre Canyon in a southerly direction.

The Las Pulgas branch originates in sub-basin 8 (Node 100) and travels downstream through sub-basin 7 (Node 200), sub-basin 6 (Node 300), sub-basin 5 (Node 400), sub-basin 3 (Node 500), sub-basin 2a (Node 600), and sub-basin 1 (Node 900) before discharging to the Pacific Ocean. The Piedre de Lumbre branch originates in sub-basin 4 (Node 700) and travels downstream through sub-basin 2b (Node 800) before confluenting with the Las Pulgas branch upstream from the project site in sub-basin 1 (Node 900).

Channel cross sections used for routing were selected as representative for each stream reach. Channel routing hydraulics was iteratively checked by using the flow rate to calculate a flow depth using Manning's Equation. The resulting flow depth was then entered into the hydrologic model to determine a new flow rate. Iterations were performed until the calculated water surface elevation and flow rate converged to a solution. Routing check calculations are provided in Appendix B.

Table 3-1 Summary of Sub-Basin Hydrologic Characteristics

Sub-Basin ID	High Elevation (ft)	Low Elevation (ft)	Flow Length (mi)	Length to Centroid (mi)	Drainage Area (mi²)	Composite Runoff CN
8	2,250	364	3.35	1.81	5.198	82
7	1,495	273	2.95	1.09	2.427	83
6	2,108	233	4.52	1.91	3.232	82
5	1,545	203	3.77	1.22	3.214	87
4	805	378	2.73	1.32	3.375	86
3	615	165	2.20	0.75	1.894	87
2b	1,130	90	4.21	1.78	2.337	83
2a	990	67	3.89	2.12	4.115	84
1	185	0	1.62	0.86	0.950	80

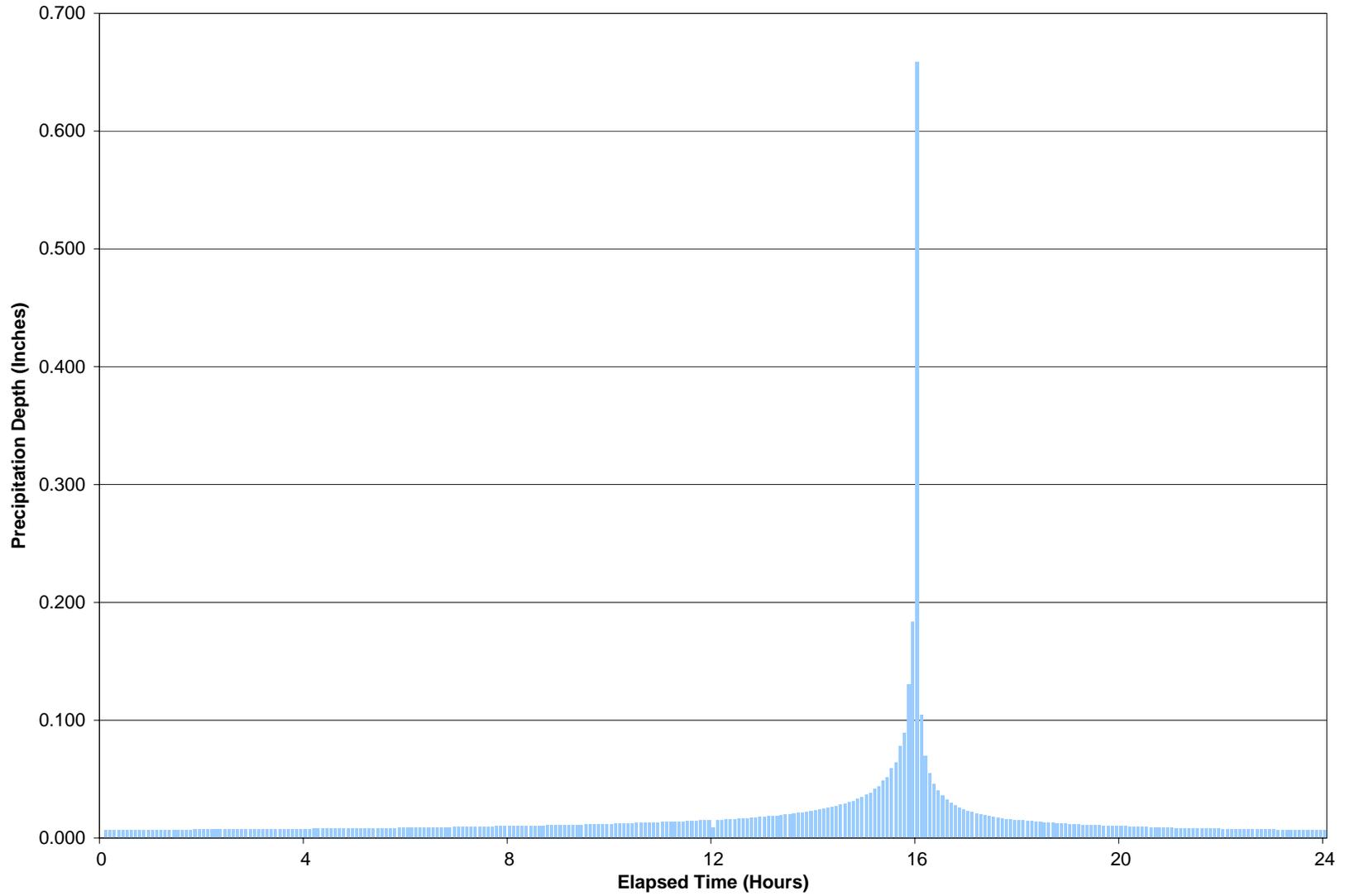


Figure 3-1 100-year 24-hour Hyetograph

Legend

- ★ Approximate Project Location
- Sub-Basin Drainage Path
- Watershed Sub-Basin Boundary

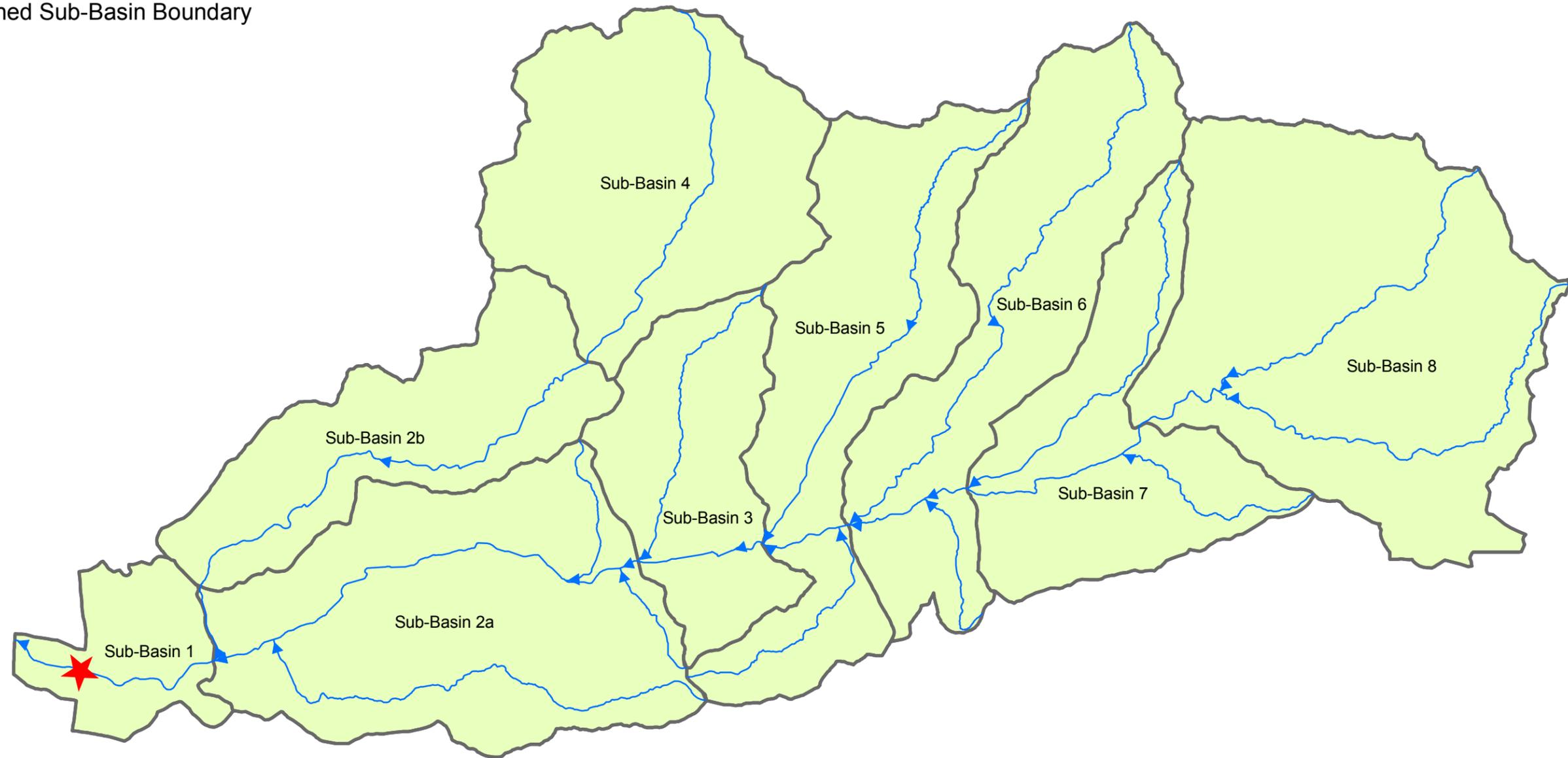


Figure 3-2
Las Flores Creek Watershed
Red Beach Access P-159, MCB Camp Pendleton

Legend

— Approximate Project Location

□ Sub-Basin Boundary

Soil Type

- A
- B
- C
- D

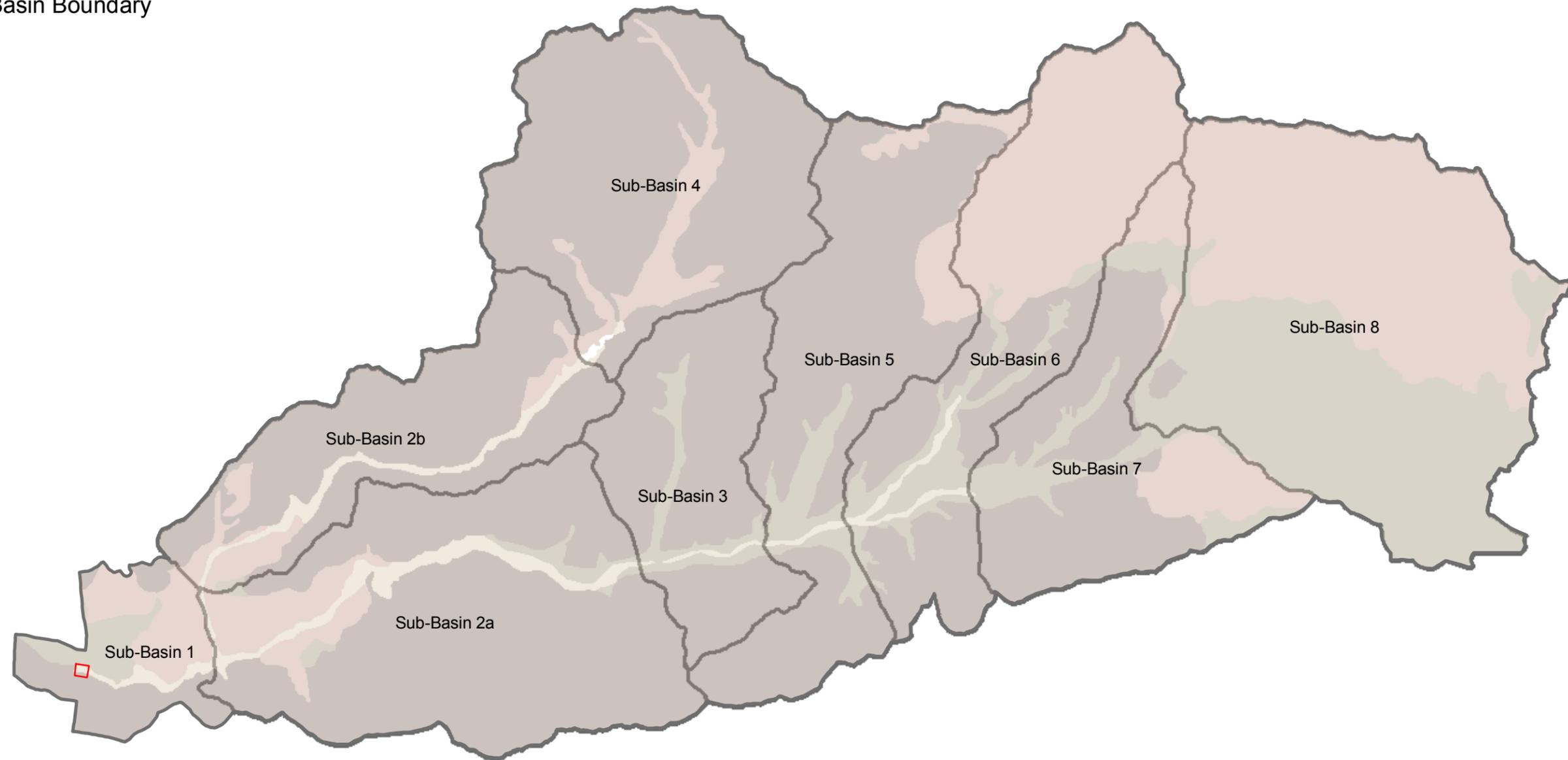


Figure 3-3
Las Flores Creek Watershed Soils Map
Red Beach Access P-159, MCB Camp Pendleton



1" = 4,000 ft

San Diego Association of Governments

Legend

Sub-Basin Boundary

Vegetation Type

- Other
- Coastal Sage-Chaparral Scrub
- Dense Engelmann Oak Woodland
- Diegan Coastal Sage Scrub
- Granitic Southern Mixed Chaparral
- Non-Native Grassland
- Southern Cottonwood-willow Riparian Forest
- Southern Willow Scrub
- Urban/Developed
- Valley Needlegrass Grassland



Figure 3-4

Las Flores Creek Watershed Vegetation Cover
Red Beach Access P-159, MCB Camp Pendleton



1" = 4,000 ft

San Diego Association of Governments

3.1.2. Long Term Hydrograph

To develop a flow time-series for the long-term sediment transport analysis, historical data from the USGS stream gage, 11046100 Las Flores Creek near Oceanside California, was utilized. All instances of minor (less than 10 cfs) or no flow were removed from the USGS daily flow series. The resulting flow series was then converted into a “quasi-unsteady” flow time series. This quasi-unsteady flow time series forms the basis of the hydraulic calculation component of the long-term sediment transport analysis discussed in Section 3.2.3. A graph of the entire hydrograph and the quasi-unsteady time series are presented in Appendix E.

3.2 Channel Hydraulics

To perform the hydraulic analysis portion of this study, several hydraulic analyses were developed using version 4.1 of the United States Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS). For this study HEC-RAS was used to develop:

- Steady state hydraulic calculations,
- Unsteady state hydraulic calculations,
- Sediment transport (mobile boundary hydraulics) calculations, and
- Scour calculations.

3.2.1. Steady State Hydraulic Calculations

HEC-RAS calculates hydraulic grade lines (HGL) for steady state conditions using an iterative solution of the one-dimensional energy equation. Model inputs are typically comprised of:

- Channel, cross section, and hydraulic structure geometries;
- Channel roughness characteristics; and,
- Flow rates at each location along the stream reach.

The software can solve for a hydraulic grade line under supercritical, subcritical, and mixed flow conditions. Subcritical solutions provide the maximum water surface elevation possible for each cross section, while supercritical solutions provide the maximum velocity possible at each cross section. The mixed flow regime solution solves the model taking into account transitions between subcritical and supercritical flow, including hydraulic jumps. As some portions of Las Flores Creek are hydraulically steep, the steady state calculations were developed for a mixed flow regime.

Steady state hydraulic computations were developed for the 5-year and 100-year 24-hour peak flow rates in Las Flores Creek downstream from the confluence of its two major branches. The results of the steady state hydraulic analyses were used to determine design scour depths relating to contraction and local pier scour, as well as general (event-based) scour.

3.2.2. Unsteady State Hydraulic Calculations

HEC-RAS performs unsteady state calculations, using an unsteady flow equation solver that was adapted from the UNET model. The unsteady state computation solves for the HGL at each channel cross section for every user-specified time step. The solution is based upon:

- Channel, cross section, and hydraulic structure geometries;
- Channel roughness characteristics;
- A user-provided initial hydraulic condition;
- An upstream inflow hydrograph; and,
- A downstream boundary condition.

The upstream inflow hydrograph utilized for the unsteady state hydraulic calculations was taken as the resultant outflow hydrograph from the unit hydrograph analysis discussed in Section 3.1.1. The unsteady model routes the inflow hydrograph through the stream reach, taking into account variation in hydraulic capacity between cross sections, storage in floodplains, and hydraulic pinch points such as hydraulic structures. To ensure model stability, the initial hydraulic condition was assumed to be an inflow and outflow of 100 cfs, with the downstream boundary condition set to normal depth (friction slope = 0.005 ft/ft). The calculations were developed for a mixed flow regime.

Unsteady state calculations were developed for the 5-year, and 100-year 24-hour storm hydrographs for the existing and proposed conditions. The 5-year storm is used to represent the bank-full discharge in Las Flores Creek and illustrates how the stream will react to flow rates that occur frequently. The 100-year storm is the largest storm event typically used for design and illustrates how the stream will react under an extreme flood event.

Unsteady state hydraulic computations were developed to determine what impact, if any, that the proposed project will have upon peak flow rate, flow depth, and flow velocity in the goby habitat downstream from the project site.

3.2.3. Sediment Transport (Mobile Boundary Hydraulics) Calculations

In addition to steady and unsteady state computations, HEC-RAS was also used to develop sediment transport calculations, sometimes referred to as “mobile boundary hydraulics”. To determine the mass or volume of channel bed degradation (erosion) or aggradation (deposition) at each stream cross section and potential stream cross sectional variation over time, the model applies:

- User-specified sediment transport functions;
- Bed armoring/sorting method;
- Fall velocity method;
- Sediment gradations;
- Sediment boundary conditions;
- Long-term hydrology; and

- Conditions necessary to solve for steady state hydraulics (e.g., channel geometry and boundary conditions).

The mobile boundary hydraulic computation is based upon a “quasi-unsteady” state hydrograph discussed in Section 3.1.2. HEC-RAS develops the ultimate channel cross section by iteratively solving for a hydraulic grade line and the erosion or aggradation at each cross section, and then adjusting each cross section. All flows less than 10 cfs were removed from the long term hydrograph because sediment transport capacity calculations indicated that there is no sediment inflow at the upstream reach boundary for a flow rate of 10 cfs for the grain sizes present at the project site.

HEC-RAS requires that the user specify the sediment transport function to be used for estimating the mass or volume of sediment. The sediment transport functions available in HEC-RAS include:

- Ackers-White,
- Engelund-Hansen,
- Laursen (Copeland),
- Meyer Peter Muller
- Toffaleti,
- Yang, and
- Wilcock.

The sediment transport functions listed above were developed based upon differing assumptions, sediment grain sizes, and hydraulic conditions. As such, the predicted sediment transport rate for any given channel may vary widely among the sediment transport functions. Some functions are more appropriate for steep gradient gravel-bed channels with primarily bed-load transport (e.g., Meyer Peter Muller), whereas others are more suited for channels exhibiting bed-material load² transport (e.g., Ackers-White, Engelund-Hansen, and Yang). Yang developed two equations in 1973 and 1984 to describe sand and gravel transport rates. Given that the sediment gradations provided by the geotechnical engineer (see Appendix E for the soil gradation) indicate the presence of both sand and gravel, the Yang equations were selected as the sediment transport functions for this study. To test variability between the most appropriate sediment transport functions, an additional long term run was performed using the Ackers-White sediment transport function (see Appendix E for results of that simulation).

HEC-RAS also requires that the user specify a bed armoring/sorting method and a fall velocity method. The Exner 5 bed sorting method, a three layer active-bed method capable of forming a coarse surface layer, was applied for this study to account for channel bed armoring over time. Some bed armoring was observed in Las Flores Creek during the site visit on July 30, 2009. The “Report 12” fall velocity method (the default method for HEC-6) was applied for all calculations.

² “*Bed-material load*” transport refers to a sediment transport function that accounts for both bed-load (material transported by rolling, dragging or skipping along the channel bed) and suspended-load transport (material entrained in flow through turbulence), excluding wash load (i.e., fine sediment particles like silt or clay that never settle in moving water).

The initial sediment grain size distributions used in the mobile boundary hydraulic modeling were based upon soil gradations provided by the project geotechnical engineer (see Appendix E). The analysis was run for the coarser of the Sieve-2 gradation based upon observation of moderate to coarse gravel on the channel bed. The sediment gradation was assumed to be applicable for all cross sections.

No sediment flow rate data has been collected for Las Flores Creek. As such, the sediment boundary conditions applied for the mobile boundary hydraulic analysis were based upon the assumption of an equilibrium sediment flow rate at the most upstream cross section, and the assumption of normal depth at the most downstream cross section (friction slope = 0.005 ft/ft). A sensitivity analysis for sediment inflow rate was conducted using four sediment rating curve boundary conditions, which represent sediment inflow rates of approximately 50%, 80%, 120%, and 150% of the sediment transport capacity calculated from the steady state hydraulic results and the Yang sediment transport equations.

The maximum scour depth both upstream and downstream from the project site was assumed to be no greater than 10 feet, except downstream from the drop structure at the NCTD rail crossing, where scour hand calculations indicated that the maximum scour for the 100-year storm would be approximately 12 feet. As the stream approaches the Pacific Ocean, the minimum scour elevation allowable was 3 feet below mean sea level (i.e., -3 feet msl). The drop structure at the downstream side of the NCTD commuter rail crossing and other permanent improvements at Stuart Mesa Road were assumed not to scour (i.e., maximum bed elevation change is 0 feet of scour).

Sediment transport models are intended to identify general stream behavior for a given stream reach, rather than the local impacts of specific hydraulic structures at specific locations. As such, the geometry files used for the sediment transport analyses do not incorporate some cross sections, bridges, or culverts that are represented in the steady and unsteady state hydraulic models discussed in Sections 3.2.1 and 3.2.2. Hydraulic structures do, however, act as grade controls, so the maximum allowable bed elevation changes at the NCTD railroad crossing and at Stuart Mesa Road were set to zero feet (i.e., no scour). Because of the reach-wide nature of the analysis, model results should be interpreted comparatively between the “Do Nothing” (starting from existing channel geometry) and the “Proposed Project” (starting from proposed channel geometry) alternatives.

3.2.4. Scour Calculations

To design scour protection for the NCTD railroad bridge piers and proposed improvements at the project site, an assessment of total scour is necessary. Total scour for the 100-year event was assessed based upon:

- General scour (event-based),
- Long-term scour,
- Contraction scour,
- Local pier and abutment scour, and
- Drop structure scour.

While the results of the mobile boundary hydraulic analysis predict long-term scour, the potential contraction scour, local pier or abutment scour, general scour, and drop structure scour must be determined by separate analyses.

General Scour

General (event-based) scour describes the temporary scour that occurs on the stream bed during large flood events. The effect of general scour is typically limited in duration, with sedimentation filling in scoured areas as the flood event recedes (the trailing limb of the stream hydrograph). To calculate general scour, spreadsheet calculations were developed based upon the Neill Regime Equation for General Scour:

$$y_f = y_i \left[\frac{q_f}{q_i} \right]^m \quad \text{and} \quad y_s = Zy_f \quad (\text{Pemberton and Lara, 1984})$$

- where:
- y_s Depth of scour below low point in existing channel (feet)
 - Z Multiplying factor
 - y_f Scoured depth below design floodwater level (feet)
 - y_i Average depth at bankfull discharge (feet)
 - q_f Design flood discharge per unit width (cfs/ft)
 - q_i Bankfull discharge per unit width (cfs/ft)
 - m Exponent = 0.67 for sand

Long-Term Scour

Long term scour describes the general aggradation or degradation of a stream reach based upon the entire range of flows (base flow and peak flows) that a stream experiences over time. Long term degradation or aggradation occurs when sediment supply is not in equilibrium with sediment transport capacity within a reach. To calculate long term scour a sediment transport (mobile boundary hydraulics) model was run for the period of record (41 years) for the USGS stream gage, 11046100 Las Flores Creek near Oceanside California, for all flows exceeding 10 cfs. Long-term scour is based upon the results of the "Proposed Project" alternative analysis. The methodology used for the long term sediment transport model is discussed in Section 3.2.3.

Contraction Scour

Contraction scour occurs when, through a change in cross section or at a bridge/culvert, flow is concentrated. The result of the contraction is typically increased flow depth and velocity, which correlate strongly with increased shear stress. For Las Flores Creek, contraction scour was computed assuming "live-bed" contraction scour, which occurs when the stream is already transporting bed load. To calculate live-bed contraction scour, HEC-RAS uses the steady state 100-year hydraulic analysis and a modified version of Laursen's live-bed scour equations:

$$y_2 = y_1 \left[\frac{Q_2}{Q_1} \right]^{6/7} \left[\frac{W_1}{W_2} \right]^{K_1} \quad \text{and} \quad y_s = y_2 - y_0 \quad (\text{RAS, Eq. 10-2 \& Eq. 10-3})$$

- where:
- y_s Average depth of contraction scour (feet)
 - y_2 Average depth after scour in contracted section (feet)
 - y_1 Average depth in main channel at approach section (feet)
 - y_0 Average depth in main channel at contracted section before scour (feet)
 - Q_1 Flow in main channel at approach section (cfs)
 - Q_2 Flow in main channel at the contracted section (cfs)
 - W_1 Bottom width in main channel at the approach section (feet)
 - W_2 Bottom width in the main channel at the contracted section, less pier widths (feet)
 - K_1 Exponent for mode of bed material transport (0.59 to 0.69)

Local Scour

Local pier scour occurs as flow accelerates around a pier, resulting in the formation of vortices that interact with the channel bed around the base of the pier, resulting in localized scour. Pier scour calculations were performed using the Colorado State University equation:

$$y_s = 2.0K_1K_2K_3K_4a^{0.65}y_1^{0.35}Fr_1^{0.43} \quad (\text{RAS, Eq. 10-6})$$

- where:
- y_s Depth of pier scour (feet)
 - K_1 Pier nose shape factor
 - K_2 Angle of attack factor
 - K_3 Bed condition factor
 - K_4 Bed armoring factor
 - a Pier width (feet)

y_1 Flow depth upstream of pier (feet)

Fr_1 Froude number upstream of pier

Local abutment scour occurs as flow travels along the base of the abutment, resulting in the formation of vortices that interact with the channel bed at the downstream extent of the abutment, resulting in localized scour. HEC-RAS computes abutment scour assuming a safety factor equal to the depth of flow in the floodplain of the approach stream cross section. Abutment scour calculations were performed using the Froehlich equation:

$$y_s = 2.27K_1K_2L^{0.43}y_a^{0.57}Fr^{0.61} + y_a \text{ (RAS, Eq. 10-14)}$$

where: y_s Depth of abutment scour (feet)

K_1 Abutment shape factor

K_2 Angle of attack factor

L Length of abutment projected normal to flow (feet)

y_a Average depth of flow in the floodplain of the approach section

Fr Froude number of flow in the floodplain of the approach section

Drop Structure Scour

Scour at the drop structure occurs as flow accelerates towards the downstream end of the drop structure spillway. The existing spillway approximates an ogee curve, such that flow over the drop structure should follow the same path as flow passing over a free fall. A hand calculation was performed using equations for scour at a vertical face (i.e., free overfall) drop structure developed by the United States Bureau of Reclamation. The result of drop structure scour is a temporary scour hole that develops at the downstream end of the drop structure. The scour depth is calculated per the equation below, while the estimated length of the impacted area can be estimated as twelve times the maximum scour depth.

$$y_s = 1.32q^{0.54}H_t^{0.225} - TW \text{ (USBR, Drop Structure Vertical Face)}$$

where: y_s Depth of scour (feet)

q Unit discharge (cfs/feet)

H_t Total drop in head (feet)

TW Tailwater depth (feet)

Section 4 Results

4.1 Hydrology

Based upon the unit hydrograph analysis described in Section 3.1.1, peak flow rates were calculated for the 5- and 100-year storm events. Table 3-1 summarizes the peak design flow rates for the watershed. A hydrologic work map is provided in Appendix B.

Table 4-1 Summary of Peak Design Flow Rates

Node	Description	Q5	Q100
	Outlet from...	(cfs)	(cfs)
100	Sub-basin 8	1,525	4,753
200	Sub-basin 7	1,832	5,976
300	Sub-basin 6	2,372	8,002
400	Sub-basin 5	2,655	9,289
500	Sub-basin 3	2,717	9,485
600	Sub-basin 2a	2,073	8,152
700	Sub-basin 4	1,313	3,348
800	Sub-basin 2b	1,281	3,813
900	Sub-basin 1	1,486	7,163

Las Flores Creek flows from its headwaters in sub-basin 8 (Node 100) downstream through sub-basin 7 (Node 200), sub-basin 6 (Node 300), sub-basin 5 (Node 400), sub-basin 3 (Node 500), sub-basin 2a (Node 600), to the Pacific Ocean at the outlet from sub-basin 1 (Node 900). A tributary to Las Flores Creek flows through Piedre de Lumbré Canyon from its headwaters in sub-basin 4 (Node 700) downstream through sub-basin 2b (Node 800) to its confluence with Las Flores Creek in sub-basin 1 (Node 900). As shown in Table 4-1, the maximum peak flow rate of 9,485 cfs occurs at Node 500 for the 100-year event, while the calculated peak flow rates at Node 600 and Node 900 (downstream) are less.

The primary reasons for the decrease in the peak flow rate despite the increasing drainage area are that:

1. Channel routing over relatively long stream reaches results in significant attenuation of peak flow rates. For example, routing over the 3.15 mile stream reach from Node 500 to Node 600 results in attenuation from 9,485 cfs to 6,741 cfs, a decrease of 2,744 cfs.
2. Peak flow from upstream sub-basins is temporally offset from the peak flow generated by downstream sub-basins. For example, the peak flow generated by sub-basin 1 occurs 2.5 hours before the peak flow routed from Node 600 arrives. The steep decline in the falling limb of the sub-basin hydrograph means that very little runoff is being contributed when the main flood peak arrives.

The combination of the above factors explains the calculated result: the flow contributions of downstream sub-basins to the watershed peak are not sufficiently large at the time of the peak to counterbalance attenuation of the watershed peak through routing and floodplain storage.

The purpose of this analysis is to develop peak flow rates for the hydraulic analyses discussed in Section 3.2. For this project no stormwater facility is being sized specifically to accommodate the maximum watershed peak flow, so it is not necessary to develop project hydrology based upon highly conservative assumptions (i.e., neglecting peak flow rate attenuation caused by channel routing and floodplain storage). A decreasing peak flow in the lower portion of the watershed is the most accurate representation of hydrology in the watershed and has therefore been applied for this project.

It should also be noted that the calculated peak flow rate through the project area, 7,163 cfs, is very similar to the flow rate of 7,803 cfs calculated in the 2004 study, “Las Flores, Aliso, and Horno Watershed Studies: MCB Camp Pendleton, CA” despite some differences³ in the parameters and analysis methodology.

4.2 Channel Hydraulics

4.2.1. Steady State Hydraulic Calculations

The steady state hydraulic calculations were developed to provide input parameters for calculation of general, contraction, and local pier and abutment scour at points of interest through the project site. The results indicate that peak velocity through the project site will generally decrease and peak flow depth through the project site will remain essentially unchanged. Upstream from the NCTD railroad embankment, floodplain inundation will be reduced and flow velocity will increase. Table 4-2 presents the results of the 100-year steady state hydraulic analysis for the existing and proposed conditions.

Table 4-2 Summary of Steady State 100-Year Hydraulics at the Project Site

River Station	Velocity		Flow Depth	
	Existing (fps)	Proposed (fps)	Existing (feet)	Proposed (feet)
2138.522	7.59	7.59	12.27	12.27
2158	Tank Crossing			
2177.030	7.66	7.66	12.87	12.87
2283.262	6.60	6.34	12.19	12.18
2324	Interstate 5 Southbound			
2364.165	6.90	6.35	13.04	13.03
2376.014	6.91	6.22	13.91	13.93
2387.862	9.87	7.42	13.38	13.71
2427	Interstate 5 Northbound			
2465.876	28.38	24.41	6.51	7.37
2482.678	35.06	30.91	5.84	6.50
2491.777	34.84	30.47	6.08	6.89

³ The 2004 study was conducted using County of Orange hydrology methodology, while this study is based upon San Diego County hydrology methodology. The primary differences involve runoff curve numbers (CN), calculation of loss and initial abstraction, precipitation values, and use of an S-curve to develop the unit hydrograph.

River Station	Velocity		Flow Depth	
	Existing	Proposed	Existing	Proposed
	(fps)	(fps)	(feet)	(feet)
2506.635	27.02	23.18	8.60	8.41
2512.096	20.63	23.16	11.17	6.38
2536	NCTD Railroad Embankment			
2563.215	10.72	8.30	15.49	10.72
2583.308	3.44	3.05	14.17	10.61
2631.854	2.49	4.22	15.75	8.73
2712.728	2.31	5.98	16.38	9.58
2792.521	2.54	6.82	16.41	10.04

Peak flow velocities indicate that potentially erosive conditions occur through the project site for both the existing and proposed conditions. This finding is supported by bank erosion noted along the southern abutments to Interstate 5 during the July 30, 2009 site visit. The decrease in flow depth and associated increase in flow velocity upstream from the NCTD railroad embankment extends upstream to a location just west of Stuart Mesa Road (River Station 3596.568) where flow depth and velocity differences are nominal. Consequently, the project will not result in any increased risk of scour to the Interstate 5 abutments during the 100 year and lesser events. Risk of scour at the Interstate 5 abutment will remain the same or less than existing conditions. The sheet pile system being constructed downstream to protect the proposed tank crossing will not provide any additional measure of protection to the Interstate 5 abutments.

Las Flores Creek passes under three significant hydraulic structures: the NCTD railroad bridge, Interstate 5 northbound, and Interstate 5 southbound. A comparison of peak 100-year water surface elevations and the hydraulic structure soffit elevations indicates that substantial freeboard is provided. Table 4-3 presents the comparison of water surface elevation and hydraulic structure soffit.

Table 4-3 100-year Hydraulic Structure Freeboard

River Station	Description	Water Surface Elevation	Soffit Elevation	Freeboard
		(feet)	(feet)	(feet)
2324	Interstate 5 (SB)	28.87	40.66	11.79
2427	Interstate 5 (NB)	29.05	41.23	12.48
2536	NCTD Railroad	39.30	50.90	11.60

Complete results for the steady state hydraulic calculations are provided in Appendix C.

4.2.2. Unsteady State Hydraulic Calculations

The unsteady state hydraulic models were developed to determine if the proposed improvements will impact the peak flow rate, velocity, and flow depth in the tidewater Goby habitat. Models were developed for the 5-year and 100-year 24-hour hydrographs

(resultant from the hydrologic analysis discussed in Section 3.1.1 and Section 4.1) for the existing and proposed conditions.

Table 4-4 presents the existing and proposed condition peak flow rate, flow velocity, and flow depth through the tidewater Goby habitat for the 5-year storm.

Table 4-4 Summary of 5-yr Hydraulic Impacts in Tidewater Goby Habitat

River Station	Peak Flow Rate		Velocity		Flow Depth	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
	(cfs)	(cfs)	(fps)	(fps)	(feet)	(feet)
90.609	1476.76	1476.82	1.93	1.93	2.83	2.83
391.617	1476.84	1476.88	1.58	1.58	3.97	3.97
686.912	1476.90	1476.91	1.18	1.18	4.54	4.54
987.112	1477.15	1477.21	2.59	2.59	3.41	3.41
1288.331	1477.20	1477.21	3.17	3.17	4.48	4.48
1589.051	1477.21	1477.28	3.91	3.91	6.93	6.93
1888.473	1477.36	1477.43	1.76	1.76	6.60	6.60

The results indicate that the proposed improvements will not substantially alter the 5-year 24-hour peak flow rate, and will have no impact upon the peak velocity, or flow depth in Las Flores Creek through the goby habitat (downstream from River Station 1888.473). The maximum increase in flow rate by 0.07 cfs is negligible compared to the magnitude of the peak flow rate.

Table 4-5 presents the existing and proposed condition peak flow rate, flow velocity, and flow depth through the tidewater goby habitat for the 100-year storm.

Table 4-5 Summary of 100-yr Hydraulic Impacts in Tidewater Goby Habitat

River Station	Peak Flow Rate		Velocity		Flow Depth	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
	(cfs)	(cfs)	(fps)	(fps)	(feet)	(feet)
90.609	6732.67	6922.12	3.30	3.33	5.91	5.98
391.617	6732.86	6924.34	3.36	3.40	7.24	7.33
686.912	6734.47	6925.90	2.41	2.45	8.26	8.35
987.112	6735.29	6926.69	4.46	4.51	6.87	6.96
1288.331	6736.05	6931.63	6.75	6.85	8.37	8.47
1589.051	6736.53	6932.01	6.52	6.59	12.31	12.44
1888.473	6737.24	6934.80	3.40	3.45	13.10	13.23

The results indicate that the proposed improvements will result in an increase to the 100-year 24-hour peak flow rate by approximately 200 cfs or 3%. However, the impact of the increase in peak flow rate on flow velocity and flow depth is minimal. Peak flow velocity in Las Flores Creek through the goby habitat (downstream from River Station 1888.473) increases by a maximum of 0.10 feet per second. The maximum increase in flow depth

is 0.13 feet. Complete results for the unsteady state hydraulic calculations are provided in Appendix D of this report.

4.2.3. Sediment Transport (Mobile Boundary Hydraulics) Calculations

To determine long-term scour and sedimentation impacts both to the tidewater Goby habitat and to the proposed project, long-term sediment transport (mobile boundary hydraulics) models were developed for “Do Nothing” and “Proposed Project” alternatives.

Table 4-6 presents the mean daily-averaged bed material load for three cross sections through the goby habitat for both alternatives and a comparison of the calculated sediment concentrations. Bed material load is the combination of:

- Bed Load – sediment transported by rolling, dragging, or skipping along the channel bed, and
- Suspended Load – Sediment transported via entrainment in flow through turbulent interaction with the channel bed.

Bed material load excludes wash load, which is comprised of fine sediment particles (clay or silt) that do not settle in moving water. Wash load differs from suspended load in that suspended load particles may resettle to the channel bed in the absence of turbulence that initiated suspension of the sediment particle.

Table 4-6 Summary of Long-Term Sediment Transport in Tidewater Goby Habitat

River Station	Average Bed Material Load As Sediment Concentration		
	Existing	Proposed	Percent Change
	(mg/L)	(mg/L)	(%)
1288.331	5,269	5,087	-3.5%
1589.051	5,254	5,056	-3.8%
1888.473	5,254	5,069	-3.5%

The calculated sediment concentrations are somewhat dependent upon the sediment boundary condition and sediment transport function used for the analysis. However, a comparative analysis of the results indicates that sediment concentration through the goby habitat is substantially the same with or without the proposed project, regardless of the assumed sediment concentration at the project boundary. Table 4-7 presents the channel invert (thalweg) elevation for the current condition, as well as the “Do Nothing” and “Proposed Project” conditions. The channel invert elevations represent the cumulative change over the entire 41-year simulation, rather than the maximum scour condition for each alternative. The change in channel invert elevation defines whether a reach is aggrading or degrading over time⁵.

⁵ In natural conditions, a channel may also migrate laterally to achieve a quasi-equilibrium state; however, HEC-RAS cannot solve for lateral migration.

Table 4-7 Summary of Long-Term Bed Elevation Change

River Station	Channel Invert (Thalweg) Elevation			
	Existing	“Do Nothing”	“Proposed Project”	“Do Nothing – Proposed Project”
	(ft)	(ft)	(ft)	(ft)
2491.777	14.91	14.95	14.93	-0.02
2,283.262	16.50	9.36	6.99	-2.37
1,888.473	13.92	5.13	4.75	-0.38
1,589.051	10.00	10.16	7.88	-2.28
1,288.331	9.51	2.57	2.49	-0.08

The results of the long-term mobile boundary analysis indicate that the channel is in a general state of degradation through the project area and the goby habitat for both alternatives. Note that the difference between the existing condition and the alternatives in Table 4-7 is not necessarily the maximum scour, which may have occurred at different times during the simulation for different cross sections and alternatives. Maximum long-term scour depth is shown in Table 4-8.

A comparison of the “Do Nothing” and “Proposed Project” alternatives indicates that the proposed project may result in some additional scour through the project site and the goby habitat. It is important to consider this additional erosion in the context of the stream reach, which will erode from the current condition with or without the project. Results and supporting information for the mobile boundary hydraulic calculations are provided in Appendix E.

4.2.4. Scour Calculations

The level of scour protection required to protect proposed infrastructure was determined through an analysis of potential long-term scour and the general, contraction, and local (pier and abutment) scour for the 100-year storm event at points of interest throughout the project site for the proposed condition. Table 4-8 presents the individual contributions from each component of total scour potential for the 100-year storm event.

Table 4-8 Summary of Scour Potential Depths near Proposed Improvements

Location	Scour Components				
	Long-Term Scour	General Scour	Contraction Scour	Pier Scour ⁶	Abutment Scour ⁷
	(feet)	(feet)	(feet)	(feet)	(feet)
2583.308	-	-2.5	-	-	-
2563.215	Concrete Apron				
RR Bridge	-	-	3.55	10.15	41.82
2512.096	Concrete Spillway and Apron				
2506.635					
2491.777					
2482.678	-	-7.3	-	-	-
2465.876	-	-8.9	-	-	-
I-5 NB	-	-	0.0	-9.0	0.0
2387.862	-	-8.6	-	-	-
2376.014	-	-9.1	-	-	-
2364.165	-	-8.1	-	-	-
I-5 SB	-	-	-0.6	-6.7	0.0
2283.262	-9.5	-7.8	-	-	-
2177.03	-	-8.2	-	-	-
2138.522	-	-5.6	-	-	-
1888.473	-9.2	-6.1	-	-	-
1589.051	-2.1	-5.1	-	-	-
1288.331	-7.0	-3.1	-	-	-

Note: slots marked with (-) indicate that this scour component was not calculated for the river station in question. Further discussion of applicability of scour components is provided in this section.

Complete results and supporting information for the scour calculations are provided in Appendix F. A graphical representation of the individual scour components and the design total scour depth through the site is shown in Figure 4-1.

Long Term Scour

The potential long-term scour depths near the proposed improvements were determined based upon a long-term sediment transport (mobile boundary hydraulics) model for the “Proposed Project” alternative. The maximum long-term scour depth near the proposed retaining wall is approximately 9.5 feet at the downstream end of the southbound Interstate 5 Bridge.

⁶ Pier scour is measured from the existing ground elevation at the pier, rather than from the channel thalweg.

⁷ Abutment scour is measured from the existing ground elevation at the abutment, rather than from the channel thalweg.

As with the 100-year storm event general scour, the long-term scour will degrade the channel to or near mean sea level. The revetment and footing design required to mitigate for the entire long-term scour potential for project retaining walls is not feasible given the budgetary constraints for construction of the proposed improvements. A discussion of the cost-benefit analysis performed to determine the level of scour protection is provided in Section 4.2.5.

Long-term scour was not considered for design of the NCTD railroad bridge piers because of the close proximity of the existing concrete drop structure and concrete apron. This existing grade control at the railroad bridge is assumed to continue to preclude long-term scour at this location, as it has historically since its installation in approximately 1916.

General Scour

Scour calculations were performed using the general scour equation developed by Neill. The anticipated general scour associated with the 100-year storm event varies between a maximum of approximately 9 feet near the northbound Interstate 5 Bridge to a minimum of approximately 3 feet near the goby habitat. Anticipated general scour upstream from the NCTD railroad bridge is approximately 2.5 feet, which is supported by approximately 1-2 feet of scour noted upstream of the concrete apron (approximate location of River Station 2583.308) during a site visit⁸.

As with the long-term scour, the general scour will degrade the channel to or near mean sea level. The revetment and footing design required to mitigate for the entire 100-year storm event general scour potential at the retaining wall is not feasible given the budgetary constraints for construction of the proposed improvements. A discussion of the cost-benefit analysis performed to determine the level of scour protection is provided in Section 4.2.5. The general scour noted upstream from the railroad bridge has been considered in design scour depth for the NCTD railroad bridge.

Contraction Scour

Contraction scour was calculated at both the northbound and southbound bridges for Interstate 5, as well as for the NCTD railroad bridge. No significant contraction scour is expected at the northbound bridge because the channel width is consistent through the bridge. For the southbound bridge, approximately 0.6 feet of contraction scour may occur. At the NCTD railroad bridge, contraction scour of 3.6 feet is estimated to occur for the 100-year storm event.

The contraction scour and hydraulics calculated by HEC-RAS do not address the lateral distribution of flows between cross sections. While HEC-RAS indicates that all flow is contained within the channel just downstream from the NCTD railroad crossing, flow through the new NCTD railroad bridge opening will inundate some portion of the right (north) overbank area where the northbound Interstate 5 bridge piers are located. Despite the anticipated inundation of the right overbank piers, no contraction scour in the

⁸ Site visit was conducted on January 24, 2011 after substantial rainfall events during December 2010 and January 2011.

overbank is anticipated because the overbank will be a concrete roadway. Flow within the channel at the northbound bridge will not be constricted, so no contraction scour is anticipated at this location.

Pier Scour

Each of the three bridge crossings have piers. Pier scour for the northbound bridge piers is calculated to be a maximum of 9.0 feet, while calculated scour for the southbound bridge is approximately 6.7 feet. Local pier scour at the proposed NCTD railroad bridge is approximately 10.2 feet. Observations from the field visit confirm that scour is occurring at the bridge piers located along the left (south) bank of Las Flores Creek at both Interstate 5 Bridges (northbound and southbound). No pier scour was observed for the bridge piers located along the right (north) bank. The absence of local pier scour along the right bank of Las Flores Creek may be the result of maintenance of the existing Red Beach access roadway by the Marine Corps.

Abutment Scour

The proposed improvements will expose the abutments for the Interstate 5 bridges along the right (north) bank of Las Flores Creek. The presence of flow on the roadway surface indicates that abutment scour will be possible; however, scour at the toe of the newly exposed abutments will be precluded because the proposed roadway under the Interstate 5 bridges will be concrete. Additionally abutment scour for the Interstate 5 bridges is considered to be unlikely because the abutments do not extend into the flow when compared with the channel geometry.

Abutment scour at the proposed NCTD railroad bridge was calculated at approximately 41.8 feet. This occurs because the right (facing downstream) abutment represents a substantial obstruction into the approaching flow. The resulting acceleration around the abutment toe results in significant scour potential. The local abutment scour has been considered in the development of the design scour depth for the NCTD railroad bridge.

Drop Structure Scour

Drop structure scour was calculated to determine the potential impacts to proposed improvements if a scour hole were to develop at the base of the drop structure at the NCTD railroad crossing. Calculations indicate that the depth of the scour hole at the base of the drop structure for the 100-year storm is approximately 13 feet for the proposed condition. No evidence of such a scour hole was noted during site visits or survey. Based upon a review of construction plans for the drop structure, the channel bed at the toe of the drop structure is protected with a substantial concrete apron, which protects the channel bed from any drop structure scour between the NCTD railroad bridge and the Interstate 5 northbound bridge. Because the existing drop structure and apron will be retained, further protection of the channel bed at the toe of the drop structure has been omitted from the determination of the design scour depth for the NCTD railroad crossing over Las Flores Creek.

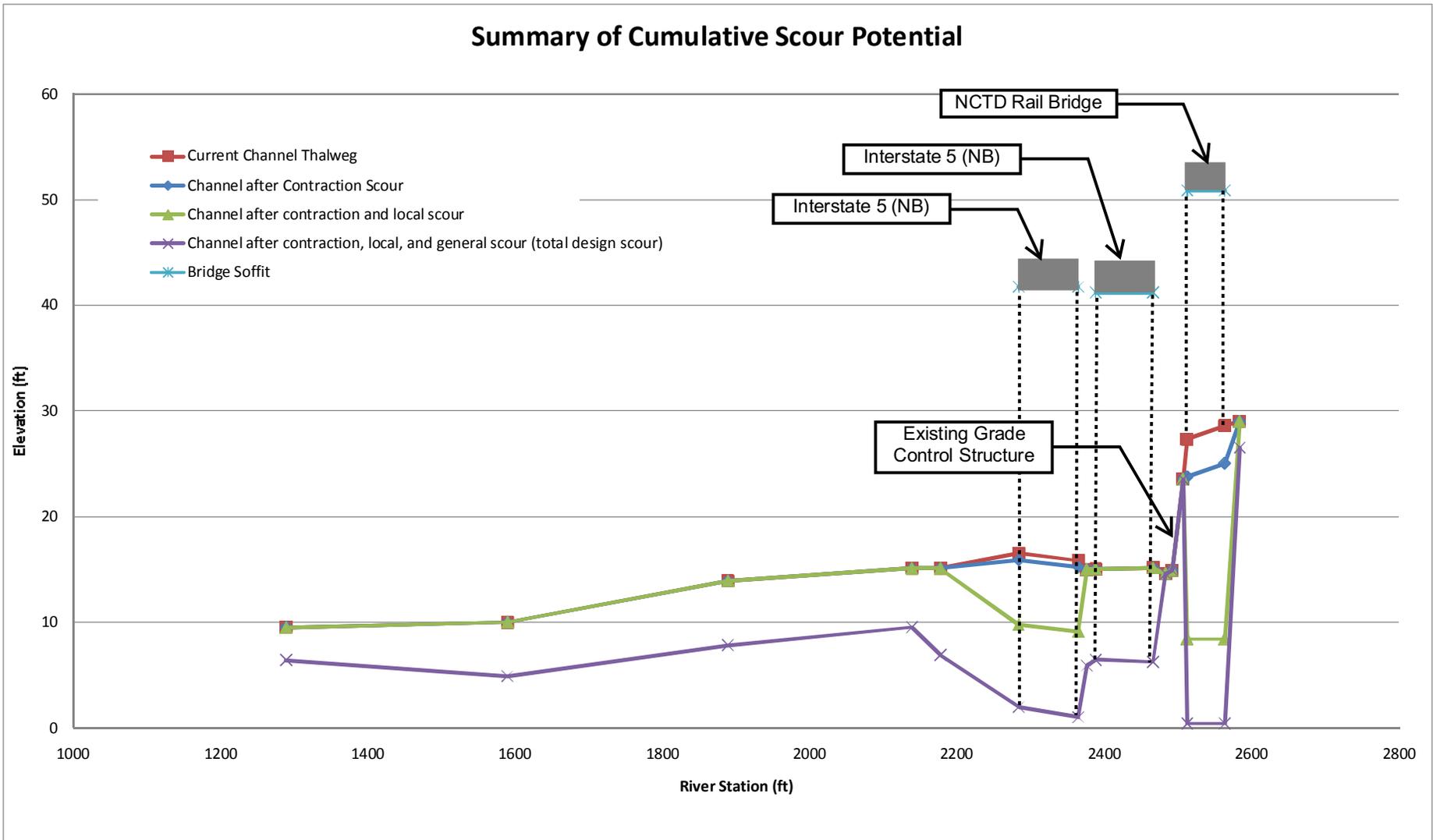


Figure 4-1
Summary of Cumulative Scour Potential

4.2.5. Cost-Benefit Analysis: Access Road Retaining Wall

The results of the various scour analyses indicate that the total scour (the summation of all scour components) near the proposed retaining wall may degrade the channel bed to an elevation at or near mean sea level⁹. The total funds available for construction of the retaining wall preclude providing scour protection against the total anticipated scour. To determine the height of the retaining wall – and, therefore, the extent of the scour protection – a cost-benefit analysis was performed. Cost was not considered during development of the NCTD railroad bridge design scour depth because of the nature of its use.

Cost-Benefit

Cost estimates were developed for a range of sheetpile wall heights ranging over exposed heights from 9.5 feet to 18.5 feet. The ratio of construction cost to the total design wall height (exposed height above current channel invert + the depth of anticipated scour) was reviewed for each design wall height. Per Table 4-9, the first significant increase in the cost-to-height ratio occurs at a wall height of approximately 14.5 feet. Given the diminishing return on investment for increasingly tall sheetpile retaining walls, the design sheetpile retaining wall height was selected as 14.5 feet. The estimated cost of construction for the 14.5 foot high sheetpile retaining wall is approximately \$505,000. Draft cost estimates for varying wall heights are provided in Appendix F.

Table 4-9 Retaining Wall Cost-Benefit Analysis

Wall Height (ft)	Cost (\$)	Cost / Wall Height (\$/ft)
9.5	\$204,000	\$21,488 /ft
10.5	\$228,000	\$21,710 /ft
11.5	\$245,000	\$21,343 /ft
12.5	\$324,000	\$25,921 /ft
14.5	\$505,000	\$34,828 /ft
16.5	\$686,000	\$41,579 /ft
18.5	\$1,073,000	\$57,992 /ft

Level of Protection

Based upon an analysis of the cross section at River Station 2283.262, the design sheetpile retaining wall will provide scour protection to a channel bed elevation of approximately 11 feet (msl), which equates to 5.5 feet of scour. The return period of a

⁹ Scour to an elevation significantly lower than sea level is considered to be unlikely, as the tidal backwater created by the Pacific Ocean would reduce flow velocity and turbulent interaction with the channel bed.

storm event that would cause 5.5 feet of scour was estimated using a log-linear interpolation of the return periods for the storms discussed in Sections 3.1 and 4.1 (Q5 and Q100) and the associated general scour calculated using the Neill regime equation. The return period for an event that will exceed 5.5 feet of scour (i.e., cause the sheetpile retaining wall to fail) is between 23 years and 40 years.

The above return period analysis is supported by the results of the long term sediment transport (mobile boundary hydraulics) analysis. For River Station 2283.262 long term scour exceeded 5 feet after approximately 24 years had elapsed. While this secondary analysis is highly dependent upon rainfall patterns and magnitudes, the calculated long term scour pattern clearly showed that the majority of channel erosion occurred during single storm events (or series of closely spaced storm events), which occurred approximately every twenty years over the period of record.

These two estimates indicate that proposed improvements are likely sufficient to protect the Red Beach access road against a flood event with a return period of approximately 20 years. It is important to recognize that one storm event¹⁰, or the combined scour from multiple events within a short duration or over time, could cause the failure of the retaining wall significantly faster than 20 years: the 20-year return period correlates to a 5% chance that a flow of this magnitude will be exceeded in any year. In essence, the proposed retaining wall design will mitigate some, but not all, risk of erosion damage to or failure of the Red Beach access road and proposed improvements. Ultimately, however, any proposed retaining wall or revetment provides protection against scour in excess of the existing condition.

Per the cost-benefit analysis conducted in Section 4.2.5, a further reduction in risk to the proposed improvements will require additional funds for construction of a retaining wall with a greater design height, deeper footing, or other protective revetment.

4.3 Temporary Sediment and Erosion Control (Construction Period)

Permanent and temporary erosion and sediment control practices are to be applied during the construction phase to eliminate the potential for erosion. A completed Stormwater Pollution Prevention Plan that documents compliance with SWRCB Order 2009-009-DWQ shall be prepared during final design, and shall reflect the appropriate requirements for the project "Risk Level."

Temporary erosion control measures may consist of measures such as binders, mats, rolled products, and mulching. Stockpiled materials shall be controlled through the use of covers with secondary containment and stored outside the path of concentrated flows. Trenches or open ditches shall be backfilled or covered with plates at the end of each work day as well as in advance or predicted rain events. Rain Event Action Plans, specific to each phase of construction, shall be formulated and implemented a minimum 24 hours prior to any forecasted event of 50% probability or greater.

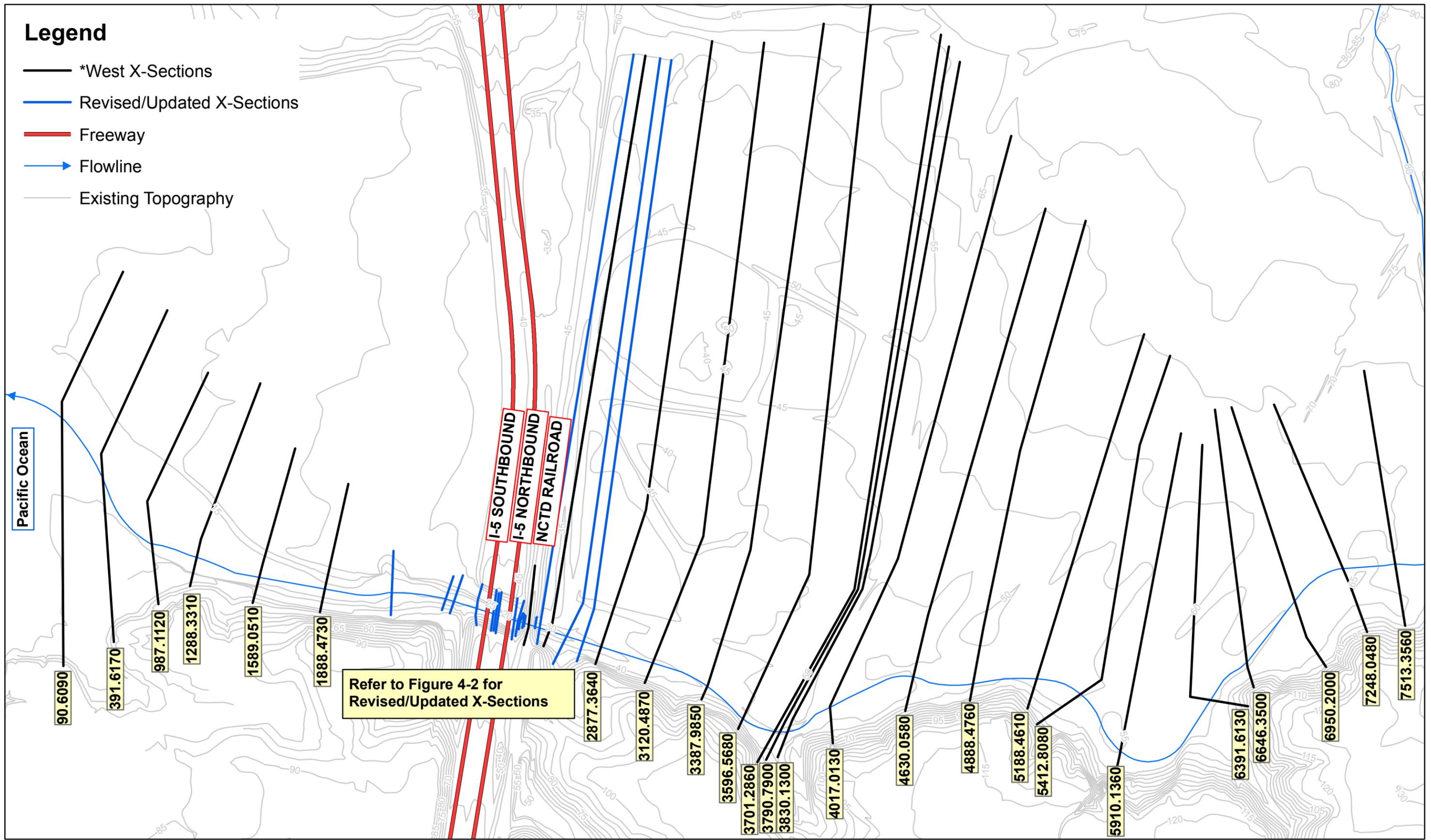
¹⁰ The analysis does not intend to guarantee that the retaining wall will protect against scour for 20 years. It is possible that a storm smaller than the 20-year event, changes in land use, or other factors may cause the retaining wall to fail sooner than indicated by this analysis.

Temporary sediment control practices will be also applied throughout the construction phase and will include at a minimum perimeter protection and stabilized construction entrances. Based upon the project risk level, other more aggressive sediment control measures may be warranted such as the use of temporary drainage diversion facilities, sediment control ponds, baker tanks, and/or active treatment systems.

Permanent landscaping is assumed part of construction within the development footprint. There are no anticipated slopes or pipe outfalls that would provide runoff a chance to increase discharge velocity from any portion of the site.

Legend

-  *West X-Sections
-  Revised/Updated X-Sections
-  Freeway
-  Flowline
-  Existing Topography



Refer to Figure 4-2 for Revised/Updated X-Sections

Figure 4-2
 Las Flores Creek Watershed Hydraulic Work Map 1 of 2
 Red Beach Access P-159, MCB Camp Pendleton



1"=400'

*From Final Report - Las Flores, Aliso, and Horno Watershed Studies, MCB Camp Pendleton, CA, December 2004, West Consultants, Inc.

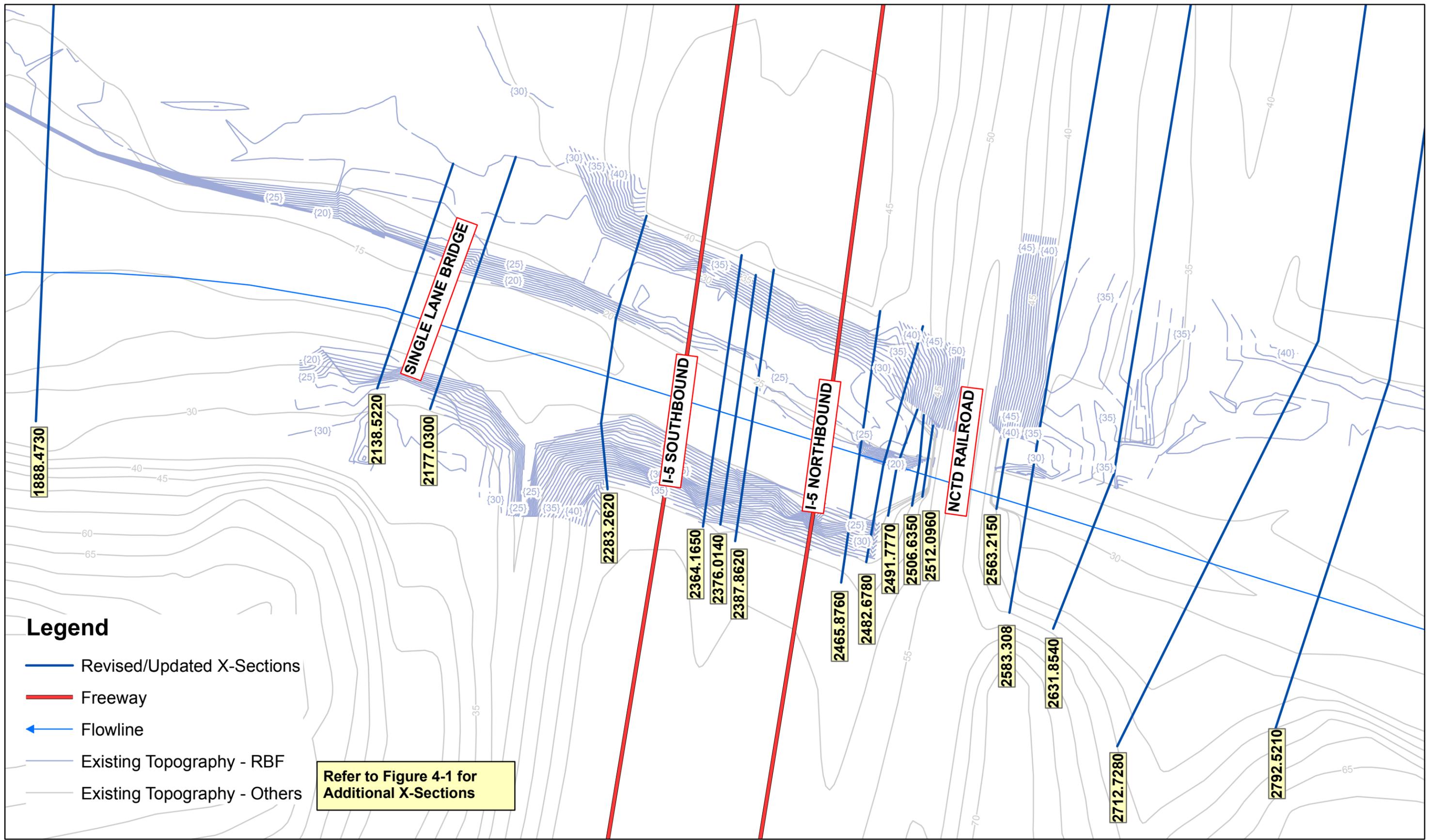


Figure 4-3
 Las Flores Creek Watershed Hydraulic Work Map 2 of 2
 Red Beach Access P-159, MCB Camp Pendleton



Section 5 Conclusions & Recommendations

The proposed project will not substantially impact flow characteristics through the goby habitat, located approximately 500 feet (150 meters) downstream from the Interstate 5 crossing of Las Flores Creek. In addition, the proposed project is not anticipated to impact sediment concentration or long-term erosional trends in the stream reach of interest.

Steady State Hydraulic Analysis

As shown in Table 4-2 the project will result in a decrease in the 100-year peak flow depth upstream from the NCTD railroad embankment. In addition, steady state peak flow velocity and depth will not be significantly impacted downstream from the project site. Through the project site, erosive potential based upon high velocities occurs in both the existing and proposed conditions. This finding is supported by the erosion noted along the southerly abutments to Interstate 5 adjacent to Las Flores Creek.

Based on the above, incorporation of erosion protection measures through the project site is necessary. Bank protection is recommended and a scour analysis and subsequent cost-benefit analysis has been conducted to support design of the proposed retaining wall. Local and contraction scour analysis was conducted for the 100-year storm event.

Unsteady State Hydraulic Analysis

As shown in Table 4-4 and Table 4-5, the unsteady state hydraulic analysis clearly shows that the proposed project will not significantly alter the peak flow rate, flow depth, or flow velocity for the 5-year and 100-year 24-hour storm events through the goby habitat. Given the range of flows represented and the closeness of fit between the existing and proposed condition results, for a given storm event the flow characteristics through the goby habitat should be substantially the same in the existing and post-project conditions. The proposed improvements will not adversely impact hydraulic conditions through the goby habitat.

Sediment Transport (Mobile Boundary Hydraulics) Analysis

As shown in Table 4-7, an analysis of long term sedimentation patterns through the project area and the goby habitat shows that Las Flores Creek will likely erode over time. The results indicate that the anticipated erosion within the channel will occur with or without the proposed project.

The results of the sensitivity analyses conducted for the sediment transport models indicate that the equilibrium sediment flow rate boundary condition and the Yang transport function produce the greatest predicted scour near the proposed retaining wall. Results of the sensitivity analysis are presented in Appendix E.

Table 4-6 presents the calculated sediment concentrations through the goby habitat area. The results indicate that the bed material sediment concentration will remain substantially unchanged through the goby habitat. This result was true across a range of assumed sediment concentrations at the model boundary. The sediment gradations

collected within Las Flores Creek are sand- and gravel-sized soil particles that are transported primarily as bed material load. In addition, because proposed improvements will not alter land use patterns that would impact sediment supply to Las Flores Creek, the wash load is not anticipated to change based upon the proposed improvements,. It is not anticipated that proposed improvements will impact water quality through an increase in wash load or turbidity.

Scour Analysis

The results of the scour analysis (see Table 4-8) indicate that project funding is insufficient to provide scour protection for the long term scour, the general scour, the contraction scour, and the local scour associated with the 100-year storm event at the proposed retaining wall along the access road. As the total scour potential cannot be mitigated for the 100 year statistical frequency, a cost-benefit analysis was conducted to determine the sheetpile retaining wall height that provides the most efficient use of the available funding. A design wall height (exposed height + scour depth) of approximately 14.5 feet was selected. Based upon a review of historic data, this design wall height could potentially provide approximately 20 years of scour protection.

Because of the uncertainty involved in sediment transport calculations, there remains risk that a single storm event, series of storm events, or significant change in watershed land use may result in scour sufficient to cause the retaining wall to fail. Mitigation of additional risk through a more substantial retaining wall or toe protection will require additional funding. While the proposed retaining wall provides only limited protection against scour, the current Red Beach access road and the northerly bridge piers and abutments for the Interstate 5 crossing of Las Flores Creek have been in existence for many years without the benefit of the protection provided by the proposed retaining wall. As such, the proposed protection measures could be seen as providing suitable protection for the proposed improvements when compared to that of existing structures.

It is recommended that the Marine Corps monitor the channel bed elevations adjacent to the retaining wall and within the creek to determine if the exposed wall height is approaching 14.5 feet. If any portion of the exposed retaining wall approaches 14.5 feet, placement of soil, rock gabions, or riprap at the toe of the retaining wall will be necessary to prevent failure of the retaining wall.

The scour analysis for the NCTD railroad bridge indicates that the combination of local abutment scour¹¹, contraction scour, general scour, and a one-foot deep low flow channel results in a design scour elevation of approximately sea level. Additional pier/support depth required for structural stability of the proposed NCTD railroad crossing should be provided at an elevation below sea level.

¹¹ Abutment scour was substantially greater than local pier scour. As such, local pier scour was not considered in developing the design scour.

Section 6 References

1. Brunner, Gary W. March 2008. *HEC-RAS, River Analysis System Hydraulic Reference Manual*. United States Army Corps of Engineers Hydrologic Engineering Center. Davis, CA.
2. Brunner, Gary W. March 2008. *HEC-RAS, River Analysis System Users Manual*. United States Army Corps of Engineers Hydrologic Engineering Center. Davis, CA.
3. Chang, Howard H. 1988. *Fluvial Processes in River Engineering*. Krieger Publishing Company. Malabar, FL.
4. County of San Diego Department of Public Works Flood Control Section. June 2003. *San Diego County Hydrology Manual*.
5. Goebel, Karen A. (USFWS). June 2009. *A letter to William H Berry regarding "Section 7 Consultation and Concurrence Request for the Red Beach Operations Access points P-159, Marine Corps Base Camp Pendleton, San Diego County, California"*.
6. WEST Consultants. December 2004. *Las Flores, Aliso, and Horno Watershed Studies MCB Camp Pendleton, CA*.

APPENDIX B

Agency Correspondence



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011



In Reply Refer To:
FWS-MCBCP-09B0253-1210169

MAR 26 2012

Mr. William H. Berry
Head, Resource Management Division
Assistant Chief of Staff, Environmental Security
United States Marine Corps
P.O. Box 555008
Camp Pendleton, California 92055-5008

Subject: Reinitiation of Informal Section 7 Consultation for the Red Beach Road Operations Access Points (P-159), North County Transit District Rail Road Bridge, Marine Corps Base Camp Pendleton, San Diego County, California

Dear Mr. Berry:

This is in response to the letter (5090.17 ENVSEC) dated December 13, 2011, from the U.S. Marine Corps (Marine Corps) requesting reinitiation of informal consultation pursuant to section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*) for the Red Beach Road Operations Access Points (P-159) Project to address the construction of the North County Transit District Rail Road Bridge (NCTD Bridge) on Marine Corps Base Camp Pendleton (MCBCP). The original project involved construction of a new bridge just north of the existing bridge, whereas the modified project will involve construction of a new bridge to the east of the existing bridge. The new bridge will span Las Flores Creek just upstream of the existing bridge, and the existing bridge that is constraining troop movement will be removed. The purpose of the project is to facilitate troop movement for training purposes on MCBCP, but it will also implement a portion of the double-tracking project addressed in the *Programmatic Biological Opinion for the Rail Corridor from the Orange County Border South to Southern Oceanside for Operations and Maintenance, and Six Double-Track Projects in San Diego County, California* (1-6-05-P-4123.2; "Double Track BO").

The Marine Corps provided a *Supplemental Biological Evaluation* (SBE) dated December 2011 for additional background information and analysis of the project. The Marine Corps' initiation request letter and the SBE request our concurrence that the modified project may affect, but is not likely to adversely affect the federally threatened coastal California gnatcatcher (*Polioptila californica californica*, "gnatcatcher") and the federally endangered least Bell's vireo (*Vireo bellii pusillus*, "vireo") and southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher") and tidewater goby (*Eucyclogobius newberryi*, "goby"). The Marine Corps has

requested that we review the proposed project as a Class II activity¹ as defined in the U.S. Fish and Wildlife Service's (Service's) 1995 *Biological Opinion for Programmatic Activities and Conservation Plans in Riparian and Estuarine/Beach Ecosystems on Marine Corps Base, Camp Pendleton* (Riparian BO).

Consultation History

We received the Marine Corps' initial request for section 7 consultation on the proposed project on April 17, 2009. On June 2, 2009, we provided a response letter (FWS-MCBCP-09B0253-09TA0797) in which we concurred that the project was not likely to adversely affect gnatcatcher and recommended that potential effects to vireo, flycatcher, and goby be addressed as a Class II consultation. On October 30, 2009, we provided a letter documenting our conclusion that the proposed project was not likely to adversely affect vireo, flycatcher, and goby. Since 2009, however, the project has been modified to construct the new bridge in a different location and to include double-tracking of the existing rail line within the project footprint.

Description of the Proposed Action

The conservation measures associated will largely remain unchanged, except that because the project-related impacts to habitat for listed species will change slightly, the amount of habitat restored to offset project-related impacts will also change. Furthermore, because the project will implement a portion of the rail double-tracking project described in the Double Track BO, impacts to riparian vegetation will be offset consistent with the measures described in that biological opinion.

Therefore, the conservation measure addressing offsetting impacts to gnatcatcher habitat (on p. 3 of the Service's October 30, 2009, letter) will be modified as follows:

- To offset permanent impacts to gnatcatcher habitat, coastal sage scrub restoration will be initiated at a location approved by AC/S ES and the Service prior to initiating the project. Based on the estimated permanent impacts to 0.31 acres (ac) of coastal sage scrub and coyote brush scrub, 0.62 ac of CSS will be restored.

The conservation measure addressing offsetting impacts to vireo and flycatcher habitat (on p. 5 of the Service's October 30, 2009, letter) will be modified as follows:

15. Permanent impacts to southern willow scrub will be offset through the restoration of native riparian vegetation in areas invaded by non-native riparian species on MCBCP. Based on estimated permanent impacts to 0.15 ac of southern willow scrub, 0.45 ac of riparian vegetation will be restored.

¹ Class II activities require project-specific review by the Service

Effects of the Proposed Action

Effects to Vireo

The proposed modifications will increase impacts to riparian vegetation from 0.15 ac to 0.28 ac (0.13 ac of temporary impact and 0.15 ac of permanent impact). Nevertheless, the project is still anticipated to impact only a fraction of the breeding territories for the one to two vireo pairs that have been consistently observed just north and east of the project footprint. Therefore, the affected vireo pairs are anticipated to establish territories in the same location following habitat removal and to have sufficient resources available for foraging, breeding, and sheltering activities, with no increased risk of mortality or reduction in reproductive output.

Other project-related effects to vireo, such as construction-related disturbance of nesting activities, will not change relative to the original project. With the proposed conservation measures, including avoidance of construction activities adjacent to nesting pairs, these effects are not anticipated to substantially interfere with essential breeding, feeding, and sheltering behaviors.

Effects to Flycatcher

Basewide surveys for flycatcher have been conducted annually along Las Flores Creek in accordance with the Riparian BO. These surveys have shown sporadic flycatcher occurrences along Las Flores Creek, but no breeding territories have been observed within or adjacent to the project footprint.

With the proposed conservation measures, potential effects of the project on dispersing flycatchers are not anticipated to substantially interfere with essential breeding, feeding, and sheltering behaviors.

Effects to Gnatcatcher

The proposed modifications will reduce impacts to gnatcatcher habitat from 0.50 ac to 0.45 ac (0.14 ac of temporary impact and 0.31 ac of permanent impact). The project will impact only a fraction of the observed gnatcatcher territories to the east and west of the project footprint. Therefore, the affected gnatcatcher pairs are anticipated to remain in the same location following habitat removal and to have sufficient resources available for foraging, breeding, and sheltering activities, with no increased risk of mortality or reduction in reproductive output.

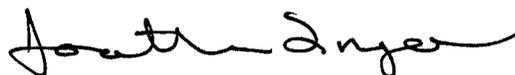
Other project-related effects to gnatcatcher, such as construction-related disturbance of nesting activities, will not change relative to the original project. With the proposed conservation measures, including avoidance of construction activities adjacent to nesting pairs, these effects

are not anticipated to substantially interfere with essential breeding, feeding, and sheltering behaviors.

As described above, we concur that the project will not adversely affect vireo, flycatcher, gnatcatcher, and goby. In addition, we agree that the proposed project is consistent with the Riparian BO and the Double Track BO. Therefore, the interagency consultation requirements of section 7 of the Act have been satisfied. Although our concurrence ends consultation, obligations under section 7 of the Act shall be reconsidered if: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (2) this action is subsequently modified in a manner that was not considered in this assessment, or (3) a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions regarding this consultation, please contact Jonathan Snyder, Division Chief, at (760) 431-9440, extension 307.

Sincerely,



For Karen A. Goebel
Assistant Field Supervisor

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE (415) 904-5200
FAX (415) 904-5400
TDD (415) 597-5885



March 29, 2012

Jeffery S. Paull
Assistant Chief of Staff
Environmental Security
Marine Corps Base Camp Pendleton
ATTN: Mark Anderson
Box 555008
Camp Pendleton, CA 92055-5008

Re: **ND-023-11** U.S. Marine Corps Negative Determination, Modifications to previously-concurred-with Bridge Replacement and Military access improvements, Red Beach, Marine Corps Base Camp Pendleton, San Diego Co.

Dear Mr. Paull:

On January 8, 2010, the Commission staff concurred with the Marine Corps' Negative Determination (ND-068-09) for the widening of the Red Beach Access Road that runs under I-5, adjacent to Las Flores Creek on Marine Corps Base Camp Pendleton. The proposal was to widen the I-5 undercrossing and improve and widen the approach road between the North County Transit District (NCTD) railroad tracks and I-5 at Red Beach. The stated purpose was to improve tactical vehicle and troop transit between Red Beach and inland training areas at Camp Pendleton.

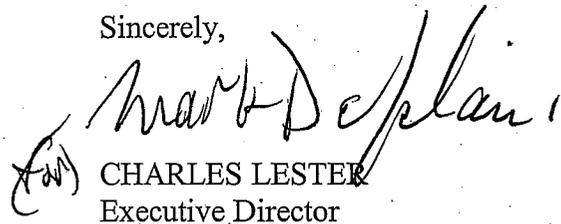
In our previous concurrence, we noted that the project would not affect public access, recreation, or public views, and while the project was adjacent to Las Flores Creek, which provides habitat for the tidewater goby, no construction would occur in the creek's wetted channel, and BMPs were to be implemented to ensure protection of water quality in the creek. We also noted that the road improvements would likely reduce sedimentation into the creek. We further noted that adequate mitigation was included to address non-ESHA habitat and wetlands.

On May 16, 2011, the Marine Corps submitted a supplemental negative determination, because the project's environmental analysis was expanded to include replacement of the railway double arch bridge located within the NCTD right-of-way. The supplemental determination focused on the additional bridge design components and acknowledged that, in addition to facilitating troop transit, the strengthened railroad bridge would facilitate increased capacity and the reliability of the rail corridor. This supplemental determination has been further augmented by the analysis in the U.S. Fish and Wildlife Service's March 26, 2012, letter, which addresses reinitiation of consultation for the modified project under Section 7 of the Endangered Species Act. This Fish and Wildlife

Service letter specifies the avoidance, minimization, and mitigation measures that will be provided to protect habitat for the coastal California gnatcatcher, the southwestern willow flycatcher, and tidewater goby, and concludes that, with these measures, these species would not be adversely affected.

Under the federal consistency regulations (Section 930.35), a negative determination can be submitted for an activity "which is the same as or similar to activities for which consistency determinations have been prepared in the past." The proposed modifications do not raise any new coastal zone resources impact issues not already addressed in our previous concurrence, and we **agree** that, with the measures included in the above-discussed Fish and Wildlife Service letter, the proposed activity will not adversely affect coastal zone resources and is similar to the previous negative determination with which we have concurred. We therefore **concur** with your negative determination made pursuant to 15 CFR Section 930.35 of the NOAA implementing regulations. Please contact Mark Delaplaine of the Commission staff at (415) 904-5289 if you have any questions regarding this matter.

Sincerely,


CHARLES LESTER
Executive Director

cc: San Diego District Office

**OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION**

1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov



October 05, 2011

Reply in Reference To: USMC061129A

Danielle Page
Head, Cultural Resource Management Branch
Assistant Chief of Staff, Environmental Security
United States Marine Corps
Box 555008
Camp Pendleton, CA 92055-5008

Re: Section 106 Consultation for Operations Access Points Red Beach Project
Amendment, Camp Pendleton

Dear Ms. Page:

Thank you for continuing consultation regarding the United States Marine Corps (USMC) efforts to comply with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), as amended, and its implementing regulation found at 36 CFR Part 800.

After receiving prior concurrence from my office that no historic properties would be affected by proposed project activities, the USMC has amended the Area of Potential Effect (APE) to provide for earthen retaining structures, concrete abutment, additional track work, modification (temporary shoofly construction) of the Las Flores Creek railroad bridge (previously determined through consensus to be *not* eligible for National Register inclusion) and vehicular use of an additional existing access road. The USMC has also determined that proposed road widening originally called for in their first project description will impact jurisdictional wetlands. As a result, the USMC is proposing to establish a mitigation area at Pilgrim Creek to address the requirements of their Habitat Mitigation Plan.

An archeological survey of the expanded APE revealed three archeological sites (CA-SDI-811, CA-SDI-10728 and CA-SDI-10731) are adjacent to, but not within, the modified APE. CA-SDI-10731 has previously been determined National Register eligible through consensus and the USMC is requesting my concurrence with their determinations that CA-SDI-811 and CA-SDI-10728 are NRHP eligible and that these project changes will alter the original finding of no historic properties affected to no adverse effect with the following conditions:

- All ground disturbing activities near all three of the above referenced archeological sites will be monitored by a qualified archeologist and a Native American monitor;
- Vehicles using the access road will be confined within the road's boundaries;
- The USMC will develop a monitoring discovery plan;
- Completion and submittal of a monitoring report to CA SHPO at project conclusion.

05 October 2011

USMC0601129A

Page 2 of 2

After reviewing the documentation provided by the USMC in support of this undertaking, I have the following comments:

- 1) I concur that the Area of Potential Effects (APE) has been properly determined and documented pursuant to 36 CFR Parts 800.4 (a)(1) and 800.16(d).
- 2) I concur that CA-SDI-811 and CA-SDI-10728 are NRHP eligible.
- 3) I concur with your finding of conditional No Adverse Effect pursuant to 36 CFR Part 800.5 (b) and that the documentation supporting this finding has been provided pursuant to 36 CFR Part 800.11(d).
- 4) Please be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, you may have future responsibilities for this undertaking under 36 CFR Part 800.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact Ed Carroll of my staff at (916) 445-7006 or at email at ecarroll@parks.ca.gov.

Sincerely,

Susan H Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

APPENDIX C

Record of Non-Applicability (RONA) and Air Quality Data



UNITED STATES MARINE CORPS
MARINE CORPS BASE
BOX 555008
CAMP PENDLETON, CALIFORNIA 92055-5008

5090
ENVSEC
APR 4 2012

MEMORANDUM FOR THE RECORD

From: Commanding Officer
To: Assistant Chief of Staff, Environmental Security
Subj: RECORD OF NON-APPLICABILITY (RONA) FOR NEPA 20020013; RED BEACH OPERATIONS ACCESS POINTS (P-159), CAMP PENDLETON
Ref: (a) U.S. Environmental Protection Agency, Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, published in the Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93)
(b) U.S. Environmental Protection Agency, Revisions to the General Conformity Regulations; Final Rule, published in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93)
(c) OPNAVINST 5090.1C (Appendix F)
Encl: (1) Red Beach Operations Access Points (P-159), Camp Pendleton Emissions Analysis for Clean Air Act Conformity Applicability

1. The references (a), (b), and (c) provide implementing guidance for documenting Clean Air Act (CAA) Conformity Determination requirements. The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants.

2. The Proposed Action would occur within the San Diego Air Basin (SDAB) portion of Marine Corps Base, Camp Pendleton. This portion of the SDAB is currently in non-attainment of the 8-hour ozone (O₃) NAAQS and is a maintenance area for carbon monoxide (CO) NAAQS. The SDAB is in attainment of the NAAQS for all other criteria pollutants. Therefore, only project emissions of CO and O₃ (or its precursors, volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]) were analyzed for conformity rule applicability. The annual *de minimis* threshold levels for this region are 100 tons of VOC, NO_x, and CO. Federal actions may be

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Subj: RECORD OF NON-APPLICABILITY (RONA) FOR NEPA 20020013; RED BEACH OPERATIONS ACCESS POINTS (P-159), CAMP PENDLETON

exempt from conformity determinations if they do not exceed designated *de minimis* threshold levels.

3. An emissions analysis for Red Beach Operations Access Points (P-159), Camp Pendleton is presented in the enclosure. *De minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the Proposed Action and a formal Conformity Determination is not considered necessary.

4. To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that implementation of the Proposed Action does not require a formal CAA Conformity Determination.



N. F. MARANO

Copy to:
Files

RED BEACH CAMP PENDLETON OPERATIONS ACCESS POINTS (P-159) EMISSIONS ANALYSIS FOR CLEAN AIR ACT CONFORMITY APPLICABILITY

INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule*, in the Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93). USEPA published *Revisions to the General Conformity Regulations; Final Rule*, in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93). The U.S. Navy published *Interim Guidance on Compliance with the Clean Air Act (CAA) General Conformity Rule* in Appendix F, OPNAVINST 5090.1C, dated 30 October 2007, which has been used by the United States Marine Corps (USMC) as interim USMC Conformity guidance. These publications provide implementing guidance to document Clean Air Act Conformity Determination requirements.

Regulations within the General Conformity Rule state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or 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 whether a federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1 51.850[a]).

The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants. Former non-attainment areas that have attained a NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

The Proposed Action would occur within the San Diego Air Basin (SDAB) portion of Marine Corps Base (MCB) Camp Pendleton. This portion of the SDAB is currently in non-attainment of the 8-hour ozone (O₃) NAAQS and is a maintenance area for carbon monoxide (CO) NAAQS. The SDAB attains the NAAQS for all other criteria pollutants. Therefore, only project emissions of O₃ (or its precursors, volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]) and CO are analyzed for conformity rule applicability.

The annual *de minimis* levels for this region are 100 tons of VOC, NO_x, and CO, as listed in Table 1. Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* threshold levels (40 CFR Part 1, Section 51.853[b]).

**Table 1. Conformity *De minimis* Levels for Criteria Pollutants
in the San Diego Air Basin**

Criteria Pollutant	<i>De minimis</i> Level (tons/year)
Volatile Organic Compounds (VOC)	100
Oxides of Nitrogen (NO _x)	100
Carbon Monoxide (CO)	100

PROPOSED ACTION

Action Proponent: The U.S. Marine Corps (USMC).

Location: Marine Corps Base (MCB) Camp Pendleton.

Proposed Action Name: Red Beach Operations Access Points (P-159) Supplemental Environmental Assessment (SEA), MCB Camp Pendleton

Proposed Action Summary: The Proposed Action would involve the replacement of the railroad double arch bridge with a new double track multi-span steel and concrete structure within the North County Transit District (NCTD) rail right of way. The P-159 Environmental Assessment (EA) prepared in April 2010 described the potential environmental consequences that would result from the proposed construction and modification of new and existing transit and maneuver corridors. A Record of Non-Applicability (RONA) for Clean Air Act Conformity and a Finding of No Significant Impact (FONSI) for the P-159 EA were signed on 02 April 2010. Since preparation of the P-159 EA, more detailed information for proposed bridge design/construction and the access road within the NCTD rail easement or right-of-way has become available, necessitating an expanded analysis of these project components. Major bridge replacement construction efforts would be restricted to within the railway easement; however, expected track work and bridge substructure work is expected to occur outside the limits of the previously analyzed project footprint in the P-159 EA. Therefore, this RONA focuses only on the proposed bridge construction, associated retaining walls, and access roads within the SEA project footprint.

Air Emissions Summary: Emission sources associated with the Proposed Action involve construction operations and no changes in operations for current sources of air emissions are proposed. Annual emissions from all construction activities were calculated by assuming that all activities for Phases one, two, and three would occur within one 12-month period. Phase four construction activities would occur at a later date determined by NCTD/SANDAG, and is therefore not included in the annual subtotal for the Proposed Action. However, estimated emissions for Phase four activities would be below *de minimis* thresholds. Estimated construction emissions due to implementation of the Proposed Action are shown in Table 2. Based on the air quality analysis for the Proposed Action, the maximum estimated emissions would be below conformity *de minimis* levels (Table 2).

**Table 2. Estimated Emissions Resulting from
Implementation of the Proposed Action**

Estimated Emissions Per Construction Phase	Emissions ¹ (tons/year)					
	CO	VOCs	NO _x	SO _x	PM ₁₀	PM _{2.5}
Phase One Construction Emissions	2.47	0.47	3.94	0.00	0.86	0.20
Phase Two Construction Emissions	1.42	0.31	2.73	0.00	0.23	0.14
Phase Three Construction Emissions	1.25	0.25	2.17	0.00	0.17	0.10
Subtotal	5.14	1.03	8.84	0.00	1.26	0.44
Phase Four Construction Emissions ²	0.71	0.13	1.14	0.00	0.12	0.06
<i>de minimis</i> threshold ³	100	100	100	NA	NA	NA
Exceeds <i>de minimis</i> threshold?	No	No	No	No	No	No

Note: ¹ SDAB is a basic nonattainment area for the 8-hour O₃ NAAQS (VOCs and NO_x are precursors to the formation of O₃), is a maintenance area for CO NAAQS, and is in attainment of the NAAQS for all other criteria pollutants.

² Phase four construction activities would occur at a later date determined by NCTD/SANDAG, and is therefore not included in the annual subtotal for the Proposed Action. Estimated emissions for Phase four activities would be below *de minimis* thresholds.

³ *de minimis* thresholds are developed from SDCAPCD major source thresholds; *de minimis* thresholds are not applicable to NAAQS attainment areas (i.e., SO₂, PM₁₀ and PM_{2.5}).

Sources: California Air Resources Board 2011c; USEPA 2011.

Affected Air Basin: San Diego Air Basin

ATTAINMENT AREA STATUS AND EMISSIONS EVALUATION CONCLUSION

The SDAB is a basic nonattainment area for the 8-hour O₃ NAAQS; VOCs and NO_x are precursors to the formation of O₃. The SDAB is considered a maintenance area for the CO NAAQS.

Total emissions resulting from construction activities have been estimated using data presented in Chapter 3 of the SEA, general air quality assumptions, and emission factors compiled from the following sources: *OFFROAD Emission Factors and CARB EMFAC2007 Model* (CARB 2007). Emissions were then compared with *de minimis* thresholds for the SDAB.

De minimis thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting that conclusion is shown in Table 2. Therefore, formal Conformity Determination procedures are not required.

APPENDIX D

Pilgrim Creek – Proposed Wetland Mitigation Site

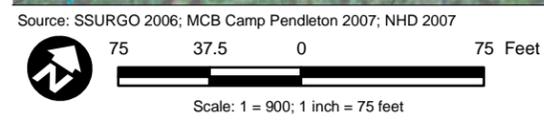
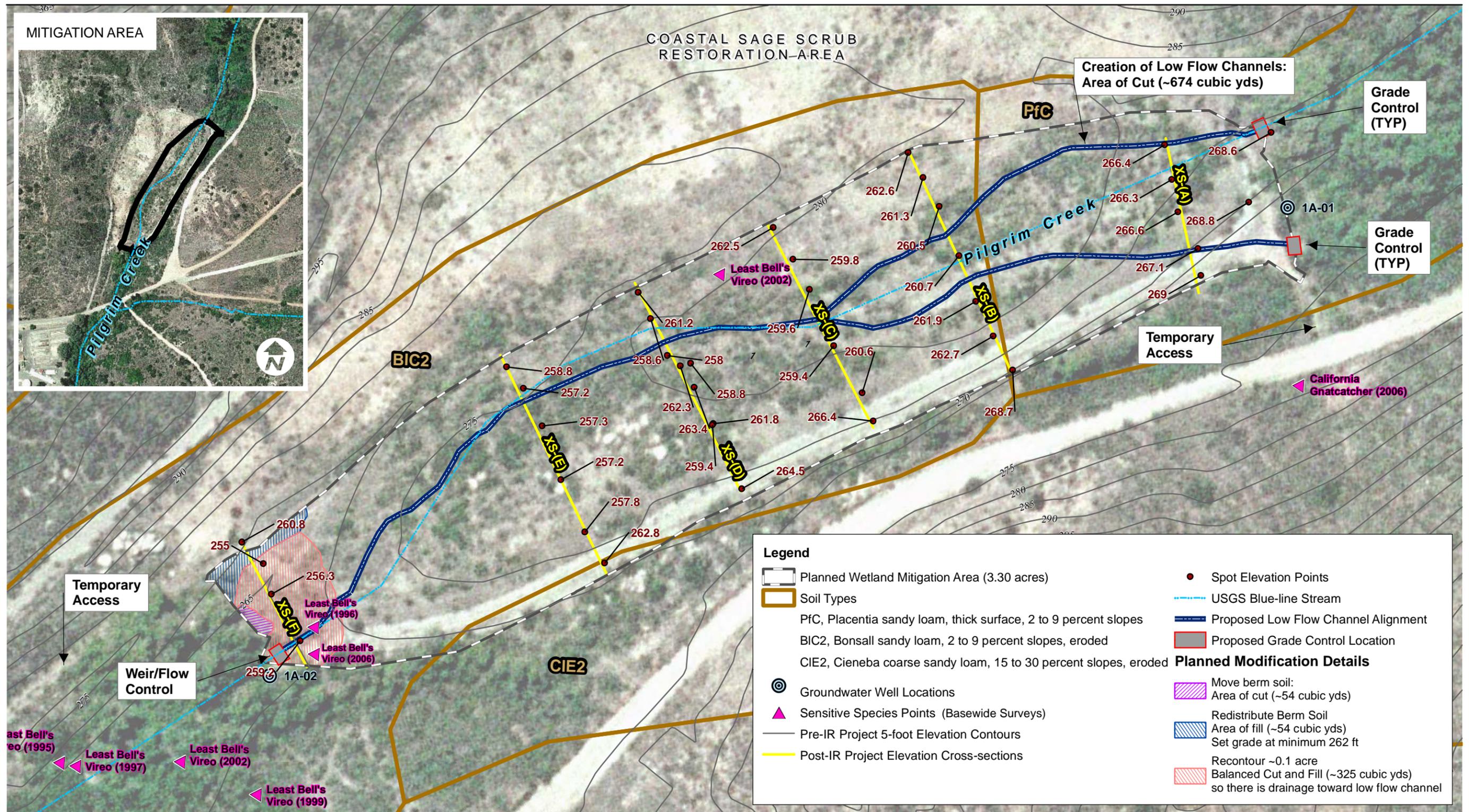


Figure 3
Plan View of Existing Conditions and Proposed Site Modifications