SANTA MARIA RIVER
BRADLEY CANYON LEVEE EXTENSION PROJECT
FINAL
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT AND MITIGATED NEGATIVE DECLARATION

Prepared by:

U.S. Army Corps of Engineers
Los Angeles District

November 2011

FINDING OF NO SIGNIFICANT IMPACT
SANTA MARIA RIVER
BRADLEY CANYON LEVEE EXTENSION PROJECT
SANTA BARBARA COUNTY, CALIFORNIA

I have reviewed the attached Supplemental Environmental Assessment/Mitigated Negative Declaration (SEA/MND) that has been prepared for the proposed Santa Maria River Bradley Canyon Levee Extension Project, located in Santa Barbara County, California. This document supplements the 2009 Final Environmental Assessment/Mitigated Negative Declaration (2009 EA/MND) that was prepared for the Santa Maria River Levee Repair Project (Reaches 1, 2, and 3). This document supports the Addendum to the Supplemental Design Deficiency Report for the Santa Maria Levee Project. The original levee repair project included improvements along a 6.5-mile-long reach of the southern Santa Maria River Levee, extending from the terminus of Bradley Canyon to the north end of Blosser Road. This project was completed in July 2011. The proposed Bradley Canyon Levee Extension Project consists of repairing 3,700 feet of the existing Bradley Canyon Levee upstream of the terminus of Bradley Canyon. Repairs would be made with soil cement and sheet pile as follows.

Approximately 2,700 feet of the Bradley Canyon Levee (Levee) would be repaired with soil cement slope protection. The remaining 1,000 feet of the Levee (along the downstream end) would be repaired with a segment of sheet pile to avoid impacts to environmentally sensitive areas containing Federally threatened California red legged frog (CRLF) and native riparian habitat. The repair is expected to be completed within one year. If a delay occurs, appropriate regulatory and resources agencies would be notified. Soil/sand excavation and construction within the channel bed would not occur from December 1^{st} through March 31^{st}, avoiding the CRLF breeding season

This final SEA/MND has been prepared in compliance with all applicable laws and regulations including but not limited to the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), Section 404 of the Clean Water Act, the National Historic Preservation Act, the Endangered Species Act, and the Clean Air Act.

The SEA/MND addresses impacts to environmental resources related to both implementation and future maintenance of the proposed project. The proposed project may result in short term impacts to environmental resources including but not limited to biological resources, water quality, and air quality. Mitigation measures have been developed to avoid or minimize impacts to environmental resources during construction and future maintenance. Mitigation measures/environmental commitments identified in the SEA/MND, BO, and any applicable permits/agreement would be implemented during the project construction.

The proposed project would result in a 0.5-acre permanent loss of habitat and 6.35 acres of temporary impacts during construction. To compensate for the 0.5-acre loss of permanent impacts, approximately 0.5 acres of habitat would be established with native riparian vegetation onsite. Temporary impacts to approximately 5.74 acres of native and non-native plant communities would be restored by re-vegetating with native grass seed-mix disturbed areas outside of Santa Barbara County Flood Control and Water Conservation District's routine maintenance area. The 0.61 acre of temporary impact to the active channel rerouted for construction would be returned to pre-construction contours and the original alignment.

The proposed project has been evaluated pursuant to Section 404(b)(1) of the Clean Water Act. The proposed project complies with the Section 404(b)(1) guidelines. The Corps has received an amended Section 401 Water Quality Certification from the California Regional Water Quality Control Board, Central Coast Region (RWQCB).

This project complies with Section 106 of the National Historic Preservation Act. A cultural resources survey was conducted within the project area in 2010. It revealed that no archaeological sites are known in the project area and the proposed project is in compliance with Section 106 of the National Historic Preservation Act.

Coordination with the USFWS, National Marine Fisheries Service, California Department of Fish and Game, and the RWQCB will continue throughout the duration of this project to avoid/minimize impacts to environmental resources.

The Corps initiated formal consultation with the USFWS under Section 7 of the Endangered Species Act on April 27, 2011, regarding the effects of the proposed project on the CRLF. A non-jeopardy biological opinion was issued by the USFWS on October 27, 2011, a copy of which is included in Appendix I of this SEA/MND. The Corps will follow all the minimization measures identified in the BO to ensure that potential effects to CRLF are minimized or avoided throughout the project. The Local Sponsor (Santa Barbara County Flood Control and Water Conservation District) is coordinating with the CDFG to obtain a 1601 Streambed Alteration Agreement (SAA) for this proposed project prior to construction. Conditions and mitigation measures identified in the SAA would be followed throughout the project to avoid and minimize impacts to any biological resources.

I have considered the available information contained in the Final SEA/MND and it is my determination that impacts resulting from the proposed Santa Maria River Bradley Canyon Levee Extension Project will not have a significant adverse effect upon the existing environment or the quality of the human environment. Preparation of an Environmental Impact Statement, therefore, is not required.

23 NOV 2011
Date

R. Mark Toy, P.E.
Colonel, US Army
Commander and District Engineer

DETERMINATION BY ENVIRONMENTAL HEARING OFFICER

_✓_ I agree with staff conclusions. Preparation of the appropriate document may proceed

__ I DO NOT agree with staff conclusions. The following actions will be taken:

__ I require consultation and further information prior to making my determination.

Signature____________________________ Initial Study Date:______________________

Signature____________________________ Negative Declaration Date:______________

Signature____________________________ Revision Date:__________________________

Signature____________________________ Final Negative Declaration Date: 10/28/11

Anne Almy, Supervising Planner, Planning and Development

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1. INTRODUCTION

The United States Army Corps of Engineers (Corps) and the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD) have jointly prepared this Final Supplemental Environmental Assessment/Mitigated Negative Declaration (SEA/MND) to evaluate the environmental effects of the proposed Project, alternatives thereto, and associated mitigation measures. This SEA/MND is a supplement to the Final Environmental Assessment/Mitigated Negative Declaration (EA/MND, August 2009) and Supplemental Design Deficiency Report (SDDR, August 2009) for the repair of 6.5 miles of the Santa Maria River Levee. Information from the 2009 EA/MND and SDDR are incorporated by reference per 40 C.F.R. 1502.21.

The Corps recently performed an additional hydraulic analysis on the Santa Maria River Levee system upstream of the Bradley Canyon confluence to update the levee design which would alleviate further damages (2011 Final SDDR Addendum). The hydraulic analysis indicates that, should a breach occur along the upstream Santa Maria River Levee during a high flow event, flows proceeding through the breach would attack the Bradley Canyon Levee and possibly overwhelm the levee and cause it to fail.

This Final SEA/MND has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321 et seq), in conformance with the Council on Environmental Quality (CEQ) Regulations [40 C.F.R. §§ 1500 et seq.] and Corps NEPA implementing regulations, and the California Environmental Quality Act (CEQA), Public Resources Code [PRC] 21000 *et seq*.), and the State CEQA Guidelines (14 Cal. Code Regs §1500 *et seq*.). The Corps is the NEPA lead agency and the SBCFCWCD, the local sponsor, is the CEQA lead agency.

1.1. PROPOSED PROJECT

The strengthening of a 3,700 linear foot reach of the Bradley Canyon Levee to address the deficiency. As currently designed, approximately 1,000 feet of sheet pile would be installed in areas supporting riparian habitat and would transition to soil cement applied to the face of the levee for the remaining 2,700 feet. The ground-disturbing construction activities due to soil cement include clearing and grading for levee preparation, expanding or widening access roads, and temporary diversion of Bradley Canyon channel. Please see Section 2 for more detailed information concerning the proposed Project.

1.2. LOCATION

The proposed Project is located in Bradley Canyon channel, north and south of Foxen canyon road (aka Betteravia Road) and west of Dominion Road, in the City of Santa Maria, County of Santa Barbara, California, as shown in Figure 1-2.

1.3. AUTHORIZATION

The project for flood control improvements in the Santa Maria River Basin, California, as set forth in House Document 400, Eighty-third Congress, second session, was approved 3 1954 by Act of Congress, Public Law 780, Eighty-third Congress, second session. Based on the criteria in Engineer Regulation 1165-2-119 (*Modifications to Completed Projects*), the construction required for the proposed Project is authorized under the existing project authority from 1954.

1.4. PROJECT BACKGROUND

The Santa Maria River Levee project was originally constructed in 1963 by the Corps. Those levee improvements consisted of a levee system constructed with compacted fill embankments with riprap revetment. There are approximately 17 miles of existing levees along the left (south) bank, 5 miles of existing levees along the right (north) bank, and 1.8 miles of existing levees along Bradley Canyon. The Santa Maria River Levee project provides flood protection to the Santa Maria Valley, which includes the entire city of Santa Maria.

In 1966, within three years of the original construction, during a moderate flood event, the levee was almost breached in two locations because flows along the meandering low flow channel impinged on the levee at a nearly perpendicular angle. While the levee revetment had been designed to handle 160,000 cubic feet per second (cfs) in bank to bank flow, the failure mode of directly impinging flows from the meandering low flow had not been addressed in the original project design. From 1966 to 1998, the design deficiency resulted in similar major damage to the levee, in spite of remedial construction efforts. The February 1998 flood caused damage so severe that a 600 foot-long breach actually did occur in the levee. Fortunately, the breach was in the levee on the opposite side from the City of Santa Maria and was downstream in an agricultural area. Therefore, the resulting flood damage was relatively minor as shown in Figure 1-1.1.

In 2005, the Federal Emergency Management Agency (FEMA), responsible for administering the National Flood Insurance Program, requested the Corps to certify that the Santa Maria River Levee Project meets the Corps' criteria for levee systems identified in ER 1165-2-119. Based on hydraulic and geotechnical analysis and review of documented failures, the Corps was not able to certify that the levee system would contain the Standard Project Flood (SPF) and satisfy the legal requirements set forth in the Code of Federal Regulations, National Flood Insurance Program (1 October 2003 edition, Article 44, Section 65.10, Mapping of Areas Protected By Levee Systems). The assumptions that were part of the original project design did not completely identify the potential failure modes that impact this levee system. Although the original design accommodates flood flows at the SPF level of flood protection (160,000 cfs), it did not address the failure mode of directly impinging flows from the meandering low flow during moderate flood events. Over the last four decades, these impinging flows have resulted in one complete breach and several near breaches of the levee system. In the early 1980s, the Corps attempted to remedy this condition by designing and constructing an extensive system of groins and training fences located at points of probable impingement. However, these mitigation measures did not perform as expected, and the potential failure condition remains. The chronology of the past corrective actions is discussed in the 2009 EA/MND and SDDR.

The 2009 SDDR described a design deficiency in the Santa Maria Levee that makes the levee vulnerable to breakage from impinging flows. The 2009 EA/MND analyzed impacts to environmental resources along the 6.5-mile-long levee, which is divided into Reaches 1, 2, and 3. The extent of the project described in the 2009 EA/MND and 2009 SDDR began at the downstream end of Reach 1 (Blosser Road) and ended at the upstream end of Reach 3 (upstream of the confluence of Bradley Canyon channel). The repair of Reaches 1, 2, and 3 has been completed.

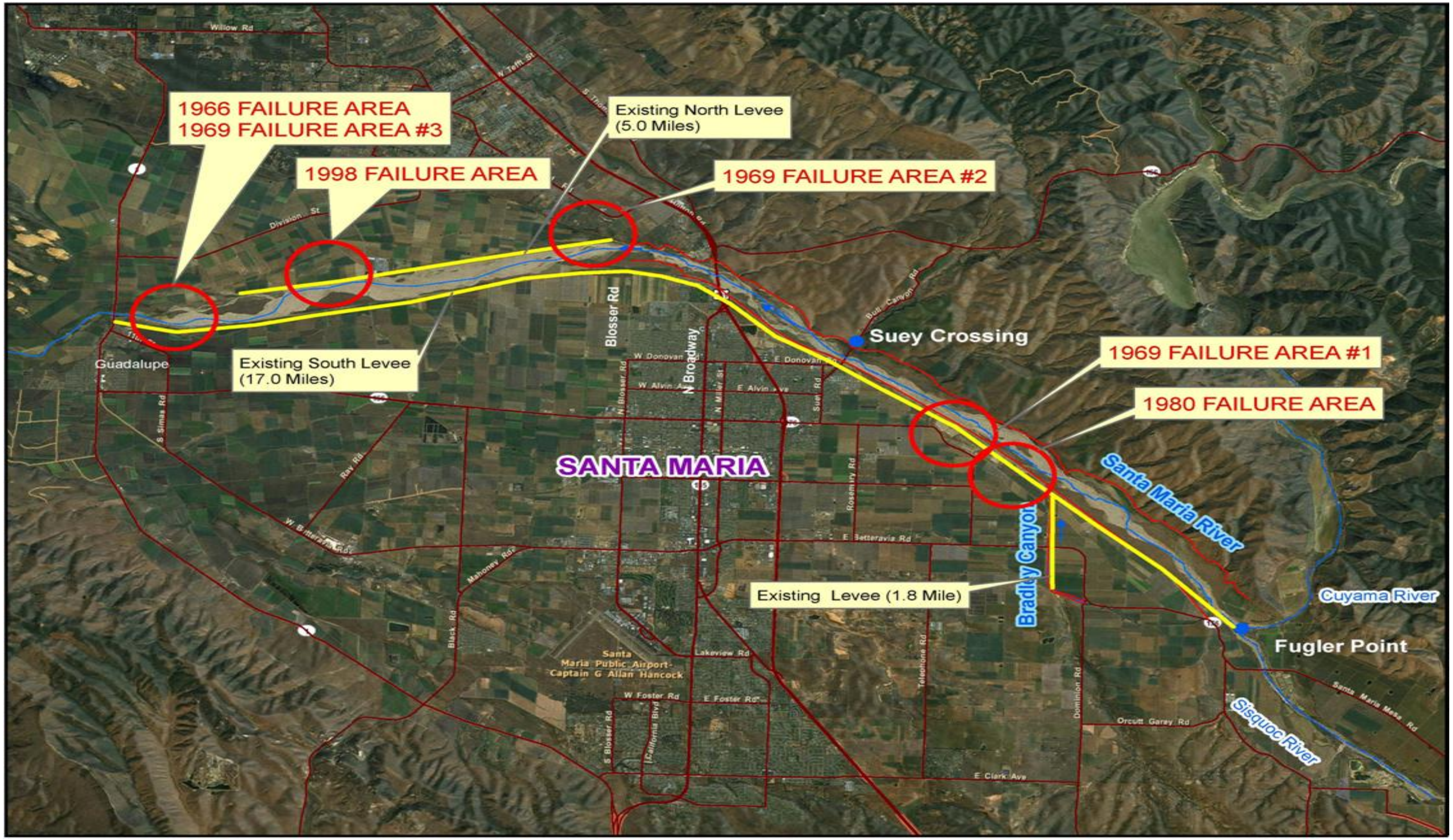

Figure 1-1.1: Historical Location of Damages

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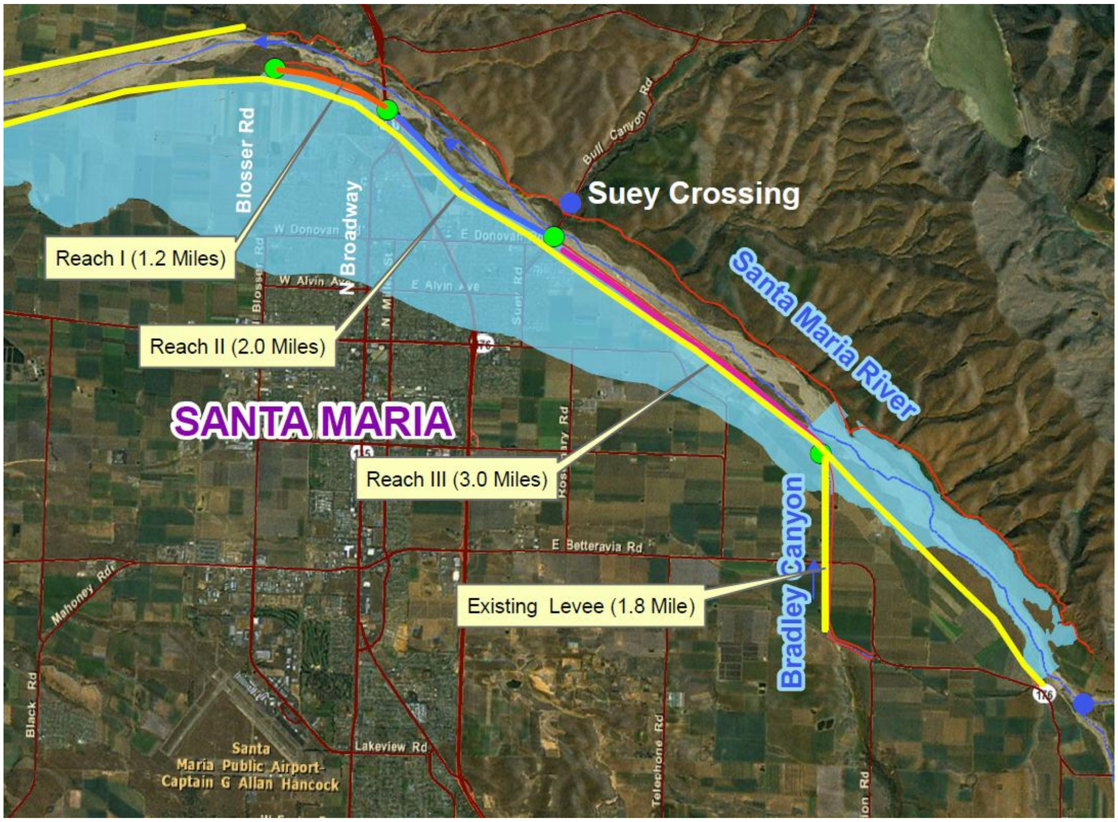

Figure 1-1.2: Map depicts flows of 30,000 cfs for Santa Maria Levee that would Breach Upstream of Bradley Canyon

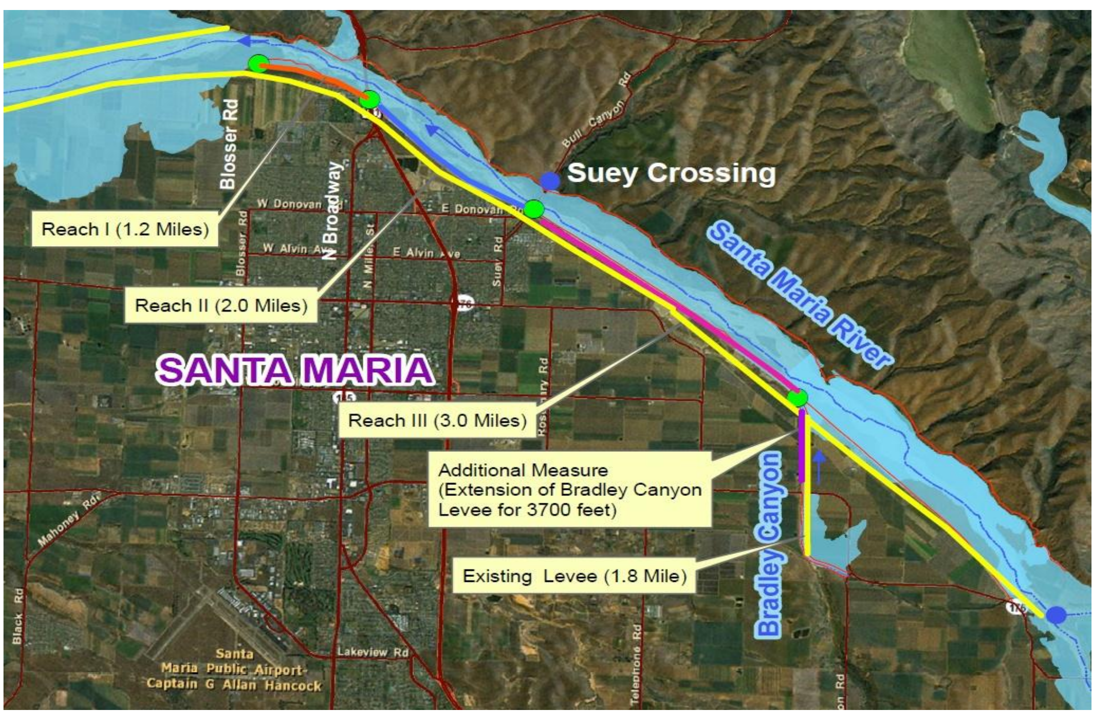

Figure 1-2.1: Project location of Reaches 1, 2, and 3 and the proposed Bradley Canyon Project

In 2011, the Corps performed a subsequent hydraulic analysis on the Santa Maria River Levee system upstream of the Bradley Canyon confluence (SDDR Addendum 2011). The hydraulic analysis indicates that, despite the lack of historical evidence, the potential exists for impinging flows to act on the southern levee upstream of Bradley Canyon. This analysis included an examination of the topography of the Santa Maria riverbed which indicated that the upstream riverbed is susceptible to low flow meanders. Because the levee upstream of the Bradley Canyon confluence was constructed with the same design as the downstream levees, they are in danger of breaching due to the impinging low flows. The hydraulic analysis determined that, should a breach occur along the upstream Santa Maria River levee during a high flow event, flows proceeding through the breach would attack the Bradley Canyon Levee and possibly overwhelm the levee and cause it to fail. If the Bradley Canyon Levee failed, in this scenario, approximately 30,000 cfs could inundate the development downstream as shown in Figure 1-1.2.

1.5. OBJECTIVES

The main objective of the proposed Project is to correct the deficiency and provide the SPF level of flood protection to the City of Santa Maria which would protect the lives and properties (homes and businesses) of individuals residing in the vicinity of the Project area. Other objectives are as follows:

- The action should be technically feasible, constructible, durable, and meets engineering and environmental criteria.
- Protect lives and property of the Santa Maria residents from flooding.
- Minimize or avoid impacts to environmental resources.

1.6. NEED AND PURPOSE OF PROJECT

Based on the additional hydraulics analysis discussed above, failure of the Santa Maria River Levee upstream of Bradley Canyon could result in flows impinging on the Bradley Canyon Levee, causing a break in the Bradley Canyon Levee and flooding of the developed area of the City of Santa Maria. The completion of the soil cement and sheet pile revetment along the existing levees has mitigated the potential for future breaches of the levee system along Reaches 1, 2 and 3. However, despite the project on Reaches 1, 2 and 3, the City of Santa Maria will not fully realize the benefits of the original authorized project until the additional failure mode is addressed.

The purpose of the proposed Project is to provide SPF level protection to the City of Santa Maria from the upstream failure mode.

1.7. COORDINATION AND AVAILABILITY OF FINAL SEA/MND

1.7.1. Availability of the Final SEA/MND

This Final SEA/MND will be made available to the public and governmental agencies. A distribution list is included in section 9 of this Final SEA/MND. Copies of the Final SEA/MND will be available in the offices of the Corps, at the various libraries listed below, and on the Corps' website.

U.S. Army Corps of Engineers
CESPL-PD-RN
Los Angeles District
915 Wilshire Blvd.
Los Angeles, CA 90017

The library locations are:

Santa Maria Library
420 S. Broadway
Santa Maria, CA 93454

City of Santa Barbara Library
40 E. Anapamu St.
Santa Barbara, CA 93101

1.7.2. Resource Agency Coordination

The lead agencies have interacted with the United States Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration's National Marine Fisheries (NMFS), the California Department of Fish and Game (CDFG), and the California Regional Water Quality Control Board (RWQCB) for purposes of identifying issues and topics presented in this Final SEA/MND. A summary of coordination is provided in the following paragraphs.

1.7.2.1. USFWS

Since March 2010 the Corps has coordinated with the USFWS regarding the effects of the proposed Project on the federally listed species managed by the USFWS. The Corps initiated formal consultation under section 7 of the Endangered Species Act on April 27, 2011. A non-jeopardy biological opinion was issued by the USFWS on October 27, 2011, a copy of which is included in Appendix I.

1.7.2.2. NMFS

In June 2010, the Corps initiated informal discussions with NMFS regarding steelhead trout and its designated critical habitat within the Project area. The Corps has preliminarily determined the proposed Project would have "no effect" on steelhead trout and its designated critical habitat.

1.7.2.3. CRWQCB

The Corps initiated coordination with the CRWQCB in February 2010. The CRWQCB indicated that because the Corps has an existing Clean Water Act Section 401 Water Quality Certification [(WQC) Certification Number 34209WQ12**]** for the original Santa Maria River Levee Repair Project for Reaches 1, 2, and 3, it is appropriate to amend the existing Section 401 WQC to include the proposed Project. After submitting additional information about the proposed Project to the CRWQCB on September 23, 2010, the CRWQCB issued an amended 401 WQC to include the proposed Project. Following the Corps' November 1, 2011 request, the CWA section 401 WQC was further amended by the CRWQCB on November 14, 2011 to be consistent with the mitigation measures described in the SEA (Appendix G).

1.7.2.4. CDFG

The lead agencies interacted with the CDFG during the CRLF protocol surveys, which included discussion on methodology and scope of the proposed surveys during the winter of 2010 and Streambed Alteration Agreement (SAA). The Corps has discussed avoidance and minimization measures for the CRLF during construction of the proposed Project. Coordination between the SBCFCWCD and CDFG is ongoing related to the SAA. Prior to project construction the SAA would be obtained by the SBCFCWCD.

2. PROPOSED PROJECT AND ALTERNATIVES

2.0. INTRODUCTION

This section identifies and describes alternatives pursuant to NEPA and CEQA requirements. **Subsection 2.1** discusses the regulatory setting for the alternatives analysis presented herein. **Subsection 2.2** describes the alternatives analyzed in this Final SEA/MND. **Subsection 2.3** presents alternatives that were considered, but rejected from further analysis in the Final SEA/MND, and explains the reasons for the exclusion of such alternatives. The environmental impacts of the proposed Project (Alternative 2A) and the alternatives are discussed by environmental issue in **Section 4** of this Final SEA/MND. A comparative impact assessment of the alternatives, including the proposed Project, is provided at the end of **Section 4** of this Final SEA/MND.

2.1. REGULATORY SETTING

The purpose for a project can be met in a variety of ways. However, these alternative ways of implementation would likely differ in how well they achieve the project purpose, their feasibility, and their impacts. The approach and requirements for alternatives analysis are slightly different depending on Federal and state regulations.

Both NEPA and CEQA require the analysis of alternative ways of implementing a project. NEPA's requirements for an alternatives analysis are found in the Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR 1502.14), and CEQA's are found in CEQA Guidelines section 15126.6. Under NEPA, the range of alternatives required to be evaluated is governed by the rule of reason, which requires an environmental assessment to set forth only those alternatives necessary to permit a reasoned choice. An environmental assessment must rigorously explore and objectively evaluate a reasonable range of alternatives as defined by the specific facts and circumstances of the proposed project. Alternatives must be feasible and consistent with the statement of purpose and need. Feasible alternatives are those that can be carried out based on technical, economic, and environmental factors, as well as common sense (40 C.F.R. § 1502.14; Forty Most Asked Questions Concerning CEQ's NEPA Regulations No. 2a). If alternatives have been eliminated from detailed study, the environmental assessment must briefly discuss the reasons for their elimination. In addition, under NEPA, the alternatives analysis should present the environmental impacts of the proposed project and the alternatives "in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public." (40 C.F.R. § 1502.14.) The "No Action" alternative must be included among the alternatives analyzed. The federal lead agency also should identify its preferred alternative.

In addition to the NEPA alternatives analysis, the Corps is required to analyze alternatives pursuant to the Clean Water Act (CWA) section 404(b)(1) Guidelines (40 C.F.R. Part 230). Under those Guidelines, the Corps is required to identify and determine the least environmentally damaging practicable alternative (LEDPA). Appendix A of the Final SEA/MND contains the "Final CWA Section 404(b)(1) Evaluation" prepared pursuant to the Guidelines. The Final CWA Section 404(b)(1) Evaluation is intended to assist the Corps in complying with the Guidelines in connection with its decision whether to proceed with the proposed Project or an alternative to the proposed Project.

The range of alternatives under CEQA is similarly governed by the rule of reason. The State CEQA Guidelines section 15126.6 states that the environmental document must describe a "range of reasonable alternatives" to the project or its location, which would feasibly attain most of the project objectives while avoiding or substantially lessening the effects of a proposed project, and evaluate the comparative merits of each alternative. The environmental review must consider a reasonable range of alternatives that will foster informed decision making and public participation, and should identify any alternatives that were considered but rejected as infeasible and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from further detailed consideration are: (a) failure to meet most of the basic project objectives; (b) infeasibility; or (c) inability to avoid significant environmental impacts. A MND must include a "No Project" alternative, similar to the "No Action" alternative required under NEPA. The description of each alternative must be sufficient to allow meaningful evaluation and comparison with a proposed project. The lead agency also must identify the environmentally superior alternative.

CEQA Guidelines section 15126.6(e)(1) indicates that the No Action alternative is not the baseline for determining whether the proposed Project's environmental impacts may be significant unless it is identical to the existing environmental setting. CEQA Guidelines section 15126.6(3)(2) further indicates that the No Action analysis should discuss the existing conditions at the time the Initial Study is published, as well as what would be reasonably expected to occur in the foreseeable future if the action were not approved, based on current plans and consistent with available infrastructure and community services.

2.2. PROJECT ALTERNATIVES (ALTERNATIVES CONSIDERED FOR ENVIRONMENTAL ANALYSIS)

As described further in the 2011 SDDR Addendum, two options were identified to provide SPF level of protection and to prevent the City of Santa Maria from flooding during events. Option 1 is the repair of 17,000 feet of the main Santa Maria River Levee from the Bradley Canyon confluence upstream to Fugler's Point and 650 feet within Bradley Canyon. Option 2 is the extension of Reach 3 bank protection along Bradley Canyon Levee for a length of 3,700 feet (Figure 2-1.1). Both sites would meet the project purpose of protecting the City of Santa Maria at the SPF level from the upstream failure mode. As in subsection 2.3 below, Option 1 alternatives were eliminated from further consideration in this Final SEA/MND. Consequently, four alternatives have been carried forward for detailed analysis in this SEA/MND, including the No Action Alternative. These alternatives are:

- No Action alternative
- Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement;
- Alternative 2B: Stabilize 3,700 feet of Bradley Canyon Levee with Soil Cement; and
- Alternative 2C: Stabilize 3,700 feet of Bradley Canyon Levee with Sheet Pile.

Each of the alternatives is summarized further below so that reviewers may evaluate the comparative merits of the proposed Project (Alternative 2A) and the other identified alternatives.

Figure **2-1.1** : Options 1 and 2 (Looking Upstream)

2.2.1. No Action Alternative

Under the No Action Alternative, no Federal participation from the Corps to provide additional flood risk management to the study area would occur. The “future without-project” would present a safety hazard to the surrounding area (Figure 2-2.1). Should a breach occur along the upstream Santa Maria River Levee during a high flow event, flows proceeding through the breach would attack the Bradley Canyon Levee and possibly overwhelm the levee and cause it to fail. The resulting flood flows could produce devastating impacts to the surrounding community, including significant loss of life of individuals residing within the city of Santa Maria. The No Action Alternative would be inconsistent with the city of Santa Maria Safety Element and the county of Santa Barbara Seismic Safety and Safety Elements, which call for the maintenance of flood control facilities to ensure adequate capacity. Additionally, the viability of existing and planned land uses would not be consistent with land use policies identified in the General Plans of the city of Santa Maria and Santa Barbara County.

If no action occurs, the SBCFCWCD may implement the following action plan during the flood season: 1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern, 2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee, and 3) developing a detailed flood fighting response plan. This action plan would provide immediate but temporary protection to the levee from the effects of meandering low flows and help facilitate timely and aggressive flood fighting of larger flows with sufficient quantities of large rock.

Continuing ad-hoc maintenance to reduce risk of a levee breach would be more environmentally damaging than implementing the proposed Project.

2.2.2. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement (Preferred Alternative – Proposed Project)

This alternative involves repairing 3,700 feet of the Bradley Canyon Levee. This alternative consists of repairing the levee using sheet pile and soil cement. Approximately 1,000 feet of sheet pile would be installed in areas supporting riparian habitat and the remaining 2,700 feet would be repaired using soil cement (Figure 2-2.5). The ground-disturbing construction activities due to soil cement include clearing and grading for levee preparation, expanding or widening access roads, and temporary diversion of Bradley Canyon channel. The construction processes for sheet pile and soil cement are provided in the following sections below (sections 2.2.2.1 thru 2.2.2.5). Future operation and maintenance activities associated with this alternative are discussed in section 2.2.2.6. This alternative costs $8,400,000.000 to construct.

2.2.2.1. Sheet Pile Component of Alternative 2A

Under this alternative, a 1,000-foot-long section of the levee would be repaired with sheet pile to avoid impacts to riparian habitat and it would also reduce impacts to waters of the United States. The sheet piling consists of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier as shown in Figure 2-2.2 below. The top of the levee would require minimal excavation to provide access to install the tiebacks and a concrete pile cap. No excavation is proposed within the riverbed.

2.2.2.2. Soil Cement Component of Alternative 2A

The upstream end of the sheet pile extension would transition into a soil cement revetment for 2,700 feet along the inside face of the levee. The Corps would excavate 15 feet below the existing grade and would extend upward at 2H:1V slope along the inside face of the levee until the top of the revetment matches the top of the existing levee. The excavation would extend down 15 feet at a 2H:1V slope, extending laterally approximately 80 feet from the toe of the levee within a 120 foot wide temporary construction easement (TCE) corridor to protect against the estimated scour depth as shown in Figure 2-2.4 below.

The proposed revetment would extend approximately seven feet below the existing riprap revetment. The existing riprap revetment would not be removed from the inside face of the levee prior to placement of the soil cement. The soil cement would be installed on top of the existing riprap. The batch plant would be located outside of the channel (Figure 2-2.6). The soil cement would be compacted in 1-foot-thick and a minimum of 8-foot-wide layers. This operation would be repeated until the soil cement reaches the top of the levee. Once the soil cement is installed, the excavation area would be backfilled with the earthen fill material that is not utilized for the mixing of the soil cement. Because the volume of soil cement below the surface of the ground would reduce the volume of back fill needed, the backfill would only be a few inches shallower than the original channel bed elevation. Soil cement is a densely compacted mixture of cementitious material, soil aggregate, and water. The mixture is compacted to form a hardened structure

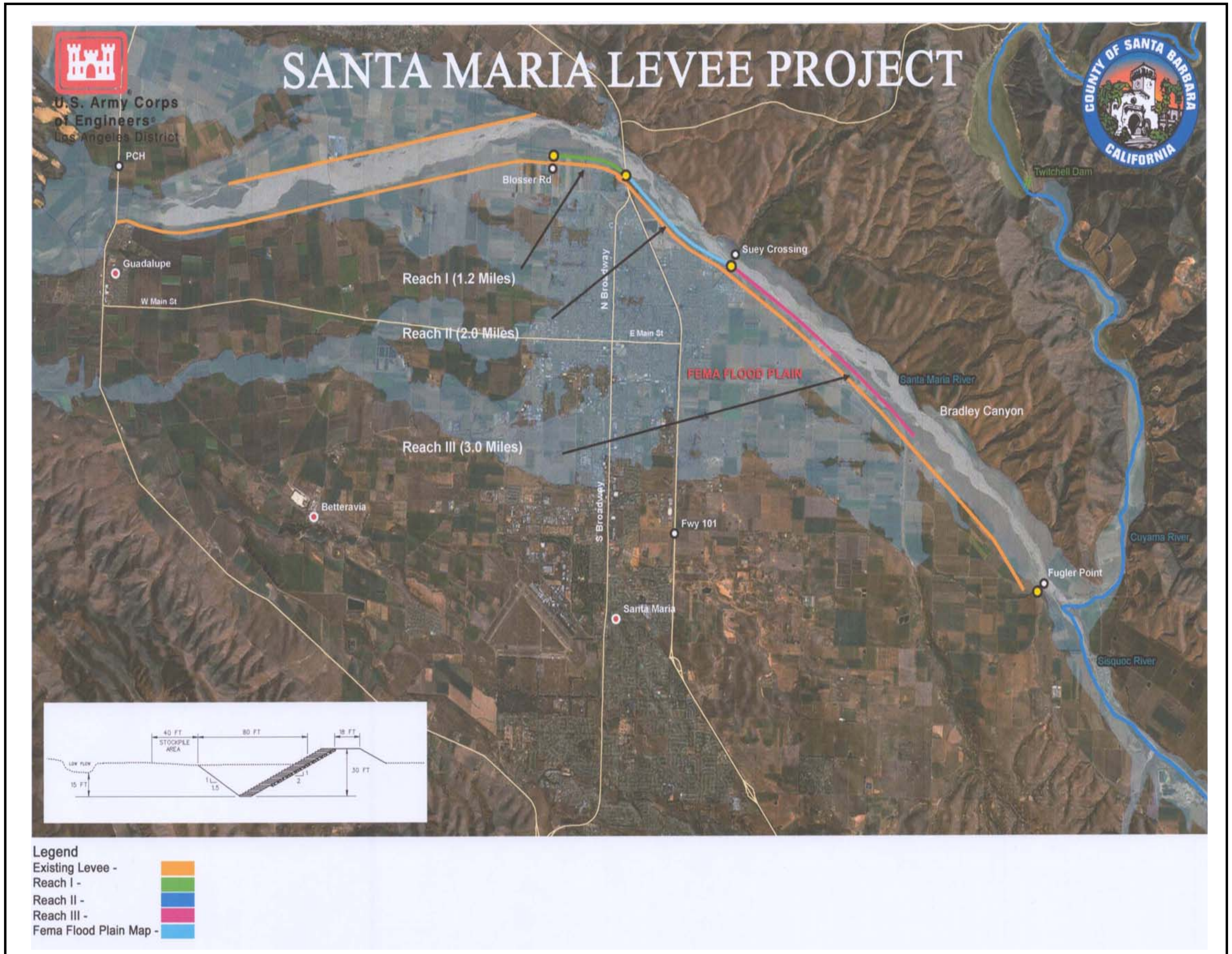

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Figure 2-2.1: FEMA Flood Plain Without Project Condition

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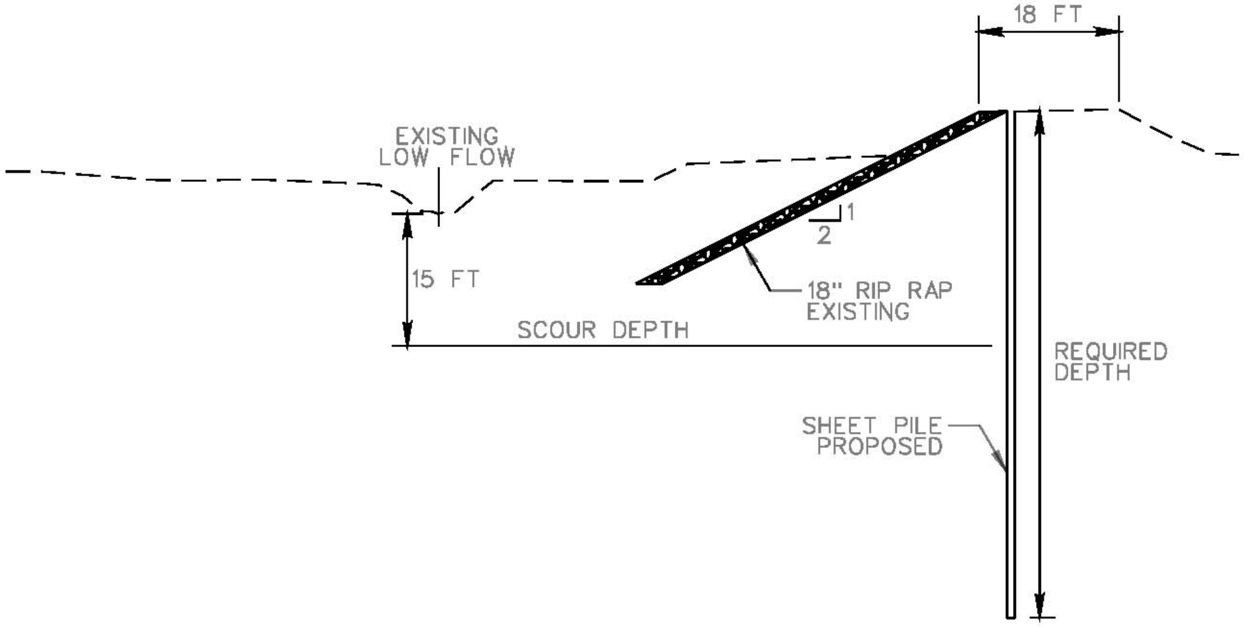

Figure 2-2.2: Typical Cross Section of Sheet Pile Component

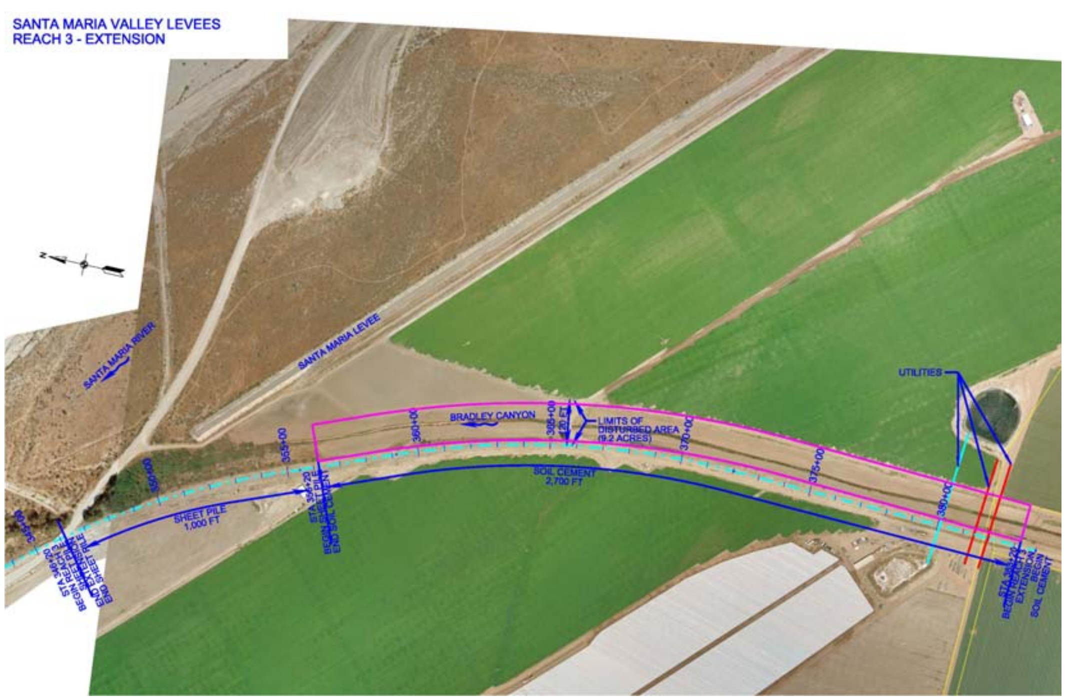

Figure 2-2.3: Proposed Project Footprint

with specific engineering properties. Soil-cement is useful as a liner because the material has higher compressive strength and lower hydraulic conductivity than the non-cemented soil. The soil cement slope protection is economically attractive in Santa Maria because suitable rock is not available within economical haul distances.

Installation of soil cement would include the following main steps: (1) Temporary diversion of the low flow Bradley Canyon channel within the 2,700-foot-long soil cement construction project area by constructing a temporary diversion channel (Figure 2-2.4 and Figure 4.3-1); (2) Clearing and grubbing vegetation within an area 120-feet wide by 2,700-feet-long within the soil cement section of the Project area; (3) Relocating a 12-inch diameter irrigation water line and two oil pipelines (Figure 3.12-1) located within the 120 foot TCE; (4) Excavating approximately 90,000 cubic yards of material from the channel to construct the soil cement revetment. Approximately 36,000 cubic yards of imported borrow material would also be utilized in the soil cement mixture. After the soil cement revetment is constructed, approximately 80,000 cubic yards of fill material would be needed to backfill to original grade. It is anticipated that approximately 30,000 cubic yards of fill material would need to be imported from onsite, but outside of the channel; (5) Mixing soil/sand with concrete to create soil cement at the upland portable batch plant near the Project area; (6) Trucking soil cement from the portable batch plant to the construction area; (7) Benching the face of the exposed slope with soil cement; and (8) Backfilling soil/sand and restoring low flow channel.

Implementation of Alternative 2A would result in 0.5 acre of permanent impacts and 6.35 acres of temporary impacts. To compensate for the 0.5-acre of permanent impacts, approximately 0.5 acre of native riparian habitat would be established adjacent to existing riparian habitat, on land owned by the SBCFCWCD. Temporary disturbed areas would be restored by re-vegetating with a native grass seed-mix in areas outside of the SBCFCWCD routine maintenance area. The 0.61 acre of temporary impact to the active channel rerouted for construction would be returned to pre-construction contours and the original alignment.

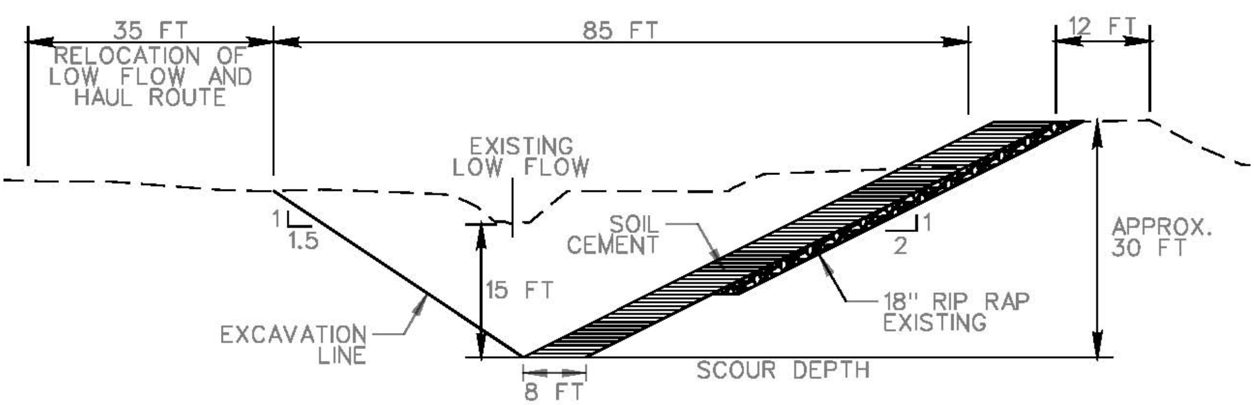

Figure 2-2.4: Typical Cross Section of Soil Cement Component

2.2.2.3. Temporary Diversion Channel

Currently, the Bradley Canyon channel within the TCE is located approximately 40 to 50 feet away from the toe of the Bradley Canyon Levee, and is approximately 10 feet wide and 3 to 4 feet deep (shown in Figure 2-2.4 and Figure 2-2.5). A temporary diversion channel would be created along the soil cement section of levee repair (2700-foot-long) to avoid construction activities and equipment movement within the existing Bradley Canyon low flow channel. The temporary diversion channel would be approximately 40-60 feet away from the existing alignment of the Bradley Canyon channel towards the eastern edge of the TCE. A temporary water diversion plan would be developed and followed throughout the construction period. Construction of the water diversion channel would be monitored by a USFWS-approved, biologist and the diversion channel would be maintained to minimize impacts to the California red-legged frog (CRLF) and to water quality. Upon completion of construction, the low flow channel would be restored to its original position and contours (shown in Figure 2-2.4 above and Figure 4.3-1).

Figure 2-2.5: Current View of the Bradley Canyon Channel and Habitat on site

2.2.2.4. Construction Duration

Construction is estimated to commence by 2012 and continue for 8 to 12 months unless delayed by weather or project-specific technical, mechanical, and funding constraints.

Prior to initiation of construction, vegetation within the TCE would be cleared and grubbed and the Bradley Canyon low flow channel diverted around the construction area to minimize/avoid impacts to CRLF and water quality. To minimize temporary construction impacts to wildlife, vegetation clearing and grubbing would be performed prior to migratory bird breeding season (February 15 thru September 15) and CRLF breeding season (December 1 through March 31). Sheet pile installation and soil cement placement on the existing rip-rapped levee may proceed concurrently during April 1 through November 30 to avoid/minimize impacts to CRLF. Sheet pile installation would require 2 to 3 months. Soil cement installation would require 6 to 8 months.

2.2.2.5. Batch Plant, Staging and Borrow Areas, Construction Equipment and Hours

Batch Plant and Staging Area

The upland portable batch plant and the staging area for soil cement and sheet pile would be located adjacent to the existing landfill facilities outside of the channel on the landside area (Figure 2-2.6). This location was utilized as the batch plant and staging area for construction of the Reach 3 levee repairs. The area is mostly devoid of vegetation with patches of non-native grassland and barren land. Proposed construction hours would be 7:00 A.M. to 6:00 P.M., Monday through Friday.

Borrow Material

This alternative would require approximately 90,000 cubic yards of material to be temporarily excavated from the TCE in order to construct the soil cement revetment. Approximately 36,000 cubic yards of imported borrow material would be utilized in the soil cement mixture. After the soil cement revetment is constructed, approximately 80,000 cubic yards of borrow material would be required to backfill to original grade. It is anticipated that approximately 30,000 cubic yards of fill material would be required to be imported from the upland side of Reach 3 with the coordination of the City of Santa Maria.

Construction Equipment

Construction equipment for the proposed soil cement would include one bulldozer, three scrapers, four dump trucks, one hydraulic excavator, one skip loader, one vibratory roller, and one water truck. Construction equipment for the proposed sheet pile would include one pile driver, crane, and material handling equipment. All construction equipment would be able to access the sheet pile operations from the haul route/ maintenance road on top of levee.

Haul/Access Road

The levee can be accessed at various locations, including: (1) To the east end of Bradley Canyon via gated entry from Betteravia Road (Foxen Canyon Road) to the top of levee, and (2) also via a gated entry at the east end of the active Santa Maria Regional Landfill, adjacent to the levee. The access/ maintenance road may be temporarily widened on the upland side of the levee by approximately 10 feet to accommodate the width of the equipment that will be used to install the sheet pile. The temporary fill will be removed after construction.

2.2.2.6. Future Operation and Maintenance

The constructed levee in Bradley Canyon would require periodic maintenance after a large storm event. The maintenance work would have to be accomplished quickly because of the public safety concerns. The SBCFCWCD would conduct all Operations and Maintenance (O&M) activities associated with this alternative that are contained in the Operation, Maintenance, Repair, Rehabilitation and Replacement (OMRRR) Manual for Santa Maria Valley Levees and Channel Improvements. Any required permits would be obtained by the SBCFCWCD from the Resource Agencies and the Corps' Regulatory Division prior to commencement of the O&M activity.

Operation of the levee includes the following:

Mobilization

Responsibility for providing sufficient equipment, material, and trained personnel for adequate operation of the project units in times of flood emergency.

U.S. Army Corps
Of Engineers
Los Angeles District

Figure 2-2.6: Proposed Batch Plant and Staging Area on the Upland Side of the Proposed Bradley Canyon Levee Extension Project

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Coordination

Appropriate measures are to be taken to insure that the activities of all local organizations connected with the protective works are coordinated with the operating agency during flood periods.

Inspection

Scheduled patrolling of flood control activities during periods of storm runoff in order to detect and correct any condition which endangers the structure. Also included is a complete inspection following each major high water period, to ascertain if any other damage has occurred.

Multi-Purpose

All uses of flood control facilities which do not involve conveyance of storm runoff. They include, but are not limited to, water conservation, wetland/wildlife habitat, water quality functions, and development for increased land utilization.

Maintenance along the Sheet Pile Segment:

Inspection and Repairs

Inspections shall be made as are necessary to insure that the flood control facilities are maintained in a properly functioning condition. This task includes maintaining portions of sheet pile infrastructure that may result in a reduced potential for scour event to create erosion and a vertical wall which would introduce a public safety hazard related to flooding, pose a barrier to wildlife passage, and result in maintenance activities in waters of the United States as specified in the 2009 SDDR and 2011 SDDR Addendum. Levee inspection is required after each major storm. Any damage may require repair immediately.

Staging areas

Staging areas designated by SBCFCWCD would be outside of the river bed.

Temporary maintenance zones

All maintenance activities would be completed within the maintenance access roads of SBCFCWCD owned right of way.

Equipment

Maintenance equipment may include dump trucks, hydraulic excavators, and track loaders.

Borrow material location

No borrow area or borrow material for maintenance activities shall be located in the channel.

Maintenance along Soil Cement Segment:

The soil cement portion of the recommended alternative would require less maintenance because the levee would be protected from the near breaches that have plagued the original project in the past. During scour event similar to those on record, the impinging flows would erode the channel invert. The resulting erosion would only expose the soil cement to its 2H:1V slope. The levee itself would be completely untouched and intact. The only maintenance required would be simply to re-grade the riverbed to fill the scoured area without any compaction requirements. If this maintenance operation were to be delayed, there would be no pressing need for the operation to occur unless there were environmental concerns.

Access points

Access to the Project area is via the south end of the project through a gated entry at Betteravia Road (Foxen Canyon Road).

Staging areas

Staging designated by the SBCFCWCD would be outside of the channel.

Temporary maintenance zones

All maintenance activities can be completed within the maintenance access roads of SBCFCWCD owned right of way.

Equipment

Possible maintenance equipment may include one belly dump trucks, one hydraulic excavator, and one skip loader.

Water Diversion

Water diversion may be necessary to perform the maintenance activities.

2.2.3. Alternative 2B: Stabilize 3,700 feet of Bradley Canyon with Soil Cement

This alternative consists, essentially, of overlaying the original riprap revetment with a new continuous revetment of soil cement. Through excavation of the channel bed immediately adjacent to the levee, the levee slope of two feet horizontal to one foot vertical (2H:1V) would extend down to the required scour depth. This alternative would result in 0.7 acre of permanent loss of habitat and 9.5 acres of temporary impacts to habitat, of which impacts to 3.0 acres would be to native vegetation consisting of mature arroyo willow, mulefat, and some upland habitat, which may support federally listed species such as least Bell's vireo and CRLF. Details about construction of the soil cement are provided in section 2.2.2.2 above. This alternative would cost $3,592,000.00 to construct.

2.2.3.1. Future Operation and Maintenance

The SBCFCWCD would conduct all Operations and Maintenance (O&M) activities associated with this alternative that are contained in the OMRRR Manual for Santa Maria Valley Levees and Channel Improvements. Any required permits would be obtained by the SBCFCWCD from the Resource Agencies and the Corps' Regulatory Division prior to commencement of the O&M activity. Maintenance of soil cement would be very similar to that described in Section 2.2.2.6 above.

2.2.4. Alternative 2C: Stabilize 3,700 feet of Bradley Canyon Levee with Sheet Pile

Sheet pile walls consist of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. This method could be used without disturbing the existing vegetation and waters of the United States and would have minimal disturbance to the top of the levee. If the levee were to erode because of impinging flows, the steel sheet pile would form a vertical wall that would prevent the breach of the levee. However, in this eroded condition, the steel sheet pile must have the strength necessary to act as a retaining wall. This design scour would expose the sheet pile for a vertical height of up to 30 feet. The sheet pile would be driven approximately 69 feet deep to ensure anchorage should the scour be that extreme. Tiebacks would be required at 10-foot intervals located near the top of the sheet pile walls. Due to the relatively narrow levee cross section, a screw-type tieback anchor with concrete pile caps would be used. This alternative would cost $16,323,000.00 to construct.

2.2.4.1. Future Operation and Maintenance

The SBCFCWCD would conduct all Operations and Maintenance (O&M) activities associated with this alternative that are contained in the OMRRR Manual for Santa Maria Valley Levees and Channel Improvements. Any required permits would be obtained by the SBCFCWCD from the Resource Agencies and the Corps' Regulatory Division prior to commencement of the O&M activity. Maintenance of the sheet pile walls would be very similar to that described in Section 2.2.2.6 above.

Table 2-2.1 summarizes the impacts and costs associated with the action alternatives.

Table 2-2.1: Summary of Impacts and Costs of Action Alternatives

Action Alternatives	Permanent Impact to Waters of the US (Acre)	Temporary Impact to Waters of the US (Acre)	Cost of the Project ($) (Construction only with no contingency)	Affect T&E Species
Alternative 2A: Sheet pile and soil cement along 3,700 linear feet of Bradley Canyon Levee	0.5	6.35	8,400,000.00	Y, (CRLF) N, (Steelhead or its designated critical habitat) N, (LBV) N, (arroyo toad) N, (tidewater goby) N, (Southwestern willow flycatcher)
Alternative 2B: Soil cement along 3,700 linear feet of Bradley Canyon Levee	0.7	9.5	3,592,000.00	Y, (CRLF) N, (Steelhead or its designated critical habitat N, (LBV) N, (arroyo toad) N, (tidewater goby) N, (Southwestern willow flycatcher)
Alternative 2C: Sheet pile along 3,700 linear feet of Bradley Canyon Levee	0	0	16,323,000.00	Y, (CRLF) N, (Steelhead or its designated critical habitat) N, (LBV) N, (arroyo toad) N, (tidewater goby) N, (Southwestern willow flycatcher)

"Y" indicates that implementation of the alternative would affect federally threatened or endangered (T&E) species and/or designated critical habitat

"N" indicates that implementation of the alternative would not affect T&E species and/or designated critical habitat

"CRLF" = California red-legged frog
"LBV" = least Bell's vireo

2.3. ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

2.3.1. Alternative 1A: Stabilize 650 feet of Bradley Canyon Levee with Sheet Pile and 17,000 feet of Santa Maria River Levee with Soil Cement

This alternative would tie into the upstream end of Reach 3 for minimizing the risks associated with breaching the Bradley Canyon portion of the levee system and flooding the City of Santa Maria. Sheet pile would extend from the existing Reach 3 confluence to approximately 650- feet along Bradley Canyon to prevent flows from flanking the upstream end of the Reach 3 revetment and will connect with the downstream end of the existing Santa Maria River Levee. At this point, the sheet pile slope protection would transition to soil cement revetment for the remaining 17,000 feet along the Santa Maria River Levee as shown in figure below. This alternative will provide the City of Santa Maria and the agricultural land behind the 17,000-foot levee with the level of flood risk reduction intended in the original project.

The Santa Maria River levee was originally designed to contain flood flows at the SPF level. The design discharges were 160,000 cfs from the project inlet at the confluence of the Cuyama River and Sisquoc River to the confluence with Suey Creek; 155,000 cfs from Suey Creek to the end of the double levees; and 150,000 cfs from the end of the double levees to the downstream end of the project at California Highway 1. The design water surface profile computations to set the levee top elevations were based on a value of 0.035 for Manning’s roughness coefficient *n*. The computed depths of flow ranged from 6.3 to 12.6 feet. The maximum average velocities for the design of the levee revetment and toe protection were determined from water surface profile computations using an *n* value of 0.025. The computed average velocities ranged from 6.2 to 16.0 ft/sec. A minimum of three feet of freeboard was used to set the levee top elevations, except locally upstream of bridges where the freeboard was increased to four feet. The riprap revetment was designed for the maximum computed velocity of 16.0 ft/sec. The levee side slopes were set at two horizontal to one vertical (SDDR 2009).

This alternative would permanently impact 3 acres of the waters of the U.S. / native vegetation and would temporarily impact 42.9 acres of waters of the U.S. Temporary impacted areas would be restored to pre-project conditions to minimize temporal loss of physical and biological functions. By placing sheet pile in the downstream portion of the extension of Reach 3, direct impacts to the adjacent Santa Maria River would be avoided and indirect impacts to sensitive biological resources, including federally listed species, would be minimized.

The least Bell’s vireo has not been reported within the Alternative 1A project area but potential for least Bell’s vireo habitat occurs in a riparian area near the downstream reach of this alternative. Impacts to least Bell’s vireos may include disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities, particularly if sheet pile installation occurs during the breeding season for this species. However, it is very unlikely that vireo would be present in the project area based on 2009 and 2010 survey results. Therefore, the Corps has determined that this alternative would have no effect on the least Bell’s vireo. The tidewater goby is not expected to occur in the project area and would not be subject to project effects. Habitat to California red-legged frogs would not likely be present within this portion of this alternative and therefore would have no effect on red-legged frog. Steelhead would likely not be present within the construction area however designated critical habitat is present on site. Due to the amount of work being proposed the longevity of this alternative does not ensure that the proposed work would be conducted during the dry season. The Corps has made the determination that Alternative 1A would have impacts to drainage patterns and baseflow and may adversely modify steelhead critical habitat.

Indirect, adverse affects, such as downstream changes in turbidity levels, erosion/accretion patterns, water quality, habitat degradation, are not expected to occur from construction as most of this work takes place immediately adjacent to the levee, outside the main channel. Temporary construction impacts would result in short-term adverse impacts to noise levels, air quality, aesthetics and channel substrate. There would be no change to maintenance requirements post-construction that could impact steelhead. To further reduce potential effects, construction would be avoided in occupied portions of the river. Overall, this Alternative would have greater impacts to the aquatic environment when compared to the Alternative 2A. This alternative would meet the overall project purpose, but would result in a substantial increase in permanent and temporary impacts to waters of the United States which would include increased maintenance impacts when compared to Alternative 2A. As a result of the substantial increase in impacts to aquatic resources, this alternative would not represent the least environmentally damaging practicable alternative. As a result of the increase in impacts to aquatic/biological resources compared to the Alternative 2A, Alternative 1A was eliminated from further consideration.

2.3.2. Alternative 1B: Stabilize 650 feet of Bradley Canyon Levee with Sheet Pile and 17,000 feet of Santa Maria River Levee with Sheet Pile

Sheet pile wall would extend from the upstream end of existing Reach 3 by 650 feet along the Bradley Canyon levee. In addition, sheet pile will be installed along the entire 17,000-feet along Santa Maria River levee. The sheet pile can be installed without disturbing the existing levee and surrounding habitat in the riverside. However, if the levee were to erode because of impinging flows, the steel sheet pile would form a vertical wall that would prevent the breach of the levee. However, in this eroded condition, the steel sheet pile must have the strength necessary to act as a retaining wall. This design scour would expose the sheet pile for a vertical height of up to 30 feet. The sheet pile would be driven approximately 69 feet deep to ensure anchorage should the scour be that extreme. Tiebacks would be required at 10-foot intervals located near the top of the sheet pile walls. Due to the relatively narrow levee cross section, a screw-type tieback anchor with concrete pile cap would be used.

Construction of this alternative would result in no impacts to waters of the U.S. However, maintenance to repair scour from winter storms would result in repeated repair activities in waters of the U.S., resulting in potential long term adverse effects to native vegetation and other biological resources. Soil would be placed at the exposed sheet pile areas within the channel to ensure stability and maintain wildlife movement, which would result in substantial direct impacts to the waters of the U.S. Maintenance of the 17,650-foot-long levee would cause extensive impacts to waters of U.S and biological resources about four times greater compared to maintenance associated with the proposed Project. In addition, the erosion cycle and levee damage not only undermines the stability of the levee but poses a potentially significant public health and safety hazard. The sheet pile alternative could also introduce the potential for additional environmental impacts (wildlife, water, air, noise, and traffic) to occur over the lifetime of the project.

Although this alternative is feasible, this alterative does not reduce impacts compared to the proposed Project, and therefore has been eliminated from further consideration.

2.3.3. Alternative 1C: Stabilize 650 feet of Bradley Canyon Levee with Soil Cement and 17,000 feet along Santa Maria River Levee with Soil Cement

This alternative would apply 650 feet of soil cement from the upstream end of Reach 3 along Bradley Canyon. In addition, soil cement revetment will be constructed along the entire 17,000-foot Santa Maria River levee. Details about construction of the soil cement are provided in section 2.2.2.2 of this SEA/MND. This alternative would result in 3.2 acres of permanent loss and 45 acres of temporary impacts to waters of the U.S., which is approximately six to seven times greater than the proposed Project (Alternative 2A). Approximately 24 acres of the 45 acres of temporary impacts would impact native vegetation, consisting of willows, mule fat and coastal sage scrub. Although this alternative is feasible, it would result in a substantial increase in permanent and temporary impacts to waters of the United States when compared to the proposed Project. As a result of the substantial increase in impacts to aquatic resources, this alternative was eliminated from further consideration.

2.3.4. Alternative 2D: Stabilize 1,000 feet of Bradley Canyon Levee with Sheet Pile and 2-ton/3-ton Rock with Plantings along 2,700 feet of Bradley Canyon Levee

This alternative would reduce some of the loss of functions and services of waters of the U.S. associated with soil cement. It would tie into the upstream end of Reach 3 and would involve a segment of sheet pile (1,000 linear feet) transitioning into 2-ton/3-ton rock with plantings (2,700 linear feet) along 3,700 feet within the Bradley Canyon channel. Per Corps guidelines provided in Engineering Technical Letter -1110-2-571, vegetation cannot be planted within 15 feet of the toe of the levee. Planting of vegetation may affect the structural integrity and can reduce the visibility during inspection of the levee and could result in breaching the levee. With a potential levee breach, there would be a substantial elevation in flood risk and the public health, safety, and welfare of the city of Santa Maria. Trees and other woody vegetation, such as shrubs and vines, can create both structural and seepage instabilities, prevent adequate inspection, and create obstacles to maintenance, flood-fighting and flood-control activities. Vegetation must be controlled in the immediate vicinity of the levee to allow proper inspection surveillance and monitoring of all structures, allow access for normal emergency operations and maintenance activities, and to prevent root-related damage to structures. In addition, suitable rock is not available within economic haul distances. Consequently, this alternative was determined to be infeasible and eliminated from further consideration.

2.3.5. Alternative 2E: Construction of Bank Stabilization Behind Existing Bradley Canyon Levee

This alternative would utilize buried bank stabilization in upland areas outside of jurisdictional waters of the U.S. to minimize flood risk in the Project area. Buried bank stabilization is a relatively new method of bank protection, and has been utilized in several locations in the Santa Clara River as part of the Natural River Management Plan in Santa Clarita, Los Angeles County, California. This alternative would include the construction of a soil cement levee approximately 3,700 feet long that would be installed in an upland area behind the existing Bradley Canyon levee. To construct the buried bank stabilization, a construction zone with a width of approximately 120 feet would be required. This alternative design would avoid direct impacts to waters of the U.S., the CRLF, and the southern steelhead. Although this alternative would avoid direct impacts to waters of the U.S. and other biological resources, it would require construction of a new soil cement levee (buried bank stabilization) and require land acquisition for the construction and maintenance of the levee. The new levee would also have to be connected to the existing Santa Maria levee, which would require modification to the existing levee in Reach 3, without compromising the level of protection provided by the existing levee system.

However, this alternative was discarded because this project is undertaken as a design deficiency and under such a project the scope is generally limited to existing features.

2.3.6. Alternative 2F: Soil Cement of the Landside of Bradley Canyon Levee

This alternative considers leaving the existing Bradley Canyon levee system in place and reinforcing the structure with soil cement embankment protection from the landside of the levee. To reduce impacts to waters of the U.S., this alternative design would limit the placement of soil cement to upland portions of the levee by reinforcing the land side of the existing levee. This alternative would reduce direct and indirect impacts to jurisdictional waters of the U.S., but would not eliminate all impacts. In addition, with this alternative design, direct impacts to the CRLF and the southern steelhead would also be minimized. This alternative would require permanent and temporary acquisition of land to construct the protection. In addition, there are engineering concerns associated with this design because all levee reinforcement would occur on the land side of the structure with no reinforcement to the toe or other sections of the levee. In addition, if flows from the Santa Maria River and Bradley Canyon erode the existing riprap bank protection, then the earthen-filled levee will be vulnerable to further fill erosion. If the riprap bank protection is eroded, the levee’s compacted fill material is eroded and the designed scour condition exists, then the soil cement would be exposed, subjected to a surcharge load and have no support underneath thus placing the soil cement mass in a cantilever position. In a cantilever position, the soil cement mass may fail due to its own weight and surcharge, thus, leaving the City of Santa Maria vulnerable to flooding. In a case where the material under the soil cement is eroded but the soil cement does not fail, the stability of the soil cement would be uncertain, which would create safety concerns. Maintenance vehicles would not be able to drive on top of the levee to assess or repair the damage to the levee. Finally, when rebuilding the eroded levee, proper compaction of the fill under the soil cement is unobtainable. The maintenance of the levee during each storm season could cause substantial impacts to biological and water resources. Therefore, this alternative is not considered feasible from a technical point of view and was eliminated from further consideration.

2.3.7. Alternative 2G: Jet Grouting of the Bradley Canyon Levee

This is a versatile ground modification system used to create in-situ cemented geometries of soilcrete. Ultra high-pressure binders (water cement mixture) would be injected into the core of the levee at high velocities. This water cement mixture would break up the soil structure completely and mix the soil particles in-situ to create a homogeneous mass, which would solidify. Concerns exist over the potential for blowouts during the jetting operation. This soilcrete mass would resist scour and thereby protect the levee. The mass would need to be designed to act as a gravity wall in the event the levee was eroded back to the soilcrete mass. This would require a very large zone of soilcrete within the levee. Once the overlying soil is eroded, then there would be a concrete embankment exposed that would present both a safety concern and a visual impact. Therefore, this alternative method to strengthening the levee was eliminated from further consideration.

2.3.8. Alternative 2H: Gabion Mattresses on Bradley Canyon Levee

Gabions are wire fabric containers that interconnect with other similar containers and are filled with onsite stone to form monolithic structures. The rock that fills these mattresses is typically smaller than what would be required for riprap. These mattresses would be laid end to end and side to side on the prepared levee bank to form a continuous mattress. Practical application of this erosion control method is generally limited to areas with intermittent flows and small drainage areas. In addition, the wire would most likely break due to abrasion and corrosion after several years and the relatively small rock from a broken gabion is washed away fairly easily. Disadvantages of this measures include: labor intensiveness to construct; on-site fabricating may increase construction cost and delay the construction schedule; requirement for excavation and possibly de-watering; wire baskets are susceptible to abrasion and corrosion; materials and construction are variable and require close quality control; requirements for regular inspection and maintenance; visibility of wire to the public; and revegetation is not recommended and existing riprap must be removed. As a result, this method would not reduce impacts to the waters of the United States or biological resources compared to the proposed Project. Therefore, this alternative was eliminated from further consideration.

2.3.9. Alternative 2I: Riprap on Bradley Canyon Levee

This is the revetment method currently used for the existing levee. This alternative would involve placing an additional layer of suitably large rock over the existing layer on the levee side slope, for the full height of the levee from the top down to the design scour depth. It is very difficult to obtain quality stone in the Project area (SDDR 2009). Obtaining quality stone would require long haul distances that would increase traffic and air quality impacts when compared to the proposed Project. Additionally, no adequate hydraulic design criteria is currently available to reliably determine the size and layer thickness of the riprap necessary to withstand the high erosive forces caused by impinging flow conditions. The rip-rap alternative would require the same excavation as soil cement and therefore would have the same impact on the environment (SDDR 2009). Technically, this measure may not provide the stability needed to prevent erosion of the levee, and it may require more frequent repair and additional costs. Therefore, this alternative was eliminated from further consideration.

2.3.10. Alternative 2J: Articulated Concrete Block on Bradley Canyon Levee

Articulating concrete block is an interlocking matrix of concrete blocks of uniform size, shape and weight connected by a series of cables which pass through pre-formed ducts in each block. Cost is heavily dependent on the price of Portland cement. Failures have been observed where a corner or edge of the mattress is undercut resulting in complete failure of the revetment. This alternative would require the same excavation as soil cement which would have the same impact on the environment. Evaluation of other Corps projects indicates that Articulated Concrete Blocks are subject to erosion and damage during high flood flow. Therefore, this alternative was not considered for further analysis.

3. EXISTING CONDITIONS

3.0. INTRODUCTION

This section describes the environmental resources that could be affected by the proposed Project. The resources include those that are typically evaluated under both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

This section describes the conditions within the Project area as they existed at the time that the Initial Study was issued. The most current information was used, which in some cases, may not correspond exactly to that date. This includes a description of the types of issues to be addressed in the subsequent analysis. It also includes a description of the study area for that resource. The study area is the geographical area within which Project-related impacts potentially could occur. For some resources, such as noise, impacts are highly localized and the study area includes only those locations close to or within the footprint of construction activities. Impacts on other resources, such as socioeconomics and air quality, would affect a broader region, and the description of the affected environment for these resources is necessarily broader, as well.

3.1. SOILS AND GEOLOGY

3.1.1. Soils

The Project site is located within an area of alluvial deposits and artificial fill materials which compose the levee and adjacent Santa Maria landfill and agricultural fields. The soils on the Project site are designated as sandy alluvial land (along and adjacent to the levee). The floor of the Santa Maria Valley, including the lower reaches of tributaries such as the Bradley Canyon drainage, is an alluviated plain of the Cuyama and Sisquoc Rivers. These rivers flow into one another near Fulger Point forming the Santa Maria River. The surface geology of the site consists mainly of units of floodplain alluvium (Qa) and channel deposits (Qg) associated with the river. Various rocks and formational materials crop-out or are mapped along the bluff and hillsides along the north side of the river and valley floor. These units typically consist of relatively thin units of stabilized dune sand (Qds) or older alluvial or terrace deposits (Qoa or Qt) overlying formational materials of Orcutt Formation (Qo), Paso Robles Formation (QTp), Careaga Sand (Tc), Monterey Shale (Tm), Obispo Tuff (Tot), and Franciscan mélange (KJfm). Locally the units are displaced by landslide deposits (Qls) or by faulting. Artificial fill materials (af) compose the levee embankments and roadways in the site vicinity.

3.1.2. Subsurface Conditions

The existing levee is an earthen embankment constructed on alluvium. The alluvium along the Santa Maria River, including the lower reaches of tributaries to the river, are predominantly well-drained sandy material with varying amounts of silt and gravel. At depth, and outside the active channel of the river and adjacent tributaries, the alluvium is interbedded or can transition to clay. The foundation support soils for the levee mainly consist of relatively deep sediments of alluvium.

3.1.2.1. Alluvium (Qg)

Alluvial stream channel deposits are generally sediments deposited along the active or recent stream channel of the Santa Maria River and adjacent tributaries. These deposits are predominantly medium to coarse sand, where exposed in the riverbed, and locally contain varying amounts and interbedded layers of gravel. The deposits are generally very loose to medium densities. The stream channel deposits within the Santa Maria River appear to be approximately 20 to 40 feet thick near the Central Coast Water Authority (CCWA) pipeline and US-101 alignments, respectively. The alluvium is typically underlain by dense older alluvium comprised of sand and gravel.

3.1.2.2. Alluvium (Qa)

The alluvium generally consists of floodplain and over bank sediments deposited along the Santa Maria River and the lower reaches of tributaries to the river. The alluvium encountered along the Santa Maria River typically consists of several feet of silty topsoil that overlie granular sediments similar in composition and thickness to the stream channel deposits (Qg) described above.

3.1.3. Geology

The Project area conditions are similar to the conditions presented in the 2009 EA/MND, and is therefore incorporated herein by reference.

3.1.3.1. Faulting

The principal fault in the site vicinity is the inferred trace of the Wilmar Avenue fault system. The Wilmar Avenue fault merges with the Santa Maria River fault near the Santa Maria River Bridge at US-101 west of Project area. The fault locations are interpreted from inferred offsets in well logs and steps in the Franciscan bedrock from geophysical data. The faults, as well as several others, are grouped as part of the San Luis Range fault system, which is potentially active. The fault locations are poorly constrained and lack clear evidence of displacement of Holocene dune sands or Quaternary alluvium in the Project vicinity.

3.1.3.2. Seismicity and Strong Ground Motion

The site is located in a seismically active region of central California, and is relatively close to mapped active and potentially active faults. Moderate to strong ground motion has affected the site in the historical past. It is the Corps opinion that there is high potential for strong ground motion to affect the site in the future.

3.1.3.3. Surface Fault Rupture

No known active faults cross the site and the site is not located within an Alquist-Priolo zone. Several faults are considered to be potentially active and are mapped across the Santa Maria River. These faults are generally associated with the Huasna, Wilmar Avenue, and Oceano Fault Systems, and include splays locally mapped as the Santa Maria River fault, the Santa Maria Fault, and Bradley Canyon Fault within the vicinity of the Project limits. The faults are generally concealed by alluvium within the Project limits. The presence of the faults is not expected to pose a significant rupture hazard relative to the life of the levee.

3.2. AIR QUALITY

Pollutants of potential concerns include ozone (O_3), CO, nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), sulfur dioxide (SO_2), and lead. These chemicals, called criteria pollutants, are harmful to individual health, materials, and agriculture. The quality of surface air (air quality) is evaluated by measuring ambient concentrations of pollutants that are known to have harmful effects on public health. The degree of air quality degradation is then compared to ambient air quality standards (AAQS) such as the California and National Ambient Air Quality Standards (CAAQS and NAAQS, respectively). The Federal Clean Air Act (CAA) (42 United States Code [USC] Sections 7401–7671q) requires the adoption of NAAQS to protect the public health and welfare from the effects of air pollution. The NAAQS have been updated on many occasions to adjust the criteria pollutants. The California Air Resources Board (CARB) has established additional standards that are generally more restrictive than the NAAQS. Table 3.2-1 summarizes the CAAQS and NAAQS for pollutants.

Table 3.2-1: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	State Standards	Federal Standards
Ozone (O_3)	1-hour	0.09 ppm	—
	8-hour	0.070 ppm	0.075 ppm
Respirable Particulate Matter (PM_{10})	24-hour	50 µg/m^3	150 µg/m^3
	Annual	20 µg/m^3	—
Fine Particulate Matter ($PM_{2.5}$)	24-hour	—	35 µg/m^3
	Annual	12 µg/m^3	15 µg/m^3
Carbon Monoxide (CO)	1-hour	20 ppm	35 pm
	8-hour	9.0 ppm	9.0 ppm
Nitrogen Dioxide (NO_2)	1-hour	0.18 ppm	0.100 ppm [a]
	Annual	0.030 ppm	0.053 ppm
Sulfur Dioxide (SO_2)	1-hour	0.25 ppm	0.075 ppm [a]
	3-hour	—	0.5 ppm
	24-hour	0.04 ppm	0.14 ppm
	Annual	—	0.03 ppm

Source: California Air Resource Board - Ambient Air Quality Standards. Information Website: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf, accessed on October 20, 2011.
ppm=parts per million; µg/m3= micrograms per cubic meter; "—" = no standard
Note: a – The new federal 1-hour NO_2 and SO_2 standards are based on the 98th and 99th percentile of daily hourly maximum values, respectively.

Federal Attainment Status. A non-attainment designation indicates that the air quality violates an ambient air quality standard. An attainment designation indicates that the air quality does not violate the established standard. An unclassified designation indicates that there is insufficient data for determining attainment or non-attainment.

The Project area is located within the South Coast Central Air Basin (SCCAB), within the jurisdiction of the Santa Barbara County Air Pollution Control District (SBCAPCD). Table 3.2-2 summarizes the attainment status of criteria pollutants for the Project area.

Table 3.2-2: Attainment Status for the South-Central Coast Air Basin (SCCAB)

Pollutant	State	Federal
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Ozone – 1 Hour (O_3)	Attainment	---
Ozone – 8 Hour (O_3)	Nonattainment	Attainment
Carbon Monoxide (CO)	Attainment	Attainment
Respirable Particulate Matter (PM_{10})	Nonattainment	Attainment
Fine Particulate Matter ($PM_{2.5}$)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment

Source: Santa Barbara County Air Quality Attainment Designation. Information Website: http://www.sbcapcd.org/sbc/attainment.htm, accessed on October 20, 2011.
The Green Book Nonattainment Areas. Information Website:
for Criteria Pollutantshttp://www.epa.gov/oar/oaqps/greenbk/gncs.html#CALIFORNIA, accessed on October 20, 2011.

3.2.1. Federal Conformity Analysis

Section 176(c)(1) of the Clean Air Act (42 U.S.C. § 7506(c)) is known as the General Conformity Rule. It prohibits the federal government from "engag[ing] in, support[ing] in any way, or provid[ing] financial assistance for, licens[ing] or permit[ing] or approv[ing] any activity" that does not conform to a State Implementation Plan (SIP) approved by the United States Environmental Protection Agency. The conformity rule was designed to ensure that federal actions do not impede local efforts to control air pollution, and requires federal agencies to demonstrate that their actions "conform with" (*i.e.*, do not undermine) the approved SIP for the subject geographic area. The first step in determining whether conformity review is required is to assess whether the federal action will take place in an air quality nonattainment or maintenance area. If the action will occur in such an area, then it is necessary to determine whether the action will result in the emission of an air pollutant that is regulated due to the nonattainment or maintenance status of the region. If so, the federal action may nonetheless be exempt (40 C.F.R. § 93.153(c) and (d)). If the action is not exempt, then one must determine whether the emissions from the action will exceed threshold levels. If threshold levels are met or exceeded, then a conformity review is required. (40 C.F.R. § 93.153(b).)

As presented in Table 3.2-2, SCCAB is designated as attainment for all Federal criteria pollutants. Therefore, the general conformity review is not required.

3.2.2. Greenhouse Gases

Greenhouse gases (GHGs) are defined as any gas that absorbs infrared radiation in the atmosphere. GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Increasing GHG concentrations in the atmosphere are believed to cause global warming and climate change.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that there is scientific consensus that global climate change will increase the frequency of heat extremes, heat waves, and heavy precipitation events. Currently accepted models predict that continued greenhouse gas emissions at or above current rates will induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2°C per decade is projected. Even if the concentrations of all greenhouse gases and aerosols are kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected. A faster temperature increase will lead to more dramatic, and more unpredictable, localized climate extremes. Other likely direct effects of global warming include an increase in the areas affected by drought, an increase in tropical cyclone activity and higher sea levels, as well as the continued recession of polar ice caps. There are already some identifiable signs that global warming is taking place. In addition to substantial ice loss in the Arctic, the top seven warmest years since the 1890s have been after 1997. In April 2007, the IPCC provided an assessment of the "current scientific understanding of impacts of climate change on natural, managed and human systems, the capacity of these systems to adapt, and their vulnerability" in its Working Group II Report. In this report, the IPCC concludes that although some people will gain and some will lose because of global climate change, the overall change will be of social and economic losses. These negative effects will likely be disproportionately shouldered by those who lack the resources needed to adapt to a change in climate. In addition, it is expected that biodiversity of terrestrial and freshwater ecosystems will be compromised and that the ranges of infectious diseases will likely increase. See Climate Change 2007: Impacts, Adaptation and Vulnerability, Intergovernmental Panel on Climate Change, available online at

http://www.ipcc.ch/ipccreports/assessments-reports.htm.

Global temperature increases may have a series of significant negative impacts on the health of California residents and the California economy. One result of the higher temperatures caused by global climate change may be compromised air quality. Warmer temperatures can cause more ground level ozone, a pollutant that causes eye irritation and respiratory problems. Another impact may result due to California's primary reliance on snowmelt for its drinking water and summertime irrigation water. Global climate change could alter the seasonal pattern of snow accumulation and snowmelt and threaten the availability of water. Climatic changes also would affect agriculture, a major California industry, which could result in economic losses.

3.3. BIOLOGICAL RESOURCES

3.3.1. General Setting

The Project area encompasses 3,700 feet of the existing Bradley Canyon levee adjacent to the Santa Maria Landfill, starting at the Bradley Canyon confluence and continuing upstream. Construction activities to repair and strengthen the soil cement portion of the levee would require 120 foot-wide temporary construction easement (TCE) (80 feet for excavation, 20 feet for the hauling road, 10 feet for the diversion channel, and 10 feet buffer between the diversion channel and haul road) from the toe of the existing levee into the low flow channel of Bradley Canyon, which is currently approximately 10 feet wide and 3 to 4 feet deep. The soil cement processing will occur in the staging area near the land fill area. Much of the upland area adjacent to the Project area has been subject to rapid changes in land use. Agricultural fields are located adjacent to and within some sections of the floodplain and occur on both the north and south sides of the Project site. Bradley Canyon channel, which can support wildlife, and federally listed species, such as the California red-legged-Frog (CRLF), are present along the borders and within the Project site. The Santa Maria Landfill is located on the southwest side of the levee.

The 1,000-foot section of the floodplain along the downstream end of the Bradley Canyon channel within the Project area is an approximately 2.75-acre area and has a well-defined secondary channel with multiple terraces. The Bradley Canyon channel terminates at the Santa Maria River via a PVC pipe culvert. This 1,000-foot reach supports riparian vegetation consisting of willow, mulefat and several other native plants, scalebroom (*Lepidospartum squamatum*), rabbits foot grass (*Polypogon monspeliensis*), curly doc (*Rumex crispus*), nut sedge (*Cyperus eragrostis*), and algal mats (*Cara* sp.).

Denuded vegetation, barren substrate and agricultural fields are located within the 2,700-foot reach of the Project area. This reach is subject to high disturbance due to agricultural fields and SBCFCWCD routine maintenance activities. The levee forms a steep riprap slope along the southern edge of the channel. Almost throughout the year, surface water is present in the Bradley Canyon channel because it receives run-off from agricultural irrigation run-off. Numerous small mammal burrows were observed along the banks and near the base of the Bradley Canyon levee during April 2010 and March 2011 surveys. A detailed description of the vegetation communities located within the Project area is provided in Section 3.3.2 (Vegetation Communities), below.

3.3.2. Vegetation Communities (Channel and Overbank)

Vegetation communities within the Project area include:

Arroyo willow riparian scrub
Central coast riparian scrub
Mulefat scrub
Non-native grasslands
Disturbed/ruderal non native vegetation
Active agriculture
Active channel/ Bradley Canyon

These plant communities were identified using aerial photographs and field surveys by Corps Biologists (April 2010 and March 2011). Community definitions are derived from Holland (1986), Muntz (1974), and Sawyer and Keeler-Wolfe (1995). The acreages of the vegetation community types are summarized in Table 3.3-1 thru Table 3.3-4 below, within the TCE. Figure 3-3-1 below shows aerial coverage of the vegetation communities and habitat types located throughout in the Project area.

Table 3.3-1: Native Habitat Located Within Project Area

Habitat Type	(Acres)* Within Levee	(Acres)* Outside Levee	Total Combined (Acres)**
Native Plant Communities			
Arroyo Willow Riparian	1.3		1.3
Riparian Scrub	.50		0.50
Mulefat Scrub	0.45		0.45
Coyote Bush Scrub	0.24		0.24
Central Coast Scrub	0.30		0.30
Total	**2.79**		**2.79**

* acreage of the vegetation community includes areas within the temporary construction easement (TCE) .
**Total Combined acres includes all areas both within and outside the levee where construction activities would occur.
"Outside of Levee" is an area out of waters of the United States where the staging area and batch plant will be located.

Table 3.3-2: Active Channel Within Project Area

Habitat Type	(Acres)* Within Levee	(Acres)* Outside Levee	Total Combined (Acres)**
Bradley Canyon channel (BC)			
Active channel (10 foot x 3700 foot)	0.83		0.83
Total	**0.83**		**0.83**

* acreage of the this active channel is the Bradley Canyon (BC) channel within the TCE.
**Total Combined acres includes all areas both within and outside the levee where construction activities would occur.
"Outside of Levee" is an area out of waters of the United States where the staging area and batch plant will be located.

Table 3.3-3: Non-Native Plant Community / AG / Barren Land Within Project Area

Community Type/Non-habitat Element	(Acres)* Within Levee	(Acres)** Outside Levee	Total Combined (Acres)***
Non-Native Plant Communities/ Ag/ Barren			
Non-native Grassland	1.0	1.0	2.0
Ruderal	1.0	2.0	3.0
Barren	1.5	2.0	3.5
Agricultural/disked	2.0		2.0
Total Habitat	**5.5**	**5.0**	**10.5**

* Acreage includes area within the TCE.
** Acreage includes area where batch plants would be placed outside of the levee during construction.
***Total Combined acres includes all areas both within and outside the levee where construction activities would occur. Within the levee this includes an area 120 feet from the toe of the levee for 3,700 feet. Areas outside the levee include temporary storage areas, staging areas, spoil storage, and batch plant sites.
"Outside of Levee" is an area out of waters of the United States where the staging area and batch plant will be located.

Table 3.3-4: Other Non-Habitat Areas Present Within Project Area

Community Type/Non-habitat Element	(Acres)* Within Levee	(Acres)** Outside Levee	Total Combined (Acres)***
Other Non-habitat Features			
Levee	0.12	1.0	1.12
Road	0.2	1.5	1.7
Access Ramp	0.3	2.0	2.3
Total	**0.62**	**4.5**	**5.12**

* Acreage includes area within the TCE.
** Acreage includes construction activities outside of the levee for the construction of sheet pile and soil cement.
*** Total Combined acres includes all areas both within and outside the levee where construction activities would occur. Within the levee this includes an area 120 feet from the toe of the levee for 3,700 feet and areas outside the levee include temporary storage areas, staging areas, spoil storage.
"Outside of Levee" is an area out of waters of the United States where the staging area and batch plant will be located.

Arroyo Willow Riparian

This community is characterized by dense, broad-leafed, winter-deciduous riparian thickets dominated by arroyo willow (*Salix lasiolepis*) and patches of sand bar willow (*S. exigua*) along the 1,000-foot downstream end of Bradley Canyon channel (see the photo below and Figure 3-3-1).

Riparian vegetation growing along the 1,000-foot downstream end of Bradley Canyon channel that would be protected via sheet pile construction

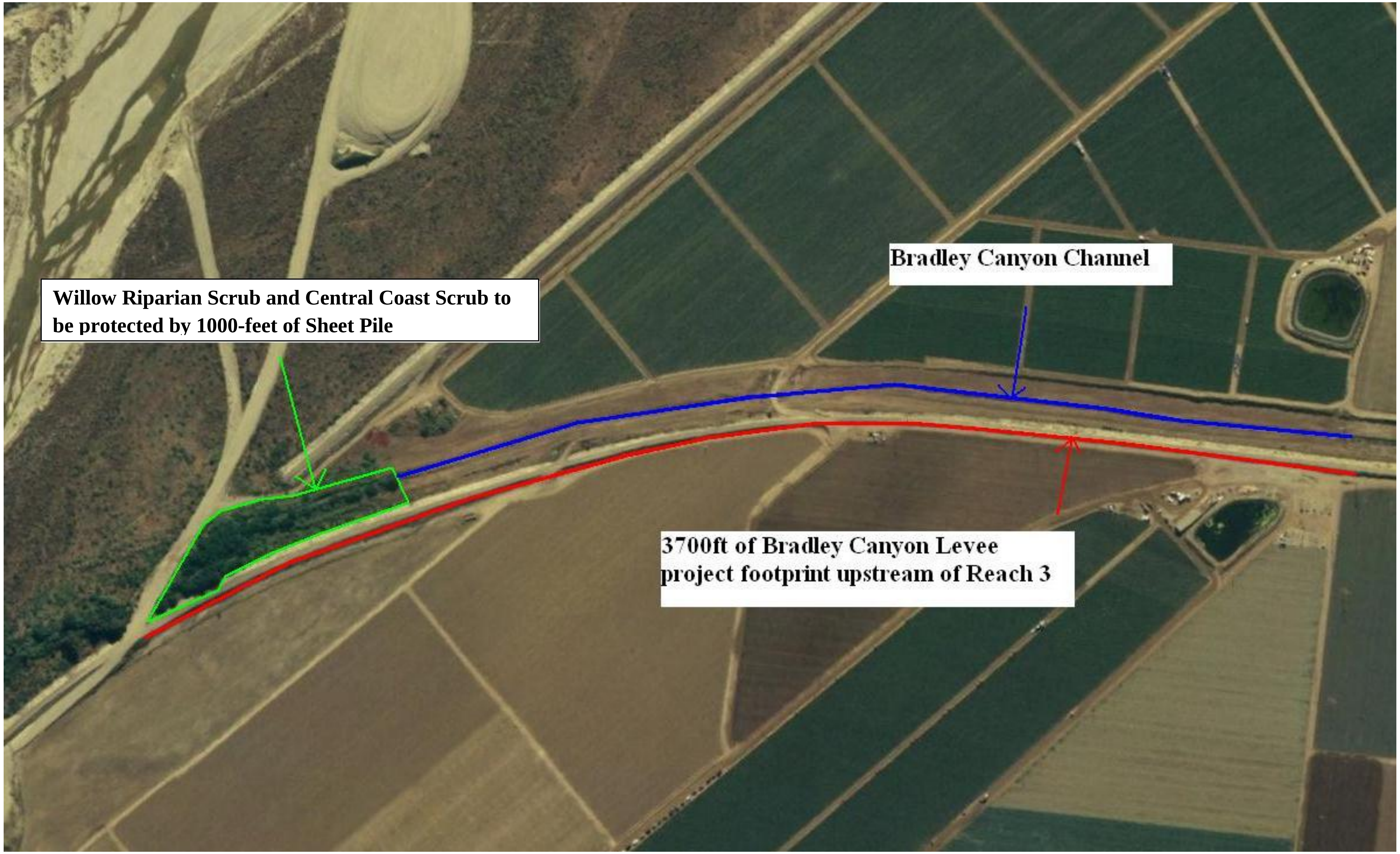
Riparian Scrub

This community is generally found along streams and rivers but may also occur in floodplain areas. Central coast riparian scrub communities vary from open to impenetrable and are dominated by any of several willow species along the 1,000-foot downstream end of Bradley Canyon channel. This community typically consists of newly emerging willows including sand bar willow, arroyo willow, and mulefat. In addition, Mexican elderberry (*Sambucus mexicanus*) is also known to occur in this habitat type.

Riparian native vegetation growing with other non-native grasses and summer mustard along the 1,000-foot downstream end of Bradley Canyon channel that would be protected by repairing this reach of sheet pile

Mulefat Scrub

Mulefat scrub is an open dense scrub community dominated by mulefat. In the Project area summer mustard, annual grasses, and western ragweed are common. Other species include willows, isolated golden bush, and scale broom. Along the 1,000-foot downstream end of Bradley Canyon channel, this community occurs in patches.



U.S. Army Corps
Of Engineers
Los Angeles District

Figure 3-3-1: Existing Vegetation and Other Habitat Within Project Area

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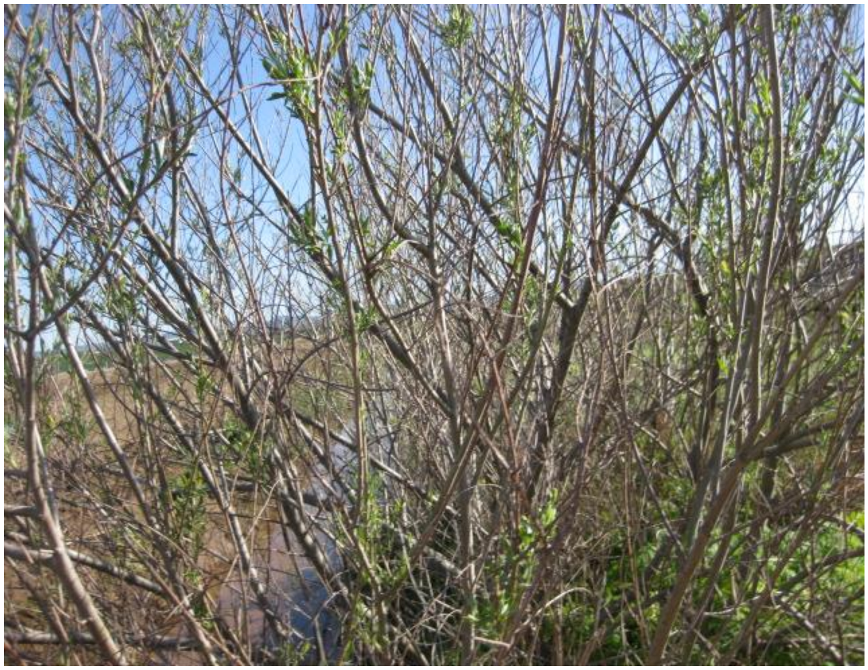


Mulefat scrub onsite along 1000-foot portion of sheet pile construction

Non-Native Grassland

Non-native grassland communities consist of predominantly low-growing herbaceous and invasive vegetation and are found throughout the entire project site. This community forms either a continuous ground cover or understory patches below emergent shrubs and riparian vegetation in the 1,000-foot downstream end of Bradley Canyon channel. Many native flowering annual herb and perennial bulb species (wildflowers), as well as naturalized annual forbs and invasive exotics, are important components of grassland communities. In the upstream 2,700 feet of the project area, these communities are dominated by weedy mats of summer mustard, field mustard (*Brassica rapa*), wild radish (*Raphanus raphanistrum*), tocalote, and Russian thistle. Cheeseweed (*Malva parviflora*), Italian thistle (*Carduus pycnocephalus*), white sweet clover, brome, and oat grasses (*Avena* sp.) are other common elements.

Disturbed/Ruderal/Barren Habitat

Disturbed plant communities, also known as ruderal communities, are dominated by herbaceous, introduced, pioneering plant species that readily colonize open disturbed soil and thrive as a result of human impacts. This type of community is found along the 2,700-foot upstream end of Bradley Canyon channel. Ruderal communities may provide a certain degree of erosion control for recently disturbed or graded areas but such communities are also a threat to the natural biodiversity of an area (Zedler et al., 1993). In the project area along the 3,700-foot Bradley Canyon channel, disturbed habitats support thick weedy mats of summer mustard, field mustard (*Brassica rapa*), wild radish (*Raphanus raphanistrum*), tocalote, Russian thistle, Cheeseweed (*Malva parviflora*), Italian thistle (*Carduus pycnocephalus*), and white sweet clover.

Ruderal and non-native grassland/vegetation onsite

Active Channel/Wash/Bradley Canyon Channel

Most of the Bradley Canyon channel, with the exception of the 1,000-foot downstream end, consists primarily of sands with minimal vegetation cover. This vegetation is mostly ruderal and non-native and most of this drainage is disked due to agricultural activities on either side of the drainage. This area may be subject to annual flooding and little established vegetation is present. Summer mustard, wild radishes, non-native grassland, and fennel are locally dense in many areas along the banks of the channel.

Disked due to Ag activities on both sides of the bank of Bradley Canyon Channel

Bradley Canyon Channel along the project site in February 2011

Active Agriculture

Agricultural fields are the dominant feature of the Bradley Canyon drainage and Project area. There are several agricultural fields present within and adjacent to the project area. The main crops grown in the area include strawberries, wine grapes, celery, lettuce, peas, squash, cauliflower, spinach, broccoli, and beans. Surrounding lands are also used for cattle ranching.

Sandy terraces barren of vegetation on eastern edge of Bradley Canyon Channel

Agricultural field along the Bradley Canyon Site

Sandy terraces barren of vegetation on both sides of the Bradley Canyon Channel

A complete list of the plant species identified in the Project area and its vicinity is presented in Table 3.3-5.

Table 3.3-5: A Complete List of Plant Species Observed Within the Project Area and its Vicinity

SPECIES	COMMON NAME
Achillea millefolium	common yarrow
Ambrosia chamissonis	beach-bur
Ambrosia psilostachya	western ragweed
*Anagallis arvensis**	scarlet pimpernel
Apiastrum angustifolium	Wild parsley
Artemisia douglasiana	Mugwort
Artemisia dracunculus	Tarragon
Aster chilensis	Aster
*Avena barbata**	slender wild oats
Baccharis salicifolia	Mulefat
*Brassica nigra**	black mustard
*Brassica rapa**	Field mustard
*Bromus diandrus**	ripgut brome
*Bromus hordeaceus**	Soft-chess brome
*Bromus madritensis ssp. Rubens**	red brome
Camissonia cheiranthifolia	beach evening-primrose
*Carduus pycnocephalus**	Italian thistle
Ceanothus cuneatus	Buckbrush
*Centaurea melitensis**	Tocalote
*Chamomilla suaveolens**	pineapple weed
*Conium maculatum**	poison-hemlock
Conyza Canadensis	Horseweed
Croton californicus	California croton
Cyperus eragrostis	Nutsedge
Deschampsia elongate	slender hairgrass
Distichlis spicata	salt grass
*Ehrharta calycina**	veldt grass
Epilobium ciliatum ssp. Ciliatum	willow-herb
Eremocarpus setigerus	turkey mullein
Ericameria ericoides	mock heather
Eriodictyon crassifolia	yerba santa
Eriogonum parvifolium	coastal buckwheat
Eriophyllum confertiflorum	golden yarrow
*Erodium cicutarium**	red-stemmed filaree
Eschscholzia californica	California poppy
*Eucalyptus globulus**	Blue gum
*Foeniculum vulgare**	Fennel
Gnaphalium californicum	California everlasting
*Gnaphalium luteo-album**	common cudweed
Heliotropium curassavicum	Heliotrope
Hemizonia increscens ssp. Increscens	Tarweed
Heteromeles arbutifolia	Toyon
Heterotheca grandiflora	telegraph weed
*Hirschfeldia incana**	perennial mustard
*Hordeum murinum**	foxtail barley
Isocoma menziesii var. vernonioides	coastal goldenbush
*Lamarckia aurea**	goldentop grass
Lepidospartum squamatum	California broomscale
Lessingia filaginifolia	California-aster
Leymus triticoides	beardless wildrye
Lotus corniculatus	birdfoot trefoil
Lotus scoparius	Deerweed

Table 3.3-5: A Complete List of Plant Species Observed Within the Project Area and its Vicinity

SPECIES	COMMON NAME
Lupinus chamissonis	silver lupine
Malacothamnus sp.	Bushmallow
*Malva parviflora**	Cheeseweed
*Marrubium vulgare**	Horehound
Medicago polymorpha	California bur clover
*Melilotus albus**	white sweet clover
*Melilotus indica**	Sour clover
Mimulus aurantiacus	Bush monkey flower
*Nicotiana glauca**	Tree tobacco
Opuntia phaeacantha	prickly-pear
Phacelia douglasii	Phacelia
*Picris echioides**	bristly ox-tongue
Plantago erecta	annual plantain
*Plantago major**	common plantain
*Polygonum sp.**	Knotweed
*Polypogon monspeliensis**	rabbits foot grass
*Raphanus raphanistrum**	Wild radish
Rhamnus californica	coffee berry
*Rumex crispus**	curly dock
Rumex salicifolius	willow-leaved dock
Salix exigua	Sand bar willow
Salix lasiolepis	arroyo willow
*Salsola tragus**	Russian thistle
Sambucus Mexicana	Mexican elderberry
Senecio blochmaniae	Blochman's groundsel
*Silybum marianum**	Milk thistle
Solanum douglasii	Douglas' nightshade
Solanum xanti	purple nightshade
*Sonchus asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria elata	Wire lettuce
*Urtica dioica ssp. Holosericea**	stinging nettle
*Vicia sativa ssp. Nigra**	common vetch
Vulpia myuros	rattail fescue
Xanthium strumarium	Cocklebur
* Indicates non-native species.	

Special Status Plant Species

No rare plant was identified in the Project area.

3.3.3. Jurisdictional Waters of the U.S.

"Waters of the United States," as defined in 33 CFR 328.3, includes, but is not limited to, lakes, rivers, and perennial or intermittent streams. The geographic extent of Corps jurisdiction of "Waters of the United States" in non-tidal areas extends to the Ordinary High Water Mark (OHWM), in the absence of adjacent wetlands. The delineation of wetlands was conducted using the routine method as described in the *Regional Supplement to the Corps of Engineering Wetland Delineation Manual: Arid West Region, Version 2.0* (U.S. Army Corps of Engineers 2008). Topographic maps, aerial photos, and other available information sites were reviewed to better determine potential Corps jurisdictional areas within the Project area. On April 29, 2010, Naeem Siddiqui (Project Biologist) and Crystal Huerta (Corps Regulatory Division Biologist) conducted field work to delineate waters of the U.S., including wetlands. Sample points were taken in order to determine wetland and upland boundaries and areas of potential jurisdiction and to note general hydrology characteristics such as channel width and characteristic morphology. Field indicators were examined and Wetland Determination Data Form-Arid West Region were completed to record the site number, latitude, longitude, Cowardin class, estimated aquatic resources, and class of aquatic resources and other parameters including hydrophytic vegetation, wetland hydrology, and hydric soils. Data forms included the recordation of plant species and the presence or absence of indicators of wetland hydrology. Observed indicators for hydrology included surface water, saturation, high water table, surface soil cracks, sediment deposits, oxidized rhizospheres along living roots, and biotic crust. The location of the OHWM along the stream banks was based on the presence of physical evidence of an OHWM including presence of rack/debris and evidence of recent bank erosion. Based on the positive identification of hydrophytic vegetation, hydric soils, and wetland hydrology, an area was identified as a jurisdictional wetland. Data points with less than three indicators but with positive evidence of hydrology indicators and physical evidence of an OHWM were considered "Waters of the United States" under Corps jurisdiction (Appendix C). The Project area supports 7.4 acres non-wetland waters of the United States and 2.75 acres of wetland waters of the United States, shown in Figure 3.3-1 above.

3.3.4. Wildlife Habitat

Riparian communities along the downstream end of Bradley Canyon channel support diverse assemblages of wildlife by providing access to water, shade, and protection from predation. These areas also provide foraging habitat and are used for nesting and breeding by a number of species. The riparian and non-native plant community types that occur within and adjacent to the Bradley Canyon channel and Santa Maria River provides habitat for a variety of resident and migratory wildlife species. Riparian areas provide potential habitat for several special status species, including the federally listed CRLF (*Rana draytonii*). Wildlife observed within the Project area included a variety of common birds, small mammals, and reptiles (see Table 3.3-6).

Table 3.3-6: Wildlife Species Observed Within or Adjacent to the Bradley Canyon Channel in June and July 2010

Common name	Scientific name
Birds	
Anna's hummingbird	*Calypte anna*
Barn owl	*Tyto alba*
Bewick's wren	*Thryomanes bewickii*
Blue grosbeak	*Guiraca caerulea*
Bullock's oriole	*Icterus bullockii*
Bushtit	*Psaltriparus minimus*
Cliff swallow	*Hirundo pyrrhonota*
California thrasher	*Toxostoma redivivum*
California towhee	*Pipilo crissalis*
Common yellowthroat	*Geothlypis trichas*
Common goldfinch	*Spinus tristis*
Common raven	*Corvus corax*
House finch	*Carpodacus mexicanus*
Killdeer	*Charadrius vociferous*
Lark sparrow	*Chondestes grammacus*

Table 3.3-6: Wildlife Species Observed Within or Adjacent to the Bradley Canyon Channel in June and July 2010	
Common name	**Scientific name**
Lawrence's goldfinch	*Carduelis lawrencei*
Lesser goldfinch	*Carrrrduelis psaltria*
Mourning dove	*Zenaida macroura*
Nuttall's woodpecker	*Picoides nuttallii*
Pacific slope flycatcher	*Empidonax difficilis*
Red-tailed hawk	*Buteo jamaicensis*
Sharp-shinned hawk	*Accipiter striatus*
Red-tailed hawk	*Buteo jamaicensis*
Song sparrow	*Melospiza melodia*
Spotted towhee	*Pipilo maculates*
Turkey vulture	*Cathartes aura*
Yellow rumbed warbler	*Dendroica coronata*
Yellow warbler	*Dendroica petechia*
Western kingbird	*Tyrannus verticalis*
Fish	
Mosquito fish	*Gambusia affinis*
Reptiles and Amphibians	
California red-legged frog	*Rana draytonii*
Western spadefoot toad	*Spea hammondii*
Western fence lizard	*Sceloporus occidentalis*
Side blotched lizards	*Uta stansburiana*
Mammals	
Brush rabbit	*Sylvilagus bachmani*
California ground squirrel	*Spermophilus beecheyi*
Coyote	*Canis latrans*
Domestic dog	*Canis familiaris*
House cat	*Felis catus*

3.3.4.1. Birds

Birds were the most common vertebrates observed in the project area and were identified by sight and sound during surveys of 2010 (Appendix F). Common species observed within these habitats included Anna's hummingbird (*Calypte anna),* Barn owl (*Tyto alba),* Bewick's wren (*Thryomanes bewickii),* Blue grosbeak (Guiraca caerulea), Bullock's oriole (*Icterus bullockii),* bushtit (*Psaltriparus minimus),* California thrasher (*Toxostoma redivivum),* California towhee (*Pipilo crissalis),* Cliff swallow (*Hirundo pyrrhonota),* Common goldfinch (*Spinus tristis),* Common raven (*Corvus corax),* Common yellowthroat (*Geothypis trichas),* House finch (*Carpadacus mexicanus),*Killdeer (*Charadrius vociferous),* Lark sparrow (*Chondestes grammacus),* Lawrence's goldfinch (*Carduelis lawrencei),* Lesser goldfinch (*Carrrrduelis psaltria),* Mourning dove (*Zenaida macroura),* Nuttall's woodpecker (*Picoides nuttallii),* Pacific slope flycatcher (*Empidonax difficilis),* Red-tailed hawk (*Buteo jamaicensis),* Sharp-shinned hawk (*Accipiter striatus),* Song sparrow (*Melospiza melodia),* Spotted towhee (*Pipilo maculates),* Turkey vulture (*Cathartes aura),* Yellow rumbed warbler (*Dendroica coronata),* Yellow warbler (*Dendroica petechia),* and Western kingbird (*Tyrannus verticalis)*. Some of these species were detected utilizing scrub and grassland communities in the Project area and in areas associated with the existing Santa Maria Landfill.

Raptors and other birds of prey are plentiful in the region and suitable nesting and foraging habitat for raptor species occurs throughout the project area. Red-tailed hawk (*Buteo jamaicensis*), killdeer, and Barn owl were among several species detected within the project area. In addition, one stick nest of red-tailed hawk was located in riparian habitat outside of the project site but near the downstream end of the Project area.

3.3.4.2. Mammals

Large mammals like coyote (*Canis latrans*) were observed during the survey in 2010 and 2011; however, in addition calls, tracks, and spoor were located in the Bradley Canyon drainage as well. The California ground squirrel (*Spermophilus beecheyii*) is another common species observed in the Project area. Also, numerous burrows were observed in the dirt and rubble along the toe of the levee.

3.3.4.3. Amphibians

Amphibians often require a source of standing or flowing water to complete their life cycle. However, some terrestrial species can survive in drier areas by remaining in moist environments found beneath leaf litter and fallen logs or by burrowing into the soil. Agricultural ditches such as Bradley Canyon channel along the Project area are known to support amphibians.

The SBCFCWCD performs routine maintenance within the Project area. The SBCFCWCD performed protocol level surveys in 2008 for the Santa Maria River Levee Improvement Project that extended up to the confluence with Bradley Canyon. That survey extended approximately 1000 feet into this project's area. The 2008 surveys identified 3 sub-adult CRLFs near the upstream terminus of that Project area (Appendix E). These surveys occurred within the lower 1000' of Bradley Canyon downstream approximately 1600 feet into the Santa Maria River. The SBCFCWCD has observed CRLFs within Bradley Canyon Channel throughout the Project area since 2003.

During the 2010 surveys, ten adult CRLFs were observed in Bradley Canyon channel (Appendix E); this area also supports common species including Baja California [Pacific] tree frogs (*Pseudacris regilla hypochondriaca*), western toads (*Anaxyrus [Bufo] boreas*), and western spadefoot toads (*Spea hammondii*).

3.3.4.4. Reptiles

Although a number of common reptile species may occur within the Project area, no reptiles were observed during surveys performed by Corps biologists in February through April 2010. Typically plant communities that have an abundant amount of leaf litter, rocks, and rotting logs would have a higher diversity of reptile species, however, the Project area has been highly modified or disturbed. Habitat conditions in the project area are not likely to support a variety of reptiles due to agricultural activities.

3.3.4.5. Native Fish

The Project area is approximately 1,000 feet away from the low flow channel of the Santa Maria River and separated by agricultural fields, levee, and maintenance roads. No fish were found in the Bradley Canyon channel during the February through April 2010 surveys except for some mosquito fish (*Gambusia affinis*) adjacent to the levee.

3.3.4.6. Special Status Wildlife Species

Special status species include species which are listed as threatened or endangered under the federal or California Endangered Species Acts (ESA), species proposed for listing, Species of Special Concern, and other species that have been identified by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), or local jurisdictions as unique or rare and which have the potential to occur within the Project area. Each of these species was assessed for its potential to occur based on the following criteria:

- Presence: Species was observed onsite or in the same watershed (aquatic species only) during a site visit or recent focused survey, or population has been acknowledged by CDFG or USFWS.
- High: Habitat (including soils) for the species occurs onsite and a known occurrence occurs within 5 miles of the site within the past 20 years.
- Moderate: Habitat (including soils) for the species occurs onsite and a known occurrence occurs within the database search but not within 5 miles of the site or within the past 20 years; or a known occurrence occurs within 5 miles of the site and within the past 20 years and marginal or limited amounts of habitat occurs onsite; or the species' range includes the geographic area and suitable habitat exists.
- Low: Limited habitat for the species occurs onsite and no known occurrences were found within the database search and the species' range includes the geographic area.
- Unlikely: Habitat requirements strongly associated with the species (including vegetation and soils) do not occur within the survey area or the known range of the species does not include the survey area.

These species include:

Listed Species under ESA

- Arroyo toad (*Anaxyrus californicus*)
- California red-legged frog (*Rana draytonii*)
- Least Bell's vireo (*Vireo bellii pusillus*)
- Southern steelhead (*Oncorhynchus mykiss*)
- Southwestern willow flycatcher (*Empidonax traillii extimus)*
- Tidewater goby (*Eucyclogobius newberryi)*

Species of special concern under California ESA

- Western spadefoot toad (*Spea hammondii*)
- Burrowing owl (*Athene cunicularia*)

3.3.5. Descriptions of Special Status Species with the Potential to Occur in the Project Area

3.3.5.1. Federal and State Listed Species

Arroyo toad (FE)

Arroyo toad (Anaxyrus californicus) is federally endangered species. Arroyo toads breed in shallow, sandy pools typically bordered by sand and gravel flood terraces. Outside of the breeding season, arroyo toads are known to use a variety of upland habitats including, but not limited to, sycamore-cottonwood woodlands, oak woodlands, coastal sage scrub, chaparral, and grassland (Holland 1995, Griffin et al. 1999). Arroyo toads have disappeared from approximately 75 percent of the species' historically occupied habitat in California. They were known to occur in coastal drainages in southern California from San Luis

Obispo County to San Diego County and in Baja California, Mexico. Arroyo toads now survive primarily as small, isolated populations in the headwaters of coastal streams, having been extirpated from much of their historic habitat.

The Sisquoc River, one of two major tributaries to the Santa Maria River, is undammed, and suitable arroyo toad habitat extends from the confluence with the Manzana Creek upstream about 9 mi (14 km) to Sycamore Campground in the Los Padres National Forest (LPNF). During a 1999-2000 survey, a single adult arroyo toad was observed on the Sisquoc River but none were seen along Manzana Creek (Hubbartt and Murphey 2005). Arroyo toad breeding occurs from April to the end of May, and toads can still call as late as the end of June (Hubbartt and Murphey 2005).

No arroyo toads were observed during the 2010 surveys of the Project area.

Arroyo Toad *(Anaxyrus californicus)*

California red-legged frog (FT)

The CRLF (*Rana draytonii*) is federally threatened. The CRLF has been extirpated or nearly extirpated from 70 percent of its former range. Currently, CRLF are known from 3 disjunctive regions in 26 California counties and 1 region in Baja California, Mexico (USFWS, 2006). This species is reported from the Santa Maria US topographic quad and the eight surrounding quads.

In 2008, SBCFCWCD biologists conducted protocol surveys within the downstream 1000-foot portion of the Project area. Three sub-adult CRLFs were identified. The SBCFCWCD has observed CRLFs within the entire Project area since 2003.

The Corps and Aspen Environmental Group performed protocol surveys for CRLF between March 4 and April 22, 2010 (Appendix E). Two areas in Bradley Canyon channel and Reach 3 with potential suitable habitat were identified for the protocol surveys. The areas were revisited during the daytime on March 25, 2010 and again on April 22, 2010 to look for egg masses. In addition, a second night visit was made on April 8^{th} to confirm the frogs were still occupying the area within Bradley Canyon channel. No tadpoles or egg masses were observed during any of these surveys. CRLFs are also present within the Project area at the downstream end of Bradley Canyon channel.

Photo of the California red-legged frog during 2010 surveys within Bradley Canyon Channel

Least Bell's vireo (FE)

Least Bell's vireo (*Vireo bellii pusillus*) is state and federally listed as endangered. This species is a summer resident within lowland riparian habitat along waterways and dry washes. The Project area supports potential breeding habitat for this species in southern riparian forest and willow scrub riparian habitat types. Aspen Environmental Group performed protocol surveys in 2009 and 2010, but this species was not detected within or in the vicinity of the Project area (Appendix F). The proposed Project is not within critical habitat as designated by the USFWS.

Least Bell's Vireo *(Vireo bellii pusillus)*
Photo by James Gallagher, Sea and Sage Audubon

Southwestern willow flycatcher (FE)

This federally endangered subspecies (*Empidonax traillii extimus*) is not known to breed in the Santa Maria River watershed, and was not observed within the Project area during 2009 and 2010 surveys. It may occur as a transient migrant.

Critical habitat does not include any rivers or floodplain habitats in Santa Barbara County. The proposed Project is not within critical habitat as designated by the USFWS.

Southwestern willow flycatcher *(Empidonax traillii extimus)*

Southern Steelhead - Southern California Evolutionary Significant Unit (ESU)(FE)

On August 18, 1997, several ESUs of southern steelhead trout (*Oncorhynchus mykiss*) were listed as threatened or endangered under the ESA (see 62 FR 43937) by the National Marine Fisheries Service (NMFS); the Southern California steelhead ESU was listed as endangered.

Steelhead is a strain of rainbow trout that migrates to and from the ocean to fulfill it life history and evolutionary requirements. It is native to Pacific Coast streams from Alaska to Mexico. In California, populations of steelhead are found in coastal streams from San Mateo Creek (San Diego County) north to the California-Oregon border. Numerous accounts of southern steelhead are known from Santa Barbara County (CNDDB 2010), and the Santa Maria River is a known migratory route.

Spawning occurs in cool, clear, well-oxygenated streams with suitable depth, current, and gravel size (Entrix 2007). Eggs hatch one to two months after laying, and fry emerge from the gravel 2-3 weeks after hatching. Juveniles remain in freshwater for 1 to 4 years before migrating to the ocean in March to April when water levels are likely to be at their highest.

Southern steelhead tolerates warmer water and more variable conditions than its northern counterpart and juveniles tend to grow faster and migrate to the ocean sooner than northern populations. According to Harper (1988), steelhead once thrived in southern California streams despite the arid nature of the area and its warmer stream temperatures. Many of these southerly streams have water temperatures in the mid-70s during the summer and early fall, yet they maintained year-round juvenile steelhead populations. This may indicate these southern runs of steelhead are genetically distinct to some degree from the more studied northern populations.

Historically, steelhead runs existed in California as far south as the San Diego River and the Santa Domingo River in northern Baja California (Needham and Gard 1959). Water diversions, dam construction, alteration of stream channels, and riparian vegetation removal associated with urbanization and development have led to the extirpation of steelhead runs in many California streams and severely reduced population sizes in others. Swift et al. (1993) state that southern steelhead have been found in virtually every coastal stream in Monterey, San Luis Obispo and Santa Barbara counties north of Point Conception within the last ten years. Today they still occur in Malibu Creek, Ventura River, Santa Clara River, and Santa Ynez River, although in greatly reduced numbers (Entrix 2007).

Photo showing existing conditions with lack of cover, depth, and habitat for steelhead in the Bradley Canyon channel, February 2011

Steelhead may occur within Santa Maria River during the winter/spring migration period from December through April, depending on hydrologic conditions and fish passage. However, the Project area lacks adequate habitat (i.e., cover, depth, temperature) to support spawning or rearing of steelhead smolts.

In February 2000, NMFS designated critical habitat for several ESUs for steelhead on the West Coast (65 FR 7765, 16 February 2000); the Santa Maria River Hydrologic Unit was designated as critical habitat. Unit 3312 of the Santa Maria River Hydrological Unit provides for fish passage to upstream breeding habitat during periods of high flow. However, Bradley Canyon channel is not designated critical habitat for steelhead.

<u>Tidewater goby (FE)</u>

The tidewater goby (*Eucyclogobius newberryi*) is federally endangered. This species is native to California's brackish Estuaries and lower reaches of streams above estuaries. It has been found as far as 12 kilometers upstream of the mouth of the Santa Maria River. It is unlikely to be found within the Project area.

3.3.5.2. Species of Special Concern

Western spadefoot toad

The Western spadefoot toad (*Spea hammondii*) is a CDFG Species of Special Concern. During the CRLF protocol surveys in April 2010, several Western spadefoot toads and tadpoles were observed. This species is reported from the Santa Maria USGS topographic quad and five of the eight surrounding quads. The western spadefoot toad occurs in coastal sage scrub, chaparral, and grasslands, where it may be found in sandy washes, on floodplains, and in low hills. Temporary breeding pools are a crucial requirement for the spadefoot toad. There is suitable habitat for this species in the western extent of the Project area where agricultural runoff feeds into the river channel, and in the grasslands and stream terraces where sandy substrate affords burrowing by the toad.

Photo depicts Western spadefoot toad during Winter 2010 surveys

Burrowing Owl

The burrowing owl (*Athene cunicularia*) is a CDFG Species of Special Concern. No borrowing owls were observed in the Project area or in the vicinity during the 2010 surveys but they have been reported from the Santa Maria USGS topographic quad. This terrestrial owl favors flat, open grassland and sparse shrubland ecosystems. In California, burrowing owls are found in close association with California ground squirrels. Ground squirrels provide nesting and refuge burrows, and maintain areas of short vegetation height, which provide foraging habitat and allow for visual detection of avian predators by the owls. Suitable habitat for burrowing owls occurs throughout most of the Project area in the form of rodent burrows, ground squirrel colonies, sparsely vegetated channel banks, debris piles, and foraging habitat. However, no sign of burrowing owls were observed (pellets, white wash, etc), possibly due to agricultural activities. Therefore, there is a low potential this species would be present in the Project area.

3.4. WATER RESOURCES AND HYDROLOGY

3.4.1. Surface Water

The proposed levee repairs would occur on the Bradley Canyon Channel Levee, tributary to the Santa Maria River. Bradley Canyon Channel begins approximately 0.7 miles upstream of Betteravia Road (Foxen Canyon Road) and flows northward to the Santa Maria River, a total distance of approximately 2 miles. This drainage is confined by a Bradley Canyon Levee on the west side of the 100-foot wide channel. An established earthen low flow channel ranging from 5 to 10 feet wide flows down the middle of the drainage. Surface water, almost entirely attributed to agriculture run-off, ranges from three feet to only a few inches in depth. Downstream (north) of Betteravia Road, the area outside of the low flow channel is dry, occasionally disked, and predominantly bare soil with hemlock, wild radish, and other non- native species. The channel remains wetted throughout the year upstream of the Betteravia Road through the agricultural areas. Over the last 3-5 years, agriculture adjacent to Bradley Canyon Channel downstream of Betteravia Road, that would consistently deliver agriculture tailwater into the system, has changed from row crops that were flood irrigated to strawberries that are drip irrigated. As such, Bradley Canyon Channel has markedly less water overall and the lower portions of the channel (where the project is proposed) dry up during the summer months where it remained wetted in previous years.

3.4.3. Surface Water Quality

The Project is located in Central Coast Regional Water Quality Control Board (RWQCB), Region 3, which has jurisdiction over a 300-mile long by 40-mile wide section of the State's central coast. Its geographic area includes all of the following counties: Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara Counties as well as the southern one-third of Santa Clara County, and small portions of San Mateo, Kern, and Ventura Counties. In the Project area, the Central Coast RWQCB is primarily concerned with water quality effects of heavy agriculture, with some oil production and steady urbanization. The Santa Maria River, including Bradley Canyon channel, is currently listed on the CWA Section 303(d) List of Water Quality Limited Segments Requiring Total Maximum Daily Loads (TMDL) for the following pollutants: nitrate, fecal coliform, and pesticides (ammonia, chlorpyrifos name, Dichloro-Diphenyl-Trichloroethane (DDT), dieldrin, endrin). These pollutants most likely originate from agricultural sources that commonly occur throughout the watershed.

The Bradley Canyon levees and soft-bottom channel were designed and constructed to divert floods from Bradley Canyon to the Santa Maria River. The Bradley Canyon levees and channel have a drainage area of approximately 7.9 square miles and was designed to accommodate a Standard Project Flood of 9,000 cfs at the confluence with the Santa Maria River.

The width of the existing Bradley Canyon channel is approximately 120 feet. The total length of the right and left levee is 10,900 feet and 900 feet, respectively. The height of the left levee within the Project area varies between 10.5 and 8.0 feet, and the height of the right levee varies between 8.0 to 0.0 feet. The right levee is not designed to contain the SPF. The channel is designed to spill over the right levee into the adjacent agricultural land during higher flows.

3.4.2. Ground Water

Groundwater character in the Santa Maria Groundwater Basin is generally variable. Total Dissolved Solid (TDS) concentrations vary throughout the basin, but tend to increase from east to west and increase toward the center of the basin (beneath the cities of Santa Maria and Guadalupe in Santa Barbara County), as well as southward, away from the recharge area of the Bradley Canyon Channel. Water tested at 78 public supply wells indicated average TDS content ranging from 139 to 1,200 mg/L (Corps 2008). Historically, the Santa Maria Valley Groundwater Basin has been subject to high nitrate concentrations, particularly near the cities of Santa Maria and Guadalupe, with nitrate concentrations recorded as high as 240 mg/L. Some wells, particularly in the northern part of the basin, showed nitrate concentrations in excess of the Maximum Contaminant Level (MCL) between the years 1990 and 2000. High TDS, sulfate, or chloride content impairs groundwater in some parts of the basin (DWR, 2004).

The depth-to-groundwater measurements conducted by the Corps in November 2008 indicate that groundwater levels in the vicinity of Project area vary between 76 and 78 feet below ground surface.

3.5. LAND USE

Existing land uses immediately surrounding the Project area include agriculture and the Santa Maria Landfill.

3.6. AESTHETICS

The Project area is bordered by agricultural fields and the Santa Maria Landfill. Bradley Canyon runs the entire length of the Project site. Existing structures within the Project area include the levee, rocks along the levee face, station markers, and a pipe culvert that traverses the Bradley Canyon into the Santa Maria River. Views of the proposed Project would be available primarily from the top of the levee.

The overall visual character of a site is defined by the agriculture fields, landforms, water, vegetative patterns, and existing man-made modifications that give the site its distinguishing visual qualities. The visual quality of a site involves a more subjective judgment of its overall attractiveness.

The landscape along the levee is flat with little topographical relief. When viewing the levee the major visual backdrop is the Santa Maria River and surrounding agricultural fields. Considering the presence of the agricultural land and the Santa Maria Landfill, the Project area as a whole has a low scenic quality as viewed from public vantage points.

The visual sensitivity of an area is based on the public's expectation of the area and the number of people viewing the area, as well as the duration and dominance of views. The public visual expectation of the area is for a mixture of agricultural and industrial land use. Overall, the landscape within the Project area is of low visual sensitivity.

3.7. RECREATION

No recreational facilities or opportunities are located within the boundaries of the Project site. However, a bike path is located on the top of the levee northwest of the Project site within the city of Santa Maria. Recreational opportunities within the immediate vicinity of the Project site (within four miles) include the following community parks: Grogan Park, Preisker Park, North Preisker Park, Jim May Park, Rice Park, Sierra Vista Park, Tunnell Park, Oakley Park, Atkinson Park, Veteran's Memorial Park, Armstrong Park, Simas Park, Joe White Park, Perlman Park, and Alice Threfts Park. Recreational opportunities within these parks include athletic fields, picnic facilities, and perimeter walkways.

3.8. NOISE

Noise conditions within the Project area are similar to the conditions presented in Section 3.8 of the 2009 EA/MND, and is therefore incorporated by reference.

One primary noise source in the Project area is traffic noise from the adjacent Santa Maria Landfill at the western end of the Project site; another noise source is agricultural machinery used in the agricultural fields. Traffic noise levels vary based on traffic volumes, vehicle speed, and type of vehicle.

In addition to the local traffic noise, the ambient noise conditions in the Project area are influenced by construction activity involving the SBCFCWCD's routine maintenance activities.

3.8.1. Sensitive Receptors in the Project Area

Some land uses are considered more sensitive to elevated noise levels because of the purpose and intent of the use. Places where people are meant to sleep or places where a quiet environment is necessary for the function of the land use are normally considered sensitive. For instance, residential areas, schools, places of worship, and hospitals are more sensitive to noise than are commercial and industrial land uses. Land uses adjacent to the Project area include the Santa Maria Landfill and agriculture. Existing structures within the Project area include the levee, rocks along the levee face, soil cement, station markers, and pipe culvert.

There are no sensitive receptors in the vicinity of the Project area. The closest residential community is located approximately 3.5 miles east of the levee. The City of Santa Maria requires heavy construction to be limited to weekdays during the day (7 a.m. to 6 p.m.) with minimal activity on weekends. In addition, the city would require construction contractors to comply with all local sound control and noise level standards, regulations, and ordinances that apply to any work performed pursuant to the contract.

3.9. TRANSPORTATION

The Project area is adjacent to Andrew Avenue, a north-south rural road, and crosses Foxen Canyon Road, an east-west secondary arterial road. These roads are used primarily by local residents and farm workers, and a small number using Foxen Canyon Road as a route to the Santa Ynez Valley.

3.10. HAZARDOUS MATERIALS AND WASTE HANDLING AND DISPOSAL

This section addresses hazardous materials and waste handling and disposal issues associated with the construction and operation of the proposed Project. Specifically, this section addresses the existing environmental contamination and hazardous materials issues in the vicinity of the Project area.

Existing and past land use activities are used as potential indicators of hazardous material storage and use. For example, many industrial sites, historic and current, are known or suspected to have soil or groundwater contamination by hazardous substances. Properties devoted to oil production, including oil fields and processing facilities, are commonly known or suspected to have environmental contamination from petroleum hydrocarbons, heavy metals, and chlorinated solvents. Other sources of hazardous materials include leaking underground tanks in commercial and industrial areas, surface runoff from contaminated sites, and pesticides and herbicides in the soil of former agricultural lands. In addition to contaminants found in soils, groundwater is subject to contamination associated with underground storage tanks and other sources in the vicinity of the Project area within the city landfill boundary lines.

The Project area includes Bradley Canyon channel and levee. There are no known hazards located within the Project area. A government records search was also conducted to identify hazardous materials sites listed pursuant to Government Code Section 65962.5. According to the Department of Toxic Substances Control's (DTSC) Hazardous Waste and Substances site "Cortese" List (http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm), no hazardous waste facilities subject to corrective action are located within the Project site. The Geotracker database (http://geotracker.swrcb.ca.gov/), maintained by the State Water Resources Control Board, tracks regulatory data about leaking underground fuel tanks (LUFT), Department of Defense (DoD), Spills-Leaks-Investigations-Cleanups (SLIC) and Landfill sites. The database (accessed on August 20, 2008) lists 12 sites that are currently undergoing assessment, remediation, or monitoring. None of the sites are located within or adjacent to the Project site.

3.11. CULTURAL RESOURCES

Cultural resources include prehistoric archaeological sites, historic archaeological sites, and historic structures, and consist of artifacts, food waste, structures, and facilities made by people in the past. Prehistoric archaeological sites are places that contain the materials remains of activities carried out by the native population of the area (Native Americans) prior to the arrival of Europeans in southern California. Artifacts found in prehistoric sites include flaked stone tools such as projectile points, knives, scrapers, and drills; ground stone tools such as manos, metates, mortars, and pestles for grinding seeds and nuts; and bone tools, such as awls. Prehistoric sites and features include hearths, bedrock mortars, rockshelters, rock art, and burials.

Historic archaeological sites are places that contain the material remains of activities carried out by people during the period when written records were produced after the arrival of Europeans. Historic archaeological materials usually consist of refuse, such as bottles, cans, and food waste, deposited near structure foundations. Archaeological investigation of historic period sites is usually supplemented by historic research using written records. Historic structures include houses, commercial structures, industrial facilities, and other structures and facilities more than 50 years old.

3.11.1. Regulatory Setting

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on cultural resources listed or eligible for listing on the National Register of Historic Places (National Register). For a cultural resource to be determined eligible for listing in the National Register it has to meet certain criteria and retain integrity. The resource has to be either minimally 50 years old or exhibit exceptional importance. After meeting the age requirement, cultural resources are evaluated according to four criteria: a, b, c, and d. The National Register criteria for evaluation as defined in 36 CFR 60.4 are:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
(b) That are associated with the lives of persons significant in our past; or
(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
(d) That have yielded, or may be likely to yield, information important in prehistory or history.

After a cultural resource has been determined eligible for inclusion in the National Register it is accorded the same level of protection as a property that is included. It then becomes formally known as a “historic property” regardless of age.

3.11.2. Scope of Work and Area of Potential Effects

The scope of work for this investigation included: 1) a cultural resources records search through the California Historical Resources Information System, Central Coastal Information Center (CCIC) at the University of California Santa Barbara; 2) a Sacred Lands File Search through the California Native American Heritage Commission (NAHC) in Sacramento; and 3) a pedestrian survey of the Project area by qualified archeologists. This investigation was conducted to satisfy the cultural resources requirements of the National Environmental Policy Act of 1969 and the National Historic Preservation Act of 1966. For the purpose of identification of existing cultural resources for this Project, the Area of Potential Effects (APE) is equal to the Project area boundary.

On April 19, 2010, personnel from the Central CCIC conducted a records search for the Project area and a one-quarter radius around the project area. According to CCIC records, this area had not been previously surveyed. Records search results indicate that there is one previously recorded cultural resource located within the quarter-mile radius of the project area. Site CA-SBR-2457-H is referred to as the Pacific Electric Santa Maria Valley Spur railroad line, aka Santa Maria Valley Railroad. Recorded by McKenna et al. in 1991, the Pacific Electric Santa Maria Valley Spur is a small-gauge rail line which connected the Gates facility to the Battles facility. This historic railroad is mapped immediately west of the Bradley Canyon Levee's upstream end. In 1991, archeologists from McKenna et al. identified the railroad tracks in the vicinity of the community of Gates which is immediately southwest of the southern end of the project area (1991b).

The California Native American Heritage Commission (NAHC) Sacred Lands File search failed to indicate the presence of sacred lands or other Native American resources in the immediate Project area.

On May 24 and 25, 2010 a Corps archeologist surveyed the Project area. No cultural resources were identified. Visibility was excellent (90%). The ground surface east of the levee consisted of previously-disturbed river sands and cobbles. Small grasses and plants were beginning to grow in this area. Bradley Canyon channel runs south paralleling the Bradley Canyon Levee. This area appeared to be a fallow field that was probably planted at one time. The ground surface west of the levee consisted of a dirt farm road in the middle of agricultural fields. The northern part of the project area contains a fallow agricultural field on the west side. This area was disturbed from repeated plowing. The substrate consisted of floodplain sands and gravels. The archeologist walked the area west of the Bradley Canyon Levee looking for the small-gauge railroad tracks. No railroad tracks were observed. It is possible that the tracks are buried underneath the dirt road. Photographs in the CA-SBR-2457-H site record show the tracks eroding from the dirt road immediately west of the Bradley Canyon Levee near the community of Gates.

3.12. UTILITIES

Because government agencies have recently categorized data pertaining to utility systems (including their location, capacity, and type) as sensitive critical infrastructure information, public access to these data is generally restricted for security reasons. As such, only information that is readily and publicly accessible is presented in this section. Table 3.12-1 summarizes and Figure 3.12-1 below shows the utility providers serving the Project area.

Table 3.12-1: Utility and Service Providers by Jurisdiction

Jurisdiction	Utility or Service System Provider
City of Santa Maria	**Natural Gas**– Southern California Gas Company **Electricity**– Pacific Gas and Electric **Water** – City of Santa Maria Utilities **Wastewater** – City of Santa Maria Utilities **Solid Waste** – Santa Maria Regional Landfill

Table 3.12-1: Utility and Service Providers by Jurisdiction	
Jurisdiction	**Utility or Service System Provider**
	Landfills Used – Santa Maria Regional Landfill

Source: Santa Maria Valley Economic Development Commission, 2010. Information Website: http://www.santamariaedc.com/cm/market_profile/utilities, accessed on March 30, 2010.

3.12.1. Water

A 12-inch diameter irrigation water line owned by Johnson crosses the Bradley Canyon channel in the Project area.

3.12.2. Oil

Two oil pipelines owned by Conoco Phillips and Greka traverse the Bradley Canyon channel and levee within the Project area.

3.13. SOCIOECONOMICS

3.13.1. General Setting

The Project area is within the jurisdictional boundaries of the city of Santa Maria, Santa Barbara County. The Project area consists of agriculture and open space. As a result, the socioeconomic analysis focuses on the city of Santa Maria which is developed primarily of residential units.

3.13.2. Population

According to the 2006 American Community Survey (ACS) of the U.S. Census, the City had an estimated population of 85,016. In addition, the median age in Santa Maria was 28.8, which is lower than the County median age of 33.8. This difference is attributable to the large number of family aged persons (children under 18 and parents between the ages of 25 and 44) residing in the city of Santa Maria (EA/MND 2009).

3.13.3. Employment

According to the 2006 ACS, the unemployment rate for Santa Maria was 6.2 percent. The statistics indicate that unemployment for the City is greater than the County's unemployment rate of 5.5 percent.

3.13.4. Housing and Income

The 2006 ACS estimated that 28,677 housing units were located in the city of Santa Maria, and a total of 22,847 housing units were noted in the 2000 Census. This represents an increase of 5,830 units, or 25.5 percent increase since the 2000 Census. In addition, according to the 2006 ACS, approximately 7.2 percent of the housing units were vacant, the average household size was 3.56 persons, and of the City's housing stock, 63.5 percent were single-family residences, 30.4 percent were multi-family residences, and 6.3 percent were mobile homes.

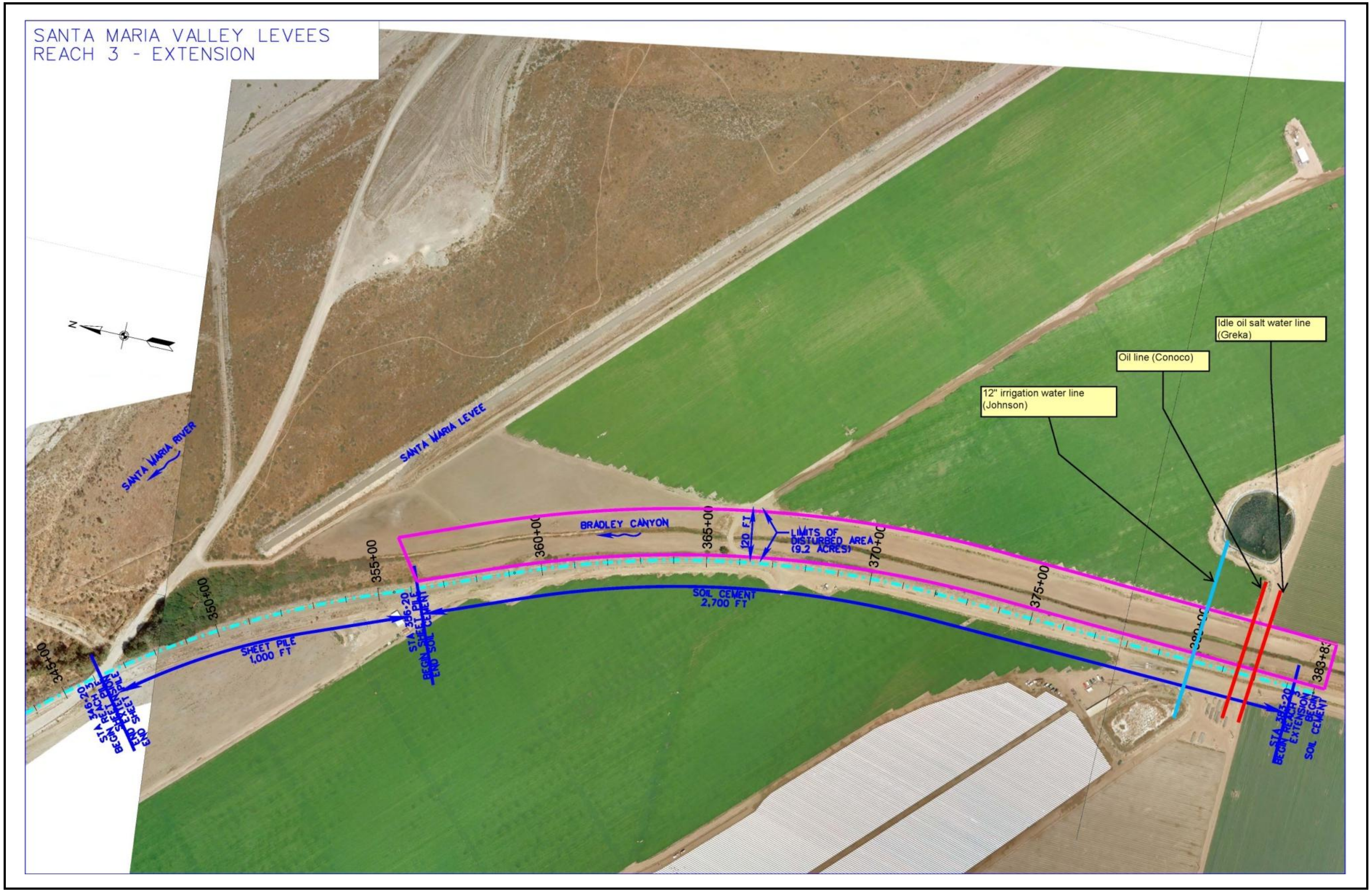
The city of Santa Maria is a middle-class community with a 2006 medium family income of $45,634 compared to $49,917 for Santa Barbara County.

3.13.5. Ethnicity

According to the 2000 Census, the majority of the population of the city of Santa Maria consists of Hispanics at 59.7 percent and Whites at 58.1 percent. This total is greater than 100 percent as Hispanics may be of any race, and therefore, are also included in applicable race categories. Otherwise, the ethnic makeup consists of Asians at 4.7 percent, African-Americans at 1.9 percent, and American Indian and Alaskan Native persons at 1.8 percent.

3.14. SAFETY

The Project area is located close to agricultural development on the northeast and southwest side of the levee and a landfill on the northwest side of the Project area. The Bradley Canyon Levee Project as originally constructed consists of a set of levees with riprap revetment. Bradley Canyon channel begins approximately 0.7 mile upstream of Betteravia Road and flows northward to the Santa Maria River, a total distance of approximately 2 miles. This drainage is confined by a levee on the west side of the 100-foot wide channel. The levees provide flood protection to the Santa Maria Valley, which includes the entire city of Santa Maria. A deficiency in the levee system exists with the original project. The 2009 SDDR described a design deficiency in the Santa Maria River Levee that makes the levee vulnerable to breakage from impinging flows. In 2011, the Corps performed a subsequent hydraulic analysis on the Santa Maria River Levee system upstream of the Bradley Canyon confluence (SDDR Addendum 2011). The hydraulic analysis indicates that, despite the lack of historical evidence, the potential exists for impinging flows to act on the southern levee upstream of Bradley Canyon. This analysis included an examination of the topography of the Santa Maria riverbed which indicated that the upstream riverbed is susceptible to low flow meanders. Because the levee upstream of the Bradley Canyon confluence was constructed with the same design as the downstream levees, they are in danger of breaching due to the impinging low flows. The hydraulic analysis determined that, should a breach occur along the upstream Santa Maria River levee during a high flow event, flows proceeding through the breach would attack the Bradley Canyon Levee and possibly overwhelm the levee and cause it to fail. If the Bradley Canyon Levee failed, in this scenario, approximately 30,000 cfs could inundate the development downstream as shown in. Taking into account that the population of the city of Santa Maria has grown to about 80,000 residents, a future breach in the levee could be disastrous.



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Los Angeles District

Figure 3.14-1: Map of Utilities Within the Project Footprint

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4. ENVIRONMENTAL CONSEQUENCES

Under CEQA and NEPA, the terms "effects" and "impacts" are used synonymously (40 C.F.R. § 1508.8). Direct or primary impacts are those caused on-site by the proposed project itself, and that occur at the same time and place. Indirect impacts are those caused by the project and are later in time or farther removed in distance, but are still reasonably foreseeable. Under CEQA and NEPA, indirect impacts also are referred to as secondary effects. (Cal. Code Regs., tit. 14, § 15358, subd. (a)(1)(2).)

Regardless of the definitional differences, under both NEPA and CEQA, the Corps and SBFCWCD must identify and analyze all impacts resulting from a proposed project and its alternatives, whether direct or indirect, and identify feasible, reasonable, and practical mitigation measures to avoid or minimize those identified impacts. (See 40 C.F.R. § 1502.16; Cal. Code Regs., tit. 14, §§ 15126.2 and 15126.4.) All impacts, whether classified as direct or indirect, must be analyzed at the same level and mitigation must be identified. To satisfy both the Corps and SBFCWCD's informational and analytical needs in one document, this SEA/MND utilizes the following format in analyzing the impacts resulting from the proposed Project and alternatives:

- **Direct Impacts**: A direct physical change in the environment is a physical change in the environment that is caused by and immediately related to the proposed Project; direct impacts occur at the same time and place as the Project.

- **Indirect Impacts**. An A physical change in the environment which is not immediately related to the Project, but which is caused indirectly by the Project; indirect impacts occur later in time or farther removed in distance; but they are still reasonably foreseeable. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment.

- **Impact Significance Criteria**. In **Section 4.0**, each environmental issue area lists the significance criteria used by the Corps and SBCFCWCD to determine at what level an impact would be considered significant.

- **Application of Significance Criteria**. This section describes how each of the significance criteria described in the preceding section is or is not applicable to the proposed Project. Those that are not applicable are not considered further.

- **No Impact**. A designation of no impact is given when no adverse changes in the environment are expected.

- **Less-than-Significant Impact**. A project impact is considered less-than-significant when it does not reach the impact significance criteria; and, therefore, would not cause a substantial change in the physical environment. As a result, no mitigation is required or necessary.

- **Significant Impact**. A project impact is considered significant if it would result in a substantial adverse change in the physical environment. Impact significance criteria (defined above) are identified and project impacts are evaluated in the context of the identified significance criteria.

- **Significant Unavoidable Impact.** A project impact is considered significant and unavoidable if it would result in a substantial adverse change in the physical environment that cannot be feasibly/reasonably avoided or mitigated to a less-than-significant level if the selected project is approved and implemented.

- **Beneficial Impact**. This is identified where the Project or alternatives would create a positive change in environmental conditions.

- **Mitigation Measure**: Mitigation measures must be feasible, practical, reasonable, and roughly proportional to the impacts of a proposed project. The mitigation also must avoid, minimize, rectify and/or restore, reduce, or compensate for identified significant impacts to the physical environment. Mitigation includes:

  - Avoiding the impact altogether by not taking a certain action or parts of an action;
  - Minimizing the impact by limiting the degree or magnitude of the action and its implementation;
  - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
  - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
  - Compensating for the impact by replacing or providing substitute resources or environments.

- **Cumulative Impacts.** Under CEQA, "cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (Cal. Code Regs., tit. 14, § 15355.) CEQA requires that cumulative impacts be discussed when the "project's incremental effect is cumulatively considerable." (Cal. Code Regs., tit. 14, § 15130, subd. (a).) NEPA regulations define "cumulative impact" 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 ([f]ederal or non-[f]ederal) or person undertakes such other actions." (40 C.F.R. § 1508.7.) NEPA states that "[c]umulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 C.F.R. § 1508.7.) In this SEA/MND, cumulative impacts resulting from the proposed Project and its alternatives are addressed separately in **Section 5.0**, Cumulative Impacts.

4.1. SOILS AND GEOLOGY

4.1.1. Significance Criteria

An impact to soil (sedimentation/erosion) and geology would be significant if implementation of the proposed Project or the alternatives would:

- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and would potentially result in a landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or
- Accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition which would not be contained or controlled on-site.

4.1.2. No Action Alternative

With the No Action Alternative, proposed improvements to the Bradley Canyon levee would not be implemented and it is reasonably assumed that geotechnical damage to the existing levee would continue to occur. In addition, the existing levee is not capable of containing a 100-year flow event and would be expected to suffer catastrophic damage during such an event. Damage of this magnitude would require emergency flood-fighting response to protect the city of Santa Maria and would eventually require repairs or a new flood control structure be installed. As such, under the No Action alternative, geologic affects associated with levee repair and/or construction would still be expected to occur in the future, and would be of a greater magnitude than under the proposed Project or action alternatives.

4.1.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

As discussed in Section 3.1, the project area has high potential for strong ground motion due to seismic events, but the risk for fault rupture is not significant. Stream channel deposits in the area are likely susceptible to seismic settlement and liquefaction.

Installation of the soil cement portion of this alternative includes substantial excavation, grading, and construction activities within the bed of Bradley Canyon channel. Additionally, the excavation of sand from the channel would be required in order to create the soil cement included in the levee improvements. Excavated materials would be used within the channel. In compliance with section 402 of the Clean Water Act, a Stormwater Pollution Prevention Plan (SWPPP) would be implemented during construction and would include erosion control measures and best management practices to avoid or minimize impacts to soil and geology resources. The SWPPP would also restrict earthmoving activities to the dry season to the maximum extent feasible, and would not permit construction activities to occur in areas containing surface water, thus minimizing the potential for erosion and sediment discharge in the Project area. The soil cement improvements to the existing levee would not result in long-term alterations to the existing topography. Adherence to the SWPPP and the mitigation measures described below would ensure that impacts to soils and geology would be less than significant. Soil cement installation would not result in a landslide, lateral spreading, subsidence, liquefaction, or collapse. Any potential impacts that would occur as a result of the soil cement levee improvement activities being located in an area with geologic conditions that are susceptible to seismic settlement and liquefaction would be reduced or avoided through compliance with the mitigation measures discussed below.

Construction of the temporary diversion channel would likely result in some erosion and turbidity. There would be a pulse of sedimentation following diversion of the channel, resulting in short term turbidity increases as the streambed adjusts to the new flow. High flows during the winter and spring following construction would continue to mobilize sediments in the area where construction occurred; potentially contributing to small increases in turbidity over that normally seen during high flow events, but with the implementation of the mitigation measures described below impacts due to sedimentation would be less than significant. Once the channel is restored to its original location, there is likely to be localized changes to channel morphology as the active floodplain in the channel is re-established.

Installation would not include excavation of sand, soil, or topsoil. There would be minimal excavation on the top of the levee to provide access to install the tiebacks and concrete pile cap. The driving of sheet pile into the existing levee would cause temporary short term vibrations, but localized liquefaction is not anticipated to occur because the soil is too dense. Potential exists for effects from earthquake-induced liquefaction including lateral spreading, which is essentially sliding of the levee into the channel. Further geotechnical investigations would be performed and results incorporated into Project design to ensure that any effects do not result in a significant geologic hazard.

The following mitigation measures would be implemented to ensure impacts to soils and geology would be less than significant.

S-1 The Corps shall prepare and implement an erosion and sedimentation control plan including both temporary and long-term best management practices. Prior to work conducted within the rainy season, extensive measures shall be implemented to avoid contamination of surface water. The Corps shall retain a copy of the erosion and sedimentation control plan on the construction site, and shall document compliance in daily monitoring reports.

S-2 The Corps shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), to be approved by the Regional Water Resources Control Board prior to construction. The SWPPP shall include best management practices. The Corps shall retain a copy f the SWPPP on the construction site, and shall document compliance in daily monitoring reports.

S-3 The Corps shall limit grading and excavation activities within the channel to the dry season (April 1 to November 30) to the maximum extent feasible, and shall not conduct grading and construction activities prior to a predicted rain event, or during a rain event. Grading and construction activities shall not occur in ponded or flowing surface water.

4.1.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include sediment and vegetation clearing that has accumulated within the channel. During a scour event similar to those on record, maintenance activities may be required within the channel to bury the levee protection again. Maintenance operations would be required within the riverbed to ensure that the sheet pile levee protection did not remain a vertical wall. Any damage may require repair immediately. Maintenance may also require temporary access along the toe of the levee and/or excavation and filling activates may occur within the channel. These activities would not be expected to result in significant impacts.

4.1.4. Alternative 2B: Stabilize 3,700 Feet of Bradley Canyon Levee with Soil Cement

Potential soil and geology resources issues and impacts associated with this alternative would be identical to the soil cement portion of Alternative 2A. Therefore, this alternative would have less than significant impacts to soil and geology with implementation of mitigation measures S1 through S-3. Please see Section 4.1.3 for a discussion of impacts and issues.

4.1.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing sediment and vegetation that has accumulated within the channel. During a scour event similar to those on record, maintenance activities may be required within the channel to bury the levee protection again. Maintenance operations would be required within the riverbed to ensure that the sheet pile levee protection did not remain a vertical wall. Any damage may require repair immediately. Maintenance may also require temporary access along the toe of the levee and/or excavation and filling activates may occur within the channel. These activities would not be expected to result in significant impacts.

4.1.5. Alternative 2C: Stabilize 3,700 feet of Bradley Canyon with Sheet Pile

Potential soil and geology issues and impacts associated with this alternative are identical to the sheetpile portion of Alternative 2A. Like the findings for Alternative 2A, with implementation of the mitigation measures S1 through S-3, this alternative would result in less than significant soil and geology impacts.

4.1.5.1. Future Maintenance

Impacts would be similar to Alternative 2A. During a scour event similar to those on record, the resulting erosion could destroy the existing levee and riprap up to the sheetpile wall. This sheetpile wall, in the eroded condition, could extend as much as 30 feet high and a few hundred feet long. Using history as a guide, there is a high probability of this erosion scenario playing out 9-10 times over the next 40 years. To repair this erosion, a large portion of the levee would have to be reconstructed using a compacted fill operation with full compaction requirements. This could easily be considered as a small project within the river and it could require its own environmental documentation. Also, this maintenance work would have to be accomplished quickly because of the public safety concerns. These maintenance activities would not be expected to result in significant impacts to soils and geology.

4.2. AIR QUALITY

4.2.1. Significance Criteria

Air quality impacts under any of the alternatives would be significant if:

- Short-term construction emissions exceed the following SBCAPCD published thresholds: 25 tons per year of VOCs or NOx.
- Emissions conflict with or obstruct implementation of the applicable air quality plans (i.e., 2007 AQMP).

The air emissions from all alternatives are comprised of temporary construction emissions. No new permanent stationary source operating emission sources would be constructed/operated. The alternatives would not create significant incremental operating emissions, nor create the potential for significant operating impacts; therefore, operating emissions have not been estimated and are not discussed in this document.

Greenhouse Gases. On February 18, 2010, the Council for Environmental Quality (CEQ) issued its "Draft NEPA Guidance on Considerations of the Effects of Climate Change and Greenhouse Gas Emissions." On page 1 of the Draft NEPA Guidance, CEQ "affirms the requirements of the statute [*i.e.*, NEPA] and regulations and their applicability to GHGs and climate change impacts." CEQ also underscores the practical limits on the analysis of global climate change. For example, CEQ provides that “agencies should recognize the scientific limits of their ability to accurately predict climate change effects, especially of a short-term nature, and not devote effort to analyzing wholly speculative effects.” (Draft NEPA Guidance, p. 2.) Similarly, CEQA observes that there “are limitations and variability in the capacity of climate models to reliably project potential changes at the regional, local, or project level, so agencies should disclose these limitations in explaining the extent to which they rely on particular studies or projections.” (*Id.* at p. 8.)

By the Draft NEPA Guidance, CEQ proposes that if a project would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of GHG emissions annually (or less than that amount on a long-term basis), lead agencies should provide a qualitative and quantitative assessment, and consider mitigation measures and reasonable alternatives. (Draft NEPA Guidance, pp. 1-2, 5.) However, CEQ does not propose that the "indicator level" (*i.e.*, 25,000 metric tons) be used to measure indirect effects, which CEQ notes "must be bounded by limits of feasibility in evaluating upstream and downstream effects of Federal agency actions." (*Id.* at p. 3.) Also of note, "CEQ does not propose this [*i.e.*, 25,000 metric tons] as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis." (*Id.* at p. 2.)

In the absence of an adopted or science-based GHG standard, the Corps will not propose a new GHG standard or make a NEPA impact determination for GHG emissions anticipated to result from the proposed Project or alternative. Rather in compliance with the CEQ's Draft NEPA Guidance on GHG's, the Corps used the 25,000 metric tons as an indicator level as to whether additional analysis is warranted.

For purposes of CEQA, with respect to the significance assessment, newly added CEQA Guidelines, section 15064.4, subdivision (b), provides:

A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

In 2008, the California Air Resources Board (CARB) proposed a draft interim CEQA significance criterion of 7,000 metric tons CO2e per year for industrial projects, and performance standards which stipulate that the project must meet the interim CARB standards for emissions associated with construction activities as well as transportation. Although the SBCAPCD is not required to adopt a GHG threshold, the SBCAPCD proposes GHG thresholds for stationary sources of 10,000 MT CO2e per year to provide a standard methodology for GHG impacts analysis (CEQA Significance Thresholds for GHGs - Questions and Answers, http://www.sbcapcd.org/apcd/ceqa-ghg-faq.pdf). However, this proposed threshold is not applicable to the proposed Project or alternatives, since neither the proposed Project nor the alternatives would require stationary emission sources during operation. Therefore, for the purpose of CEQA significance determination in this document, the CARB draft interim CEQA significance thresholds are used.

4.2.2. No Action Alternative

Under the No Action Alternative, the proposed activities would not be conducted. Potential impacts to air quality resources would not occur. However, continued flooding or erosion of the levee and adjacent roadway could occur. Flood flows that produce devastating impacts to the surrounding community could trigger the widespread use of equipment emitting at potentially significant levels for emergency repairs. As described in Section 2, the following action plan could occur: (1) ongoing annual routine maintenance by the SBCFCWCD to construct and/or maintain the Bradley Canyon levee and channel to direct frequently occurring low flows away from the levee at the locations of greatest concern, (2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee, and (3) developing a detailed flood fighting response plan. This action plan would provide immediate protection to the levee from the effects of meandering low flows and facilitate timely and aggressive flood fighting of larger flows with sufficient quantities of large rock. Strategically placing stockpiles of rock also enhances the ability to respond to new locations of flow concentration or impingement that would likely develop in the future.

4.2.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee With Combination of Sheet Pile and Soil Cement

Project-related activities that contribute to emissions include: clearing and grubbing of vegetation, excavating soil/sand from the channel, transporting material on or up paved roads, installing sheet pile and soil cement to repair the levee, operating construction equipment, commuting (workers), and operating trucks.

Construction of this alternative would result in short-term impacts to ambient air quality. Construction duration for the soil cement is expected to occur for a period of a year. Ideally, the dry season from May to November would be utilized as the construction window; however, there are some environmental concerns that may further limit the construction window.

Temporary construction emissions would result from on-site activities, such as surface clearing, excavation, soil cement production, and soil cement placement, etc; and from off-site activities such as construction related soil and soil cement haul trips and construction worker commuting. Pollutant emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather. Based on the description of the alternative, the temporary construction activities are likely to involve about 8 to 10construction worker trips daily to and from the site, and up to about 20 truck trips would occur on a busy day of construction activity along local roadways that access the site.

In 2009, the air emissions were estimated for the original Santa Maria River Levee Improvement Project using the latest URBEMIS 2007, Version 9.2.4 (Appendix K of the SEA/MND) and are presented in Table 4.2-1. Construction of the Santa Maria River Levee Improvement Project in Reaches 1-3 involved installing approximately 11 miles of soil cement slope protection and 1700 linear feet of sheet pile along the Santa Maria River.

The proposed Project would improve a 3,700 linear foot reach of the Bradley Canyon Levee from the upstream end of Reach 3. Construction activities and equipment usage for the proposed Project would be the same as those required for the 2009 Project. Because the proposed Project is a very small portion of the improvement project, modeling for emission estimates for the proposed Project was not performed. Emissions for the proposed Project were linearly interpolated based on the total emissions for the 2009 Project which were estimated conservatively assuming 8 hours of daily equipment operation, which is very unlikely. These emissions include most of construction activities and equipment usage, such as off-road equipment use on-site, on-site vehicle trips, and employee commutes, but do not include additional vehicle trips to import 30,000 cubic yards of fill material as described in the Project Description.

Therefore, emissions associated with these vehicle trips for material imports were estimated separately using URBEMIS 2007 (ver. 9.2.4), and added to the overall emissions estimated using the interpolation method (see Appendix K).

Table 4.2-1 Estimated Construction Emissions for the 2009 Project (tons/year)

	VOC	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
2009	1.14	6.40	4.88	0.00	0.87	0.24
2010	4.30	24.32	18.25	0.00	4.08	1.11
2011	2.78	15.86	11.85	0.00	2.97	0.81
Total	8.22	46.58	34.98	0.00	7.92	2.16

Table 4.2-2 Estimated Construction Emissions for the Proposed Project (tons/year)

	VOC	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
2012	0.30	1.73	1.30	0.00	0.29	0.08
2013	0.61	3.45	2.59	0.00	0.59	0.16
Total	0.91	5.18	3.89	0.00	0.88	0.24

As presented in Table 4.2-2, emissions generated from the proposed Project would be well below 25 tons/year for VOC or NOx. Therefore, impacts are insignificant.

Although not required, Mitigation Measures AQ-1 through AQ-16 would be implemented to further reduce criteria pollutant emissions from proposed construction equipment and activities. Therefore, emissions are expected to remain below the threshold throughout the construction period.

Because Santa Barbara County is designated nonattainment for the state eight hour ozone and PM_{10} standards, standard measures for dust control must be implemented for all discretionary construction activities regardless of the significance of the fugitive dust impacts and measures for control of ozone precursors must be consistent with the applicable attainment plans. Stationary sources are required to have permits from the SBCAPCD before constructing, changing, or operating the source. Compliance with this requirement would ensure that Alternative 2A would not conflict with or obstruct implementation of the applicable air quality plans. Therefore, impacts would be less than significant.

Mitigation Measures for PM_{10} Emissions

AQ-1 Develop and implement a Fugitive Dust Emission Control Plan (FDECP). The construction contractor shall develop and implement the FDECP for construction work. Measures to be incorporated into the plan shall include, but are not limited to the following:

- Water the unpaved road access and other disturbed areas of the active construction sites at least three times per day, or apply California Air Resources Board (CARB) certified soil binders.
- If possible, install wheel washers/cleaners or wash the wheels of trucks and other heavy equipment where vehicles exit the site or unpaved access roads.
- Increase the frequency of watering or implement other additional fugitive dust mitigation measures to all disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts) exceed 25 miles per hour (mph).

- Travel route planning shall be completed to identify required travel routes to minimize travel on unpaved roads to each construction or disposal site to the extent feasible.
- Minimize amount of disturbed area and reduce on site vehicle speeds to 15 miles per hour (mph) or less.

AQ-2 Restrict engine idling. Diesel engine idle time shall be restricted to no more than 10 minutes in duration. This is not required for trucks that require engines to be on while waiting onsite, such as concrete trucks.

AQ-3 Use on-road vehicles that meet California on-road standards. All on-road construction vehicles working within California shall meet all applicable California on-road emission standards and shall be licensed in the State of California. This does not apply to construction worker personal vehicles.

AQ-4 All project construction and site preparation operations shall be conducted in compliance with all applicable SBCAPCD Rules and Regulations with emphasis on Rule 302 (Opacity), Rule 303 (Nuisance), and Rule 345 (Fugitive Dust), as well as Rule 201 (Permits Required).

AQ-5 Gravel pads must be installed at all access points to prevent tracking of mud onto public roads.

AQ-6 If importation, exportation, or stockpiling of fill material is involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin unless material is kept moist or treated with soil binders for transport within project area.

AQ-7 The contractor shall designate a person or persons to monitor the dust control program and to order increased watering as necessary to prevent transport of dust offsite. Their duties shall include holiday and weekend periods when work may not be in progress.

Measures for NO_x Emissions

AQ-8 Only heavy-duty diesel-powered construction equipment with engines meeting CARB/U.S. Environmental Protection Agency (USEPA) Tier 2 certification level or engines manufactured after 2005 shall be used.

AQ-9 The engine size of construction equipment shall be the minimum practical size.

AQ-10 The number of pieces of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number are operating at any one time.

AQ-11 Construction equipment shall be maintained in tune per the manufacturer's specifications.

AQ-12 Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or pre-combustion chamber engines.

AQ-13 Catalytic converters shall be installed on gasoline-powered equipment if feasible.

AQ-14 Diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters as certified and/or verified by USEPA or CARB shall be installed on equipment operating onsite.

AQ-15 Diesel-powered equipment should be replaced by electric equipment whenever feasible.

AQ-16 Idling of heavy-duty diesel trucks during loading and unloading shall be limited to five minutes; auxiliary power units should be used whenever possible. State law requires drivers of diesel fueled commercial vehicles weighing more than 10,000 pounds:

- Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location.
- Shall not idle a diesel-fueled auxiliary power system (APS) for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if the vehicle has a sleeper berth and is within 100 feet of a restricted area (homes and schools).
- Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.

Likewise, GHG emissions for the proposed Project were linearly interpolated based on the total GHG emissions estimated for the 2009 Project, as presented in Tables 4.2-3 and 4.2-4.

Table 4.2-3 Estimated Construction GHG Emissions for 2009 Project (metric ton)

	CO2e/Year
Final EA/MND 2009 Emissions	
Off-road – Diesel	6,869.39
On-road – Passenger	175.39
Onroad – Delivery	597.81
Total	7,642.59

Note: The amount of total CO_2 equivalent is estimated by multiplying emissions of CH_4 and N_2O by their global warming potential factors. Global warming potential factors for CH_4 and N_2O are 21 and 310, respectively.

Table 4.2-4 Estimated Construction GHG Emissions for Proposed Project (metric ton)

	CO2e/Year
Off-road- Diesel	764.09
On-road – Passenger	19.51
Onroad – Delivery	69.55
Total	853.16

Note: The amount of total CO_2 equivalent is estimated by multiplying emissions of CH_4 and N_2O by their global warming potential factors. Global warming potential factors for CH_4 and N_2O are 21 and 310, respectively.

The proposed Project would produce GHG emissions below the CEQA significance threshold of 7,000 MT CO2e/year. Therefore, the proposed Project would have a less-than-significant impact under CEQA.

The SBCAPCD published the SBCAPCD Guidelines, which recommends that climate change impacts be mitigated to the extent reasonably possible, whether or not they are determined to be significant. However, the GHG/Climate Change Mitigation Measures suggested in the SBCAPCD guidelines would not be feasible or very effective for a small project, such as the proposed Project. However, implementation of Mitigation Measures AQ-1 through AQ-16 would further reduce GHG emissions attributable to this alternative.

4.2.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include sediment and vegetation clearing that has accumulated within the channel. During a scour event similar to those on record, maintenance activities may be required within the channel to bury the levee protection again. Maintenance operations would be required within the riverbed to ensure that the sheet pile levee protection did not remain a vertical wall. Any damage may require repair immediately. Maintenance may also require temporary access along the toe of the levee and/or excavation and filling activates may occur within the channel. These activities would not be expected to result in significant impacts.

4.2.4. Alternative 2B: Stabilize 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential air quality impacts associated with this alternative would be identical to Alternative 2A, which would be dominated by the emissions from the soil cement construction activity. The construction duration for the soil cement alternative would be approximately 8 to 12 months. Potential air quality impacts associated with this alternative would be identical to Alternative 2A, which would be dominated by the emissions from the soil cement construction activity. Emission estimates shown for Alternative 2A in Table 4.2-2 would be identical to those for Alternative 2B. Because the difference in project schedule and duration would be very minimal, it is expected that the difference in emission estimates would also be negligible. Therefore, this alternative would have less than significant air quality impacts. Although not required, Mitigation Measures AQ-1 through AQ-16 would be implemented to further reduce criteria pollutant emissions from proposed construction equipment and activities.

Similar to Alternative 2A, stationary sources are required to have permits from the SBCAPCD before constructing, changing, or operating the source. Compliance with this requirement would ensure that Alternative 2B would not conflict with or obstruct implementation of the applicable air quality plans. Therefore, impacts would be less than significant.

Potential GHG emissions shown for Alternative 2A in Table 4.2-4 would be identical to those for Alternative 2B. Because the difference in project schedule and duration would be very minimal, it is expected that the difference in emission estimates would also be negligible. Implementation of Mitigation Measures AQ-1 through AQ-16 would further reduce GHG emissions attributable to this alternative.

4.2.4.1. Future Maintenance

As with Alternative 2A, future maintenance activities would be performed by the SBCFCWCD and may include sediment and vegetation clearing that has accumulated within the channel. During a scour event similar to those on record, maintenance activities may be required within the channel to bury the levee protection again and may require temporary access along the toe of the levee. Routine maintenance is not expected to result in significant air quality impacts. Future maintenance would result in minor levels of GHGs.

4.2.5. Alternative 2C: Stabilize 3,700 feet of Bradley Canyon Levee with Sheet Pile

In 2009, the air emissions were estimated for the sheet pile alternative in the 2009 Final EA/MND using the latest URBEMIS 2007, Version 9.2.4 (Appendix K of the SEA/MND) and are presented in Table 4.2-5.

Similar to Alternative 2A, emissions for this alternative were linearly interpolated based on the total emissions estimated for the Sheet Pile Alternative in the 2009 Final EA/MND, as presented in Table 4.2-6.

Table 4.2-5 Estimated Construction Emissions for the Sheet Pile Alternative in the 2009 Final EA/MND (tons/year)

	VOC	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
2009	0.48	3.38	1.90	0.00	2.12	0.48
2010	1.36	9.37	5.37	0.00	6.28	1.42
2011	1.27	8.57	5.08	0.00	6.25	1.40
2012	1.02	6.60	4.07	0.00	5.23	1.16
Total	4.13	27.92	16.42	0.00	19.88	4.46

Table 4.2-6 Estimated Construction Emissions for Alternative 2C (tons/year)

	VOC	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
2012	0.15	1.04	0.61	0.00	0.74	0.17
2013	0.31	2.07	1.22	0.00	1.47	0.33
Total	0.46	3.11	1.83	0.00	2.21	0.50

As presented in Table 4.2-6, construction emissions would be below 25 tons/year for VOC or NOx. Therefore, impacts would be less than significant. Although not required, Mitigation Measures AQ-1 through AQ-16 would be implemented to further reduce criteria pollutant emissions from proposed construction equipment and activities.

Similar to Alternative 2A, stationary sources are required to have permits from the SBCAPCD before constructing, changing, or operating the source. Compliance with this requirement would ensure that Alternative 2C would not conflict with or obstruct implementation of the applicable air quality plans. Therefore, impacts would be less than significant to air quality.

Similar to criteria pollutant emissions, potential GHG emissions for Alternative 2C would be less than those estimated for Alternative 2A. Therefore, GHG emissions associated with Alternative 2C would also be less than significant under CEQA. Implementation of Mitigation Measures AQ-1 through AQ-16 would further reduce GHG emissions attributable to this alternative.

4.2.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations performed by the SBCFCWCD would be required within the riverbed to ensure that the levee protection did not remain a vertical wall. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the sheet pile, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee and/or excavation and fill activities in the channel. However, future routine maintenance is not expected to result in a significant air quality impact. Future maintenance would result in minor levels of GHGs.

4.3. BIOLOGICAL IMPACTS

4.3.1. Significance Criteria

An impact to biological resources would be considered significant if a project alternative results in:

- Substantial loss of riparian habitat, alluvial scrub vegetation;
- Substantial loss of individuals of a Federally-listed species or designated critical habitat; and/or
- Substantial impedance to the movement or migration of fish or wildlife.

4.3.2. No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed. As the No Action Alternative would not correct the deficiency from the original design, the damage that has been sustained would worsen over time, and could eventually result in complete failure of the levee, and therefore, disastrous flood damage. This would be inconsistent with the city of Santa Maria Safety Element and the County of Santa Barbara Seismic Safety and Safety Element, which call for the maintenance of flood control facilities to ensure adequate capacity. Repairs required after flood damage would likely have increased risk of significant impacts to biological resources as both the scale and scope of the clean-up effort would affect a larger area.

Additionally, the SBCFCWCD would have to continue flood fighting activities. The following action plan could occur: 1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern; 2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee; and 3) developing a detailed flood fighting response plan. This action plan would provide immediate protection to the levee from the effects of meandering low flows and facilitate timely and aggressive flood fighting of larger flows with sufficient quantities of large rock. Strategically placing stockpiles of rock also enhances the ability to respond to new locations of flow concentration or impingement that would likely develop in the future.

4.3.3. Alternative 2A: Repair of 3,700 Feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

4.3.3.1. Vegetation and Habitat

Implementation of the proposed Project would result in both temporary and permanent effects to native and non-native vegetation within the Bradley Canyon channel (shown in Figure 2.2-7 and Figure 4.3-1). Tables 4.3-1 through 4.3-3 provide details on the specific habitat that would be disturbed as a result by implementation of the soil cement portion of the proposed Project. The sheetpile portion of the proposed Project would avoid impacts to riparian vegetation as shown in Figure 4.3-1 below.

Direct impacts to native and non-native plant communities would occur as a result of the removal of vegetation during construction activities. These ground-disturbing construction activities include clearing and grading for levee preparation, temporarily widening of the access/ maintenance road may on the upland side of the levee by approximately 10 feet to accommodate the width of the equipment that will be used to install the sheet pile. The temporary fill will be removed after construction, temporary diversion of Bradley Canyon channel as shown in Figure 4.3-1, and placing soil cement on the levee. Construction activities also include establishing a batch plant, staging area, and equipment storage area outside of the channel bed on the upland side of the levee as shown in Figure 2.2-8. Implementation of the proposed Project would disturb a total of 6.85 acres of habitat within the Bradley Canyon channel, of which 6.35 acres would be temporary and 0.50 acre would be permanent due to placement of eight-foot wide soil cement for bank protection at the toe of the levee during construction.

Potential indirect impacts to native vegetation communities including lower terrace scrub communities could include alterations in existing topography and hydrology regimes, the accumulation of fugitive dust, disruptions to native seed banks from ground disturbance, and the colonization of non-native, invasive plant species.

Implementation of Alternative 2A would result in 0.5 acre of permanent loss of habitat, and 6.35 acres of temporary impacts during construction. To compensate for the 0.5-acre loss of permanent impacts, approximately 0.5 acre of native riparian habitat would be established adjacent to existing riparian habitat, as shown in figure 4.3-2 and table 4.3-6. Temporary impacts to native and non-native plant communities (approximately 5.74 acres) would be re-vegetated with a native grass seed-mix as shown in table 4.3-4 in areas located outside of the SBCFCWCD routine maintenance area. The 0.61 acre of temporary impact (table 4.3-5) to the active Bradley Canyon channel rerouted for construction would be returned to pre-construction contours and the original alignment as shown in figure 4.3-1).

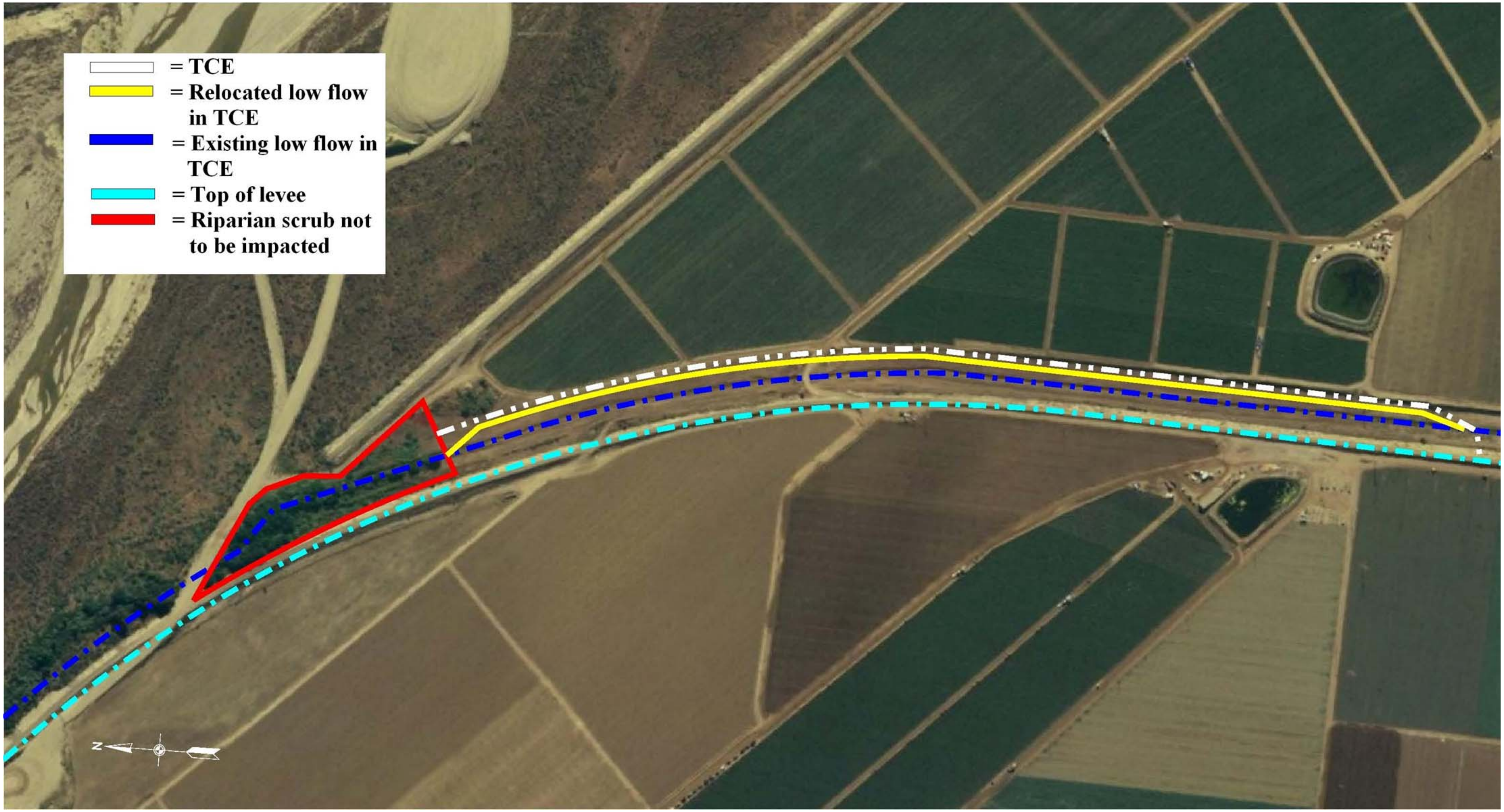
To reduce effects of the proposed Project on plant communities, the Corps would implement mitigation measures **BR-6** which requires the restoration of permanent and temporary impact areas. Adherence to the identified mitigation measures would reduce impacts to less than significant levels.

Noxious and Invasive Plants

To reduce the effects of exotic weeds on natural plant communities, the Corps would implement mitigation measures **BR-1** which requires the delineation of the work area, **BR-2** worker training, **BR-6** which requires the restoration of permanent and temporary impact areas , and **BR-8** which requires that equipment are cleaned prior to working in the riparian corridor. These measures would reduce the effects of the proposed Project by reducing the potential spread and colonization of weedy species and by restoring native plant communities at the conclusion of construction. Adherence to identified mitigation measures would reduce impacts to less than significant levels.

Special Status Plant Species

Federal or state listed plant species were not identified in the Project area during reconnaissance-level surveys conducted in the summer and fall of 2009-2010. There would be no effect on special status plant species.



U.S. Army Corps
Of Engineers
Los Angeles District

Figure4.3-1: Habitat impacted and protected within proposed Bradley Canyon Levee Extension Project Footprint. The Temporary Construction Easement (TCE) is 120-feet from the toe of the Levee as marked on the figure.

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Photo depicting disking and habitat on site in March 2010

Table 4-3.1: Native Habitat Disturbed by Proposed Project					
Community Type/Non-habitat Element	Temporary * Disturbance (Acres)		Permanent Disturbance (Acres)		Total Disturbance Combined (Acres)
	Within Levee	Outside Levee	Within Levee	Outside Levee	
Native Plant Communities					
Arroyo Willow Riparian	0.10				0.10
Riparian Scrub	0.133				0.133
Mulefat Scrub	0.001				0.001
Coyote Bush Scrub	0.01				0.01
Central Coast Scrub	0.003				.0003
Subtotal	0.24				0.24
Total	0.24				0.24

*Temporary disturbance includes areas 112 feet from the permanent disturbance zone for the 3,700-foot reach less 1,000 feet where sheet pile would be installed. Disturbance also includes areas where batch plants would be placed outside of the levee during construction.
“Outside of Levee” is an area out of waters of the United States where the staging area and batch plant will be located.

Table4.3-2: Active Channel Disturbed by Proposed Project					
Community Type/Non-habitat Element Bradley Canyon Channel	Temporary * Disturbance (Acres)		Permanent Disturbance (Acres)		Total Disturbance Combined (Acres)
	Within Levee	Outside Levee	Within Levee	Outside Levee	
Active channel (10’x2700’)	0.61				0.61
Subtotal	0.61				0.61
Total	0.61				0.61

*Temporary Disturbance includes areas 112 feet from the permanent disturbance zone for the 3,700-foot reach less 1,000 feet where sheet pile would be installed. Disturbance also includes areas where batch plants would be placed outside of the levee during construction.
“Outside of Levee” is an area out of waters of the United States where the staging area and batch plant will be located.

Table4.3-3: Non-Native Habitat Disturbed by Proposed Project

Community Type/Non-habitat Element	Temporary * Disturbance (Acres)		Permanent ** Disturbance (Acres)		Total *** Disturbance Combined (Acres)
	Within Levee	Outside Levee	Within Levee	Outside Levee	
Non-Native Plant Communities/ Ag/ Barren					
Non-native Grassland	1.0	1.0	0.20		2.2
Ruderal	1.0	1.0	0.10		2.1
Barren	1.5	2.0	0.20		3.7
Agricultural/disked	2.0				2.0
Subtotal	5.5	4.0	0.50		10.0
Total Habitat	5.5	4.0	0.50		10.0

*Temporary Disturbance includes areas 112 feet from the permanent disturbance zone for the 3,700-foot reach less 1,000 feet where sheet pile would be installed. Disturbance also includes areas where batch plants would be placed outside of the levee during construction.

**Permanent Disturbance includes areas 8 to 10 feet from the toe of the levee for 3,700-foot reach less 1,000 feet where sheet pile would be installed. Permanent disturbance would result from an expanded levee footprint.

***Total Habitat includes all areas both within and outside the levee where construction activities would occur. Within the levee this includes an area 120 feet from the toe of the levee for 3,700 feet less 1,000 feet where sheet pile would be installed. Areas outside the levee include temporary storage areas, staging areas, spoil storage, and batch plant sites.
"Outside of Levee" is an area out of waters of the United States where the staging area and batch plant will be located.

Table4.3-4: Temporary Impact vs. Proposed Revegetation

Community Type	Impact to Habitat (Acres)	Proposed Restoration (Acres)	Location (s)
Native/Non-Native Plant Communities			
Arroyo Willow	0.10	0.10 native grass seed mix	Onsite
Riparian Scrub	0.133	0.133 native grass seed mix	Onsite
Mulefat Scrub	0.001	0.001 native grass seed mix	Onsite
Coyote Bush Scrub	0.01	0.01 native grass seed mix	Onsite
Central Coast Scrub	0.003	0.003 native grass seed mix	Onsite
Barren land	1.5	1.5 seed native grass mix	Onsite
Ruderal/ disturbed	1.0	1.0 seed native grass mix	Onsite
Non-native Grassland	1.0	1.0 native grass seed mix	Onsite
Agricultural/disked	2.0	2.0 native grass seed mix	Onsite
Total seed mix	5.74	5.74 native grass seed mix	Onsite

Table4.3-5: Temporary Impact to Active Channel vs. Proposed Restoration

Community Type	Impact to Bradley canyon channel (Acres)	Proposed Restoration (Acres)	Location (s)
Active Channel			
Active Channel (10' x 2700')	0.61	0.61 to its original location	Onsite

Table4.3-6: Permanent Impact vs. Proposed Mitigation

Community Type	Impact to Habitat (Acres)	Proposed Mitigation (Acres)	Location (s)
Non-native Grassland	0.20	0.20 (Establishing willow riparian habitat)	Onsite adjacent to sheetpile riparian
Ruderal	0.10	0.10 (Establishing willow riparian habitat)	Onsite adjacent to sheetpile riparian area
Barren	0.20	0.20 (Establishing willow riparian habitat)	Onsite adjacent to sheetpile riparian area
Total Habitat	0.50	0.50 (Establishing willow riparian habitat)	Onsite

Figure 4.3-2 Proposed Mitigation location for permanent impacts

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Jurisdictional Habitats

Direct effects to jurisdictional waters of the United States would occur from levee construction, the use of temporary work areas, temporary diversion of the active channel, and vegetation clearing and grubbing. Implementation of the proposed Project would impact approximately 6.85 acres of waters of the United States within the Bradley Canyon channel. Levee construction would permanently impact approximately 0.5 acre of waters of the United States, which primarily consists of non-native grassland and barren substrate. Implementation of the proposed Project would temporarily impact approximately 6.35 acres of native and non-native vegetation and active channel consisting of 0.24 acre of native vegetation, 0.61 acre of active Bradley canyon channel, 1.0 acre of non-native grassland, 1.5 acres of barren substrate, 1.0 acre of ruderal/disturbed vegetation, and 2.0 acres of agricultural/ disked habitat.

To minimize and compensate the effects of the proposed Project on jurisdictional waters of the United States, the Corps would implement mitigation measures **BR-6 and 7**. BR-6 requires the restoration of disturbed areas (permanent and temporary) at the conclusion of construction. To restore lost functions and services, the Corps will restore approximately 5.74 acres of the degraded vegetation communities present in the Project area and establish 0.5 acre of riparian habitat at the Bradley Canon confluence. BR-7 requires temporary impacts to the active channel be mitigated by returning the re-routed channel to its pre-construction alignment and contours. Adherence to the identified mitigation measures would reduce impacts to less than significant levels.

4.3.3.2. Wildlife

The Bradley Canyon channel supports a variety of both common and sensitive wildlife species.

As the proposed Project would occur in both portions of the active channel and adjacent terrace area within the confines of the levee system this could affect species that rely on adjacent uplands for portions of their life history. Some of the wildlife species, specifically semi-aquatic species such as amphibians, depend upon land and water. Vegetated uplands are important areas utilized by many semi-aquatic and riparian species. Riparian vegetation provides necessary foraging and nesting habitat for many bird species (Rottenborn, 1999; Bolger et al., 1997). The Project area contains suitable foraging and nesting habitat for both resident and migratory birds. Ground-disturbing activities have the potential to disturb vegetation utilized by wildlife, including nesting birds. Construction noise could also disrupt breeding birds. With the exception of a few non-native birds, such as European starling, any active nest is fully protected against take pursuant to the Migratory Bird Treaty Act (MBTA) and relevant U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) codes. Impacts to nesting birds could occur if construction activity results in abandonment of the nest.

Direct impacts to wildlife that could occur as a result of the proposed Project include the removal of vegetation and subsequent temporary loss of wildlife habitat. In addition, construction activities would result in the displacement and/or potential mortality of resident wildlife species that are poor dispersers such as snakes, lizards, and small mammals. Construction may also result in the temporary degradation of the value of adjacent native habitat areas in the channel due to disturbance, noise, increased human presence, and increased vehicle traffic during construction. Indirect impacts may include increased human presence and the loss of habitat through the colonization of noxious weeds.

Threatened and Endangered Species

Habitat in the Project area has the potential to support a variety of state and federally listed wildlife species. These include southern steelhead trout, California red-legged frog, arroyo toad, least Bell's vireo, tidewater goby, southwestern willow flycatcher, western spadefoot toad, and burrowing owl.

Southern steelhead trout

The Santa Maria River is known to support passage by southern steelhead only during periods of high flow where the Santa Maria River provides connectivity from downstream areas (i.e. the Pacific Ocean and estuarine habitat) to higher elevation streams where breeding occurs. The Santa Maria River has been designated as critical habitat for this species by the National Marine Fisheries Service. In general this species would likely not be present within the proposed construction area and would not be subject to construction related effects. Given the hydrology and soil conditions within the Bradley Canyon channel, direct and indirect effects to this species are not expected to occur. Mitigation Measure **BR-4**, which includes working outside of the winter-spring fish migration period which can extend from December 1 through March 1, would ensure no effects are exacted to this federally listed species as a result of this proposed Project. The Project area does not occur within the designated critical habitat for the species.

Therefore, the proposed Project would have no affect on this species or designated critical habitat.

California red-legged frog

Even though changes in harvesting crops and the use of drip irrigation has reduced the amount of water within the low flow of Bradley Canyon channel as shown in the photo below and the overall numbers of CRLF within the project limits have fluctuated over the years, CRLF are still likely to be present within the project limits.

Bradley Canyon Channel in February 2011

CRLF have been documented to make overland movements of several hundred meters and up to one mile during a winter-spring wet season (Bulger et al., 2003; Fellers and Kleeman, 2007). This is particularly true on nights with high humidity or precipitation.

Due to the presence of CRLF in the channel year-round, construction of the proposed Project may adversely affect this species. Formal consultation with the United States Fish and Wildlife Service (USFWS) pursuant to section 7 of the Endangered Species Act would be required. The Corps initiated formal Section 7 consultation with the USFWS in April, 2011. A non-jeopardy biological opinion was issued by the USFWS on October 27, 2011.

The Corps has incorporated various avoidance and minimization measures into the proposed Project to minimize effects on CRLF. Construction would be avoided during the CRLF breeding season (December 1st thru March 31st) in areas with the potential for CRLF occurrence. In addition, mitigation measures have been developed to avoid/minimize the potential effect on this species during project construction as specified below such as **BR-1** which requires delineation of the work area with fencing and construction equipment would be placed at the staging area, about 20 to 30 meters away from riparian vegetation and habitat suitable for the CRLF; **BR-5** which requires construction activities would be monitored by a USFWS-approved biologist; and **BR-2** which requires pre-construction surveys for sensitive species, and **BR-9** which requires equipment would be cleaned prior to working in the Project area.

Arroyo toad

There is no potential for arroyo toad to occur on site and therefore would have no effect to the toad.

Least Bell's Vireo

The least Bell's vireo has not been reported within the Project area but has been observed in riparian areas near the Cuyama River few miles upstream of the Project area. There is also suitable habitat for least Bell's vireo consisting of thickets of riparian woodland near the far downstream reach of the Project area but none were sighted during the recent surveys. The Project area does not occur within the designated critical habitat for the species. Thus, direct and indirect effects to this species are not expected to occur and the proposed Project would have no effect on this species or its designated critical habitat.

Tidewater goby

The tidewater goby is native to California's brackish water lagoons and prefers lightly saline cool water with sandy bottoms. This species is not expected to be found within the Project area. Therefore, the proposed Project would have no affect on this species.

Southwestern willow flycatcher

There is no potential for southwestern willow flycatcher to occur onsite and therefore would have no effect to the species.

Other Special Status Species

The area is highly disturbed due to agricultural activities and urbanization but if there may be some species including birds, reptiles, mammals, and amphibians that have the potential to be affected by the proposed Project. Direct effects to these species could occur from construction activities, movement of equipment, and human trampling. Disturbance would be associated with the ground disturbance. To avoid impacts to migratory birds, ground clearing and grubbing and Bradley Canyon channel diversion would be done outside of the bird nesting season and CRLF breeding season. Impacts to small special-status terrestrial herpetofauna potentially present in the Project area, including spadefoot toad, western toad, and California gray squirrel, would be similar. Direct impacts include being hit by vehicles on access roads, mechanical crushing during grading, and general disturbance due to increased human activity. Furthermore, implementation of the proposed Project may result in small but permanent loss of terrace habitat due to the placement of soil cement protection. However, all temporarily disturbed areas in the construction zone would be restored onsite after completion of the project. Individuals of one or more of the special-status terrestrial herpetofauna could be injured or killed during ground-disturbing project activities in undeveloped upland habitats and in some developed areas throughout the Project area. Indirect impacts to these species could be from compaction of soils.

Raptors are also known to occur in the region and a barn owl was observed in the riparian habitat at the downstream section of the Project area. Burrowing owl, a CDFG Species of Special Concern, has some potential to occur within portions of the levee or adjacent grasslands. However, burrow surveys conducted by Corps biologists and Aspen biologists in January 2010 and 2011did not identify any suitable burrows.

Direct impacts to nesting birds could include disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities and the loss of foraging and nesting habitat due to vegetation clearing. Indirect impacts include the loss of habitat due to the establishment of noxious weeds and a disruption of breeding activity or the flushing of adult or fledging birds through the use of new or improved access roads from construction personnel.

The removal of habitat outside of the bird breeding season would likely result in the temporary displacement of breeding birds. The displaced birds/wildlife would likely move to other areas available in the vicinity of the project site. Breeding birds and other wildlife may temporarily leave their territories due to construction activity which could lead to reduced reproductive success.

The project activities would be subject to the MBTA. Implementation of the proposed Project would not substantially reduce habitat available for these species, restrict their range, or cause their regional populations to drop below self-sustaining levels. To reduce the effects of the proposed Project on these species, the Corps would implement the same measures utilized for sensitive riparian species. This would include the replacement of lost habitat functions through the restoration of habitat onsite or offsite in the same watershed, construction monitoring, pre-construction surveys, and the avoidance of nest locations. Vegetation would be cleared outside the breeding season (February 15 to September 15).

These impacts would be considered less than significant with the implementation of avoidance and minimization measures described below.

Wildlife Movement

Terrestrial Wildlife

Wildlife corridors provide a variety of functions and can include habitat linkages between natural areas, provide greenbelts and refuge systems, and divert wildlife across permanent physical barriers to dispersal such as highways and dams by roadway underpasses and ramps (Hass, 2000; Simberloff et al., 1992). Generally, the accepted definition describes a wildlife corridor as a linear habitat embedded in a dissimilar matrix that connects two or more larger blocks of habitat (Beier and Noss, 1998). Noss (1987) also suggests several potential advantages to corridors including increased species richness and diversity, decreased probability of extinction, maintenance of genetic variation, a greater mix of habitat and successional stages, and alternative refugia from large disturbances.

Linkages and corridors facilitate regional animal movement and are generally centered around waterways, riparian corridors, flood control channels, contiguous habitat, and upland habitat. Drainages generally serve as movement corridors because wildlife can move easily through these areas and surface water is available from agricultural irrigation. Corridors also offer wildlife unobstructed terrain for foraging and for dispersal of young individuals.

Even though the Bradley Canyon low flow channel would be temporarily diverted during construction along the length of the soil-cement portion, ground-disturbing activity including clearing and grubbing/grading and levee repairs within the 120 foot wide construction zone are not likely to significantly interfere with terrestrial wildlife movement during construction with the implementation of Mitigation Measures **BR-1 through BR-20** below.

At the completion of construction, the proposed levee improvements would not result in a new barrier to wildlife movement. Currently, the construction of the proposed Project would generally involve initial clearing and grubbing of habitat, excavation of soil/sand from the channel, and the construction of soil cement protection over an existing levee. While the levee would be slightly larger, new barriers to movement would not be constructed. Large urban areas in the Santa Maria Valley, agricultural lands, and Santa Maria Landfill areas occur adjacent to the project alignment. Due to the limited area of levee construction and the large open area that occurs within the Project site, wildlife would not be physically prevented from moving during project construction. Therefore, impacts to wildlife movement would be considered less than significant.

Aquatic Wildlife

The portion of Bradley Canyon channel located within the Project area would be temporarily diverted during levee repair work. BMPs and measures suggested by the USFWS, RWQCB, and in this Final SEA/MND would be implemented to minimize project-related impacts to aquatic wildlife resources during construction activities. Upon completion of work, the low flow channel throughout the Project area would be reconstructed to the original configuration and contours. The proposed Project would not substantially interfere with the movement of any native resident or migratory fish species within the Bradley Canyon channel. Native and migratory fish do not occur in the Project area. However, during the rainy season, when there is a potential for fish to occur within the Project area, no construction activities would occur. Measures to avoid and minimize impacts include the following mitigation measures: **BR-1** which requires the delineation of the work area; **BR-2 and BR-5** which requires the use of a USFWS-approved biologist for pre-construction surveys for sensitive species and during construction; **BR-3** which requires worker training; and **BR-6** and **BR-7** which requires the restoration of disturbed areas. These measures would ensure that any activities in riparian activities do not result in an obstruction to wildlife movement.

The Corps proposes to implement the following mitigation measures to minimize effects of the proposed Project on biological resources:

BR-1 Prior to site disturbance, the Corps' contractor shall clearly delineate the limits of construction on project plans with the coordination of the Corps biologist. All new construction, site disturbance, and vegetation removal shall be located within the delineated construction boundaries. The storage of equipment and materials and temporary stockpiling of soil shall be located within designated staging areas only. The limits of construction shall be delineated in the field with temporary construction fencing, staking, or flagging.

BR-2 Prior to initial ground disturbance or removal of any riparian vegetation with the project area, a USFWS-approved biologist shall survey the construction site and adjacent areas to determine if any sensitive plants, fish, or wildlife species are present. If the species are present, the Corps shall modify construction activities to avoid removal or substantial disturbance to the key habitat areas or features where possible. Avoidance and minimization measures shall be described in a pre-construction briefing report for the construction contractor. All terms and conditions included in the biological opinion rendered by the USFWS shall be followed prior to and during construction.

BR-3 Prior to initiation of construction activities, a USFWS-approved biologist shall conduct pre-construction environmental training for all construction crew members. The training shall focus on required mitigation measures and a summary of sensitive species and habitats potentially present within and adjacent to the Project area.

BR-4 The construction contractor shall clear vegetation associated with project construction only during periods when migratory birds are not nesting and California red-legged frogs (CRLF) are not breeding (15 September through 30 November). The Corps contractor shall limit grading and excavation activities within the channel to the dry season (April 1 to November 30).

BR-5 Construction activities shall be monitored by a USFWS- approved biologist during the initial ground disturbing activities, including vegetation clearance and water diversion. Thereafter, a designated biological monitor shall be onsite throughout project implementation to ensure CRLFs are not killed or injured as described in the USFWS's biological opinion. The designated biological monitor shall have completed the species specific training specified in BR-3.

BR-6 The Corps shall restore disturbed areas (temporary and permanent) as restoration/compensation for impacts to native and non-native vegetation communities. The Corps shall prepare a Habitat Restoration and Revegetation Plan for the project. Plans for restoration, enhancement/revegetation and/or establishment shall include at a minimum: (a) the location of the restoration site; (b) the plant species to be used; (c) a schematic depicting the restoration area; (d) time of year that the planting will occur; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation onsite; (g) performance criteria; (h) detailed monitoring and maintenance program; (i) adaptive management measures; (j) long-term management plan; and (k) site protection. Restoration shall include the revegetation of stripped or exposed work areas. Permanent impacts will be mitigated onsite through the establishment of riparian habitat in compliance with the Corps' Mitigation Rule at 33 CFR Part 332 and as described in the Habitat Restoration and Revegetation Plan.

BR-7 Upon completion of construction, the Bradley Canyon low flow channel shall be returned to its pre-construction location and contours.

BR-8 The Corps shall ensure that all vehicles and large equipment utilized on the Project have been washed prior to commencing work on the Project. This includes wheels, undercarriages, bumpers, and all parts of the vehicle. The Corps' contractor shall keep a written log documenting that vehicles have been cleaned prior to use on the Project site. Once equipment and vehicles have been staged on the job site no further washing would be required unless the vehicles or equipment are moved offsite and then returned.

BR-9 Before project activities begin, the USFWS-approved biologist must identify appropriate areas to receive relocated CRLFs. These areas must be in proximity to the capture site, support suitable vegetation, and be free of exotic predatory species (e.g., bullfrogs) to the best of the USFWS-approved biologist' knowledge. The USFWS- approved biologist must be allowed sufficient time to move CRLFs from the site before work activities begin. When capturing and relocating CRLFs from work sites, the USFWS-approved biologist must minimize the amount of time that the animals are held in captivity. During this time, they must be maintained in a manner that does not expose them to temperatures or any other environmental conditions that could cause injury or undue stress. CRLFs must be captured by hand or dipnet and transported in buckets separate from other species. The USFWS-approved biologist is to maintain detailed records of any individuals that are moved (e.g. size, discoloration, any distinguishing features, digital photographs) to assist him or her in determining whether translocated animals are returning to the original points of capture.

BR-10 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to prevent CRLFs from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

BR-11 Water will not be impounded in a manner that may attract CRLFs within the construction site. A USFWS-approved biologist shall ensure that the spread or introduction of invasive exotic species such as bullfrogs, crayfish, and centrarchid fishes are avoided to the maximum extent possible during construction.

BR-12 Field personnel will be trained to recognize and avoid CRLF and the field personnel shall alert the USFWS-approved biologist or designated biological monitor if a CRLF is found in the project area.

BR-13 A qualified Corps biologist shall be present at the work site at all times during project construction or other habitat disturbance.

BR-14 As identified in the amended Clean Water Act section 401 Water Quality Certification issued by the Regional Water Quality Control Board, the contractor shall implement best management practices for erosion control during and after project implementation (e.g., silt fences, settling basins, and/ or other sediment traps will be temporarily used).

BR-15 During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas (e.g., trash left during or after project activities may result in an increased number of predators, such as raccoons (*Procyon lotor*) or opossums (*Didelphis virginiana*), that may injure or kill CRLFs).

BR-16 All steep-walled holes or trenches that may act to trap CRLFs must be covered at the end of each work day, or a wildlife escape ramp must be installed so that any CRLFs that become trapped have the opportunity to escape;

BR-17 No pets will be allowed on the construction site.

BR-18 The USFWS-approved biologist(s) or designated biological monitor must conduct routine surveys of work areas, including each morning before construction activities resume, to ensure CRLFs have not moved back into a work area overnight. If the species is discovered in a work area and is at risk of harm from project related activities, the Corps will suspend work on that particular phase of the project until the animal voluntarily leaves the area or until a USFWS-approved biologist is available to capture and relocate the individual.

BR-19 The USFWS-approved biologist and designated biological monitor, in full coordination with the Corps, will be a liaison between resource agencies and construction staff regarding compliance with the USFWS's biological opinion.

BR-20 Construction activities must be halted when a rain event of 1/2 inch or more is forecast within 48 hours as predicted by the National Weather Service. After a rain event, the USFWS-approved biologist must conduct a pre-construction survey for CRLFs dispersing through the project site. Construction must resume only after the site has sufficiently dried and the USFWS-approved biologist determine that CRLFs are unlikely to be dispersing through the project site.

4.3.3.3. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may also include clearing debris, weeds, and wild growth that has accumulated within the channel. During a scour event similar to those on record, maintenance operations may be required within the channel to repair the levee. Maintenance operations would be required along the downstream end of Project area to ensure that the sheet pile levee protection did not remain an exposed vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm and may include, as necessary, test programs to determine the condition of the bank protection, investigation to determine the cause of some potential or actual malfunction, and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Impacts could include trampling and crushing of native vegetation by vehicular or foot traffic, alterations in topography and hydrology, increased erosion and sedimentation, and the introduction of non-native, invasive plant species due to increased human presence on foot or equipment. However, implementation of the mitigation measures above would reduce impacts to less than significant.

4.3.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Under this alternative, soil cement would be placed along the entire face of the existing levee. Impacts to biological resources would be similar to Alternative 2A. Details are provided in the following sections below.

4.3.4.1. Vegetation and Habitat

Implementation of this alternative would result in the greatest temporary and permanent effects to native, non-native, agricultural, and barren habitat within Bradley Canyon. In total, this alternative would disturb a total of 9.5 acres of habitat consisting of non-native vegetation, native vegetation, Bradley Canyon channel, barren land, and agricultural land of which 0.7 acre are considered a permanent impact. Temporary impacts to native riparian vegetation would be 2.5 acres and permanent impacts would be approximately 0.2 acre. Project-related permanent impacts to 0.7 acre would be fully mitigated by restoring 9.5 acres of temporarily disturbed area.

Indirect impacts to native vegetation communities could include alterations in existing topography and hydrology regimes, the accumulation of fugitive dust, disruptions to native seed banks from ground disturbance, and the colonization of non-native, invasive plant species. Temporary channel diversion may also be required to direct flow away from the construction areas.

Implementation of the mitigation measures described above would reduce impacts to less than significant.

Noxious and Invasive Plants

Direct impacts associated with the introduction of noxious weeds would be similar but of greater magnitude than the impacts that would be caused by Alternative 2A. Implementation of the mitigation measures described above would reduce impacts to less than significant levels.

Special Status Plant Species

Federal or state listed plant species do not occur on the levee or existing access road and would not be affected by this alternative. Listed plant species are not expected to occur within the project area during construction periods. Direct and indirect effects to these species are not expected to occur. Therefore, Alternative 2B would have no effect on these species.

Jurisdictional Habitats

Direct impacts to jurisdictional waters of the United States would be similar but of greater magnitude than the impacts that would be caused by Alternative 2A. Increased disturbance to jurisdictional waters could increase the potential for the degradation of water quality and plant communities. Implementation of this alternative would result in temporary and permanent disturbances to approximately 9.5 acres of Bradley Canyon channel, including temporary disturbances to 7.0 acres of non-native habitat, non-native grassland, vegetation, and other habitat (i.e., agricultural areas and barren areas) and 2.5 acre of native habitat of which 0.7 acre is permanent impacts. Implementation of the mitigation measures described for Alternative 2A would reduce impacts to less than significant levels.

4.3.4.2. Wildlife

Implementation of this alternative would have direct effects on wildlife species that occur within the channel on the riverside of the levee. Indirect impacts may include increased human presence and the loss of habitat through the colonization of noxious weeds. Operational impacts would be less frequent than impacts that would be caused by the proposed project because of the stability of the slope protection. During inspections, wildlife could be affected by noise, human disturbance, and fugitive dust.

Threatened and Endangered Species

Habitat in the Project area has the potential to support a variety of state and federally listed wildlife species. These include southern steelhead trout, California red-legged frog, arroyo toad, least Bell's vireo, tidewater goby, southwestern willow flycatcher, western spadefoot toad, and burrowing owl.

Southern steelhead trout

The Santa Maria River is known to support passage by southern steelhead only during periods of high flow where the Santa Maria River provides connectivity from downstream areas (i.e. the Pacific Ocean and estuarine habitat) to higher elevation streams where breeding occurs. The Santa Maria River has been designated as critical habitat for this species by the National Marine Fisheries Service. In general this species would likely not be present within the proposed construction area and would not be subject to construction related effects. Given the hydrology and soil conditions within the Bradley Canyon channel, direct and indirect effects to this species are not expected to occur. Mitigation Measure **BR-4**, which includes working outside of the winter-spring fish migration period which can extend from December 1 through March 1, would ensure no effects are exacted to this federally listed species as a result of this proposal. The Project area does not occur within the designated critical habitat for the species. Therefore, Alternative 2B would have no affect on this species or designated critical habitat.

California red-legged frog

Even though changes in harvesting crops and the use of drip irrigation has reduced the amount of water within the low flow of Bradley Canyon channel and the overall numbers of CRLF within the project limits have fluctuated over the years, CRLF are still likely to be present within the project limits.

CRLF have been documented to make overland movements of several hundred meters and up to one mile during a winter-spring wet season (Bulger et al., 2003; Fellers and Kleeman, 2007). This is particularly true on nights with high humidity or precipitation.

Due to the presence of CRLF in the channel year-round, construction of this proposal may adversely affect this species. Formal consultation with the United States Fish and Wildlife Service (USFWS) pursuant to section 7 of the Endangered Species Act would be required. The Corps initiated formal Section 7 consultation with the USFWS in April, 2011. The final SEA/MND would incorporate the biological opinion rendered by the USFWS.

The Corps has incorporated various avoidance and minimization measures into the project to minimize effects on CRLF. Construction would be avoided during the CRLF breeding season (November 30tht thru March 31st) in areas with the potential for CRLF occurrence. In addition, mitigation measures have been developed to avoid/minimize the potential effect on this species during project construction as specified below such as **BR-1** which requires delineation of the work area with fencing and construction equipment would be placed at the staging area, about 20 to 30 meters away from riparian vegetation and habitat suitable for the CRLF; **BR-5** which requires construction activities would be monitored by a USFWS-approved biologist; **BR-2** which requires pre-construction surveys for sensitive species, and **BR-9** which requires equipment would be cleaned prior to working in the riparian corridor.

Arroyo toad

There is no potential for arroyo toad to occur on site and therefore would have no effect to the toad.

Least Bell's Vireo

The least Bell's vireo has not been reported within the Project area but has been observed in riparian areas near the Cuyama River few miles upstream of the Project area. There is also suitable habitat for least Bell's vireo consisting of thickets of riparian woodland near the far downstream reach of the Project area but none were sighted during the recent surveys. The Project area does not occur within the designated critical habitat for the species. Thus, direct and indirect effects to this species are not expected to occur and this proposal would have no effect on this species or its designated critical habitat.

Tidewater goby

The tidewater goby is native to California's brackish water lagoons and prefers lightly saline cool water with sandy bottoms. This species is not expected to be found within the Project area. Therefore, this alternative would have no affect on this species.

Southwestern willow flycatcher

There is no potential for southwestern willow flycatcher to occur onsite and therefore would have no effect to the species.

Other Special Status Species

This alternative would increase the amount of habitat subject to project disturbance and would increase the potential for direct loss of other special status species when compared to Alternative 2A. As described for listed species construction of this alternative would remove habitat within the Bradley Canyon channel and adjacent terrace habitats. Impacts to species that occupy this area would occur if present.

The types of impacts to small special-status terrestrial herpetofauna (e.g. spadefoot toads, horned lizards, pacific tree frog) potentially present in the Project area would be the same as the impacts that would be caused by Alternative 2A but the potential for effects to these species would increase due to the loss of additional habitat. The direct impacts include being hit by vehicles on access roads, mechanical crushing during grading, fugitive dust, and general disturbance due to increased human activity. Furthermore, this alternative would result in small but permanent loss of terrace habitat due to the placement of soil cement protection. Indirect impacts to these species include compaction of soils and the introduction of exotic plant species.

Direct impacts to nesting birds could include temporary loss of habitat and the disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities.

Implementation of the mitigation measures described for Alternative 2A would reduce impacts to less than significant levels.

Wildlife Movement

Terrestrial/Aquatic Wildlife

The portion of Bradley Canyon channel located within the Project area would be temporarily diverted during levee repair work. Best management practices and measures suggested by USFWS, RWQCB, and in this Final SEA/MND would be implemented to minimize project-related impacts to aquatic wildlife resources during construction activities. Upon completion of work, the low flow channel throughout the Project area would be reconstructed to the original configuration and contours. Construction of this alternative would result in the temporary disturbance of habitat but would not result in permanent features that would inhibit or restrict wildlife movement. The use of soil cement throughout the entire length of the Project area would also reduce the potential for erosion of the sheet pile and the creation of vertical cuts that would limit movement. Barriers to wildlife movement would not occur and only temporary effects to wildlife moving along the levee would occur during construction. This alternative would not interfere with the movement of any native resident or migratory fish species. As proposed, this alternative would not result in significant impacts to wildlife movement.

4.3.4.3. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may also include clearing debris, weeds, and wild growth that has accumulated within the channel. During a scour event similar to those on record, maintenance operations may be required within the channel to repair the levee. Maintenance operations would be required along the downstream end of Project area to ensure that the sheet pile levee protection did not remain an exposed vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm and may include, as necessary, test programs to determine the condition of the bank protection, investigation to determine the cause of some potential or actual malfunction, and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Impacts could include trampling and crushing of native vegetation by vehicular or foot traffic, alterations in topography and hydrology, increased erosion and sedimentation, and the introduction of non-native, invasive plant species due to increased human presence on foot or equipment. However, implementation of the mitigation measures above would reduce impacts to less than significant.

4.3.5. Alternative 2C: Stabilize 3,700 feet of Bradley Canyon Levee with Sheet Pile

Sheet pile walls consist of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. This method could be used without disturbing the existing levee slope and the vegetation. No excavation would be required in the channel for this alternative. As a result, this alternative would not result in the removal of riparian or upland vegetation within the channel. Impacts associated with this alternative would be greatly reduced and limited to the effects of noise and fugitive dust on adjacent riparian and upland habitat. The potential effects to both common and listed species would be reduced with the implementation of this alternative. Construction of this alternative would result in no impacts to waters of the U.S. However, maintenance to repair scour from winter storms would result in repeated repair activities in waters of the U.S., resulting in potential long term adverse effects to native vegetation and other biological resources. Soil would be placed at the exposed sheet pile areas within the channel to ensure stability and maintain wildlife movement, which would result in direct impacts to the waters of the U.S. This alternative would require extensive maintenance due to the bigger footprints of sheet pile installation as compared to Alternative 2A. Under this alternative, the repeated maintenance activities could cause greater impacts to waters of the U.S. and other biological resources when compared to Alternative 2A. In addition, the erosion cycle and levee damage not only undermines the stability of the levee but poses a potentially significant public health and safety hazard. The sheet pile alternative could also introduce the potential for additional environmental impacts (wildlife, water, air, noise, and traffic) to occur over the lifetime of the project.

4.3.5.1. Vegetation and Habitat

Implementation of this alternative would not result in temporary or permanent effects to riparian or upland vegetation within the Bradley Canyon channel. Work would be limited to the existing access road and currently barren staging areas adjacent to the river on the landside. Direct impacts to native riparian plant communities would not occur. Indirect impacts to native vegetation communities could include alterations in existing hydrology regimes and the accumulation of fugitive dust.

<u>Noxious and Invasive Plants</u>

Direct impacts associated with the introduction of noxious weeds would be limited to wind-blown material transferred to the adjacent upland or stream terraces. No vehicle access would occur within the channel and direct transfer of material would be reduced with this alternative.

<u>Special Status Plant Species</u>

Federal or state listed plant species do not occur on the project footprints of the levee or existing access road and would not be affected by this alternative.

<u>Jurisdictional Habitats</u>

This alternative would avoid working in the channel and direct effects on jurisdictional waters of the United States would not occur. Implementation of the mitigation measures for Alternative 2A would avoid effects on jurisdictional waters.

4.3.5.2. Wildlife

Implementation of this alternative would reduce direct effects of the project on wildlife species that occur within the riparian corridor and terrace habitat within the Project area. The direct impacts to wildlife that could occur from this alternative include the temporary degradation of the value of adjacent native habitat areas in the channel due to disturbance, noise, increased human presence, and increased vehicle traffic during construction. Indirect impacts may include increased human presence and the loss of habitat through the colonization of noxious weeds.

<u>Threatened and Endangered Species</u>

<u>Southern steelhead trout</u>

Construction of this alternative would avoid direct modification or alteration of the Bradley Canyon channel and would avoid removal of habitat. The Project area does not occur within the designated critical habitat for the species. Implementation of the mitigation measures for Alternative 2A would avoid effects to this species.

<u>California red-legged frog</u>

Direct impacts to CRLF could occur from construction noise activities. However, the potential for effects to CRLF would be lower than Alternative 2A as construction activities would not occur within the channel. Disturbance would be associated with vehicle access on the levee roads or from vibration from sheet pile installation. Indirect impacts to these species could include the degradation of water quality, changes in water runoff due to access road construction, and the spread of noxious weeds along sensitive riparian areas. Implementation of the mitigation measures for Alternative 2A would avoid effects to this species.

<u>Arroyo toad</u>

There is no potential for arroyo toad to occur on site and therefore would have no effect to the toad.

<u>Least Bell's vireo</u>

The least Bell's vireo has not been reported within the Project area but has been observed in riparian areas near the Cuyama River few miles upstream of the Project area. There is also suitable habitat for least

Bell's vireo consisting of thickets of riparian woodland near the far downstream reach of the Project area but none were sighted during the recent surveys. The Project area does not occur within the designated critical habitat for the species. Thus, direct and indirect effects to this species are not expected to occur and this proposal would have no effect on this species or its designated critical habitat.

Tidewater goby

The project area lacks any suitable habitat for tidewater goby and direct/indirect effects to this species would not occur.

Southwestern willow flycatcher

There is no potential for southwestern willow flycatcher to occur onsite and therefore would have no effect to the species.

Other Special Status Species

As described for listed species construction of this alternative would avoid direct removal of habitat within the Bradley Canyon channel and adjacent terrace habitats. Impacts to species that occupy this area would be avoided. The primary effects would be from noise and vibration.

Direct impacts to nesting birds could include disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities. Implementation of the mitigation measures for Alternative 2A would reduce impacts to less than significant levels.

The project activities would be subject to the MBTA. Implementation of this alternative would not substantially reduce habitat available for these species, restrict their range, or cause their regional populations to drop below self-sustaining levels. To reduce the effects of the proposed action on these species, the Corps would implement the same measures utilized for sensitive riparian species. This would include the replacement of lost habitat functions through the restoration of habitat, construction monitoring, pre-construction surveys, and the avoidance of nest locations. These impacts would be considered less than significant with the implementation of mitigation measures described in this SEA/MND.

Wildlife Movement

Terrestrial/Aquatic Wildlife

Construction of this alternative would not impact wildlife corridors within the Bradley Canyon channel. Barriers to wildlife movement would not occur and only temporary effects to wildlife movement along the Bradley Canyon levee would occur during construction. There is a potential for portions of the sheet pile to become exposed after major scour events. This has the potential to create barriers where wildlife movement would be hindered and safety hazard. However, many of these adjacent areas provide poor habitat for wildlife and remain accessible to mobile wildlife species. This alternative would not interfere with the movement of any native resident or migratory fish species. As proposed, this alternative would not result in significant impacts to wildlife movement.

4.3.5.3. Future Maintenance

Potential effects from maintenance under this alternative could be greater than effects from maintenance under Alternative 2A. Future maintenance activities conducted by the SBCFCWCD may include clearing sediment and vegetation that has accumulated within the channel. Maintenance operations would be required along the entire project length within the channel to ensure that the sheet pile levee protection did not remain an exposed vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm and may include, as necessary, test programs to determine the condition of the bank protection, investigation to determine the cause of some potential or actual malfunction, and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance to repair scour from winter storms would result in repeated repair activities in waters of the U.S., resulting in potential long term adverse effects to native vegetation and other biological resources. Soil would be placed at the exposed sheet pile areas within the channel to ensure stability and maintain wildlife movement, which would result in direct impacts to the waters of the U.S. This alternative would require extensive maintenance due to the bigger footprints of sheet pile installation as compared to Alternative 2A. Under this alternative, the repeated maintenance activities could cause greater impacts to waters of the U.S. and other biological resources when compared to Alternative 2A. In addition, the erosion cycle and levee damage not only undermines the stability of the levee but poses a potentially significant public health and safety hazard. The sheet pile alternative could also introduce the potential for additional environmental impacts (wildlife, water, air, noise, and traffic) to occur over the lifetime of the project.

4.4. WATER RESOURCES AND HYDROLOGY

4.4.1. Significance Criteria

An impact to water resources and hydrology would be significant if it were to meet one or more of the following significance criteria:

- Violate any water quality standards or waste discharge requirements, create any substantial new sources of polluted runoff, or otherwise degrade water quality;
- Substantially deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion, siltation, or other flood-related damage on- or offsite;
- Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite, or otherwise create or contribute to runoff water which would exceed the capacity of existing or planned stormwater drainage systems; and
- Place housing within a 100-year floodplain as shown on the FEMA Insurance Rate Maps.

4.4.2. No Action Alternative

Under the No Action Alternative, no modification to address the effects of the upstream levee deficiency on the City of Santa Maria would be implemented. Therefore, under the No Action Alternative, the city of Santa Maria would not be adequately protected against flooding during a 100-year storm event and would be susceptible to disastrous flood damage, including risk of life, during a 100-year storm event.

SBCFCWCD may continue flood fighting activities. The following action plan could occur: 1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern; 2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee; and 3) developing a detailed flood fighting response plan. This action plan would provide immediate protection to the levee from the effects of meandering low flows and facilitate timely and aggressive flood fighting of larger flows with sufficient quantities of large rock. Strategically placing stockpiles of rock also enhances the ability to respond to new locations of flow concentration or impingement that would likely develop in the future. However, this action plan would not resolve or correct the design deficiency of the levee.

4.4.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

Violate any water quality standards or waste discharge requirements, create any substantial new sources of polluted runoff, or otherwise degrade water quality.

Use of heavy construction equipment and vehicles during levee repair activities could potentially result in the accidental release or discharge of pollutants such as sediments, oils, fuels, and other equipment fluids. It would be possible for these pollutants to reach the channel as a result of accidental spills, leaks, and/or erosion resulting from the movement of earth materials during levee repair activities. The release of pollutants into surface waters could result in contamination of surface and/or groundwater that would be potentially significant without the implementation of the mitigation measures described below. If groundwater resources are encountered during excavation activities required during construction, dewatering of the affected groundwater would be required in order to avoid groundwater contamination. It is considered highly unlikely that groundwater would be encountered during construction of the project, based on the depth-to-groundwater measurements conducted by the Corps in November 2008), which indicate that groundwater levels in the vicinity of Project area vary between 76 and 78 feet below ground surface. Although it is unlikely that groundwater would be encountered during construction, it is possible for construction activities to affect surface water resources and therefore, the mitigation measures identified below should be implemented to ensure that any potential impacts related to this significance criterion would be less than significant.

The following mitigation measures would be incorporated into contract specifications for the proposed Project to reduce potential impacts to water resources and hydrology.

WR-1 The conditions identified in the amended 401 WQC, dated September 23, 2010 and November 14, 2011 (File Number 34209WQ12) would be followed to minimize impacts to water quality and erosion.

WR-2 Soil and sand excavation and construction within the Bradley Canyon channel shall not occur during the rainy season and California red-legged frog breeding season (November 30 through March 31) or when flowing and/or ponded water is present and shall not occur prior to a predicted significant rain event. If surface water is present it shall be diverted around the work area prior to ground disturbance in the presence of a USFWS-approved biologist. If groundwater resources are encountered during excavation activities required during construction, the affected area will be dewatered to avoid groundwater contamination.

WR-3 The Corps' contractor shall prepare a Spill Prevention and Contingency Plan for work within and adjacent to the Bradley Canyon channel. The plan shall be implemented prior to and during site disturbance and construction activities. The plan will include measures to prevent or avoid an incidental leak or spill, including identification of materials necessary for containment and clean-up and contact information for management and agency staff. The plan and necessary containment and clean-up materials shall be kept within the construction area during all construction activities. Workers shall be educated on measures included in the plan at the pre-construction meeting or prior to beginning work on the project. Corps staff shall contact appropriate authorities in the county or affected municipalities in the event of accident or spill.

WR-4 The Corps' contractor shall ensure that all vehicles and large equipment utilized on the project have been washed prior to commencing work on the project. This includes wheels, undercarriages, bumpers and all parts of the vehicle. The Corps' contractor shall keep a written log documenting that vehicles have been cleaned prior to use on the project. Once equipment and vehicles have been staged on the job site no further washing would be required unless the vehicles or equipment are moved offsite and then returned.

WR-5 All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 20 meters from any riparian habitat or water body. The Corps' contractor shall ensure contamination of habitat does not occur during such operations.

WR-6 The Corps' contractor shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), to be approved by the Regional Water Quality Control Board prior to construction. The SWPPP shall include best management practices. The SWPPP will include a Water Diversion Plan and an Erosion Control Plan which would be designed to minimize water quality impacts. The Corps' contractor shall submit a Notice of Intent (NOI) to the Regional Water Quality Control Board with appropriate fees at least one month prior to initiation of construction. The Corps' contractor shall retain a copy of the SWPPP on the construction site and shall document compliance in daily monitoring reports. The Corps' contractor shall submit a Notice of Completion to the Regional Water Quality Control Board.

WR-7 A pre-construction biological survey shall be conducted by a USFWS-approved biologist for facilities with potential habitat for native aquatic species prior to initiation of the water diversion and any construction work.

Substantially deplete groundwater supplies or interfere with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.

Implementation of the soil cement portion of this alternative would include the excavation of sand/soil at the levee site and construction of a soil cement barrier to a depth of approximately 15 feet into the ground. However, based on the depth to groundwater in the vicinity of the Project area, it appears highly unlikely that construction activities associated with the proposed levee improvements would have any substantial impact on groundwater level, supply, and/or recharge. If groundwater is encountered during the proposed levee repair activities, implementation of the mitigation measures identified above would avoid impacts to groundwater resources. Based on the location of the Project area and depth of soil cement construction activities, it is not expected that groundwater flow would be affected. If groundwater resources are encountered during soil cement excavation activities, dewatering of the affected groundwater would be required in order to avoid potential impacts.

Implementation of the sheet pile portion of this alternative would include the installation of sheet pile wall to a depth of approximately 69 feet. Due to the relatively shallow sheetpiles and the pervious nature of the levee foundation materials, it is anticipated that if sheetpile installation affects groundwater, such effects would be localized and no significant impact to the overall groundwater basin would be anticipated. In addition, it is anticipated that these walls would not result in a change in the depth to groundwater within the channel.

Implementation of this alternative would not require the long-term use of water for revegetation efforts, and would not result in an over-commitment or overdraft of the underlying groundwater basin. Adherence to the mitigation measures above would avoid groundwater contamination from stormwater pollutants such as oil, grease, pesticides, nutrients, sediments, and pathogens. Therefore, any potential impacts related to this criterion would be less than significant.

Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion, siltation, or other flood-related damage on- or offsite. Construction of the proposed Project would modify the existing face of the Bradley Canyon Levee, but would not substantially alter the existing drainage pattern of the site or area. Soil cement cannot be vegetated, so the use of soil cement would prevent vegetation from growing on the levee face, although there is currently little to no vegetation on the levee face. The temporary impact areas would be revegetated. Prior to construction, a diversion channel would be excavated in the channel to direct surface flows away around the construction areas and the excavated material would be utilized as additional borrow material for the soil cement. The SBCFCWCD currently monitors their ongoing maintenance activities on the levee and within the channel; based on these monitoring results, adverse effects resulting from this alternative, which would strengthen the levee, are not intended. As part of the future operation and maintenance, the SBCFCWCD would continue to inspect the levee and monitor channel flow, drainage patterns, and erosion after implementation of the levee improvements associated with this alternative. The sheet pile wall would be installed within the top of the levee, and would not significantly affect percolation rates or drainage patterns. As a result, this alternative would not significantly affect percolation rates or drainage patterns in the area, and would not substantially alter the existing drainage pattern of the site or area.

Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite, or otherwise create or contribute to runoff water which would exceed the capacity of existing or planned stormwater drainage systems. This alternative includes improvements to the existing Bradley Canyon Levee, and does not include any actions or features that would substantially increase the rate or amount of surface runoff. Strengthening the levee would not require the use of surface water, and would not affect the quantity of surface water in the channel or underlying groundwater basin. Revegetation efforts proposed by the Corps for the soil cement portion would include the use of a water supply to establish vegetation. However, water conservation measures such as the use of recycled water would reduce the effect on water supply and would not result in increased surface runoff to a degree that on- or off-site flooding would occur. The sheet pile portion would not include revegetation and would therefore not include the use of a water supply to establish vegetation. Potential impacts would be less than significant and would be avoided through the implementation of the above mitigation measures.

Place housing within a 100-year floodplain as shown on the FEMA Insurance Rate Maps. The proposed Project is a levee improvement project and would not place housing within a 100-year floodplain; it is expected that improvements made to the levee would result in homes being removed from the 100-year floodplain areas identified on FEMA Insurance Rate Maps. No impact would occur.

4.4.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel bed to bury the levee protection again. Maintenance operations would be required along Bradley Canton Levee upstream of existing Reach 3 within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee and/or excavating/filling activities within the channel. These maintenance activities would result in maintaining the beneficial impacts regarding flood hazards. Future routine maintenance is not expected to result in an additional or significant impact.

4.4.4. Alternative 2B: Repair of 3,700 Feet of Bradley Canyon Levee with Soil Cement

Potential water resources and hydrology issues and impacts associated with this alternative are identical to the soil cement portion of Alternative 2A. Therefore, this alternative would have less than significant water resources and hydrology impacts. Please see Section 4.4.3 for a discussion of impacts and issues.

4.4.4.1. Future Maintenance

Similar to Alternative 2A, during a scour event similar to those on record, maintenance operations performed by the SBCFCWCD may be required within the riverbed to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not be expected to result in impacts to water resources and hydrology.

4.4.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential water resources and hydrology issues and impacts associated with this alternative are identical to the sheet pile portion of Alternative 2A. Therefore, this alternative would have less than significant water resources and hydrology impacts. Please see Section 4.4.3 for a discussion of impacts and issues.

4.4.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations performed by the SBCFCWCD would be required within the Bradley Canyon channel to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These maintenance activities would result in maintaining the beneficial impacts regarding flood hazards. Future routine maintenance is not expected to result in an additional or significant impact.

4.5. LAND USE

4.5.1. Significance Criteria

Land use impacts could be significant if they were to: (1) be inconsistent or in noncompliance with applicable land use plans or policies; (2) preclude the viability of existing land use; (3) preclude continued use or occupation of an area; or (4) be incompatible with land uses adjacent to or in the vicinity of the Project area to the extent that public health or safety is threatened.

4.5.2. No Action Alternative

Under the No Action Alternative, the proposed improvements to the Bradley Canyon Levee would not be implemented. As the No Action Alternative would not correct the deficiency from the original design, the levee would continue to be at increased risk of failure, and therefore, could result in disastrous flood damage. This would be inconsistent with the city of Santa Maria Safety Element and the county of Santa Barbara Seismic Safety and Safety Element, which call for the maintenance of flood control facilities to ensure adequate capacity.

4.5.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

Consistency with applicable plans and policies

Table4.5-1 below lists the applicable plans and policies, and details how construction and operation of this alternative would be consistent with these policies.

Table4.5-1: Consistency with Applicable Land Use Plans and Policies

Agency Regulating Land Use	Regulation or Policy	Action Consistent?	Method of Consistency
City of Santa Maria Safety Element Summary	GOAL 2 - FLOODING Minimize the public's exposure to potential flooding and dam inundation hazards.	Yes	This alternative would maintain and improve the existing Bradley Canyon Levee, thereby minimizing the public's exposure to potential flooding.
Santa Barbara County Land Use Element	Hillside and Watershed Protection Policies Temporary vegetation, seeding, mulching, or other suitable stabilization method shall be used to protect soils subject to erosion that have been disturbed during grading or development. All cut and fill slopes shall be stabilized as rapidly as possible with planting of native grasses and shrubs, appropriate non-native plants, or with accepted landscaping practices. Degradation of the water quality of groundwater basins, nearby streams, or wetlands shall not result from development of the site. Pollutants, such as chemicals, fuels, lubricants, raw sewage, and other harmful waste, shall not be discharged into or alongside coastal streams or wetlands either during or after construction.	Yes	With implementation of mitigation measures described in the Biological Resources and Water Quality sections of this document, this alternative would be consistent with these policies. Adherence to identified commitments would ensure that impacts are reduced to less than significant levels. 5. Temporarily disturbed area along the Bradley Canyon would be restored with the native vegetation. This restoration would be performed onsite. To minimize impacts to water quality, mitigation measures have been incorporated in this Final SEA/MND. No pollutant would be discharged within the waters of the United States. 1. BMPs for erosion control have been incorporated in this Final SEA/MND. The Corps' contractor would prepare a

Table4.5-1: Consistency with Applicable Land Use Plans and Policies

Agency Regulating Land Use	Regulation or Policy	Action Consistent?	Method of Consistency
	Streams and Creeks Policies All permitted construction and grading within stream corridors shall be carried out in such a manner as to minimize impacts from increased runoff, sedimentation, biochemical degradation, or thermal pollution.		Stormwater Pollution Prevention Plan to minimize erosion and ensure that no pollutant would be discharged within the Bradley Canyon channel.
Santa Barbara County Seismic Safety and Safety Element	VII. Flood Control Conclusions and Recommendations Where investigations indicate the desirability and feasibility of additional flood control works, these projects should be constructed as soon as possible.	Yes	The Corps' Hydraulics and Hydrology in the 2011 SDDR Addendum revealed that corrective measures should be taken to provide SPF level of protection to the developed area of the city of Santa Maria. This alternative is consistent with this policy.

Preclude the viability of existing land use

Implementation of the proposed Project would not result in the removal or demolition of any structure or relocation of people. Most of the land is either open land or agricultural land. As a result, impacts related to construction of the proposed Project would be temporary and would not alter the land use within the Project area. Therefore, impacts are less than significant.

Preclude Continued Use or Occupation of an Area

Construction of the proposed Project would preclude access to portions of a bike path adjacent to the channel; however, this disruption would be temporary and would not have any lasting impact that would preclude its future use or occupation. Therefore, impacts would be less than significant.

Compatibility with adjacent land uses

This alternative would be compatible with adjacent land uses from the perspective of both existing uses as well as future uses. Construction of the existing levee was authorized in 1963 and adjacent uses were planned to be compatible with this flood control facility. As the proposed Project would improve the existing levee without changing its function, it would be compatible with existing adjacent uses. The purpose of the project is to provide SPF level of protection to the developed area of the city of Santa Maria. As development continues within the city of Santa Maria, the improvement of the levee is critical to ensuring the safety and protection of development of adjacent uses. Consequently, the proposed Project would also be compatible with future adjacent uses.

4.5.3.1. Future Maintenance

There would be no impacts to land use by future operation and maintenance since the maintenance of the exposed levee within the Project area would not permanently result in changes to existing or future land uses.

4.5.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential land use issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant land use impacts. Please see Section 4.5.3 for a discussion of impacts and issues.

4.5.4.1. Future Maintenance

Similar to Alternative 2A, during a scour event similar to those on record, maintenance operations performed by the SBCFCWCD may be required within the riverbed to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not be expected to result in an additional or significant impact.

4.5.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential land use issues and impacts associated with this alternative are identical to the Proposed Action except that the footprint in this case would be bigger than the one in the proposed action Alternative 2A to some extent but this alternative would still have less than significant land use impacts.

4.5.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations would be performed by the SBCFCWCD and required within the channel bed to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Future routine maintenance would not be expected to result in an additional or significant impact.

4.6. AESTHETICS

4.6.1. Significance Criteria

Determination of the significance of impacts to visual resources is based on the level of visual sensitivity in an area. Visual sensitivity is defined as the degree of public interest in a visual resource and concern over adverse changes in the quality of that resource. In general, an impact to a visual resource occurs if implementation of the proposed Project or alternatives would result in a substantial alteration to an existing sensitive visual character or setting.

4.6.2. No Action Alternative

Under the No Action Alternative, the proposed levee repair construction would not occur. Flooding and erosion to the levee would continue to pose a serious concern to the stability of the adjacent roadways and agricultural lands. Ongoing repair and flood fighting activities would likely occur and the area would be subject to periodic visual impacts from construction equipment.

4.6.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

Development of the proposed Project would be prominently visible during the construction phase of the project. Construction staging areas and equipment associated with the proposed Project would be located adjacent to the levee and would be visible to pedestrians and recreationalists using the bikepath on the top of the levee. However, portions of the levee would be closed for use in the construction area and views from pedestrians and recreationalists in these areas may be from a distance. The Project area contains a variety of views and perspectives which reflect the diversity of land uses which include existing agricultural fields. Views across the channel from the levee include elevated benches within the Santa Maria riverbed containing sage scrub and riverine vegetation with the sandy streambed in the middle of the channel. The existing visual character of the region is low and does not provide for a particularly pleasing viewscape, given the ongoing channel maintenance activities and the existing activities at the Santa Maria Landfill.

For the sheet pile portion of the proposed Project, the top of the levee at the west end of Bradley Canyon confluence would require minimal excavation to provide access to install the tiebacks and concrete pile cap. No excavation would be required in the channel itself. The proposed Project would not permanently alter the viewscape or impinge on a scenic vista with Bradley Canyon. Most views of the existing levee are currently limited but viewers may observe vegetation along the levee slope when using the bikepath on top of the levee. The disturbed nature of the channel provides limited scenic value. As such, conditions or views of the levee would not substantially change from existing conditions.

The closest officially designated state scenic highway is Route 166 from U.S. Highway 101 near Santa Maria to Route 33 in Cuyama Valley. The proposed would not result in impacts on a state scenic highway or other scenic roadway. The proposed Project would not substantially alter the existing viewscape and would not damage any scenic resources within a state scenic highway. Impacts would be considered less than significant.

4.6.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. Any maintenance activities for the levee would use existing access roads. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Maintenance operations would be required along Bradley Canyon channel within the channel bed to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall would have a visual impact for the local residents and workers. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not result in any significant change to the existing viewscapes.

4.6.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential visual issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant visual impacts. Please see Section 4.6.3 for a discussion of impacts and issues.

4.6.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the Bradley Canyon channel to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not result in any significant change to the existing viewscapes.

4.6.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Sheet pile walls consist of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. This method could be used without disturbing the existing levee. The initial construction of the sheet pile would require very little impact on existing vegetation. The top of the levee road would require minimal excavation to provide access to install the tiebacks and concrete pile cap. No excavation would be required in the Bradley Canyon channel itself for this alternative. This alternative would not substantially alter the existing viewscape and would not damage any scenic resources within a State scenic highway. Impacts would be considered less than significant.

4.6.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations would be performed by the SBCFCWCD and required within the Bradley Canyon channel to ensure that the levee protection did not remain a vertical wall. The vertical wall would have a visual impact for the agricultural workers. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not result in any significant change to the existing viewscapes.

4.7. RECREATION

4.7.1. Significance Criteria

Recreation impacts would be considered significant if they would result in permanent or long-term preclusion of a recreational area, temporarily preclude use of an area (including biking, equestrian and hiking trails) during a peak recreational season, result in long-term loss or degradation of the recreational value of a major recreational facility, or conflict with an established use of an area.

4.7.2. No Action Alternative

Under the No Action Alternative, the proposed Project would not occur. Flooding and erosion to the levee would continue to pose a serious concern to the stability of the adjacent roadways and the bike path on top of the levee. Ongoing repair and flood fighting activities would likely occur. As these roadways may provide access to recreational facilities, the No Action Alternative could lead to the disruption of access for road repairs. This could result in impacts to recreational facilities over time.

4.7.3. Alternative 2A: Repair of 3,700 Feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

The proposed Project would be located along an approximately 3,700 foot reach of the Bradley Canyon Levee. It would be located on land generally not available to public use. No recreational land uses exist on or within the Project area. However, a bikepath is located on top of the levee.

The proposed Project would neither induce population growth nor result in a direct population increase through the need for new employees or construction workers. As such, the proposed Project would cause no increase in the use of existing neighborhood and regional parks or other recreational facilities located within 4 miles of the Project area. Construction activities may temporarily disrupt use of segments of the bikepath on top of the levee for approximately a year. Alternative routes would be available on adjacent roadways. To minimize this impact, prior to construction, the Corps shall prepare a Traffic Management Plan (see Mitigation Measure T-1 below in Section 4.9.3), which would clearly identify all affected roadways, bikepaths, and pedestrian paths effected by the proposed Project. The Traffic Management Plan would identify measures to notify the public and divert bike traffic safely around the construction area. The Traffic Management Plan would be adhered to by the Corps throughout all grading and construction periods. The proposed Project would not include the construction of or induce expansion of any recreational facilities. Construction of the proposed Project would not occur on or directly adjacent to any recreational facilities. Construction activities may result in temporary congestion or travel delays on local streets which also provide access to the recreation facilities identified in Section 3.7, however access to recreational facilities would not be restricted. Therefore, the proposed Project would have a less than significant recreation impacts.

4.7.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Maintenance operations would be required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities would not be expected to have significant impacts on recreational facilities.

4.7.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential recreation issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant recreation impacts. Please see Section 4.7.3 for a discussion of impacts and issues.

4.7.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weeds, and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities would not have significant impacts on recreational facilities.

4.7.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential recreation issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant recreation impacts. Please see Section 4.7.3 for a discussion of impacts and issues.

4.7.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations would be performed by the SBCFCWCD and required within the riverbed to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities are not expected to have significant impacts on recreational facilities.

4.8. NOISE

4.8.1. Significance Criteria

The noise impacts would be considered significant if they would result in a substantial temporary or periodic increase in ambient (existing) noise levels, in those areas where sensitive receptors are located.

4.8.2. No Action Alternative

Under the No Action Alternative, the proposed Project would not be conducted. No impact to noise would occur. Therefore, no construction related noise impacts to nearby receptors would occur under the No Action Alternative. However, under the No Action Alternative, the levee deficiency from the original design would not be corrected, leaving the levee at continued risk of failure during moderate flood events. Flood damage can result in the potential loss of life and property in the adjacent residential areas and physical impacts to the roadways, resulting in required construction activities on these roadways.

Additionally, the SBCFCWCD may continue flood fighting activities. The following action plan could occur: 1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern, 2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee, and 3) developing a detailed flood fighting response plan.

4.8.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

The proposed Project would have the potential to temporarily increase noise in the Project area. Noise sources include construction related activities, earth moving, and traffic. Construction noise would be created from on-site and off-site sources. On-site noise during construction would occur primarily from driving of sheet pile, heavy-duty diesel and gasoline-powered construction equipment. Off-site noise would be generated from trucks delivering materials and equipment to the job-sites, as well as from vehicles used by workers commuting to and from the job sites.

Short-term adverse noise levels would result from construction activities. On-site sources would include the operation of heavy construction equipment during construction activities such as water trucks, cement delivery trucks, scrapers, bulldozers, motor grader, bottom dump trucks, pile driver, and drum compactor. Generally, periodic noise levels directly adjacent to the active construction areas can be expected to range from 75 to 90 dBA with the exception of the pile driver for sheet pile installation, depending on the distance the receptor is from the source of noise. Although construction activities would result in short-term adverse noise levels, this impact is less than significant because there are no sensitive receptors in the vicinity of the Project area.

The temporary nature of the impact in conjunction with existing city regulations on hours of operation would lessen the adverse impacts due to construction noise. As all construction activity would occur between 7 a.m. and 6 p.m., construction of the proposed Project would not violate the city of Santa Maria Noise Ordinance. For all demolition and construction activity within the Project area, additional noise attenuation techniques shall be employed as needed:

N-1 Equip each internal combustion engine used for any purpose on the job or related to the job with a muffler of a type recommended by the manufacturer. No internal combustion engine would be operated on the study area without said muffler. All diesel equipment would be operated with closed engine doors and would be equipped with factory-recommended mufflers.

N-2 Contractors shall implement appropriate additional noise mitigation measures including, but not limited to, changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, notifying adjacent residents 24-hours in advance of construction work, and installing acoustic barriers around stationary construction noise sources.

4.8.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Maintenance operations would be required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. As such, the temporary increase in ambient noise levels would not be substantial, and less-than-significant impacts to ambient noise levels would occur as a result of the maintenance operations.

4.8.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential noise issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant noise impacts. Please see Section 4.8.3 for a discussion of impacts and issues.

4.8.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Maintenance operations would be required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. As such, the temporary increase in ambient noise levels would not be substantial, and less-than-significant impacts to ambient noise levels would occur as a result of the maintenance operations.

4.8.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential noise issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant noise impacts. Please see Section 4.8.3 for a discussion of impacts and issues.

4.8.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations would be performed by the SBCFCWCD and required within the riverbed to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. As such, the temporary increase in ambient noise levels would not be substantial, and less-than-significant impacts to ambient noise levels would occur as a result of the maintenance operations.

4.9. TRANSPORTATION

4.9.1. Significance Criteria

Impacts to transportation and circulation are assessed with respect to the potential for disruption or improvement of current transportation patterns and systems, deterioration or improvement to existing levels of service, and changes in existing levels of transportation safety during construction or operation of a project. Impacts may arise from physical changes to circulation (e.g., closing, rerouting, or establishing roads), or changes in daily or peak hour traffic volumes created by either direct or indirect workforce and population changes relative to proposed Project activities and alternatives. The proposed Project or alternatives would have a significant impact on transportation if they were to cause closures of major roadways; restrict access to or from adjacent land uses; or restrict the movements of emergency vehicles.

4.9.2. No Action Alternative

Under the No Action Alternative, the proposed Project construction would not be conducted. The No Action Alternative would result in further degradation of the existing levee and continued risk to residential areas and local roadways during flood events. The SBCFCWCD may continue flood fighting activities. The following action plan could occur: (1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern, (2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee, and (3) developing a detailed flood fighting response plan. Flood damage can result in physical impacts to adjacent roadways. As these roadways are heavily utilized by commuters, the No Action Alternative could lead to the disruption of access for flood fighting activities and road repairs.

4.9.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

Traffic would temporarily increase and disruptions to the surrounding street network may occur during proposed Project construction. Potential issues include additional congestion on local roadways, increased hazard to bicyclists or pedestrians, and delays for travelers caused by construction activities.

4.9.3.1. Construction

Primary access to the levee area would be via existing maintenance roads. Construction of the proposed Project would occur over an approximate 12 month period, 7:00 A.M. to 6:00 P.M., Monday through Friday. The proposed transportation route would utilize Foxen Canyon, Betteravia, and existing service roads adjacent to the levee. Temporary construction activities are likely to involve about 8 to 10 construction worker trips daily to and from the site, and up to about 20 truck trips would occur on a busy day of construction activity along local roadways that access the site. This level of construction traffic would not result in a significant impact to the existing traffic volumes of the area. Traffic impacts would be short-term, and limited to the construction schedule. The transport of construction equipment and vehicles on affected roadways within the city of Santa Maria may cause periodic, temporary delays. However, this effect would not result in significant delays affecting level of service and road capacity, significantly affect the capacity or circulation patterns along the affected route, or require long-term road or access improvements beyond what is currently provided by levee service roads. Implementation of the proposed Project would not require additional road maintenance or the creation of new roads. In addition, the proposed Project would not limit access to or from adjacent land uses, and would not restrict emergency vehicle access. Construction activities of the proposed Project would potentially affect the existing bikepath located on the levee. However, the Corps would implement a Traffic Management Plan to ensure impacts to transportation remain at less than significant levels. The following mitigation measure would be incorporated to ensure that impacts related to traffic during construction remain less than significant:

T-1 The contractor shall coordinate in advance with emergency service providers to avoid restricting movements of emergency vehicles. Police departments, fire departments, ambulance services, and paramedic services shall be notified in advance by the contractor of the proposed locations, nature, timing, and duration of any construction activities and advised of any access restrictions that could impact their effectiveness. At locations where access to nearby property is blocked, provision shall be ready at all times to accommodate emergency vehicles, such as plating over excavations, short detours, and alternate routes in conjunction with local agencies. The Traffic Management Plan shall include details regarding emergency services coordination and procedures. Additionally, the Traffic Management Plan shall clearly identify all affected roadways, bikepaths, and pedestrian paths within the area of effect. The Traffic Management Plan shall identify measures to notify the public and divert automobile, bike, and pedestrian traffic safely around the construction area, including but not limited to a notice posted in the local publication, posted signage, and written notification to the city of Santa Maria Public Works Department and Recreation and Parks Department, and California Department of Transportation.

4.9.3.2. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to bury the levee protection again. Maintenance operations would be required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities are expected to generate a minimal number of annual vehicle trips on the local roadway system and are already routinely conducted at or adjacent to the Bradley Canyon Levee. Therefore, maintenance operations would not require the closure of any roadways, would not substantially disrupt current transportation patterns and systems, and would not degrade the existing levels of service in the Project area.

4.9.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential transportation issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant transportation impacts. Please see Section 4.9.3 for a discussion of impacts and issues.

4.9.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities are expected to generate a minimal number of annual vehicle trips on the local roadway system and are already routinely conducted at or adjacent to the Bradley Canyon Levee. Future maintenance of this alternative would not require the closure of any roadways, would not substantially disrupt current transportation patterns and systems, and would not degrade the existing levels of service in the Project area.

4.9.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential transportation issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant transportation impacts. Please see Section 4.9.3 for a discussion of impacts and issues.

4.9.5.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities are expected to generate a minimal number of annual vehicle trips on the local roadway system and are already routinely conducted at or adjacent to the Bradley Canyon Levee. Future maintenance of this alternative would not require the closure of any roadways, would not substantially disrupt current transportation patterns and systems, and would not degrade the existing levels of service in the Project area.

4.10. HAZARDOUS MATERIALS AND WASTE HANDLING AND DISPOSAL

4.10.1. Significance Criteria

This section discusses potential safety concerns associated with the proposed Project and alternatives. Impacts are assessed according to the potential for increased safety risks to construction personnel, the public, and property. Impacts would be significant impacts if the proposed Project or alternatives substantially increased risks to the public or the environment.

4.10.2. No Action Alternative

Under the No Action Alternative, the proposed Project would not be conducted. While no new hazards would be introduced, safety issues such as flooding as a result of a failure to the levee would persist. The SBCFCWCD may continue flood fighting activities. The following action plan could occur: 1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern, 2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee, and 3) developing a detailed flood fighting response plan.

4.10.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

Construction of the proposed Project would involve the excavation of soils from the toe of the existing levee that could possibly be contaminated due to past waste disposal practices, including discharging of waste to sewer systems and storm drains. The SBCFCWCD conducted soil testing in March 2008, along with historical data, indicated the in-situ materials at the toe of the levee were suitable for soil cement for both Santa Maria River Levee and in the vicinity of Bradley Canyon. Additionally, the Bradley Canyon channel would be diverted during construction and the material excavated from new channel could be used as additional borrow material, if needed for the soil cement. The channel excavation could also be a possible source of contamination due to past waste disposal practices. A government records search was also conducted to identify hazardous materials sites listed pursuant to Government Code Section 65962.5. With respect to the Bradley Canyon Levee, no hazardous material sites were identified. Additional hazard facility searches as described in Section 3.11 did not identify locations within the Project area. The proposed Project activities would not require long-term storage, treatment, disposal, or transport of substantial quantities of hazardous materials. However, small quantities of hazardous materials would be stored, used, and handled during the proposed Project activities, including petroleum hydrocarbons and their derivatives (e.g., diesel, gasoline, oils, lubricants, and solvents) to operate the construction equipment. These materials would be contained within vessels engineered for safe storage. Storage of substantial quantities of these materials along the levee is not anticipated. Furthermore, construction vehicles may require on-site fueling, or routine or emergency maintenance that could result in the release of oil, diesel fuel, transmission fluid or other materials; however, the materials would not be used in quantities or stored in a manner that would pose a significant hazard to the public or the workers themselves. Therefore, impacts from general construction activities would be less than significant.

Accidental spills or leaks during construction may contaminate the channel, and underlying groundwater basin. The following mitigation measure would be incorporated by the Corps to ensure that impacts from accidental spills or leaks are less than significant.

WR-3 See Water Resources and Hydrology Mitigation Measures described above.

Construction would be limited to the levee and channel, and is not in close proximity to areas of industrial activity, toxic waste sites, or oil wells that would pose a significant risk to construction workers and members of the public. However, three pipelines run through the Project site: a Conoco Phillips oil pipeline, a Johnson 12" Irrigation Water Pipeline, and Greka Idle Oil Salt Water line traverse the Bradley Canyon channel and levee within the Project area (Figure 3.13-3). All three lines would be protected in place along the levee and would occur within the 120-foot construction zone. Mitigation measure **PS-5** listed below under Section 4.12.3 would be incorporated by the Corps.

Repair activities would not require long-term storage, treatment, disposal, or transport of substantial quantities of hazardous materials. Any materials that may be used would not be used in quantities or stored in a manner that would pose a significant hazard to the public or the workers themselves. As such, less than significant hazards or hazardous materials impacts would occur. Implementation of the proposed Project would reduce the risk of flooding problems occurring as a result of a failure of the levee and would therefore result in a beneficial impact from a hazards perspective.

4.10.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Maintenance operations would be required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities would not require long-term storage, treatment, disposal, or transport of substantial quantities of hazardous materials. Any materials that may be used would not be used in quantities or stored in a manner that would pose a significant hazard to the public or the workers themselves. As such, less than significant hazards or hazardous materials impacts would occur.

4.10.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential hazards issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant impacts associated with hazardous materials and waste handling and disposal. Please see Section 4.10.3 for a discussion of other impacts and issues.

4.10.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities would not require long-term storage, treatment, disposal, or transport of substantial quantities of hazardous materials. Any materials that may be used would not be used in quantities or stored in a manner that would pose a significant hazard to the public or the workers themselves. As such, less than significant hazards or hazardous materials impacts would occur.

4.10.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential hazards issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant impacts associated with hazardous materials and waste handling and disposal. Please see Section 4.10.3 for a discussion of other impacts and issues.

4.10.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations would be required within the channel to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities would not require long-term storage, treatment, disposal, or transport of substantial quantities of hazardous materials. Any materials that may be used would not be used in quantities or stored in a manner that would pose a significant hazard to the public or the workers themselves. As such, less than significant hazards or hazardous materials impacts would occur.

4.11. CULTURAL RESOURCES

4.11.1. Significance Criteria

Impacts would also be considered significant if implementation of the proposed Project or its alternatives would adversely affect a historic property by altering the characteristics that qualify the property for inclusion on the National Register of Historic Places in a manner that would diminish the integrity of the property. Integrity is the ability of a property to convey its significance, based on its location, design, setting, materials, workmanship, feeling, and association. Adverse effects can be direct or indirect. They include reasonably foreseeable impacts that may occur later in time, be farther removed in distance, or be cumulative. (ACHP, 2003).

4.11.2. No Action Alternative

Under the No Action Alternative, the proposed Project would not be conducted. No impact to cultural resources would occur.

4.11.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

Based on investigations conducted by Corps archeologists, the Corps has determined there are no known historic properties within the Project area. No cultural resources were observed during the pedestrian survey of the Project area. However, it is possible that the remains of the Santa Maria Valley Railroad tracks could be present buried beneath the dirt road near the upstream section of the Bradley Canyon Levee. Records search results also indicated that additional cultural resources have been previously identified in the general vicinity of the Project area. Therefore, the following mitigation measures would be incorporated by the Corps to ensure no adverse effects to cultural resources occur.

CR-1 Earthmoving activities will be monitored by a qualified archeologist who meets, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739). Earthmoving includes grubbing and ground clearing, grading, and excavation activities. If a previously unidentified cultural resource is discovered, all earthmoving activities in the vicinity of the discovery shall be diverted away from the discovery until the Corps complies with 36 CFR § 800.13(a)(2).

The results of the cultural resources records search from the California Historical Resources Information System, Central Coastal Information Center (CHRIS-CCIC) did not reveal the presence of any recorded Native American human remains or burials within the Project area or a one-quarter mile radius. The California Native American Heritage Commission (NAHC) Sacred Lands File search failed to indicate the presence of sacred lands or other Native American resources in the immediate Project area. However, the absence of recorded Native American burials in the Project area or surrounding vicinity does not preclude the existence of buried resources within the Project area. Impacts to cultural resources would be considered less than significant with the implementation of the following mitigation measures to identify, evaluate, and recover human remains that are accidentally encountered during implementation of the proposed Project.

CR-2 If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

4.11.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection again. Maintenance operations would be required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Because there are no cultural resources within the channel, future maintenance would not result in impacts to historic properties.

4.11.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential cultural resources issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have no adverse effect to historic properties. Please see Section 4.11.3 for a discussion of impacts and issues.

4.11.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the riverbed to bury the levee protection again. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Because there are no cultural resources within the channel, future maintenance would have no adverse effect to historic properties.

4.11.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Under this alternative, a sheet pile wall would be constructed immediately adjacent to the existing levee. Construction of the sheet pile wall would involve driving the sheet pile walls into the ground and drilling holes for the screw type anchor tiebacks; there would be no excavation into the channel. The construction staging areas would be located within the SBCFCWCD right-of-way which has already been disturbed. Because the majority of areas surrounding the existing levee have been disturbed, it is not anticipated that the construction staging areas would impact any historic properties. Previous archeological surveys have identified resources near the APE. Therefore, it is recommended that construction activities related to the implementation of this alternative be monitored by a qualified archeologist. Mitigation measure CR-1 listed under Section 4.11.3 would be incorporated by the Corps.

4.11.5.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations would be required within the channel to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may require temporary access along the toe of the levee. Because there are no cultural resources within the channel, future maintenance would have no adverse effect to historic properties.

4.12. PUBLIC SERVICES AND UTILITIES

4.12.1. Significance Criteria

Impacts to utilities would be considered significant if existing utility systems would be adversely affected by the proposed levee repair activities. Any unplanned disruption or utility service or physical impact to the existing utility lines would also be considered significant. In addition, impacts to public service and utility providers could potentially occur with an increase to the size of the population and geographic area served, and the number and type of calls for service, physical development, or an increase in demand for service that could result in capacity constraints to existing public service and utilities providers.

4.12.2. No Action Alternative

Under the No Action Alternative, the proposed Project would not be conducted. Therefore, no construction-related impacts or temporary increases in public services or utilities demand would occur. However, under the No Action Alternative, correction of the levee design would not occur which could result in breaching of the levee during flood events. This flood water increases the amount of water treated by local wastewater treatment plants. Furthermore, ponding floodwater on local roadways results in an increase to police calls and increases traffic delays, resulting in an impact to emergency access and response times. These safety hazards and additional increases to stormwater treated by local wastewater treatment plants could be considered impacts of the No Action alternative. The SBCFCWCD may continue flood fighting activities. The following action plan could occur: 1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern, 2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee, and 3) developing a detailed flood fighting response plan.

4.12.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

4.12.3.1. Public services

Construction activities would result in an increase in the potential of fire hazards and could increase the need for police service and fire trucks due to accidents caused by construction personnel or equipment. The presence of construction equipment (vehicles, generators, tools, wiring etc.) may increase the likelihood of a fire. Vegetation present in or near the construction areas could be ignited by a spark or heat-related incident due to the operation of construction equipment or construction activities. In addition, the presence of construction personnel increases the potential for fires through the increase of human influenced ignition (i.e., smoking, use of flammables, etc.). Therefore, construction of the proposed Project could have the potential to result in a temporary increase in police and fire service. However, this increase would be short term and would not result in a significant permanent demand on fire or police facilities serving the Project area. In addition, levee repairs would not affect the long-term capacities of fire or police services. This potential increase in risk is considered short-term and temporary, only occurring during the limited construction phase of the proposed Project. However, to further reduce this potential short-term risk the Corps would ensure the following mitigation measures are implemented:

PS-1 The contractor will be required to provide adequate safety and emergency response training for construction workers.

PS-2 All construction equipment shall be equipped with the appropriate spark arrestors and functioning mufflers.

PS-3 Spark arresters and a water truck shall be available at the Project site at all times when welding or grinding activities are taking place.

PS-4 All rubber-tired construction vehicles shall be equipped with appropriate fire fighting equipment to aid in the prevention or spread of fires.

PS-5 The contractor will coordinate with local city agencies/departments, private entities and Caltrans for appropriate notification to the public; any utility relocation, removal, protection or abandonment requirements; the location of staging areas; and safety procedures to reduce potential hazards.

4.12.3.2. Utility lines

Three pipelines run through the Project site: a Conoco Phillips oil pipeline, a Johnson 12” Irrigation Water Pipeline, and Greka Idle Oil Salt Water line traverse the Bradley Canyon channel and levee within the Project area (Figure 3.13-3). All three lines would be protected in place along the levee and would occur within the 120-foot construction zone. Mitigation measure PS-5 listed above and the following additional mitigation measures would be incorporated by the Corps.

U-1 During the preliminary design phase of each project component, the utility service providers shall be consulted to identify existing and proposed buried facilities in affected roadways and to determine which utilities require relocation and which can be avoided. If relocation is required, the appropriate utility service provider will be consulted to sequence construction activities to avoid or minimize interruptions in service.

U-2 If utility service disruption is necessary, residents and businesses in the Project area will be notified a minimum of two to four days prior to service disruption through local newspapers, and direct mailings to affected parties.

U-3 The Corps’ contractor will be required to excavate around utilities, including hand excavation as necessary, to avoid damage and to minimize interference with safe operation and use. Hand tools must be used to expose the exact location of buried gas or electric utilities.

U-4 Prior to construction, utility locations shall be verified through field surveys.

4.12.3.3. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. Operation and maintenance activities are not expected to result in an increase in the local population, leading to a long-term increase in demand or use of local wastewater service. There would be no operational impacts to existing wastewater providers’ capacities. There would be no operational impacts to existing schools, fire, or police department service capabilities. During a scour event similar to those on record, maintenance operations may be required within the channel bed to rebury the levee protection. Maintenance operations would be required along Bradley Canyon Levee within the channel bed to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the Bradley Canyon levee. Operation and maintenance of the levee would not generate solid waste and would therefore not affect existing landfill capacities. Impacts to solid waste facilities would not be significant.

4.12.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential impacts under this alternative would be the same as Alternative 2A and would not be expected to result in an increase in the local population, leading to long-term demands to local public services, would not generate any additional population that could exceed the capacity of local public service providers, would not increase any demands on schools or lower the level of service for fire protection or police protection, and is not expected to result in any long-term hazards that would place increased demands on emergency service providers. Water demand for construction would not be a significant impact and wastewater generated during construction is not expected to significantly impact the capacity of the wastewater provider identified in Table 3.14-1. This alternative would not generate or increase stormwater runoff in a manner that would affect wastewater treatment nor would it affect the remaining capacities of local landfills to serve local waste demands and impacts would be considered less than significant.

4.12.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Operation and maintenance of the levee would not generate solid waste and would therefore not affect existing landfill capacities. Impacts to solid waste facilities would not be significant.

4.12.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential impacts under this alternative would be the same as Alternative 2A and would not be expected to result in an increase in the local population, leading to long-term demands to local public services, would not generate any additional population that could exceed the capacity of local public service providers, would not increase any demands on schools or lower the level of service for fire protection or police protection, and is not expected to result in any long-term hazards that would place increased demands on emergency service providers. Water demand for construction would not be a significant impact and wastewater generated during construction is not expected to significantly impact the capacity of the wastewater provider identified in Table 3.12-1. This alternative would not generate or increase stormwater runoff in a manner that would affect wastewater treatment nor would it affect the remaining capacities of local landfills to serve local waste demands and impacts would be considered less than significant.

4.12.4.1 Future Maintenance

Operation and maintenance activities are not expected to result in an increase in the local population, leading to a long-term increase in demand of solid waste generation. Maintenance operations would be performed by the SBCFCWCD and required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Operation and maintenance of the levee would not generate solid waste and would therefore not affect existing landfill capacities. Impacts to solid waste facilities would not be significant.

4.13. SOCIOECONOMICS

4.13.1. Significant Criteria

The significance of population and expenditure impacts are assessed in terms of their direct effect on the local economy and related effect on other socioeconomic resources (e.g., housing). If implementation of the proposed Project or alternative would result in substantial shifts in population trends, adversely affect regional spending and earning patterns, or introduce overwhelming demand for public services or utilities, socioeconomic impacts would be considered significant.

4.13.2. No Action Alternative

Under the No Action Alternative, the proposed Project activities would not be conducted. The minor socioeconomic impacts to communities in the region would not occur. However, continued flooding or erosion could occur. These activities would require flood fighting and emergency repairs but are not likely to result in substantial impacts to socioeconomics of the region.

4.13.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

Proposed Project activities would be limited to the local area adjacent to the Bradley Canyon Levee. Proposed activities are short-term and would not attract a long-term worker population to the Project area. Some direct and indirect Project-related jobs would be created from construction of the levee repairs. The majority of the construction-related jobs are expected to be filled by both currently employed and unemployed labor force participants from Santa Barbara County and adjoining San Luis Obispo County. Therefore, construction of the Project would not increase the region’s population significantly. Implementation of the proposed Project would neither place a demand on employment opportunities, housing, or public facilities, nor would it create new employment opportunities, housing, or public facilities in the region. In addition, minority or low income communities would not be disproportionately affected by implementation of the proposed Project. Consequently, the proposed Project would not create socioeconomic impacts within the adjacent communities and no impacts would occur.

4.13.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Maintenance operations would be required to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities for the sheet pile and soil cement would not be expected to create socioeconomic impacts within the adjacent communities.

4.13.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Like Alternative 2A, this alternative would neither induce population growth nor result in a direct population increase through the need for new employees or construction workers. In addition, minority or low income communities would not be disproportionally affected by this alternative. As such, this alternative would cause no potential socioeconomic impacts. Refer to Section 4.13.3 for a discussion of impacts and issues.

4.13.4.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not be expected to create socioeconomic impacts within the adjacent communities.

4.13.5. Alternative 2c: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Like Alternative 2A, this alternative would neither induce population growth nor result in a direct population increase through the need for new employees or construction workers. In addition, minority or low income communities would not be disproportionally affected by this alternative. As such, this alternative would cause no potential socioeconomic impacts. Refer to Section 4.13.3 for a discussion of impacts and issues.

4.13.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations would be performed by the SBCFCWCD and required within the riverbed to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. In addition, inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities would not create socioeconomic impacts within the adjacent communities.

4.14. SAFETY

4.14.1. Significance Criteria

Public Safety impacts would be considered significant if they result in increased hazards risks to the residents of the city of Santa Maria as a result of failure of the Bradley Canyon Levee.

4.14.2. No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed and the levee deficiency from the original design would not be corrected. As a result, the Bradley Canyon levee would continue to be at an increased risk of failure during moderate flood events and could result in flood damage. Therefore, significant impacts to public safety may occur to the residents of the city of Santa Maria. The SBCFCWCD may continue flood fighting activities. The following action plan could occur: (1) ongoing annual routine maintenance to direct frequently occurring low flows away from the levee at the locations of greatest concern, (2) stockpiling large rock for flood fighting at key locations immediately adjacent to the levee, and (3) developing a detailed flood fighting response plan.

4.14.3. Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement

As has occurred in the past, during large flow events within the channel the additional water would follow the low flow alignment and it would impinge on the levee at an acute angle. This scenario has played out numerous times during the last four decades. It is this scenario that has placed the residents of Santa Maria at dire risk of flooding. As described in Section 3.12, within three years of original construction, during a moderate flood event, the Santa Maria River Levee was almost breached in two locations because flows along the meandering low flow channel impinged on the levee at a nearly perpendicular angle. Several times from 1966 to 1998, this design deficiency has resulted in similar major damage to the Santa Maria River Levee. Over the last four decades, there have been several remedial construction efforts undertaken on this levee or within the Santa Maria River. These efforts have attempted to compensate for the underlying deficiency, but each has proven to be either limited in effectiveness or temporary. Flooding as a result of another breach in the levee could potentially result in the significant loss of life of individuals residing within the city of Santa Maria. The exact failure location on the levee could never be known before it occurred, but, if levee repairs were constructed, the risk of flooding to the local community would be significantly reduced. The construction of the proposed Project would ensure that impacts to public safety would be less than significant.

4.14.3.1. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Maintenance operations would be required within the channel to ensure that the sheet pile levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not create impacts to public safety.

4.14.4. Alternative 2B: Repair of 3,700 feet of Bradley Canyon Levee with Soil Cement

Potential Public Safety issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant safety impacts. Please see Section 4.14.3 for a discussion of impacts and issues.

4.14.4.4. Future Maintenance

Future maintenance activities would be performed by the SBCFCWCD and may include clearing debris, weed and wild growth that has accumulated within the channel or floodway. During a scour event similar to those on record, maintenance operations may be required within the channel to rebury the levee protection. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. These activities would not create impacts to public safety.

4.14.5. Alternative 2C: Repair of 3,700 feet of Bradley Canyon Levee with Sheet Pile

Potential Public Safety issues and impacts associated with this alternative are identical to Alternative 2A. Therefore, this alternative would have less than significant safety impacts. Please see Section 4.14.3 for a discussion of impacts and issues.

4.14.5.1. Future Maintenance

During a scour event similar to those on record, maintenance operations would be performed by the SBCFCWCD and required within the channel to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage. Inspection of the bank protection is required after each major storm, and may include, as necessary, test programs to determine the condition of the bank protection, and investigation to determine the cause of some potential or actual malfunction and the corrective action necessary. Any damage may require repair immediately. Maintenance operations may also require temporary access along the toe of the levee. Maintenance activities would not be expected to have impacts on public safety.

4.15. COMPARISON OF ACTION ALTERNATIVES

Table4.15-1 summarizes the environmental impacts of the proposed Project and alternatives in a comparative form.

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
Air Quality	Construction emissions estimates for VOC and NOx are below the 25 tons per year guideline of the Santa Barbara County Air Pollution Control District for determining the significance of construction impacts. Emissions would not conflict with or obstruct implementation of the applicable air quality plans. Mitigation measures to minimize fugitive dust (PM10) and to reduce NOx emissions from construction equipment would ensure that	Same as the proposed Project. The air quality impacts of the Sheet Pile alternative regarding the Federal General Conformity Rule,toxic air contaminants and odors, would be similar to or less than those of the Proposed Action.	Same as the proposed Project. Because the difference in project schedule and duration would be very minimal, it is expected that the difference in emission estimates would also be negligible	No additional impacts to air quality would occur. However, repair of the Bradley Canyon Levee would not be implemented and continued flooding or erosion of the levee and adjacent roadway could occur. Flood flows that produce devastating impacts to the surrounding community could trigger the widespread use of equipment emitting at potentially significant levels for emergency

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
	construction emissions are less than significant.			repairs.
Biological Resources	Direct and indirect impacts to a highly disturbed, depauperate plant community and diversion of the Bradley Canyon channel would occur as a result of the removal of vegetation and grading during construction activities. Construction activities could also potentially affect nesting migratory bird species. Mitigation Measures would be implemented to avoid/minimize effects during nesting birds and CRLF breeding season. Impacts to wildlife movement and movement of any native resident or migratory fish species is considered less than significant. Direct effects to jurisdictional waters of the United States would occur from levee construction, the use of temporary work areas, temporary diversion of the active channel, and vegetation clearing and grubbing. Implementation of the proposed Project would impact approximately 6.85 acres of waters of the United States within the Bradley Canyon channel. Permanent impacts from levee construction would be approximately 0.5 acre, which primarily consists of non-native grassland and barren substrate. The project would result in 6.35 acres of temporary disturbance to native and non-native vegetation and active channel. To reduce the effects of the proposed Project on	No excavation would be required in the Bradley Canyon Channel for this alternative. As a result, this alternative would not result in the removal of riparian vegetation within the channel. Implementation of this alternative would avoid direct effects of the proposal on wildlife species that occur within the riparian corridor and terrace habitat within the Bradley Canyon channel. Although the sheet pile alternative would avoid direct impacts to waters of the U.S., this alternative would still require intense maintenance to repair scour from winter storms and would result in long term operational effects to biological resources and waters of the U.S. Erosion along the toe of the levee would act as a barrier to wildlife movement and alter the habitat conditions on the project area. Recompaction of the levee where sheet pile is exposed would be anticipated to occur 8-10 times over the next forty years (SDDR 2009). Each recompaction activity would result in additional disturbance to jurisdictional areas. Under the Sheet Pile alternative, maintenance activities would be extensive and would result in similar temporary impacts to	Impacts would be similar to the proposed Project, but at a slightly greater magnitude. Specifically, this alternative would result in the removal of the only intact riparian vegetation within the Project site. Were soil cement to be used on the levee and the impinging flows eroded the channel invert, the resulting erosion would only expose the soil cement at its 2H:1V slope. The levee itself would be completely untouched and intact. The only maintenance required would be simply to regrade the riverbed of the Channel to fill the scoured area without any compaction requirements. If this maintenance operation were to be delayed, there would be no detrimental effects and no pressing need for the operation to occur.	Under the No Action Alternative, the proposed improvements to the Bradley Canyon Levee would not be implemented. As the No Action Alternative would not correct the deficiency from the original design, the damage that has been sustained would worsen over time, and could eventually result in complete failure of the levee, and therefore, disastrous flood damage. This would be inconsistent with the city of Santa Maria Safety Element, the county of Santa Barbara Seismic Safety and Safety Element, which call for the maintenance of flood control facilities to ensure adequate capacity.

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
	jurisdictional waters of the United States, the Corps would implement mitigation measure BR-6 which requires the restoration of disturbed areas (permanent and temporary) to native habitat at the conclusion of construction. To restore lost functions and services, the Corps would restore 5.74 acres of the degraded vegetation communities present in the Project area and establish 0.5 acre of riparian habitat at the Bradley Canyon confluence. Adherence to the identified mitigation measure would reduce impacts to less than significant levels. Pursuant to BR-7, the 0.61 acre of temporary impact to the active channel rerouted for construction would be returned to pre-construction contours and the original alignment.	Waters of the U.S. over time compared to the proposed Project. Under this alternative, intense maintenance would cause repeated disturbance to the Waters of the U.S. to fix the erosion. The Sheet Pile Alternative would also introduce the potential for additional environmental impacts (noise, traffic) to occur over the lifetime of the Project.		

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
Water Resources and Hydrology	Impacts to surface and groundwater could occur from fuel leaks, spills or the disruption of soils. Based on the location of the Project and depth of construction activities, it is not expected that groundwater flow would be affected by the Project due to the diversion of the Bradley Canyon channel. The proposed Project would not significantly affect percolation rates or drainage patterns in the area, and would not substantially alter the existing drainage pattern of the site or area, and does not include any actions or Project features that would substantially increase the rate or amount of surface runoff. Mitigation Measures would reduce potential impacts to water quality, groundwater supplies, existing drainage pattern and surface run-off.	Same as the proposed Project.	Same as the proposed Project.	Under the No Action Alternative, the proposed improvements to the Bradley Canyon Levee would not be implemented and the Corps would not be able to certify the Santa Maria River Levee (EA/MND 2009) , which was originally constructed in 1963, as being geotechnically and hydraulically capable of containing a 100-year storm event, as requested by FEMA. The city of Santa Maria would not be adequately protected against flooding during a 100-year storm event and would be susceptible to disastrous flood damage, including risk of life.
Land Use	The proposed Project would be compatible with adjacent land uses from the perspective of both existing uses as well as future uses.	Same as the proposed Project.	Same as the proposed Project.	The No Action Alternative would not correct the deficiency from the original design, the levee would continue to be at risk of failure during moderate flood events, and therefore, could result in disastrous flood damage. This would be inconsistent with the city of Santa Maria Safety Element, the county of Santa Barbara Seismic Safety and Safety Element, which call for the maintenance of flood control facilities to ensure adequate capacity.

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
Aesthetics	The proposed Project would not substantially alter the existing viewscape and would not damage any scenic resources within a State scenic highway. Impacts would be less than significant	Same as the proposed Project, except that use of sheet pile over a larger stretch of the Project area would result in greater potential for exposure of the sheet pile. Until the levee is reconstructed, exposed sheet pile would create an aesthetic impact.	Same as the proposed Project.	The proposed levee repairs would not be conducted. Flooding and erosion to the levee would continue to pose a serious concern to the stability of the adjacent roadways, commercial and to the residential areas on the south side of the levee. Ongoing repair and flood fighting activities would likely occur and the area would be subject to periodic visual impacts from construction equipment.
Recreation	The proposed Project would cause no increase in the use of existing neighborhood and regional parks or other recreational facilities. It would not include the construction of or induce expansion of any recreational facilities and construction would not occur on or directly adjacent to any recreational facilities. Construction activities may result in temporary congestion or travel delays on local streets which also provide access to the recreation facilities, however access to recreational facilities would not be restricted. Prior to construction, the Corps Contractor would prepare a Traffic Management Plan, which would clearly identify all affected roadways, and pedestrian paths within the area of effect. The Plan would identify measures to notify the public and divert automobile and pedestrian traffic safely around the construction area. Proposed Project impacts, therefore, would be less than significant.	Same as the proposed Project.	Same as the proposed Project.	The proposed levee repairs would not be conducted. Flooding and erosion to the levee would continue to pose a serious concern to the stability of the adjacent roadways, commercial areas, and to the residential areas on the south side of the levee. Ongoing repair and flood fighting activities would likely occur. As these roadways may provide access to recreational facilities, the No Action Alternative could lead to the disruption of access for road repairs. This could result in impacts to recreational facilities over time.
Noise	The temporary nature of the impact in conjunction with	Same as the proposed Project.	The temporary nature of the impact in	No construction related noise impacts to nearby

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
	existing city regulations on hours of operation would lessen the potential of a significant impact due to construction noise. As all construction activity would occur between 7 a.m. and 6 p.m., construction of the proposed Project would not violate the City of Santa Maria Noise Ordinance. In addition, the Bradley Canyon levee construction site along Santa Maria Landfill areas is separated by the levee itself and a two lane road on the north edge. With the incorporation of environmental commitments N-1 through N-2, construction noise impacts would be less than significant. Vibration impacts from sheet pile driving would be of a temporary nature and are not expected to exceed vibration perception thresholds of nearby individuals. Impacts are considered less than significant.		conjunction with existing city regulations on hours of operation would lessen the potential of a significant impact due to construction noise. As all construction activity would occur between 7 a.m. and 6 p.m., construction of this alternative would not violate the City of Santa Maria Noise Ordinance. A Santa Maria Landfill commercial development is shielded to the Project site by a noise barrier wall providing shielding effects. In addition, the levee construction site along landfill areas is separated by the levee itself and a two lane road on the north edge.. With the incorporation of environmental commitments N-1 through N-2, construction noise impacts would be less than significant.	Santa Maria Landfill receptors would occur under the No Action Alternative. However, under the No Action Alternative, the levee deficiency from the original design would not be corrected, leaving the levee at continued risk of failure during moderate flood events. Flood damage can result in physical impacts to the roadways, resulting in required construction activities on these roadways. Ongoing repair and flood fighting activities would likely occur.
Socio-Economics	Construction of the proposed Project would not increase the region's population significantly. Implementation of the proposed Project activities would neither place a demand on employment opportunities, housing, or public facilities, nor would it create new employment opportunities, housing, or public facilities in the region. Consequently, the proposed Project activities would not create socioeconomic impacts within the adjacent communities and no impacts would occur.	Same as the proposed Project.	Same as the proposed Project.	Under the No Action Alternative, proposed flood control measures would not be implemented and continued flooding or erosion of the adjacent levee could occur. These activities would require flood fighting and emergency repairs but are not likely to result in substantial impacts to Socioeconomics of the region.

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives				
Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
Transportation	Traffic impacts would be short-term, and limited to the construction schedule. The transport of construction equipment and vehicles on affected roadways within the city of Santa Maria may cause periodic, temporary delays. However, this effect would not result in significant delays affecting level of service and road capacity, significantly affect the capacity or circulation patterns along the affected route, or require long-term road or access improvements beyond what is currently provided by levee service roads. Implementation of the proposed Project would not require additional road maintenance or the creation of new roads. In addition, the proposed Project would not limit access to or from adjacent land uses, and would not restrict emergency vehicle access. Prior to construction, the Corps would prepare and adhere to a Traffic Management Plan which would identify measures to notify the public and divert automobile and pedestrian traffic safely around the construction area. The proposed Project would result in less than significant impacts.	Same as the proposed Project.	Same as the proposed Project.	Under the No Action Alternative, proposed flood control measures would not be implemented. The No Action Alternative would result in further degradation of the existing levee and continued risk to commercial areas and local roadways during flood events. Flood damage can result in the potential loss of life and property in the adjacent residential areas and physical impacts to the roadways. Ongoing repair and flood fighting activities would likely occur. As these roadways are heavily utilized by commuters, the No Action Alternative could lead to the disruption of access for road repairs.
Hazardous Materials and Waste Handling and Disposal	No known hazards are located within the proposed Project area. Impacts from general construction activities, including the use of small quantities of hazardous materials, such as petroleum hydrocarbons and their derivatives (e.g., gasoline, oils, lubricants, and solvents), to operate the construction equipment would be less than significant. Accidental spills or leaks during construction may	Potential hazards issues and impacts associated with this alternative are identical to the proposed Project. However, with respect to the two oil pipelines that traverse the proposed Project site, implementation of the sheet pile alternative would require alternative methods of construction within the pipeline areas to avoid disturbance or harm potentially	Same as the proposed Project.	The proposed upgrades to the Bradley Canyon Levee would not be conducted. While no new hazards would be introduced, safety issues such as flooding as a result of a failure to the levee would persist. Ongoing repair and flood fighting activities would likely occur.

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
	contaminate the channel and underlying groundwater basin. However, the Corps contractor would prepare a Spill Prevention and Contingency Plan for work within and adjacent to the Bradley Canyon channel, and impacts would be less than significant. Two oil pipelines owned by Conoco Phillips and Greka traverse the Bradley Canyon channel and levee within the Project area. The proposed Project would not require construction activities to the depth of the pipelines and impacts would be less than significant after the mitigation measures are implemented	resulting pipe breakage, leaks, or spills. Impacts would be less than significant.		
Safety	Flooding as a result of another breach in the levee could potentially result in the significant loss of life of individuals residing within the city of Santa Maria. The construction of the proposed Project would ensure that impacts to Safety would be less than significant.	Same as the proposed Project. However, during a scour event similar to those on record, maintenance operations would be required within the channel to ensure that the levee protection did not remain a vertical wall. The vertical wall condition after a scour event would become a public safety hazard and a barrier to animal passage.	Same as the proposed Project.	Under the No Action Alternative, proposed flood control measures would not be implemented and the levee deficiency from the original design would not be corrected. As a result, the Bradley Canyon levee would continue to be at an increased risk of failure during moderate flood events and could result in flood damage. Significant impacts to Public Safety may occur to the residents of the city of Santa Maria. Ongoing repair and flood fighting activities would likely occur.
Cultural Resources	The Project area is not known to contain any historic properties. However, previous archeological surveys have identified cultural resources near the APE. Monitoring of construction activities would be conducted by a qualified archeologist, in case unknown resources are discovered. As a result, the	Same as the proposed Project.	Same as the proposed Project	Under the No Action Alternative, proposed flood control measures would not be implemented and the levee deficiency from the original design would not be corrected. As a result, the Bradley Canyon levee would continue to be at an increased risk of failure

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
	proposed Project would not have an adverse affect on historic properties.			during moderate flood events and could result in flood damage. Significant impacts to Public Safety may occur to the residents of the city of Santa Maria. Ongoing repair and flood fighting activities would likely occur.
Public Services and Utilities	The proposed Project is not expected to result in an increase in the local population, leading to a long-term increase in demand or use of local wastewater service. There would be no operational impacts to existing wastewater provider's capacities. There would be no operational impacts to existing schools, fire, or police department service capabilities. Operation of the channel would not generate solid waste and would therefore not affect existing landfill capacities. Impacts to public services and utilities would not be significant.	Same as the proposed Project.	Same as the proposed Project.	No construction related impacts or temporary increases in public services or utilities demand would occur. However, under the No Action Alternative, correction of the levee design would not occur which could result in breaching of the levee during flood events. This flood water increases the amount of water treated by local wastewater treatment plants. Furthermore, ponding of floodwater on local roadways results in an increase to police calls and increases traffic delays, resulting in an impact to emergency access and response times. Ongoing repair and flood fighting activities would likely occur.
Soils and Geology	A Stormwater Pollution Prevention Plan (SWPPP) would be implemented and would include erosion control measures and best management practices to avoid or minimize impacts to earth resources and geology. The proposed Project would not result in a landslide, lateral spreading, subsidence, liquefaction, or collapse. To ensure that impacts would not occur as a result of the levee improvement activities being located in an area with	Implementation of this alternative would introduce the potential for erosion and down-gradient sedimentation to occur both during construction and after the completion of sheet pile installation. In order to reduce the significance of this potential impact, disturbed soils would be restored following construction, and stockpiled soil materials would be managed to	A SWPPP would be implemented and would include erosion control measures and best management practices to avoid or minimize impacts to earth resources and geology. This alternative would not result in a landslide, lateral spreading, subsidence, liquefaction, or collapse. To ensure that impacts would not occur as a result of the	The proposed improvements to levee would not be implemented and it is reasonably assumed that geotechnical damage to the levee would continue to occur. In addition, the existing levee is not capable of containing the flow of an SPF storm event and would be expected to suffer catastrophic damage during such an event. Damage of this

Table4.15-1: Summary of Environmental Impacts of Proposed Project and Alternatives

Resource	Level of Impact			
	Proposed Project	Sheet Pile Alternative	Soil Cement Alternative	No Action Alternative
	geologic conditions that are susceptible to seismic settlement and liquefaction, compliance with mitigation measures would occur, and impacts would be less than significant. Implementation of the sheet pile portion would introduce the potential for erosion and downgradient sedimentation to occur both during construction and after the completion of sheet pile installation. In order to reduce the significance of this potential impact, disturbed soils would be restored following construction, and stockpiled soil materials would be managed to avoid or minimize potential for erosion and down-gradient sedimentation. Implementation of the sheet pile wall would not include excavation of sand, soil, or topsoil. However, the driving of sheet pile into the existing Bradley Canyon Levee would cause vibrations but localized liquefaction is not anticipated to occur. Liquefaction would not likely occur because the soil is too dense. Potential exists for effects from earthquake-induced liquefaction including lateral spreading, which is essentially sliding of the levee into the channel. Further geotechnical investigations would be performed and results incorporated into Project design to ensure that any effects do not result in a significant geologic hazard.	avoid or minimize potential for erosion and down gradient sedimentation. Implementation of the Sheet Pile Alternative would not include excavation of sand, soil, or topsoil. However, the driving of sheet pile into the existing levee would cause vibrations but localized liquefaction is not anticipated to occur. Liquefaction would not likely occur because the soil is too dense. Potential exists for effects from earth quake induced liquefaction including lateral spreading, which is essentially sliding of the levee into the channel. Further geotechnical investigations would be performed and results incorporated into the project design to ensure that any effects do not result in a significant geologic hazard. A SWPPP would be implemented for this alternative as well.	levee improvement activities being located in an area with geologic conditions that are susceptible to seismic settlement and liquefaction, mitigation measures would be implemented, and impacts would be less than significant.	magnitude would require emergency flood-fighting response to protect the city of Santa Maria and would eventually require repairs or a new flood control structure be installed. As such, under the No Action Alternative, geologic affects associated with levee repair and/or construction would still be expected to occur in the future, and would be of a greater magnitude than under the project alternatives.

5. CUMULATIVE IMPACTS AND GROWTH INDUCEMENT

5.0. INTRODUCTION

Under NEPA, a cumulative impact is 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 C.F.R. § 1508.7.

Under the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15130, subd. (b)(3)), the lead agency should provide a reasonable explanation of the geographic limitation used in the cumulative impacts analysis. There are two commonly used approaches, or methodologies, for establishing the cumulative impact setting or scenario. One approach is to use a “list of past, present, and probable future projects producing related or cumulative impacts.” 14 Cal Code Regs §15130(b)(1)(A). The other is to use a “summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact.” 14 Cal Code Regs §15130(b)(1)(B). This SEA/MND uses the list approach to provide a tangible understanding and context for analyzing the potential cumulative effects of a project.

In accordance with CEQA/NEPA regulations, a discussion of cumulative impacts resulting from actions and projects that are proposed, under construction, or reasonably anticipated to be implemented in the near future is required. Based on the relatively limited extent of the Bradley Canyon watershed in relation to the Santa Maria River watershed and the rapid attenuation of impacts downstream of levied sections of the River, for this SEA/MND, the geographic extent/scope of the cumulative impacts analysis is defined as the Bradley Canyon watershed and 11 miles of the lower Santa Maria River mainsteam, including tributaries and adjacent agricultural lands in this reach of the river.

Table 5.1-1 provides a list of projects occurring within this geographical extent/scope and considered to have the potential for creating cumulative impacts in association with the proposed Project. The table indicates the project name and project type, as well as its location and status.

Table 5. 1-1: Cumulative Projects Occurring within the Geographic Scope

Project Name	General Location	Description
CITY OF SANTA MARIA, SANTA BARBARA COUNTY		
Bradley Canyon Levee Extension of Santa Maria River Project	Bradley Canyon confluence to 3,700 feet upstream along the existing levee	Strengthen the levee with soil cement and sheet pile for a 3,700-foot-long stretch upstream of Bradley Canyon confluence.
Armstrong Apartments	1340-1400 North Bradley adjacent to US-101	New residential development totaling 8 apartments on 0.56 acres.
Santa Maria River Levee Repair	Bradley Canyon to Blosser Road along the Santa Maria River Levee	Strengthen the levee with soil cement and sheet pile for a 6.5-mile-long stretch.

Table 5. 1-1: Cumulative Projects Occurring within the Geographic Scope

Project Name	General Location	Description
SMOOTH	300 block of Roemer Way	New 51,953-square-foot industrial development totaling 90 rooms on 1.36 acres.
Roemer Court Hotels – Fairfield	2061 Roemer Court	New industrial development of two warehouse/storage accessory buildings totaling 2,100 square feet on 1.19 acres.
Roemer Court Hotels – Candlewood Inn	2079 Roemer Court	New 51,953-square-foot industrial development totaling 90 rooms on 1.36 acres.
Santa Maria Fire Station #3	1670 East Donovan Road	New industrial development of a fire station totaling 6,688 square feet on 1.36 acres.
Templo El Salvador	800 West Hidden Pines Way	New industrial development of multi-purpose and sanctuary buildings totaling 27,953 square feet on 2.8 acres.
Farm Supply Warehouse Buildings Roemer Court	200 block of East Roemer Way	New industrial development of a hotel totaling 39,371 square feet on 2.5 acres.
Donovan and US-101 Chevron	739 East Donovan Road	New industrial development of a car wash addition and conversion of an existing service bay into a convenience store totaling 756 square feet on 0.51 acres.
Asi Es Me Tierra Restaurant	111 East Donovan Road	New industrial development of an auto repair with an unspecified area converted to restaurant use totaling 3,600 square feet on 0.35 acres.
North Broadway Retail Center	1800 block of North Broadway (between Grant and Taylor Streets)	New two-building-industrial development of a neighborhood retail center totaling 49,000 square feet on 4.51 acres.
Chen Commercial	1700 block of North Broadway	New four-building-industrial development of retail, office space, and a restaurant totaling 38,370 square feet on 3.1 acres.
Santa Maria Landfill Gas Flare Power Plant	2065 E. Main Street	1,440 sf methane electric power plant

Source: City of Santa Maria
http://www.ci.santa-maria.ca.us/planning/ResidentialProjectsList-July200809.pdf
http://www.ci.santa-maria.ca.us/planning/ComIndProjectsList-July200809.pdf

A database search of completed Corps Regulatory permit actions within the study area identified 193 separate, complete permit actions dating back to 1994 -2011 (16-year period). These permit actions resulted in approximately 57.754 acres of permanent impacts and 1204.654 acres of temporary impacts to Corps jurisdiction (waters of the United States). Of the temporary impacts, the vast majority is considered "recurrent" in nature, and is associated with in-channel aggregate mining and, to a lesser degree, pilot channel excavation. Over the past several years, the SBCFCWCD has periodically constructed pilot channels within the Santa Maria River to train meandering flows away from the south levee mostly in areas just upstream of Suey Road downstream to the U.S. Highway overcrossing, in the vicinity of the City of Santa Maria. These pilot channels have ranged from 50-feet to 300-feet in width and 1000' to 1 mile in length depending upon the location of the natural channel on any given year and the threats posed to the levee. SBCFCWCD will continue to maintain the channel. In particular, the low flow Bradley Canyon channel down the middle of the channel as well as the most downstream area through the willow woodland that periodically needs to be "brushed", i.e., the willow limbs need to be trimmed back from growing in the flow area of the low flow and obstructing flows. To offset impacts to waters of the United States associated with previous permit actions, the Corps has required 1515.764 acres of compensatory mitigation generally consisting of wetland, riparian, and riparian buffer restoration and enhancement

The following assessment focuses on addressing the following: (1) the area(s) in which the effects of the proposed Project would be felt; (2) the effects that are expected in the area(s) from the proposed Project; (3) past, present, and reasonably foreseeable future actions that have or that are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact(s) that can be expected if the individual impacts are allowed to accumulate.

5.1. ANALYSIS OF CUMULATIVE IMPACTS

5.1.1. Air Quality

<u>Criteria Pollutants</u>

Construction activities associated with the proposed Project were determined to result in less than significant impacts as the emissions of criteria pollutants were estimated far below the Santa Barbara County Air Pollution Control District (SBCAPCD) thresholds level. In addition, the proposed Project would not have any stationary emissions source after completion of the construction. The proposed Project area would be located within the South Central Coast Air Basin (SCCAB), within the jurisdiction of the Santa Barbara County Air Pollution Control District (SBCAPCD). Significant combined impacts are not expected to occur as the other proposed projects are expected to be equipped with the best available control technology and available mitigation measures to meet the SBCAPCD requirements. Considering the temporary nature of the proposed Project's construction and likelihood of other cumulative projects implementing emission controls to meet SBCAPCD requirements, cumulative air quality impacts are expected to be less than significant.

<u>Green House Gases</u>

The scope of analysis for cumulative GHGs impacts, the region of analysis is the state of California. This analysis presents the potential of the proposed Project along with other cumulative projects to contribute to global climate change.

Scientific evidence indicates a trend of warming global surface temperatures over the past century due at least partly to the generation of GHG emissions from human activities, as further discussed in Section 3.2, Air Quality. Some observed changes include shrinking glaciers, thawing permafrost, and shifts in plant and animal ranges. Credible predictions of long-term impacts from increasing GHG levels in the atmosphere include sea level rise, changes to weather patterns, changes to local and regional ecosystems. These and other effects would have environmental, economic, and social consequences on a global scale. In California, CO2 emissions totaled approximately 478 million metric tons in year 2003. See Emission Reduction Plan for Ports and International Goods Movement, March 21, 2006, published by the Air Resources Board. As shown in Table 4.2-2, construction of the proposed Project would produce GHG emissions within California borders. Implementation of mitigation measures AQ-1-AQ-16 would further reduce GHG emissions.

5.1.2. Biological Resources

Implementation of the proposed Project would not result in significant impacts to biological resources as described in Section 4.3. The proposed Project combined with other projects would not contribute to cumulative biological resource impacts within the region. The effects of the project are site specific and localized and would not result in incremental cumulative impacts to biological resources. As identified in Section 4.3 of this Final SEA/MND, areas disturbed within the Temporary Construction Easement (TCE) would be restored with native species. Impacts from the proposed Project would be reduced to less than significant levels and effects of this action would not be considered cumulatively significant with mitigation.

5.1.3. Water Resources and Hydrology

As discussed in Section 4.4 of this Final SEA/MND, implementation of the proposed Project would not result in significant impacts to water resources and hydrology. The discussion provided above in regard to Corps Regulatory permit actions in the study area explains that permanent impacts and recurrent temporary impacts to waters of the Unites States have totaled 1,262.404 acres (since 1994), and that the Corps has required 1,515.764 acres of compensatory mitigation for these impacts. The maintenance activities for the Bradley Canyon Levee repair may require the SBCFCWCD to obtain approvals/permit(s) from the resource agencies, including the RWQCB and the Corps' Regulatory Division, if the maintenance activities would result in discharge of fill material to waters of the United States. Such maintenance activities would maintain the proposed Project's beneficial impacts regarding flood hazards and would not combine with past, present, or future regulatory actions or other cumulative projects to result in cumulative impacts. Potential effects on water resources and hydrology are localized and would not combine with any of the projects listed in Table 5. **1-1**. Therefore, the incremental effect of proposed Project activities combined with other projects would not result in significant cumulative impacts to water resources or hydrology in the region.

5.1.4. Soils and Geology

No significant impacts to geological resources would occur from implementation of the proposed Project (See Section 4.1 of this Final SEA/MND). As potential effects on soils and geology would be site-specific and less than significant, no contribution to cumulative impacts in the region would occur.

5.1.5. Land Use

The proposed Project activities would not change the land use and would not deviate from the General Plan and Policies of the City of Santa Maria and Santa Barbara County. As described in Section 4.5 of this Final SEA/MND, the proposed project activities are short-term; any effects on land use would be temporary and would terminate upon completion of the project. Therefore, the proposed Project would not contribute cumulatively to impacts from projects that are scheduled to occur during or after completion of the project.

5.1.6. Aesthetics

The proposed Project activities would be short-term, localized, and would not significantly impact or conflict with visual resources (Final SEA/MND Section 4.6). The proposed Project would not contribute to degradation or alteration of the scenic viewscape and any potential impacts would cease to occur upon completion of the proposed activity. As such, no cumulative aesthetic impacts would occur.

5.1.7. Recreation

The proposed Project activities would not significantly impact existing recreational uses (Final SEA/MND Section 4.7). Prior to construction the Corps would prepare a Traffic Management Plan (Mitigation Measure T-1) to minimize potential impacts on recreational uses. The proposed Project combined with other projects would not contribute to an incremental effect on recreation that would be cumulatively considerable.

5.1.8. Noise

The primary noise source within the Project area would be from heavy-duty diesel- and gasoline-powered construction equipment. Offsite noise would be generated from trucks delivering materials and equipment to the proposed and other job sites, as well as from vehicles used by workers commuting to and from the job sites. As discussed in Section 4.8 of this SEA/MND, impacts due to the proposed Project are considered to be less than significant. The proposed Project would be required to comply with local noise ordinances and combined with other projects would not be expected to contribute to noise impacts that would be cumulatively considerable.

5.1.9. Socioeconomic

The proposed Project would not create socioeconomic impacts to adjacent communities in the region (See Section 4.13). As such, the proposed Project combined with other projects would not contribute to an incremental socioeconomic effect that would be cumulatively considerable.

5.1.10. Transportation

The quantity of traffic associated with construction of the proposed Project would be minimal, temporary, and would not contribute to permanent changes in traffic volume. Given the short duration of the proposed Project, cumulative traffic impacts combined with other projects would be less than significant (Section 4.9). The proposed Project would not result in impacts to transportation that would be cumulatively considerable.

5.1.11. Hazardous Materials and Waste (HTRW) Handling and Disposal

As discussed in Section 4.10 of this Final SEA/MND, the proposed Project would result in impacts that are less than significant. Because the proposed Project would alleviate potential flooding problems of the Santa Maria River Levee, it would result in a beneficial impact with regard to hazardous materials and combined with other projects would not contribute impacts that would be cumulatively considerable.

5.1.12. Safety

As discussed in Section 4.14 of this Final SEA/MND, the proposed Project would not result in increased risks to public safety. The construction of the proposed Project would be a beneficial impact. Therefore, safety risks associated with the proposed Project combined with other projects would not result in a significant cumulative impact.

5.1.13. Cultural Resources

The proposed Project would not significantly impact cultural resources (Final SEA/MND Section 4.11). Since no cultural resources were identified during the cultural resources investigation and since the Project area is considered not to be sensitive for cultural resources, it is unlikely that this project would contribute to the cumulative loss or destruction of cultural resources. As the proposed Project activities would occur within previously disturbed areas and existing channels, it would not contribute cumulatively to projects that would occur during or after the completion of the project outside of the channel in nearby areas.

5.1.14. Public Services and Utilities

The proposed Project would have no significant impacts on utilities (Final SEA/MND Section 4.12). As such, the proposed Project combined with other projects would not contribute to an incremental impact on utilities that would be cumulatively considerable.

5.2. GROWTH INDUCEMENT

Pursuant to the California Environmental Quality Act (CEQA) Guidelines, growth-inducing impacts of the proposed Project should be addressed, specifically:

"*the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of wastewater treatment plant, might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."*

Growth inducement is generally dependent upon the presence or lack of existing utilities and public services in an area. The provision of new utilities and services can induce growth in an undeveloped area. Growth inducement can also occur if the proposed project makes it feasible to increase the density of development in surrounding areas. Growth may be considered beneficial, detrimental, or of little significance to the environment, depending on its actual impacts to the environmental resources present in the area.

The proposed Project would not result in direct growth-inducing impacts. However, the proposed Project would reduce the likelihood of future breeches in undeveloped areas along the levee. Implementation of the proposed Project would not change the land use identified in the General Plan and policies of the City and County. Therefore, the proposed Project is consistent with the criteria identified in the General Plan and policies. The project may facilitate growth within the area zoned for residential or industrial purposes

6. ENVIRONMENTAL COMMITMENTS

6.0. INTRODUCTION

An impact analysis has been performed for the repair of the Bradley Canyon Levee (Section 4). Mitigation measures have been incorporated to minimize impacts to the environmental resources. After implementation of avoidance or minimization measures implementation of the proposed Project would not result in any significant impacts to soils/geology, air quality, biological resources, water resources and hydrology, land use, aesthetics, recreation, noise, transportation, hazardous materials and waste handling and disposal, cultural resources, utilities, socioeconomics, and safety. The following mitigation measures have been incorporated to minimize project-related effects and those would be followed during construction and future maintenance, as applicable.

6.1. SOILS AND GEOLOGY

S-1 The Corps shall prepare and implement an erosion and sedimentation control plan including both temporary and long-term best management practices. Prior to work conducted within the rainy season, extensive measures shall be implemented to avoid contamination of surface water. The Corps shall retain a copy of the erosion and sedimentation control plan on the construction site, and shall document compliance in daily monitoring reports.

S-2 The Corps shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), to be approved by the Regional Water Resources Control Board, prior to construction. The SWPPP shall include best management practices. The Corps shall retain a copy f the SWPPP on the construction site, and shall document compliance in daily monitoring reports.

S-3 The Corps shall limit grading and excavation activities within the channel to the dry season (April 1 to November 30) to the maximum extent feasible, and shall not conduct grading and construction activities prior to a predicted rain event, or during a rain event. Grading and construction activities shall not occur in ponded or flowing surface water.

6.2. AIR QUALITY

6.2.1. Mitigation Measures for PM_{10} Emissions

AQ-1 Develop and implement a Fugitive Dust Emission Control Plan (FDECP). The construction contractor shall develop and implement a FDECP for construction work. Measures to be incorporated into the plan shall include, but are not limited to, the following:

- Water the unpaved road access and other disturbed areas of active construction sites at least three times per day or apply California Air Resources Board (CARB) certified soil binders.
- If possible, install wheel washers/cleaners or wash the wheels of trucks and other heavy equipment where vehicles exit the site or unpaved access roads.
- Increase the frequency of watering or implement other additional fugitive dust mitigation measures to all disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts) exceed 25 miles per hour.

- Travel route planning shall be completed to identify required travel routes to minimize unpaved road travel to each construction or disposal site to the extent feasible.
- Minimize amount of disturbed area and reduce on site vehicle speeds to 15 miles per hour (mph) or less.

AQ-2 Restrict engine idling. Diesel engine idle time shall be restricted to no more than 10 minutes in duration. This is not required for trucks that require engines to be on while waiting onsite, such as concrete trucks.

AQ-3 Use on-road vehicles that meet California on-road standards. All on-road construction vehicles working within California shall meet all applicable California on-road emission standards and shall be licensed in the State of California. This does not apply to construction workers' personal vehicles.

AQ-4 All project construction and site preparation operations shall be conducted in compliance with all applicable Santa Barbara County Air Pollution Control District (SBCAPCD) Rules and Regulations with emphasis on Rule 302 (Opacity), Rule 51 (Nuisance), and Rule 303 (Fugitive Dust), as well as Rule 345, (Permits Required).

AQ-5 Gravel pads must be installed at all access points to prevent tracking of mud onto public roads.

AQ-6 If importation, exportation, or stockpiling of fill material is involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin unless material is kept moist or treated with soil binders for transport within the project area.

AQ-7 The contractor shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transportation of dust offsite. Their duties shall include holiday and weekend periods when work may not be in progress

6.2.2. Mitigation Measures for NO_x Emissions

AQ-8 Only heavy-duty diesel-powered construction equipment with engines meeting CARB/U.S. Environmental Protection Agency (USEPA) Tier 2 certification level or engines manufactured after 2005 shall be used.

AQ-9 The engine size of construction equipment shall be the minimum practical size.

AQ-10 The number of pieces of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number are operating at any one time.

AQ-11 Construction equipment shall be maintained in tune per the manufacturer's specifications.

AQ-12 Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or pre-combustion chamber engines.

AQ-13 Catalytic converters shall be installed on gasoline-powered equipment, if feasible.

AQ-14 Diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters as certified and/or verified by USEPA or CARB shall be installed on equipment operating onsite.

AQ-15 Diesel-powered equipment should be replaced by electric equipment whenever feasible.

AQ-16 Idling of heavy-duty diesel trucks during loading and unloading shall be limited to five minutes; auxiliary power units should be used whenever possible. State law requires drivers of diesel-fueled commercial vehicles weighing more than 10,000 pounds:

- Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location;
- Shall not idle a diesel-fueled auxiliary power system (APS) for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if the vehicle has a sleeper berth and is within 100 feet of a restricted area (homes and schools);
- Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.

6.3. BIOLOGICAL RESOURCES

BR-1 Prior to site disturbance, the Corps' contractor shall clearly delineate the limits of construction on project plans with the coordination of the Corps biologist. All new construction, site disturbance, and vegetation removal shall be located within the delineated construction boundaries. The storage of equipment and materials and temporary stockpiling of soil shall be located within designated staging areas only. The limits of construction shall be delineated in the field with temporary construction fencing, staking, or flagging.

BR-2 Prior to initial ground disturbance or removal of any riparian vegetation with the project area, a USFWS-approved biologist shall survey the construction site and adjacent areas to determine if any sensitive plants, fish, or wildlife species are present. If the species are present, the Corps shall modify construction activities to avoid removal or substantial disturbance to the key habitat areas or features where possible. Avoidance and minimization measures shall be described in a pre-construction briefing report for the construction contractor. All terms and conditions included in the biological opinion rendered by the USFWS shall be followed prior to and during construction.

BR-3 Prior to initiation of construction activities, a USFWS-approved biologist shall conduct pre-construction environmental training for all construction crew members. The training shall focus on required mitigation measures and a summary of sensitive species and habitats potentially present within and adjacent to the Project area.

BR-4 The construction contractor shall clear vegetation associated with project construction only during periods when migratory birds are not nesting and California red-legged frogs (CRLF) are not breeding (15 September through 30 November). The Corps contractor shall limit grading and excavation activities within the channel to the dry season (April 1 to November 30).

BR-5 Construction activities shall be monitored by a USFWS- approved biologist during the initial ground disturbing activities, including vegetation clearance and water diversion. Thereafter, a designated biological monitor shall be onsite throughout project implementation to ensure CRLFs are not killed or injured as described in the USFWS's biological opinion. The designated biological monitor shall have completed the species specific training specified in BR-3.

BR-6 The Corps shall restore disturbed areas (temporary and permanent) as restoration/compensation for impacts to native and non-native vegetation communities. The Corps shall prepare a Habitat Restoration and Revegetation Plan for the project. Plans for restoration, enhancement/ revegetation and/or establishment shall include at a minimum: (a) the location of the restoration site; (b) the plant species to be used; (c) a schematic depicting the restoration area; (d) time of year that the planting will occur; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation onsite; (g) performance criteria; (h) detailed monitoring and maintenance program; (i) adaptive management measures; (j) long-term management plan; and (k) site protection. Restoration shall include the revegetation of stripped or exposed work areas. Permanent impacts will be mitigated onsite through the establishment of riparian habitat in compliance with the Corps' Mitigation Rule at 33 CFR Part 332 and as described in the Habitat Restoration and Revegetation Plan.

BR-7 Upon completion of construction, the Bradley Canyon low flow channel shall be returned to its pre-construction location and contours.

BR-8 The Corps shall ensure that all vehicles and large equipment utilized on the Project have been washed prior to commencing work on the Project. This includes wheels, undercarriages, bumpers, and all parts of the vehicle. The Corps' contractor shall keep a written log documenting that vehicles have been cleaned prior to use on the Project site. Once equipment and vehicles have been staged on the job site no further washing would be required unless the vehicles or equipment are moved offsite and then returned.

BR-9 Before project activities begin, the USFWS-approved biologist must identify appropriate areas to receive relocated CRLFs. These areas must be in proximity to the capture site, support suitable vegetation, and be free of exotic predatory species (e.g., bullfrogs) to the best of the USFWS-approved biologist' knowledge. The USFWS- approved biologist must be allowed sufficient time to move CRLFs from the site before work activities begin. When capturing and relocating CRLFs from work sites, the USFWS-approved biologist must minimize the amount of time that the animals are held in captivity. During this time, they must be maintained in a manner that does not expose them to temperatures or any other environmental conditions that could cause injury or undue stress. CRLFs must be captured by hand or dipnet and transported in buckets separate from other species. The USFWS-approved biologist is to maintain detailed records of any individuals that are moved (e.g. size, discoloration, any distinguishing features, digital photographs) to assist him or her in determining whether translocated animals are returning to the original points of capture.

BR-10 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to prevent CRLFs from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

BR-11 Water will not be impounded in a manner that may attract CRLFs within the construction site. A USFWS-approved biologist shall ensure that the spread or introduction of invasive exotic species such as bullfrogs, crayfish, and centrarchid fishes are avoided to the maximum extent possible during construction.

BR-12 Field personnel will be trained to recognize and avoid CRLF and the field personnel shall alert the USFWS-approved biologist or designated biological monitor if a CRLF is found in the project area.

BR-13 A qualified Corps biologist shall be present at the work site at all times during project construction or other habitat disturbance.

BR-14 As identified in the amended Clean Water Act 401 Water Quality Certification issued by the Regional Water Quality Control Board, the contractor shall implement best management practices for erosion control during and after project implementation (e.g., silt fences, settling basins, and/ or other sediment traps will be temporarily used).

BR-15 During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas (e.g., trash left during or after project activities may result in an increased number of predators, such as raccoons (*Procyon lotor*) or opossums (*Didelphis virginiana*), that may injure or kill CRLFs).

BR-16 All steep-walled holes or trenches that may act to trap CRLFs must be covered at the end of each work day, or a wildlife escape ramp must be installed so that any CRLFs that become trapped have the opportunity to escape.

BR-17 No pets will be allowed on the construction site.

BR-18 The USFWS-approved biologist(s) or designated biological monitor must conduct routine surveys of work areas, including each morning before construction activities resume, to ensure CRLFs have not moved back into a work area overnight. If the species is discovered in a work area and is at risk of harm from project related activities, the Corps will suspend work on that particular phase of the project until the animal voluntarily leaves the area or until a USFWS-approved biologist is available to capture and relocate the individual.

BR-19 The USFWS-approved biologist and designated biological monitor, in full coordination with the Corps, will be a liaison between resource agencies and construction staff regarding compliance with the USFWS's biological opinion.

BR-20 Construction activities must be halted when a rain event of 1/2 inch or more is forecast within 48 hours as predicted by the National Weather Service. After a rain event, the USFWS-approved biologist must conduct a pre-construction survey for CRLFs dispersing through the project site.

Construction must resume only after the site has sufficiently dried and the USFWS-approved biologist determine that CRLFs are unlikely to be dispersing through the project site.

6.4. WATER RESOURCES AND HYDROLOGY

WR-1 The conditions identified in the amended 401 WQC dated September 23, 2010, and November 14, 2011 (Case File Number 34209WQ12) would be followed to minimize impacts to water quality and erosion.

WR-2 Soil and sand excavation and construction within the Bradley Canyon channel shall not occur during the rainy season and California red-legged frog breeding season (November 30 through March 31) or when flowing and/or ponded water is present and shall not occur prior to a predicted significant rain event. If water flow is present it would be diverted prior to ground disturbance in the presence of a USFWS-approved biologist and work can be conducted as approved by the Corps environmental monitor.

WR-3 The construction contractor shall prepare a Spill Prevention and Contingency Plan for work within and adjacent to the Bradley Canyon Channel. The plan shall be implemented prior to and during site disturbance and construction activities. The Spill Prevention and Contingency Plan will include measures to prevent or avoid an incidental leak or spill, including identification of materials necessary for containment and clean-up and contact information for management and agency staff. The Spill Prevention and Contingency Plan and necessary containment and clean-up materials shall be kept within the construction area during all construction activities. Workers shall be educated on measures included in the plan at the pre-construction meeting or prior to beginning work on the project. Corps staff shall contact appropriate authorities in the county or affected municipalities in the event of accident or spill.

WR-4 The Corps' contractor shall ensure that all vehicles and large equipment utilized on the project have been washed prior to commencing work on the project. This includes wheels, undercarriages, bumpers and all parts of the vehicle. The Corps' contractor shall keep a written log documenting that vehicles have been cleaned prior to use on the project. Once equipment and vehicles have been staged on the job site no further washing would be required unless the vehicles or equipment are moved offsite and then returned.

WR-5 All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 20 meters from any riparian habitat or water body. The Corps' contractor shall ensure contamination of habitat does not occur during such operations.

WR -6 The construction contractor shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), to be approved by the Regional Water Quality Control Board prior to construction. The SWPPP shall include BMPs. The SWPPP would include a Water Diversion Plan and an Erosion Control Plan which would be designed to minimize water quality impacts. The BMPs that are identified in the SWPPP will be followed during construction activities related to the proposed action in addition to this SEAMND. The SWPPP would be reviewed and approved by the Corps environmental staff prior to submitting it to the Regional Water Quality Control Board. The construction contractor shall submit a Notice of Intent (NOI) to the Regional Water Quality Control Board with appropriate fees at least one month prior of initiation of construction. The Corps' contractor shall retain a copy of the SWPPP on the construction site and shall document compliance in daily monitoring reports. The Corps' contractor shall submit a Notice of Completion to the Regional Water Quality Control Board.

WR-7 A pre-construction biological survey shall be conducted by a USFWS-approved biologist for facilities with potential habitat for native aquatic species prior to initiation of the water diversion and any construction work.

6.5. NOISE

N-1 Equip each internal combustion engine used for any purpose on the job or related to the job with a muffler of a type recommended by the manufacturer. No internal combustion engine would be operated on the study area without said muffler. All diesel equipment would be operated with closed engine doors and would be equipped with factory-recommended mufflers.

N-2 Contractors shall implement appropriate additional noise mitigation measures including, but not limited to, changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, notifying adjacent residents 24-hours in advance of construction work, and installing acoustic barriers around stationary construction noise sources.

6.6. TRANSPORTATION

T-1 The construction contractor shall develop a traffic plan and ensure that designated roads are used during construction. The construction contractor shall coordinate in advance with the City of Santa Maria and its emergency services to avoid roads restricting movements of emergency vehicles. At locations where access to nearby property is blocked, provision shall be ready at all times to accommodate emergency vehicles, such as plating over excavations, short detours, and alternate routes in conjunction with local agencies. The Traffic Management Plan shall include details regarding emergency services coordination and procedures. Additionally, the Traffic Management Plan shall clearly identify all affected roadways, bike paths, and pedestrian paths within the affected area. The plan shall identify measures to notify the public and divert automobile and pedestrian traffic safely around the construction area, including but not limited to a notice posted in the local publication, posted signage, and written notification to the City of Santa Maria Public Works Department and Recreation and Parks Department, and California Department of Transportation.

6.7. CULTURAL RESOURCES

CR-1 Construction activities associated with this project will be monitored by a qualified archeologist who meets, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739). Earthmoving includes grubbing and ground clearing, grading, and excavation activities. If a previously unidentified cultural resource is discovered, all earthmoving activities in the vicinity of the discovery shall be diverted away from the discovery until the Corps complies with 36 CFR § 800.13(a)(2).

CR-2 If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

6.8. PUBLIC SERVICES AND UTILITIES

6.8.1. Public Services

PS-1 The contractor will be required to provide adequate safety and emergency response training for construction workers.

PS-2 All construction equipment shall be equipped with the appropriate spark arrestors and functioning mufflers.

PS-3 Spark arresters and a water truck shall be available at the Project site at all times when welding or grinding activities are taking place.

PS-4 All rubber-tired construction vehicles shall be equipped with appropriate fire fighting equipment to aid in the prevention or spread of fires.

PS-5 The contractor will coordinate with local city agencies/departments, private entities and Caltrans for appropriate notification to the public; any utility relocation, removal, protection or abandonment requirements; the location of staging areas; and safety procedures to reduce potential hazards.

6.8.2. Utilities

U-1 During the preliminary design phase of each project component, the utility service providers shall be consulted to identify existing and proposed buried facilities in affected roadways and to determine which utilities require relocation and which can be avoided. If relocation is required, the appropriate utility service provider will be consulted to sequence construction activities to avoid or minimize interruptions in service. The Local Sponsor and its contractor shall comply with permit conditions and such conditions shall be included in the contract specifications.

U-2 If utility service disruption is necessary, residents and businesses in the project area will be notified a minimum of two to four days prior to service disruption through local newspapers, and direct mailings to affected parties.

U-3 The contractor will be required to excavate around utilities, including hand excavation as necessary, to avoid damage and to minimize interference with safe operation and use. Hand tools must be used to expose the exact location of buried gas or electric utilities.

U-4 Prior to construction during the Plans and Specifications phase, utility locations shall be verified through field surveys.

7. COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

7.0. INTRODUCTION

The following section provides compliance with applicable environmental laws and regulations, Executive Orders, and other guidelines for the proposed Project.

7.1. FEDERAL LAWS AND REGULATIONS

7.1.1. National Environmental Policy Act of 1969 (NEPA)

This Final SEA/MND has been prepared in accordance with the requirements of the National Environmental Protection Act (NEPA) of 1969 (42 USC 4321, as amended, the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and Corps NEPA implementing regulations at 33 CFR Part 230 and Engineer Regulation 200-2-2.

The purpose of NEPA is to provide decision makers and the public with an accurate assessment upon which to evaluate the proposed project. Federal agencies fulfill their duties under NEPA once they have taken a "hard look" at the environmental effects of their actions. While an Environmental Impact Statement (EIS) is required for "major Federal actions significantly affecting the quality of the human environment," NEPA regulations provide that an agency may first prepare an EA to determine whether an action will have a significant impact that would require preparation of an EIS. If the agency concludes there is no significant effect associated with the proposed project, it may issue a Finding of No Significant Impact in lieu of preparing an EIS. Additionally, an agency's decision to forego preparation of an EIS may be justified, even in the presence of adverse environmental impacts, if the agency adopts mitigation measures in response to identified impacts.

As documented in this SEA/MND, the proposed Project will not significantly affect the quality of the human environment. Mitigation measures are incorporated to minimize impacts to the environmental resources. Therefore preparation of an EIS is not required.

7.1.2. Clean Air Act (Amendments 42 USC § 7401–7671) (CAA)

Section 176(c)(1) of the Clean Air Act (42 U.S.C. § 7506(c)) is known as the General Conformity Rule. It prohibits the federal government from "engag[ing] in, support[ing] in any way, or provid[ing] financial assistance for, licens[ing] or permit[ing] or approv[ing] any activity" that does not conform to a State Implementation Plan (SIP) approved by the United States Environmental Protection Agency. The conformity rule was designed to ensure that federal actions do not impede local efforts to control air pollution, and requires federal agencies to demonstrate that their actions "conform with" (i.e., do not undermine) the approved SIP for the subject geographic area. The first step in determining whether conformity review is required is to assess whether the federal action will take place in an air quality nonattainment or maintenance area. If the action will occur in such an area, then it is necessary to determine whether the action will result in the emission of an air pollutant that is regulated due to the nonattainment or maintenance status of the region. If so, the federal action may nonetheless be exempt.1 If the action is not exempt, then one must determine whether the emissions from the action will exceed

[1] The exemptions are set out in 40 C.F.R. § 93.153, subds. (c) and (d) and include activities that would result in no emissions increase or an increase in emissions that is clearly de minimis.

threshold levels. If threshold levels are met or exceeded, then a conformity review is required. (40 CFR § 93.153(b).)

The Project area is located within the South Coast Central Air Basin (SCCAB), within the jurisdiction of the Santa Barbara County Air Pollution Control District. Because the SCCAB is in attainment for all six criteria pollutants, general conformity review is not required.

7.1.3. Endangered Species Act of 1973, as amended (16 USC § 1531 et seq)

Section 7 of the Endangered Species Act (ESA) requires consultation with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), as appropriate, if a federal action may affect threatened or endangered species and/or designated critical habitat (see 50 CFR Part 402).

The Corps conducted surveys to determine presence of federally-listed species within the Project area. The Corps has determined that the proposed Project would not affect arroyo toad, least Bell's vireo, southwestern willow flycatcher, tidewater goby, and southern steelhead trout. If the species are found to be present during construction, construction activities shall be ceased and consultation with the USFWS and or NMFS, as appropriate, shall take place. The Corps has determined the proposed Project may adversely affect the California red-legged frog (CRLF) and subsequently initiated formal consultation with the USFWS in April, 2011. A non-jeopardy biological opinion was issued by the USFWS on October 27, 2011.

7.1.4. Fish and Wildlife Coordination Act, As Amended

The proposed Project is in compliance with the Fish and Wildlife Coordination Act. Coordination with the USFWS has occurred throughout the plan formulation process. Survey results were shared with the USFWS. The Corps coordinated with the USFWS in developing conservation measures to minimize or avoid impacts to biological resources including federally listed species and will continue to coordinate with the USFWS until the biological opinion is rendered and construction is completed.

7.1.5. Clean Water Act of 1977 (33 USC § 1251 et seq.)

The Clean Water Act (CWA) was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States.

Section 404 of the Clean Water Act. Section 404 of the Clean Water Act (CWA) governs the discharge of dredged or fill material into waters of the United States, including wetlands. Although the Corps does not issue itself a permit for its own activities, the Corps authorizes its own discharges of dredged or fill material by applying all applicable substantive legal requirements, including application of the section 404(b)(1) Guidelines. The CWA section 404(b)(1) Guidelines state that:

" ...no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." (40 C.F.R. § 230.10(a).)

Under the section 404(b)(1) Guidelines, the Corps must demonstrate avoidance or minimization of impacts to waters of the United States to the maximum extent practicable. Under the above requirements, the Corps can only proceed with a project that is the "least environmentally damaging practicable alternative" (LEDPA). A Final CWA section 404(b)(1) analysis has been prepared and is included in Appendix A of this SEA/MND. The proposed Project is the LEDPA.

Section 401 of the Clean Water Act. Under section 401 of the CWA, every applicant for a federal permit or license for any activity which may result in a discharge of dredge or fill material to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards (*i.e.*, beneficial uses, objectives, and anti-degradation policy). On September 23, 2010, the Regional Water Quality Control Board issued an amended 401 water quality certification for the proposed Project. Following the Corps' November 1, 2011 request, the CWA section 401 WQC was further amended by the CRWQCB on November 14, 2011 to be consistent with the mitigation measures described in the SEA (Appendix G).

Section 402 of the Clean Water Act. In 1972, the Federal Water Pollution Control Act (later referred to as the Clean Water Act [CWA]) was amended to require National Pollutant Discharge Elimination System (NPDES) permits for the discharge of pollutants into "waters of the United States" from any point source. As defined in the CWA, "waters of the United States" are surface waters, including rivers, lakes, estuaries, coastal waters, and wetlands, that are interstate waters used in interstate and/or foreign commerce, their tributaries, territorial seas at the cyclical high tide mark, and adjacent wetlands. In 1987, section 402 of the CWA was amended to require that the United States Environmental Protection Agency (USEPA) establish regulations for permitting of municipal and industrial stormwater discharges under the NPDES permit program. The USEPA published final regulations regarding stormwater discharges on November 16, 1990. (See 55 Fed.Reg. 47990 (Nov. 16, 1990).) The regulations require that Municipal Separate Storm Sewer System (MS4) discharges to surface waters be regulated by a NPDES permit. An MS4 is a publicly-owned conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that are designed or used for collecting or conveying stormwater separately from wastewater.

In addition, CWA section 304(a) requires states to adopt water quality standards for receiving water bodies and to have those standards approved by the USEPA. These water quality standards consist of designated beneficial uses for a particular receiving water body (*e.g.*, wildlife habitat, agricultural supply, fishing, *etc.*), along with water quality criteria necessary to support those uses. Water quality criteria consist of either prescribed concentrations or levels of constituents, such as lead, suspended sediment, and fecal coliform bacteria, or narrative statements describing the quality of water that supports a particular beneficial use. Because California had not established a complete list of acceptable water quality criteria, USEPA established numeric water quality criteria for certain toxic constituents in surface waters with human health or aquatic life designated uses in the form of the California Toxics Rule (CTR). (40 C.F.R. § 131.38.) The final rule establishes ambient water quality criteria for priority toxic pollutants in the State of California. The Corps' contractor will coordinate with the Regional Water Quality Control Board for requirements of Section 402 of the CWA prior to construction. A Notice of Intent will be submitted to the Regional Water Quality Control Board and a Stormwater Pollution Prevention Plan (SWPPP) will be prepared to the states' requirements of the NPDES storm water program prior to construction.

7.1.6. National Historic Preservation Act of 1966 (16 USC § 470)

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on cultural resources listed or eligible for listing on the National Register of Historic Places (National Register).

Based on identification efforts to date, there are no historic properties within the area of potential effects (APE). A letter of coordination for the proposed Project will be sent to the State Historic Preservation

Officer describing the APE, pedestrian survey and record search results. Construction activities associated with the proposed Project will be monitored by a qualified archaeologist who meets, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739).

7.1.7. Migratory Bird Treaty Act of 1972

The Migratory Bird Treaty Act (MBTA) makes it unlawful to pursue, hunt, capture, kill, possess, or attempt such an action towards any bird listed in wildlife protection treaties between the United States and several countries including Great Britain, Mexico, Japan, and countries that in the Commonwealth of Independent States. A “migratory bird” includes the living bird, any part of the bird, its nests, or eggs. Disturbance of the nest of a migratory bird requires a permit issued by the USFWS pursuant to CFR Title 50. Environmental commitments incorporated into the proposed Project activities would avoid impacts to these species (Final SEA/MND Section 4.3 Biological Resources). These commitments include construction monitoring, pre-construction surveys, and the avoidance of nest locations. When possible, vegetation would be cleared outside of the bird breeding season (February 15 to September 15). The proposed Project activities would be in compliance with MBTA.

7.1.8. Executive Order 11988, Floodplain Management (42 CFR 26961)

Signed May 24, 1977, Executive Order 11988 requires that governmental agencies, in carrying out their responsibilities, provide leadership and take action to restore and preserve the natural and beneficial values served by floodplains. Before proposing, conducting, supporting, or allowing an action in a floodplain, each agency is to determine if planned activities will affect the floodplain and evaluate the potential effects of the intended action on its functions. In addition, agencies shall avoid locating development in a floodplain in order to mitigate impacts to the water quality and hydrology in the area. Alternatives have been developed to repair the levee and provide needed SPF level of flood protection to the City of Santa Maria. The proposed Project activities would not conflict with Executive Order 11988.

7.1.9. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 identifies and addresses disproportionately high and adverse human health or environmental effects resulting from the programs, policies, or activities of federal agencies on minority populations and low-income populations in the United States. The Order is further intended to provide access to information and public participation relating to potential impacts to these populations. The proposed Project activities would not create socioeconomic impacts within the adjacent communities. There would be no conflict with Executive Order 12898.

7.1.10. Noise Control Act of 1972 (42 USC § 4901-4918)

The Noise Control Act directs all federal agencies to carry out, “to the fullest extent within their authority,” programs within their jurisdictions in a manner that furthers a national policy of promoting an environment free from noise that jeopardizes health and welfare. The USEPA identifies a 24-hour exposure level of 70 dB as the level of environmental noise which will preclude any measurable hearing loss over a lifetime (USEPA, 1974). Noise levels of 55 dBA (Ldn) outdoors and 45 dBA (Ldn) indoors were identified as precluding activity interference and annoyance. These levels are not standards, criteria, regulations, or goals and should be viewed as a threshold below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise. Although construction activities will result in noise impacts at nearby locations, these impacts will be short-term and will cease upon completion of construction. City regulations on hours of operation will be followed to minimize the potential impact due to construction. All construction activity would occur between 7 a.m. and 6 p.m. and construction of the proposed Project would not violate the City of Santa Maria Noise Ordinance. The proposed Project activities would be consistent with this Act.

7.1.11. Resource Conservation and Recovery Act of 1976 (42 USC § 6901)

The Resource Conservation and Recovery Act (RCRA) was enacted to ensure the safe and environmentally responsible management of hazardous and nonhazardous solid waste and to promote resource recovery techniques to minimize waste volumes. To ensure responsible management of hazardous and nonhazardous waste, the mitigation measures listed in Section 4.10.3 would be integrated into the proposed Project activities. Therefore, the proposed Project activities would be consistent with this Act.

7.1.12. Hazardous Waste and Solid Waste Amendments Act of 1984 (42 USC § 6901)

The Hazardous Waste and Solid Waste Amendments Act of 1984 are amendments to the RCRA and the Solid Waste Disposal Act that authorize regulations or require that regulations be promulgated on waste minimization, land disposal of hazardous wastes, and underground storage tanks. In order to minimize waste impacts, the proposed Project activities would implement the mitigation measures listed in Section 4.10.3. There would be no conflict with this Act.

7.1.13. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 USC § 9601)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides a statutory framework for the cleanup of waste sites containing hazardous substances and, as amended by the Superfund Amendments in 1986 and Reauthorization Act, provides an emergency response program in the event of a release (or threat of a release) of a hazardous substance to the environment. CERCLA's goal is to provide for response and remediation of environmental problems that are not adequately covered by permit programs of other environmental laws, such as the CAA, the CWA, the RCRA, and the Atomic Energy Act. In order to minimize hazardous waste impacts, the proposed project activities would implement the mitigation measures listed in Section 4.10. There would be no conflict with this Act.

7.1.14. Toxic Substances Control Act of 1976 (15 USC § 2601, et seq.)

The Toxic Substances Control Act (TSCA) provides the USEPA with the authority to require testing of both new and old chemical substances entering the environment and to regulate them where necessary. In order to be consistent with this Act, the proposed Project activities would implement the mitigation measures listed in Section 4.10.

7.2. STATE REGULATIONS

7.2.1. California Environmental Quality Act (California Public Resources Code Section 21000 et seq.)

The California Environmental Quality Act (CEQA) requires state and local agencies to disclose and consider the environmental implications of their actions. It further requires that agencies, when feasible, avoid or reduce the significant environmental impacts of their decisions. This document meets the goals, policies, and requirements of CEQA. Information and analysis to meet CEQA requirements are included within this Final SEA/MND for each resource. CEQA establishes requirements and procedures for state and local agency review of the environmental effects of projects proposed within their jurisdictions.

Initial Study (IS) Checklist has been prepared to aid and facilitate evaluation of the proposed project. The Initial Study Checklist (Final SEA/MND Appendix B) found that all potential project impacts could be mitigated to levels that are less than significant and that a MND is the appropriate environmental document to comply with the CEQA.

7.2.2. 1601 Streambed Alteration Agreement from California Department of Fish and Game

The SBCFCWCD will submit an application to the Department of Fish and Game (Department) to obtain 1601 Streambed Alteration Agreement and will provide a copy of Section 1601 agreement to all contractors, subcontractors, and the Contractor's project supervisors. Copies of the agreement and all required permits and supporting documents will be readily available at the construction site at all times during periods of active work and will be presented to any Department personnel, or personnel from another agency upon demand.

7.2.3. Air Quality Regulations

The California Air Resource Board (CARB) has issued a number of California Ambient Air Quality Standards (CAAQS). These standards include pollutants not covered under the NAAQS and also require more stringent standards than provided under the NAAQS. Pollutants regulated under these standards include ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

CARB, like USEPA, also has on-road and off-road engine emission reduction programs that indirectly affect the project's emissions through the phasing in of cleaner on-road and off-road equipment engines. Additionally, CARB has a Portable Equipment Registration Program that allows owners or operators of portable engines and associated equipment to register their units under a statewide program in order to operate their equipment, which must meet specified program emission requirements, without having to obtain individual permits from local air districts.

Emission estimates for VOC and NOx for the proposed Project are below the SBCAPCD published thresholds of 25 tons per year and would not conflict with or obstruct implementation of the applicable air quality plans. Implementation of Mitigation Measures AQ-1 through AQ-16 would further reduce construction emissions. Therefore, the proposed Project would be in compliance with the state air quality regulations.

7.2.4. Cal/OSHA

The California Office of Safety and Health Administration (Cal/OSHA) regulates employee noise exposure as mandated by Title 8 of the California Code of Regulations, Group 15, Article 105 §§ 5095-5100. Cal/OSHA stipulates the same requirements as Federal OSHA. Additionally, a Hearing Conservation Program must be instituted when employees are exposed to noise levels of an 8-hour time weighted average at or greater than 85 dBA. California Government Code (§65030 et seq.) requires each local government entity to implement a noise element as part of their general plan. The California Office of Planning and Research has developed guidelines (OPR, 1990) for evaluating the compatibility of various land uses surrounding a project area as a function of community noise exposure. The proposed Project activities would not conflict with Cal/OSHA standards.

7.3. LOCAL REGULATIONS

7.3.1. Air Quality

The proposed project is within the SBCAPCD jurisdiction. The SBCAPCD is responsible for planning, implementing, and enforcing federal and state ambient standards within the County of Santa Barbara. The regulations of this agency are primarily focused on stationary sources; therefore, most of the local agency regulations are not relevant to this project. However, portable engines used during construction that are larger than 50 horsepower and that are not registered under the CARB Portable Equipment Registration Program would need to obtain permits from the SBCAPCD.

7.3.2. Noise

According to Santa Maria land use compatibility guidelines, noise is considered a significant impact if sensitive land uses are exposed to an exterior noise level greater than 60 dB Community Noise Equivalent Level (CNEL) or interior noise level greater than 45 dB CNEL for habitable rooms. Noise sensitive land uses are defined as residences, transient lodging, schools, hospitals, nursing homes, churches, meeting halls, office buildings, and mortuaries. The maximum exterior noise level for commercial land uses is 65 dB CNEL, while for industrial land uses it is 70 dB CNEL. Section 12-7.14a and 12.8-15a of the Santa Maria Municipal Code were revised in April 2008 to allow for noise levels up to 75 dBA for patios, balconies, and other outdoor living areas associated with residential uses. The revised standards also include provisions for informing prospective buyers of such properties regarding these elevated noise levels.

The City of Santa Maria General Plan does not include standards for construction noise but includes standard mitigation to address this issue on a case-by-case basis. There are restrictions on hours of construction activity. Heavy construction should be limited to the weekday hours (7 a.m. to 6 p.m.) with minimal activity on weekends. For all demolition and construction activity within the proposed project area, additional noise attenuation techniques (environmental commitments in Final SEA/MND Section 6) would be employed as needed to ensure that noise remains within levels allowed by the City of Santa Maria noise standards

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11. LIST OF ACRONYMS AND ABBREVIATIONS

ACS	American Community Survey
ADT	Average Daily Traffic
APE	Area of Potential Effects
APS	Auxiliary Power System
ATCM	Airborne Toxic Control Measure
BLM	Bureau of Land Management
CA-1	California Highway 1
CAA	Clean Air Act (Federal)
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
Cal/OSHA	California Office of Safety and Health Administration
CARB	California Air Resources Board
CCIC	Central Coastal Information Center
CCWA	Central Coast Water Authority
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act (California Public Resources Code Section 21000 et seq.)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CFR	U.S. Code of Federal Regulations
cfs	Cubic feet per second
CH_4	Methane
CHRIS	California Historical Resources Information System
CNEL	Community Noise Equivalent Level
CO	Carbon Monoxide
CO_2	Carbon Dioxide
Corps	United States Army Corps of Engineers
CRWQCB	California Regional Water Quality Control Board
CWA	Clean Water Act of 1977 (33 U.S.C. 1251 et seq.) (formerly the Federal Water Pollution Control Act of 1972)
dB	Decibel
dBA	Decibel (A-weighting network)
DDR	Design Deficiency Report
DDT	Dichlorodiphenyltrichloroethane
DOD	Department of Defense
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EA	Environmental Assessment
EC	Environmental Commitment

EIS	Environmental Impact Statement
ER	Engineer Regulation
ESA	Endangered Species Act of 1973, 1988 Amendments (16 USC § 1531 et seq.)
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
H&H	Hydrology and Hydraulics
Ldn	Day-Night Average Sound Level
LEDPA	Least Environmentally Damaging Practicable Alternative
Leq	Equivalent Continuous Sound Level
Lmax	Maximum Sound Level
Lmin	Minimum Sound Level
lsd	land surface datum
LST	localized significance thresholds
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level
MND	Mitigated Negative Declaration
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act (42 U.S.C. § 4321 et seq.)
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_x / NO_2	Oxides of Nitrogen / Nitrogen Dioxide
NRHP	National Register of Historic Places
NSR	New Source Review
OPR	Office of Planning and Research
OSHA	U.S. Department of Labor Occupation Safety & Health Administration
PM_{10} / $PM_{2.5}$	Particulate Matter less than 10/2.5 µm in Aerodynamic Diameter
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
SBC	Santa Barbara County
SBCAPCD	Santa Barbara County Air Pollution Control District
SBCFCD	Santa Barbara County Flood Control District
SBCFCWCD	Santa Barbara County Flood Control and Water Conservation District
SBCFD	Santa Barbara County Fire Department
SCAB	South Coast Air Basin
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLIC	Spills, Leaks, Investigations, Cleanups

SMBSD	Santa Maria-Bonita School District
SO_X /SO_2	Oxides of Sulfur / Sulfur Dioxide
SPF	Standard Project Flood
SR	State Route
Superfund	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
SWPPP	Storm-Water Pollution Prevention Plan
TAC	Toxic Air Contaminants
TCE	Temporary Construction Easement
TDS	Total Dissolved Solid
TMDL	Total Maximum Daily Loads
TSCA	Toxic Substance Control Act
UBC	Uniform Building Code
US-101	United States Highway 101
USA	Underground Service Alert
USACE	United States Army Corps of Engineers
USC	U.S. Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compounds
WMA	Wildlife Management Area
YBP	Years before present

Appendix A

Clean Water Act Section 404(b(1) Evaluation

U.S ARMY
CORPS OF ENGINEERS

CLEAN WATER ACT SECTION 404(B)(1) EVALUATION
SANTA MARIA RIVER PROJECT EXTENSION OF REACH 3

November 2011

I. INTRODUCTION

The following evaluation is prepared in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). The intent of this document is to state and evaluate information regarding the effects of the discharge of dredged or fill material into waters of the United States. The proposed project consists of further repairing the existing Santa Maria River levee system to ensure the levee system is capable of containing the standard project flood (SPF) (160,000 cubic feet per second) by extending the repairs to be completed as part of Reach 3 of the Santa Maria River Levee Repair/Improvement Project. This document supplements the Supplemental Environmental Assessment/Mitigated Negative Declaration (SEA/MND) for the Santa Maria River Levee Improvement Bradley Canyon Extension Project.

II. PROJECT DESCRIPTION

A. LOCATION

The proposed Project is located in Bradley Canyon channel, north and south of Foxen canyon road (aka Betteravia Road) and west of Dominion Road, in the City of Santa Maria, County of Santa Barbara, California

B. GENERAL DESCRIPTION

The Santa Maria River Levee project was originally constructed in 1963 by the Los Angeles District of the U.S. Army Corps of Engineers (Corps) to provide flood protection to the Santa Maria Valley, including the entire City of Santa Maria. The original construction consisted of a set of earthen levees with riprap revetment. The levee along the south side of the river extends a distance of 17 miles, extending from Fugler's Point to California Highway 1 (CA-1) Bridge. The original project also included a 5-mile-long levee along the north side of the River located between U.S. Highway 101(US-101) Bridge and the CA-1 Bridge and 1.8-mile-long levees along Bradley Canyon.

In 2005, the Federal Emergency Management Agency (FEMA), responsible for administering the National Flood Insurance Program, requested the Corps certify that the Santa Maria River Levee project meets the Corps' criteria identified in ER 1165-2-119. Based on a hydraulic and geotechnical analysis and review of several documented levee failures as shown in the attached figure Historical Locations of Damages, the Corps was unable to certify that the levee system will contain the SPF due to a deficiency in the original levee design that does not account for the angle of approach of meandering lower volume flows that impinge on the levee.

The 2009 Supplemental Design Deficiency Report (SDDR) described a design deficiency in the Santa Maria Levee that makes the levee vulnerable to breakage from impinging flows. The 2009 EA/MND analyzed impacts to environmental resources along the 6.5-mile-long levee, which is divided into Reaches 1, 2, and 3. The extent of the project described in the 2009 EA/MND and 2009 SDDR began at the downstream end of Reach 1 (Blosser Road) and ended at the upstream end of Reach 3 (upstream of the confluence of Bradley Canyon channel). The repair of Reaches 1, 2, and 3 have been completed.

Further Hydrology & Hydraulics (H&H) analysis revealed an additional failure mode for the Santa Maria levee upstream of Bradley Canyon, not accounted for in the 2009 SDDR or the 2009 EA/MND. The 2011 SDDR Addendum, provides analysis demonstrating that a failure of the Santa Maria levee upstream of Bradley Canyon could result in flows impinging on the Bradley Canyon levee, causing a break in that levee and flooding of the developed area of the City of

Santa Maria behind the repaired portions of the Santa Maria levee. Thus, after additional hydraulic analysis, the Corps has identified that the benefits projected for the correction approved in the 2009 SDDR (preventing flooding of the city of Santa Maria) will not be provided unless the additional failure mode is addressed. To ensure that this flooding does not occur, and the City of Santa Maria receives Standard Project Flood (SPF) level of flood protection the 2011 SDDR Addendum recommends taking corrective action. This Final SEA/MND evaluates alternatives to prevent the flooding resulting from a breach along the new failure location upstream of Bradley Canyon confluence and provide the needed SPF level of flood protection to the city of Santa Maria.

C. OVERALL AND BASIC PROJECT PURPOSE

The overall project purpose is to repair the existing levee system to contain the SPF and ensure that the City of Santa Maria has an adequate level of flood protection. The basic project purpose is flood hazard reduction, which is water dependent. For the rebuttable presumptions specified in the U.S. Environmental Protection Agency's (EPA) Clean Water Act section 404(b)(1) guidelines to apply, the proposed project must impact special aquatic sites and be non-water-dependent. Although the proposed project would impact a special aquatic site, the proposed project is water-dependent, and therefore, the rebuttable presumptions do not apply.

D. PROPOSED PROJECT (SHEET PILE AND SOIL CEMENT ALTERNATIVE)

The proposed project consists of improving a 3,700-foot-long section of the existing levee along Bradley Canyon using a combination of soil cement revetment and sheet pile to address a deficiency in the original levee design. The proposed project includes installing sheet pile for 1,000 feet along the top of the existing levee, and adding soil cement for the remaining 2,700 linear feet. The construction process includes the following:

Sheet Pile Component
Sheet pile walls consist of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. This method could be used without disturbing the existing levee. If the levee were to erode because of impinging flows, the steel sheet pile would form a wall that would prevent the breach of the levee. However, in this eroded condition, the steel sheet pile must have the strength necessary to act as a retaining wall. The projected design scour would expose the sheet pile for a vertical height of up to 30 feet. The sheet pile would be driven approximately 69 feet deep to ensure anchorage to the projected scour depth. Tiebacks would be required at 10-foot intervals located near the top of the sheet pile walls. Due to the relatively narrow levee cross section, a screw-type tieback anchor with a concrete pile cap would be used. The construction of the sheet pile would have no impact on existing vegetation. The top of the drainage side of the levee would require minimal excavation to provide access to install the tiebacks and concrete pile cap. No excavation would be required in the drainage.

Soil Cement Component
Installation of soil cement would include the following main steps: (1) Temporary diversion of the low flow Bradley Canyon channel within the 2,700-foot-long soil cement construction project area by constructing a temporary diversion channel (Figure 2.2-4 and 4.3-1 of the SEA/MND); (2) Clearing and grubbing vegetation within an area 120-feet wide by 2,700-feet-long within the soil cement section of the Project area; (3) Relocating a 12-inch diameter irrigation water line and two oil pipelines (utility map 3.12-1of the SEA/MND) located within the 120 foot TCE; (4) Excavating approximately 90,000 cubic yards of material from the channel to construct the soil cement revetment. Approximately 36,000 cubic yards of imported borrow material would also be

utilized in the soil cement mixture. After the soil cement revetment is constructed, approximately 80,000 cubic yards of fill material would be needed to backfill to original grade. It is anticipated that approximately 30,000 cubic yards of fill material would need to be imported from onsite, but outside of the channel; (5) Mixing soil/sand with concrete to create soil cement at the upland portable batch plant near the Project area; (6) Trucking soil cement from the portable batch plant to the construction area; (7) Benching the face of the exposed slope with soil cement; and (8) Backfilling soil/sand and restoring low flow channel.

On the drainage side of the levee, soil would be excavated to a depth of approximately 15 feet below the existing grade, and extending about 80 feet from the toe of the levee, at a 2:1 (Horizontal: Vertical) slope. Excavated soil would be stockpiled adjacent to the work area outside the temporary construction area and out of the channel in an upland area next to the batch plant location. A portable batch plant would be assembled to generate soil cement. There would only be one soil cement batch plant in operation at a time. The batch plant would be located outside of Bradley Canyon in the landside area of the levee. This alternative would require approximately 90,000 cubic yards of material to be temporarily excavated from the TCE in order to construct the soil cement revetment. Approximately 36,000 cubic yards of borrow material would be utilized in the soil cement mixture. After the soil cement revetment is constructed, approximately 80,000 cubic yards of borrow material would be required to backfill to original grade. It is anticipated that approximately 30,000 cubic yards of fill material would be required to be imported from the upland side of Reach 3 with the coordination of the City of Santa Maria. The Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD) conducted soil testing in March 2008 at the vicinity of the proposed project site. The specific soil tests, in combination with consideration of historical soil data for the project area, indicated the in-situ materials at the toe of the levee were suitable for soil cement.

The proposed revetment would extend approximately 7 feet below the existing riprap revetment. The existing riprap revetment would not be removed from the inside face of the levee prior to placing the soil cement. The soil cement would be installed on top of the existing riprap. Once mixed in an onsite plant, the soil cement would be compacted in 1-foot thick and a minimum of 8-foot wide layers. This operation would be repeated until the soil cement reaches the top of the levee. Once the soil cement is installed, the excavation area would be backfilled with the earthen fill material that is not utilized for the mixing of the soil cement. Because the volume of soil cement below the surface of the ground would reduce the volume of back fill needed, the backfill would only be a few inches shallower than the original bottom elevation.

The placement of soil cement would result in temporary impacts to a 120-foot-wide corridor along the Bradley Canyon channel adjacent to the soil cement installation area. Therefore, the low flow channel would need to be temporarily diverted/ relocated during construction. Approximately 6.35 acres of waters of the U.S. would be temporarily disturbed and 0.50 acre of waters of the U.S. would be permanently impacted within the Bradley Canyon channel.

After work in waters of the U.S. is completed, the Corps would restore the temporary and permanent impact areas as described in the SEA/MND and Appendix D (Biological Resources Mitigation and Monitoring Plan) of the SEA/MND.

Construction Duration

Construction is expected to be initiated in 2012. Vegetation would not be cleared and grubbed February 15 thru September 15. Sheet pile would be driven-in, and soil cement placed between April 1 through November 30 in order to avoid work within the rainy season, avoiding and minimizing turbidity levels in the Bradley Canyon channel, and avoiding the California red-legged frog breeding season. The lead time for ordering sheet pile is three to four months.

Construction activities associated with the installation of sheet pile can be completed in approximately two to three months, while installation of soil cement can take up to six to eight months to complete the construction. With the proposed project design, installation of sheet pile and soil cement can be completed simultaneously. Depending on when the notice to proceed (NTP) is given for the proposed construction the duration of the proposed project could vary from eight months (if NTP is given in May or June) to twelve months (if NTP is given in October). Proposed construction hours would be 7:00 A.M. to 6:00 P.M., Monday through Friday.

Construction Equipment

Construction equipment for the proposed soil cement would include one bulldozer, three scrapers, four dump trucks, one hydraulic excavator, one skip loader, one vibratory roller, and one water truck. Construction equipment for the proposed sheet pile would include one pile driver, one crane, and material handling equipment. All construction equipment would be able to access the sheet pile operations from the maintenance road on top of the levee.

Construction Route

The levee can be accessed at various locations, including: (1) To the east end of Bradley Canyon via gated entry from Betteravia Road (Foxen Canyon Road) to the top of levee, and (2) also via a gated entry at the east end of the active Santa Maria Regional Landfill, adjacent to the levee. The maintenance road may be temporarily widened on the upland side of the levee by approximately 10 feet to accommodate the width of the equipment that will be used to install the sheet pile. The temporary fill will be removed after construction.

Future Operation and Maintenance

The SBCFCWCD would conduct all Operations and Maintenance (O&M) activities associated with this alternative that are contained in the Operation, Maintenance, Repair, Rehabilitation and Replacement (OMRRR) Manual for Santa Maria Valley Levees and Channel Improvements. Any required permits would be obtained by the SBCFCWCD from the Resource Agencies and the Corps' Regulatory Division prior to commencement of the O&M activity.
Operation of the levee may include the following:

Mobilization

Responsibility for providing sufficient equipment, material, and trained personnel for adequate operation of the project units in times of flood emergency.

Coordination

Appropriate measures are to be taken to insure that the activities of all local organizations connected with the protective works are coordinated with the operating agency during flood periods.

Inspection

Scheduled patrolling of flood control activities during periods of storm runoff in order to detect and correct any condition which endangers the structure. Also included is a complete inspection following each major high water period, to ascertain if any other damage had occurred.

Multi-Purpose

All uses of flood control facilities which do not involve conveyance of storm runoff. They include, but are not limited to, water conservation, wetland/wildlife habitat, water quality functions, and development for increased land utilization.

Maintenance along the Sheet Pile Segment:

Inspection and Repairs
Inspections shall be made as are necessary to insure that the flood control facilities are maintained in a properly functioning condition. This task includes maintaining portions of sheet pile infrastructure that may result in a reduced potential for scour event to create erosion and a vertical wall which would introduce a public safety hazard related to flooding, pose a barrier to wildlife passage, and result in maintenance activities in waters of the United States as specified in the 2009 SDDR and 2011 SDDR Addendum. Levee inspection is required after each major storm. Any damage may require repair immediately.

Staging areas
Staging areas designated by SBCFCWCD would be outside of the river bed.

Temporary maintenance zones
All maintenance activities would be completed within the maintenance access roads of SBCFCWCD owned right of way.

Equipment
Maintenance equipment may include dump trucks, hydraulic excavators, and track loaders.

Borrow material location
No borrow area or borrow material for maintenance activities shall be located in the channel.

Maintenance along Soil Cement Segment:

The soil cement portion of the recommended alternative would require less maintenance because the levee would be protected from the near breaches that have plagued the original project in the past. During scour event similar to those on record, the impinging flows would erode the channel invert. The resulting erosion would only expose the soil cement to its 2H: 1V slope. The levee itself would be completely untouched and intact. The only maintenance required would be simply to regrade the riverbed to fill the scoured area without any compaction requirements. If this maintenance operation were to be delayed, there would be no pressing need for the operation to occur unless there were environmental concerns.

Access points
Access to the Project area is via the south end of the project through a gated entry at Betteravia Road (Foxen Canyon Road).

Staging areas
Staging designated by the SBCFCWCD would be outside of the channel.

Temporary maintenance zones
All maintenance activities can be completed within the maintenance access roads of SBCFCWCD owned right of way.

Equipment
Possible maintenance equipment may include one belly dump trucks, one hydraulic excavator, and one skip loader.

Water Diversion
Water diversion may be necessary to perform the maintenance activities.

E. ALTERNATIVES ANALYSIS

The alternatives analysis must rigorously explore and objectively evaluate all practicable alternatives capable of achieving the overall purpose of the proposed activity. Practicability is defined in terms of cost, logistics, and existing technology.

1. NO FEDERAL ACTION

With the No Federal Action Alternative, no Federal participation from the Corps to provide additional flood risk management to the study area would occur. With no improvements, there would not be temporary construction impacts to channel substrate, turbidity levels, erosion/accretion, water quality, aquatic habitat, wildlife habitat, noise levels, aesthetics and air quality. In addition, with no action, there would not be permanent impacts to channel substrate, drainage patterns, aesthetics and erosion/accretion. With no action, the existing safety hazard to the surrounding area due to the increased flood risk would remain and the existing facility would not meet the SPF flood protection criteria. The high risk of flood hazards to the city of Santa Maria community would persist. The No Federal Action Alternative would not meet the overall project purpose and is therefore impracticable. However, the No Federal Action Alternative is carried forward for analysis as the "future without-project" condition.

2. SEQUENCED SEARCH FOR LESS ENVIRONMENTALLY DAMAGING ALTERNATIVES

a. OTHER SITES

Alternative locations outside the Santa Maria River basin, including upland sites, have not been examined because the proposed Santa Maria Levee Repair Project is site-specific. However, this analysis does consider alternative project designs in both the main-stem of the Santa Maria River (extending from Bradley Canyon 17,000 linear feet upstream to Fuglar's Point plus 650 feet within Bradley Channel) as well as Bradley Canyon channel.

b. OTHER DESIGNS

Ten action alternatives in Bradley Canyon and the main-stem of the Santa Maria River were considered by the Corps, including: 1) sheet pile wall; 2) soil cement; 3) riprap; 4) articulated concrete block; 5) gabion mattresses; 6) sheet pile and 2-3-ton rock with plantings; 7) jet grouting, 8) sheet pile; 9) soil cement, and 10) a combination of sheet pile and soil cement. As discussed in the SEA/MND and below, the Corps eliminated from further consideration riprap, articulated concrete blocks, gabion mattresses and jet grouting. Therefore, in addition to the No Federal Action Alternative discussed above, six alternatives (including the proposed project) are carried forward for further analysis.

Alternative 2A

Sheet pile and soil cement for 3,700 linear feet along Bradley Canyon levee (proposed project). As discussed above, this alternative would tie into the upstream end of Reach 3 and would involve a segment of sheet pile transitioning into soil cement slope protection. Sheet pile would extend from the upstream end of Reach 3 to approximately 1,000 feet from the upstream of Bradley Canyon Levee of the project area. At this point, the sheet pile slope protection would transition to soil cement revetment for the remaining 2,700 feet along the Bradley Canyon Levee. This alternative would permanently impact 0.5 acre and temporarily impact 6.35 acres of non-wetland, waters of the United States. Alternative 1 would meet the overall project purpose and would be practicable in light of costs and logistics and technology. As a result, Alternative 2A could potentially be the least environmentally damaging practicable alternative.

Alternative 2B

Soil cement along 3,700 linear feet of Bradley Canyon levee. Soil cement is a densely compacted mixture of cementitious material, soil aggregate and water. The mixture is compacted to form a hardened structure with specific engineering properties. Soil-cement is useful as a liner because the material has higher compressive strength and lower hydraulic conductivity than the non-cemented soil. The soil cement slope protection is economically attractive in Santa Maria because suitable rock is not available within economical haul distances. This alternative consists, essentially, of overlaying the original riprap revetment with a new continuous revetment of soil cement. Through excavation of the river bed immediately adjacent to the levee, the levee slope of two feet horizontal to one foot vertical (2H:1V) would extend down to the required scour depth. This alternative would result in 0.7 acre of permanent impact and 9.5 acres of temporary impacts to waters of the U.S. Alternative 2B would meet the overall project purpose, but would result in greater temporary impacts to waters of the United States when compared to the proposed project. Alternative 2B appears to be practicable in light of cost, logistics and technology and, as a result, could represent the least environmentally damaging practicable alternative.

Alternative 2C

Sheet pile for 3,700 linear feet along Bradley Canyon levee. Sheet pile walls consist of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. This method could be used without disturbing the existing levee. If the levee were to erode because of impinging flows, the steel sheet pile would form a wall that would prevent the breach of the levee. However, in this eroded condition, the steel sheet pile must have the strength necessary to act as a retaining wall. This design scour would expose the sheet pile for a vertical height of up to 30 feet. The sheet pile would be driven approximately 69 feet deep to ensure anchorage should the scour be that extreme. Tiebacks would be required at 10-foot intervals located near the top of the sheet pile walls. Due to the relatively narrow levee cross section, a screw-type tieback anchor with concrete pile caps would be used. This alternative would result in no impacts to waters of the U.S. Alternative 2C would meet the overall project purpose and is practicable. As a result, Alternative 2C could potentially represent the least environmentally damaging practicable alternative.

Alternative 1A

This alternative would tie into the upstream end of Reach 3 for minimizing the risks associated with breaching the Bradley Canyon portion of the levee system and flooding the City of Santa Maria. Sheet pile would extend from the existing Reach 3 confluence to approximately 650- feet along Bradley Canyon to prevent flows from flanking the upstream end of the Reach 3 revetment and will connect with the downstream end of the existing Santa Maria River Levee. At this point, the sheet pile slope protection would transition to soil cement revetment for the remaining 17,000 feet along the Santa Maria River Levee as shown in figure 2-3.1 of the Final SEA/MND. This alternative will provide the City of Santa Maria and the agricultural land behind the 17,000-foot levee with the level of flood risk reduction intended in the original project.

This alternative would permanently impact 3 acres of the waters of the U.S. / native vegetation and would temporarily impact 42.9 acres of waters of the U.S. Temporary impacted areas would be restored to pre-project conditions to minimize temporal loss of physical and biological functions. By placing sheet pile in the downstream portion of the extension of Reach 3, direct impacts to the adjacent Santa Maria River would be avoided and indirect impacts to sensitive biological resources, including federally listed species, would be minimized.

The least Bell's vireo has not been reported within the proposed Project area but potential least Bell's vireo habitat occurs in a riparian area within the vicinity of the project near the downstream reach of the Project. Impacts to least Bell's vireos may include disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities, particularly if sheet pile installation occurs during the breeding season for this species. However, it is very unlikely that vireo would be present in the proposed project area (Appendix F of the SEA/MND). Therefore, the Corps has determined that this alternative would have no effect on the least Bell's vireo. The tidewater goby is not expected to occur in the project area and would not be subject to project effects. Habitat to California red-legged frogs would not be present within this project site and therefore would have no effect on red-legged frog. Steelhead would likely not be present within the construction area however designated critical habitat is present on site. Due to work being conducted during the dry season the Corps has made the determination that the proposed project would have minor impacts to drainage patterns and baseflow and that no constituent elements of steelhead critical habitat are present and therefore the proposed project is not likely to adversely modify steelhead critical habitat.

Indirect, adverse affects, such as downstream changes in turbidity levels, erosion/accretion patterns, water quality, habitat degradation, are not expected to occur from construction as most of this work takes place immediately adjacent to the levee, outside the main channel. Temporary construction impacts would result in short-term adverse impacts to noise levels, air quality, aesthetics and channel substrate. There would be no change to maintenance requirements post-construction that could impact steelhead. To further reduce potential effects, construction would be avoided in occupied portions of the river. Other mitigation measures as well as avoidance and minimization measures are described in Section 4 and 6 of the SEA/MND. Overall, Alternative 1A would have similar or greater impacts to the aquatic environment when compared to the proposed project. Alternative 1A would meet the overall project purpose, but would result in a substantial increase in permanent and temporary impacts to waters of the United States when compared to the proposed project. As a result of the substantial increase in impacts to aquatic resources, Alternative 1A would not represent the least environmentally damaging practicable alternative.

Alternative1B

Sheet pile wall would extend from the upstream end of existing Reach 3 by 650 feet along the Bradley Canyon levee. In addition, sheet pile will be installed along the entire 17,000-feet along Santa Maria River levee. The sheet pile can be installed without disturbing the existing levee and surrounding habitat in the riverside. However, if the levee were to erode because of impinging flows, the steel sheet pile would form a vertical wall that would prevent the breach of the levee. However, in this eroded condition, the steel sheet pile must have the strength necessary to act as a retaining wall. This design scour would expose the sheet pile for a vertical height of up to 30 feet. The sheet pile would be driven approximately 69 feet deep to ensure anchorage should the scour be that extreme. Tiebacks would be required at 10-foot intervals located near the top of the sheet pile walls. Due to the relatively narrow levee cross section, a screw-type tieback anchor with concrete pile cap would be used.
This alternative would result in no impacts to waters of the U.S. When compared to the proposed project, additional impacts would be limited to indirect effects to noise, air quality and fugitive dust. Operational impacts would occur during routine inspection and maintenance of the levee and would be conducted after every major storm event to ensure the stability of the sheet pile. Routine inspection and maintenance would be confined within 15-feet of the levee within the river. The river would be left denuded of vegetation per the ETL 1110-2-571 after construction. Inspections would also occur to ensure the bank has not eroded at the sheet pile creating unsafe conditions for citizens and wildlife.

The tidewater goby is not expected to occur in the project area and would not be affected by this alternative. The Federally listed southern steelhead would likely not be present within the construction area during the time of year that construction is proposed; however, the proposed project is located within its designated critical habitat. The Corps has determined that no constituent elements of steelhead critical habitat are present and therefore the proposed project would not adversely modify designated critical habitat. This alternative would not disturb habitat that is occupied by the federally-listed California red-legged frog during a portion of the rainy season. To reduce potential indirect effects, construction would be avoided in occupied portions of the river and mitigation measures described in Section 4 and 6 of this SEA/MND would be implemented. The least Bell’s vireo has not been reported within the proposed project area but potential least Bell’s vireo habitat occurs in a riparian area near the downstream reach of the Project (Appendix F of the SEA/MND). Direct impacts to least Bell’s vireos could include disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities, particularly if sheet pile installation occurs during the breeding season for this species.

Although construction of this alternative would result in no direct construction-related permanent or temporary impacts to waters of the U.S. when compared to the soil cement alternative and the project within the Bradley Canyon channel, it would require substantially higher maintenance obligations and associated temporary disturbances to the riverbed over time. With moderate to large storm events, the existing levee would be prone to erosion by high velocity peak flows, resulting in substantial damage and more frequent maintenance being required over time. The existing levee has almost breached eight times during the last 45 years and has actually breached on one occasion. The potential for impinging flow conditions that caused those damages would still exist within Santa Maria River after this project has been completed. With the full sheet pile alternative, impinging flows would erode the channel invert during moderate to large storm events with the resulting erosion destroying sections of the existing levee and riprap up to the sheet pile wall. This sheet pile wall, in the eroded condition, could extend as much as 30 feet high and a few hundred feet long. This would produce an extreme fall hazard for the public and a potential wildlife passage issue. To repair the eroded section of the levee, a large segment of the levee would have to be reconstructed using a fill operation with full compaction requirements. With this alternative, inspections and maintenance activities would be required more frequently than compared to the proposed project.

This maintenance work associated with Alternative 1B would have to be accomplished relatively quickly because of the above substantial public safety issues. Based on past peak flow data and associated damage to the existing levee, there is a high probability of the above extensive levee damage taking place approximately eight to ten times over the next 40 years. As documented above, the soil cement approach is a technically superior design for achieving the project purpose because of the substantial reduction in damage to the levee and the need for repeated and large-scale maintenance activities. The sheet pile alternative would initially avoid all impacts to waters of the U.S. However, maintenance to repair scour from winter storms would result in repeated repair activities in waters of the United States, resulting in potential long term effects to riparian habitat and biological resources. Soil would be placed at the exposed sheet pile within the river channel to ensure stability and maintain wildlife movement, which would result in direct impacts to the riverbed. Under this alternative, the repeated maintenance activities could cause similar or greater impacts to waters of the U.S., channel substrate, drainage patterns, turbidity levels, baseflow, erosion/accretion, noise, air quality, aesthetics and biological resources when compared to the proposed action. In addition, the erosion cycle and levee damage not only undermines the stability of the levee but poses a potentially substantial public health and safety hazard. This alternative could also introduce the potential for additional environmental impacts (water, air, noise, and traffic) to occur over the lifetime of the proposal.

Although this alternative is feasible, this alterative does not reduce impacts compared to the proposed Project, and therefore does not represent the least environmentally damaging practicable alternative.

Alternative 1C

Stabilize 650-feet of Bradley Canyon levee with Soil-cement and 17,000 feet of the Santa Maria River levee with soil cement as well.

This alternative would apply 650 feet of soil cement from the upstream end of Reach 3 along Bradley Canyon. In addition, soil cement revetment will be constructed along the entire 17,000-foot Santa Maria River levee. Details about construction of the soil cement are provided in section 2.2.2.2 of this SEA/MND. This alternative would result in 3.2 acres of permanent loss and 45 acres of temporary impacts to waters of the U.S., which is approximately six to seven times greater than the proposed Project (Alternative 2A proposed project). Approximately 24 acres of the 45 acres of temporary impacts would impact native vegetation, consisting of willows, mule fat and coastal sage scrub. Although this alternative is feasible, it would result in a substantial increase in permanent and temporary impacts to waters of the United States when compared to the proposed Project.

Alternative 1C would involve excavation of soil adjacent to the Bradley Canyon Levee and Santa Maria southern levee to create soil cement for placement on the levee face. This would result in the largest temporary and permanent effects to riparian and upland vegetation within the Santa Maria River Levee compared to the other alternatives. When compared to the proposed action, this alternative would increase impacts to riparian habitats and vegetation communities as well as potential impacts to water quality, drainage patterns, erosion/accretion, turbidity levels, aesthetics and baseflow. To minimize impacts, temporary impact areas would be actively restored to pre-project habitat communities.

The tidewater goby is not expected to occur in the project area and would not be affected by this alternative. The Federally listed southern steelhead would likely not be present within the construction area during the time of year that construction is proposed; however, the proposed project is located within designated critical habitat. The Corps has determined that no constituent elements of steelhead critical habitat are present and therefore the proposed project would not adversely modify designated critical habitat. This alternative would not disturb habitat that is occupied by the federally-listed California red-legged frog during a portion of the rainy season. The federally listed least Bell's vireo has not been reported within the proposed project area. Implementation of mitigation measures for this alternative would avoid effects to the California red-legged frog and least Bell's vireo, if present. Regular inspections of the levee and associated hard structure features would occur and maintenance operations may be required within the riverbed to re-bury the levee protection following scouring associated with moderate to large storm events. The County would complete the maintenance activities associated with scouring events and would stay within 15-feet of the no vegetation zone. Frequency of maintenance operations is expected to be lower than the proposed project. If impinging flows eroded the channel invert, the resulting loss of substrate would only expose the soil cement at its 2H: 1V slope. The levee itself would remain intact. The only required maintenance would be to regrade the riverbed to fill the localized scoured area without any compaction requirements. If this maintenance operation were to be delayed, there would be no detrimental effect on the function of the levee and no pressing need for the small-scale repair operation to occur. Although this alternative is practicable it would incur substantially greater construction-related environmental impacts, including temporary and permanent impacts to aquatic resources, when compared to the proposed project. As a result, Alternative 1C would not represent the least environmentally damaging practicable alternative.

c. OTHER PROJECT DESIGNS DETERMINED IMPRACTICABLE

Alternative 2D

This alternative would tie into the upstream end of Reach 3 and would involve a segment of sheet pile (1,000 linear feet) transitioning into 2-ton/3-ton rock with plantings (2,700 linear feet) along 3,700 feet within the Bradley Canyon drainage. Engineering Division has evaluated this alternative in the past and has determined that additional plantings are not practicable due to the impinging flows. There is guidance (ET1 1110-2-571) that provides guidelines for levee vegetation management implementation within 15-feet of the levee. The integrity of this maintenance activity is paramount to the public health, safety, and welfare of the city of Santa Maria. The presence of undesirable vegetation can undermine the integrity of the maintenance activity and lead to failure if proper maintenance is not corrected. Trees and other woody vegetation, such as shrubs and vines, can create both structural and seepage instabililities, prevent adequate inspection, and create obstacles to maintenance and flood-fighting and flood-control activities. Vegetation must be controlled to allow proper inspection surveillance and monitoring of all structures, allow access for normal emergency operations and maintenance activities, and to prevent root-related damage to structures. In addition, suitable rock is not available within economic haul distances. As a result of the need for vegetation management to allow for stability, inspection, and maintenance and the lack of suitable rock, this alternative was determined to be impracticable. This alternative was excluded from further consideration.

Alternative 2E

This alternative would utilize buried bank stabilization in upland areas outside of jurisdictional waters of the U.S. to minimize flood risk in the Project area. Buried bank stabilization is a relatively new method of bank protection, and has been utilized in several locations in the Santa Clara River as part of the Natural River Management Plan in Santa Clarita, Los Angeles County, California. This alternative would include the construction of a soil cement levee approximately 3,700 feet long that would be installed in an upland area behind the existing Bradley Canyon levee. To construct the buried bank stabilization, a construction zone with a width of approximately 120 feet would be required. This alternative design would avoid direct impacts to waters of the U.S., the CRLF, and the southern steelhead . Although this alternative would avoid direct impacts to waters of the U.S. and other biological resources, it would require construction of a new soil cement levee (buried bank stabilization) and require land acquisition for the construction and maintenance of the levee. The new levee would also have to be connected to the existing Santa Maria levee, which would require modification to the existing levee in Reach 3, without compromising the level of protection provided by the existing levee system. This alternative was discarded because this project is undertaken as a design deficiency and under such a project the scope is generally limited to existing features.

Alternative 2F

This alternative considers leaving the existing Bradley Canyon levee system in place and reinforcing the structure with soil cement embankment protection from the landside of the levee. To reduce impacts to waters of the U.S., this alternative design would limit the placement of soil cement to upland portions of the levee by reinforcing the land side of the existing levee. This alternative would reduce direct and indirect impacts to jurisdictional waters of the U.S., but would not eliminate all impacts. In addition, with this alternative design, direct impacts to the CRLF and the southern steelhead would also be minimized. This alternative would require permanent and temporary acquisition of land to construct the protection. In addition, there are engineering concerns associated with this design because all levee reinforcement would occur on the land side of the structure with no reinforcement to the toe or other sections of the levee. In addition, if flows from the Santa Maria River and Bradley Canyon erode the existing riprap bank protection, then the earthen-filled levee will be vulnerable to further fill erosion. If the riprap bank protection is eroded, the levee's compacted fill material is eroded and the designed scour condition exists, then the soil cement would be exposed, subjected to a surcharge load and have no support underneath thus placing the soil cement mass in a cantilever position. In a cantilever position, the soil cement mass may fail due to its own weight and surcharge, thus, leaving the City of Santa Maria vulnerable to flooding. In a case where the material under the soil cement is eroded but the soil cement does not fail, the stability of the soil cement would be uncertain, which would create safety concerns. Maintenance vehicles would not be able to drive on top of the levee to assess or repair the damage to the levee. Finally, when rebuilding the eroded levee, proper compaction of the fill under the soil cement is unobtainable. The maintenance of the levee during each storm season could cause substantial impacts to biological and water resources. Therefore, this alternative is not considered feasible from a technical point of view and was eliminated from further consideration

Alternative 2G

Jet Grouting is a versatile ground modification system used to create in-situ cemented geometries of soilcrete. Ultrahigh-pressure binders (a water cement mixture) would be injected into the core of the levee at high velocities. This water cement mixture would break up the soil structure completely and mix the soil particles in-situ to create a homogeneous, cylindrical mass, which would solidify. These cylindrical masses would then be overlapped to create a linear curtain of soilcrete which would resist scour and thereby protect the levee.

Jet grouting is very costly and requires specialized equipment. Because of the erosion caused by directly impinging flows, a very large zone of soilcrete would be required within the levee for this alternative to perform well. Once the levee was in the eroded condition, this mass of soilcrete would need to be designed to act as a gravity wall. This would preclude the use of just one linear curtain of soilcrete. There would need to be overlapping linear curtains of soilcrete to gain the mass required for a gravity wall. Because the scour depth from the top of the levee would be potentially 30 feet, there would likely be several overlapping linear curtains of soilcrete. The magnitude of soilcrete required makes this alternative impracticable. Additionally, once the overlying soil is eroded, the exposed concrete face would present a public safety hazard until maintenance crews rebuilt the eroded levee, and reconstruction would result in additional disturbance to waters of the U.S. Therefore, in light of these practicability and safety factors, this measure was excluded from further consideration.

Alternative 2H

Gabions are wire fabric containers that interconnect with other similar containers and are filled with on-site stone to form monolithic structures. The rock that fills these mattresses is typically smaller than what would be required for riprap. These mattresses would be installed end to end and side to side on the prepared levee bank to form a continuous mattress. This continuous mattress would resist scour and thereby protect the levee. Practical application of this erosion control method is generally limited to areas with intermittent flows and small drainage areas. Gabion Mattresses are susceptible to damage during major storm events. Trying to use gabions to solve the design deficiency in this project is problematic. The biggest concern is that the wire would most likely break due to abrasion and corrosion after several years. Once the wire fabric breaks, the only scour protection remaining is from the stone that was in the wire fabric containers. The rock is smaller than what would be required for riprap and would be removed by high velocity peak flows relatively easily. This would leave the levee vulnerable in locations where the wire failed. To repair gabions each affected section must be removed and replaced with new gabions, the required maintenance would be very intensive. As a result, this method would not reduce impacts to the waters of the United States or biological resources. Therefore, this alternative was eliminated from further consideration.

Alternative 2I

Riprap revetment method currently used, unsuccessfully, on the existing levee. This alternative would involve placing an additional layer of suitably large rock over the existing layer of riprap for the full height of the levee from the top down to the design scour depth. This new layer of riprap would have to be large enough to withstand the erosive forces caused by impinging flows along the meandering low flow channel. This new structure would resist the scour and thereby protect the levee. Required riprap stone size is usually determined by the velocity of the flow parallel to the levee face. However, there are no adequate hydraulic design criteria currently available to reliably determine the size and layer thickness of the riprap necessary to withstand the highly erosive forces caused by impinging flow conditions. Even though the new riprap must be substantially larger than the existing stone, determining the required stone size is very difficult. As shown by the degradation of the existing stone, it is very difficult to obtain quality stone in the project area. Obtaining large, quality stone would require long haul distances that would augment the construction cost of the project in addition to increasing the traffic and air quality impacts caused by trucks importing the stone. Because of the lack of adequate design criteria and the difficulty in obtaining quality stone, this alternative is not practicable and excluded from further consideration.

Alternative 2J

Articulated concrete block is an interlocking matrix of concrete blocks of uniform size, shape and weight connected by a series of cables which pass through pre-formed ducts in each block. These interlocking blocks form an erosion resistant mattress that would be placed on the levee slope for the full height of the levee from the top down to the design scour depth. This matrix of connected blocks would be used to resist the scour and thereby protect the levee. Importing the number of articulated concrete blocks needed for the project would require many truck trips which would increase traffic and air quality impacts. This product is not as effective as riprap in adjusting to erosion of underlying sandy soil due to its somewhat limited flexibility. In fact, failures have been observed where a corner or edge of the articulated concrete block mattress was undercut and there was an unraveling effect causing the failure of the whole revetment. Because of the impinging flows conditions at the project site, a major concern is that the erosive forces from these flows will cause a failure of the mattress by eroding the underlying sandy soil and that the subsequent flows will undermine and remove large sections of the revetment. Because of the impinging flow failure mode occurring on this project, the use of this engineering product cannot be definitively determined to be technically feasible. This measure does not meet the overall project purpose and was excluded from further consideration.

F. GENERAL DESCRIPTION OF DREDGED OR FILL MATERIAL

The project site is located within an area of alluvial deposits, imported fill materials, and agricultural runoff from nearby agricultural fields immediately adjacent to the Bradley Canyon channel. The following is a summary of the soils in the project area.

The floor of the Santa Maria Valley, including the lower reaches of tributaries such as the Bradley Canyon drainage, is an alluviated plain of the Cuyama and Sisquoc Rivers. These rivers flow into one another near Fulger Point forming the Santa Maria River. The surface geology of the site consists mainly of units of floodplain alluvium (Qa) and channel deposits (Qg) associated with the river. Various rocks and formational materials crop-out or are mapped along the bluff and hillsides along the north side of the river and valley floor. These units typically consist of relatively thin units of stabilized dune sand (Qds) or older alluvial or terrace deposits (Qoa or Qt) overlying formational materials of Orcutt Formation (Qo), Paso Robles Formation (QTp), Careaga Sand (Tc), Monterey Shale (Tm), Obispo Tuff (Tot), and Franciscan mélange (KJfm). Locally the units are displaced by landslide deposits (Qls) or by faulting. Artificial fill materials (af) compose the levee embankments and roadways in the site vicinity.

Subsurface Conditions

The existing levee is an earthen embankment constructed on alluvium. The alluvium along the Santa Maria River, including the lower reaches of tributaries to the river, are predominantly well-drained sandy material with varying amounts of silt and gravel. At depth, and outside the active channel of the river and adjacent tributaries, the alluvium is interbedded or can transition to clay. The foundation support soils for the levee mainly consist of relatively deep sediments of alluvium.

Alluvium (Qg)

Alluvial stream channel deposits are generally sediments deposited along the active or recent stream channel of the Santa Maria River and adjacent tributaries. These deposits are predominantly medium to coarse sand, where exposed in the riverbed, and locally contain varying amounts and interbedded layers of gravel. The deposits are generally very loose to medium densities. The stream channel deposits within the Santa Maria River appear to be approximately 20 to 40 feet thick near the Central Coast Water Authority (CCWA) pipeline and US-101 alignments, respectively. The alluvium is typically underlain by dense older alluvium comprised of sand and gravel.

Alluvium (Qa)

The alluvium generally consists of floodplain and over bank sediments deposited along the Santa Maria River and the lower reaches of tributaries to the river. The alluvium encountered along the Santa Maria River typically consists of several feet of silty topsoil that overlie granular sediments similar in composition and thickness to the stream channel deposits (Qg) described above.

Implementation of the proposed project includes excavation, grading, and construction activities within the bed of the Bradley Canyon channel. Sand in the drainage would be excavated for use in creating soil cement. Following placement of the soil cement on the drainage-side slope of the existing levee, excavated materials that were not used in mixing soil cement would be used to fill the excavated area(s). Material needed for the soil cement (approximately 90,000 cubic yards) would be obtained through the necessary excavation at the toe of the levee. In the event that a source that could contaminate the soil is encountered, Best Management Practices (BMP) would be implemented to minimize the human and ecological exposure to the contaminants. Any contaminated soil would be removed and disposed of in a landfill that is approved for receiving contaminated soils.

G. DESCRIPTION OF THE PROPOSED DISCHARGE SITE

The Bradley Canyon levees and soft-bottom channel were designed and constructed to divert floods from Bradley Canyon to the Santa Maria River. The Bradley Canyon levees and channel have a drainage area of approximately 7.9 square miles and was designed to accommodate a Standard Project Flood of 9,000 cfs at the confluence with the Santa Maria River.

The width of the existing Bradley Canyon channel is approximately 120 feet. The total length of the right and left levee is 10,900 feet and 900 feet, respectively. The height of the left levee within the Project area varies between 10.5 and 8.0 feet, and the height of the right levee varies between 8.0 to 10.0 feet. The right levee is not designed to contain the SPF. The channel is designed to spill over the right levee into the adjacent agricultural land during higher flows.

An established earthen low flow, ranging from 5 feet wide and 4 feet deep, meanders through the channel. Surface water, almost entirely attributed to agriculture run-off, ranges from three feet to only a few inches in depth during the dry season. Over the last 4-6 years, agriculture adjacent to the channel downstream of Betteravia Road, that would consistently deliver agriculture tailwater into the system, has changed from row crops that were flood irrigated to strawberries that are drip irrigated. As such, the channel has markedly less water overall and the channel dries up during the summer months where it remained wetted in previous years.

There are dense patches of vegetation within portions of the Project area, particularly in the 1,000-linear feet portion where the sheet pile is proposed, and surrounding streambed which provide adequate cover and nesting habitat for several non-listed migratory bird species including Red tailed hawk (*Buteo jamaicensis*), observed in February 2010, and other wildlife species. Numerous small mammal burrows were observed in the banks and near the base of the levee.

H. DESCRIPTION OF THE DISPOSAL METHOD

Material excavated during the construction of the proposed Project would either be reused throughout the Project area or exported to an approved disposal site. BMPs would be implemented to limit the amount of soil and sediment that enters the storm drainage system in the city of Santa Maria. These methods may include, but are not necessarily limited to, avoiding wet-weather construction, covering open piles, using fiber rolls or silt fences where appropriate, and temporary diversion of surface water away from active construction sites. During construction of the soil cement portion of the proposed Project, material excavated at the levee toe would be used as the necessary soil source for mixing soil cement for the new revetment. The existing riprap revetment would not be stripped off of the levee before the soil cement would be placed. Instead, soil cement would overlay the existing riprap. Once mixed in an on-site plant, the soil cement would be compacted in 1-foot-thick by 8-foot-wide layers. This operation would be repeated until the soil cement reaches the top of the levee. Once the soil cement is placed against the existing riprap, the excavated area would be backfilled with the native material not used for the mixing of the soil cement. Because the volume of soil cement below the surface of the ground would reduce the volume of backfill needed, the backfill would only be a few inches shallower than the original riverbed elevation. After the necessary re-grading, the change in the channel invert elevation would be undetectable. Any contaminated soil discovered during levee improvements would be removed and disposed of in a landfill that is approved for receiving contaminated soils.

Implementation of the sheet pile portion would not include the importation, mobilization, or excavation of sand, soil, or topsoil. Though not anticipated, any contaminated soil discovered during construction activities would be removed and disposed of in a landfill that is approved for receiving contaminated soils.

III. PHYSICAL/CHEMICAL CHARACTERISTICS AND ANTICIPATED CHANGES

A. SUBSTRATE

The Project site is located within an area of alluvial deposits and imported fill material. Soils on the Project site are characterized as riverwash, with sandy alluvial lands comprising the surrounding area. These “undeveloped” soil types are generally susceptible to erosion by wind and water. Bradley Canyon channel, within the study area, is relatively narrow meandering alluvial channel with a mosaic of riparian vegetation and sandy terraces barren of vegetation. Vegetative cover generally consists of arroyo willow riparian scrub, mulefat scrub, central coast scrub, non-native grasslands, disturbed/ruderal, active channel, and active agriculture.

The existing levee was constructed with earthen and rock fill material. Under the proposed Project, sand excavated from the channel adjacent to the levee would be used to create soil cement. Following placement of the soil cement, excavated materials that were not used in mixing soil cement would be used to fill the excavated area(s). This would result in the permanent conversion of 8-feet of substrate due to soil-cement fill. Maintenance for the soil cement section would be minimal, with only potential regrading of areas where the buried soil cement is exposed by scour. The Corps would restore the temporary disturbed habitat/vegetation back to original native vegetation. Long term management would be completed by the SBCFCWCD.

Excavation of sand, soil or topsoil within the channel would not occur for the sheet pile portion of the proposed Project. There may be the potential for erosion and down-gradient sedimentation to occur both during construction and after the completion of sheet pile installation. Maintenance for the sheet pile section would be required if major flow events result in exposure of the sheet pile.

In order to minimize potential impacts to channel substrate, disturbed soils would be restored following construction, and stockpiled soil materials would be managed to avoid or minimize potential for erosion and down-gradient sedimentation. Additionally, the Corps would prepare a Stormwater Pollution Prevention Plan, and implement BMPs where appropriate, to minimize these effects upon substrate and water quality. The Corps would also limit grading and excavation activities within the channel to the dry season (April 1 to November 30) to the maximum extent feasible, and shall not conduct grading and construction activities prior or during a significant rain event. Given the implementation of BMPs, the proposed levee improvements are not expected to indirectly affect the substrate of downstream waterbodies (e.g., Santa Maria River estuary, Pacific Ocean). In the event that contaminated soils are encountered during levee improvement actions, BMPs would be implemented to minimize the human and ecological exposure to the contaminants. Any contaminated soil would be removed and disposed of in a landfill that is approved for receiving contaminated soils. Based on the above information, the proposed Project would result in short-term adverse impacts to channel substrate during construction activities, with long-term minor impacts once the sheetpile/soil cement structure has been completed.

The soil cement and sheetpile alternatives would have substantially similar environmental impacts when compared to the proposed Project for most environmental parameters including drainage patterns, water quality, turbidity levels, erosion/accretion patterns, air quality, aesthetics and baseflow. However, the sheetpile alternative would have increased adverse impacts when compared to the proposed project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

B. CURRENTS, CIRCULATION OR DRAINAGE PATTERNS

Surface water runoff in the Project area generally drains west, towards the Pacific Ocean. The proposed Project construction area falls within the FEMA 100-year floodplain. The construction of a diversion channel for redirection of surface flows around the work area(s) is expected to result in short-term adverse impacts to existing current, circulation and drainage patterns, if present. Specifically, the diversion channel would capture and convey low flows that may result in localized increases in flow velocities. Dewatering of the site may also be needed. The proposed Project would improve the existing levee to withstand a 100-year storm event, thereby protecting adjacent communities from flooding damage. The proposed levee improvements are not expected to increase the velocity or surface water elevation of storm flows through the Project area. The proposed levee improvements would not involve modification of existing drainages (i.e., stormwater drains) that drain into the Project area. Accordingly, existing currents, circulation, and drainage patterns in the Project area would not be altered, with the exception that higher flows during storm events (up to the 100-year flood event) would be contained within the levees, whereas the current condition of the levees is not capable of withstanding larger storm events.

The soil cement and sheetpile alternatives would have substantially similar environmental impacts when compared to the proposed Project for most environmental parameters including drainage patterns, water quality, turbidity levels, erosion/accretion patterns, air quality, aesthetics and baseflow. However, the sheetpile alternative would have increased adverse impacts when compared to the proposed project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

C. SUSPENDED PARTICULATES; TURBIDITY

The construction activities described in Section B (General Description) would likely result in temporary increases in suspended particulates and turbidity in the Project area, as well as downstream in the Santa Maria River, particularly during the wet season. However, most watercourses within this region exhibit naturally elevated levels of suspended sediment load and turbidity due to unconsolidated, coarse substrate, minimal vegetation and a short, intense wet season. BMPs would be implemented to limit the amount of soil and sediment that enter Bradley Canyon and the Santa Maria River. These methods may include, but are not necessarily limited to, avoiding wet-weather construction, minimizing disturbance areas, covering open piles, using fiber rolls or silt fences where appropriate, and temporary diversion of surface water away from active construction sites. Disturbed areas would be replanted or reseeded with native species to ensure slope stability and retention of soil. The proposed levee improvement is not expected to increase flow velocities or downstream erosion. Under the proposed Project, long term turbidity in the Project area would likely improve over time because in comparison with the existing levee, the improved levee would not be expected to erode or scour during high flow events. The sheet pile portion of the proposed Project would allow for short-term erosion or scouring of the levee face during a storm event. However, inspection of the bank protection is required after each major storm event, and any damage resulting from erosion or scouring of the sheet pile section would be repaired immediately.

The soil cement and sheetpile alternatives would have substantially similar environmental impacts when compared to the proposed Project for most environmental parameters including drainage patterns, water quality, turbidity levels, erosion/accretion patterns, air quality, aesthetics and baseflow. However, the sheetpile alternative would have increased adverse impacts when compared to the proposed Project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

D. WATER QUALITY (TEMPERATURE, SALINITY PATTERNS AND OTHER PARAMETERS)

The Santa Maria River, including Bradley Canyon channel. is currently listed on the 2006 CWA Section 303(d) List of Water Quality Limited Segments Requiring Total Maximum Daily Loads (TMDL) for the following pollutants: nitrate, fecal coliform, and pesticides (ammonia, chlorpyrifos, name, Dichloro-Diphenyl-Trichloroethane (DDT), dieldrin, endrin). These pollutants most likely originate from agricultural sources that commonly occur throughout the watershed and immediately adjacent to the Project area.

Use of heavy construction equipment and vehicles during the proposed levee improvements could potentially result in the accidental release or discharge of pollutants such as sediments, oils, fuels, and other equipment fluids. It would be possible for these pollutants to reach the river as a result of accidental spills, leaks, and/or erosion resulting from the movement of earth materials during levee repair activities. The release of pollutants into surface waters could result in contamination of surface and/or groundwater. If groundwater resources are encountered during excavation activities required during construction, dewatering of the affected groundwater would be required in order to avoid groundwater contamination.

With the implementation of mitigation measures including implementation of standard BMPs, potential impacts would be reduced to less than significant. Such measures would include biological monitoring, preparation and implementation of a Spill Prevention and Contingency Plan, limiting construction to avoid work during the rainy season (December 1 through March 31) to the maximum extent feasible, surface water diversion, and dewatering. Temporary impacted areas would be restored to pre-project habitat communities or better.

The proposed levee improvement would not increase flow velocities or downstream erosion and would not likely result in significant changes to water quality in Bradley Canyon, the Santa Maria River or the underlying Santa Maria River Groundwater basin. The reduced risk of flooding that would be provided after levee improvements could lead to improvements in water quality by preventing stormwater flow from flooding adjacent (urban) and downstream (rural) areas, which would introduce the potential for contact with contaminated soils outside of the river channel to occur.

The soil cement and sheetpile alternatives would have substantially similar environmental impacts when compared to the proposed Project for most environmental parameters including drainage patterns, water quality, turbidity levels, erosion/accretion patterns, air quality, aesthetics and baseflow. However, the sheetpile alternative would have increased adverse impacts when compared to the proposed Project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

E. FLOOD CONTROL FUNCTIONS

The Project area is currently bordered by levees. As stated in the Project background, the levee system is not certifiable by the Corps to contain the SPF and satisfy the legal requirements set forth in the Code of Federal Regulations, National Flood Insurance Program (November 2008, Article 44, Section 65.10, Mapping of Areas Protected By Levee Systems) due to a design deficiency. The southern Santa Maria River levee has proven to be unsatisfactory in confining low to moderate cross-channel flows. Failure of this levee would likely lead to catastrophic loss of life and property. The proposed Project would improve flood control within the Project area. The proposed levee improvements would reduce the risk of a levee breach by storm flows and protect urban areas from flooding in the event of a 100-year storm event.

F. STORM, WAVE AND EROSION BUFFERS

Not applicable. The proposed Project would not have the potential to affect coastal hydrology. Activities under the proposed Project would include improvements to the existing levee and would not alter existing conditions relevant to storm, wave, and erosion buffers.

G. EROSION AND ACCRETION PATTERNS

The soils on the Project site are designated as “riverwash” (within the channel), sandy alluvial land (upstream along the 2,700-feet portion of the proposed Project and adjacent to the levee), and clay soil (downstream along the 1,000-feet portion of the proposed Project and adjacent to the levee). The original levee was constructed with fill material so the proposed Project would alter the original design of the existing structure. Soil characteristics are variable; however, erosion has been observed along the face of the levee. The channel substrate materials are generally sandy, and will likely scour at relatively low stream flow velocities (possibly as low as 1 to 2 feet per second). In addition, routine maintenance operations along the channel by the SBCFCWCD remove sediment from the channel. Channel bank erosion and scouring below the toe of the existing rock slope protection have impacted the levee during past storm events, and are likely to continue in the future.

The proposed Project would involve disturbance of substrate and placement of additional, impermeable fill both in and adjacent to waters of the United States. During construction of the proposed Project, increased erosion and accretion may occur. BMPs would be implemented to reduce erosion and accretion, including but not limited to minimizing the disturbance area, covering open piles, installing fiber rolls or silt fences where appropriate, and avoiding wet-weather construction. Additionally, disturbed areas would be replanted or reseeded with native species to ensure slope stability and retention of soil. The proposed improvements would permanently encroach on an average of 8 feet from the current levee toe into the channel. However, this is not expected to increase flow velocities or erosion within and downstream of the Project area. After completion of the proposed levee improvements, erosion and accretion patterns would be similar to existing conditions with the exception that the levee improvements would reduce the risk of levee damage or breach from storm flows.

The soil cement and sheetpile alternatives would have substantially similar environmental impacts when compared to the proposed Project for most environmental parameters including drainage patterns, water quality, turbidity levels, erosion/accretion patterns, air quality, aesthetics and baseflow. However, the sheetpile alternative would have increased adverse impacts when compared to the proposed Project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

H. AQUIFER RECHARGE

The Bradley Canyon channel is located within the Santa Maria River Valley Groundwater Basin (Santa Maria Groundwater Basin), which underlies a surface area of approximately 184,000 acres (288 square miles) in the coastal portion of northern Santa Barbara and southern San Luis Obispo Counties (DWR, 2004). The Santa Maria River system is a major source of recharge to this groundwater basin. In addition, Twitchell Dam is operated to optimize groundwater recharge for the Santa Maria Groundwater Basin. Other, more minor sources of recharge include deep percolation of urban and agricultural return water, treated wastewater return, and septic tank effluent (DWR, 2004).

As reported by the Corps, flows in the Santa Maria River, including the lower reach of the Bradley Canyon channel, tend to result in “mounding” of the level of underlying groundwater, which causes groundwater levels to rise to near-surface elevation, particularly in close proximity to the flowing river. Deeper groundwater levels tend to occur during dry periods and are generally farther away from the river and its tributaries specifically the Bradley Canyon drainage. Soil moisture, groundwater level, and groundwater quality fluctuate seasonally in connection with precipitation, storm water runoff, irrigation intensity (withdrawals and recharge), and releases from Twitchell Dam (USACE, 2008).

The levee improvements included under the proposed Project would not affect the conveyance capacity of the Santa Maria River or the Bradley Canyon channels, except that after the levee improvements, storm flows up to a 1 percent chance (100-year flood) event would be contained in the channel and would not be expected to breach the improved levee. As such, the levee improvements could have some effect on aquifer recharge by containing flow that would otherwise flood downstream areas as overland flow and infiltrate to the underlying groundwater basin. In addition, an approximately 120-foot-wide corridor temporary construction easement along the portion of the channel adjacent to the location of the placement of soil cement would be temporarily impacted. The placement of soil cement would reduce the potential for infiltration within the Project area. However, the reduction in potential infiltration area is considered negligible when considering the remaining available area for groundwater recharge within Bradley Canyon. The reduction of potential infiltration associated with the proposed Project would be minimal, and therefore, any potential effects of levee improvements on aquifer recharge would be no more than minimal.

The sheetpile alternative would have increased adverse impacts when compared to the proposed Project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

I. BASEFLOW

Bradley Canyon receives seasonal flow from an agricultural field immediately adjacent to the project that flows via culvert directly into the Santa Maria River. Hydrology within Bradley Canyon is generally subsurface, exhibiting intermittent surface flows during and for several days following rainfall events. The Santa Maria River and its tributaries in the Santa Maria Valley are “losing” systems, which means that surface water flow rapidly infiltrates into underlying permeable layers (DWR, 2008). Surface flow will generally remain for several days following the cessation of the rain event during an average wet year, with surface water (e.g., ponded) sustaining for longer periods. This flow occurs for extended periods of time and provides surface flow connectivity from downstream areas to upper portions of the watershed.

Depth to groundwater along the Santa Maria River Levee varies, and has historically ranged from 10 to more than 50 feet below ground surface over the past twenty years, depending on annual rainfall (SBC, 2008). Most recently, in November of 2008, borings conducted by So Cal Drilling in three locations (determined by the USACE) were drilled to just over 80 feet in depth and encountered groundwater at depths between 76 and 78 feet below ground surface (DYA, 2009). Each of these three borings was conducted along the proposed south levee alignment, approximately 20 feet from the toe of the slope (DYA, 2009). In addition to these three borings, 16 other borings were drilled to typical depths of approximately 50 feet and did not encounter groundwater (USACE, 2009). These borings are considered indicative of current groundwater conditions at the proposed Project site.

The level of groundwater in the Santa Maria Groundwater Basin is strongly connected to the flow levels in the Sisquoc, Cuyama, and Santa Maria Rivers, as well as Orcutt Creek (DWR, 2004). Surface and shallow subsurface flow in the Project area is characterized by stormflow and is not expected to include baseflow from the underlying groundwater system. As described above, under present conditions, baseflow along the proposed Project alignment has been evaluated between 70 and 80 feet below ground surface. See discussion of aquifer recharge above (Section Aquifer Recharge). Additional discussion can also be found in Section 4.4.3 of the SEA/MND. Given the above information, including mitigation measures, the proposed Project would not affect groundwater supply or groundwater recharge conditions.

The soil cement and sheetpile alternatives would have substantially similar environmental impacts when compared to the proposed Project for most environmental parameters including drainage patterns, water quality, turbidity levels, erosion/accretion patterns, air quality, aesthetics and baseflow. However, the sheetpile alternative would have increased adverse impacts when compared to the proposed Project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

J. **Mixing zone, in light of the depth of water at the disposal site; current velocity, direction and variability at the disposal site; degree of turbulence; water column stratification; discharge vessel speed and direction; rate of discharge; dredged material characteristics; number of discharges per unit of time; and any other relevant factors affecting rates and patterns of mixing:** Not Applicable.

IV. BIOLOGICAL CHARACTERISTICS

A. SPECIAL AQUATIC SITES (WETLANDS, MUDFLATS, CORAL REEFS, POOL AND RIFFLE AREAS, VEGETATED SHALLOWS, SANCTUARIES AND REFUGES, AS DEFINED IN 40 CFR 230.40-45)

The downstream 1,000 foot reach of the Project area contains wetlands. All impacts proposed by the Corps would have no permanent impact on this special aquatic site. Temporary impacts would be associated with noise and would be short-term. The Soil Cement Alternative would impact this wetland area and, as a result, this alternative would have increased impacts to special aquatic sites when compared to the proposed Project. Similar to the proposed Project, the Sheet Pile Alternative would not impact wetlands.

B. HABITAT FOR FISH AND OTHER AQUATIC ORGANISMS

The Project area supports surface flow from the adjacent agricultural field which then flows into a culvert that is connected to the Santa Maria River. The section of the river within the Project area is a narrow, meandering, and often braided alluvial channel with a mosaic of riparian vegetation, barren areas and agricultural fields. The connectivity of surface flow doesn't provide habitat conditions for the federally endangered southern steelhead (*Oncorhynchus mykiss*)("steelhead") and the Tidewater goby (*Eucyclogobius newberryi) (*"goby"), and other aquatic organisms. In February 2000, NMFS designated critical habitat for several ESUs for steelhead on the West Coast (65 FR 7765, 16 February 2000); the Santa Maria River Hydrologic Unit was designated as critical habitat. Unit 3312 of the Santa Maria River Hydrological Unit provides for fish passage to upstream breeding habitat during periods of high flow. However, Bradley Canyon channel is not designated critical habitat for steelhead. Potential impacts to other species such as the federally endangered arroyo toad (*Anaxyrus californicus*), southwester willow flycatcher (*Empidonax traillii extimus*), least Bell's vireo (*Vireo bellii pusillus*) and the federally threatened California red-legged frog (*Rana aurora draytonii*), are discussed in Section C (Wildlife Habitat) and D (Endangered and Threatened Species). Steelhead and goby would likely not be present within the construction area and would not be subject to construction-related effects. Indirect, adverse affects, such as habitat degradation, are not expected to occur from construction as most of this work takes place immediately adjacent to the levee, outside the main channel.

The levee forms a steep rock rip rap slope along the southern edge of the channel. Surface water was present within the Bradley Canyon channel during the time of the February to April 2010 surveys (Corps and Aspen Environmental) however, most of the Project area is denuded of vegetation due to agricultural activities except the last 1000-foot portion where patches of dense riparian arroyo willows were found in the channel. Due to No. 3 of the constituent elements for steelhead, freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover, the impacts to steelhead if work is constructed in late summer early fall would not likely adversely modify steelhead critical habitat within Bradley Canyon. The proposed Project would have no affect on this species.

The sheetpile alternative would have increased adverse impacts when compared to the proposed Project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, wetlands, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

C. WILDLIFE HABITAT (BREEDING, COVER, FOOD, TRAVEL, GENERAL)

Riparian and riparian-associated plant communities typically accommodate a disproportionately high number of species and provide a larger degree of ecological function than surrounding upland areas (Fischer and Fischenich, 2000). In arid regions such as southern California, riparian habitats play a particularly crucial role in maintaining biodiversity because up to 80 percent of vertebrate species rely on them for at least part of their lifecycle (Knopf et al., 1988) and because of the central role riparian habitats play in a variety of ecological functions (Rottenborn, 1999; Fischer and Fischenich, 2000).

The Project area supports a wide variety of habitat conditions ranging from barren sandy areas subject to routine scour to riparian scrub communities. Vegetation communities identified in the Project area include: Arroyo willow riparian; Riparian scrub; Mulefat scrub; Coyote bush scrub; Central coast scrub; Non-native grasslands; ruderal; and active channel. The proposed Project would have no direct disturbance to the vegetation communities as a result of the proposed sheet pile installment within the 1,000 linear feet portion of the Project area.

Vegetation in the Project area has the potential to support a broad diversity of wildlife species that could use the area for breeding, foraging, and dispersal, such as the federally endangered arroyo toad (*Bufo californicus*), southwestern willow flycatcher (*Empidonax traillii extimus*), least Bell's vireo (*Vireo bellii pusillus*) and the federally threatened California red-legged frog (*Rana draytonii*). The Corps has determined that the proposed project may affect the CRLF and initiated formal consultation on April 27, 2011. A non-jeopardy biological opinion was issused by the USFWS on October 27, 2011. Due to the lack of any known occurrences of arroyo toad, southwestern willow flycatcher and least Bell's vireo in the project vicinity, the Corps determined that the proposed project would have no effect on all these species. Habitat quality in the river would be considered good and typical of an intermittent stream channel in southern California. The Initial Study prepared by the SBCFCWCD also noted that several migratory bird species have the potential to nest in habitats within the Project site. These include but are not limited to, the yellow breasted chat (*Icteria virens*), yellow warbler (*Dendroica petechia brewster*), long-eared owl (Asio otus), sharp shinned hawk (Accipiter striatus), Cooper's hawk (*Accipiter cooperii*), whitetailed kite (*Elanus leucurus*), and warbling vireo (*Vireo gilvus*). Wilson's warbler (*Wilsonia pusilla*) an uncommon bird, was noted in riparian habitat within the Project area. Great horned owl (*Bubo virginianus*) was observed in August 2008 within the channel. Numerous other wildlife species were also observed during the surveys.

While the area supports a broad diversity of wildlife, Project effects would be largely temporary and would not result in substantial limitations to use of the area for foraging, cover or dispersal. Potential adverse impacts associated with the proposed Project would be reduced to insignificant levels with the implementation of mitigation measures located in Section 6 of the SEA/MND.

The sheetpile alternative would have increased adverse impacts when compared to the proposed project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

D. ENDANGERED OR THREATENED SPECIES

Federal or State listed plant species were not observed within the Project area. The Corps and Aspen Environmental Group performed protocol surveys for CRLF between March 4 and April 22, 2010 (Appendix E of the SEA/MND). Two areas in Bradley Canyon channel and Reach 3 with potential suitable habitat were identified for the protocol surveys. The areas were revisited during the daytime on March 25, 2010 and again on April 22, 2010 to look for egg masses. In addition, a second night visit was made on April 8^{th} to confirm the frogs were still occupying the area within Bradley Canyon channel. No tadpoles or egg masses were observed during any of these surveys. CRLFs are also present within the Project area at the downstream end of Bradley Canyon channel.

Further, while this species is typically highly aquatic, California red-legged frogs have been documented to make overland movements of several hundred meters and up to one mile during a winter-spring wet season. This is particularly true on nights with high humidity or precipitation. In addition, the County of Santa Barbara has indicated that the primary crops in this area have shifted from lettuce and broccoli, water intensive crops, to strawberries which are drip irrigated. This crop conversion will further reduce the potential for California red-legged frogs to occur in the area outside the rainy season as access to perennial water may be more limited provided these crops remain the primary agricultural product in these fields.

To reduce the effects of the proposed Project on California red-legged frogs, the Corps would avoid construction in occupied portions of the channel during its breeding season (December-April). The use of sheet pile would extend from the downstream end of the extension of Reach 3 to approximately 1,000 feet from the upstream end of the Project area (west end of the extension of Reach 3). At this point the sheet pile would transition into a soil cement slope protection at the upstream end for the remaining 2,700 feet of the extension of Reach 3 (the upstream extent of the Project area at the Bradley Canyon channel). This would avoid areas where California red-legged frogs were most recently observed. In addition, the Corps would implement a series of measures that would reduce the potential for take of this species during Project construction. These measures include: require the use of qualified environmental monitors during construction, pre-construction surveys for sensitive species, and the relocation of listed species should they occur, and the requirement that equipment is cleaned prior to working in the riparian corridor. Further measures to specifically reduce the effects of the Project on California red-legged frog include focused surveys for the species by qualified biologists, the identification of suitable predator free habitat for relocated animals, and the implementation of safe amphibian handling guidelines (see Section 4.3 and Section 6 of the SEA/MND). Therefore, the proposed Project may adversely affect the California red-legged frog. The Corps has initiated a formal Section 7 consultation with the USWFS and received a biological opinion with an incidental take statement on October 27, 2011.

The federally endangered tidewater goby (*Eucyclogobius newberryi*) is present within the Santa Maria River, but its presence is limited to the lagoon at the mouth of the river approximately 10 miles downstream, and is not expected to be found within the Project area. The proposed Project would have no affect on this species.

The least Bell's vireo and the southwestern flycatcher has not been reported within the proposed Project area but has been observed in riparian areas near the Cuyama River. There is also potential least Bell's vireo habitat in riparian areas near the far downstream reach of the Project area. As this species range continues to expand, it is likely to occur along portions of the Santa Maria River. To reduce the effects of the proposed Project on least Bell's vireo and other neotropical migrants the Corps would avoid construction in the downstream 1,000 feet of the channel where higher quality riparian habitat occurs and implement a series of measures that would reduce the potential for effects to this species if present. These measures include: the delineation of the work area, the use of qualified environmental monitors during construction, pre-construction surveys for sensitive species, the implementation of protective measures should they occur, worker training, and the cleaning of all equipment prior to working in the riparian corridor. Through the implementation of proposed mitigation measures effects of the proposed Project to this species would be avoided. Avoiding soil cement construction in the downstream portion of the extension of Reach 3 is not meant as conservation for this species, rather it is to avoid impacts to a mature riparian habitat. The proposed Project would have no affect on this species.

Although the project area supports suitable habitat for the federally endangered arroyo toad (*Anaxyrus californicus*), any known occurrences of arroyo toad in the project vicinity. Therefore, the Corps determined that the proposed project would not affect this endangered species.

The sheetpile alternative would have increased adverse impacts when compared to the proposed project for maintenance activities, including augmented noise and wildlife disturbance associated with the ongoing maintenance of the sheetpile levee, repeated disturbance to the channel substrate for future maintenance requirements, temporary impacts to safety levels and temporary impacts to recreational use of the area when the sheetpile levee is exposed by high velocity storm flows. The soil cement alternative would have a minor increase in construction impacts when compared to the proposed Project, including a larger construction footprint in waters of the United States which would result in a minor increase in adverse impacts to channel substrate, aquatic habitat, wildlife habitat and endangered species. Both alternatives would include similar avoidance and minimization measures including restoration of temporary construction areas to pre-project contours and implementation of standard best management practices.

E. BIOLOGICAL AVAILABILITY OF POSSIBLE CONTAMINANTS IN DREDGED OR FILL MATERIAL, CONSIDERING HYDROGRAPHY IN RELATION TO KNOWN OR ANTICIPATED SOURCES OF CONTAMINANTS; RESULTS OF PREVIOUS TESTING OF MATERIAL FROM THE VICINITY OF THE PROJECT; KNOWN SIGNIFICANT SOURCES OF PERSISTENT PESTICIDES FROM LAND RUNOFF OR PERCOLATION; SPILL RECORDS FOR PETROLEUM PRODUCTS OR DESIGNATED (SECTION 311 OF THE CWA) HAZARDOUS SUBSTANCES; OTHER PUBLIC RECORDS OF SIGNIFICANT INTRODUCTION OF CONTAMINANTS FROM INDUSTRIES, MUNICIPALITIES OR OTHER SOURCES:

There are no known hazards located within the Project area. The proposed Project and alternatives would only utilize native fill material taken from the work area and channel. A government records search was also conducted to identify hazardous materials sites listed pursuant to Government Code Section 65962.5. According to the Department of Toxic Substances Control's Hazardous Waste and Substances site "Cortese" List (http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm), no hazardous waste facilities subject to corrective action are located within the proposed Project site. The Geotracker database (http://geotracker.swrcb.ca.gov/), maintained by the State Water Resources Control Board, tracks regulatory data about leaking underground fuel tanks, Department of Defense, Spills-Leaks-Investigations-Cleanups and Landfill sites. The database (accessed on August 20, 2008) lists 12 sites that currently undergoing assessment, remediation or monitoring. None of the sites are located within or adjacent to the Project area. Based on the above information, it was determined that there was not a substantial amount of contaminants found in the Bradley Canyon channel as a result of the adjacent agricultural field. Therefore, there is no evidence of any type of hazardous substance contamination in the levee materials or surrounding area.

The Project area extends from the east side of the Santa Maria City Landfill, which does not accept household hazardous wastes identified by the California Integrated Waste Management Board. However, household hazardous materials are collected at the landfill site and stored in a Household Hazardous Waste Facility, equipped with a 5,000-square-foot metal canopy cover to ensure proper coverage of all disposed waste. (City of Santa Maria, 2009) Hazardous and potentially hazardous materials collected and stored at the Santa Maria City.

Landfill site are not considered to have the potential to be transported downstream or to expose residents of the city of Santa Maria or other natural receptors to hazardous materials in the case of a catastrophic flood event.

V. SUMMARY OF INDIRECT AND CUMULATIVE EFFECTS

The following indirect and cumulative impacts were considered in this analysis: indirect effects of the proposed discharge of fill on the aquatic ecosystem and the cumulative effects of the proposed discharge on the aquatic ecosystem, in consideration of past present and reasonably foreseeable projects in the project vicinity (see list in Section 5 of the SEA/MND). Specifically, direct impacts to substrate, currents, circulation or drainage patterns, suspended particulates; turbidity, water quality, flood control functions, storm water and erosion buffers, erosion and accretion patterns, aquifer recharge, and baseflow were determined to be insignificant for the proposed Project. In Section IV, biological characteristics, it was determined that the 1,000 linear feet portion of the project would take place near wetland waters of the U.S. In addition, it was determined that consultation with the USFWS would bring the Corps into compliance with the Endangered Species Act. There is also no know contaminants present on site; however BMP's in place would lead the biological availability of possible contaminants to be insignificant. With the implementation of the proposed Project, it is anticipated that there would be temporary effects to wildlife habitat that would not result in substantial limitations to use of the area for foraging, cover or dispersal, and potential short-term water quality changes within and immediately adjacent to the proposed location. Use of heavy construction equipment and vehicles during the proposed levee improvements could potentially result in the accidental release or discharge of pollutants such as sediments, oils, fuels, and other equipment fluids and short-term temporary noise impacts. The accidental release of one or more construction-related pollutants could affect surface and/or groundwater quality in the Project area.

With the construction of the proposed project, there would be minor indirect impacts to substrate in Bradley Canyon channel due to potential scouring along the toe of the soil cement levee. In addition, the construction of the soil cement levee would result in minor indirect impacts to drainage patterns and flow velocity in Bradley Canyon channel. With the construction of the soil cement levees, localized changes in flow velocity could result in minor changes to erosion and accretion patterns in Bradley Canyon channel. With the potential increase in flow velocity and the associated changes in erosion and accretion patterns, minor, localized scouring of less established riparian vegetation (saplings) could occur during moderate storm events. Potential indirect effects to aquatic, wildlife and endangered species in the project area include minor, localized changes in substrate, flow velocity and riparian vegetation. With the construction of the proposed project, no indirect impacts are expected for water quality, aquifer recharge, baseflow and turbidity levels.

Implementation of the proposed Project would result in less than significant indirect impacts to biological resources as described above. The proposed Project combined with other projects would not contribute to cumulative biological resource impacts within the region. The effects of the project are site specific and localized and would not result in incremental cumulative impacts to biological resources. As identified in Section 4.3 of the Final SEA/MND, areas disturbed within the Temporary Construction Easement (TCE) would be restored with native species. Impacts from the proposed Project would be reduced to less than significant levels and effects of this action would not be considered cumulatively significant with mitigation.

Other cumulative effects not related to the proposed action:

1. OCCURRED ON-SITE HISTORICALLY

As described under Section II (Project Description), construction of the original levee was completed in 1963. Existing land uses immediately surrounding the Project area include agriculture and the Santa Maria Landfill.

2. LIKELY TO OCCUR WITHIN THE FORESEEABLE FUTURE

Residential development within the city of Santa Maria is expected to continue in the foreseeable future, and agricultural use of areas surrounding the Project site is also expected to continue.

3. CONTEXTUAL RELATIONSHIP BETWEEN THE PROPOSED ACTION AND (1) AND (2) ABOVE

Levee improvements under the proposed Project would protect homes, businesses, and other infrastructure from storm-related damages that would occur in case of the failure or breach of the existing levee system. The proposed Project would provide protection from flood damage to existing developments that have occurred historically in the area as well as to those likely to occur within the foreseeable future.

Section 5 of the SEA/MND provides a full discussion of the cumulative impacts. As described in the SEA/MND, a database search of completed Corps Regulatory permit actions within the proposed project area identifies 181 separate, complete permit actions, dating back to 1994 (16 year period). Of these permit actions, permanent impacts and recurrent temporary impacts to Corps jurisdiction (waters of the U.S.) totaled approximately 1,267.33 acres. Under Corps authority, waters of the U.S. are subject to regulation pursuant to Clean Water Act (CWA) Section 404 and Rivers and Harbors Act Section 10 (33 CFR § 320-332). Of these impacts, the vast majority are considered "recurrent temporary," and are associated with in-channel aggregate mining and to a lesser degree, pilot channel excavation. To offset impacts to the waters of the U.S., the Corps has required a total of approximately 1,516.53 acres of compensatory mitigation, generally consisting of wetland, riparian, and riparian buffer restoration and enhancement.

The following assessment focuses on addressing the following: (1) the area(s) in which the effects of the proposed Project would be felt; (2) the effects that are expected in the area(s) from the proposed Project; (3) past, present, and reasonably foreseeable future actions that have or that are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact(s) that can be expected if the individual impacts are allowed to accumulate

VI. COMPARISON OF ALTERNATIVES

The following discussion provides an overview and comparison of the alternatives.

A. SHEET PILE AND SOIL CEMENT ALTERNATIVE WITHIN 3,700-LINEAR FEET WITHIN BRADLEY CANYON DRAINAGE (ALTERNATIVE 2A - PREFERRED ALTERNATIVE).

Developed during preparation of the SEA/MND, alternative (2A) would result approximately 0.50 acre of waters of the U.S. and temporarily impact 6.35 acres of non-wetland waters of the U.S. To minimize impacts, approximately 0.5 acre of native riparian habitat would be established adjacent to existing riparian habitat, on land owned by the SBCFCWCD. Temporary disturbed areas would be restored by re-vegetating with a native grass seed-mix in areas outside of the SBCFCWCD routine maintenance area. The 0.61 acre of temporary impact to the active channel rerouted for construction would be returned to pre-construction contours and the original alignment.

The tidewater goby, southwestern willow flycatcher, California gnatcatcher, and arroyo toad are not expected to occur in the Project area and would not be subject to any project effects. Steelhead would likely not be present within the construction area and would not be subject to construction-related effects. Indirect, adverse affects, such as habitat degradation, are not expected to occur from construction as most of this work takes place immediately adjacent to the levee, outside the main channel. There would be no change to maintenance requirements post-construction that could impact steelhead. Impacts to the areas where California red-legged frogs were detected during 2010 surveys would be avoided/minimized with implementation of the sheet pile component at the downstream end of the Project area to the maximum extent. Other mitigation measures are described in Section 4.3 and Section 6 of the SEA/MND. Direct effects are not expected to occur. Indirect effects to this species are minor and temporary due to noise effects during construction. The least Bell's vireo has not been reported within the Project area but potential least Bell's vireo habitat occurs in a riparian area near the downstream reach of the Project. Impacts to least Bell's vireos may include disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities, particularly if sheet pile installation occurs during the breeding season for this species. However, it is very unlikely that vireo would be present in the Project area.

Based on analysis presented in the SEA/MND as well as the screening process for practicability and environmental impacts, this alternative would reduce and/or avoid impacts to aquatic resources associated with the individual Sheet Pile and Soil Cement Alternatives by integrating primary features of each alternative. Use of soil cement as the primary stabilization measure in the proposed alternative minimizes future large scale and repeated maintenance activities, reducing potential future long term impacts to environmental resources including but not limited to riparian areas, biological resources, aesthetics, safety, traffic, and air quality.

B. SOIL CEMENT ALTERNATIVE WITHIN 3,700-LINEAR FEET WITHIN BRADLEY CANYON DRAINAGE (ALTERNATIVE 2B)

This alternative would involve excavation of soil adjacent to the levee to create soil cement for placement on the levee face. This would result in the largest temporary and permanent effects to riparian and upland vegetation within the Bradley Canyon channel compared to the other alternatives. In total, this alternative would temporarily impact 9.5 acres and permanently impact 0.7 acre of waters of the U.S. Impacts to the unvegetated land and non-native habitat within the riverside portion of the levee is described in Section 4 of the SEA/MND. Increased disturbance to jurisdictional aquatic habitat and riparian vegetation communities could increase the potential for permanent adverse impacts to water quality and jurisdictional plant communities. Temporarily impacted areas with vegetation would be actively restored to pre-project habitat communities. The tidewater goby is not expected to occur in the Project area and would not be subject to Project effects. The Federally listed southern steelhead would not have effects within the construction area as work will be done in dry season and non-migratory fish season and outside of the main channel. Indirect, adverse affects, such as habitat degradation, are not expected to occur as most of this work takes place immediately adjacent to the levee, outside the main channel. Direct and indirect effects to this species are not expected to occur. This alternative could disturb habitat that is occupied by the federally-listed California red-legged frog during a portion of the rainy season. To reduce the effects of this alternative to the California red legged frog, the Corps would implement a series of mitigation measures including working during non- breeding season and non-rainy season, pre-construction surveys to verify the species is not present in the work area. The federally listed least Bell's vireo has not been reported per survey report within the Project area but this alternative would increase the potential for loss of suitable least Bell's vireo habitat. Impacts to least Bell's vireo, arroyo toad, and the southwestern willow flycatcher are not expected to occur. Regular inspections of the levee and associated hard structure features would occur and maintenance operations may be required within the riverbed to re-bury the levee protection following significant scour events. SBCFCWCD would complete the maintenance activities in a significant scouring event and would stay within 15-feet of the no vegetation zone.

Frequency of maintenance operations is expected to be lower than the Sheet Pile Alternative as well as the proposed Project. If impinging flows eroded the channel invert, the resulting erosion would only expose the soil cement at its 2H:1V slope. The levee itself would remain intact. The only maintenance would be to regrade the riverbed to fill the localized scoured area without any compaction requirements. If this maintenance operation were to be delayed, there would be no detrimental effect on the function of the levee and no pressing need for the small-scale repair operation to occur. The Soil Cement Alternative would result in greater construction-related environmental impacts, including aquatic resources, than the proposed Project.

C. SHEET PILE ALTERNATIVE WITHIN 3,700-LINEAR FEET WITHIN BRADLEY CANYON DRAINAGE (ALTERNATIVE 2C)

Under this alternative, no excavation would be required in the riverbed for initial construction. As a result, this alternative would not result in the removal of riparian vegetation within the channel and, as described in Section 4.3 of the SEA/MND, direct effects to jurisdictional waters of the U. S. and associated habitats would not occur. Impacts would be limited to indirect effects of noise and fugitive dust on adjacent riparian habitat. Operational impacts would occur during routine inspection and maintenance of the levee and would be conducted after every major storm event to ensure the stability of the sheet pile. Routine inspection and maintenance would be confined within 15-feet of the levee within the river. The Bradley Canyon channel would be left denuded of vegetation per the ETL 1110-2-571 after construction. Inspections would also occur to ensure the bank has not eroded at the sheet pile creating unsafe conditions for citizens and wildlife.

This alternative would initially avoid direct impacts in the channel and direct effects to the federally-listed California red-legged-frog, southern steelhead and tidewater goby would not occur. The Project area is located within designated critical habitat for the southern steelhead. Due to the time of construction the project will have no effect on critical habitat. California red-legged frogs have been observed in the Project area and could occur on levee roads during rain events or evenings when this species may forage in the area. These amphibians may be subject to mortality from vehicle traffic or construction activities. To reduce potential effects, construction would not occur during the rainy season and during the California red-legged frog breeding season and mitigation measures described in Section 6 of the SEA/MND would be implemented in order to avoid/ minimize impacts to this species. The least Bell's vireo has not been reported within the Project area but potential least Bell's vireo habitat, southwestern willow flycatcher, and arroyo toad habitat occurs in a riparian area near the downstream reach of the Project. The Corps has determined that this alternative would have no effect on the least Bell's vireo, southwestern willow flycatcher, and the arroyo toad. Although construction of the Sheet Pile Alternative would result in no direct construction-related permanent or temporary impacts to waters of the U.S. and to the riparian vegetation when compared to the soil cement alternative and the proposed Project, it would require substantially higher maintenance obligations and associated temporary disturbances to the riverbed over time. With moderate to large storm events, the existing levee would be prone to erosion by high velocity peak flows, resulting in substantial damage and more frequent maintenance being required over time. The existing levee has almost breached eight times during the last 45 years and has actually breached on one occasion. The potential for impinging flow conditions that caused those damages would still exist within Santa Maria River and Bradley Canyon after this project alternative has been completed.

With the full sheet pile alternative, impinging flows would erode the channel invert during moderate to large storm events with the resulting erosion destroying sections of the existing levee and riprap up to the sheet pile wall. This sheet pile wall, in the eroded condition, could extend as much as 30 feet high and a few hundred feet long. This would produce an extreme fall hazard for the public and a potential wildlife passage issue. To repair the eroded section of the levee, a large segment of the levee would have to be reconstructed using a fill operation with full compaction requirements. With the Sheet Pile Alternative, inspections and maintenance activities would be required more frequently compared to the Soil Cement Alternative and the combined Sheet Pile and Soil Cement Alternative.

This maintenance work would have to be accomplished quickly because of the public safety concerns. Based on past peak flow data and associated damage to the existing levee, there is a high probability of the above extensive levee damage taking place approximately eight to ten times over the next 40 years. As documented above, the soil cement approach is a technically superior design for achieving the project purpose because of the substantial reduction in damage to the levee and the need for repeated and large-scale maintenance activities.

The sheet pile alternative would initially avoid all direct impacts to waters of the U.S. However, maintenance to repair scour from winter storms would result in repeated repair activities in waters of the United States, resulting in potential long term effects to riparian habitat and biological resources. Soil would be placed at the exposed sheet pile within the river channel to ensure stability and maintain wildlife movement, which would result in direct impacts to the riverbed. Under this alternative, the repeated maintenance activities could cause similar or greater impacts to waters of the U.S. and biological resources when compared to the proposed Project. In addition, the erosion cycle and levee damage not only undermines the stability of the levee but poses a potentially significant public health and safety hazard. The Sheet Pile Alternative could also introduce the potential for additional environmental impacts (water, air, noise, and traffic) to occur over the lifetime of the Project.

VII. FINDINGS

A. Evaluation of Compliance with 404(b)(1) guidelines (restrictions on discharge, 40 CFR 230.10). (A check in a block denoted by an asterisk indicates that the project does not comply with the guidelines.)

1) Alternatives Test

☐ Yes ☒ No **a)** Based on the analysis above, are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the United States" or at other locations within these waters?

Discussion:

Based on the analysis above, the Corps has determined the proposed Project constitutes Least Environmentally Damaging Practicable Alternative.

2) Special restrictions. Will the project:

☐ Yes ☒ No **a)** violate state water quality standards?

☐ Yes ☒ No **b)** violate toxic effluent standards (under Section 307 of the Act)

☐ Yes ☒ No **c)** jeopardize endangered or threatened species or their critical habitat?

☐ Yes ☒ No **d)** violate standards set by the Department of Commerce to protect marine sanctuaries?

☒ Yes ☐ No

e) evaluation of the information in II C and D above indicates that the proposed discharge material meets testing exclusions criteria for the following reason(s)

(X) based on the above information, the material is not a carrier of contaminants

( ) the levels of contamination are substantially similar at the extraction and disposal sites and the discharge is not likely to result in degradation of the disposal site and pollutants will not be transported to less contaminated areas

( ) acceptable constraints are available and will be implemented to reduce contamination to acceptable levels within the disposal site and prevent contaminants from being transported beyond the boundaries of the disposal site.

3) Other restrictions. Will the discharge contribute to significant degradation of "waters of the U.S." through adverse impacts to:

☐ Yes ☒ No

a) human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites?

☐ Yes ☒ No

b) life states of aquatic life and other wildlife?

☐ Yes ☒ No

c) diversity, productivity and stability of the aquatic ecosystem, such as the loss of fish or wildlife habitat, or loss of the capacity of wetland to assimilate nutrients, purify water or reduce wave energy

☐ Yes ☒ No

d) recreational, aesthetic and economic values?

☒ Yes ☐ No

4) Actions to minimize potential adverse impacts (mitigation). Will all appropriate and practicable steps (40 CFR 23.70-77) be taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystem?

Discussion: The discharge of dredged or fill material under the proposed Project would have minor direct and indirect impacts on the aquatic ecosystem. To minimize potential impacts to channel substrate, disturbed soils would be restored following construction, and stockpiled soil materials would be managed to avoid or minimize potential for erosion and down-gradient sedimentation. Additionally, the Corps would prepare a Stormwater Pollution Prevention Plan, and implement BMPs where appropriate, to minimize these effects upon substrate and water quality. The Corps would also limit grading and excavation activities within the river to the dry season (April 1 to November 30) to the maximum extent feasible, and shall not conduct grading and construction activities prior or during a significant rain event. As a result of these minimization measures the proposed Project would result in short-term adverse impacts to channel substrate during construction activities, with long-term minor impacts once the sheetpile/soil cement structure has been completed. Best management practices (BMPs) would be implemented to limit the amount of soil and sediment that enter Bradley Canyon and the Santa Maria River. These methods may include, but are not necessarily limited to, avoiding wet-weather construction, minimizing disturbance areas, covering open piles, using fiber rolls or silt fences where appropriate, and temporary diversion of surface water away from active construction sites. Disturbed areas would be replanted or reseeded with native species to ensure slope stability and retention of soil. In addition, biological monitoring, preparation and implementation of a Spill Prevention and Contingency Plan, limiting construction to avoid work during the rainy season (December 1 through March 31) to the maximum extent feasible, surface water diversion, dewatering, and temporary impacted areas would be restored to pre-project habitat communities are minimization measures that would minimize impacts to water quality. BMPs would be implemented to reduce erosion and accretion patterns, including but not limited to minimizing the disturbance area, covering open piles, installing fiber rolls or silt fences where appropriate, and avoiding wet-weather construction. To reduce the effects of the proposed Project on California red-legged frogs, the Corps would avoid construction in frog breeding season and during the rainy season. In addition, the Corps will coordinate with the USFWS to implement a series of measures that would reduce the potential for incidental take of this species during Project construction. These measures include: require the use of qualified environmental monitors during construction, pre-construction surveys for sensitive species, and the relocation of listed species should they occur, and the requirement that equipment is cleaned prior to working in the riparian corridor. Further measures to specifically reduce the effects of the Project on California red-legged frog include focused surveys for the species by USFWS-approved biologists, the identification of suitable predator free habitat for relocated animals, and the implementation of safe amphibian handling guidelines (see Section 6 in the SEA/MND). To reduce the effects of the proposed Project on least Bell's vireo and other neotropical migrants the Corps would avoid construction in the downstream 1,000-linear foot portion of the River channel where higher quality riparian habitat occurs and implement a series of measures that would reduce the potential for effects to this species if present. These measures include: the delineation of the work area, the use of qualified environmental monitors during construction, pre-construction surveys for sensitive species, the implementation of protective measures should they occur, worker training, and the cleaning of all equipment prior to working in the riparian corridor. To offset impacts to the waters of the U.S., the Corps would implement compensatory mitigation, generally consisting of establishment of native riparian habitat in the Project area. Therefore with the above avoidance and minimization measures proposed by the Corps and additional mitigation measures located in Section 6 of the SEA/MND, the proposed Project would avoid and minimize impacts to the aquatic environment to the maximum extent practicable.

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Appendix B

Initial Study Checklist

U.S ARMY
CORPS OF ENGINEERS

INITIAL STUDY CHECKLIST

FOR THE BRADLEY CANYON LEVEE EXTENSION IMPROVEMENT PROJECT

November 2011

1. SUMMARY

1.1 PROJECT TITLE

The Santa Maria River Levee Improvement Project, Bradley Canyon Levee Extension.

1.2 PROJECT SPONSOR/LEAD AND RESPONSIBLE AGENCIES

Santa Barbara County Flood Control and Water Conservation District
123 East Anapamu Street, 2nd Floor
Santa Barbara, CA 93101

1.3 CONTACT PERSON

Thomas D. Fayram,
Deputy Public Works Director
Santa Barbara County Flood Control and Water Conservation District
Santa Barbara, CA 93101
(805) 568-3440

1.4 PROJECT LOCATION

The original project Santa Maria River Levee Repair Project for the improvement of Reaches 1, 2, and 3 (2009 EA/MND) is located in the City of Santa Maria, Counties of Santa Barbara and San Luis Obispo, California and consisted of improving a 6.5-mile reach of the southern Santa Maria River Levee extending from the terminus of Bradley Canyon to the north end of Blosser Road (Figure 1.1-3). However the proposed project for the Bradley Canyon Levee extension of the current Reach 3 runs along the Bradley Canyon Levee for another 3,700 feet upstream of the terminus of Bradley Canyon Channel which starts from station marker 383+20 and ends at station maker 346+20 (Figure 2.2-5) of this SEA/MND.

The proposed project area consists of the levee improvement along the Bradley Canyon Levee , adjacent to Bradley Canyon Channel tributary to the Santa Maria River. The Santa Maria River originates in the Los Padres National Forest and drains a 1,880-square-mile watershed. It is rocky and shallow and consists of a very wide flat channel bordered by the Santa Maria River Levee along portions of the north and south banks to protect farms and the City of Santa Maria. The river defines part of the border between Santa Barbara County and San Luis Obispo County, California and empties into the Pacific Ocean. No lakes or dams are located on the Santa Maria River and during much of the year it has very little water but can swell greatly during a winter storm.

Adjacent land uses include residential, commercial, agricultural, recreational, and industrial (Figure 1-1 of the 2009 EA/MND and 1.1-3 of this Final SEA/MND). The proposed project site is bordered by agricultural fields and urban development within the City of Santa Maria to the northwest and the Santa Maria River to the southeast. Urban development includes a bikepath with a safety rail along the top of the levee and the Santa Maria Landfill. Agricultural land and undeveloped property are located north of the proposed project site and across the Santa Maria River. Existing structures within the study area include the abovementioned crossings, the levee itself, rocks along the levee face, and soil cement.

1.5 GENERAL PLAN DESIGNATION

The proposed project area is located within the jurisdictional boundaries of the City of Santa Maria, Santa Barbara County. The areas located within Santa Barbara County primarily consist of agricultural and open space.

1.6 DESCRIPTION OF PROJECT

The current repair of the Santa Maria River Levee Reaches 1, 2 & 3 is ongoing (2009 EA/MND) and is expected to be completed by the end of this year (2011) but further U.S. Army Corps of Engineers (Corps) Hydraulics and Hydrology (H&H) analysis has revealed that the levee could fail upstream of Reach 3 (Bradley Canyon) and cause loss of lives and property to the City of Santa Maria. The Corps examined various options to address the risk to the City of Santa Maria. The H&H analysis stated that there are two main options that can substantially reduce the risk of flooding to the City of Santa Maria: Option 1, Repair of 17,650 feet of the main Santa Maria River Levee from the Bradley Canyon confluence upstream to Fugler's Point; and Option 2, Extension of Reach 3 bank protection along Bradley Canyon Levee for a length of 3,700 feet (Figure 2.1-2). Both sites would potentially meet the project purpose of protecting the City of Santa Maria at the Standard Project Flood (SPF) level from the upstream failure mode. These options were developed considering environmental, economic, technical, and practicability factors. The Corps examined various material alternatives to stabilize the levee for both Options including soil cement, sheet pile, and combination of soil cement and sheet pile. The cost to repair 17,650 feet of levee for Option 1 using soil cement only, the least costly method at that site, would be about three to four times higher than Option 2 (a 3,700-foot-long levee along Bradley Canyon). In addition, implementation of Option 1 using soil cement along a 17,650-foot-long levee with soil cement would result in permanent loss of 3 acres and temporary loss of 47 acres of waters of the United States and it could also result in potentially significant impacts to air quality. The substantial disturbance to waters of the United States would likely yield a substantial increase in the cost of compensatory mitigation as compared to of the Bradley Canyon site (3,700 feet of levee repair). Considering both environmental and economic factors, it was recommended to repair a 3,700-foot-long section of the Bradley Canyon Levee with a combination of soil cement and sheet pile.

The Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD) would conduct all Operation and Maintenance (O&M) activities associated with the proposed project that will be contained in the Operation and Maintenance Manual for Santa Maria Valley Levees and Channel Improvements Bradley Canyon Extension Project. Additionally, the SBCFCWCD would attain all permits required for O&M activities, as necessary from the resources agencies and from the Corps Regulatory Division prior to conducting any O&M activities . A discussion of O&M activities and potential impacts from these activities is included in the impact discussion of each environmental resource in Section 4 of the 2011 SEA/MND and 2009 EA/MND.

1.7 FINDING AND RECOMMENDATION

This Initial Study found that all potential project impacts could be mitigated to levels that are less than significant and that a Mitigated Negative Declaration (MND) is the appropriate environmental document to comply with the California Environmental Quality Act (CEQA). Sections 4 and 6 of the Final SEA/MND and 2009 Final EA/MND contain a summary and discussion of the environmental commitments incorporated into the proposed project to minimize potential impacts to less than significant levels.

2. ENVIRONMENTAL DETERMINATION

2.1 CEQA REVIEW PROCESS

A SEA and MND has been prepared for the Santa Maria River Levee Improvement Project, Bradley Canyon Levee extension pursuant to the National Environmental Policy Act (NEPA). The California Environmental Quality Act (CEQA) Guidelines of 2005 state that "the lead agency may use an environmental assessment or a similar analysis prepared pursuant to the National Environmental Policy Act" to satisfy the requirements of the Initial Study [CCR Title 14, Chapter 3, Section 15063]. Nonetheless, this Initial Study Checklist has been prepared to aid and facilitate evaluation of this project.

2.2 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by the project. As described in the evaluation of environmental impacts in Section 4 of the Final SEA/MND and Final 2009 EA/MND, all environmental factors were found to be less than significant with mitigations incorporated in the proposed Project Santa Maria River Levee Improvement Project, Bradley Canyon Levee extension).

☐ Aesthetics	☐ Agricultural Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards and Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffi
☐ Utilitie s/Service Systems	☐ Mandatory Findings of Significance	

2.3 DETERMINATION

Based on the analysis in the Final SEA/MND and the the 2009 Final EA/MND, it has been determined that all project-related environmental impacts could be reduced to less than significant levels with the incorporation of environmental commitments; a MND will meet the requirements of CEQA and NEPA. The environmental commitments included in the Final SEA/MND are designed to reduce or eliminate the potentially significant environmental impacts described therein. Environmental commitments are structured in accordance with the criteria in Section 15370 of the state CEQA Guidelines. Therefore, on the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT (EIR) is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by environmental commitments based on the earlier analysis as described on attached sheets. An EIR is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or environmental commitments that are imposed upon the project, nothing further is required.

Section 4 of the 2009 EA/MND and this Final SEA/MND provide the basis for the impact finding for each environmental factor and the environmental commitments that are designed to reduce or eliminate the potentially significant environmental impacts. Environmental commitments are structured in accordance with the criteria in Section 15370 of the state CEQA Guidelines.

______________________________ ____________________
Signature Date

____
Printed Name

3. EVALUATION OF ENVIRONMENTAL IMPACTS

3.1 AESTHETICS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b. Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d. Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

a. Would the project have a substantial adverse effect on a scenic vista?
NO IMPACT. T he proposed project would not adversely affect a scenic vista. See Section 4.6.2 of the 2009 EA/MND and Section 4.8 of this SEA/MND for a detailed discussion of the environmental impacts associated with aesthetics for this project.

b. Would the project substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?
NO IMPACT. The proposed project does not occur within the viewshed of a state scenic highway. See Section 4.6.2 of the 2009 EA/MND and Section 4.8 of this SEA/MND for a detailed discussion of the environmental impacts associated with aesthetics for this project.

c. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
LESS THAN SIGNIFICANT IMPACT. The proposed project would not permanently alter the viewscape or impinge on a scenic vista. Most views of the existing levee are currently limited but viewers may observe vegetation along the levee slope when using the bike trail on top of the levee. In addition, the levee has only limited viewing opportunities for local residential communities. The disturbed nature of the channel provides limited scenic value. As such, conditions or views of the levee would not substantially change from existing conditions. See Section 4.6.2 of the 2009 EA/MND and Section 4.8 of this SEA/MND for a detailed discussion of the environmental impacts associated with aesthetics for this project.

d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?
NO IMPACT. The proposed project would not include facilities that would result in night lighting, glare, or other such impacts on surrounding areas. Construction-related lighting would be temporary and would not create a significant impact. See Section 4.6.2 of the 2009 EA/MND and Section 4.8 of this SEA/MND for a detailed discussion of the environmental impacts associated with aesthetics for this project.

3.2 AGRICULTURAL RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agricultural farmland.

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b. Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
c. Involve other changes in the existing environment, which due to their location or nature could individually or cumulatively result in loss of Farmland, to non-agricultural use?	☐	☐	☒	☐

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
NO IMPACT. The proposed project would not involve the conversion of any land classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance under the California Department of Conservation Farmland Mapping and Monitoring Program, (California Department of Conservation, Division of Land Resource Protection, 2007).

b. Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?
NO IMPACT. The proposed project would not conflict with any public policies for the protection of agricultural uses. The proposed project site is located within the City of Santa Maria, County of Santa Barbara, and County of San Luis Obispo, which has not designated any agricultural preserves in the proposed project site. The proposed project site is not located under Williamson Act contracts (California Department of Conservation, Division of Land Resource Protection, 2006).

c. Would the project involve other changes in the existing environment, which due to their location or nature could result in conversion of farmland to non-agricultural use?
LESS THAN SIGNIFICANT IMPACT. The northern and southern part of the of the proposed project site is designated as agricultural land use. The proposed project would result in temporary impacts to the site such as disturbance of fallow agricultural land, habitat disturbance, and construction noise, but these impacts would not extend beyond the project construction period and any temporarily disturbed sites would be restored to their original state.

3.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or pollution control district may be relied upon to make the following determinations.

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

LESS THAN SIGNIFICANT IMPACT. The proposed project will conform to the Air Quality Management Plan (AQMP). See Section 4.2 of this SEA/MND and Section 4.1.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with air quality for this project.

b. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Although construction of the proposed project would result in short-term air quality impacts, incorporation of specified mitigation measures, environmental commitments, and fugitive dust controls would ensure that these impacts are less than significant. The following environmental commitments would be incorporated into the proposed project:

<u>**Mitigation Measures for PM_{10} emissions**</u>

AQ-1 Develop and Implement a Fugitive Dust Emission Control Plan. The construction contractor shall develop and implement a Fugitive Dust Emission Control Plan (FDECP) for construction work. Measures to be incorporated into the plan shall include, but are not limited to the following:

- Water the unpaved road access and other disturbed areas of the active construction sites at least three times per day or apply California Air Resources Board (CARB) certified soil binders.

- If possible, install wheel washers/cleaners or wash the wheels of trucks and other heavy equipment where vehicles exit the site or unpaved access roads.
- Increase the frequency of watering or implement other additional fugitive dust mitigation measures to all disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts) exceed 25 miles per hour (mph).
- Travel route planning shall be completed to identify required travel routes to minimize unpaved road travel to each construction or disposal site to the extent feasible.

AQ-2 Restrict engine idling. Diesel engine idle time shall be restricted to no more than 10 minutes duration. This is not required for trucks that require engines to be on while waiting onsite, such as concrete trucks.

AQ-3 Use on-road vehicles that meet California on-road standards. All on-road construction vehicles working within California shall meet all applicable California on-road emission standards and shall be licensed in the State of California. This does not apply to construction worker personal vehicles.

AQ-4 All project construction and site preparation operations shall be conducted in compliance with all applicable Santa Barbara County Air Pollution Control District (SBCAPCD) Rules and Regulations with emphasis on Rule 50 (Opacity), Rule 51 (Nuisance), and Rule 55 (Fugitive Dust), as well as Rule 10, (Permits Required).

AQ-5 Gravel pads must be installed at all access points to prevent tracking of mud onto public roads.

AQ-6 If importation, exportation, and stockpiling of fill material are involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin, unless material is kept moist or treated with soil binders for transport within project area.

AQ-7 The contractor shall designate a person or persons to monitor the dust control program and to order increased watering as necessary to prevent transport of dust offsite.

Measures for NO_x and $PM_{2.5}$ emissions

AQ-8 Only heavy-duty diesel-powered construction equipment with engines meeting CARB/USEPA standrads.

AQ-9 The engine size of construction equipment shall be the minimum practical size.

AQ-10 The number of pieces of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number are operating at any one time.

AQ-11 Construction equipment shall be maintained in tune per the manufacturer's specifications.

AQ-12 Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or pre-combustion chamber engines.

AQ-13 Catalytic converters shall be installed on gasoline-powered equipment, if feasible.

AQ-14 Diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters as certified and/or verified by U.S. Environmental Protection Agency (USEPA) or CARB shall be installed on equipment operating on-site.

AQ-15 Diesel-powered equipment should be replaced by electric equipment whenever feasible.

AQ-16 Idling of heavy-duty diesel trucks during loading and unloading shall be limited to five minutes; auxiliary power units should be used whenever possible. State law requires that drivers of diesel fueled commercial vehicles weighing more than 10,000 pounds:

- Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location,
- Shall not idle a diesel-fueled auxiliary power system (APS) for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if the vehicle has a sleeper berth and is within 100 feet of a restricted area (homes and schools),
- Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.

See Section 4.2 of this SEA/MND and Section 4.1.2 of the 2009 EA/MND for a detailed discussion for a detailed discussion of the environmental impacts and environmental commitments associated with air quality for this project.

c. **Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?**
LESS THAN SIGNIFICANT IMPACT. See Section 4.2 of this SEA/MND and Section 4.1.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with air quality for this project.

d. Would the project expose sensitive receptors to substantial pollutant concentrations?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The maximum construction activity onsite construction emissions are estimated, after implementation of SBCAPCD Rule requirements and the proposed project's environmental commitments (AQ-1 through AQ-16 above), to be below the SBCAPCD localized significance thresholds. See Section 4.2 of this SEA/MND and Section 4.1.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with air quality for this project.

e. Would the project create objectionable odors affecting a substantial number of people?
LESS THAN SIGNIFICANT IMPACT. Construction equipment and construction operations such as the soil cement operation may create objectionable odors. These odors would be temporary and are types of odors regularly experienced by the public and so would not significantly affect a substantial number of people.

3.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of wildlife nursery sites?	☐	☐	☒	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a. **Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?**
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The project area is known to periodically support federally listed species including California red-legged frog (CRLF) and it is within the designated critical habitat for the Southern steelhead trout. In addition, several California species of special concern have the potential to occur in the region. See Section 4.2.2 of the 2009 EA/MND and Section 4.3 of this Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with biological resources for this project. With the implementation of environmental commitments described in Section 4 and 6 0f this SEA/MND impacts to rare plants and sensitive wildlife would be considered less than significant. The Corps proposes to implement the following mitigation measures to minimize effects of the project on biological resources:

BR-1 The construction contractor shall clear vegetation associated with project construction only during periods when migratory birds are not nesting (15 September through 15 February).

BR-2 Construction activities shall be monitored by the qualified biologist to assure that vegetation is removed only in the designated areas. Riparian areas are not to be disturbed and shall be flagged by the Corps' biologist prior to commencement of construction.

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BR-3 to offset permanent impact to the waters of the United States project sites will be revegetated with an appropriate assemblage of native seed mix and riparian and upland vegetation suitable for the area. Locally collected native plant material will be used to maximum extent practible. Invasive, exotic plants will be controlled to the maximum extent practible. These measures will be implemented to all areas disturbed by the project activities unless the Corps determines that it is not feasible or practible (For Example, an area disturbed by construction that under goes routine maintenance and levee inspection activities by the SBFCD may not to be vegetated).

BR-4 Prior to site disturbance, the Corps' contractor shall clearly delineate the limits of construction on project plans. All new construction, site disturbance, and vegetation removal shall be located within the delineated construction boundaries. The storage of equipment and materials and temporary stockpiling of soil shall be located within designated areas only and/or outside of natural habitat areas and channel. The limits of construction shall be delineated in the field with temporary construction fencing, staking, or flagging.

BR-5 Two days Prior to initiation of construction activities, a Corps qualified biologist shall survey the construction site and adjacent areas to determine if any sensitive plants, fish, or wildlife species are present in addition to CRLF. If the species are present, the Corps contractor shall modify construction activities to avoid removal or substantial disturbance to the key habitat areas or features where possible. Avoidance and impact minimization measures shall be described in a pre-construction briefing report for the construction contractor. All conservation measures included in the Biological Opinion issued by the United States Fish and Wildlife Service shall be followed prior to and during construction.

BR-6 Prior to construction activities, a Corps qualified biologist shall conduct pre-construction environmental training for all construction crew members.

BR-7 The Corps biologist shall monitor construction activities to ensure compliance with mitigation measures in areas potentially supporting nesting birds or other listed species. Results of the monitoring shall be summarized in monthly monitoring reports for submittal to the Corps project manager and regulatory agencies (as applicable).

BR-8 The Corps biologist(s) shall conduct reconnaissance and protocol surveys for LBV and southwestern willow flycatcher and focused surveys for nesting birds protected by the MBTA in areas that support riparian habitat within 500 feet of the construction footprint if construction activities are scheduled to occur during the breeding season (February 15 to September 15). Work shall not occur within 500 feet of a nesting LBV. The buffer for non-listed birds shall be 150 feet. This buffer may be modified in coordination with the USFWS.

To the maximum extent practicable, the proposed project shall be designed and implemented in such a way as to minimize adverse effects to CRLF/arroyo toad and their habitat. To achieve that purpose, the following avoidance/minimization measures shall be taken as a minimum:

BR-9 If possible, schedule construction activities for times of the year when impacts to the CRLF/arroyo toad would be minimal.

BR-10 A qualified biologist would perform the surveys two days prior to the initiation of the project construction. If CRLF are found, the qualified biologist shall relocate these frogs to an appropriate suitable habitat location in accordance with the incidental take statement of the biological opinion issued by the USFWS.

BR-11 A qualified biologist will relocate the CRLF to the shortest distance possible to a location that contains suitable habitat and would not be affected by activities associated with the proposed project. These areas must be in proximity to the capture site, support suitable habitat, and be free of exotic predatory species (e.g., bullfrogs) to the best of the qualified biologists' knowledge. The qualified biologist must be allowed sufficient time to move California red-legged frogs from the site before work activities begin. The biologist would maintain detailed records of any individuals that are moved (e.g. size, discoloration, any distinguishing features, digital photographs) to assist him or her in determining whether translocated animals are returning to the original points of capture.

BR-12 Stream contours shall be returned to their original condition at the end of the project activities.

BR-13 Work activities shall be completed between April 1st to November 1st should the contractor need to conduct activities outside this period, the construction area would be surveyed to make sure presence of the CRLF. If they are found, they would be relocated to the suitable habitat in accordance with the BO conditions. Construction activities would be monitored fully all the time during construction by a qualified biologist per the BO conditions. If construction goes beyond November 1st, the Environmental Resources Branch (ERB) Biologist would coordinate with the USFWS and provide direction to the Construction Field Representative.

BR-14 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to prevent California red-legged frogs/arroyo toad from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

BR-15 Water will not be impounded in a manner that may attract California red-legged frog/arroyo toad within construction site. A Corps qualified biologist shall ensure that the spread or introduction of invasive exotic species such as bullfrogs, crayfish, and centrarchid fishes, to the maximum extent possible during construction.

BR-16 Field personnel will be trained to recognize and avoid CRLF/arroyo toad.

BR-17 A Corps qualified biologist shall be present at the work site until such time as all removal of CRLF instruction of works, and habitat disturbance has been completed.

BR-18 As identified in the authorization and permits issued under the authority of the Clean Water Act 401 Certificate (Regional Water Quality Control Board) that it received for the proposed project, the contractor shall implement best management practices for erosion control during and after project implementation, e.g. silt fences, settling basins, and/ or other sediment traps will be temporarily used).

BR-19 During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas e.g. trash left during or after project activities may result in an increased number of predators, such as raccoons (Procyon lotor) or opossums (Didelphis virginiana), that may injure or kill California red-legged frogs).

BR-20 Project sites will be revegetated with an appropriate assemblage of native seed mix suitable for the area.

BR-21 Upon completion of the project, the Corps environmental monitor will ensure that a project completion form is completed and sent to the Ventura Fish and Wildlife Office.

b. **Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or USFWS?**
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Implementation of the proposed project would result in both temporary and permanent effects to some riparian scrub and upland vegetation within the Bradley Canyon Levee Extension Project. Table 4.3-2 through 4.3-7 Vegetation, Habitat and Other Non-Habitat Elements located in Section 4.3.3.1 of the Final SEA/MND provides detail to the specific habitat or non-habitat element including access roads, the existing levee, and disturbed areas that would be subject to both temporary and permanent disturbance. Permanent impact to waters of the US would be mitigated onsite through the enhancement and creation of native habitat as shown Table 4.3-8. See Sections 4.3.3 and 6.1 of the Final SEA/MND for a detailed discussion of the environmental impacts, environmental commitments, and mitigation associated with biological resources for this project.

c. **Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means?**
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project includes removing vegetation within jurisdictional waters of the United States. The Corps proposes to mitigate for the loss of jurisdictional Waters of the United States in compliance with the Clean Water Act (CWA) Section 404(b)(1) Guidelines and the Corps/USEPA mitigation rule for no net loss of wetlands as shown in Table 4.3-8. However, with the implementation of mitigation and environmental commitments discussed in Sections 4.3.3.3 and 6.2 of the Final SEA/MND, impacts would be less than significant.

d. **Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of wildlife nursery sites?**
LESS THAN SIGNIFICANT IMPACT. Ground-disturbing activity including temporary diversion of the existing Bradley Canyon channel and levee repairs could interfere with terrestrial wildlife movement during construction. However, at the completion of construction, the proposed levee improvements would not result in a new barrier to wildlife movement. In addition, many of the species that utilize the channel corridor are nocturnal and would not be affected by proposed project construction. Therefore, impacts to wildlife movement would be considered less than significant. See Section 4.3.3 of the 2011 SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with biological resources for this project.

e. **Would the project conflict with any local policies or ordinances protecting biological resources such as a tree preservation policy or ordinance?**

LESS THAN SIGNIFICANT IMPACT. Local ordinances protecting trees such as oaks would be considered less than significant with the implementation of the environmental commitments. See Section 4.3.3.1 of the 2011 SEA/MND and Section 4.3.3 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with biological resources for this project.

f. **Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?**
NO IMPACT. The proposed project would not conflict with an adopted plan. See Section 4.3.3 of the 2011 SEA/MND and Section 4.3.3.1 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with biological resources for this project.

3.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?	☐	☒	☐	☐
b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐
d. Disturb any human remains including those interred outside of formal cemeteries?	☐	☒	☐	☐

a. **Would the project cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?**
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. No cultural resources were observed during the pedestrian survey of the project area. There are no known historical resources within the project area. However, previous archeological surveys have identified cultural resources near the project area. Therefore, it is recommended that construction activities related to the implementation of this alternative be monitored by a qualified archeologist. The following environmental commitment would be incorporated by the Corps to ensure that adverse effects to historical resources are mitigated:

CR-1 Construction activities associated with this project will be monitored by a qualified archeologist who meets the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739). Earthmoving includes grubbing, ground clearing, grading, and excavation activities. If a previously unidentified cultural resource is discovered, all earthmoving activities in the vicinity of the discovery shall be diverted away from the discovery until the Corps complies with 36 CFR § 800.13(a)(2). See Section 4.11 of the Final SEA/MND for a detailed discussion of cultural resources for this project.

b. Would the project cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. It is not anticipated that the proposed project would cause a substantial adverse change in the significance of a unique archaeological resource. Environmental commitment CR-1 would be incorporated by the Corps to ensure that adverse effects to unique archaeological resources are mitigated. See Section 4.11.1 of the Final SEA/MND for a detailed discussion of cultural resources for this project.

c. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
LESS THAN SIGNIFICANT IMPACT. It is not anticipated that the proposed project would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

d. Would the project disturb any human remains including those interred outside of formal cemeteries?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The results of the cultural resources records search from the California Historical Resources Information System, Central Coastal Information Center (CHRIS-CCIC) did not reveal the presence of any recorded Native American human remains or burials within the project area or a one-mile radius. The California Native American Heritage Commission (NAHC) Sacred Lands File search failed to indicate the presence of sacred lands or other Native American resources in the immediate project area. However, the absence of recorded Native American burials in the project area or surrounding vicinity does not preclude the existence of buried resources within the project area. Therefore, the following mitigation measure is recommended to identify, evaluate, and recover human remains that are accidentally encountered during implementation of the proposed project. Impacts to these resources would be considered less than significant if the following environmental commitment is executed:

CR-2 If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

3.6 GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d. Be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code (1994) creating substantial risks to life or property?	☐	☐	☐	☒
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

a. Would the project expose people or structures to potential adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

NO IMPACT. No known active faults cross the proposed project site and the proposed project site is not located within an Alquist-Priolo Zone (USACE, 2008). The proposed project is not expected to expose people or structures to adverse effects as a result of the rupture of a known earthquake fault.

ii) Strong seismic ground shaking?

LESS THAN SIGNIFICANT IMPACT. The proposed project site is located in a seismically active region of central California and is relatively close to mapped active and potentially active faults. Moderate to strong ground motion has affected the proposed project site in the historical past. As described in the 2009 EA/MND and 2011 SEA/MND, there is potential for strong ground motion to affect the proposed project site in the future. However, proposed project features would be designed and implemented to avoid potential adverse effects, including the risk of loss, injury, or death, associated with the potential for strong ground shaking. See Section 4.4.2 of the 2009 EA/MND and Section 4.1.2 of the 2011 SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with geology and soils for this project.

iii) Seismic-related ground failure, including liquefaction?

LESS THAN SIGNIFICANT IMPACT. As described in Section 3.4 of the 2009 EA/MND and Section 3.1 of the 2011 SEA/MND, the proposed project is located in a seismically active area of central California. Moderate to strong ground motion has affected the proposed project site in the historical past and is expected to affect the proposed project site in the future. However, as described in the 2009 EA/MND and 2011 SEA/MND, the presence of potentially active faults in the vicinity (including as associated with the Huasna, Wilmar Avenue, and Oceano Fault Systems) is not expected to pose a significant rupture hazard relative to the life of the levee. In addition, it is expected that levee slopes will be designed using a minimum factor of safety of at least 1.1 for pseudostatic (earthquake) loading conditions. Potential exists for effects from earthquake-induced liquefaction including lateral spreading, which is sliding of the levee into the channel. However, as described in the 2009 EA/MND, further geotechnical investigations would be performed and results incorporated into project design to ensure that any effects do not result in a significant geologic hazard.

iv) Landslides

LESS THAN SIGNIFICANT IMPACT. As described in the 2009 EA/MND, a relatively high bluff (up to 100 feet) forms the majority of the north bank of the Santa Maria River. Within the proposed project limits, along portions of the river, the base of the bluff is unprotected. The face of the bluff is relatively steep, eroded, and commonly experiences landslides. The levees are generally outside the limits of the bluffs and therefore have a low potential for being impacted by landsliding along the bluffs. See Section 4.4.2 of the 2009 EA/MND and Section 4.1.2 of the 2011 SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with geology and soils for this project.

b. Would the project result in substantial erosion or the loss of topsoil?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. As described in the 2009 EA/MND and 2011 SEA/MND, the proposed project would comply with requirements of the State Water Resources Control Board through implementation of a Stormwater Pollution Prevention Plan (SWPPP), including erosion control measures and Best Management Practices (BMPs) to avoid or minimize erosion. The SWPPP would also restrict earth-moving activities to the dry season (to the maximum extent feasible) and would not permit construction activities to occur in areas containing surface water, thus minimizing the potential for erosion and sediment discharge in the proposed project area. The Corps would implement the following Environmental Commitments:

ER-1 Minimize exposed soil surfaces in area and in time.

ER-2 Prohibit clearing and grading activities until a firm construction schedule is known.

ER-3 Stabilize construction site soils with erosion control measures, like silt fences, matting etc.

ER-4 Implement a Stormwater Pollution Prevention Plan (SWPPP), to be approved by the State Water Resources Control Board, prior to construction.

ER-5 Limit grading and excavation activities within the channel to the dry season (April 1st to November 1st) to the maximum extent feasible due to winter rainy season.

See Section 4.4.2 of the 2009 EA/MND and Section 4.1.2 for a detailed discussion of the environmental impacts and environmental commitments associated with geology and soils for this project.

c. Is the project located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?
LESS THAN SIGNIFICANT. The existing levee is an earthen embankment founded on alluvium that is predominantly well-drained sandy material with varying amounts of silt and gravel; the proposed project is not located on unstable geologic units. Construction activities would include the driving of sheet pile into a portion of the existing Santa Maria River Levee which would cause vibrations in the area; however, as described in the 2009 EA/MND, localized liquefaction is not anticipated to occur. Liquefaction would likely not occur because the soil is too dense. Additionally, further geotechnical investigations would be performed and results incorporated into project design to ensure that any effects do not result in a significant geologic hazard. See Section 4.4.2 and Section 4.1.2 of the 2009 EA/MND and 2011 SEA/MND for a

detailed discussion of the environmental impacts and environmental commitments associated with geology and soils for this project.

d. Is the project located on expansive soil as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

NO IMPACT. The proposed project is located along the existing Bradley Canyon Levee adjacent to Santa Maria River Levee system; the existing levee is an earthen embankment founded on alluvium. The alluvium along the Bradley Canyon Channel tributary to Santa Maria River is predominantly well-drained sandy material with varying amounts of silt and gravel. At depth and outside the active channel of the river the alluvium is interbedded or can transition to clay. The foundation support soils for the levee mainly consist of relatively deep sediments of alluvium. See Section 4.4.2 of the 2009 EA/MND and Section 4.1.2 of the 2011 SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with geology and soils for this project.

e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

NO IMPACT. The proposed project includes improvements to a 3.700-foot reach of the existing Bradley Canyon Levee System and does not include installation of septic tanks or alternative wastewater disposal systems.

3.7 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b. Create a significant hazard to the public or the environment through the reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☐	☒	☐	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☐

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
h. Expose people or structures to the risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☒	☐	☐
i. Cause exposure to hazards from oil or gas pipelines or oil well facilities?	☐	☒	☐	☐

a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project would not require long-term storage, treatment, disposal, or transport of significant quantities of hazardous materials; however, small quantities of hazardous materials would be stored, used, and handled during construction. Construction of the proposed project would involve the excavation of soils from the toe of the existing levee that could possibly be contaminated due to past waste disposal practices, including discharging of waste to sewer systems and storm drains. However, Environmental Commitment WR-2 (Spill Prevention and Contingency Plan) of the water resources as described in Section 4 of this Final SEA/MND would be included in the proposed project to reduce any potential impacts associated with contaminated soils. See Section 4.11.2 of the 2009 EA/MND and Section 4.10.1 of the 2011Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hazards and hazardous materials for this project.

b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Environmental Commitment WR-3, which requires the contractor to prepare a Spill Prevention and Contingency Plan to reduce impacts associated with the accidental release of hazardous materials during construction. After the levee improvements are complete, there will be no potential for accidental release of hazardous materials. See Section 4.11.2 of the 2009 EA/MND and 4.4.1 of the 2011 SEA/MND for a detailed discussion of the environmental impacts associated with hazards and hazardous materials for this project.

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project would be located in the vicinity of three existing schools: Christ the

King, located at 1431 Mount Whitney Way (0.14 mile west of the project site); Taylor Elementary School, located at 1921 Carlotti Drive (0.07 mile west of the project site); and Tommie Junst Junior High School, located at 930 Hidden Pines Way (0.22 mile south of the project site). The proposed project would not require long-term storage, treatment, disposal, or transport of significant quantities of hazardous materials; however, small quantities of hazardous materials would be stored, used, and handled during construction temporarily. Additionally, the Corps would implement Environmental Commitment WR-2 (Spill Prevention and Contingency Plan) to reduce impacts associated with the accidental release of hazardous materials during construction. See Section 4.11.2 of the 2009 EA/MND and Section 4 of this Final SEA/MND for a detailed discussion of the environmental impacts associated with hazards and hazardous materials for this project.

d. Would the project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?
NO IMPACT. The proposed project site would not be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and would not create a significant hazard to the public or the environment. See Section 4.10 of the 2011 SEA/MND and Section 4.11.2 of the 2009 EA/MND for environmental commitments and a detailed discussion of the environmental impacts associated with hazards and hazardous materials for this project.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?
NO IMPACT. The Northside Airpark is located approximately 6.5 miles west-southwest from the downstream end of the proposed project site. The proposed project consists of improving an existing levee to reduce the potential for flood damage to the adjacent Base and community and would not result in a safety hazard. See Section 4.10 of the 2011 SEA/MND and Section 4.11.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hazards and hazardous materials for this project.

f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?
NO IMPACT. The Northside Airpark is located approximately 6.5 miles west-southwest from the downstream end of the proposed project site. The proposed project consists of improving an existing levee to reduce the potential for flood damage to the adjacent Base and community and would not result in a safety hazard. See Section 4.10 of the 2011 SEA/MND and Section 4.11.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hazards and hazardous materials for this project.

g. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project would not require long-term storage, treatment, disposal, or transport of significant quantities of hazardous materials; however, small quantities of hazardous materials would be stored, used, and handled during construction. A Spill Prevention and Contingency Plan would be prepared in compliance with Environmental Commitment WR-2 (Spill Prevention and Contingency Plan). Additionally, the Corps would implement Environmental Commitment PS-1 listed below under Public Services (Section 3.13 of the 2009 EA/MND) to provide adequate safety and emergency response training for construction workers. See Section 4.10 of the 2011 SEA/MND and Section 4.11.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hazards and hazardous materials for this project.

h. Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project is located near industrial, agricultural, and recreational areas. The proposed project involves the improvement of an existing levee and would require no permanent on-site operational personnel. Construction equipment would be equipped with fire prevention measures to decrease the risk of fires (see Environmental Commitments PS-2 and PS-4 in Section 3.13 of the 2009 EA/MND). Therefore, no significant impacts are expected due to exposure of people or structures to a significant risk of loss, injury, or death attributable to wildland fires. See Section 4.10 of the 2011 SEA/MND and Sections 4.11.2 and 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with fire for this project.

i. Would the project result in exposure to hazards from oil or gas pipelines or oil well facilities?
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Three pipelines (Conoco Phillips oil, Greka oil pipeline, and Johnson irrigation water pipeline) traverse the study area and the project site (SBC, 2008). All three lines would be protected in place along the levee and would occur within the 120-foot construction zone. Environmental Commitment PS-5 of the 2009 EA/MND listed under Public Services (Section 3.13) would be incorporated by the Corps. See Section 4.10 of the 2011 SEA/MND and Section 4.11.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with this impact.

3.8 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☒	☐	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite?	☐	☐	☒	☐
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	☐	☐	☒	☐
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems to provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f. Otherwise substantially degrade water quality?	☐	☒	☐	☐
g. Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h. Place within a 100-year floodplain structures, which would impede or redirect flood flows?	☐	☐	☐	☒

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j. Inundate by seiche, tsunami, or mudflow?	☐	☐	☒	☐

a. Would the project violate any water quality standards or waste discharge requirements?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Use of heavy construction equipment and vehicles during levee repair activities could potentially result in the accidental release or discharge of pollutants such as sediments, oils, fuels, and other equipment fluids. The release of pollutants into surface waters could result in contamination of surface and/or groundwater that would be potentially significant without the implementation of the environmental commitments included as part of the proposed project. If groundwater resources are encountered during excavation activities required during construction, dewatering of the affected groundwater would be required in order to avoid groundwater contamination. Environmental Commitments included as part of the project, as described in Section 4 and 6 of this Final SEA/MND, include requirements to prepare a Spill Prevention and Contingency Plan (WR-2), restrict construction and excavation in the Bradley canyon Cannel to outside the rainy season (WR-2), and implement a de-watering plan in coordination with the Regional Water Quality Control Board (WR-1). Accordingly, construction and implementation of the proposed project would not result in a significant impact related to violation of a water quality standard or waste discharge requirement. See Section 4 and Section 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

b. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Depth to groundwater in the Bradley Canyon Channel tributary to Santa Maria Groundwater Basin is strongly connected to the flow levels in surface waterways and precipitation. As described in Section 3.3.3 of the 2009 EA/MND and 2011 Final SEA/MND, depth to groundwater along the project alignment has varied over the years; however, recent test borings (conducted in November 2008) encountered no groundwater to depths of

50 feet at 16 locations and encountered groundwater at depths of 76 to 78 feet at three locations along the south levee. These results, which are considered representative of groundwater conditions at the project site, indicate that it is highly unlikely that groundwater resources would be encountered during construction of the proposed levee improvements. If groundwater is encountered, the implementation of Environmental Commitments included as part of the project (including WR-1 through WR-7, described in the Final SEA/MND) would avoid or minimize potential impacts to groundwater resources. Additionally, the proposed project would not require the long-term use of water (for instance in revegetation) and would not result in an over-commitment or overFinal of the underlying groundwater basin. Any potential impacts to groundwater supply and recharge would be localized and less than significant. See Section 4.3.2 of the 2009 EA/MND and Section 4 and Section 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

c. **Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site?**
LESS THAN SIGNIFICANT IMPACT. Construction of the proposed project would modify the existing face of the Bradley Canyon Levee but would not substantially alter the existing drainage pattern of the site or area. A temporary water diversion of the Bradley Canyon Channel in dry season would be excavated during construction of the proposed project to divert potential flows away from the construction area but this channel would be installed in a sandy area within the 120-foot construction area and would not be a permanent feature of the proposed project. The proposed project would not significantly affect percolation rates or drainage patterns in the area and would not substantially alter the existing drainage pattern of the site or area. Substantial erosion or siltation would not occur due to a substantial alteration of the existing drainage pattern of the site or area. See Section 4.3.2 of the 2009 EA/MND and Sections 4 and 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

d. **Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?**
LESS THAN SIGNIFICANT IMPACT. The proposed project includes repairs and improvements to the existing Bradley Canyon Levee and connected to the Santa Maria LEvee and does not include any actions or project features that would substantially increase the rate or amount of surface runoff. Repairing the levee would not require the use of surface water and would not affect the quantity of surface water in the river or underlying groundwater basin. The proposed project is not expected to result in a substantial increase in the rate or amount of surface water runoff or in flooding onsite or offsite. See Section 4.3.2 of the 2009 EA/MND and Sections 4 and 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

e. **Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems to provide substantial additional sources of polluted runoff?**
LESS THAN SIGNIFICANT IMPACT. As described above, the proposed project includes repairs and improvements to the existing Bradley Canyon Levee and does not include any actions or project features that would substantially increase the rate or amount of surface runoff. Environmental commitments included as part of the proposed project and described in Section 4.3.2 of the 2009 EA/MND and Sections 4 and 6 of the Final SEA/MND would minimize the potential for project construction activities to contribute polluted runoff. See Section 4.3.2 of the 2009 EA/MND and Sections 4 and 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

f. **Would the project otherwise substantially degrade water quality?**
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. As described above, environmental commitments included as part of the proposed project as described in Sections 4 and 6 of the Final SEA/MND and Section 7 of the 2009 EA/MND include requirements to prepare a Spill Prevention and Contingency Plan, restrict construction and excavation in the channel outside the rainy season, and implement a de-watering plan in coordination with the Regional Water Quality Control Board. Implementation of these required measures would minimize or avoid the potential for the proposed project to substantially degrade water quality. See Section 4.3.2 of the 2009 EA/MND AND Sections 4 and 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

g. **Would the project place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?**
NO IMPACT. The proposed project is a levee improvement project and would not place housing within a 100-year floodplain or SPF flood zone; it is expected that improvements made to the levee under the proposed project would result in homes being removed from the 100-year floodplain areas identified on FEMA Insurance Rate Maps.

h. **Would the project place within a 100-year floodplain structures which would impede or redirect flood flows?**
NO IMPACT. The proposed project is a levee improvement project that would result in existing homes and structures being removed from the 100-year floodplain areas identified on FEMA Insurance Rate Maps.

i. Would the project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

NO IMPACT. As a levee improvement project, the proposed project would protect people and structures downstream of the existing Santa Maria River Levee from significant risk of loss, injury, or death involving flooding. See Section 4.3.2 of the 2009 EA/MND and Sections 4 and 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

j. Would the project cause inundation by seiche, tsunami, or mudflow?

LESS THAN SIGNIFICANT IMPACT. The Study Area (project site) is located approximately 13 miles downstream of Twitchell Reservoir and is located within the inundation zone for the Twitchell Dam. As such, the proposed project area would be subject to inundation if the Twitchell Dam were to fail or breach. The proposed project area is also located approximately 5 to 22 miles inland from the Pacific Ocean and could potentially be affected by a tsunami (earthquake-induced ocean waves). However, because the proposed project site is located approximately 65 feet above sea level and due to the broad nature of the Santa Maria River Basin, it is considered unlikely that the proposed project site would be affected by a tsunami. See Section 4.3.2 of the 2009 EA/MND and Sections 4 and 6 of the Final SEA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with hydrology and water quality for this project.

3.9 LAND USE

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☐	☒
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c. Conflict with any applicable habitat conservation plan or natural communities conservation plan?	☐	☐	☐	☒

a. Would the project physically divide an established community?

NO IMPACT. Implementation of the proposed project would not result in the displacement of people nor the demolition, conversion, or removal of residential structures. Therefore, the proposed project would not divide an established community. See Section 4.5.2 of the 2009 EA/MND and 4.6 of the Final SEA/MND for a detailed discussion of the environmental impacts associated with existing land use for this project.

b. Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?
NO IMPACT. Implementation of the proposed project would require compliance with applicable land use plans, policies, and regulations from Santa Barbara County and the City of Santa Maria. Because the proposed project would be designed to maintain and improve drainage in the existing flood control channels, it would be consistent with all applicable plans and policies. See Section 4.5.2 of the 2009 EA/MND and 4.6 of the Final SEA/MND for a detailed discussion of the environmental impacts associated with land use for this project.

c. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?
NO IMPACT. The proposed project is not located within the boundaries of a habitat conservation plan or natural conservation plan.

3.10 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a. Would the project result in the loss of availability of a known mineral resource classified MRZ-2 by the State Geologist that would be of value to the region and the residents of the state?
NO IMPACT. The proposed project is not located in a known mineral resource zone classified as MRZ-2 by the State Geologist. No impacts would occur.

b. Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

NO IMPACT. The existing Santa Maria River Levee was authorized in 1963 and adjacent uses were planned to be compatible with these flood control facilities. The proposed project would improve the existing levee without changing its function. No impacts would occur.

3.11 NOISE

Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?	☐	☐	☒	☐
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project expose people residing	☐	☐	☐	☒

Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
or working in the project area to excessive noise levels?				

a. Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

LESS THAN SIGNIFICANT IMPACT. Construction noise levels are not expected to violate the local noise Municipal Code. See Section 4.9 of the Final SEA/MND and Section 4.8.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with noise for this project.

b. Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

LESS THAN SIGNIFICANT IMPACT. Although construction activities would include heavy equipment, it is unlikely that this equipment would result in perceptible, let alone excessive, groundborne vibration. See Section 4.9 of the Final SEA/MND and Section 4.8.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with noise for this project.

c. Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

NO IMPACT. The proposed project consists of improvements to repair an existing levee; therefore, no substantial permanent increase in ambient noise levels would occur. See Section 4.9 of the Final SEA/MND and Section 4.8.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with noise for this project.

d. Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project would have the potential to temporarily increase noise in the project area. Noise sources include construction-related activities, earth moving, and traffic. Some disturbance to the local residences could occur as a result of increased noise levels. However, this impact will be short-term and will cease upon completion of construction. With implementation of the following environmental commitments described further in Sections 4.8.2 and 7.2 of the 2009 EA/MND and Section 4.9 of the Final SEA/MND impacts from construction noise would be less than significant:

N-1 Equip each internal combustion engine used for any purpose on the job or related to the job with a muffler of a type recommended by the manufacturer. No internal combustion engine would be operated on the study area without said muffler. All diesel equipment would be operated with closed engine doors and would be equipped with factory-recommended mufflers.

N-2 Contractors shall implement appropriate additional noise mitigation measures including, but not limited to, changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, notifying adjacent residents 24 hours in advance of construction work, and installing acoustic barriers around stationary construction noise sources.

N-3 All active construction areas located within 50 feet of adjacent homes and school boundaries shall be shielded with a ½-inch plywood wall of at least seven feet in height, or other barrier that reduces noise transmission to ensure the noise levels are within the City of Santa Maria noise standards.

See Section 4.9 of the Final SEA/MND and Section 4.8.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with noise for this project.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
NO IMPACT. See Section 4.9 of the Final SEA/MND and Section 4.8.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with noise for this project.

f. For a project within the vicinity of a private air strip, would the project expose people residing or working in the project area to excessive noise levels?
NO IMPACT. See Section 4.9 of the Final SEA/MND and Section 4.8.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with noise for this project.

3.12 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing	☐	☐	☐	☒

elsewhere?				
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a. Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?
NO IMPACT. The proposed project is an upgrade to existing flood control channels which includes short-term construction activities. Therefore, construction of the proposed project would not attract a long-term worker population to the proposed project vicinity and would not increase the region's population. See Section 4.9.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with socioeconomics for this project.

b. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
NO IMPACT. No residential properties currently exist at the proposed project site and no housing or people would be displaced by the proposed project. Therefore, implementation of the proposed project would not result in the displacement of any housing, including affordable housing, nor would it necessitate the construction of replacement housing. See Section 4.9.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with socioeconomics for this project.

c. Would the project displace substantial numbers of people necessitating the construction of replacement housing elsewhere?
NO IMPACT. As stated above, there is no existing housing at the proposed project site. Therefore, the proposed project would not result in the displacement of people nor would it necessitate the construction of replacement housing elsewhere. See Section 4.9.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with socioeconomics for this project.

3.13 PUBLIC SERVICES

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times ,or other performance objectives for any of the public services:				No
i) Fire protection?	☐	☒	☐	☐
ii) Police protection?	☐	☒	☐	☐
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

i) Fire protection?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Fire protection services could be required at the project area in the event of an accident or fire. However, the likelihood of an incident requiring such a response would be low. Neither construction nor operation of the proposed project would cause a disproportionate stress on the service capacities of the fire stations or personnel that serve the project area. However, to reduce the potential risk the Corps would ensure that the following environmental commitments are incorporated into the plan.

PS-1 The contractor will be required to provide adequate safety and emergency response training for construction workers.

PS-2 All construction equipment shall be equipped with the appropriate spark arrestors and functioning mufflers.

PS-3 Spark arresters and a water truck shall be available at the project site at all times when welding or grinding activities are taking place.

PS-4 All rubber-tired construction vehicles shall be equipped with appropriate fire fighting equipment to aid in the prevention or spread of fires.

PS-5 The contractor will coordinate with local city agencies/departments, private entities, and Caltrans for appropriate notification to the public; any utility relocation, removal, protection or abandonment requirements; the location of staging areas; and safety procedures to reduce potential hazards.

See Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with public services for this project.

ii) Police protection?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Long-term impacts to public services are usually associated with population in-migration and growth in an area which increases the demand for a particular service and necessitates the expansion of existing facilities or construction of new facilities. However, the proposed project would not result in a population increase in the region. Because the intent of the proposed project is to provide improvements to repair an existing levee to reduce potential for flood damage in the area it would neither stimulate population in-migration nor increase demands on public services such as police protection. However, to reduce the potential risk the Corps would ensure that Environmental Commitments PS-1 through PS-5 are incorporated into the plans. See Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with public services for this project.

iii) Schools?

NO IMPACT. Because the proposed project would not result in an increase in the population or in-migration within the region as described in Section 3.12 (a) above, there would be no significant long-term impact on public services such as schools. See Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with public services for this project.

iv) Parks

NO IMPACT. See Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with public services for this project.

v) Other Public Facilities?

NO IMPACT. See Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with public services for this project.

3.14 RECREATION

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☒	☐	☐

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

NO IMPACT. The proposed project would be located within an existing flood control channel on land generally not available to public use. No recreational land uses exist on or within the proposed project site. See Section 4.7.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with recreation for this project.

b. Would the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project does not include recreational facilities. A bikepath is located on top of the levee. Construction activities may temporarily disrupt use of segments of the bikepath for a maximum period of approximately one to two years. Alternative routes would be available on adjacent residential streets. In addition, prior to construction, the Corps Contractor would prepare a Traffic Management Plan (see Environmental Commitment T-1 below in Section 3.15) which would clearly identify all affected roadways, bikepaths, and pedestrian paths within the area of effect. See Section 4.7.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with recreation for this project.

3.15 TRANSPORTATION AND TRAFFIC

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☒	☐	☐
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d. Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☒
e. Result in inadequate emergency access?	☐	☒	☐	☐
f. Result in inadequate parking capacity?	☐	☐	☐	☒
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?	☐	☐	☐	☒

a. **Would the project cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?**
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. Traffic would temporarily increase and disruptions to the surrounding street network may occur during project construction. Potential issues include additional congestion on local roadways and delays for travelers caused by construction activities. However, these impacts would be temporary and the Corps would implement a Traffic Control Plan (Environmental Commitment T-1) to ensure impacts to transportation remain at less than significant levels.

T-1 The contractor shall coordinate in advance with emergency service providers to avoid restricting movements of emergency vehicles. Police departments, fire departments, ambulance services, and paramedic services shall be notified in advance by the contractor of the proposed locations, nature, timing, and duration of any construction activities and advised of any access restrictions that could impact their effectiveness. At locations where access to nearby property is blocked, provision shall be ready at all times to accommodate emergency vehicles, such as plating over excavations, short detours, and alternate routes in conjunction with local agencies. The Traffic Management Plan shall include details regarding emergency services coordination and procedures.

Additionally, the Traffic Management Plan shall clearly identify all affected roadways, bikepaths, and pedestrian paths within the area of effect. The Plan shall identify measures to notify the public and divert automobile, bike, and pedestrian traffic safely around the construction area, including but not limited to a notice posted in the local publication, posted signage, and written notification to the City of Santa Maria Public Works Department and Recreation and Parks Department and California Department of Transportation.

See Section 4.10.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with traffic for this project.

b. Would the project cause, either individually or cumulatively, a level-of-service standard established by the county congestion management agency for designated roads or highways to be exceeded?
LESS THAN SIGNIFICANT IMPACT. The proposed project would not result in significant delays affecting level of service and road capacity, significantly affect the capacity or circulation patterns along the affected route, or require long-term road or access improvements beyond what is currently provided by levee service roads. See Section 4.10.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with traffic for this project.

c. Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?
NO IMPACT. The proposed project is not expected to result in a change in air traffic patterns. See Section 4.10.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with traffic for this project.

d. Would the project substantially increase hazards because of a design feature or incompatible uses?
NO IMPACT. The proposed project is intended to decrease hazards due to flooding. As has occurred in the past, during large flow events within the river the additional water would follow the low flow alignment and it would impinge on the levee at an acute angle. This scenario has played out numerous times during the last four decades.

The proposed project would alleviate current hazards and is not expected to increase hazards because of a design feature or incompatible uses. See Section 4.10.2 and 4.12.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with traffic and safety for this project.

e. **Would the project result in inadequate emergency access?**
LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project would not restrict emergency vehicle access. Additionally, Environmental Commitment T-1 would be incorporated by the proposed project. See Section 4.10.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with traffic for this project.

f. **Would the project result in inadequate parking capacity?**
NO IMPACT. The proposed project would park construction vehicles within the construction staging areas of the proposed project site and off of local roadways. See Section 4.10.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with traffic for this project.

g. **Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?**
NO IMPACT. The proposed project would not conflict with adopted policies, plans, or programs supporting alternative transportation. See Section 4.10.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with traffic for this project.

3.16 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d. Have sufficient water supplies available	☐	☐	☒	☐

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				
e. Result in a determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

a. Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

LESS THAN SIGNIFICANT IMPACT. The proposed project would provide improvements to repair an existing levee. Portable toilets brought to staging areas for construction crews would be emptied into septic tanks or municipal sewage systems. See Section 4.12 of the Final SEA/MND and Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with utilities for this project.

b. Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

NO IMPACT. the proposed project would not generate wastewater that would require the construction or expansion of wastewater treatment facilities. Because the proposed project would improve the existing levee and would not require the expansion or construction of new water or wastewater treatment facilities, no impacts would occur. See Section 4.12 of the Final SEA/MND and Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with utilities for this project.

c. Would the project require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

NO IMPACT. The proposed project is to repair an existing levee and would not require construction of new stormwater drainage facilities or expansion of existing facilities. See Section 4.12 of the Final SEA/MND and Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with utilities for this project.

d. Would the project have sufficient water supplies available to serve the proposed project from existing entitlements and resources, or would new or expanded entitlements be needed?

LESS THAN SIGNIFICANT IMPACT. Water would be required during project construction for dust abatement and cleaning of construction equipment. Water use would also include water necessary to make the soil cement used during project construction as well as for any revegetation activities. However, water use for the proposed project would not change the ability of the water supplier in serving the project area demands. Therefore, the water demand for construction of the proposed project would not be a significant impact. See Section 4.12 of the Final SEA/MND and Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with utilities for this project.

e. Would the project result in a determination by the wastewater treatment provider that serves or may serve the proposed project that it has adequate capacity to serve the proposed project's projected demand in addition to the provider's existing commitments?

LESS THAN SIGNIFICANT IMPACT. The proposed project would not generate significant amounts of wastewater. See Section 4.12 of the Final SEA/MND and Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts and environmental commitments associated with utilities for this project.

f. Would the project be served by a landfill with sufficient permitted capacity to accommodate the proposed project's solid waste disposal needs?

LESS THAN SIGNIFICANT IMPACT. Se Section 4.12 of the Final SEA/MND and Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with utilities for this project.

g. Would the project comply with federal, state, and local statutes and regulations related to solid waste?

LESS THAN SIGNIFICANT IMPACT. See Section 4.12 of the Final SEA/MND and Section 4.14.2 of the 2009 EA/MND for a detailed discussion of the environmental impacts associated with utilities for this project.

3.17 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, effects of other current projects, and the effects of probable future projects.)	☐	☐	☐	☒
c. Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project activities would not result in significant impacts to biological resources. Ongoing activities in the project area include new industrial development projects and a residential development project (Table 5-1 of the 2009 EA/MND). As discussed in Section 4 of this Final SEA/MND, the proposed project activities are short-term and any effects on biological resources would most likely be temporary and would terminate upon completion of the proposed project and would not result in impacts that would interact with other cumulative projects. However, in order to avoid permanent impacts to biological resources, the proposed project activities would include restoration of sites that have experienced environmental damage. The Corps would also implement environmental commitments to avoid impacts to sensitive species (see Section 4 of the 2011 Final SEA/MND). Since any impacts associated with the proposed project activities would be short-term and would not substantially affect environmental resources, the proposed project activities would be less than significant and the increment added by the proposed project would not result in impacts that are cumulatively considerable for biological resources.

The proposed project would not significantly impact cultural resources (See Section 4 the Final SEA/MND and Section 4.13 of the 2009 EA/MND). As the proposed project activities would occur within the existing channels and would not contribute cumulatively to projects that would occur after completion of the proposed project, the proposed project would not contribute to a cumulative effect on cultural resources.

b. Does the project have impacts that are individually limited but cumulatively considerable?

NO IMPACT. No other pending or probable future projects were identified in the project area with impacts that would coincide with the proposed project's construction phase or operational impacts and result in significant cumulative impacts. Therefore, the proposed project does not have the potential to combine with the impacts of other regional projects to result in effects that are cumulatively considerable (See Section 5 of the Final SEA/MND).

c. Does the project have environmental effects, which would cause substantial adverse effects on human beings, either directly or indirectly?

LESS THAN SIGNIFICANT IMPACT. The proposed project does not involve any activities, either during construction or operation, which would cause significant adverse effects on human beings. Impacts generated during construction of the proposed project, such as increased noise or release of hazardous materials, would be temporary and can be mitigated to less than significant levels. Operational impacts would not cause significant adverse effects on human beings, and in fact implementation of the proposed project would decrease the risk of adverse effects on human beings due to flooding.

4. REFERENCES

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5. REPORT PREPARATION

U. S. Army Corps of Engineers		
Naeem Siddiqui	Environmental Coordinator/Biologist	B.S (Hons) Biology Years of Experience: 11
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Appendix C

Wetland Jurisdictional Delineation Report

U.S Army
Corps of Engineers

WETLAND JURISDICTIONAL DELINEATION REPORT FOR THE BRADLEY CANYON LEVEE EXTENSION IMPROVEMENT PROJECT

November 2011

INTRODUCTION

The U.S. Army Corps of Engineers (Corps) Environmental Resources Branch (ERB) Planning Division represented by Naeem Siddiqui (Biologist) and Crystal Huerta (Regulatory Biologist) has conducted a wetland delineation within the extension of Reach 3 of the Santa Maria Levee Repair Project (SMRLRP). Following an extensive alternative analysis, the Corps' preferred alternative was the least damaging practicable alternative (LEDPA). The preferred alternative was to strengthen the existing south levee with sheet pile and soil cement revetment. As currently designed the Corps is proposing to extend 3,700 feet along the existing Reach 3 levee, specifically located in the Bradley Canyon drainage. Flow from an immediately adjacent agricultural field enters into a culvert downstream which then flows into the Santa Maria River. Levee protection is required from the top of the existing levee to the estimated scour depth which is approximately 15 feet below the existing thalweg. Two methods of protection will be utilized along the extension consisting of sheet pile and soil cement. Sheet pile will be utilized in the downstream portion of the extension to protect the existing native and riparian habitat and soil cement will be utilized for the remaining portion of the extension where there is no vegetation and the land is disturbed with agricultural activities.

1.0 BACKGROUND

The Santa Maria Levee Project was originally constructed in 1963 by the Corps Los Angeles District. The original construction consisted of a set of earthen levees with riprap revetment. The levee along the south side of the river extends a distance of 17 miles. The project begins at Fugler's Point and ends at the California Highway 1 (CA-1) bridge. The project also includes a 5-mile-long levee along the north side of the river located between U.S. Highway 101(US-101) bridge and the CA-1 bridge. The levee project would provide flood protection to the Santa Maria Valley which includes the entire City of Santa Maria.

In 2005 the Federal Emergency Management Agency (FEMA), responsible for administering the National Flood Insurance Program, requested the Corps certify that the Santa Maria Levee Project meets the Corps' criteria for levee systems. Based on a detailed hydraulic and geotechnical analysis and review of several documented failures, the Corps was unable to certify that the levee system will contain a 100-year flood and satisfy the legal requirements set forth in the Code of Federal Regulations National Flood Insurance Program (1 October 2003 edition, Article 44, Section 65.10, Mapping Areas Protected by Levee Systems). The Corps has identified a deficiency in the original levee design which would not account for the angle of approach of meandering lower volume flows that impinge on the levee.

The purpose of this report is to provide a delineation of waters of the United States, including wetlands, for the Santa Maria River Levee Repair Site (SMRLRP), which will facilitate compliance with the requirements of the Corps' Section 404 (b)(1) analysis and Section 401 of the Clean Water Act (CWA) administered by the Regional Water Quality Control Board (RWQCB). This report discusses the existing environmental conditions at the SMRLRP sites and documents the current acreages of waters of the United States, including wetlands.

2.0 ENVIRONMENTAL SETTING

The proposed project is located in the City of Santa Maria, Santa Barbara County, California. The proposed project consists of extending Reach 3 along the existing levee for approximately 3,700 feet (Figure Attached: Santa Maria Levees Reach 3-Extension).

The Santa Maria River originates in Las Padres National Forest and drains a 1,600-square-mile watershed capable of producing a peak discharge of approximately 100,000 cubic feet per second (cfs) during a precipitation event with a 100-year return interval. The channel morphology and substrate is characterized by coarse sand and gravel and consists of a very wide flat channel bordered by the Santa Maria Levee along portions of the north and south banks to protect farms and the City of Santa Maria. The river defines part of the border between Santa Barbara County and San Louis Obispo County and empties into the Pacific Ocean. No lakes or dams are located downstream of the project site within the Santa Maria watershed.

Adjacent land uses include commercial, agricultural, and industrial. The proposed project site is bordered by urban development to the southwest and the active Santa Maria River channel to the northeast. Agricultural land and undeveloped property are located to the north of the proposed project site and across the Santa Maria River. The levee and the proposed project are traversed by the US-101 bridge 5 miles north of the project site and Suey Road 3 miles from the project site. Existing structures within the study area include the above crossings, the levee itself, rocks along the levee face, soil cement, and station markers.

The proposed project area consists of the levee and the adjacent river bed. The top of the levee is approximately eight feet above the river bed. Stormwater and urban runoff drainages to the south and west flow towards the river and drain via floodgates that traverse the levee. Flow within the river is generally confined within the levee system but during moderate to large storm events channel flows may inundate unprotected agricultural property and/or breach the levee. Habitat communities within the proposed project area include riparian scrub, non-native grassland, coastal sage scrub, ruderal/disturbed, riverwash, freshwater marsh, and landscaped/developed vegetation.

3.0 REGULATORY OVERVIEW AND DEFINITIONS

3.1 U.S. ARMY CORPS OF ENGINEERS

Section 404 of the CWA provides the Corps regulatory permitting authority over activities that result in a discharge of dredged or fill material into “navigable Waters of the United States”. The term “waters of the United States” is defined at 33 CFR Part 328.3(a) as follows: *The limits of USACE jurisdiction under Section 404 as defined in 33 CFR Section 328.4 are as follows: (a) territorial seas: three nautical miles in a seaward direction from the baseline; (b) waters of the U.S.: high tide line or to the limit of adjacent non-tidal waters; (c) Non-tidal waters of the U.S.: ordinary high water mark (OHWM) or to the limit of adjacent wetlands; (d) Wetlands: to the limit of the Wetland.*

The USACE has developed standard methods contained in the Interim Regional Supplement to the Corps of Engineering Wetland Delineation Manual: Arid West Region (U.S. Army Corps of Engineers 2006), a supplement to the Corps of Engineers Wetland Delineation Manual (Environmental Library 1987), to determine the presence or the absence of wetlands and "Waters of the U.S.". The procedures described in the Interim Regional Supplement to the Corps of Engineering Wetland Manual: Arid West Region were used to identify wetlands and "Waters of the U.S." in the project site that are potentially subject to regulation under Section 404 of the CWA.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extends to the ordinary high water mark (OHWM) which is defined in 33 CFR 328.3(e) as: …. the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

3.1.1 RAPANOS V. UNITED STATES AND CARABELL V. UNITED STATES

On June 5, 2007, the Environmental Protection Agency (EPA) and the Corps issued joint guidance that addresses the scope of jurisdiction pursuant to the CWA in light of the Supreme Court's decision in the consolidated cases *Rapanos v. United States and Carabell v. United States*. As a result of this case, the Corps will assert jurisdictions over the following waters: 1) Traditional Navigable Waters (TNW); 2) Wetlands adjacent to traditional navigable waters; 3) Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g. typically three months); 4) Wetlands that directly abut such tributaries. The following waters will need to be analyzed to determine if there is a significant nexus: 1)Non-navigable tributaries that are not relatively permanent; 2) Wetlands adjacent to non-navigable tributaries that are not relatively permanent; 3) Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

For Jurisdictional Delineations that include waters other than TNW and/or adjacent RPWs tributary to TNWs and/or adjacent wetlands, the Corps will apply the significant nexus standard that includes the data set forth in the Approved Jurisdictional Determination form completed and in Appendix A.

3.2 REGIONAL WATER QUALITY CONTROL BOARD

The Dickey Water Pollution Act of 1949 and Porter-Cologne Act of 1969 established the State Water Resources Control Board (SWRCB) and nine RWQCBs in the State of California. The SWRCB and each RWQCB regulate activities in "Waters of the State" which include "Waters of the United States." "Waters of the State" are defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The RWQCB regulates discharges of fill and dredged material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act through the State Water Quality Certification Program. State Water Quality Certification is necessary for all projects that require a Corps action which may include discharge of fill and dredged material, or fall under other federal jurisdiction, and have the potential to impact waters of the state. The Water Quality Certification (or waiver) determines that the permitted activities will not violate water quality standards individually or cumulatively over the term of the action. Water quality certification must be consistent with the requirements of the Federal Clean Water Act, the California Environmental Quality Act, the California Endangered Species Act, and the Porter-Cologne Act. If a proposed project or portion of a proposed project does not require a federal permit but does involve dredge or fill activities that may result in a discharge to Waters of the State, the RWQCB has the option to regulate the dredge and fill activity under its state authority in the form of Waste Discharge Requirements or Certification of Waste Discharge Requirements.

If a proposed project or portion of a proposed project does not require a federal permit but does involve dredge or fill activities that may result in a discharge to Waters of the State, the RWQCB has the option to regulate the dredge and fill activity under its state authority in the form of Waste Discharge Requirements or Certification of Waste Discharge Requirements.

4.0 FIELD METHODS

4.1 POTENTIAL SECTION 404 JURISDICTIONAL WETLANDS

The Corps has defined the term "wetlands" as follows: *Those areas that are inundated or saturated by surface or ground water at a frequency and a duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas* (33 CFR 328.3).

The three parameters listed in the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2006) that are used to determine the presence of wetlands are: (1) hydrophytic vegetation, (2) wetland hydrology, and (3) hydric soils. According to the Manual: *"….[E]vidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland delineation."*

4.1.1 VEGETATION

Hydrophytic vegetation is defined as areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurrence in wetland. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The United States Fish and Wildlife Service (FWS) has published *The National List of Plant Species that Occur in Wetlands* (Reed 1988) which separates vascular plants into the following four basic categories based on plant species frequency of occurrences in wetlands:

- Obligate Wetlands (OBL). Occur almost always (estimating>99%) under natural conditions in wetlands.

- o Facultative Wetlands (FACW). Usually occur in wetlands (estimated probability67-99%) but occasionally found in non-wetlands.
- o Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability 34-66%).
- o Facultative Wetland (FACW). Usually occurring non-wetlands (estimated probability 67-99%) but occasionally found in wetlands (estimated probability 1-33%).

The Corps considers OBL, FACW, and FAC species to be indicators of a wetland. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not listed in the FWS wetland plants document is assumed to be an upland species.

A secondary hydrophytic vegetation identifier is a prevalence index of 3.0 or less. The prevalence index is a weighted-average wetland indicator status of all plant species in the sampling plot, where each indicator status category is given a numeric code (OBL=1, FACW=2, FAC=3, FACU=4, and UPL=5) and weighting is by abundance (percent cover). This method is a more comprehensive analysis of the hydrophytic status of the community than one based on just a few dominant species. The prevalence index is used in this supplement to determine whether hydrophytic vegetation is present on sites where indicators of hydric soil and wetland hydrology are present but the vegetation initially fails the dominance test.

4.1.2 HYDROLOGY

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible or records of wetland hydrology are not available assessment of wetland hydrology is frequently supported by indicators such as water marks and surface soil cracks; other areas that may not be jurisdictional are “isolated” wetlands, or non-navigable waters which are not connected or adjacent to navigable waters of the United States. Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands) or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by indicators such as watermarks, surface soil cracks, sediment deposits, or a high water table. OHWM is a line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank shelving, changes in the character of soil, destruction of terrestrial vegetation, and the presence of litter.

4.1.3 SOILS

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation. Field indicators of wetland soils include sulfidic odor, observations of ponding, inundation or saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), or gleying, which indicates reducing conditions by a blue-grey color. Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soil survey, both of which must be verified in the field. Field indicators for hydric soils are particularly difficult to observe in sandy soils, which are often recently deposited soils of floodplains. These soils usually lack sufficient fines (clay and silt) and organic material to allow use of color as a reliable indicator of hydric soil. Hydric soil indicators in sandy soils include accumulations of organic matter and organic pan.

5.0 POTENTIAL SECTION 404 JURISDICTION

5.1 WATERS OF THE UNITED STATES

The project site was evaluated for the presence of "Waters of the United States." "Waters of the United States" subject to Corps jurisdiction include lakes, rivers, and perennial or intermittent streams. Corps jurisdiction of "Waters of the United States" in non-tidal areas extends to the OHWM as defined as:

The term "ordinary high water mark" means that the line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impresses on the bank, shelving, changes in the characteristics of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.
Federal Register Vol. 51, 219,Part 328.3 (d). November 13, 1986.

"Waters of the United States" are identified in the field by the presence of a defined river or streambed, a bank, and evidence of the flow of water, or by the abundance of emergent vegetation in ponds or lakes.

The delineation of Section 404 "Waters of the United States" and wetlands was conducted using the routine method, as described in the *Interim Regional Supplement to the Corps of Engineering Wetland Delineation Manual: Arid West Region* (U.S. Army Corps of Engineers 2006). Topographic maps, aerial photos, and other available information regarding the project site were reviewed to better determine potential Corps jurisdictional areas. Naeem Siddiqui, (Biologist) and Crystal Huerta (Regulatory Biologist) from the Corps conducted field work to delineate waters of the United States and wetlands on April 29, 2010. Sample points were taken in order to determine wetland and upland boundaries and areas of potential jurisdiction and to note general hydrology characteristics such as channel width and characteristic morphology. Field indicators were examined and Wetland Determination Data Form-Arid West Region were completed to record the site number, latitude, longitude, cowardian class, estimated aquatic resources, class of aquatic resources and other parameters including hydrophytic vegetation, wetland hydrology, and hydric soils. Data forms included the recordation of plant species and the presence or absence of indicators of wetland hydrology. A sample point was considered to be within a Corps wetland if the area met all three wetland parameters. If one or more of these parameters was not met in a typical situation, the point was not considered as a Corps wetland but rather a potential Corps "Waters of the United States" and RWQCB "Waters of the State". At each sampling point, indicators of wetland hydrology were examined. Observed indicators for hydrology included surface water, saturation, high water table, surface soil cracks, sediment deposits, oxidized rhizospheres along living roots, and biotic crust. The location of the OHWM along the stream banks was based on the presence of physical evidence of an OHWM including presence of rack or debris and evidence of recent bank erosion. Based on the positive identification of hydrophytic vegetation, hydric soils, and wetland hydrology, an area was identified as a jurisdictional wetland area. Data points with less than three indicators but with positive evidence of hydrology indicators and physical evidence of an OHWM were considered "Waters of the United States" under Corps jurisdiction and "Waters of the State" under RWQCB jurisdiction.

6.0 RESULTS

After an initial site visit, evaluation of aerial photography of the site and the United States Geological Survey (USGS) topographic map, it was determined that the proposed project impacts within the extension of Reach 3 of the project site within Santa Maria River Watershed are all located in "Waters of the United States" under Corps jurisdiction and "Waters of the State" under RWQCB jurisdiction. The downstream portion of the extension of Reach 3 contained all three parameters and therefore determined to be wetland waters of the United States. Each sample point was evaluated to identify the vegetation, hydrology, and soils surrounding that point. The criteria for each were analyzed according to the *Interim Regional Supplement to the Corps of Engineering Wetland Delineation Manual: Arid West Region* (U.S. Army Corps of Engineers 2006). The results of wetland delineation within the extension of Reach 3 are as follows:

TABLE 1: SANTA MARIA RIVER LEVEE REPAIR DELINEATION RESULTS, EXTENSION OF REACH 3 END OF PREVIOUS REACH 3 FOR A TOTAL OF 1,000 FEET UPSTREAM (R3-E1)

Criteria Met (X)	R3-E1		
Sample Point	Vegetation	Hydrology	Soils
R-3-3	X	X	X

TABLE 2: SANTA MARIA RIVER LEVEE REPAIR DELINEATION RESULTS, EXTENSION OF REACH 3 UPSTREAM OF R3-E1 FOR 2,700 FEET (R3-E2)

Criteria Met (X)	R3-E1		
Sample Point	Vegetation	Hydrology	Soils
R-3-3	X	X	-

Based on the above detailed field information, the proposed project would temporarily impact 7.4 acres of non-wetland waters of the United States. In addition, the project would permanently impact a 3,700-foot conveyance area of Bradley Canyon which will generate 0.5 acre of permanent impact to the waters of the United States.

Appendix D.

Mitigation Monitoring Plan

U.S Army
Corps of Engineers

MITIGATION MONITORING PLAN FOR THE BRADLEY CANYON LEVEE EXTENSION IMPROVEMENT PROJECT

November 2011

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Soils and Geology	Potential acceleration of wind and water erosion and sedimentation.	**S-1** The Corps shall prepare and implement an erosion and sedimentation control plan including both temporary and long-term best management practices. Prior to work conducted within the rainy season, extensive measures shall be implemented to avoid contamination of surface water. The Corps shall retain a copy of the erosion and sedimentation control plan on the construction site, and shall document compliance in daily monitoring reports.	Erosion and Sedimentation Control Plan components shall be included in the Project Plans and Specifications.	The plan shall be implemented prior to the commencement of and throughout grading/construction.	The Corps-approved biologist (Biologist) or Construction Representative (CR) shall perform site inspections throughout the construction phase and document compliance in daily monitoring reports.	Wind and Water erosion, as well as Sedimentation, would be less than significant.
Soils and Geology	Potential acceleration of wind and water erosion and sedimentation.	**S-2** The Corps shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), to be approved by the Regional Water Resources Control Board, prior to construction. The SWPPP shall include best management practices. The Corps shall retain a copy f the SWPPP on the construction site, and shall document compliance in daily monitoring reports.	A SWPP shall be submitted to the RWQCB for review and approval prior to the start of construction. The plan shall be implemented throughout grading/construction.	The plan shall be implemented prior to the commencement of and throughout grading/construction	The Biologist or CE shall perform site inspections throughout the construction phase and document compliance in daily monitoring reports.	Wind and Water erosion, as well as Sedimentation, would be less than significant.
Soils and Geology	Potential acceleration of wind and water erosion and sedimentation.	**S-3** The Corps shall limit grading and excavation activities within the channel to the dry season (April 1 to November 30) to the maximum extent feasible, and shall not conduct grading and	Grading and excavation seasonal and weather limits shall be included in the Project Plans and Specifications.	Throughout all phases of grading and construction.	The Biologist or CE shall ensure the plan requirements are enforced during construction.	Wind and Water erosion, as well as Sedimentation, would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		construction activities prior to a predicted rain event, or during a rain event. Grading and construction activities shall not occur in ponded or flowing surface water.				
Air Quality	Construction activities would produce emissions that would exceed daily PM_{10} emission significance threshold.	**AQ-1** Develop and Implement a Fugitive Dust Emission Control Plan. The construction contractor shall develop and implement a Fugitive Dust Emission Control Plan (FDECP) for construction work. Measures to be incorporated into the plan shall include, but are not limited to the following: o Water the unpaved road access and other disturbed areas of the active construction sites at least three times per day, or apply CARB certified soil binders. o If possible, install wheel washers/cleaners or wash the wheels of trucks and other heavy equipment where vehicles exit the site or unpaved access roads. o Increase the frequency of watering or implement other additional fugitive dust mitigation measures to all disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts)	Contractor shall submit a FDECP to the CR for review and approval prior to initiation of construction activities. The FDECP shall designate an on-site contact person employed by the contractor who is in charge of ongoing dust control.	Plan submittal prior to construction and AQ protection measures will be implemented throughout all of the construction phases.	The Biologist shall ensure compliance on-site. The designated contact person shall respond to nuisance complaints.	PM10 emissions would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		exceed 25 miles per hour (mph). o Travel route planning shall be completed to identify required travel routes to minimize unpaved road travel to each construction or disposal site to the extent feasible.				
Air Quality	Construction activities would produce emissions that would exceed daily PM_{10} emission significance threshold.	**AQ-2** Restrict engine idling. Diesel engine idle time shall be restricted to no more than 10 minutes in duration. This is not required for trucks that require engines to be on while waiting onsite, such as concrete trucks.	Engine Idling restrictions shall be included in the Project Plans and Specifications**.**	Condition shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on site	PM10 emissions would be less than significant.
Air Quality	Construction activities would produce emissions that would exceed daily PM_{10} emission significance threshold.	**AQ-3** Use on-road vehicles that meet California on-road standards. All on-road construction vehicles working within California shall meet all applicable California on-road emission standards and shall be licensed in the State of California. This does not apply to construction workers' personal vehicles.	Condition shall be noted on all plans.	Condition shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on site.	PM10 emissions would be less than significant.
Air Quality	Construction activities would produce emissions that would exceed daily PM_{10} emission significance threshold.	**AQ-4** All project construction and site preparation operations shall be conducted in compliance with all applicable Santa Barbara County Air Pollution Control District (SBCAPCD) Rules and Regulations with emphasis on Rule 50 (Opacity), Rule 51	Applicable SBCAPCD Rules and Regulations shall be included in the Project Plans and Specifications.	APCD Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on site.	PM10 emissions would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		(Nuisance), and Rule 55 (Fugitive Dust), as well as Rule 10.				
Air Quality	Construction activities would produce emissions that would exceed daily PM_{10} emission significance threshold.	**AQ-5** Gravel pads must be installed at all access points to prevent tracking of mud onto public roads.	Gravel Pads or equivalent control measures shall be included in the Project Plans and Specifications.	Condition shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on site.	PM10 emissions would be less than significant.
Air Quality	Construction activities would produce emissions that would exceed daily PM_{10} emission significance threshold.	**AQ-6** If importation, exportation, or stockpiling of fill material is involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin unless material is kept moist or treated with soil binders for transport within the project area.	Dust control measures at stockpile areas and during material transport shall be included in the Project Plans and Specifications.	Condition shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on site.	PM10 emissions would be less than significant.
Air Quality	Construction activities would produce emissions that would exceed daily PM_{10} emission significance threshold.	**AQ-7** The contractor shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transportation of dust offsite.	The contractor shall provide contact information for a person or persons who will monitor the dust control programs.	Contact information shall be provided to the Biologist and CR prior to commencement of the project.	The Biologist shall ensure compliance on site.	PM10 emissions would be less than significant.
Air Quality	Construction activities would produce emissions	**AQ-8** Only heavy-duty diesel-powered construction equipment with engines	Requirement shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and	The Biologist shall ensure compliance on-	No_x emissions would be less than significant

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
	that would exceed daily NO_x emissions significance threshold.	meeting CARB Tier 1 emission standards and U.S. Environmental Protection Agency (USEPA) standards. Equipment meeting CARB Tier 2 or higher emission standards should be used to the maximum extent feasible.		construction periods.	site.	
Air Quality	Construction activities would produce emissions that would exceed daily NO_x emissions significance threshold.	**AQ-9** The engine size of construction equipment shall be the minimum practical size	Requirement shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant
Air Quality	Construction activities would produce emissions that would exceed daily NO_x emissions significance threshold.	**AQ-10** The number of pieces of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number are operating at any one time.	Requirement shall be included in the Project Plans and Specifications	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant
Air Quality	Construction activities would produce emissions that would exceed daily NO_x emissions significance threshold.	**AQ-11** Construction equipment shall be maintained in tune per the manufacturer's specifications.	Requirement shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant
Air Quality	Construction activities would produce emissions that would exceed	**AQ-12** Construction equipment operating onsite shall be equipped with two to four degree engine timing	Requirement shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
	daily NO_x emissions significance threshold.	retard or pre-combustion chamber engines.				
Air Quality	Construction activities would produce emissions that would exceed daily NO_x emissions significance threshold.	**AQ-13** Catalytic converters shall be installed on gasoline-powered equipment, if feasible.	Requirement shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant
Air Quality	Construction activities would produce emissions that would exceed daily NO_x emissions significance threshold.	**AQ-14** Diesel catalytic converters, diesel oxidation catalysts, and diesel Construction activities would produce emissions that would exceed daily NO_x and $PM_{2.5}$ emissions significance threshold particulate filters as certified and/or verified by USEPA or CARB shall be installed on equipment operating onsite.	Requirements shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant
Air Quality	Construction activities would produce emissions that would exceed daily NO_x emissions significance threshold.	**AQ-15** Diesel-powered equipment should be replaced by electric equipment whenever feasible.	Requirement shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant
Air Quality	Construction activities would produce emissions that would exceed daily NO_x	**AQ-16** Idling of heavy-duty diesel trucks during loading and unloading shall be limited to five minutes; auxiliary power units should be used	Requirements shall be included in the Project Plans and Specifications.	Conditions shall be adhered to throughout all grading and construction periods.	The Biologist shall ensure compliance on-site.	No_x emissions would be less than significant

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
	emissions significance threshold.	whenever possible. State law requires drivers of diesel-fueled commercial vehicles weighing more than 10,000 pounds: o Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location; o Shall not idle a diesel-fueled auxiliary power system (APS) for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if the vehicle has a sleeper berth and is within 100 feet of a restricted area (homes and schools); o Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.				
Biological Resources	Potential adverse impact to riparian habitat and sensitive species.	**BR-1** Prior to site disturbance, the Corps' contractor shall clearly delineate the limits of construction on project plans with the coordination of the Corps qualified biologist. All new construction, site disturbance, and vegetation removal shall be located within the delineated construction boundaries. The storage of	Construction limits, including equipment and material storage, and stockpile areas shall be designated in the Project Plans and Specifications and implemented in the field in coordination with the Corps approved biologist.	Delineation of construction limits shall be implemented prior to the commencement of construction.	The Biologist shall ensure disturbance remains within the designated limits and shall perform site inspections throughout the construction phase.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		equipment and materials and temporary stockpiling of soil shall be located within designated areas only and/or outside of natural habitat areas and channel. The limits of construction shall be delineated in the field with temporary construction fencing, staking, or flagging.				
Biological Resources	Potential adverse impact to riparian habitat and sensitive species.	**BR-2** Two days prior to initiation of construction activities, a USFWS-approved biologist shall survey the construction site and adjacent areas to determine if any sensitive plants, fish, or wildlife species are present. If the species are present, the Corps shall modify construction activities to avoid removal or substantial disturbance to the key habitat areas or features where possible . Avoidance and minimization measures shall be described in a pre-construction briefing report for the construction contractor. All terms and conditions included in the biological opinion rendered by the United States Fish and Wildlife Service shall be followed prior to and during construction.	The following information shall be included in the Project Plans and Specifications: • Pre-project survey requirements for sensitive species. • Avoidance and minimization measures required to protect sensitive species • Terms and conditions of the Biological Opinion.	Surveys shall be done prior to the commencement of construction. Avoidance and protective measures shall be implemented throughout all grading and construction periods.	The USFWS-approved Biologist shall ensure compliance with sensitive species protective measures by performing site inspections throughout the grading and construction periods.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Biological Resources	Potential adverse impact to riparian habitat and sensitive species.	**BR-3** Prior to initiation of construction activities, a USFWS-approved biologist shall conduct pre-construction environmental training for all construction crew members. The training shall focus on required mitigation measures and a summary of sensitive species and habitats potentially present within and adjacent to the Project area.	The Project Plans and Specifications shall state that pre-project environmental training is required for all construction crew members.	Prior to commencement of construction activities and when new crew members join the project.	The USFWS-approved Biologist shall ensure that sensitive species training is conducted with all construction crew members.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-4** The construction contractor shall clear vegetation associated with project construction only during periods when migratory birds are not nesting and California red-legged frogs (CRLF) are not breeding (15 September through 30 November). The Corps shall limit grading and excavation activities within the channel to the dry season (April 1 to November 30).	Seasonal timing restrictions shall be included in the Project Plans and Specifications.	Grading and excavation shall occur from April 1 to November 30. Vegetation Clearing shall occur from September 15 to November 30.	The USFWS-approved Biologist shall inspect for compliance.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-5** Construction activities shall be monitored by a USFWS-approved biologist weekly to ensure that vegetation is removed only in the designated areas and to ensure compliance with mitigation measures in areas potentially supporting nesting birds or other listed species. Results of the monitoring shall	Weekly monitoring requirement descriptions shall be included in the Project Plans and Specifications.	Monitoring for vegetation removal will occur on at least a weekly basis throughout all phases of grading and construction.	The USFWS-approved Biologist will monitor vegetation removal on a weekly basis and will summarize the results in a monthly monitoring report to be submitted to	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		be summarized in monthly monitoring reports for submittal to the Corps project manager and regulatory agencies.			the CR.	
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-6** The Corps shall restore disturbed areas (temporary and permanent) as restoration/compensation for impacts to native and non-native vegetation communities. The Corps shall prepare a Habitat Restoration and Revegetation Plan for the project. Plans for restoration, enhancement/revegetation and/or establishment shall include at a minimum: (a) the location of the restoration site; (b) the plant species to be used; (c) a schematic depicting the restoration area; (d) time of year that the planting will occur; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation onsite; (g) performance criteria; (h) detailed monitoring and maintenance program; (i) adaptive management measures; (j) long-term management plan; and (k) site protection. Restoration shall include the revegetation of stripped or exposed work areas. Permanent impacts will	The Habitat Restoration and Revegetation Plan shall include the above components as notes and specifications. The Habitat Restoration and Revegetation Plan shall be reviewed and approved by the EM, CR and SBCFCD.	The Habitat Restoration and Revegetation Plan shall be approved by the Corps and SBCFCD prior to implementation. Implementation of the Habitat Restoration and Revegeation Plan shall commence within 90 days of project completion.	The Biologist shall inspect for restoration. Maintenance shall be confirmed through site inspections.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		be mitigated onsite through the establishment or enhancement of riparian habitat in compliance with the Corps' Mitigation Rule at 33 CFR Part 332 and as described in the Habitat Restoration and Revegetation Plan.				
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-7** Upon completion of construction, the Bradley Canyon low flow channel shall be returned to its pre-construction location and contours.	The pre-project location of the low flow channel shall be shown in the Project Plans and Specifications.	Upon completion of construction.	The Biologist or CR shall coordinate with the construction contractor to ensure correct placement of the low flow channel.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-8** The Corps shall ensure that all vehicles and large equipment utilized on the Project have been washed prior to commencing work on the Project. This includes wheels, undercarriages, bumpers, and all parts of the vehicle. The Corps' contractor shall keep a written log documenting that vehicles have been cleaned prior to use on the Project site. Once equipment and vehicles have been staged on the job site no further washing would be required unless the vehicles or equipment are moved offsite and then returned.	Vehicle and equipment washing requirements, including the requirement of keeping a log, shall be included in the Project Plans and Specifications.	Vehicle and equipment washing requirements shall be implemented throughout all grading and construction periods.	The Biologist shall ensure compliance by inspecting contractor logs throughout all grading and construction periods.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-9** If CRLFs are found within the project area, a USFWS-approved biologist shall relocate the CRLFs the shortest distance possible to a location that contains suitable habitat and would not be affected by activities associated with the project. These areas must be in proximity to the capture site, support suitable habitat, and be free of exotic predatory species (e.g., bullfrogs) to the best of the qualified biologists' knowledge. The qualified biologist must be allowed sufficient time to move CRLFs from the site before work activities begin. The biologist would maintain detailed records of any individuals that are moved (e.g. size, discoloration, any distinguishing features, digital photographs) to assist him or her in determining whether translocated animals are returning to the original points of capture.	Pre-project environmental training requirements (BR-3) shall include information on how the construction crew shall coordinate with the EM and qualified biologist to move CRLFs.	CRLF protection measures shall be in effect from pre-construction activities through all phases of grading and construction activities.	The USFWS-approved Biologist shall document all CRLF translocations.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-10** If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to prevent California red-legged frogs	Dewatering requirements shall be included in the Project Plans and Specifications.	From pre-construction through all phases of grading and construction activities.	The USFWS-approved Biologist shall ensure compliance through site inspections.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.				
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-11** Water will not be impounded in a manner that may attract California red-legged frogs within construction site. A USFWS-approved biologist shall ensure that the spread or introduction of invasive exotic species such as bullfrogs, crayfish, and centrarchid fishes are avoided to the maximum extent possible during construction.	Water impoundment restrictions and exotic species control measures shall be included in the Project Plans and Specifications.	From pre-construction through all phases of grading and construction activities.	The USF WS-approved Biologist shall ensure compliance through site inspections and removal of exotic species from the construction site.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-12** Field personnel will be trained to recognize and avoid CRLF and the field personnel shall alert the USFWS-approved biologist if a CRLF is found in the project area; stop work in immediate area until coordination with Corps biologist is completed.	Environmental Training as described in B-3 above shall include information on CRLF avoidance and protection.	From pre-construction through all phases of grading and construction activities.	The USFWS-approved Biologist shall provide crew training and move any frogs as needed.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-13** A qualified Corps biologist shall be present at the work site at all times during project construction and habitat disturbance.	Biological monitoring requirements shall be included in the Project Plans and Specifications.	From pre-construction through all phases of grading and construction activities.	The USFWS-approved Biologist shall be on site at all times.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-14** As identified in the amended Clean Water Act 401 Water Quality Certification issued by the Regional Water Quality Control Board, the contractor shall implement best management practices for erosion control during and after project implementation (e.g., silt fences, settling basins, and/ or other sediment traps will be temporarily used).	All 401 Water Quality Certification conditions shall be included in the Project Plans and Specifications.	Throughout all phases of grading and construction activities.	The Biologist shall ensure compliance through site inspections.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.
Biological Resources	Potential adverse impacts to riparian habitat and sensitive species.	**BR-15** During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas (e.g., trash left during or after project activities may result in an increased number of predators, such as raccoons (*Procyon lotor*) or opossums (*Didelphis virginiana*), that may injure or kill California red-legged frogs).	Trash collection/management requirements shall be included in the Project Plans and Specifications.	Throughout all phases of grading and construction activities.	The Biologist shall ensure compliance through site inspections.	Impacts to sensitive species habitat, individuals, or populations would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Water Resources and Hydrology	Potential violation of water quality standards or waste discharge requirements.	**WR-1** The conditions identified in the 401 WQC, dated September 15, 2009 and amended September 23, 2010 (Case File Number 34209WQ12) would be followed to minimize impacts to water quality and erosion.	All 401 Water Quality Certification conditions shall be included in the Project Plans and Specifications.	Throughout all phases of grading and construction activities.	The Biologist shall ensure compliance through site inspections.	Impacts to water quality standards or waste discharge requirements would be less than significant.
Water Resources and Hydrology	Potential violation of water quality standards or waste discharge requirements.	**WR-2** Soil and sand excavation and construction within the Bradley Canyon channel shall not occur during the rainy season and California red-legged frog breeding season (November 30 through March 31) or when flowing and/or ponded water is present and shall not occur prior to a predicted significant rain event. If water flow is present it would be diverted prior to ground disturbance in the presence of a qualified Corps biologist/monitor and work can be conducted as approved by the Corps environmental monitor.	Grading and excavation seasonal and weather limits shall be included in the Project Plans and Specifications.	Throughout all phases of grading and construction.	The Biologist or CE shall ensure the plan requirements are enforced during construction.	Impacts to water quality standards or waste discharge requirements would be less than significant.
Water Resources and Hydrology	Potential violation of water quality standards or waste discharge requirements.	**WR-3** The construction contractor shall prepare a Spill Prevention and Contingency Plan for work within and adjacent to the Bradley Canyon Channel. The plan shall be implemented prior to and during site disturbance and construction activities. The Spill Prevention and	The contractor shall submit a Spill Prevention and Contingency Plan to the CR for approval prior to commencement of any on-site disturbance. The plan shall include the following: •Measures to prevent or avoid incidental leaks or spills	The Spill Prevention and Contingency Plan shall be submitted to the CR and approved prior to the commencement of on-site disturbance.	The Biologist shall ensure that containment and clean-up materials are maintained on site throughout all phases of grading and construction activities and in the event of a	Impacts to water quality standards or waste discharge requirements would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		Contingency Plan will include measures to prevent or avoid an incidental leak or spill, including identification of materials necessary for containment and clean-up and contact information for management and agency staff. The Spill Prevention and Contingency Plan and necessary containment and clean-up materials shall be kept within the construction area during all construction activities. Workers shall be educated on measures included in the plan at the pre-construction meeting or prior to beginning work on the project. Corps staff shall contact appropriate authorities in the county or affected municipalities in the event of accident or spill.	•Identification of materials for spill containment an clean-up •Construction Contractor contact person.		spill, the Biologist shall notify the appropriate authorities.	
Water Resources and Hydrology	Potential violation of water quality standards or waste discharge requirements.	**WR-4** The Corps' contractor shall ensure that all vehicles and large equipment utilized on the project have been washed prior to commencing work on the project. This includes wheels, undercarriages, bumpers and all parts of the vehicle. The Corps' contractor shall keep a written log documenting that vehicles have been cleaned prior to use on the project.	Vehicle and equipment washing requirements, including the requirement of keeping a log, shall be included in the Project Plans and Specifications.	Vehicle and equipment washing requirements shall be implemented throughout all grading and construction periods.	The Biologist shall ensure compliance by inspecting contractor logs throughout all grading and construction periods.	Impacts to water quality standards or waste discharge requirements would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		Once equipment and vehicles have been staged on the job site no further washing would be required unless the vehicles or equipment are moved offsite and then returned.				
Water Resources and Hydrology	Potential violation of water quality standards or waste discharge requirements.	**WR-5** All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 20 meters from any riparian habitat or water body. The Corps' contractor shall ensure contamination of habitat does not occur during such operations.	Vehicle fueling, maintenance and other equipment staging area restrictions shall be included in the Project Plans and Specifications and the area shall be identified in the field.	Throughout all phases of grading and construction activities.	The Biologist shall ensure compliance by on-site inspections.	Impacts to water quality standards or waste discharge requirements would be less than significant.
Water Resources and Hydrology	Potential violation of water quality standards or waste discharge requirements.	**WR-6** The construction contractor shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), to be approved by the Regional Water Quality Control Board prior to construction. The SWPPP shall include BMPs. The SWPPP would include a Water Diversion Plan and an Erosion Control Plan which would be designed to minimize water quality impacts. The BMPs that are identified in the SWPPP will be followed during construction activities related to the proposed action in addition to this SEAMND. The SWPPP would be reviewed and approved by the	The construction contractor shall prepare a SWPP and submit this plan to Corps staff for approval. Once approved by the Corps staff, the SWPP shall be submitted to the RWQCB and approved prior to the start of construction.	The construction contractor shall submit a NOI to the RWQCB at least 1 month prior to initiation of construction and shall submit a NOC to the RWQCB. The plan shall be implemented throughout grading/construction and compliance shall be documented by the construction contractor through daily monitoring reports.	The Biologist or CE shall perform site inspections throughout the construction phase and check for documentation in the construction contractor's daily monitoring reports.	Impacts to water quality standards or waste discharge requirements would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
		Corps environmental staff prior to submitting it to the Regional Water Quality Control Board. The construction contractor shall submit a Notice of Intent (NOI) to the Regional Water Quality Control Board with appropriate fees at least one month prior of initiation of construction. The Corps' contractor shall retain a copy of the SWPPP on the construction site and shall document compliance in daily monitoring reports. The Corps' contractor shall submit a Notice of Completion to the Regional Water Quality Control Board.				
Water Resources and Hydrology	Potential violation of water quality standards or waste discharge requirements.	**WR-7** A pre-construction biological survey shall be conducted by a qualified biologist for facilities with potential habitat for native aquatic species prior to initiation of the water diversion and any construction work.	Pre-construction biological survey requirements shall be included in the Project Plans and Specifications.	Surveys shall be performed in aquatic areas prior to initiation of water diversion, dewatering or any construction work.	The Biologist will conduct pre-project surveys for aquatic species and provide survey results to the CR and construction contractor prior to initiation of any water diversion, dewatering or any other construction activities.	Impacts to water quality standards or waste discharge requirements would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Noise	Potential impacts from demolition and construction noise.	**N-1** Equip each internal combustion engine used for any purpose on the job or related to the job with a muffler of a type recommended by the manufacturer. No internal combustion engine would be operated on the study area without said muffler. All diesel equipment would be operated with closed engine doors and would be equipped with factory-recommended mufflers.	Noise reductions requirements shall be included in the Project Plans and Specifications.	Throughout all phases of grading and construction activities.	The Biologist shall site inspect prior to the commencement of, and as needed during all, grading and construction activities.	Noise impacts from demolition and construction would be less than significant.
Noise Po	tential impacts from demolition and construction noise.	**N-2** Contractors shall implement appropriate additional noise mitigation measures including, but not limited to, changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, notifying adjacent residents 24-hours in advance of construction work, and installing acoustic barriers around stationary construction noise sources.	Noise reduction requirement shall be included in the Project Plans and Specifications. Construction Contractor shall provide a copy of the construction notice given to adjacent residents to the CR or Biologist.	Noise reduction measures shall be in place throughout all grading and construction activities. Notice of impending construction commencement shall be given to adjacent residents 24 hours in advance.	Biologist shall ensure compliance with on-site inspections.	Noise impacts from demolition and construction would be less than significant.
Transportation	Potential substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on	**T-1** The construction contractor shall develop a traffic plan and ensure that designated roads are used during construction. The construction contractor shall coordinate in advance with the	Traffic Plan requirements and coordination with City of Santa Maria and its emergency services requirements shall be included in the Project Plans and Specifications.	The Traffic Plan components shall be followed during all grading and construction activities.	The Biologist shall ensure that the Traffic Plan is submitted to the CR and approved.	Potential impact to volume-to-capacity ratio on roads, or congestion at intersections would be less than

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
	roads, or congestion at intersections.	City of Santa Maria and its emergency services to avoid roads restricting movements of emergency vehicles. At locations where access to nearby property is blocked, provision shall be ready at all times to accommodate emergency vehicles, such as plating over excavations, short detours, and alternate routes in conjunction with local agencies. The Traffic Management Plan shall include details regarding emergency services coordination and procedures. Additionally, the Traffic Management Plan shall clearly identify all affected roadways, bike paths, and pedestrian paths within the affected area. The plan shall identify measures to notify the public and divert automobile and pedestrian traffic safely around the construction area, including but not limited to a notice posted in the local publication, posted signage, and written notification to the City of Santa Maria Public Works Department and Recreation and Parks Department, and California Department of Transportation.	The Traffic Plan shall be submitted to the CR prior to the commencement of grading or construction activities.			significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Hazardous Materials and Waste Handling and Disposal	Potential impacts to the channel and underlying groundwater basin from accidental spills or leaks during construction.	See WR-3 above.	See WR-3 above.	See WR-3 above.	See WR-3 above.	Potential impacts to the channel and underlying groundwater basin from accidental spills or leaks would be less than significant.
Hazardous Materials and Waste Handling and Disposal	Exposure to hazards from oil or gas pipelines or oil well facilities.	See **PS-5** below.	See PS-5 Below.	See PS-5 below.	See PS-5 below.	Potential impact of exposure to hazards from oil or gas pipelines or oil well facilities would be less than significant.
Cultural Resources	Potential substantial adverse change in the significance of an historical or unique archaeological resource.	**CR-1** Construction activities associated with this project will be monitored by a qualified archeologist who meets, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739). Earthmoving includes grubbing and ground clearing, grading, and excavation activities. If a previously unidentified cultural resource is discovered, all earthmoving activities in the vicinity of the discovery shall be diverted away from the discovery until the Corps complies with 36 CFR § 800.13(a)(2).	Cultural Resources monitoring and protection requirements shall be included in the Project Plans and Specifications.	During all earth-moving operations.	The Corps will hire a qualified archeologist who will monitor all earth-moving operations and notify the appropriate agencies if cultural resources are encountered.	Potential impacts to historical or unique archeological resources would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Cultural Resources	Potential impacts as a result of disturbance to human remains.	**CR-2** If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.	Cultural resources/human remains monitoring and protection requirements shall be included in the Project Plans and Specifications.	During all earth-moving operations.	The Corps will hire a qualified archeologist who will monitor all earth-moving operations and notify the appropriate agencies if human remains are encountered.	Potential impacts of disturbing any human remains would be less than significant.
Public Services and Utilities	Potential adverse physical impacts associated with maintaining acceptable service ratios, response times, or other performance objectives for fire and police protection.	**PS-1** The contractor will be required to provide adequate safety and emergency response training for construction workers.	Safety and emergency response training Requirements shall be included in the Project Plans and Specifications.	Training shall be provided prior to the commencement of grading and construction activities and as appropriate when new construction crew members join the job.	The Biologist or CR shall document safety training meeting in their monitoring notes.	Potential adverse physical impacts associated with police and fire protection would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Public Service and Utilities	Potential adverse physical impacts associated with maintaining acceptable service ratios, response times, or other performance objectives for fire and police protection.	**PS-2** All construction equipment shall be equipped with the appropriate spark arrestors and functioning mufflers.	Spark arrestor and muffler requirements shall be included in the Project Plans and Specifications.	Throughout all grading and construction activities.	Biologist shall ensure compliance with periodic site inspections.	Adverse physical impacts associated with police and fire protection would be less than significant.
Public Service and Utilities	Potential adverse physical impacts associated with maintaining acceptable service ratios, response times, or other performance objectives for fire and police protection.	**PS-3** Spark arresters and a water truck shall be available at the Project site at all times when welding or grinding activities are taking place.	Fire prevention measures shall be included in the Project Plans and Specifications.	Anytime welding or grinding activities are taking place.	The Biologist shall ensure compliance with site inspections.	Adverse physical impacts associated with police and fire protection would be less than significant.
Public Service and Utilities	Potential adverse physical impacts associated with maintaining acceptable service ratios, response times, or other performance objectives for fire and police protection.	**PS-4** All rubber-tired construction vehicles shall be equipped with appropriate fire-fighting equipment to aid in the prevention or spread of fires.	Fire prevention measures shall be included in the Project Plans and Specifications.	Anytime welding or grinding activities are taking place.	The Biologist shall ensure compliance with site inspections.	Adverse physical impacts associated with police and fire protection would be less than significant.
Public Service and Utilities	Potential adverse physical impacts associated with maintaining	PS-5 The contractor will coordinate with local city agencies/departments, private entities and Caltrans for	Coordination requirements shall be included in the Project Plans and Specifications.	Throughout all grading and construction activities.	The Biologist shall ensure compliance through	Adverse physical impacts associated with police and fire protection

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
	acceptable service ratios, response times, or other performance objectives for fire and police protection.	appropriate notification to the public; any utility relocation, removal, protection or abandonment requirements; the location of staging areas; and safety procedures to reduce potential hazards.			coordination with the construction contractor.	would be less than significant.
Public Service and Utilities	Potential impacts from disruption in utility services or accidental leaks or spills from damage to pipelines.	**U-1** During the preliminary design phase of each project component, the utility service providers shall be consulted to identify existing and proposed buried facilities in affected roadways and to determine which utilities require relocation and which can be avoided. If relocation is required, the appropriate utility service provider will be consulted to sequence construction activities to avoid or minimize interruptions in service. The Local Sponsor and its contractor shall comply with permit conditions and such conditions shall be included in the contract specifications.	Known utility locations shall be included in the Project Plans and Specifications.	The Local Sponsor (Santa Barbara County Flood Control District) and the construction contractor shall coordinate and sequence utility relocations or protection in place with the levee repair construction.	The CR will ensure coordination between the construction contractor and the Local Sponsor for the management of utilities.	Potential impacts to utilities would be less than significant.
Public Service and Utilities	Potential impacts from disruption in utility services or accidental leaks or spills from damage to pipelines.	**U-2** If utility service disruption is necessary, residents and businesses in the project area will be notified a minimum of two to four days prior to service disruption through local newspapers, and direct mailings to affected parties.	Notification requirements for utility service disruption shall be included in the Project Plans and Specifications.	Notification shall be required during all phases of grading and construction activities.	Biologist will ensure compliance with notifications through coordination with the construction contractor.	Potential impacts to utilities would be less than significant.

Resource Area	Description of Impact	Environmental Commitment/ Mitigation	Plan Requirements	Timing	Monitoring Requirements	Level of Significance after Mitigation
Public Service and Utilities	Potential impacts from disruption in utility services or accidental leaks or spills from damage to pipelines.	**U-3** The contractor will be required to excavate around utilities, including hand excavation as necessary, to avoid damage and to minimize interference with safe operation and use. Hand tools must be used to expose the exact location of buried gas or electric utilities.	Utility protection requirements shall be included in the Project Plans and Specifications.	During all phases of grading and construction activities.	Biologist shall ensure compliance with site inspections.	Potential impacts to utilities would be less than significant.
Public Service and Utilities	Potential impacts from disruption in utility services or accidental leaks or spills from damage to pipelines.	**U-4** Prior to construction during the Plans and Specifications phase, utility locations shall be verified through field surveys.	All utility locations shall be identified prior to the Plans and Specifications phase and included in the Project Plans and Specifications for reference.	During the Plans and Specifications development phase.	The CR will confirm that all utility locations are included in the Plans and Specifications prior to finalization of these documents.	Potential impacts to utilities would be less than significant.

Note: As appropriate the above mitigation measures would be incorporated into the contract Plans and Specifications.

Appendix E.

California Red-Legged Frog Survey Report

U.S Army
Corps of Engineers

CALIFORNIA RED-LEGGED FROG SURVEY REPORT FOR THE BRADLEY CANYON LEVEE EXTENSION IMPROVEMENT PROJECT

November 2011

1.0 INTRODUCTION

The purpose of this report is to assess potential impacts to California red-legged frogs (*Rana drytonii*) from construction activities associated with repairing the levees along the Santa Maria River including Bradley Canyon. The Santa Maria River Levee, originally constructed in 1963, was designed to provide flood protection to the Santa Maria Valley which includes the City of Santa Maria. The section of the levee between the terminus of Bradley Canyon and the North end of Blosser Road sustained substantial structural damage from storm flows that hit the levee at near perpendicular angles culminating in a breach of the structure in 1998 and subsequent revetment and groin damage in 2001 and 2005 respectively. The original design of the levee did not address the potential for failure from directly impinging flows therefore it was recommended to strengthen this approximately 6.5-mile section of the levee with sheet pile and soil cement revetment (see Environmental Assessment; USACE, 2009 for full project description). The project area was divided into three reaches: Reach 1 – Blosser Road to Highway 101 Bridge (approximately 1.2 miles long); Reach 2 – Highway 101 Bridge to Suey Crossing (approximately 2.0 miles long); and Reach 3 – Suey Crossing Bridge to Bradley Canyon (approximately 3.1 miles long). Construction is scheduled to start in Reaches 1 and 2 in January 2010 and construction in Reach 3 started in May 2010.

The U.S. Army Corps of Engineers (Corps) prepared a Supplemental Design Deficiency Report (SDDR) and Environmental Assessment/Mitigated Negative Declaration (EA/MND) in August 2009 to provide technical, engineering, and environmental solutions to bring the levee to the authorized level of flood protection. Subsequent to completion of the DDR and finalization of the 2009 EA/MND, further analysis was performed and the Hydrology and Hydraulics results revealed that the levee could fail upstream of Bradley Canyon confluence at various additional locations which were not taken into account in the 2009 EA/MND and SDDR (Figure 1.1-1 of the Final SEA/MND). Levee failure could result in flooding urbanized area of the City of Santa Maria. To ensure that needed Standard Project Flood (SPF) level of flood protection is provided to the City of Santa Maria, the SDDR addendum dated July 2010 recommended either extension of Reach 3 of the Bradley Canyon Levee for about 3,700 feet upstream of Bradley Canyon Channel or the repair the Santa Maria River Levee for 17,650 feet upstream of the Santa Maria River (Figure 1.5-3 of the Final SEA/MND). The area along Bradley Canyon confluence proposed for levee repair supports habitat for the federally listed species California Red-legged Frog (CRLF). Therefore, the Corps conducted surveys with technical assistance from the Aspen Environmental Group between March and April 2010. Details of survey results are provided in the following sections.

2.0 LEGAL STATUS AND BACKGROUND INFORMATION ON THE CALIFORNIA RED-LEGGED FROG

The federally threatened CRLF (listed in 1996, U.S. Fish and Wildlife Service) is endemic to California and Baja California, Mexico. Declines of this frog have been well documented and it is estimated that this species has been extirpated from nearly 70% of its former range (USFWS, 2002). Causes for decline that are most often cited include habitat loss and degradation as well as predation and competition from non-native bullfrogs (Jennings and Hayes, 1994). This highly aquatic frog generally inhabits permanent slow-moving water. Streams or ponded areas (both artificial and natural) are used for breeding and daily activities. Occupied water sources often contain riparian and emergent vegetation including willows (*Salix* sp.), mulefat (*Baccharis* sp.), cattails (*Typha* sp.), rushes (*Juncus* sp.), and watercress (*Nasturtium* sp.). This frog is known to occupy many of the coastal drainages including agricultural ditches in Santa Maria and surrounding areas. Several agricultural ditches run directly adjacent and parallel to and even into the Santa Maria Levee Repair Project area, therefore there is potential for these frogs to be impacted by project activities where suitable habitat is present.

3.0 EXISTING PROJECT SITE CONDITIONS

The Corps prepared a 2009 Final EA/MND to address impacts along Reaches 1, 2, and 3. The 2009 EA/MND evaluated impacts to biological resources and impacts to existing vegetation. Repair of the levee along Reaches 1, 2, and 3 required removal of vegetation. The 2009 EA/MND provided restoration of temporarily disturbed native and non-native habitat. It also included commitments that vegetation would be cleared prior to migratory bird nesting season. Prior to the surveys, vegetation removal activities along Reaches 1, 2, and 3 as per the 2009 EA/MND were cleared but part of the upper extent of Reach 3, which supports riparian vegetation, was left undisturbed. Reach 1 commences approximately 500 feet west of Blosser Road and runs eastward approximately 1.2 miles to the Highway 101 bridge crossing. This reach is isolated from the river channel by large agricultural fields which occur on the adjacent flood plain. Residential housing occurs adjacent to the project area along the entire south side of the reach from Blosser Road to the Highway 101 bridge. Habitat associated with the residential area and bike path, prior to vegetation removal, consisted of disturbed annual grasses and ruderal habitat with some landscaped areas. Ornamental plantings of oaks are present along the residential area south of the project site.

Just upstream, Reach 2 includes a 2.0-mile stretch of habitat between the Highway 101 crossing and Suey Crossing. This Reach includes a wide alluvial floodplain where the active channel abuts the existing levee in several locations. Evidence of historic scour is common and two higher elevation stream terraces dominated by coastal scrub and riparian scrub extend into the active channel. A vacant lot dominated by non-native annual grasses and residential housing occurs immediately south of the project area from the Highway 101 bridge to Suey Crossing Road. Agricultural fields and large areas of open space occur on the north side of the river. Prior to vegetation removal activities, habitat associated with this Reach, within areas subject to project disturbance, consisted of various scrub communities. On higher elevation terraces coastal scrub communities were dominated by golden bush (*Isocoma menziesii var. vernonioides*), scale broom (*Lepidospartum squamatum*), golden yarrow (*Eriophyllum comfertiflorum*), wild tarragon (*Artemesia dracunculus*), and phacilia (*Phacelia douglasii*). Riparian scrub was also a common element in this area and consisted of dense patches of sandbar willow (*Salix exigua*), mulefat (*Baccharis salicifolia*), and coyote bush (*Baccharis pilularis*). Weedy non-native species were common in this area and occurred across the Reach. White sweet clover (*Melilotus albus*), tocalote (*Centaurea melitensis*), tree tobacco (*Nicotiana glauca*), and fennel (*Foeniculum vulgare*) were locally dense in many areas.

Reach 3 includes a 3.1-mile section of the river from Suey Crossing to Bradley Canyon. The active channel is very close to the toe of the levee through much of Reach 3. This is especially true at the western end of the reach where most of the vegetation is at the toe of the levee and the active channel is extremely sparse. Most of the area south of the levee consists of agricultural fields, the Santa Maria Landfill, and a concrete batch plant. Vegetation removal did not occur within the last 1,700 feet of the upstream extent of Reach 3 and the areas have remained untouched. Habitat in these untouched areas consisted of an old alluvial terrace dominated by coyote bush, scale broom, willow (*Salix sp.*), Mulefat, and patches of buckwheat (*Eriognum fasciculatum*). Areas near Bradley Canyon Wash consisted of Arroyo Willow Riparian and Riparian Scrub habitats. Cottonwoods (*Populus fremontii*) and a few scattered gum (*Eucalyptus sp.)* trees occur in this area throughout the entire upstream end of Reach 3.

4.0 METHODS

Prior to the protocol surveys reported herein, initial reconnaissance level surveys were conducted within the entire project footprint to determine the potential for suitable CRLF habitat. Also, the California Department of Fish and Game's CNDDB was accessed to determine locations of CRLF that had been previously recorded in the vicinity of the project site (refer to Section 4.1 below). Based on the results of the reconnaissance surveys and CNDDB records, it was determined that the CRLF would be most likely to occur at the extreme upper extent of Reach 3 (Bradley Canyon), a ponded area in the central portion of Reach 3, and at the westernmost extent of Reach 1 (agricultural ditch across the levee road). Based on proximity to known populations, water, and riparian habitat it was determined that the highest potential for frog occurrence was within the Bradley Canyon area of Reach 3. However, all occurrences of ponded or flowing water within Reach 3 were surveyed for frogs.

4.1 PROTOCOL CALIFORNIA RED-LEGGED FROG SURVEYS

Protocol surveys for CRLF require a minimum of 2 daytime surveys at least 7 days apart plus 4 nighttime surveys conducted a minimum of 7 days apart over the course of a six-week period. Surveys were conducted between March 4 and April 22, 2010 (refer to Section 3.2 below for additional survey information). Surveys were conducted by the Corps biologist with technical assistance from the Aspen Environmental Group. A permitted biologist with extensive experience with this species was present during time of the survey. While survey activities were focused on the habitat present in Reach 3, the agricultural ditch present in the western extent of Reach 1 was also looked at as part of the survey effort. Daytime surveys were conducted by walking adjacent to or in (if shallow and clear) all standing or flowing water from Bradley Canyon to Suey Crossing Road and actively looking for eggs, tadpoles, and frogs both in the water and on the banks. Binoculars were used to search areas that were inaccessible by foot (i.e. across pools and downstream of impenetrable vegetation).

Night surveys began at least one hour after sunset and were not completed within 3 days of a full moon and were conducted by walking in or adjacent to water sources. Visual inspection was aided with headlamps, spotlights, and binoculars. Surveyors looked for adult frogs and their eye-shine both on the banks and in the water. Red-legged frog locations were recorded with a Garmin GPS using WGS 84 geodetic datum.

4.2 SURVEY SCHEDULE

Protocol surveys for CRLF were conducted per the following schedule:

Date	Day/Night	Surveyors	Time	Location
March 4	Day and Night	Cindy Hitchcock and Brady Daniels (Aspen), Naeem Siddiqui (USACE)	3pm-5pm and 6:45pm-9pm	Reach 3, including Bradley Canyon
March 25	Day and Night	Cindy Hitchcock and Brady Daniels (Aspen), Naeem Siddiqui (USACE)	5:00pm-6:30pm and 7pm-9:30pm	Reach 3, excluding Bradley Canyon, and agricultural ditch at end of Reach 1
April 8	Night	Brady Daniels (Aspen), Naeem Siddiqui (USACE)	8pm-10pm	Reach 3, including Bradley Canyon
April 22	Day and Night	Cindy Hitchcock and Brady Daniels (Aspen), Naeem Siddiqui (USACE)	5:30pm-7pm and 8:25-9:15pm	Reach 3, including Bradley Canyon

5.0 RESULTS

5.1 RECORDS FOR CALIFORNIA RED-LEGGED FROG IN THE VICINITY OF THE PROJECT SITE

A review of the CNDDB found seven reported locations of CRLF within 5 miles of the project site. This included observations of adult frogs and egg masses as well as audible identifications of calling adults. The nearest occurrence of CRLF is less than 0.5 miles south of the western extent of Reach 1, adjacent to Blosser Road, where a single adult was observed in a trapezoidal, concrete lined ditch.

5.2 SURVEY RESULTS

The initial daytime survey on March 4, 2010 was conducted from Bradley Canyon (34.935172°, -120.355939°) to Suey Crossing Road (34.968618°, -120.403986°: Figure 2). This initial survey was used to document any wet areas occurring from Bradley Canyon to Suey Crossing that would provide suitable habitat for CRLF and be included in subsequent survey events.

There were two main areas observed in Reach 3 with potential suitable habitat (i.e. water) identified as the focus for the protocol surveys. These included the agricultural ditch in Bradley Canyon (Figures 3 and 4) and a wetted area midway between Bradley Canyon and Suey Crossing (Figures 2 and 7). These two locations were treated as separate survey areas because there was no suitable interstitial habitat for CRLF. Because these frogs are closely tied to permanent water and the interstitial habitat was dry, the area was not considered to be suitable habitat. At the time of the initial surveys, the agricultural ditch in Bradley Canyon had a moderate to slow flow of heavily silted water. The land adjacent the ditch had been recently disked and was generally void of vegetation for the first two surveys. Subsequent surveys found non-native grasses growing in the previously disked areas and in some areas hanging over the bank. However, by the final survey on April 22nd, the area again showed evidence of recent disking. Downstream of the disked region the riparian vegetation became very dense, running adjacent to the ditch from where the agricultural field ended to a culvert running over the ditch.

The water flows under this culvert through a corrugated plastic pipe (approximately 2.5 feet in diameter; Figure 5). The water spills out of this pipe into a large (approximately 10 feet in diameter) pool with several willows in and adjacent to the water (Figure 5). The water flows out of this pool and through shallow riffles cutting northward until it joins the Santa Maria River. The banks along this riffle section are high and steeply downcut and the flow tapered off to nothing by the final survey (Figure 6). The only water within the remainder of Reach 3 (excluding Bradley Canyon) was found midway between Bradley Canyon and Suey Crossing where a cement agricultural ditch crosses under the levee road and empties into a cement spillway flowing down the levee to the toe creating a ponded area (Figure 7). During the initial March 4th survey the ponded area extended northward about 100 meters into a system of shallow grass-lined channels abutting the project area. This area was observed to gradually dry up during each subsequent survey.

CRLFs were observed in Bradley Canyon from 34.936780°, -120.356380° to the culvert pool at 34.940114°, -120.358676°. CRLFs were not observed during any surveys downstream of the culvert pool or in the remainder of Reach 3. Because adult frogs were present in Bradley Canyon additional nighttime surveys were not necessary according to protocol, however this area was re-visited during the daytime on March 25th and again on April 22nd to look for egg masses because an amplexing couple was previously observed. In addition, a second night visit was made on April 8th to confirm that the frogs were still occupying the area. No CRLF tadpoles or egg masses were observed during any of these surveys. Numerous treefrogs (*Pseudacris hypochondriaca*), Western toads (*Anaxyrus boreas*), and spadefoot toads (*Spea hammondii*) were seen and heard calling throughout Reach 3 including Bradley Canyon (Figure 8). Treefrog and spadefoot egg masses and spadefoot tadpoles were also observed in both Bradley Canyon and the other Reach 3 habitat. The specific survey results by date are as follows:

March 4th (day and night)

No eggs or tadpoles were observed within the survey areas, however a large "plop" was heard in the water near the dense riparian vegetation along Bradley Canyon during the day which may have been a frog jumping into the water. This same night the entire stretch was resurveyed and 10 adult CRLFs were seen throughout the ditch from the disked area to the culvert pool, including the area where the "plop" was heard. No frogs were seen downstream of the culvert pool. All adult frogs were of moderate size. One pair (near the dense riparian vegetation along Bradley Canyon) was in amplexus while the remaining frogs were found singly throughout the channel and culvert pool. Spadefoot toads, Western toads, and treefrogs were also observed and heard calling during nighttime surveys in Reach 3 including Bradley Canyon. Egg masses of both spadefoot toads and treefrogs were found in a road rut along the culvert crossing. No CRLFs, tadpoles, or eggs were discovered in the remainder of Reach 3 (excluding Bradley Canyon).

March 25th (day and night)

No CRLF eggs or tadpoles were discovered during the daytime survey in Bradley Canyon. Spadefoot tadpoles however, were observed in the road rut which previously had egg masses. The water in this rut had dried to less than 1/4 of its former size by this time. At night, Reach 3 was surveyed and both treefrogs and Western toads were observed. No CRLFs, tadpoles, or eggs were discovered. The agricultural ditch at the northern end of Reach 1 was also surveyed at night and at least 6 juvenile bullfrogs were observed but no CRLFs were found.

April 8th (night only)

Adult CRLFs were still present and active in and along the agricultural ditch in Bradley Canyon. Approximately 10 adults were recorded within the same extent of Bradley Canyon as was previously recorded. Non-native grasses and some thistle had grown in the previously disked area and grasses now hung over the banks into the water. No CRLFs, tadpoles, or eggs were discovered in the remainder of Reach 3. Western toads, spadefoot toads and eggs, and treefrogs were observed throughout Reach 3 including Bradley Canyon. The road rut that previously held spadefoot tadpoles was now completely dry.

April 22nd (day and night)

The area in Bradley Canyon from the upper extent of the survey to the dense riparian vegetation had been re-disked by this date, leaving very little vegetation on the immediate banks of the agricultural ditch (Figure 4). Three adult CRLFs were observed during the day near the dense riparian vegetation in Bradley Canyon. No eggs or tadpoles were found in the ditch. No frogs, tadpoles, or eggs were discovered in the culvert pool. By this date, the road rut at the culvert crossing was recharged by recent rain and spadefoot tadpoles were found in this water. In the remainder of the Reach 3 habitat, spadefoot eggs and tadpoles were found during the day and nighttime surveys. No CRLFs, tadpoles, or eggs were found in Reach 3, including Bradley Canyon. Treefrogs were heard calling in Reach 3 during the nighttime survey.

5.3 GENERAL WILDLIFE OBSERVATIONS

A red-tailed hawk was observed near the Bradley Canyon culvert during all of the daytime surveys. On March 4th and March 25th the hawk was observed sitting on a nest, however on April 22nd the nest looked as if it had been destroyed although the hawk was observed circling overhead.

6.0 SUMMARY AND CONCLUSIONS

CRLFs are present within the Santa Maria Levee Improvement Project area at the upstream end of Reach 3 in Bradley Canyon. Because frogs were observed in amplexus, it is assumed that breeding is also occurring in Bradley Canyon, although no egg masses or tadpoles were seen. However, the water had a high silt content, which provided less than ideal conditions for the detection of eggs masses and tadpoles. It is unlikely that CRLFs would permanently occupy the ponded area in Reach 3 downstream of Bradley Canyon. Most of the ponded area is too shallow and dries up too quickly for CRLFs to complete their aquatic life stages (generally 4 weeks as eggs followed by 3 to 15 months as tadpoles; Hitchcock et al., 2003, 2006) although in a particularly wet year this may be possible. This area would however, provide suitable foraging habitat although its distance from the nearest known occupied habitat makes foraging here an unlikely event. Furthermore there is no suitable interstitial habitat for CRLFs to traverse to get from the Bradley Canyon area to the ponded area in Reach 3. The Santa Maria River is currently flowing about 250 feet north, adjacent the proposed construction area and although there is the potential for CRLFs to be washed downstream from areas above, the Santa Maria River itself does not provide suitable breeding habitat or habitat for daily activities in the form of pools or back-eddies. The Santa Maria River is too shallow, broad, and swift-flowing, therefore it highly unlikely albeit not impossible that CRLFs would migrate to the ponded area in Reach 3 from

Bradley Canyon. The other anurans that occupy the ponded area (treefrogs, Western toads, spadefoot toads; Figure 7) are more terrestrial species and do not rely as heavily on permanent water sources as the CRLFs do, therefore the results of the surveys are consistent with what was expected based on habitat and historical records.

The current construction plan is to use soil cement protection along the majority of Reach 3 transitioning to sheet pile for the last 1,700 feet, which includes the Bradley Canyon area. The use of sheet pile construction will aid in the minimization of potential impacts to CRLFs in Bradley Canyon because it will be contained within a smaller area than would the soil cement construction. [The sheet pile construction consists of driving a series of interlocking panels into the ground from the crest of the levee which would not disturb the existing levee or riverbed, whereas the soil cement construction requires excavation and backfilling from the toe of the levee into the riverbed and spreading the soil cement mixture across the existing riprap to reinforce the structure (see 2009 EA for full description)]. The soil cement construction in the remainder of Reach 3 (excluding Bradley Canyon) is not expected to impact CRLFs because the habitat in this area is not suitable for breeding and long-term persistence of this species.

7.0 REFERENCES

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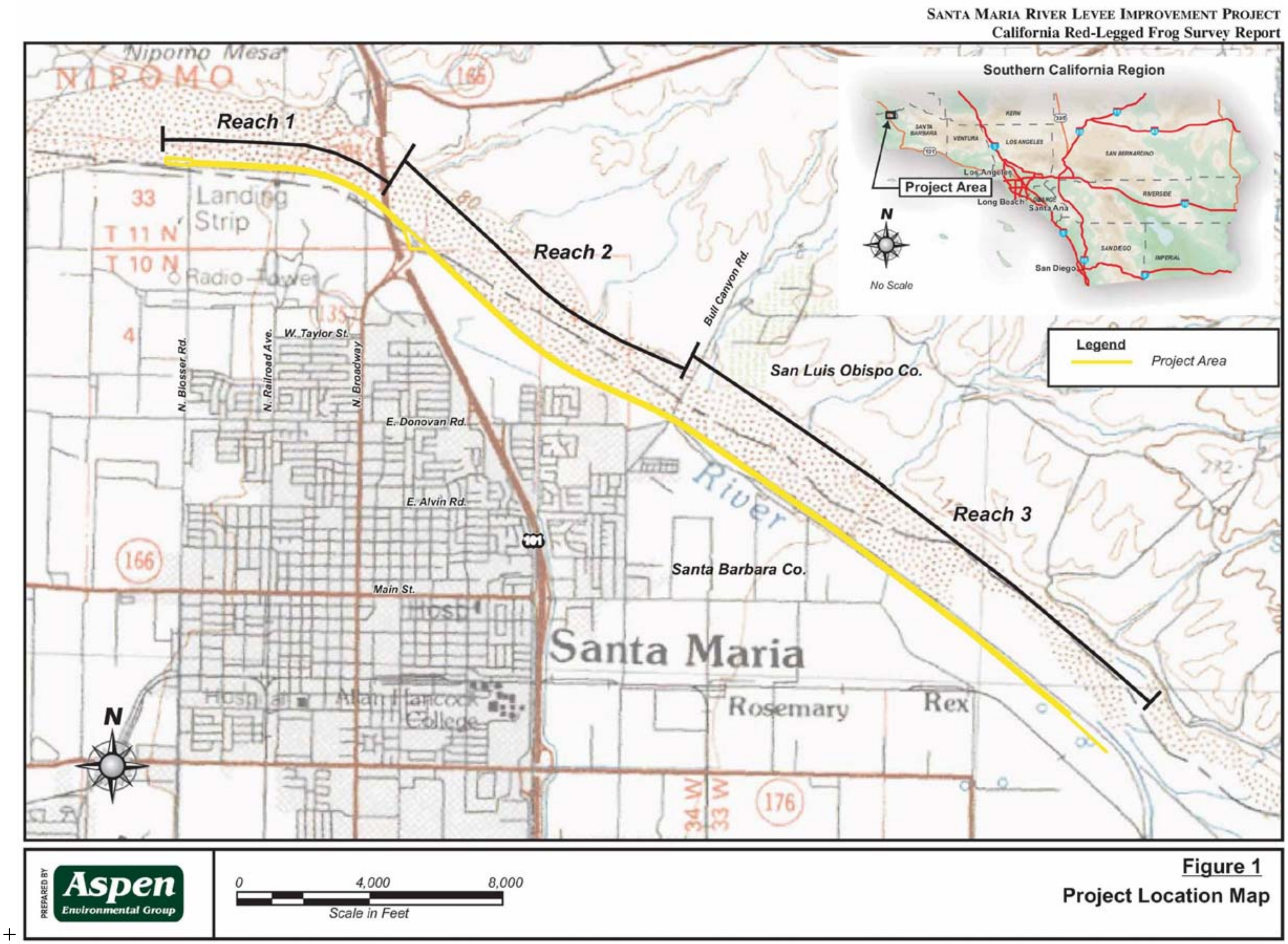

Figure 1: Project Location

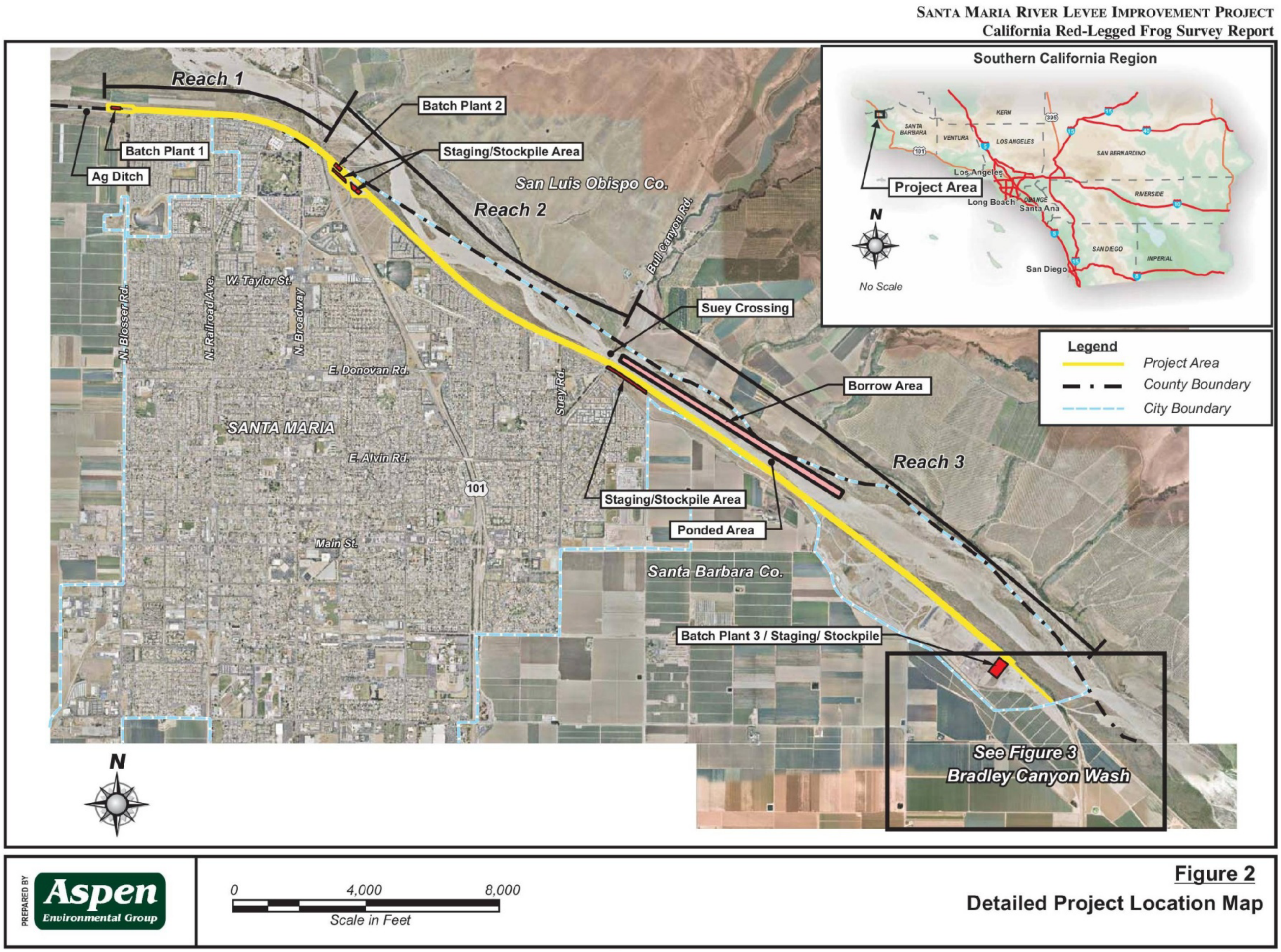

Figure 2: Detailed Project Locations

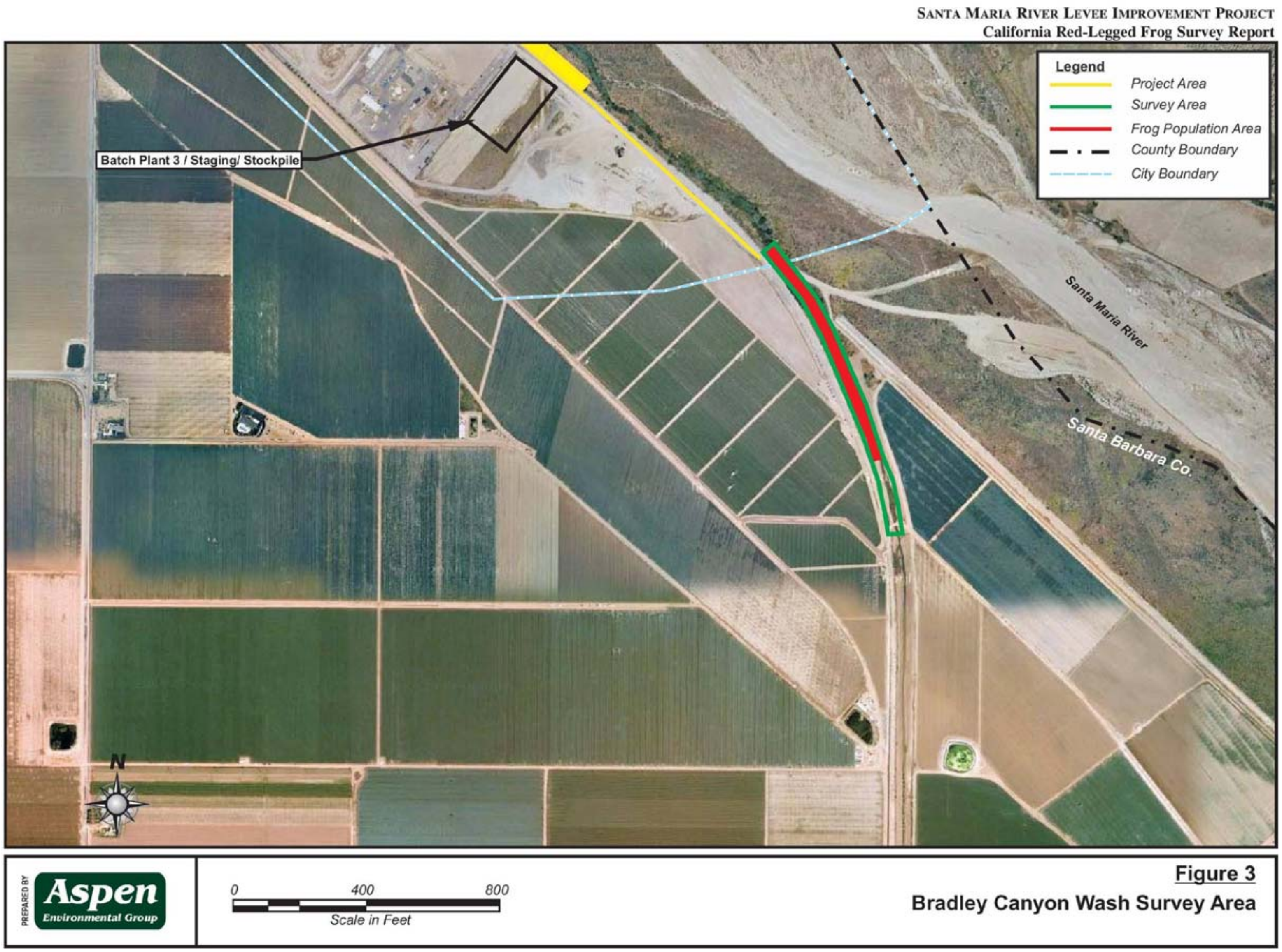

Figure 3: Bradley Canyon Survey Area

Figure 4: Bradley Canyon channel containing red-legged frog population. Note disked banks.

Figure 5: Culvert pool on April 22nd after considerable drying had occurred.

Figure 6: Outflow of culvert pool showing steeply downcut banks.

Figure 7: Ponded area in Reach 3 showing outflow from cement culvert, pond, outflow ditch, and Santa Maria River in distance.

Figure 8: Red-legged frog adults (top), spadefoot toad eggs, tadpole and adult (middle), Western toad adult (bottom left), and Pacific treefrog adult (bottom right).

Appendix F.

Least Bell's Vireo Survey Report

U.S ARMY
CORPS OF ENGINEERS

LEAST BELL'S VIREO SURVEY REPORT
2010 SURVEY (ASPEN)
2009 SURVEY (HELIX)
FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT

November 2011

30423 Canwood St., Suite 215, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

To: Naeem Siddiqui, USACE

From: Jared Varonin, Aspen Environmental Group

Date: July 21, 2010

Subject: LBV Survey

Subject: Non-protocol least Bell's vireo surveys in and near Bradley Canyon Wash.

Summary of Initial Activity: On June 17, 21 and 22 and July 2 and 11, 2010, Aspen Environmental Group (Aspen) conducted reconnaissance level surveys (non-protocol in nature) for least Bell's vireo (*Vireo bellii pusillus*) within the Bradley Canyon Wash and adjacent areas (within Reach 3) at the Santa Maria Levee Improvement Project. More specifically areas surveyed were located along and adjacent to the southern bank of the Santa Maria River near the intersection of Andrews Avenue and Sugar Street which are situated both in the City of Santa Maria and unincorporated areas of Santa Barbara County.

Methods: Surveys were conducted between 0800 hours and 1100 hours from approximately 500' upstream to 500' downstream of the Bradley Canyon Wash confluence with the Santa Maria River. Late afternoon surveys were attempted on several of the survey days however windy conditions provided an unsuitable survey environment for the least Bell's vireo and were abandoned. Both visual and acoustic methods were used to identify species and determine behavior. Site temperatures ranged from 57 degrees F in the early morning to 65 degrees F by late morning. Surveys completed in June 2010 found overcast skies with no wind (except for northwest winds on June 17, 2010) while those conducted in July 2010 documented clear mornings with no wind. On occasion noise related to downstream constructions activities occurring as part of the levee improvement project were audible. These activities had no affect on the surveys.

All bird species were identified, and behavior was observed to determine if breeding, feeding or fledging activities were in progress.

Results: Twenty-seven bird species were observed during the course of the surveys; however no least Bell's vireo were documented within survey areas. Nesting and fledging activities of common bird species were documented during all of the surveys; however, these activities noticeably tapered off from the beginning to the end of the surveys. Begging from fledglings and territorial offences were the most abundant behaviors observed.

Conclusion: While no least Bell's vireo were documented during the survey efforts, suitable habitat is present and the species is known to occur in the area. Although late in the breeding season the surveys were conducted in a period that this species would have been detected should it have been present within the survey areas.

Recommendations: It is the recommendation of Aspen not to disturb vegetation, particularly riparian and riparian scrub, until the end of the official nesting season (March 1 – August 15) to avoid interruption of breeding activities. In addition it is recommended that protocol level surveys for least Bell's vireo be conducted in 2011 to further document the presence/absence of the species within project areas.

Bird species observed (visually and/or audibly) near Bradley Canyon Wash in June and July 2010.

Common Name	**Scientific Name**
Anna's hummingbird	*Calypte anna*
Barn owl	*Tyto alba*
Bewick's wren	*Thryomanes bewickii*
Blue grosbeak	Guiraca caerulea
Bullock's oriole	*Icterus bullockii*
Bushtit	*Psaltriparus minimus*
California thrasher	*Toxostoma redivivum*
California towhee	*Pipilo crissalis*
Cliff swallow	*Hirundo pyrrhonota*
Common goldfinch	*Spinus tristis*
Common raven	*Corvus corax*
Common yellowthroat	*Geothypis trichas*
House finch	*Carpadacus mexicanus*
Killdeer	*Charadrius vociferous*
Lark sparrow	*Chondestes grammacus*
Lawrence's goldfinch	*Carduelis lawrencei*
Lesser goldfinch	*Carrrrduelis psaltria*
Mourning dove	*Zenaida macroura*
Nuttall's woodpecker	*Picoides nuttallii*
Pacific slope flycatcher	*Empidonax difficilis*
Red-tailed hawk	*Buteo jamaicensis*
Sharp-shinned hawk	*Accipiter striatus*
Song sparrow	*Melospiza melodia*
Spotted towhee	*Pipilo maculatus*
Turkey vulture	*Cathartes aura*
Yellow rumbed warbler	*Dendroica coronata*
Yellow warbler	*Dendroica petechia*
Western kingbird	*Tyrannus verticalis*

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August 4, 2009 AEG-07.1

Mr. Chris Dellith
U.S. Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, California 93003

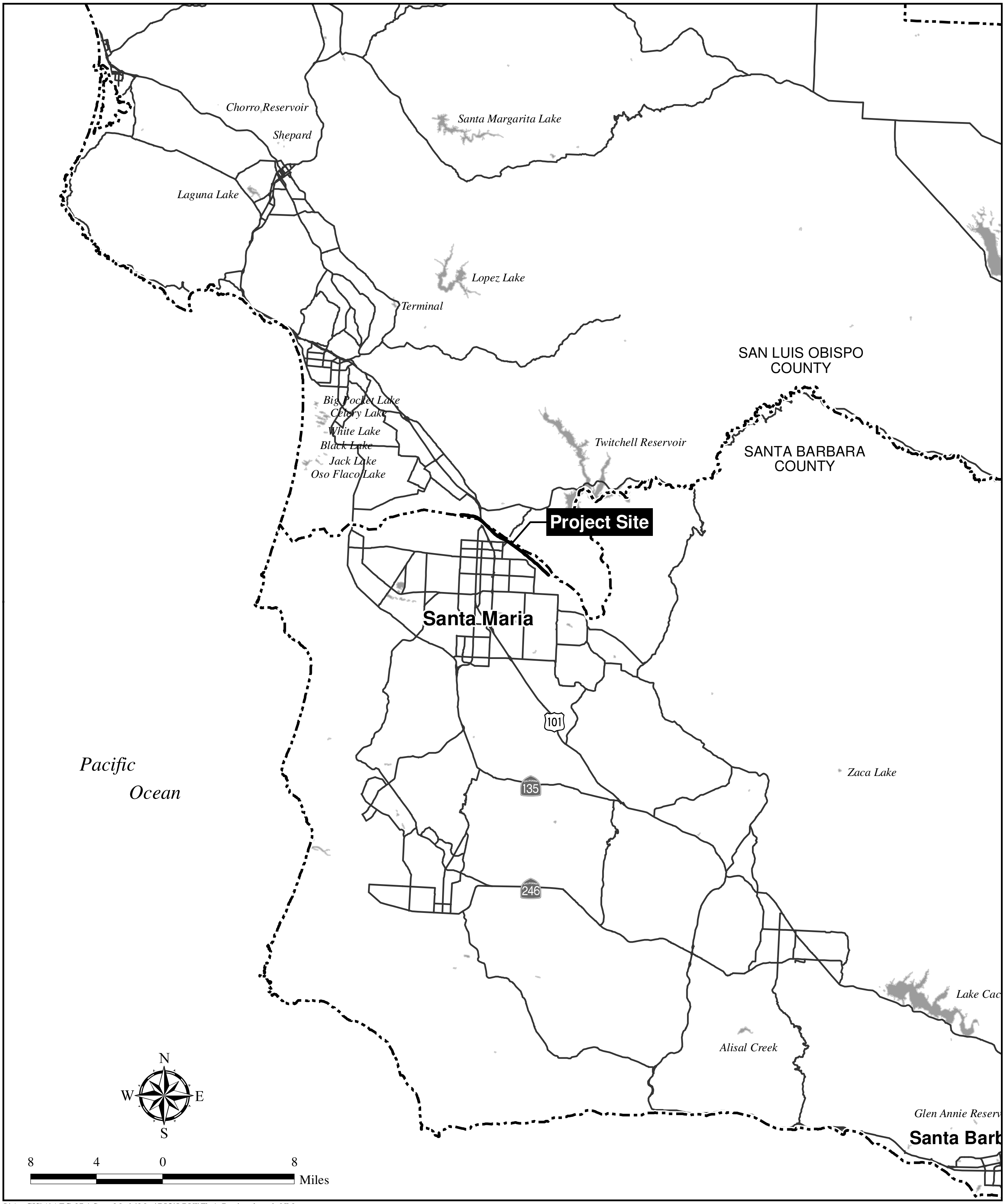
Subject: 2009 Least Bell's Vireo (*Vireo bellii pusillus*) Survey Report for the Santa Maria Levee Project in Santa Maria, California

Dear Mr. Dellith:

This letter presents the results of a U.S. Fish and Wildlife Service (USFWS) presence/absence protocol survey conducted by HELIX Environmental Planning (HELIX) for the least Bell's vireo (vireo) on the 6-mile Santa Maria Levee project site. The site is located along the southern side of the Santa Maria River, in the City of Santa Maria, Santa Barbara County, California (Figure 1). The project is located in Sections 1, 2, 12, and 13, Township 10 north, Range 34 W; Sections 17 and 18, Township 10 north, Range 33 west; and Sections 33, 34, and 35, Townships 11 north, Range 34 west as shown on the U.S. Geological Survey (USGS) 7.5-minute Santa Maria and Twitchell Dam quadrangle maps (Figure 2). Bull Canyon road is located at the approximate center of the project alignment.

METHODS

Eight site visits of 2 days each were performed according to the schedule in Table 1. The survey effort varied from the USFWS protocol as there was less than 10 days between each survey. Each survey covered potential vireo habitat on site that consists of narrow stands of willow riparian, riparian scrub, and mule fat scrub that occur as narrow stands along the levee. Survey 1 included a habitat assessment and covered the entire project length of approximately 6 miles. The remaining surveys covered approximately 2.2 linear miles of potential vireo habitat comprised of 0.8 miles with low to moderate potential and an additional 1.3 miles with marginal potential. Marginal habitat is habitat that has some of the requirements of vireo habitat but lacks the full vegetative structure of typical vireo habitat and is included in the survey only due to its proximity of potential vireo habitat. The areas of potential habitat were scattered along the 4.8 miles of the project alignment primarily situated east of Highway 101 (Figure 2). The potential vireo habitat surveyed is comprised of mule fat scrub, riparian scrub and arroyo willow riparian habitats. The remainder of the riparian habitat located along the project alignment is comprised of sparse mule fat scrub and riparian scrub that do not have the vegetative structure necessary to support the vireo. An additional 0.9 linear miles of habitat comprised of riparian scrub and arroyo willow riparian



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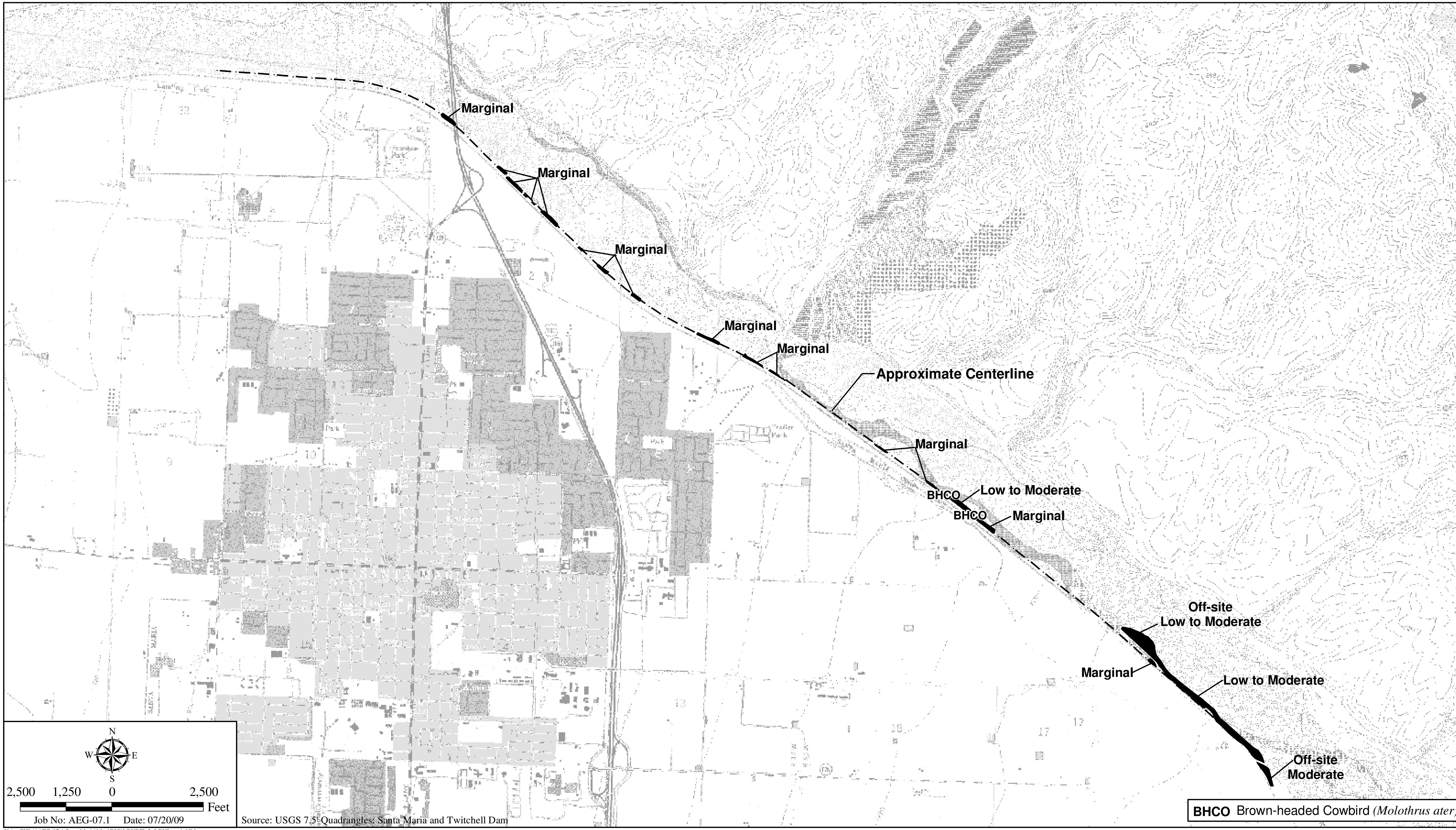
Regional Location Map

SANTA MARIA LEAST BELLS' VIREO SURVEYS

Figure 1



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Potential Least Bell's Vireo Habitat

SANTA MARIA LEAST BELLS' VIREO SURVEYS

HELIX

Figure 2

habitats adjacent to the project alignment was also surveyed, bringing the total survey area to approximately 3.1 linear miles (Figure 2).

The surveys were conducted on foot by walking along the edges of the habitat patches. Binoculars were used when birds could not be readily identified by unaided eyesight or by sound; no recorded vireo vocalizations were played. The surveys were conducted by HELIX biologist Rob Hogenauer in June and July 2009.

Table 1
SURVEY INFORMATION

Site Visit	Survey Date	Start/Stop Times	Total Area Surveyed (miles)*	Weather Conditions
1	6/7/09	0600-1100	3	Partly cloudy, 61°-70°F, wind 2-8 mph
	6/8/09	0615-1055	3	Cloudy, , 58°-73°F, wind 1-4 mph
2	6/16/09	0620-1015	1.4	Partly cloudy, 60°- 74°F, wind 0-2 mph
	6/17/09	0550-1030	1.7	Cloudy, 63°-68°F, wind 2-5 mph
3	6/25/08	0540-1025	1.8	cloudy, 66°- 71°F, wind 1-3 mph
	6/26/09	0600-1035	1.3	Cloudy, 60°-66°F, wind 1-2 mph
4	7/2/09	0625-1015	1.5	Clear, 65°- 70°F, wind 1-3 mph
	7/3/09	0600-1015	1.6	Partly cloudy, 61°-73°F, wind 1-2 mph
5	7/9/09	0620-1030	1.5	Clear, 59°-72° F, wind 0-2 mph
	7/10/09	0605-1040	1.6	Cloudy, 58°-70°F, wind 2-5 mph
6	7/18/09	0550-1025	1.7	Partly cloudy, 63°-75°F, wind 0-2 mph
	7/19/09	0615-1000	1.4	Clear, 64°-73°F, wind 1-3 mph
7	7/24/09	0535-1010	1.7	Cloudy, 62°-67°F, wind 1-3 mph
	7/25/09	0615-0950	1.4	Cloudy, 60°-65°F, wind 1-2 mph
8	7/30/09	0730-1045	1.3	Cloudy, 63°-72°F, wind 1-3 mph
	7/31/09	0640-1045	1.8	Partly cloudy, 61°-72°F, wind 2-4 mph

*survey area approximated and shown in linear miles

SURVEY RESULTS

The least Bell's vireo was not found on the Santa Maria River Levee project site or in the adjacent habitat. Two brown-headed cowbirds (*Molothrus ater*) were observed in potential vireo habitat located approximately 2 miles west of the east end of the project alignment (Figure 2). A list of species observed or detected during the vireo survey is included (Appendix A).

I certify that the information in this report and attached exhibits fully and accurately represent our work. Please contact me on my cell phone at (562) 537-2426 if you have any questions.

Sincerely,

Rob Hogenauer
Biologist

Copy: Chris Huntley, Aspen Environmental Group

Attachments: Appendix A Species List
Figure 1 Regional Location Map
2 Potential Least Bell's Vireo Habitat

Appendix A
SANTA MARIA RIVER LEVEE PROJECT
ANIMAL SPECIES OBSERVED OR DETECTED

FAMILY	SCIENTIFIC NAME	COMMON NAME
INVERTEBRATES		
Anthophoridae	*Xylocopa* spp.	carpenter bee
Apiidae	*Apis mellifera mellifera*	honey bee
Apiidae	*Apis mellifera mellifera*	honey bee
Formicidae	*Messor* sp.	harvester ant
Formicidae	*Pogonomyrex* sp.	harvester ant
Pieridae	*Anthocharis sara*	Sara orange tip
Pieridae	*Pieris protodice*	common white butterfly
Tenebrionidae	*Eleodes* spp.	darkling beetle
VERTEBRATES		
Reptiles and Amphibians		
Colubridae	*Pituophis catenifer*	gopher snake
Hylidae	*Pseudacris regilla*	Pacific tree frog
Phrynosomatidae	*Phrynosoma coronatum*	coast horned lizard
Phrynosomatidae	*Sceloporus occidentalis*	western fence lizard
Phrynosomatidae	*Sceloporus orcutti*	granite spiny lizard
Phrynosomatidae	*Uta stansburiana*	common side-blotched lizard
BIRDS		
Accipitridae	*Buteo jamaicensis*	red-tailed hawk
Aegithalidae	*Psaltriparus minimus*	bushtit
Alaudidae	*Eremophila alpestris actia*†	California horned lark
Cardinalidae	*Guiraca caerulea*	blue grosbeak
Cathartidae	*Cathartes aura*	turkey vulture
Charadriidae	*Charadrius vociferus*	killdeer
Columbidae	*Streptopelia risoria*	Ringed turtle dove
Columbidae	*Zenaida macroura*	mourning dove
Corvidae	*Aphelocoma californica*	western scrub jay
Corvidae	*Corvus brachyrhynchos*	American crow
Cuculidae	*Geococcyx californianus*	greater road runner
Emberizadae	*Chondestes grammacus*†	lark sparrow
Emberizadae	*Pipilo crissalis*	California towhee
Emberizidae	*Melospiza melodia*	song sparrow
Emberizidae	*Pipilo erythrophthalmus*	spotted towhee
Falconidae	*Falco sparverius*	American kestrel

Appendix A
SANTA MARIA RIVER LEVEE PROJECT
ANIMAL SPECIES OBSERVED OR DETECTED

FAMILY	**SCIENTIFIC NAME**	**COMMON NAME**
Fringillidae	*Carduelis psaltria*	lesser goldfinch
Fringillidae	*Carpodacus mexicanus*	house finch
Hirundinidae	*Hirundo rustica*	barn swallow
Hirundinidae	*Petrochelidon pyrrhonota*	cliff swallow
Hirundinidae	*Tachycineta bicolor*	tree swallow
Icteridae	*Euphagus cyanocephalus*	Brewer’s blackbird
Icteridae	*Icterus bullockii*	Bullock’s oriole
Icteridae	*Molothrus ater*	brown-headed cowbird
Icteridae	*Sturnella neglecta*	western meadowlark
Lanidae	*Lanius ludovicianus*†	Loggerhead shrike
Mimidae	*Mimus polyglottos*	northern mockingbird
Mimidae	*Toxostoma redivivum*	California thrasher
Odontophoridae	*Callipepla gambelli*	Gambel’s quail
Picidae	*Picoides nutallii*†	Nuttall’s woodpecker
Recurvirostridae	*Himantopus mexicanus*	black-necked stilt
Strigidae	*Bubo virginianus*	great horned owl
Sturnidae	*Sturnus vulgaris*	European starling
Timaliidae	*Chamaea fasciata*	wrentit
Trochilidae	*Calypte anna*	Anna’s hummingbird
Trochilidae	*Calypte costae*†	Costa’s hummingbird
Troglodytidae	*Salpinctes obsoletus*	rock wren
Troglodytidae	*Troglodytes aedon*	house wren
Tyrannidae	*Myiarchus cinerascens*	ash-throated flycatcher
Tyrannidae	*Sayornis nigricans*	black phoebe
Tyrannidae	*Sayornis saya*	Say’s phoebe
Tyrannidae	*Tyrannus verticalis*	western kingbird
Tyrannidae	*Tyrannus vociferans*	Cassin’s kingbird

MAMMALS

Canidae	*Canis familiaris*	domestic dog
Canidae	*Canis latrans*	coyote
Leporidae	*Lepus californicus*	black-tailed jack rabbit
Leporidae	*Sylvilagus audubonii*	desert cottontail
Sciuridae	*Spermophilus beecheyi*	California ground squirrel

†Sensitive species

Appendix G.

Clean Water Act Section 401 Certification

U.S ARMY
CORPS OF ENGINEERS

401 CLEAN WATER ACT CERTIFICATIONS
2009, 2010
FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT
BRADLEY CANYON LEVEE EXTENSION PROJECT

November 2011

California Regional Water Quality Control Board
Central Coast Region

Linda S. Adams
Secretary for Environmental Protection

Internet Address: http://www.waterboards.ca.gov/centralcoast
895 Aerovista Place, Suite 101, San Luis Obispo, California 93401-7906
Phone (805) 549-3147 • FAX (805) 543-0397

Arnold Schwarzenegger
Governor

September 23, 2010

Naeem A. Siddiqui
Naeem.A.Siddiqui@usace.army.mil
Ecosystem Planning Section
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Blvd.
Los Angeles, CA 90017

BY ELECTRONIC AND REGULAR MAIL

Dear Mr. Siddiqui:

AMENDED WATER QUALITY CERTIFICATION NUMBER 34209WQ12 FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT, SANTA BARBARA COUNTY

Thank you for the opportunity to review your June 9, 2010 amended application for water quality certification of Reach 3 of the Santa Maria River Levee Improvement Project. The project appears to protect beneficial uses of State waters. We are issuing the enclosed Amended Water Quality Certification.

On September 15, 2009 the Central Coast Regional Water Quality Control Board (Central Coast Water Board) issued Water Quality Certification 34209WQ12 for project activities that include the construction of temporary cement batch plants, clearing vegetation for construction activity, and installation of soil cement protection combined with a segment of sheet pile, as described in the US Army Corps of Engineers (US ACOE) application for Water Quality Certification and supporting documents. The Certification provides Central Coast Water Board staff the opportunity to review, evaluate, and potentially amend the conditions of the Certification when the US ACOE provides updated information about an extension of Reach 3. This amendment addresses the next portion of the project, named the Extension of Reach 3, that extends along Bradley Canyon Channel for 3,700 feet. The amendment detailed in Attachment 1 provides additional technically specified conditions specific to this Extension of Reach 3 in the Santa Maria River.

If you have questions please contact David Innis (805) 549-3150 or by e-mail at dbinnis@waterboards.ca.gov. Please include the above certification number in all correspondence pertaining to this certification.

Sincerely,

for Roger W. Briggs
Executive Officer

cc:

Natasha Lohmus
nlohmus@dfg.ca.gov
California Department of Fish and Game
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109

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State Water Resources Control Board
Division of Water Quality
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RSwitzer@waterboards.ca.gov

California Department of Fish and Game
Lake and Streambed Alteration
1234 East Shaw Street
Fresno, CA 93710

Dave Smith
Wetlands Regulatory Office (WTR-8)
U.S. Environmental Protection Agency
75 Hawthorne St.
San Francisco, CA 94105

S:\Shared\Section 401 Certification\Certifications\Santa Barbara\Santa Maria River Levee Improvement\Reach 3 Amendment August 2010\Amended Cert Santa Maria Levee Improvements_final.doc

Amended Action for Clean Water Act Section 401
Water Quality Certification 34209WQ12
for Discharge of Dredged and/or Fill Materials

ATTACHMENT 1 - REACH 3 EXTENSION PROJECT INFORMATION AND CONDITIONS

Amendment Application Date	Received: June 9, 2010 Completed: July 19, 2010
Applicant	US Army Corps of Engineers (US ACOE)
Applicant Representatives	Naeem A. Siddiqui, Biologist, Ecosystem Planning Section
Project Name	Extension of Reach 3: Santa Maria River Levee Improvements - Bradley Canyon Channel
Central Coast Water Board Application Number	34209WQ12 (Amendment)
Type of Project	Levee extension using sheet pile and soil cement strengthening and armoring.
Project Location	Unincorporated areas of north Santa Barbara County Latitude: 34° 56' 35.778" N Longitude: -120° 21' 46.454" W
County	Santa Barbara
Receiving Water(s)	Santa Maria River 312.00 Santa Maria Hydrologic Unit;
Water Body Types	River
Designated Beneficial Uses	Municipal and Domestic Supply (MUN) Agricultural Supply (AGR) Industrial Service Supply (IND) Ground Water Recharge (GWR) Water Contact Recreation (REC-1) Non-Contact Recreation (REC-2) Wildlife Habitat (WILD) Cold Fresh Water Habitat (COLD) Warm Fresh Water Habitat (WARM) Migration of Aquatic Organisms (MIGR) Rare, Threatened or Endangered Species (RARE) Freshwater Replenishment (FRSH) Commercial and Sport Fishing (COMM)
Project Description (purpose/goal)	The Central Coast Regional Water Quality Control Board (Central Coast Water Board) understands that the project includes the following: Extend the US ACOE efforts to maintain and strengthen 3,700 feet of Reach 3 bank protection along the Bradley Canyon Channel Levee to provide the City of Santa Maria with flood protection. The proposed levee embankment protection extends along the Bradley Canyon Channel Levee for 3,700 feet starting from the upstream end of the original Reach 3 construction as detailed in the Final Environmental Assessment/Mitigated Negative Declaration

	(EA/MND), dated August 2009. US ACOE hydraulic analysis determined that additional protection along the Bradley Canyon Channel would prevent the Bradley Canyon Levee from failing even if flood waters breached the upstream portion of the Santa Maria River Levee. Areas within the Extension of Reach 3 project footprint include riparian vegetation habitat and habitat for the California Red-legged frog. US ACOE will strengthen the levee in these areas by installing sheet pile amid the existing levee embankment. The US ACOE shall restore temporary disturbances in these areas of sensitive habitat according to Central Coast Water Board Compensatory Mitigation Requirements (below). US ACOE will armor the remaining 2,700 foot long section of the Extension of Reach 3 levee embankments with a soil-cement overlay. The US ACOE shall restore permanent and temporary disturbances in this area of non-sensitive habitat according to Central Coast Water Board Compensatory Mitigation Requirements (below). Where the two sections meet, the upstream end of the sheet pile protection will transition into a section protected by soil cement revetment. The soil cement revetment will extend an additional 2,700 feet upstream along the inside face of the levee. Excavation for the revetment will begin within 120 feet along the inside face of the levee at the toe of the existing levee embankment. The existing riprap revetment will not be stripped off of the inside face of the levee prior to placing the soil cement. Instead, soil cement will be placed against the existing riprap or against the excavated slope. The excavated material will be utilized as borrow material to generate the soil cement mixture for the new revetment. The US ACOE shall use no other borrow site. After mixing the soil and cement at an on-site batch plant outside of the river, the soil cement will be applied in compacted 1-foot thick and minimum 8-foot wide layers. The US ACOE and/or contractor(s) shall repeat this operation until the soil cement layers reach the top of the levee. Once the soil cement is placed, the excavation will be backfilled with the material not utilized for the mixing of the soil cement. Because the volume of soil cement below the surface of the ground will reduce the volume of backfill needed, the backfill will only be a few inches shallower than the original grade elevation. Although the 8-foot width of soil cement embankment protection will decrease the existing conveyance area of Bradley Canyon Channel, the US ACOE may excavate the invert of the channel approximately 1 to 2-feet to compensate for the decreased conveyance area. The US ACOE shall restore areas of active channel disturbed during the project to original grade and contours according to the Central Coast Water Board Compensatory Mitigation Requirements

	(below).
Preliminary Water Quality Concerns	Central Coast Water Board staff finds the project has the potential to cause the loss of functions and values of waters of the State as a result of project impacts. Central Coast Water Board staff also finds the project has the potential to discharge pollutants from earth-moving and pile driving equipment, especially since work may occur when water is present. Primary sources of pollutants are: leaking oil, gasoline, hydraulic fluid, and other liquid contaminates associated with earth-moving equipment. In addition, the Central Coast Water Board staff finds the project has the potential to cause sedimentation and siltation in the waterways. Erosion may be caused by a) construction activities, or b) by altering the channel form of the waterway such that downstream or upstream portions of the waterway experience modified hydrology, leading to erosion, or c) installation of culverts that are not large enough to pass stormwater flow and its associated debris, causing water to back up and erode/incise the sides of the river banks or levee embankments.
Central Coast Water Board Mitigation Requirements	The US ACOE must follow mitigation requirements stipulated in the original Water Quality Certification (34209WQ12) for Reaches 1, 2 and 3 issued September 15, 2009.
Area of Disturbance (Acres)	<u>Waterbody Type</u> <u>Permanent</u> <u>Temporary</u> <u>Total</u> Streambed/Riparian (acres) 0.500 6.977 7.477 The proposed project will <u>temporarily</u> disturb a total of 6.977 acres of habitat within the Bradley Canyon Channel consisting of: • native plant communities (subtotal of 0.337 ac) composed of arroyo willow riparian (0.001 ac), riparian scrub (0.002 ac), coyote bush (0.001), central coast scrub (0.002 ac), • active channel (0.370 ac); • non-native plant communities (subtotal of 4.1 ac) composed of grasslands (1.2 ac), ruderal (0.9 ac), barren land (2.0 ac); • agriculture fields (2.5 ac); and • non- habitat elements (access roads and ramp). The project will <u>permanently</u> disturb 0.5 acres of non-native plant communities within the levee.
Fill Volume	Total excavation volume: 80,000 cubic yards Volume of material needed for the soil cement construction: 30,000 cubic yards.
U.S. Army Corps of Engineers Permit No	This is a federal project implemented by the US ACOE; no US ACOE permitting required.
Dept. of Fish and Game Streambed Alteration Agreement	Department of Fish and Game has limited jurisdiction for this federal project.
Possible Listed Species	Tidewater goby (Federal Endangered, FE) Southern steelhead trout (FE)

	California red-legged frog (Federal Threatened, FT) Least Bell's vireo (FE) Arroyo chub Western spadefoot toad Southwestern pond turtle Silvery (California) legless lizard Coast horned lizard Two-striped garter snake Burrowing Owl Tricolored blackbird Loggerhead shrike American badger Pallid bat Townsend's big-eared bat Western red bat
Status of CEQA Compliance	Combined CEQA/NEPA document: EA/MND approved. Lead Agency: Central Coast Water Board
Central Coast Water Board Compensatory Mitigation Requirements	Central Coast Water Board staff must be notified if mitigations as described in the 401 Water Quality Certification application or the Reach 3 Extension amendment for this project are altered by the imposition of subsequent permit conditions by any local, state or federal regulatory authority. US ACOE shall notify Central Coast Water Board staff of any modifications that interfere with compliance with this certification. <u>The following mitigations are required to comply with 401 Water Quality Certification:</u> • The US ACOE shall restore all disturbed areas (7.477 ac) per the following relationships and Appendix G (Mitigation Plan) of the 2009 EA/MND. • No areas will be disturbed outside of the levee. • All temporary disturbance to native plant communities and active channel (0.377 ac) will be restored like for like within the channel. • The project related permanent loss of 0.5 acres will be fully mitigated by converting 4.1 acres (except agriculture) of non-native plant community into native habitat on-site. • The US ACOE shall convert an additional 3.3 acres of non-native habitat to native plant habitat within the area near reaches 1, 2, and 3 and the extension reach areas of the Santa Maria River, with the same performance criteria in accordance with Appendix G of the 2009 EA/MND. • The US ACOE shall implement adequate irrigation to assure success of the restoration, re-vegetation, and conversion of non-native habitat to native habitat. The US ACOE shall abide by all other mitigation and water quality protection practices provided in the original September 15, 2009 Certification and the Final EA/MND.
Amendment Application	Federal agency (US ACOE) sponsoring the project pays no fee; no

Fee	cost recovery agreement in place
Amended Project Fee	n/a
Total Amended Certification Fee	n/a
Additional Conditions	The Central Coast Water Board requires visual monitoring and annual reports for this project as specified in the September 15, 2009 Certification.

California Regional Water Quality Control Board
Central Coast Region

Linda S. Adams
Secretary for
Environmental Protection

Internet Address: http://www.waterboards.ca.gov/centralcoast
895 Aerovista Place, Suite 101, San Luis Obispo, California 93401-7906
Phone (805) 549-3147 • FAX (805) 543-0397

Arnold Schwarzenegger
Governor

September 15, 2009

Robert Koplin
U.S. Army Corps of Engineers
915 Wilshire Blvd.
Los Angeles, Ca 90017

Dear Mr. Koplin:

WATER QUALITY CERTIFICATION NUMBER 34209WQ12 FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT, SANTA BARBARA COUNTY

Thank you for the opportunity to review your May 4, 2009 application for water quality certification of the Santa Maria River Levee Improvement Project. The application was completed on August 13, 2009. The project appears to protect beneficial uses of State waters. We are issuing the enclosed Technically Conditioned Certification.

At this time, we do not anticipate iSSUing additional requirements based on your application. Should new information come to our attention that indicates a water quality problem, we may require additional monitoring and reporting, issue Waste Discharge Requirements, or take other action.

Your Section 401 Water Quality Certification application and CEQA documents indicate that project activities may affect beneficial uses and water quality. The Water Board issues this certification to protect water quality and associated beneficial uses from project activities. We need reports to determine compliance with this certification. All technical and monitoring reports requested in this certification, or anytime after, are required per Section 13267 of the California Water Code.

Your failure to submit reports required by this certification, or your failure to submit a report. of technical quality acceptable to the Executive Officer, may subject you to enforcement action per Section 13268 of the California Water Code. The Water Board will base enforcement actions on the date of certification. Any person affected by this Water Board action may petition the State Water Resources Control Board (State Board) to review this action in accordance with California Water Code Section 13320; and Title 23, California Code of Regulations, Sections 2050 and 3867-3869. The State ,Board, Office of Chief Counsel, PO Box 100, Sacramento, CA 95812, must receive the petition within 30 days of the date of this certification. We will provide upon request copies of the law and regulations applicable to filing petitions.

If you have questions please contact Dominic Rogues at (805) 542-4780 or via e-mail at droques@waterboards.ca.gov, or Phil Hammer at (805) 549-3882. Please mention the above certification number in all future correspondence pertaining to this project.

Sincerely,

Roger W. Briggs
Executive Officer

Enclosure: Action on Request for CWA Section 401 Water Quality Certification

S:\Section 401 Certification\Certifications\Santa Barbara\Santa Maria River Levee Improvement\Santa Maria River Levee Improvements.doc

cc: Enclosures

Crystal Huerta
U.S. Army Corps of Engineers
Ventura Office
Regulatory Section
2151 Allesandro Drive, Suite 110
Ventura, CA 93001

Natasha Lohmus
California Department of Fish and Game
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109

401 Program Manager
State Water Resources Control Board
Division of Water Quality
Stateboard401 @waterboards.ca.gov

R9-WTR8-Mailbox@epa.go

Action on Request for
Clean Water Act Section 401 Water Quality Certification
for Discharge of Dredged and/or Fill Materials

PROJECT: Santa Maria River Levee Improvement Project
APPLICANT: Robert Koplin
U.S. Army Corps of Engineers
915 Wilshire Blvd.
Los Angeles, Ca 90017

ACTION:
1. 0 Order for Standard Certification
2. • Order for Technically-conditioned Certification
3. 0 Order for Denial of Certification

STANDARD CONDITIONS:

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment per section 13330 of the California Water Code and section 3867 of Title 23 of the California Code of Regulations (23 CCR).

2. This certification action is not intended to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed per to 23 CCR subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license was being sought.

3. In the event of a violation or threatened violation of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under state law. For purposes of Section 401 (d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification.

4. This Water Quality Certification is subject to the acquisition of all local, regional, state, and federal permits and approvals as required by law. Failure to meet any conditions contained herein or any the conditions contained in any other permit or approval issued by the State of California or any subdivision thereof may result in the revocation of this Certification and civil or criminal liability. .

5. In response to a suspected violation of any condition of this certification, the Water Board may require the holder of any permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the Water Board deems appropriate, provided that the burden, including costs, of the reports shall have a reasonable relationship to the need for the reports and the benefits obtained from the reports.

6. The total fee for this project is not recoverable from the federal agency sponsoring the project.

REGIONAL WATER QUALITY CONTROL BOARD CONTACT
Dominic Roques
Central Coast Region, Region 3
(805) 542-4780
(805) 788-3562 (fax)
drog ues@waterboards.ca.gov
Please refer to certification 34209WQ12 when corresponding with the Water Board concerning this project.

WA"rER QUALITY CERTIFICATION:
I hereby issue an order certifying that any discharge from the Santa Maria River Levee Improvement Project shall comply with the applicable provisions of· sections 301 ("Effluent Limitations"), 302 ("Water Quality Related Effluent Limitations"), 303 ("Water Quality Standards and Implementation Plans"), 306 ("National Standards of Performance"), and 307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act.

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the applicant's project description and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the Regional Water Quality Control Board's Water Quality Control Plan (Basin Plan).

9-15-09
Date

Roger W. **Briggs**
Executive Officer
Regional Water Quality Control Board

Attachment 1

PROJECT INFORMATION

Application Date	Received: May 4 ,2009 Completed: August 13, 2009
Applicant	U.S. Army Corp of Engineers (ACOE)
Applicant Representatives	Mr. Robert Koplin
Project Name	Santa Maria River Levee Improvement Project
Water Board Application Number	34209WQ12
Type of Project	Levee strengthening and slope protection
Project Location	Downstream end: Longitude: 120 ^{0} 27' 17.436" W Latitude: 34 ^{0} 59' 23.076" N Upstream_end: Longitude: 120 ^{0} 21' 46.454" W Latitude: 34 ^{0} 56' 35.778" N
County	Santa Barbara
Receiving Water(s)	Santa Maria River 312.00 Santa Maria Hydrologic Unit
Water Body Type	River
Designated Beneficial Uses	Municipal and Domestic Supply Agricultural Supply (AGR) Industrial Service Supply (IND) Ground Water Recharge (GWR) Water Contact Recreation (REC-1) Non-Contact Recreation (REC-2) Wildlife Habitat (WILD) Cold Fresh Water Habitat (COLD) Warm Fresh Water Habitat (WARM) Migration of Aquatic Organisms (MIGR) Rare, Threatened or Endangered Species (RARE) Estuarine Habitat (EST) Freshwater Replenishment (FRSH) Commercial and Sport Fishing (COMM)
Project Description (purpose/goal)	The purpose of the project is to strengthen the existing south levee with sheet pile and soil cement revetment in order to address the deficiency in the existing design. The Central Coast Regional Water Quality Control Board (Water Board) understands that the project activities include the construction of temporary cement batch plants, clearing vegetation for construction activity, and installation of soil

	cement protection combined with a segment of sheet pile.
Preliminary Water Quality Issues	The Water Board finds the project has the potential to cause sedimentation, siltation, and pollutant release in the River. Erosion could be caused by the construction activities or by the work associated with the soil cement. Loss of riparian habitats would also occur as a result of the project.
Water Board Mitigation Requirements	Mitigations proposed by ACOE that are required to comply with 401 Water Quality Certification are as follows: • In accordance with Environmental Commitment BR-7 in Final Environmental Assessment/Mitigated Negative Declaration for the Santa Maria Levee Improvement Project (August 2009), soil/sand excavation and construction within the river bed shall not occur during the rainy season (January 1 through March 31), or when flowing and/or ponded water is present, and shall not occur prior to a predicted significant rain event, during a significant rain event, and if surface water is present within 50 feet of work area. • ACOE shall use silt fences and/or straw wattles around construction areas to control and eliminate erosion and sedimentation. • Erosion control measures shall be applied to all disturbed earth surfaces. • Seeding of entire disturbed area with an approved grass seed mixture and placement of erosion control blankets over seeded areas shall be implemented for slope stabilization. • All construction vehicles and equipment used on site must be well maintained and checked daily for fuel and hydraulic fluid leaks or other problems that could result in spills of toxic materials. • The contractor must be required to have oil absorbent pads onsite in case a spill occurs. • ACOE must designate a staging area for equipment/vehicle fueling and storage at least 100 feet away from waterways, in a location where fluid will not flow into waterways. • All vehicle fueling must occur at least 100 feet away from waterways, and in the designated staging area. • Sand bags shall be filled with clean gravel. • ACOE must prepare and submit a dewatering plan to the Central Coast Water Board prior to commencement of construction activities that would potentially require its implementation (excavation into river bed). • All avoidance, mitigation practices, and revegetation plans

	associated with the areas of disturbance must be implemented according to the Avoidance and Mitigation measures and goals established in the Mitigation and Monitoring Plan for Biological Resources (Appendix G of the Final Environmental Assessment/Mitigated Negative Declaration for the Santa Maria Levee Improvement Project (August 2009)). • All minimization measures associated with the environmental effects must be implemented according to the proposed environmental commitments established in the Final Environmental Assessment/Mitigated Negative Declaration for the Santa Maria Levee Improvement Project (August 2009), Section 7: Environmental Commitments. • Water Board staff must be notified if mitigations as described in the 401 Water Quality Certification application or the Final Environmental Assessment/Mitigated Negative Declaration for this project are altered by the imposition of subsequent permit conditions by any local, state or federal regulatory authority. ACOE must inform Water Board staff of any modifications that interfere with compliance with this certification.
Area of Disturbance	84.34 acres temporary disturbance and 8.99 acres of permanent impact to river channel habitats
Fill/Excavation Area	8.99 acres of fill
Dredge Volume	N/A
U.S. Army Corps of Engineers Permit No.	This is a federal project implemented by the ACOE; no ACOE permitting required.
Dept. of Fish and Game Streambed Alteration Agreement	Department of Fish and Game has limited jurisdiction for this federal project.
Possible Listed Species	Tidewater goby (Federal Endangered, FE) Southern steelhead trout (FE) California red-legged frog (Federal Threatened, FT) Least Bell's vireo (FE) Arroyo chub Western spadefoot toad Southwestern pond turtle Silvery (California) legless lizard Coast horned lizard Two-striped garter snake Burrowing Owl Tricolored blackbird Loggerhead shrike American badger

	Pallid bat Townsend's big-eared bat Western red bat
of CEQA Compliance	Combined CEQA/NEPA document: EA/MND approved. Lead Agency: Central Coast Water Board
Water Board Compensatory Mitigation Requirements	The project will include the following: • Onsite mitigation shall be the first priority in accordance with the Mitigation and Monitoring Plan for Biological Resources (Appendix G of the Final Environmental Assessment/Mitigated Negative Declaration for the Santa Maria Levee Improvement Project (August 2009». ACOE shall contact the Water Board if suitable restoration sites cannot be located onsite. • ACOE must mitigate lost habitat through the enhancement of existing disturbed and non-native vegetation communities in the project area. ACOE must restore a total of 85.21 acres of disturbed areas to native plant communities. Approximately 12.14 acres of this habitat would be considered created habitat. In addition, all areas subject to temporary disturbance must be subject to restoration with native plant communities. • ACOE must notify the Water Board and initiate compensatory mitigation immediately upon conclusion of construction of levee improvements.
Total Certification Fee	Federal agency (ACOE) sponsoring the project pays no fee; no cost recovery agreement in place.
Additional Conditions	Contact Water Board staff when project begins to allow for a site visit. The Water Board requires visual inspection, mitigation monitoring, and a project completion report for this project: • Visually inspect the site (at least one reach upstream and downstream of project) after completion of the project and for two subsequent rainy seasons to ensure that the new structures are not causing excessive erosion or other water quality problems. If the project does cause water quality problems, contact the Water Board staff member overseeing the project. You will be responsible for obtaining any additional permits necessary for implementing plans for restoration to prevent further water quality problems. • First Report: Within 30 days of project completion, submit a project completion report that contains a summary of daily activities, monitoring observations, and problems incurred and actions taken; include properly identified post-project photos.

	• lVIitjgation Monitoring Report: Perform monitoring and submit reports in accordance with the Mitigation and Monitoring Plan for Biological Resources (Appendix G of the Final Environmental AssessmenUMitigated Negative Declaration for the Santa Maria Levee Improvement Project (August 2009)).

California Regional Water Quality Control Board
Central Coast Region

895 Aerovista Place, Suite 101, San Luis Obispo, California 93401-7906
(805) 549-3147 • FAX (805) 543-0397
http://www.waterboards.ca.gov/centralcoast

Matthew Rodriquez
Secretary for Environmental Protection

Edmund G. Brown Jr.
Governor

November 14, 2011

Naeem A. Siddiqui **BY ELECTRONIC MAIL**
Naeem.A.Siddiqui@usace.army.mil
Ecosystem Planning Section
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Blvd.
Los Angeles, CA 90017

Dear Mr. Siddiqui:

AMENDED WATER QUALITY CERTIFICATION NUMBER 34209WQ12 FOR EXTENSION OF REACH 3 OF THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT - BRADLEY CANYON CHANNEL, SANTA BARBARA COUNTY

Based on a change in project scope and reduction in the areas of disturbance, we are amending Water Quality Certification No. 34209WQ12 for the Extension of Reach 3: Santa Maria River Levee Improvements - Bradley Canyon Channel. This amendment clarifies areas of disturbance and mitigation, and identifies where the U.S. Army Corps of Engineers must re-vegetate, restore riparian habitat, and create new riparian habitat within the Bradley Canyon Channel.

The **Area of Disturbance** is amended (new text in underlined; previous text in strikeout) to state:

"Waterbody Type	Permanent	Temporary	Total
Streambed/Riparian (acres)	0.500	5.740 ~~6.977~~	6.240 ~~7.477~~
Active Channel (acres)	0	0.610 ~~0.0~~	0.610 ~~0.0~~
Total (acres)	0.500	6.350	6.850

The proposed project will temporarily disturb a total of 6.350 ~~6.977~~ acres of habitat within the Bradley Canyon Channel consisting of:

- native plant communities (subtotal of 0.247 ~~0.337~~ ac) composed of arroyo willow riparian (0.01 ~~0.001~~ ac), riparian scrub (0.133 ~~0.002~~ ac), coyote bush (0.01 ~~0.001~~), central coast scrub (0.003 ~~0.002~~ ac), mule fat scrub (0.001 ~~0.0~~)
- active channel (0.610 ~~0.370~~ ac);
- non-native plant communities (subtotal of 5.5 ~~4.1~~ ac) composed of non-native grasslands (1.0 ~~1.2~~ ac), ruderal (1.0 ~~0.9~~ ac), barren land (1.5 ~~2.0~~ ac);
- agriculture fields (2.0 ~~2.5~~ ac); and
- non- habitat elements (access roads and ramp).

The project will permanently disturb 0.5 acres of non-native plant communities within the levee and channel consisting of:
non-native grasslands (.20 ac), ruderal (0.10 ac), barren land (.20 ac)."

The **Compensatory Mitigation Requirements** are amended (new text in underlined; previous text in strikeout) to state:

"Central Coast Water Board staff must be notified if mitigations as described in the 401 Water Quality Certification application or the Reach 3 Extension amendment for this project are altered by the imposition of subsequent permit conditions by any local, state or federal regulatory authority. US ACOE shall notify Central Coast Water Board staff of any modifications that interfere with compliance with this certification.

The following mitigations are required to comply with the 401 Water Quality Certification:

- The US ACOE shall restore all disturbed areas (6.850 ~~7.477~~ ac) per the following relationships and according to Appendix ~~G~~L (~~Mitigation Plan~~ Reach 3 Extension Habitat Mitigation Monitoring Plan (HMMP)) of the revised 2011 SEA/MND, a supplemental environmental assessment to ~~of~~ the 2009 EA/MND.
- No areas will be disturbed outside of the levee during restoration activities.
- All temporary disturbance to native plant communities (0.244 acre) ~~and active channel (0.377)~~, and 5.5 acre to non-native plant community will be fully restored ~~like for like within the channel~~ to native plant habitat onsite by re-vegetating with a native seed-mix.
- The project related permanent impact to 0.5 acres of non-native habitat will be fully mitigated by establishing 0.5 acre of willow riparian ~~by converting 4.1 acres (except agriculture) of non-native plant community into native~~ habitat on-site.
- Additionally, the 0.610 acre of temporary impact to the active Bradley Canyon channel will be fully restored to pre-existing conditions or better.
- ~~The US ACOE shall convert an additional 3.3 acres of non-native habitat to native plant habitat within the area near reaches 1, 2, and 3 and the extension reach areas of the Santa Maria River, with the same performance criteria in accordance with Appendix G of the 2009 EA/MND.~~
- The US ACOE shall implement adequate irrigation to assure success of the restoration, re-vegetation, and conversion of non-native habitat to native habitat in accordance to the HMMP (Appendix L).

The US ACOE shall abide by all other mitigation and water quality protection practices provided in the original September 15, 2009 Certification and the Final EA/MND."

Based on the minor nature of this amendment, we do not expect it to result in additional impacts to water quality or beneficial uses. In addition, all other aspects of the project are to remain as previously proposed. This letter serves as authorization for the amendment; a new section 401 Water Quality Certification is not required.

If you have questions please contact **David Innis** at (805) 549-3150 or via email at dbinnis@waterboards.ca.gov, or Phil Hammer at (805) 549-3882**.** Please mention the above certification number in all future correspondence pertaining to this project.

Sincerely,

for
Roger W. Briggs
Executive Officer

cc:

Natasha Lohmus
California Department of Fish and Game
Lake and Streambed Alteration
nlohmus@dfg.ca.us

Tiffany A. Troxel
Office of Counsel
U.S. Army Corps of Engineers
Tiffany.A.Troxel@usace.army.mil

401 Program Manager
State Water Resources Control Board
Division of Water Quality
Stateboard401@waterboards.ca.gov

R9-WTR8-Mailbox@epa.gov

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Appendix H.

Hydrology and Hydraulics Memorandum

U.S ARMY
CORPS OF ENGINEERS

ADDENDUM TO SUPPLEMENTAL DESIGN DEFICIENCY REPORT HYDROLOGY AND HYDRAULICS APPENDICES DRAFT FINAL

FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT BRADLEY CANYON LEVEE EXTENSION PROJECT

November 2011

US Army Corps
Of Engineers
Los Angeles District Santa Barbara, San Luis Obispo, Ventura, and Kern Counties, California

SANTA MARIA RIVER LEVEE PROJECT

Addendum to Supplemental Design Deficiency Report

HYDROLOGY AND HYDRAULICS APPENDIX

Prepared by: U.S. Army Corps of Engineers
Los Angeles District

March 2011

SANTA MARIA RIVER LEVEE PROJECT

Addendum to Supplemental Design Deficiency Report

HYDROLOGY & HYDRAULICS APPENDIX

March 2011

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List of Attachments

Santa Maria Levee Project
Hydrology & Hydraulics (H&H) Appendix
Addendum to Supplemental Design Deficiency Report

1. Introduction.

This H&H report is an appendix to the Addendum to the Supplemental Design Deficiency Report (DDRs) for the Santa Maria Levee Project which was prepared by the Corps of Engineers, Los Angeles District, dated August 2009. Plate 1 shows the location map of the Santa Maria River Watershed. The project area is presented on Plate 2, which includes the Santa Maria River and Bradley Canyon levees. The project consists of approximately 17 miles of revetted levee along the left bank of the Santa Maria River from Fugler Point to the State Highway 1 bridge at Guadalupe, about 5 miles of revetted levee along the right bank of the Santa Maria River from a point about 1¼ miles downstream from U.S. Highway 101 to a point about 1½ miles upstream from the Southern Pacific Railroad bridge, and about 1.8 miles of channel and revetted levee along Bradley Canyon Wash upstream from the confluence with the Santa Maria River.

The focus of the hydrology section of this appendix is to update the frequency discharges for the project area of Santa Maria River. The hydraulics section of this report summarizes floodplain extents and flow depths. All Risk and Uncertainty information for hydrology and hydraulic results are also included.

2. Purpose And Scope.

The purpose of the study is to address the risk and uncertainties for the Santa Maria River levees associated with flood flows in the Santa Maria River and Bradley Canyon Wash. This report presents the hydrologic & hydraulic analyses for the Santa Maria River Watershed and tributaries.

3. Initial Design and Hydrology of Original Project.

The design of the original project is documented in *Design Memorandum No. 1, General Design for Santa Maria Valley Levee and Channel Improvements*, December 1958 (Ref. 4.3.). The Santa Maria River levee project as originally constructed consists of a set of levees with riprap revetment. The project was designed to contain the standard project flood (SPF). The standard project flood was based on 24-hour rainfall, averaging from 6.2 to 11 inches over the contributing subareas. A constant loss rate of 0.3 inch per hour was used for the upper Cuyama River and 0.2 inch per hour for the rest of the drainage area. Unit hydrographs were developed for Huasna River near Santa Maria and for the Sisquoc River near Garey. Based on unit hydrographs, synthetic hydrographs were derived for computing runoff. Routing of floods through Twitchell Dam was performed by the Puls ISD method, and stream flow routing from one concentration point to another was done by the successive-average-lag method. The maximum outflow with the revised operation schedule is 11,500[1] cubic feet per second. The SPF discharges were 160,000 ft^3/s from

[1] The 1958 DM No. 1 for the Santa Maria River mentions a revision to the operation schedule was necessary and resulted in a peak outflow of 11,500 ft^3/s during the SPF. The 1960 Water Control Manual shows a maximum outflow discharge of 12,700 ft^3/s at spillway crest.

the project inlet at the confluence of the Cuyama River and Sisquoc River to the confluence with Suey Creek; 155,000 ft^3/s from Suey Creek to the end of the right bank levee; and 150,000 ft^3/s from the end of the right bank levees to the downstream end of the project at California Highway 1. The Bradley Canyon SPF discharges were 7,000 ft^3/s and 9,000 ft^3/s at the upstream and downstream end of levees, respectively. Plate 2 shows the location of levees for the Santa Maria River including Bradley Canyon.

4. References.

4.1. *Design Deficiency Report for the Santa Maria Levee Project*, U.S. Army Corps of Engineers, Los Angeles District, dated August 2009.

4.2. *Supplement to Design Memorandum No. 1 for Santa Maria Valley Levees and Channel Improvements*, U.S. Army Corps of Engineers, Los Angeles, dated March 1980.

4.3. *Design Memorandum No. 1 General Design for Santa Maria Valley Levees and Channel Improvements, Santa Maria River Basin, CA*, U.S. Army Corps of Engineers, Los Angeles, dated December 1958.

4.4. *Santa Maria Project, California, Definite Plan Report, Hydrology Appendix*, U.S. Army Corps of Engineers, Los Angeles, dated September 1955.

4.5. *Santa Maria River & Tributaries, California, Flood Control, Hydrology in the Santa Maria River Basin*, U.S. Engineer Office, Los Angeles, CA, dated February 1939.

4.6. *Hydrologic Analysis Report for Flood Insurance Restudy, Santa Maria River Levee Failure Analysis, Santa Barbara County, CA,* MAP IX – Mainland, dated November 2006.

4.7. *Flood Insurance Study, Santa Barbara County, CA and Incorporated Area*, Federal Emergency Management Agency, dated April 6, 2009.

4.8. *Engineering Manual (EM) 1110-2-1411, Standard Project Flood Determination*, U.S. Army Corps of Engineers (USACE), 1965.

4.9. *Insurance Study Guidelines and Specifications for Study Contractors (FEMA 37),* Federal Emergency Management Agency (FEMA), 1991.

4.10. *EM 1110-2-1619 Risk-Based Analysis for Flood Damage Reduction Studies*, USACE, 1996.

4.11. *Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix H – Guidance for Mapping of Areas Protected by Levee Systems*, FEMA, 2003.

4.12. *Memorandum for Record Hydrology and Hydraulics Policy Memorandum No. 4 Debris Loading on Bridges and Culverts*, USACE, 2004.

4.13. *Engineering Regulation (ER) 1105-2-101 Risk Analysis for Flood Damage Reduction Studies*, USACE, 2006.

4.14. *Ground Surface Representation Report for Flood Insurance Restudy Santa Maria River Levee Failure Analysis Santa Barbara County, CA,* MAP IX - Mainland, April 2007.

4.15. *HEC-FDA Flood Damage Reduction Analysis User's Manual Version 1.2.4,* USACE, 2008.

4.16. *Ground Survey and Photogrammetric Mapping for Santa Maria River Project,* Johnson-Frank & Associates, Inc., September 2009.

4.17. *Santa Maria Valley Levees South Levee Improvement Reach 1 (Blosser Road to U.S. Highway 101 Bridge) Reach 2 (U.S. Highway 101 Bridge to Suey Crossing Bridge,* USACE, 2009.

4.18. *Santa Maria Valley Levees South Levee Improvement Reach 3 – Volumes 1 & 2 (Suey Crossing Bridge to Bradley Canyon Confluence),* USACE, 2009.

4.19. *Engineering Circular (EC) 1110-2-6067 USACE Process for the National Flood Insurance Program (NFIP) Levee System Evaluation*, USACE, 2010.

4.20. *HEC-RAS River Analysis System Hydraulic Reference Manual Version 4.1*, USACE, 2010.

5. Description of the Drainage Area.

5.1. General. The Santa Maria River Watershed study area, which drains approximately 1 720 mi², is located in northern Santa Barbara County, eastern San Luis Obispo, and northern Ventura County, with a small portion in Kern County (see Plate 1). The Santa Maria River is formed by the confluence of Cuyama and Sisquoc Rivers at Fugler Point. From Fugler Point, the Santa Maria River flows westward to the Pacific Ocean just west of the City of Guadalupe about 60 miles northwest of Santa Barbara. Upstream from Fugler Point, the watershed is characterized by parallel northwest-trending ranges and valleys of folded and faulted strata. Downstream from Fugler Point is the broad Santa Maria Valley, comprised of the Santa Maria Plain along the river, the Nipomo Upland on the north, and the Orcutt Upland on the south. The principal tributaries downstream of Fugler Point are Bradley Canyon, Suey Creek and Nipomo Creek.

The Cuyama River (drainage area 1,147 mi²) originates in Ventura County near the junction of the San Rafael and Caliente Mountains and flows generally westward for about 110 miles to its confluence with Sisquoc River. The drainage area of Cuyama River is long and narrow. The tributaries are many and of short length and have a relatively insignificant impact on the project reach. About 20 miles from its source, the Cuyama River enters the broad Cuyama Valley. At the lower end of the valley, the river enters a canyon section through which it flows for about 63 miles to its confluence with Sisquoc River.

The Sisquoc River (drainage area 471 mi^2) begins in the south-central part of the watershed in the San Rafael Mountains and flows generally westward for about 50 miles to its confluence with Cuyama River. The river flows in a well-defined channel through a canyon for the upper 42 miles. About 8 miles above its mouth, the river emerges into the Sisquoc River Valley through which it flows to Cuyama River. The most important tributaries are Manzana, Labrea, and Tepusquet Creeks. An arm of the plain extending upstream from Fugler Point along the Sisquoc River to the mouth of La Brea Creek, a distance of about 8 miles, is known as the Sisquoc Plain.

The watershed is an elongated area with a maximum east-west length of 445 miles and a maximum north-south width of 154 miles. Elevations range from 6,000 feet in the upper watershed to 65 feet at the outlet to the City of Guadalupe. The major geographic area of the watershed is bounded on the north by Santa Lucia, the La Panza and the Caliente mountain ranges, on the east by the Santa Clara River watershed, on the south by the Santa Ynez River and San Antonio Creek watersheds, and the west by the City of Guadalupe. The location and extent of the drainage area are shown on plate 1. Approximately 90 percent of the drainage area is mountainous, with steep, rocky ridges and numerous canyons; and rest of the area consists of narrow alluvial valleys and a coastal plain.

5.2. Runoff Characteristics. The runoff in the Santa Maria River Watershed is typical of all the streams in Southern California. Since the storms that visit region are of the cyclonic type, they produce rainfall of high intensity and short duration. The runoff is termed “flashy” because it attains its peak, or maximum flow, in a few hours and subsides with similar rapidity. The runoff originates on steep, precipitous mountain slopes and flows at high velocities through channels with steep gradients. When flows strike the gentler slope of the alluvial plains at the base of mountains, the velocities decrease significantly. Because climatic and drainage area characteristics are not conducive to continuous runoff, very little stream flow occurs except during and immediately following rainfall.

5.3. Existing Water Related Structures. Twitchell Dam is one of the large-scale Federal water projects in the region designed to capture the seasonal floodwaters to recharge aquifers. The Twitchell Dam on the Cuyama River is located 6 miles above the confluence with the Sisquoc River. About, 1,121 mi^2 drain into the Twitchell Dam whose major functions are water conservation and flood control. The Bureau of Reclamation constructed the Twitchell Dam in 1958.

Twitchell Dam has a gross capacity of 387,020 ac-ft at top of dam and 197,756 ac-ft at spillway crest (USACE, 2007 survey). Of the total storage, 87,274 ac-ft is allocated to flood control while 110,482 ac-ft is allocated to conservation storage (USACE, 2007 survey). During normal operation (non-flood), Twitchell Dam releases stored water to maintain a flow of about 300 ft^3/s whenever possible. The maximum release rate from the gates is 12,700 ft³/s when the reservoir water-surface elevation is at spillway crest (651.5 ft). Table 1 shows the elevation-outflow relationship for Twitchell Dam.

The Santa Maria Valley Levees were designed to provide protection from the Standard Project Flood computed by the USACE (1958). The U.S. Army Corps of Engineers (USACE) completed construction of the Santa Maria Valley and Bradley Canyon levees in 1963 (Ref. 4.2.).

5.4. Vegetation. A dense cover of conifers is in the higher elevations; live oak, brush, and grass are common on the lower slopes and deciduous trees are along the stream bottoms. The predominant natural plant communities are Valley oak series along the Santa Maria River and Coast live oak series on the terraces of Nipomo Plain. Vegetation along Santa Maria River channel is characterized by low, shrubby vegetation, usually dominated by golden bush; mule fat and willow are also quite common. A majority of the watershed area shows evidence of overgrazing. Relatively small acreages of pasture and cultivated lands are also found along river. There is a salt marsh lagoon at the mouth of river outside the project area.

Animal life along the Santa Maria River channel is typical of the wildlife found along southern California's usually dry coastal streams and includes beechey ground squirrel, black-tailed hare, Audubon cottontail, and coyote. The channel functions as a "refuge" and movement corridor for wildlife because surrounding areas are mostly under agricu1tural or grazing land uses.

5.5. Land Use. Agricultural land uses are an important characteristic of the watershed and its hydrology. Nearly all land surrounding the City of Santa Maria, to the east, west, and south sides is zoned as Agriculture. Vineyards and grazing lands lie in the foothills to the east and southwest of the City of Santa Maria. Vegetables and strawberries account for almost one-half of Santa Maria Valley's irrigated acreage. In addition to vegetables and strawberries, field crops are grown on fallowed vegetable land and on non-irrigated prime land (County of Santa Barbara Planning and Development 2009).

Land use within the levees (the channel area), consists of grazing and agriculture. An off-road motorcycle course with three small structures is indicated northwest of Santa Maria.

The Land use pattern in Santa Maria reflects major transportation routes. Older strip commercial land uses are located along major roadways, and industrial uses are generally located along rail lines. The extent of present urbanization was based on USGS topographic maps and aerial photography.

5.6. Geology and Soil. The shape and extent of the Santa Maria River Watershed have resulted mostly from the severe folding and faulting to which the region has been subjected. The rocks in the drainage area are mostly sedimentary; some igneous and metamorphic rocks are exposed in a few small areas. The mountain and foothill areas in the Sisquoc River Watershed consist principally of consolidated deposits of shale, sandstone, and conglomerate. Shallow, residual soil covers most of these mountains and hills. The Cuyama area is made up of sedimentary and alluvial deposits of terrace gravels, clays, shales, and limestones. These deposits and the residual soils and the recent alluvium resulting from their decomposition are easily eroded. This characteristic has played an important part in the physiography of the area. The streams that enter the Cuyama River in the valley flow through steep gorge-like canyons resulting from the rapid erosion of the soft sedimentary rocks. Unconsolidated deposits, mostly alluvial, cover the floor of the valley. The depth of alluvium on the valley floor is about 50 feet at the upper end of the Sisquoc River Valley, 115 feet at Fugler Point, and 230 feet at the coast. In general, the valley fill is extremely pervious.

Sedimentary formations, ranging in age from Upper Jurassic to Quaternary, cover nearly all of the Santa Maria River Basin. Igneous and metamorphic rocks of the Franciscan group (Upper Jurassic) and Miocene volcanics are exposed in a few small areas. The older sedimentaries consist mostly of shale, sandstone, and conglomerate, with occasional minor quantities of chert, limestone and tuff. The younger sedimentaries include deposits of both Tertiary and Quaternary sand, gravel, silt, and clay. The Quaternary deposits include terrace deposits, recent alluvium, river-channel deposits, and considerable wind-blown sand, which occur along the coast. The dune sand also extends as far as 12 miles inland across the Nipomo Upland north of the river.

6. Precipitation and Runoff.

6.1. Precipitation Records. NOAA (National Oceanic and Atmospheric Administration) is in process of updating the Atlas 14 data for Santa Maria River Watershed. Therefore, NOAA Atlas 2 (Volume XI) was used to find frequency precipitation depths in the Santa Maria River Watershed.

6.2. Streamflow Records. Stream gaging stations have been operated at several locations in the drainage area, with various periods of record from 1930 to date. Stream gage station locations in and around the Santa Maria River Watershed are shown on Plate 4, and pertinent data is given in Table 2. The stream gages in the watershed have been operated and maintained by Santa Barbara County Flood Control District (SBFCD) since 1930.

6.3. Climatology And Meteorology. The climate of the Santa Maria area is generally mild. Extremes of temperature are rare in the valley, but temperature variation increases with elevation. Prevailing winds from the Pacific Ocean are generally light to moderate; the highest velocities occur during the spring.

The climate is characterized by a short rainy season during the winter months and a long dry season during the summer months. Extremes of temperature are rare and of short duration. The winters are mild and frosts are not severe except occasionally in the mountainous areas. The average length of the season between frosts at Santa Maria is about

270 days. Summers along the coast are of the cool Mediterranean type; summers in the interior mountain valleys are hot. The humidity is relatively low in the interior but high on the coast. Moist air from the ocean moves upstream through the Santa Maria Valley with resultant sea breezes in the afternoon and nocturnal fogs that extend inland a considerable distance. The average mean annual temperature recorded for Santa Maria is 57.6º F. The average winter temperature is 57ºF and the average summer temperature is 68.4ºF.

The greatest floods of record on the Santa Maria River have resulted from general winter storms. Occasionally, unusual heavy but brief rainfall of the thunderstorm type occurs during the winter season. In summer, rainfall associated with tropical storms has occurred in the region, but such occurrences are relatively small. Mean annual precipitation varies from about 14 inches near the coast to more than 30 inches in the higher mountains. Precipitation in the form of snow is common in the higher portions of the surrounding mountains during the winter storms but is not a significant contributor to runoff in the study area.

6.3.1. Storms. Two types of storms produce precipitation in the Santa Maria River Watershed:

6.3.1.1. General Winter Storms. Most storm precipitation in the drainage area results from general winter storms that are associated with extra tropical cyclones of north Pacific origin. During the months from November to April, these storms move southward over the ocean and then inland to southern California, with resultant precipitation over large areas. Major storms consist of one or more cyclonic disturbances and occasionally last 4 days or more. Occasionally in the winter season, storms of the thunderstorm type occur either separately or in conjunction with a general winter storm and result in brief heavy precipitation over relatively small areas.

6.3.1.2 General Summer Storms. Storms associated with tropical cyclones have occurred in this region during the summer, but such occurrences are infrequent and relatively unimportant. Summer thunderstorms are not uncommon but are generally of short duration and of small areal extent.

6.3.2. Storms And Floods Of Record. Storms and floods – The floods of record date back more than 100 years. Three storms between December 1861 and January 1862, collectively called the Great Floods, produced some of the largest flood discharges ever experienced in California. Beginning on December 24, 1861, it rained for almost four weeks. The largest flood in California's recorded history occurred from January 9–12, 1862. The entire Sacramento and San Joaquin Valleys were inundated for an extent of 250-300 miles, averaging 20 miles in breadth. Many damaging floods have occurred in the Santa Maria River Watershed. However, supporting rainfall and runoff records are meager. Brief descriptions of the storms and floods of 1909, 1914, 1937, 1938, 1941, 1943, 1960, 1966, 1969, 1978, 1980, 1992-1993, 1995, 1998, and 2011 are given in subsequent paragraphs. Significant events are known to have occurred in other years for which no storm summaries were available.

6.3.2.1. Storms and floods of 1909. The storm period of January and February 1909 produced general precipitation over most of California. A total precipitation of 15.3 inches, which is about 109 percent of mean seasonal, was recorded at Santa Maria during January and February. The corresponding values of Ozena, in the upper Cuyama River area, are 11.5 inches and 87 percent. The average precipitation over the drainage area was estimated at about 10 inches for the period 20 – 27 January. The peak discharge of the Santa Maria River near Guadalupe was estimated at 100,000 cubic feet per second.

6.3.2.2. Storms and floods of 1914. A flood occurred in 1914 during the storm of 17-22 February, which was the last in a series of three storms that occurred during January and February in southern California. The average precipitation over the drainage area was estimated at about 9 inches for the storm of 17-22 February. Although no estimate of the peak discharge is available, a comparison of the hydrologic data indicates that the peak discharges of this flood were about equal to those of January 1909 flood.

6.3.2.3. Storms and floods of 1937 and 1938. The storms of February 1937 and February and March 1938 caused minor floods on the Santa Maria River and tributaries. The largest storm, which occurred during the period 27 February through 4 March 1938, averaged about 7 inches over the drainage area; a peak discharge of 17,300 cubic feet per second was recorded on the Cuyama River near Santa Maria. No estimate is available of flow on the Santa Maria River.

6.3.2.4. Storm and floods of 1941. The storm of March 1941 averaged about 5 inches over the drainage area. A peak discharge of 14,700 cubic feet per second was recorded at the Santa Maria River gage near Guadalupe.

6.3.2.5. Storms and Floods of 1943. The storm of 20-24 January 1943 was in many respects the most severe on record in southern California. It centered in the San Gabriel Mountains, generally northeast of Los Angeles; however, intensities in the Santa Maria River Basin were low. The average precipitation over the Santa Maria River Basin was estimated at about 7 inches. The recorded peak discharge at the Santa Maria River gage near Guadalupe was 13,800 cubic feet per second. The thunderstorm that occurred between 2200 on 3 March 1943 and 0100 on 4 March 1943, during 3 days of shower-type rain, resulted in short-period precipitation of record-breaking magnitude for the southern California coastal region. The storm centered in the vicinity of Sierra Madre; runoff was moderately heavy from local areas were high rainfall intensities occurred. In the Santa Maria River Basin, rainfall and runoff were relatively light.

6.3.2.6. Storms and Floods of 1966. The first significant flow after completion of the levee project occurred in December 1966. The peak flow in the Santa Maria River was estimated at 30,000 cubic feet per second. The flood, which was one-fifth the magnitude of the project-design flood, caused some damage to the levee. The principal damage occurred about 400 feet of the left-levee toe where it was undercut by flows with velocities estimated at 16 feet per second that impinged on the levee in a nearly perpendicular direction. The impingement caused two crescent-shaped failures extending about midway up the levee.

6.3.2.7. Storms and Floods of 1969. During the February 1969 storms, several problem areas developed as a result of several days of sustained flows. The levee was eroded on left bank by meandering flood flows that attacked the levee at a sharp angle. The impinging flow caused the stone revetment to slump riverward in a crescent shape, eroding one-third of the levee section. Erosion occurred also near the upstream end of the right levee caused revetment failure to the levee crest and along the left levee from where the revetment slumped to 2 to 3 feet above the existing streambed. The Peak flow in the Santa Maria River was estimated to be 24,300 ft^3/s.

6.3.2.8. Storms and Floods of 1978. Heavy storms occurred in February and March. Agricultural damages occurred along the upper reaches of the Cuyama River where over 340 acres were flooded. Reported water depths ranged up to 10 feet. The city of Santa Maria had road and park damages

6.3.2.9. Storms and Floods of 1980. A flow roughly estimated at 8,000 cfs caused damage to the left levee of the Santa Maria River just downstream from the Bradley Canyon confluence. Damage resulted from meandering flows hitting the levee at about an 80 degree angle. The levee sloughed off in a crescent shape until it reached a point about 4 feet from the edge of the levee road. About 200, feet of levee facing, requiring 600,000 tons of rock were replaced.

6.3.2.10. Storms and floods of 1992 and 1993. Several parts of southern California received over 200-percent of normal rainfall. Santa Barbara County had widespread slope destabilization and coastal flooding. The 1992-1993 rainy season was one of the wettest recorded in Santa Barbara County; areas of the County received 180-percent to 209-percent normal rainfall. One of the County’s highest short-duration rainfall intensities was recorded during 1993; 1¼ inches fell in 15 minutes at the City of Buellton Fire Station. Following a storm event that occurred in late March, Santa Barbara County was declared a federal disaster area with substantial damage along 12 creeks.

6.3.2.11. Storms and Floods of 1995. Heavy Storms. The floods of 1995 brought widespread flooding to Santa Barbara County. The most severe flooding occurred on the south coast while the rest of the county was not flooded.

6.3.2.12. Storms and Floods of 1998. The river shifted course and flowed directly towards the north levee. The levee breached near the Guadalupe and Bonita School Crossing. The break washed away approximately 1,000 feet of levee. Flows in the Cuyama River below Buckhorn Canyon were recorded at 26,200 ft³/s. Flow in the Santa Maria River was estimated at 20,000 ft³/s.

6.3.2.13. Storms and Floods of 2011. In March, flash flood warnings and wind advisories were issued for the Santa Ynez and Lompoc valleys through late Sunday, the first day of Spring. A powerful storm and strong winds dropped about 4.2 inches of rain in the Santa Maria Valley and more than 4.5 inches of rain in the Lompoc area over the weekend. Heavy flow in the Santa Maria River was observed. Peak flows of 7,290 ft³/s for the Sisquoc River near Garey and 22,200 ft³/s at Suey Crossing near Santa Maria were recorded.

7. Discharge-Frequency Analyses.

Runoff records were available for six stream gages in the Santa Maria River watershed. Two of the gages are located along the Cuyama River, two gages along the Sisquoc River, and two gages on the mainstem of the Santa Maria River. Pertinent data for the stream gages are shown in Table 2. Based on data quality, locations, and period of records only the Sisquoc River near Garey and Cuyama River gages were used.

Discharge-frequency analyses for the stream gages were performed in accordance with Water Resource Council (WRC) guidelines outlined in Bulletin 17B. The HEC-SSP computer program was used to perform flood frequency analyses for the stream gages. The USGS stream gage for Sisquoc River near Garey (USGS #11140000) is located on Santa Maria Mesa Road Bridge. The gage has a 471 mi² drainage area. The period of record for the Sisquoc River near Garey gage is from March 1941 to February 2009 and includes zero flow records. A generalized skew of –0.3 from the skew figure in the back of Bulletin 17B was used to weight the computed skew as recommended in Bulletin 17B. The regional skew mean square error (MSE) 0.302 and a median plotting position are used as shown in Table 3.

The HEC-SSP computer program was also used to simulate the FEMA analysis on the same stream gage Sisquoc River near Garey (USGS #11140000) to compare the results of flood frequency with current study. The data set record used for this analysis is from March 1941 to January 2005 without zero flow records. Results from this study are shown in Table 4.

The two USGS stream gages on the Cuyama River, Cuyama River near Santa Maria (USGS #11137000) and Cuyama River below Buckhorn (USGS #11136800) are located very close to each other as shown in Plate 4. It was decided to combine the period of record for these gages. The period of record, after combining into one continuous record, was from 1904 to 2009. The Cuyama

River downstream flow is restricted by Twitchell Dam. This frequency analysis was only useful for the area upstream of Twitchell Dam. The results for the Cuyama River streamgage were used for verification of model results. The model results were up to 15% higher than discharge-frequency results and were considered acceptable.

The discharge frequency analysis results of annual peak discharges for the stream gage Sisquoc River near Garey (USGS #11140000) are acceptable. The standard deviation and mean are 0.782 and 3.235, respectively, which are consistent with previous studies. The discharge-frequency values for the 2-, 5-, 10-, 25-, 50-, 100-, 200-, 500-year events are shown in Table 4. Figure 1 represents the final frequency curve for the stream gage Sisquoc River near Garey (USGS # 1114000) along with the annual data plotted using median plotting positions and Figure 2 shows FEMA 2006 Study final frequency curve for the same gage, annual data were plotted using Weibull plotting positions.

8. Rainfall-Runoff Analysis.

Discharge-frequency values from the previous studies by the Corps of Engineers for the Santa Maria River Watershed were based on regional discharge-frequency relationships developed in 1958 & 1979. FEMA used a similar approach and updated discharges in 2006 (Ref. 4.7.). By contrast, the current analysis uses rainfall-runoff models calibrated to the discharge-frequency relationships for the individual stream gage location. The Hydrologic Modeling System (HEC-HMS), developed at the Hydrologic Engineering Center (HEC) at Davis, California, was used for the hydrologic analyses. The HEC-HMS software uses a “three-model” approach, which includes a basin model, a meteorological model, and a control specification model. The major elements in the rainfall-runoff model development include watershed characteristics, basin “n” values, base flow, rainfall data, loss rates, S-graph, and channel routing. The study was done to develop discharges at key locations:

- Santa Maria River upstream end of levee at Fugler Point
- Santa Maria River above Bradley Canyon
- Bradley Canyon upstream end of levee
- Bradley Canyon downstream end of levee
- Santa Maria River below Bradley Canyon
- Santa Maria River downstream end of levee

Initially, basin models were created for each of the 6 locations. Results for storm centering showed a significant change in discharge for only three of the locations and thus, three separate basin models were utilized for the study. The model IDs assigned to these locations and used in the HEC-HMS models are:

- SMRabBC - Santa Maria River below Santa Maria River and Bradley Canyon Confluence
- BCabSMR - Bradley Canyon above Santa Maria River
- SMRatG - Santa Maria River at Guadalupe

8.1. Basin Models. HEC-GeoHMS was developed by the Hydrologic Engineering Center as a geo-spatial hydrologic tool kit for engineers and hydrologists. The program allows users to visualize spatial information, document watershed characteristics, perform spatial analysis, delineate sub-basins and streams, construct inputs to hydrologic models, and assist with report preparation. Working with HEC-GeoHMS through its interfaces, menus, tools, and buttons, in a windows environment, allows the user to expediently create hydrologic input that can be used directly with HEC-HMS.

The basic data needed for hydrologic analysis using Arcview/HEC-GeoHMS is the Digital Elevation Model (DEM). The DEM is simply a file that contains the study area broken up into thousands of cells (in our case 10 meter x 10 meter grids). Each cell has an average elevation associated with it. Even though there may be vast changes in elevation within a single cell, the whole cell is given a single average elevation. The number of cells depends on only two factors 1) the size of the study area and 2) the dimension of the cell.

DEMs were downloaded from the Geo Community website. Roughly 43 individual DEM quadrangles were processed from their SDTS file format into ArcInfo grids including unit conversions and a change in the horizontal coordinate system. Before the grids could be merged into a single terrain model, the gap between grids was removed one by one. Once the DEMs were assembled into a single consistent form, a drainage analysis using the tools in HEC-GeoHMS was performed to use in hydrologic modeling.

8.1.1. Subarea Delineation. The Santa Maria River Watershed including the Cuyama and Sisquoc River tributaries were subdivided. Plate 3 shows concentration points (CP) locations and Table No. 5 shows concentration point pertinent data. A schematic flow diagram of the entire stream system is shown on Figure 3. The lower, upper and middle portions of the watershed are shown in Figures 4, 5, and 6.

For modeling runoff, the drainage area within the Santa Maria River Watershed was divided into 16 subareas ranging in size from 1 mi^2 (Bradley Canyon) to 786.0 mi^2 (Cuyama River) based primarily on subarea homogeneity, tributary boundaries, and critical points where discharge data was needed. Since the focus was on the lower portion of the watershed, the upper subareas were not broken into smaller subareas. The HEC-GeoHMS computer program, in conjunction with ArcView, was used with USGS 10-meter DEMs (Digital Elevation Models) to delineate the watershed and compute subarea characteristics. Subarea boundaries are shown on the USGS topographic map on Plate 5. The subarea characteristics are listed in Table 6.

8.1.2. Loss Rates. The initial-constant loss rate method was utilized in the rainfall-runoff models to estimate the portion of rainfall that is “lost” to various factors including infiltration, interception, detention storage, evaporation, and transpiration. Based on previous studies in and around the Santa Maria River

Watershed, a constant loss rate of 0.20 in/hr was deemed applicable for valley subareas and 0.30 in/hr was deemed applicable for mountainous subareas. The percentage of valley and mountain for each subarea was estimated from previous studies and aerial photographs. An initial loss rate of 1.10 inches was estimated for the subareas. Both initial and constant loss rates are calibration parameters that were adjusted throughout the modeling process. Loss rates for each subarea are listed in Table 7.

<u>8.1.3. Impervious Cover.</u> An impervious factor was used to account for urbanization. The HEC-HMS models calculate 100% runoff from the impervious portion of the subareas. The percent impervious cover was estimated for each subarea using engineering judgment and aerial photographs. The percent impervious cover for each subarea is presented in Table 7.

<u>8.1.4. Unit Hydrographs.</u> The method used to develop synthetic unit hydrographs is the Los Angeles District procedures as described in the Department of the Army Technical Bulletin No. 5-550-3 entitled "Flood Prediction Techniques", dated February 1957. The procedure has its basis in an S-graph, which is the time distribution of runoff as a function of watershed lag time. Lag time is defined as the time in hours for 50 percent of total volume of runoff of the unit hydrograph to occur following the start of unit rainfall. The watershed lag time was approximated for all subareas using the lag relationship below. Figure 7 shows the relationship in graphical form.

$$\mathrm{Lag} = 24 \cdot n \cdot \frac{\quad}{\quad}$$

The basin n-value is a variable in the lag equation that permits adjustment of lag time depending on the type of ground cover and other characteristics affecting watershed response to effective rainfall. The percentage of uniform, moderate and steep slopes n-values for each subarea was estimated through aerial photography and topographic maps of the watershed and the guidelines described in Table 8. Then weighted n-values were calculated for each subarea. Subarea characteristics including the basin n-values are given in Table 9.

<u>8.1.5. S-Graph.</u> The S-graph applied in the Santa Maria Watershed is the Santa Barbara S-graph. The Santa Barbara S-graph shown on Figure 8, is the nearest S-graph found to have similar runoff characteristics as Santa Maria River Watershed.

<u>8.1.6. Baseflow.</u> There is no significant impact on peak flow due to base flow and no base flow is assumed for HEC-HMS models.

8.1.7. Flood Routing. Flood routing through both natural and improved channels was performed using the Muskingum method. The flood wave travel time in a reach, which approximates the Muskingum coefficient K, was determined by dividing reach length by average peak flow velocity. The peak flows determined in previous study for Santa Maria River Watershed were used. Manning's formula for normal depth and an appropriate cross section were used to compute the average peak flow velocity for each reach. Cross sections were determined from the DEMs and USGS topographic maps. Muskingum X values were estimated according to the relative importance of channel storage. Values of X used in this study were estimated 0.3 for all upstream reaches and 0.4 for downstream reaches. The number of subreaches (in HEC-HMS model) was calculated by dividing K (hrs) by the computation time step 5 minutes (0.0833 hr). Routing parameters for the various reaches in the study area are given in Table 10.

8.2. Meteorologic Models. For this analysis, meteorologic models were developed for the 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year events using durations of 2-, 3-, 6-, and 24 hours at three concentration points.

The total point-precipitation depths for the selected exceedance probability for durations from 5 minutes through the desired total duration of the hypothetical storm were used in the HEC-HMS models. Depths for various durations for a specified exceedance probability were obtained from NOAA Atlas 2 (Volume XI) for the Western U.S., California. The 6-hr and 24-hr depths were determined from isopluvial maps included in the Atlas. The values for other durations were calculated using PREFRE Program (precipitation-frequency computations). This program was developed by office of Hydrology, National Weather Service, 1973 and revised by Hydrology Section, U.S. Army Corps of Engineers, Los Angeles District in 1996. This program uses equations and nomographs provided in NOAA Atlas 2. The values for 200-yr and 500-yr are founded by plotting curves using Generalized Extreme Value (GEV) analytical distributions (NOAA Preferred method) and smoothed prior to use the data. The point precipitation values for the entire Santa Maria River Watershed are shown in Table 11. For the two other storm centering BCabSMR and SMRblBC, the storm is centered individually and precipitation depth is calculated, are shown in Table 12 and Table 13 accordingly. For contributing drainage areas 3-hour, 6-hour, and 24-hour storm patterns frequency storms were used for simulation to get peak discharges for required locations. The critical runoff-producing storm was determined to be a 24-hour duration storm for all locations of contributing drainage areas.

A depth-area-duration correction factor is applied in HEC-HMS, because intense rainfall is unlikely to be distributed uniformly over a large watershed. For a specified frequency and duration, the average rainfall depth over an area is less than the depth at a point. To account for this, the U.S. Weather Bureau (1958) derived, from averages of annual series of point and areal values for several dense, recording rain gage networks, factors by which point depths are to be reduced to yield areal-average de-pths. The factors, expressed as a percentage of point depth, are a function of area and duration. The depth-area-reduction curve is shown on Figure 9.

HEC-HMS interpolates to find depths for durations that are integer multiples of the time interval selected for runoff modeling. HEC-HMS uses linear interpolation, with logarithmically transformed values of depth and duration. The successive differences in the cumulative depths (the incremental precipitation depths) are calculated for each computation interval. The storm hyetograph is created using the alternating block method (Chow, Maidment, Mays, 1988) from the incremental precipitation values (blocks). This method positions the block of maximum incremental depth at the middle of the required duration. The remaining blocks are arranged in descending order, alternately before and after the central block.

8.3. Control Specification Model. The simulations were done using a 5-minute computation interval time and a 24-hour storm duration. The simulations were run for 5 days to ensure all runoff reached the outlet.

9. Hydrology Summary and Results.

The rainfall-runoff models were calibrated to stream gage information for the Sisquoc River, which is completely uncontrolled. Calibration of the subarea parameters like initial loss and constant loss rate were adjusted until the discharges closely matched the discharges from the discharge-frequency curves for all the return periods. Calibration was performed using the Sisquoc River near Garey stream gage (USGS No. 11140000).Verification was done using the Cuyama River stream gage data for the upstream uncontrolled portion of the subarea. The results from these simulations for each CP were plotted on log-probability paper. A graphical curve was plotted through the points to get final results. The final results are presented in Table 14. Hydrographs for the 100-year event for Santa Maria River at Guadalupe (SMRatG), Santa Maria River above Bradley Canyon (SMRabBC), and Bradley Canyon above the Santa Maria River (BCabSMR) are shown on Figures 10, 11 and 12 respectively. The approach selected, discrete event rainfall-runoff analysis, provided estimates of peak flows at selected locations in the watershed, and also made available flood hydrographs at these locations of interest. The basis of this approach -- frequency rainfall and subarea runoff calibrated to discharge-frequency relationships at the gaged location -- provided a sound basis for computation of frequency discharges.

The portion of the watershed contributing to the project reach is not expected to see any significant development over the project life. Thus, there is no expectation of frequency discharges changing for future conditions. No changes were made for future c

A comparison was made with results from the previous Corps of Engineer Report for Santa Maria Valley Levees and Channel Improvements, dated March 1980. The results from the current analysis indicate that discharges at all locations have decreased for the upper end of the discharge-frequency curves (or less frequent events) and increased for the lower end of the curves (or more frequent events). There has been an additional 28 years of data at the stream gage since the previous analysis. Therefore, an update to the discharge-frequency curves was necessary. Figures 13, 14 and 15 show discharge-frequency curves for three key locations. The 100-year discharge for Santa Maria River below Bradley Canyon to the downstream end of levee has decreased from 78,000 ft³/s to 71,000 ft³/s. Final frequency discharges are shown in Table 15. The 100-year and Standard Project Flood discharges are shown in plate 7.

The design discharge for the original project is documented in Ref. 4.2. The project was designed to contain flood flows up to the authorized level, the Standard Project Flood (SPF). The use of the SPF was sought, as a general rule, in the design of flood control works for communities where protection of human life and high-valued property is involved (Ref. 4.2.). Although the computed SPF discharges for the project reach of the Santa Maria River ranged from 160,000 ft³/s to 150,000 ft³/s, the entire project reach was originally designed for 160,000 ft³/s. Based on the current analysis and a graphical extension of the discharge-frequency curves for the Santa Maria River and Bradley Canyon, a discharge of 160,000 ft³/s corresponds to an approximately 0.02% chance event (5,000-year).

10. Hydraulics Evaluation.

10.1. General Description of Evaluation Reach for Hydraulic Evaluation. The evaluation reach consists of four levee segments: Reach 1, Reach 2, Reach 3, and Bradley Canyon (Reach 3 extension). The Santa Maria River levee project as originally constructed consists basically of a set of levees with riprap revetment. Several breaches after construction resulted in a design deficiency of the original levees. Damages were caused by impinging flows on the levee as well as poor rock source. A new levee design to alleviate further damages is the extent of this evaluation. The Reach 1 levee is the segment along the left (south) side of the Santa Maria River extending from approximately Blosser Road to the U.S. Highway 101 Bridge (Hwy. 101). The Reach 2 levee begins at Hwy. 101 and extends to the Suey Crossing Bridge. The Reach 3 levee segment is from the Suey Crossing Bridge and terminates at the Bradley Canyon Confluence. The Bradley Canyon Levee (Reach 3 extension) is along the left (west) side of the Bradley Canyon River from the confluence with Santa Maria River to approximately 1.8 miles upstream. Refer to Plate 2 for evaluation reach segments.Survey Data and Channel Geometry. MAP IX-Mainland generated a cohesive topographic dataset for the Santa Maria River and Bradley Canyon River and provided Triangular Irregular Network (TIN) in April 2007 (Ref. 4.14.). Johnson-Frank & Associates, Inc. completed ground surveys and photogrammetric mapping of approximate 1,047 acres of the Santa Maria River and Bradley Canyon River area near the City of Santa Maria in September 2009 (Ref. 4.16.). TIN and 1-foot contours from the surveys and mapping were used for the geometric data.

10.2. Hydraulic Model. The USACE's Hydrologic Engineering Center's River Analysis System (HEC-RAS) version 4.1 was used for the hydraulic analysis (Ref. 4.20.).

10.3. Basic Analysis Assumptions. In applying the numerical model, the flow is in a one-dimensional, uniform, steady state. The one-dimensional assumption is applicable since during high flows most of the flow travels downstream along the channel allowing the model to be analyzed in one direction. The uniform flow statement is reasonable since in most situations flow depth and velocity is gradually changing. Steady flow states that the change in depth is constant as a function of time. The steady state assumption is reasonable for most of the evaluation reach except at specific locations where there are abrupt changes in the cross sectional flow; examples include hydraulic jumps, abrupt channel bends and changes in bed slope (Ref. 4.20.).

10.4. Manning's n-values. Roughness coefficients (n-values) of 0.035 and 0.025 were used in the original design to evaluate channel-friction losses for both Santa Maria River and Bradley Canyon River (Ref. 4.3.). The water surface profiles based on a "n-value" of 0.035 determined the maximum water-surface profile and was used to determine the levee crest elevations. The levees were designed with sufficient height to provide a minimum freeboard of 3 feet, and 4 feet for a moderate distance upstream from existing bridges. The n-value of 0.025 was used to determine the maximum average velocities to be considered in the design of the levee facing and the levee toe protection (Ref. 4.3.).

10.5. Bridges. As-constructed bridge plans for three bridges (Suey Road Bridge, Highway 101 Bridge, and Bonita School Road) were coded into the hydraulic model. However, only the Suey Road Bridge and the Highway 101 were part of this evaluation. All bridge measurements were verified in the field. Two feet of debris loading was added to each side of all piers that measure 6 ft or less in width (transverse dimension) for the full depth of flow (Ref. 4.12.).

10.6. Coefficients of Contraction/Expansion. Per guidance contained in the HEC-RAS Reference Manual (Ref. 4.20.), it is recommended that the contraction and expansion coefficients be set 0.3 and 0.5 at bridges when contraction/expansion conditions exists. However, since the bridges span the river no contraction/expansion occurs, therefore the contraction/expansion coefficients were set to 0.1 and 0.3, respectively.

10.7. Bridge Modeling Approach. Since all of the bridges within the evaluation reach are supported by piers that extend into the channel cross section, the highest energy solution between: Energy Only (Standard Step), Momentum, and Yarnell (Class A only) appropriate for each bridge was selected for low flow conditions; and Energy Only or Pressure and/or Weir for high flow conditions (Ref. 4.20.). For the Bonita School Road and Highway 101 Bridge the Energy Method was chosen because open channel flow conditions occur for low and high flow conditions. At Suey Road Bridge a combination of pressure and weir flow conditions exist. In this case, for high flow conditions an iterative procedure is calculated to determine the amount of each type of flow. The hydraulic program continues to iterate until both the pressure flow and the weir flow method have the same energy upstream of the bridge.

10.8. Boundary Conditions. Since the flow regime along the Santa Maria River is considered subcritical the downstream boundary limits was set to critical depth (Ref. 4.20.). Discharge values for Santa Maria River are much higher then Bradley Canyon River flows. The boundary condition for the Bradley Canyon River was set to the known water surface elevation where the Santa Maria River joins the Bradley Canyon River since at that location the stage is driven predominantly by the backwater of the Santa Maria River and not by flow coming down from Bradley Canyon, which was another requirement by HEC.

10.9. Final Results – Computed Water Surface Elevations. The final water surface profile for the evaluation reach is shown in Attachment A. Typical cross section information upon which the hydraulic model was developed is presented in Attachment B. Finally, the supporting pertinent hydraulic data for the above referenced water surface profile is displayed in tabulated format and shown in Attachment C.

11. Performance Reliability Analysis.

11.1. Objective of Risk-Based Analysis. The probability of exceedance and uncertainty analysis of levee containment is accepted by the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) levee system evaluation requirements. This policy requirement applies to all new and existing levees (Refs. 4.13 and 4.11.). However, FEMA's primary focus has been a reliance on the concept of "freeboard". Specifically, FEMA's levee certification requirements are discussed in detail in their 44 CFR Section 65.10(b)(1) of the NFIP regulations as well as in Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix H – Guidance for Mapping of Areas Protected by Levee Systems (Refs. 4.3. and 4.5.). Essentially, their requirements consist of, in general terms, 3 feet of freeboard above the computed water surface elevation for the 1% chance event (100-year), plus an additional foot of freeboard at bridges, and an additional 0.5 foot required at the upstream end and tapering to the minimum at the downstream end of the levee (Refs. 4.9 and 4.11.). Exceptions to the freeboard requirement may be pursued, based on the FEMA policy of permitting other Federal agencies responsible for levee construction to certify that levees will pass the FEMA Base Flood (100-year event) (Ref. 4.19.).

The USACE probability of exceedance and uncertainty analysis procedure for riverine levees is described in Chapters 4 and 5 of Engineering Manual (EM) 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies (Ref. 4.10.). A Monte Carlo simulation in the USACE's Hydrologic Engineering Center's Flood Damage Analysis (HEC-FDA) program version 1.2.5 was used to compute the uncertainty and assurance [conditional non-exceedance probability (CNP)] of the levee to reduce the flood risks from the 1% chance event (100-year) (Refs. 4.10. and 4.19.). Essentially, this means that a levee or incised channel must have a "conditional non-exceedance probability" (performance reliability) of 95%, with a minimum of 2 feet of freeboard added to the computed water surface elevation (relative to the inside of the levee) using the median estimate of the 1% chance event (100-year) (Ref. 4.19.). Assurance between 90 and 95% can be found in accordance with NFIP levee system evaluation requirements if it is at least the FEMA required freeboard above the 1% annual chance exceedance flood (Ref. 4.19.). Assurance less than 90% cannot be found in accordance with NFIP levee requirements (Ref. 4.19.).

11.2. Computational Methodology Process. Following the guidance found in EM 1110-2-1619 (Ref. 4.4.) and HEC-FDA User's Manual (Ref. 4.15.) is the computational methodology that requires a two step process to determine the necessary input information into the HEC-FDA program. The first step is to compute the "**Stage Uncertainty**". A discussion of its development is as follows:

11.2.1. Part One: Stage Uncertainty. Total stage uncertainty is a function of model uncertainty (S_{model}) and natural uncertainty ($S_{natural}$).

Natural uncertainty is a function of four parameters; watercourse bed composition, drainage area, 1% chance event (100-year) flow, and stage range.

Watercourse Bed Composition (Bed Identifier). With respect to the water course bed composition factor, information in "Table 5-1" was utilized (Ref. 4.10.). A higher value relates to higher "mobility" of the bed material. (Note this is completely independent of the smoothness of the bed material). Manning's n variation is a function of S_{model} (as will be discussed later.) For the bed material, consider how confident one can be that the bottom topography will remain unchanged over time. A less "mobile" material will resist scour and erosion better.

Table 5-1 Bed Identifiers (I_{Bed})	
Material	Identifier
Rock/Resistant Clay	0
Boulders	1
Cobbles	2
Gravels	3
Sands	4
Engineer Manual EM 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies, 1 August 1996	

Since the evaluation reach invert is comprised of sands, the bed composition factor corresponds to 4.

<u>Drainage Area.</u> As discussed in the Hydrology Evaluation (Refer to Hydrology Section), the Santa Maria area is hydrologically impacted by 1,634 square miles of land that make up the drainage area.

<u>The 1% Chance (100-year) Event Flow.</u> Through the evaluation reach, the 1% chance event (100-year) peak discharge used for the analysis are 66,300 cfs for Santa Maria River upstream end to the Bradley Canyon River confluence and Bradley Canyon River; and 70,900 cfs for Santa Maria River downstream of the Bradley Canyon confluence (Refer to Hydrology sections).

<u>Stage Range.</u> Range is defined as the maximum predicted or observed range of stage on the watercourse. The minimum flow in the river is set to zero, therefore, the minimum water surface elevation is equal to the invert elevation at any location. In a theoretical worst case scenario, the water surface could rise to the height of the levee and then by some additional value while overflowing. For this evaluation, the height of the levees plus one foot was determined to be the maximum water surface elevation at any given cross section river station.

The four parameters listed above serve as inputs for the equation below, which yields natural uncertainty. As explained in Ref. 4.10. this equation is written to use metric units of measure and therefore requires conversion before calculating.

$$S_{tnatural} = [\ 0.07208 + 0.04936\, I_{bed} - 2.2626 \times 10^{-7}\, A_{basin} + 0.02164\, H_{range} + 1.4194 \times 10^{-5}\, Q_{100}\ ]^2$$

Where I_{bed} = stream bed identifier for the size of the bed material which controls flow in the reach of interest

A_{basin} = drainage basin area in square kilometers

H_{range} = maximum expected or observed range in stage in meters

Q_{100} = peak discharge of the (1% chance) flood in cubic meters per second

Since an HEC-RAS model was available for the evaluation reach, invert and levee elevations data can be found in tabular form for each designated cross section. With this information, a $S_{natural}$ value was determined for each cross section. The hydrologic, hydraulic and natural uncertainty data are displayed in tabular format in Table 1: Hydraulic Pertinent Data and Risk and Uncertainty Input Results, found in Attachment D.

11.2.1.1. Model Uncertainty (Smodel) from Computer Model Data. As defined in EM 1110-2-1619 (Ref. 4.10.), model uncertainty is associated with the accuracy of the Manning's n-values used in the model of the watercourse. Because the n-value is not a measurable quantity, there is some inherent uncertainty with the n-values used in a computer model or a mathematical calculation.

As mentioned, the Manning's n-value determination is not exact. This is demonstrated in the information presented in Figure 16 (Ref. 4.10.), which plots n deviation versus assumed n. This figure provides information on a good plus or minus range for any assumed n-values. i.e.; if the n value assigned is 0.035, the selected value is determined to be within 0.01 of that value, or between 0.025 and 0.045.

To calculate the model uncertainty, two modified geometries for the evaluation reach were created in HEC-RAS (Ref. 4.20.); one with a lower range (assumed n minus uncertainty) and one with an upper range (assumed n plus uncertainty) of n-values. In addition to modifying Manning's n-values, debris parameters were adjusted in the HEC-RAS model to create a best and worst case scenario. Sediment has not been a factor since construction of the levees, since there is no indication of aggradation/degradation within the rivers. For this study, the "best case" geometry with low n values was modeled with the debris option not factored in (i.e. turned off in the model). Debris for the high n-value geometry was set at four feet on each side of piers, stretching from the river bed to the waterline. This created what's referred to as "worst case" geometry.

The value of model uncertainty is the standard deviation of the variation in water surface elevations between the "best case" and "worst case" geometries. This being the case, a steady state analysis was conducted for each geometry using HEC-RAS. The output results from both iterations were then displayed on a spreadsheet with a focus on determining the water surface elevation at each cross section within the evaluation reach. Finally, in accordance with Ref.

4.10., these water surface values were averaged to determine an E_{mean} for each damage sub-reach. The sub-reaches used for this analysis are Reach 1, Reach 2, Reach 3, and Bradley Canyon. The deviation in the water surface profiles were then calculated using Eqn. 5-7 (Ref. 4.10.) below.

$$S_{model} = \frac{E_{mean}}{4}$$

Where E_{mean} = mean difference between the upper and lower limits of the calculated stage

For this assessment, model uncertainty was averaged over each damage sub-reach. The model uncertainty calculation is listed in Table - Hydraulic Pertinent Data and Risk and Uncertainty Input Results, found in Attachment D.

<u>11.2.1.2. Total uncertainty</u> (S_{total}). Model and natural uncertainty are related using the Eqn. 5-6 (Ref. 4.10.) to calculate the total uncertainty at each of the damage sub-reach's cross-sections stations. S_{total} values at each station within each sub-reach was then averaged to determine the total uncertainty for the respective damage sub-reach. Because the HEC-FDA program uses one designated index station within each sub-reach, the natural uncertainty for that specific station was averaged with the model uncertainty for the encompassing sub-reach to calculate the total uncertainty at that index station applicable to its damage sub-reach (defined below). The index location for the evaluation reach is specified to aggregate stage-damage functions with uncertainty for flood damage analysis calculations. For this analysis the index location was set at the cross section location with the least freeboard for the SPF discharge.

$$S_t = \sqrt{S^2{}_{natural} + S^2{}_{\text{model}}}$$

Where S_t = total standard deviation of uncertainty

$S_{natural}$ = standard deviation of uncertainty as a function of pertinent natural physical characteristics of the watershed and conveyance

S_{model} = standard deviation of uncertainty of computed water surface data using mathematical models

The total uncertainty calculation for this analysis is also listed in Table: Hydraulic Pertinent Data and Risk and Uncertainty Input Results, found in Attachment D.

<u>11.2.2. Part Two: HEC-FDA Reliability Analysis.</u>

<u>11.2.2.1. Step One - Configure (Damage Reaches and Index Stations)</u>

*<u>Defining Damage Reaches</u>***.** The evaluation reach was sub-divided into four shorter river sub-reaches: Reach 1, Reach 2, Reach 3, and Bradley Canyon (Reach 4).

Selecting Sub-Reach Index Stations. HEC-FDA (Ref. 4.15.) evaluates the reliability of an entire damage reach based on the reliability at one index station within the sub-reach. Information on the reach index station parameters are shown in Table - Hydraulic Pertinent Data and Risk and Uncertainty Input Results, found in Attachment D. The cross section with the lowest freeboard within each sub-reach was selected as the index location.

11.2.2.2. Step Two - Hydraulic Data (Water Surface Profile, Stage-Discharge, Exceedance Probability, Levee Information, Geotechnical Fragility Curves)

Water Surface Profile Data. Uncertainty calculations are based on the 1% chance event (100-year) and associated water surface elevations. The HEC-FDA analysis requires more information; specifically, water surface profiles for eight different frequency flow events. The normal default events are the 2-, 5-, 10-, 25-, 50-, 100-, 250-, and 500-year events. These defaults were changed based on available information. This analysis utilized the 200-year event instead of the 250-year event (Refer to Hydrology sections). Once all eight flow regimes were established, they were each used to complete a steady state analysis with the base project geometry in HEC-RAS. Appendix C of the HEC-RAS User's Manual (Ref. 4.20.) describes in detail how to export the water surface profiles from the HEC-RAS model into the HEC-FDA program.

The current water surface profiles have changed since the original construction. In the original design the water surface profiles were computed by the reach method, using the Manning formula. As such, a typical cross section geometry was assumed, i.e. trapezoidal configuration. The current water surface profiles uses more detailed topography to accurately model current conditions of the rivers.

Stage Discharge Function with Uncertainty. Defining the uncertainty about each water surface profile across the different frequency flow events was required by HEC. Once the water surface profiles are established, the HEC-FDA program then retrieves a stage-discharge function from the water surface profile. Subsequently, the uncertainty then needs to be assigned for each index station. The HEC-FDA software will calculate the uncertainty based off a normal distribution and an error and stage input by the user. The uncertainty calculated at each index station is calculated and then applied along with the corresponding 1% (100-year) water surface elevation at the given index station. The normal distribution assumes that uncertainty will get no higher than the entered value, and will reduce linearly to zero as flow reduces to zero. Attachment D identifies the uncertainty and stage values that were used for each index station.

Exceedance Probability Function with Uncertainty. The basic information for this task is also extracted from the applicable HEC-RAS water surface profiles. Next, the graphical determination option was used in the analysis. Since the HEC-FDA program requires a value in years for the equivalent record length (Ref. 4.15.), the discharge-frequency data was based on an equivalent streamgage record length of 66 years.

Levee Data: Levee top of bank elevations for Reaches 1, 2 and 3 were extracted from as-constructed drawings (Refs. 4.17.and 4.18.). Top of bank levee elevations along Bradley Canyon were extracted from survey data (Ref. 4.16.). Levee elevations are shown in Table 16.

Geotechnical Fragility Curves: Creating fragility curves was a recommendation by HEC, however, since the levee embankment will be composed of soil cement it is unlikely the material will fail if overtopped. Therefore, fragility curves were not produced.

11.2.2.3. Step Three - Reliability Analysis. With the above information as input into HEC-FDA program, an "Evaluation by Analysis Years" was performed on the evaluation reach. The results of this analysis, which specify the non-exceedence probability per sub-reach for the specified frequency events, essentially indicated that the evaluation reach has greater than a 95% non-exceedance probability for a 1% chance event (100-year), which is required for levee evaluation. These results for the 1% chance event are summarized in Table 18. Freeboard (FB) at each index location was also included in the table and discussed below.

Risk and Uncertainty Analysis for the Standard Project Flood. A separate analysis was conducted for the 0.02% chance event (SPF) to determine whether the SPF event would overtop the levees or contain these flows. The goal was to keep the same original authorized level of protection. The only location along Santa Maria where the water is not contained is in reach 3 at the upstream side of Suey Crossing bridge. Further, the analysis showed overtopping of the Bradley Canyon levee by approximately 0.7 feet. In order to contain the SPF the levee was raised approximately one foot in a small portion of the Bradley Canyon levee, HEC-RAS River Sta. 374+31.18 to Sta. 384+62.01 (Refer to Attachment A). By raising the levee height a freeboard of approximately 0.2 feet was attained. The results for the 0.02% chance event before and after raising the levee are reported in Tables 19 and 20.

Consequently, since the SPF is contained only after raising the levee along Bradley Canyon the performance reliability of the 1% chance event was also updated to reflect the new levee height, refer to Table 21.

11.3 Risk & Uncertainty Summary. Hydraulic modeling of all four segments of the evaluation reach indicate that freeboard for the 1% chance event (100-year) is over 2 feet for Santa Maria levees and for the Bradley Canyon levee. An evaluation of risk and uncertainty using the HEC-FDA program showed that the entire evaluation reach does pass the 1% chance event with greater than a 95% probability. Refer to Attachment D for Hydraulic Pertinent Data and Risk and Uncertainty Input Results.

The goal to keep the same authorized level of protection to address design deficiencies and not changing the current levee configuration however was not achieved. The only area along Santa Maria that was not contained was just upstream of Suey Crossing bridge. Along Bradley Canyon a small portion of the levee was raised by one foot. Since Bradley Canyon is still in the design phase raising the levee would increase the level of protection for SPF flows.

12. Hydraulics Results.

The probability of exceedance and uncertainty analysis of levee containment is accepted by the FEMA NFIP levee system evaluation requirements if 3 feet of freeboard above the computed water surface elevation for the 1% chance event (100-year), plus an additional foot of freeboard at bridges, and an additional 0.5 foot required at the upstream end and tapering to the minimum at the downstream end of the levee (Refs. 4.9. and 4.11.). All segments of the levee system achieved a 3 foot freeboard clearance and 4 foot at bridges except just upstream of Suey Road Bridge, where freeboard was 3.9 feet.

The USACE probability of exceedance and uncertainty analysis procedure used a Monte Carlo simulation in the HEC-FDA program to determine if the levee system had a “conditional non-exceedance probability” (performance reliability) of 95%, with a minimum of 2 feet of freeboard added to the computed water surface elevation of the 1% chance event (100-year) (Ref. 4.10.).

As discussed in the above, the results from the HEC-FDA analysis confirmed that the entire evaluation reach has greater than a 95% non-exceedance probability for the 1% chance event (100-year) with greater than 2 feet of freeboard. Raising the levee along a portion of Bradley Canyon by approximately one foot will contain the SPF flows.

Table 1: Elevation-Storage-Outflow Relationship
Twitchell Dam

Twitchell Dam		
Elevation (ft)	Storage (ac-ft)	Outflow (ft^3/s)
623	110,482	500
623.2	110,982	1,500
623.4	111,232	3,000
623.6	111,983	5,000
623.8	112,233	7,800
624	112,984	11,630
651.5	197,756	12,700
652	199,579	12,850
654	207,012	13,450
656	214,628	14,300
658	222,435	15,500
660	230,444	16,800
665	251,458	21,100
668.2	265,633	24,700
670	273,849	26,500
675	297,602	32,900
678.2	313,451	37,600
680	322,566	37,800
685	348,689	38,700
690	376,188	40,000
692	387,020	40,700
Invert Elevation – 474.0 feet Spillway Crest = 651.5 feet Top of Dam = 692 feet		

Table 2: Pertinent Data for USGS Stream Gage Stations in and around Santa Maria River Watershed

Station ID, USGS	Gage Station Name	Drainage Area (mi^2)	Latitude	Longitude	Elevation (ft)	Year Began	Year End
11136800	Cuyama River below Buckhorn Canyon, CA	886	35º01”	120º13”	615	1904	2009
11137000	Cuyama River Near Santa Maria, CA	904	35º01”	120º28”	609	1930	1962
11138500	Sisquoc River Near Sisquoc, CA	281	34º84”	120º17”	624	1930	2009
11140000	Sisquoc River Near Garey, CA	471	34º89”	120º31”	355	1941	2009
11141000	Santa Maria River at Guadalupe, CA	1,741	34º98”	120º57”	65	1941	1987
11140585	Santa Maria River at Suey Crossing, CA	636	34º 58	120º24”	250	2007	2009
11138100	Cuyama River below Twitchell Dam	1,132	34º56’	120º17”	410	1959	1983

Table 3: Flow Frequency Analysis Statistics for USGS Gage No. 11140000

Study Name	No. of Years of Record	Mean (X)	Standard Deviation (S)	Station Skew	Regional Skew	MSE	Adopted Skew (G)
Santa Maria Valley Levees and Channel Improvements Design Memorandum No. 2 - US Army Corps of Engineers, March 1980	38	3.208	0.7397	-0.2349	-0.2	0.302	-0.2
Santa Maria River Levee Failure Analysis – FEMA Region IX, November 2006	54	3.389	0.6741	-0.645	-0.3	0.550	-0.574
Current Study March 2011	66	3.235	0.782	-0.762	-0.3	0.302	-0.621

Table 4: Discharge-Frequency Results
Comparison with FEMA Study for
Sisquoc River near Garey Stream Gage

	Current 2011 Study	**FEMA 2006 Study**
Location	Sisquoc River near Garey	Sisquoc River near Garey
Gage Number	11140000	11140000
Drainage Area (mi^2)	471	471
Period of Record	1941-2009	1941-2005
Zero Flows Included	Yes	No
2-yr (ft^3/s)	2,000	2,800
5-yr (ft^3/s)	8,000	9,200
10-yr (ft^3/s)	14,800	15,700
25-yr (ft^3/s)	26,500	26,300
50-yr (ft^3/s)	37,200	35,500
100-yr (ft^3/s)	49,300	45,800
200-yr (ft^3/s)	62,700	56,900
500-yr (ft^3/s)	81,800	72,600

Table 5: Pertinent Data for Concentration Points in Santa Maria River Watershed

Concentration Point (CP) Number	**Concentration Point Name**	**CP ID**	**Drainage Area (mi^2)**	**Comment**
1	SMR at Guadalupe	SMRatG	1721.3	
2	SMR above Guadalupe	SMRabG	1712.2	SMR d/s end of right bank levee
3	SMR below Nipomo Creek	SMRblNC	1692.0	
4	SMR above Nipomo Creek	SMRabNC	1663.7	
5	Nipomo Creek above SMR	NCabSMR	28.3	
6	SMR below Suey Creek	SMRblSC	1660.7	
7	SMR above Suey Creek	SMRabSC	1647.4	
8	Suey Creek above SMR	SCabSMR	13.3	
9	SMR below Bradley Canyon	SMRblBC	1636.6	Confluence of SM-BC
10	SMR above Bradley Canyon	SMRabBC	1627.1	
11	Bradley Canyon above SMR	BCabSMR	9.5	Bradley Canyon d/s levee
12	Bradley Canyon above Levee	BCabLv	8.4	Bradley Canyon u/s levee
13	SMR below Sisquoc River	SMRblSR	1617.7	SMR u/s end of left bank levee
14	Sisquoc River above SMR	SRabSMR	471.5	USGS Stream Gage – Sisquoc near Garey
15	Sisquoc River near Sisquoc	SRnrS	281.1	USGS Stream Gage
16	Cuyama River above Sisquoc	CRabSR	1146.3	
17	Twitchell Dam	Twit	1120.7	Outflow from Twitchell Dam
18	Cuyama River above Twitchell Dam	CRabTwit	1120.7	Inflow to Twitchell Dam
19	Cuyama R near Santa Maria	CRnrSM	902.5	USGS Stream Gage
SMR = Santa Maria River d/s = downstream u/s = upstream				

Table 6: Subarea Parameters

Subarea	Drainage Area A (mi²)	Length L (mi)	Length to Centroid Lca (mi)	Elevation Maximum (ft)	Elevation Minimum (ft)	Slope S (ft/mi)	Lag (hrs)
A	786.84	81.69	42.45	6006.6	1405.5	56.3	11.445
B	115.65	32.65	14.19	2767.4	626.3	65.6	7.818
C1	218.24	31.95	31.58	2568.6	775.8	56.1	10.826
C2	25.52	10.45	3.77	2246.3	350.0	181.5	1.669
D1	245.37	36.71	15.10	6156.8	1079.7	138.3	5.189
D2	35.68	14.17	7.15	3731.6	628.3	219.0	2.492
E	190.41	33.18	17.79	4344.8	350.0	120.4	5.251
F1	1.16	3.67	2.22	392.6	291.3	27.6	0.567
F2	8.37	7.02	4.08	1251.3	319.7	132.7	0.949
G	9.34	5.81	2.36	562.4	291.3	46.6	0.765
H	10.79	5.69	2.60	1546.7	254.6	226.9	0.585
I	13.28	11.15	6.76	1700.6	254.5	129.7	1.905
J	3.04	4.99	2.60	735.4	194.1	108.6	0.521
K	28.29	11.04	4.31	1398.8	194.8	109.0	1.244
L	20.23	12.80	5.69	286.4	101.4	14.5	1.285
M	9.01	8.69	4.20	354.8	69.4	32.9	0.933

Table 7: Loss Rate Parameters and Percent Impervious Cover
for Santa Maria River Watershed

Subarea	Initial Loss (in)	Constant Loss (in/hr)	Impervious (%)
A	1.1	0.3	0
B	1.1	0.3	0
C1	1.1	0.3	0
C2	1.1	0.3	0
D1	1.1	0.3	0
D2	1.1	0.3	0
E	1.1	0.3	0
F1	1.1	0.3	0
F2	1.1	0.3	5
G	1.1	0.2	5
H	1.1	0.2	5
I	1.1	0.2	5
J	1.1	0.2	5
K	1.1	0.2	25
L	1.1	0.2	35
M	1.1	0.2	15

Table 8: Basin “n” Value Estimation Guidelines

Basin “n”	Description
n = 0.05	Drainage area is quite rugged with sharp ridges and narrow, bends, over large boulders, and have considerable debris obstruction. The ground cover, excluding small areas of rock outcrops, includes many trees and considerable underbrush. No drainage improvements exist in the area.
n = 0.03	Drainage area is generally rolling, with rounded ridges and moderate side slopes. Watercourses meander in fairly straight, unimproved channels with some boulders and lodged debris. Ground cover includes scattered brush and grasses. No channel improvements exist in the area.
n = 0.02	Drainage area has comparatively uniform slopes and surface characteristics such that channelization does not occur. Ground cover consists of cultivated crops or substantial growths of grass and fairly dense small shrubs, cacti, or similar vegetation. No drainage improvements exist in the area.
n = 0.015	Drainage area has fairly uniform, gentle slopes with most watercourses either improved or along paved streets. Ground cover consists of some grasses with appreciable areas developed to the extent that a large percentage of the area is impervious.

Table 9: Basin "n" Values for Santa Maria River Watershed

Sub area	Drainage Area (mi^2)	Uniform Slope Area %	Moderate Slope Area %	Steep Slope Area %	n_1 (Uniform Slope)	n_2 (Moderate Slope)	n_3 (Steep Slope)	Weighted n Values
A	786.84	8.0	6.4	85.6	0.02	0.03	0.05	0.046
B	115.65	-	-	-	-	-	-	0.070*
C1	218.24	-	-	-	-	-	-	0.070*
C2	25.52	-	18.7	81.3	-	0.03	0.05	0.046
D1	245.37	-	-	-	-	-	-	0.050*
D2	35.68	-	-	-	-	-	-	0.050*
E	190.41	6.2	-	93.8	0.02	-	0.05	0.048
F1	1.16	-	-	-	-	-	-	0.020
F2	8.37	20.2	79.8	-	0.02	0.03	-	0.028
G	9.34	55.7	44.3	-	0.02	0.03	-	0.024
H	10.79	54.3	45.7	-	0.02	0.03	-	0.024
I	13.28	37.7	-	62.3	0.02	0.03	0.05	0.039
J	3.04	-	-	-	-	-	-	0.020*
K	28.29	5.7	94.3	-	0.015	0.03	0.05	0.029
L	20.23	51.4	48.6	-	0.015	0.03	-	0.017
M	9.01	15.1	84.9	-	0.015	0.03	-	0.019

* Adopted from previous studies

Table 10: Routing Parameters

Reach Name	Length (ft)	Velocity (ft/s)	Travel Time (min)	Time Step (hrs)	Muskingum K (hrs)	Muskingum X	No. of Subreaches
RA-B	172,366	12	3.99	0.0833	4.0	0.3	48
RB-C1	28,620	11	0.72	0.0833	0.7	0.3	9
RC1-C2	39,008	12	0.90	0.0833	0.9	0.3	11
RD1-D2	60,931	11.5	1.47	0.0833	1.5	0.3	18
RC2-E	18,246	7.58	0.67	0.0833	0.7	0.3	8
RD2-E	56,499	12	1.31	0.0833	1.3	0.3	16
RF2-F1	11,570	11.08	0.29	0.0833	0.3	0.3	3
RE-G	19,278	7.15	0.75	0.0833	0.7	0.3	9
RG-H	16,385	6.89	0.66	0.0833	0.7	0.3	8
RH-I	16,333	6.46	0.70	0.0833	0.7	0.3	8
RI-J	17,310	7.20	0.67	0.0833	0.7	0.3	8
RJ-L	29,253	6.94	1.17	0.0833	1.2	0.3	14
RL-M	9,732	7.19	0.38	0.0833	0.4	0.4	5

Table 11: Point Precipitation Values
for Storm Centered over Santa Maria River Watershed at Guadalupe

Duration	**2-yr (in)**	**5-yr (in)**	**10-yr (in)**	**25-yr (in)**	**50-yr (in)**	**100-yr (in)**	**200-yr (in)**	**500-yr (in)**
5-min	0.15	0.23	0.28	0.35	0.40	0.45	0.50	0.57
15-min	0.29	0.45	0.55	0.68	0.78	0.88	0.98	1.11
30-min	0.40	0.62	0.76	0.95	1.08	1.22	1.35	1.53
1-hr	0.51	0.78	0.96	1.20	1.37	1.54	1.72	1.95
2-Hr	0.71	1.10	1.20	1.67	1.91	2.14	2.38	2.69
3-Hr	0.91	1.40	1.37	2.12	2.42	2.71	3.00	3.39
6-Hr	1.38	2.09	1.54	3.16	3.61	4.05	4.49	5.07
12-Hr	1.95	3.04	1.72	4.68	5.36	6.03	6.71	7.61
24-Hr	2.52	4.00	1.95	6.20	7.11	8.02	8.92	10.10

PREFRE Parameters (Precipitation Frequency Computer Program)
Location = Santa Maria River at Guadalupe
Number = 10
Latitude = 34.58
Longitude = 120.34
Elevation = 65

Table 12: Point Precipitation Values for Storm Centered Above Santa Maria River and Bradley Canyon Confluence

Duration	2-yr (in)	5-yr (in)	10-yr (in)	25-yr (in)	50-yr (in)	100-yr (in)	200-yr (in)	500-yr (in)
5-min	0.15	0.23	0.28	0.35	0.40	0.45	0.50	0.57
15-min	0.29	0.45	0.55	0.68	0.78	0.88	0.98	1.11
30-min	0.40	0.62	0.76	0.95	1.08	1.22	1.35	1.53
1-hr	0.51	0.78	0.96	1.20	1.37	1.54	1.72	1.95
2-hr	0.72	1.10	1.35	1.68	1.92	2.16	2.40	2.73
3-hr	0.92	1.40	1.72	2.14	2.44	2.74	3.05	3.45
6-hr	1.39	2.11	2.59	3.20	3.65	4.10	4.55	5.14
12-hr	1.98	3.09	3.82	4.77	5.46	6.15	6.84	7.76
24-hr	2.57	4.08	5.08	6.34	7.27	8.20	9.12	10.33

PREFRE Parameters (Precipitation Frequency Computer Program)
Location = Santa Maria River below Bradley Canyon
Zone Number = 10
Latitude = 34.56
Longitude = 120.21
Elevation = 295

Table 13: Point Precipitation Values for Storm Centered Bradley Canyon Watershed

Duration	2-yr (in)	5-yr (in)	10-yr (in)	25-yr (in)	50-yr (in)	100-yr (in)	200-yr (in)	500-yr (in)
5-Min	0.14	0.22	0.27	0.34	0.39	0.44	0.49	0.56
15-Min	0.27	0.43	0.53	0.67	0.77	0.87	0.97	1.11
1-Hr	0.47	0.75	0.93	1.17	1.34	1.52	1.69	1.93
2-Hr	0.63	1.00	1.23	1.55	1.78	2.00	2.23	2.53
3-Hr	0.78	1.23	1.52	1.91	2.18	2.46	2.74	3.10
6-Hr	1.13	1.78	2.20	2.74	3.14	3.54	3.93	4.46
12-Hr	1.51	2.21	2.66	3.26	3.69	4.12	4.55	5.12
24-Hr	1.88	2.64	3.14	3.77	4.24	4.71	5.17	5.79

PREFRE Parameters (Precipitation Frequency Computer Program)
Location = At Bradley Canyon before confluence with Santa Maria River
Zone Number = 10
Latitude = 34.56
Longitude = 120.21
Elevation = 291

Table 14: Discharge Frequency Results at Selected Locations in the Santa Maria River Watershed

Location	CP	2-yr (50%) (ft^3/s)	5-yr (20%) (ft^3/s)	10-yr (10%) (ft^3/s)	25-yr (4%) (ft^3/s)	50-yr (2%) (ft^3/s)	100-yr (1%) (ft^3/s)	200-yr (0.5%) (ft^3/s)	500-yr (0.2%) (ft^3/s)	SPF (0.02%) (ft^3/s)
Santa Maria River upstream end of levee to Bradley Canyon	**SMRblBC**	3,300	9,980	18,900	36,500	52,000	66,300	80,900	100,000	160,000
Bradley Canyon* upstream end of levee to downstream end of levee	**BCabSMR**	920	1,900	2,650	3,680	4,430	5,180	5,920	6,920	9,000
Santa Maria River Bradley Canyon confluence to downstream end of levee	**SMRatG**	3,980	11,500	20,500	38,400	54,900	70,900	86,800	108,000	160,000
*Bradley Canyon discharge-frequency values. However, for design purposes the upper portion of the Santa Maria River levee was assumed to fail, therefore the discharge frequencies for Santa Maria River at upstream end of levee to Bradley Canyon was utilized for Bradley Canyon since discharges are higher and are more conservative.										

Table 15: Comparison of Discharge Frequency Results at Selected Locations in the Santa Maria River Watershed

Concentration Point (CP)	Location	5-yr (ft^3/s)	10-yr (ft^3/s)	25-yr (ft^3/s)	50-yr (ft^3/s)
SMRblBC	Santa Maria River upstream end of levee to Bradley Canyon	9,980	18,900	36,500	52,000
		5,900	13,000	30,000	50,000
BCabSMR	Bradley Canyon upstream end of levee to downstream end of levee	1,900	2,650	3,680	4,430
		NA	NA	NA	NA
SMRatG	Santa Maria River Bradley Canyon confluence to downstream end of levee	11,500	20,500	38,400	54,900
		5,500	12,000	28,000	47,000

The upper value in each column for each location is for the current study.

The lower value is from Design memorandum No. 2 for Santa Maria Valley Levees and Channel Improvements, dated March 1980 U.S. Army Corps of Engineers.

The Bradley Canyon Levees SPF discharges (BCabSMR-CP) are from previous study of Design Memorandum No. 1 General Design for Santa Maria Valley Levees and Channel Improvements, dated March 1958.

NA – Not available

Table 15 (Cont.): Comparison of Discharge Frequency Results at Selected Locations in the Santa Maria River Watershed

Concentration Point (CP)	**Location**	**100-yr (ft^3/s)**	**500-yr (ft^3/s)**	**SPF (ft^3/s)**	
SMRblBC	Santa Maria River upstream end of levee to Bradley Canyon	66,300	100,000		
		80,000	201,000	160,000	160,000
BCabSMR	Bradley Canyon upstream end of levee to downstream end of levee	5,180	6,920		
		NA	NA	7,000	9,000
SMRatG	Santa Maria River Bradley Canyon confluence to downstream end of levee	70,900	108,000		
		78,000	190,000	160,000	160,000

The upper value in each column for each location is for the current study.

The lower value is from Design memorandum No. 2 for Santa Maria Valley Levees and Channel Improvements, dated March 1980 U.S. Army Corps of Engineers.

The Bradley Canyon Levees SPF discharges (BCabSMR-CP) are from previous study of Design Memorandum No. 1 General Design for Santa Maria Valley Levees and Channel Improvements, dated March 1958.

NA – Not available

Table 16: Top of Levee Elevations

River	Reach	HEC-RAS Station	As-Built Station	Existing Elevation	New Elevation
Santa Maria	1		150	201.79	
Santa Maria	1	39000	495	203.79	
Santa Maria	1		1200	204.76	
Santa Maria	1	40000	1280	204.99	
Santa Maria	1	41000	2082	207.32	
Santa Maria	1		2300	207.95	
Santa Maria	1	42000	3092	210.41	
Santa Maria	1		3400	211.32	
Santa Maria	1	43000	3975	213.10	
Santa Maria	1		4500	214.72	
Santa Maria	1	44000	4865	217.06	
Santa Maria	1		5600	221.78	
Santa Maria	1	45089.9	5799	223.21	
Santa Maria	1	45211.9	5920	224.08	
Santa Maria	2		6250	226.70	
Santa Maria	2		6490	227.54	
Santa Maria	2	46000	6618	227.99	
Santa Maria	2		6746.59	228.57	
Santa Maria	2		6800	228.65	
Santa Maria	2	47000	7625	229.98	
Santa Maria	2		7800	230.26	
Santa Maria	2	47934.05	8417	231.62	
Santa Maria	2		8900	232.65	
Santa Maria	2	49000	9365	234.05	
Santa Maria	2		10000	235.51	
Santa Maria	2	50000	10365	236.61	
Santa Maria	2		11100	238.77	
Santa Maria	2	51000	11365	239.46	
Santa Maria	2		12200	241.66	
Santa Maria	2	52000	12542	242.82	
Santa Maria	2		13300	245.43	
Santa Maria	2	53000.5	13530	246.14	
Santa Maria	2		14400	248.88	
Santa Maria	2	54000	14435	249.01	
Santa Maria	2		15500	253.06	
Santa Maria	2	55001.51	15432	252.90	
Santa Maria	2	56000	16470	255.41	
Santa Maria	2		16600	255.72	
Santa Maria	2	56668	17138	256.20	
Santa Maria	2	56749	17219	256.28	
Santa Maria	3		17612.08	256.42	
Santa Maria	3	57000	17738	257.02	
Santa Maria	3		18600	262.18	
Santa Maria	3	58000	18738	262.34	
Santa Maria	3		19700	263.42	
Santa Maria	3	59000	19742	263.50	
Santa Maria	3	60000	20742	265.30	
Santa Maria	3		20800	265.44	
Santa Maria	3	61000	21743	268.46	
Santa Maria	3		21900	268.99	

Table 16: (Cont.) Top of Levee Elevations

River	Reach	HEC-RAS Station	As-Built Station	Existing Elevation	New Elevation
Santa Maria	3	62000	22746	271.95	
Santa Maria	3		23000	272.81	
Santa Maria	3	63000	23712	274.73	
Santa Maria	3		24100	275.77	
Santa Maria	3	64000	24712	277.36	
Santa Maria	3		25200	278.61	
Santa Maria	3	65000	25712	280.40	
Santa Maria	3		26300	282.44	
Santa Maria	3	66000	26754	283.76	
Santa Maria	3		27400	285.66	
Santa Maria	3	67000	27760	286.78	
Santa Maria	3		28500	289.05	
Santa Maria	3	68000	28762	289.94	
Santa Maria	3		29600	292.82	
Santa Maria	3	69000	29772	293.22	
Santa Maria	3	70000	30673	295.29	
Santa Maria	3		30700	295.33	
Santa Maria	3	71000	31676	297.87	
Santa Maria	3		31800	298.23	
Santa Maria	3	72000	32678	300.78	
Santa Maria	3		32900	301.42	
Santa Maria	3		33462.14	303.05	
Santa Maria	3		33558	303.33	
Santa Maria	3	73000	33678	303.68	
Bradley Canyon	4	41838.76	4770.37	324.32	
Bradley Canyon	4	41288.92	4776.31	324.18	
Bradley Canyon	4	40737.92	4807.84	323.25	
Bradley Canyon	4	39971.60	4838.85	321.36	
Bradley Canyon	4	39444.79	4835.49	318.96	
Bradley Canyon	4	38900.94	2968.60	314.18	
Bradley Canyon	4	38462.01	2169.71	311.17	313.81
Bradley Canyon	4	38112.98	2216.13	310.79	311.69
Bradley Canyon	4	37783.76	2538.94	310.83	311.26
Bradley Canyon	4	37431.18	2509.66	310.78	311.15
Bradley Canyon	4	36897.55	2537.00	309.50	
Bradley Canyon	4	36355.05	2370.00	308.50	
Bradley Canyon	4	35819.57	972.13	305.75	
Bradley Canyon	4	35279.98	1013.45	304.65	

Table 17: Reliability Analysis Results (using 100-year water surface profile with existing levee height)

Stream Name	Reach	Long-Term Risk (years)			Conditional Non-Exceedance Probability by Events						FB
		10	30	50	10%	4%	2%	***1%***	0.5%	0.02%	(ft)
Santa Maria	1	0.0002	0.0005	0.0009	1.0000	1.0000	1.0000	***1.0000***	1.0000	0.9997	6.2
Santa Maria	2	0.0003	0.0009	0.0017	1.0000	1.0000	1.0000	***0.9999***	0.9994	0.9960	5.6
Santa Maria	3	0.0002	0.0243	0.1158	1.0000	1.0000	0.9961	***0.9738***	0.8397	0.4872	2.7
Bradley Canyon	4	0.0244	0.0.0599	0.1162	1.0000	1.0000	0.9953	***0.9733***	0.8473	0.4798	2.9
FB = freeboard											

Table 18: Reliability Analysis Results (using SPF water surface profile with existing levee height)

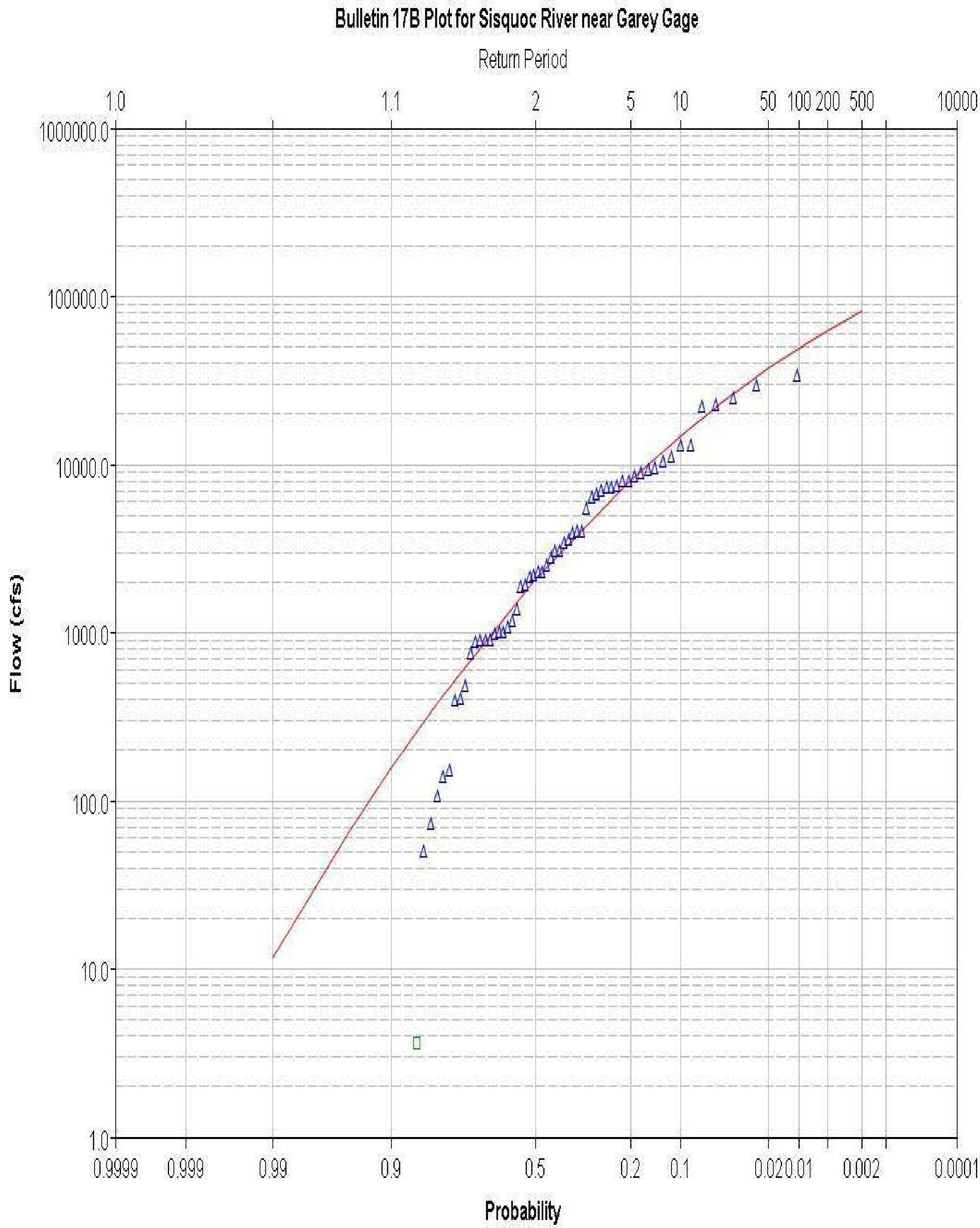
Stream Name	Reach	Long-Term Risk (years)			Conditional Non-Exceedance Probability by Events						FB
		10	30	50	10%	4%	2%	1%	0.5%	***0.02%***	(ft)
Santa Maria	1	0.0002	0.0005	0.0009	1.0000	1.0000	1.0000	1.0000	1.0000	***0.9998***	3.2
Santa Maria	2	0.0011	0.0027	0.0054	1.0000	1.0000	1.0000	0.9996	0.9950	***0.9809***	1.9
Santa Maria	3	0.0284	0.0696	0.1343	1.0000	1.0000	0.9954	0.9671	0.8162	***0.4740***	-1.2
Bradley Canyon	4	0.0210	0.0516	0.1005	1.0000	1.0000	0.9960	0.9765	0.8741	***0.6044***	-0.7
FB = freeboard											

Table 19: Reliability Analysis Results (using SPF water surface profile with updated levee height)

Stream Name	Reach	Long-Term Risk (years)			Conditional Non-Exceedance Probability by Events						FB
		10	30	50	10%	4%	2%	1%	0.5%	***0.02%***	(ft)
Bradley Canyon	Existing	0.0210	0.0516	0.1005	1.0000	1.0000	0.9960	0.9765	0.8741	***0.6044***	-0.7
Bradley Canyon	Raised Levee 1’	0.0073	0.0182	0.0360	1.0000	1.0000	0.9996	0.9949	0.9614	***0.8543***	0.2
FB = freeboard											

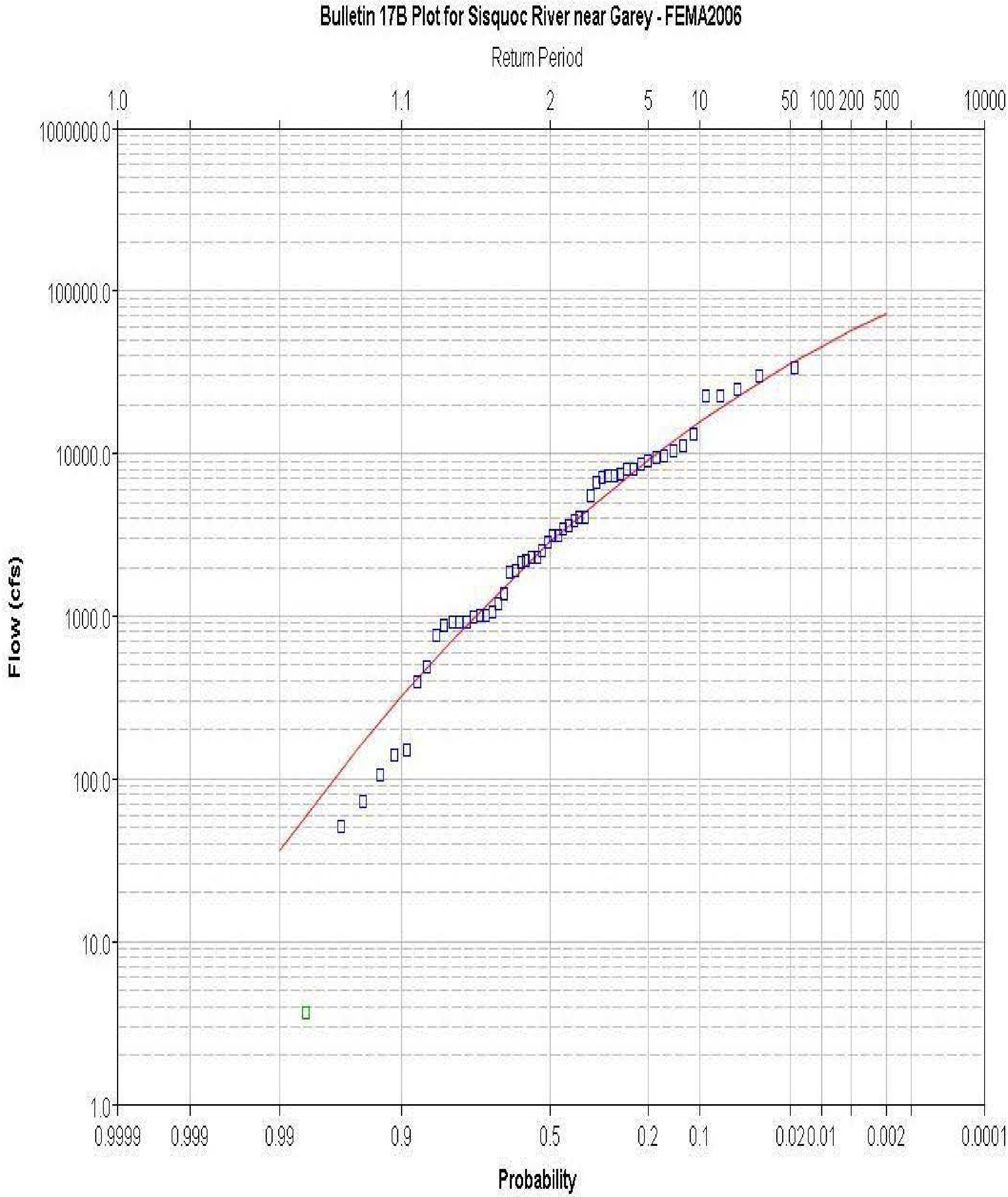
Table 20: Reliability Analysis Results (using 100-year water surface profile with updated levee height)

Stream Name	Reach	Long-Term Risk (years)			Conditional Non-Exceedance Probability by Events						FB
		10	30	50	10%	4%	2%	***1%***	0.5%	0.02%	(ft)
Bradley Canyon	Existing	0.0244	0.0.0599	0.1162	1.0000	1.0000	0.9953	***0.9733***	0.8473	0.4872	2.9
Bradley Canyon	Raised Levee 1’	0.0080	0.0199	0.0395	1.0000	1.0000	0.9996	***0.9948***	0.9561	0.8122	3.8
FB = freeboard											



Observed Events Δ Computed Probability Curve

Figure 1: Discharge-Frequency Curve
USGS Gage No. 11140000 Sisquoc River near Garey



Observed Events □ Computed Probability Curve

Figure 2: Discharge-Frequency Curve FEMA 2006 Study
USGS Gage No. 11140000 Sisquoc River near Garey

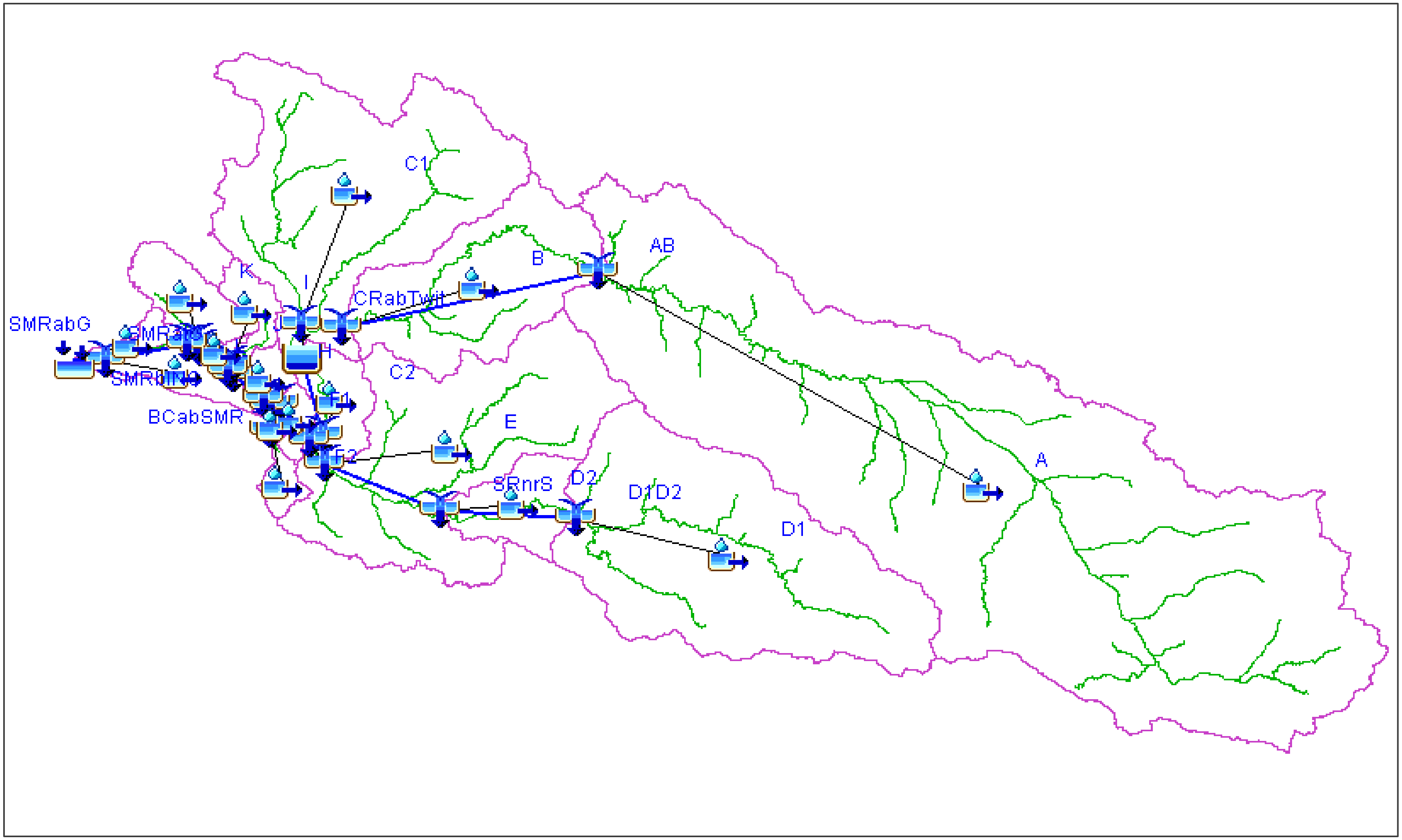


Figure 3: Schematic Diagram – HEC-HMS Model – Santa Maria River Watershed

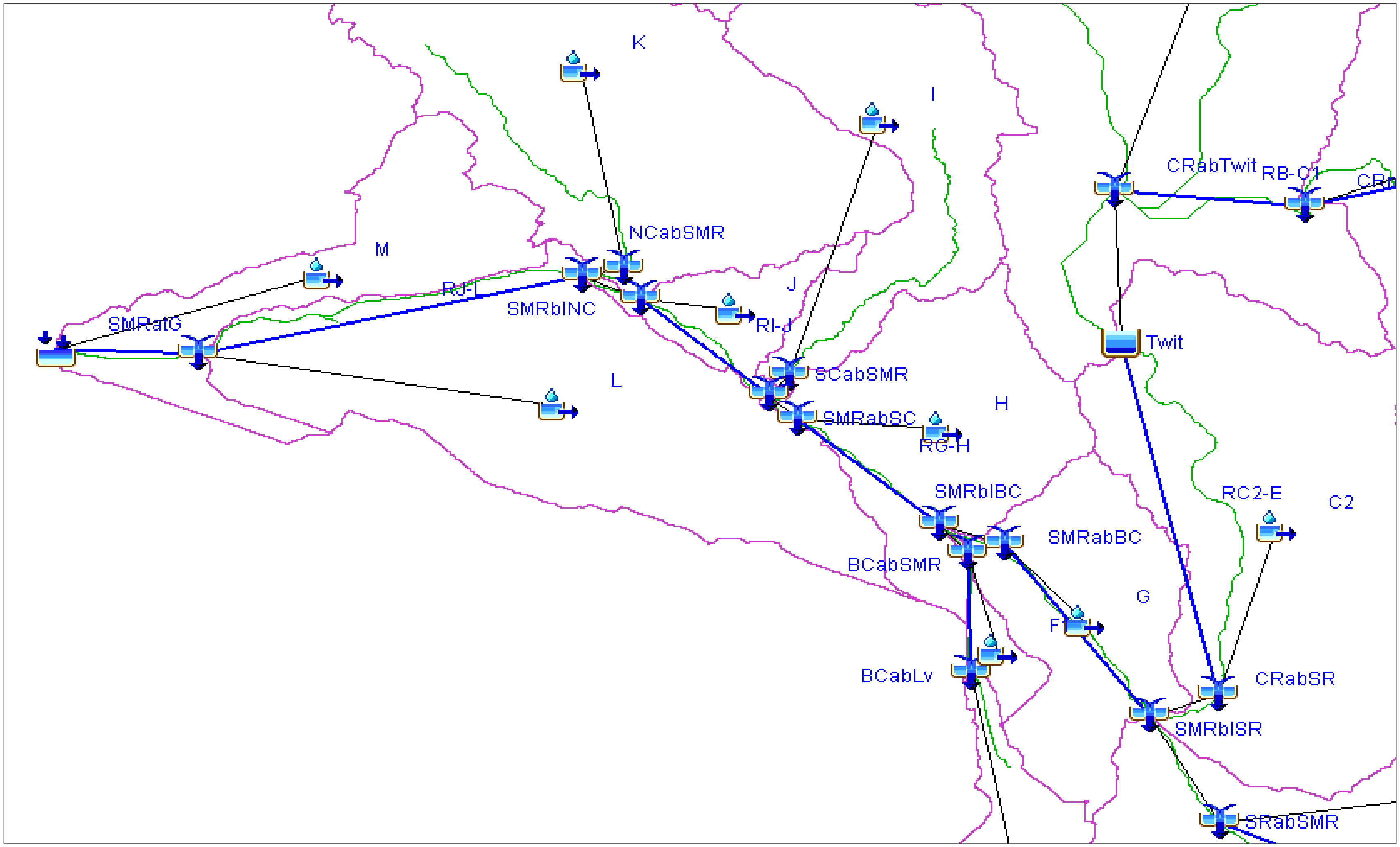


Figure 4: Schematic Diagram – HEC-HMS Model – Lower Portion of Santa Maria River Watershed

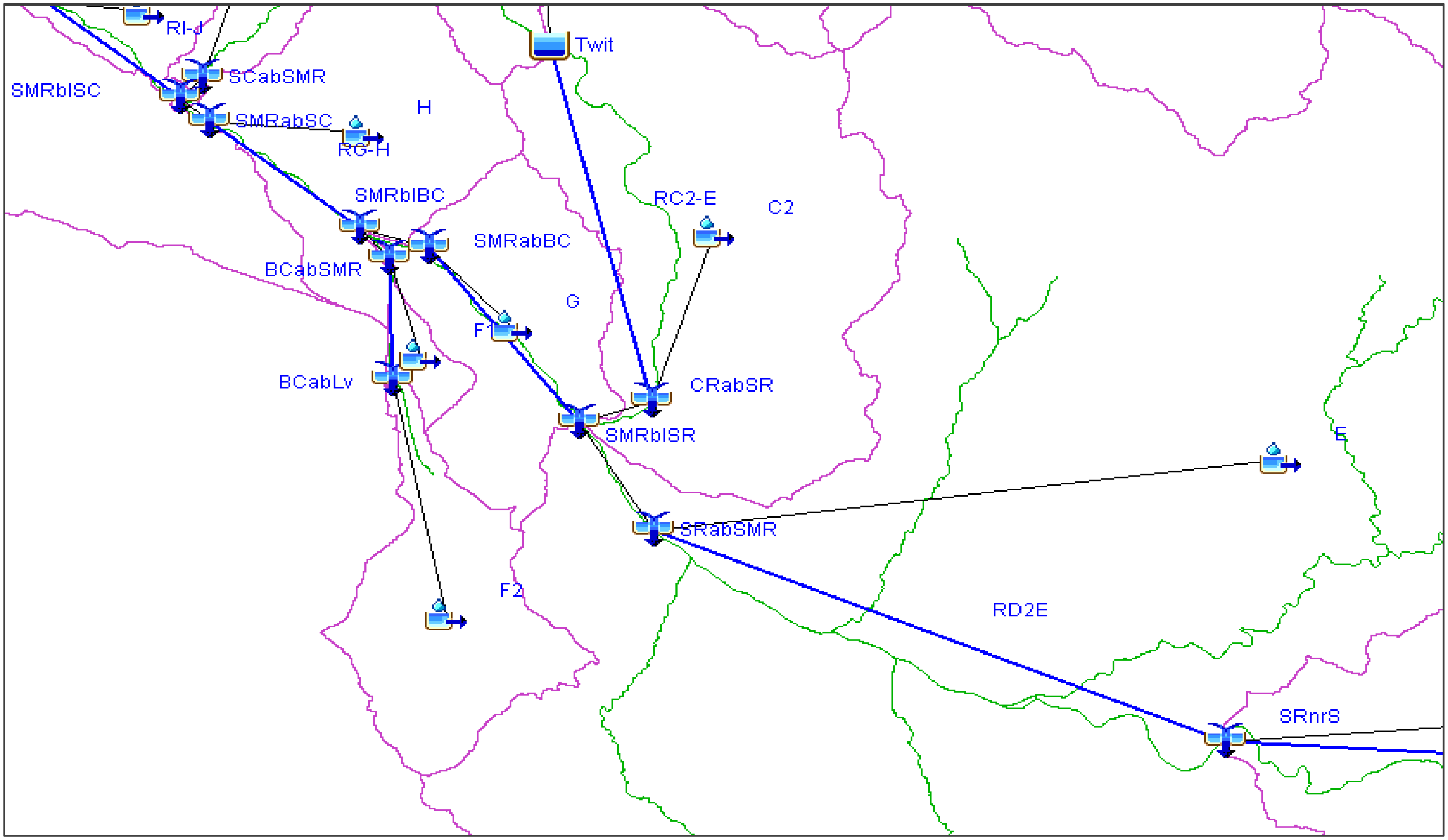


Figure 5: Schematic Diagram – HEC-HMS Model – Portion of Sisquoc River - Santa Maria Watershed

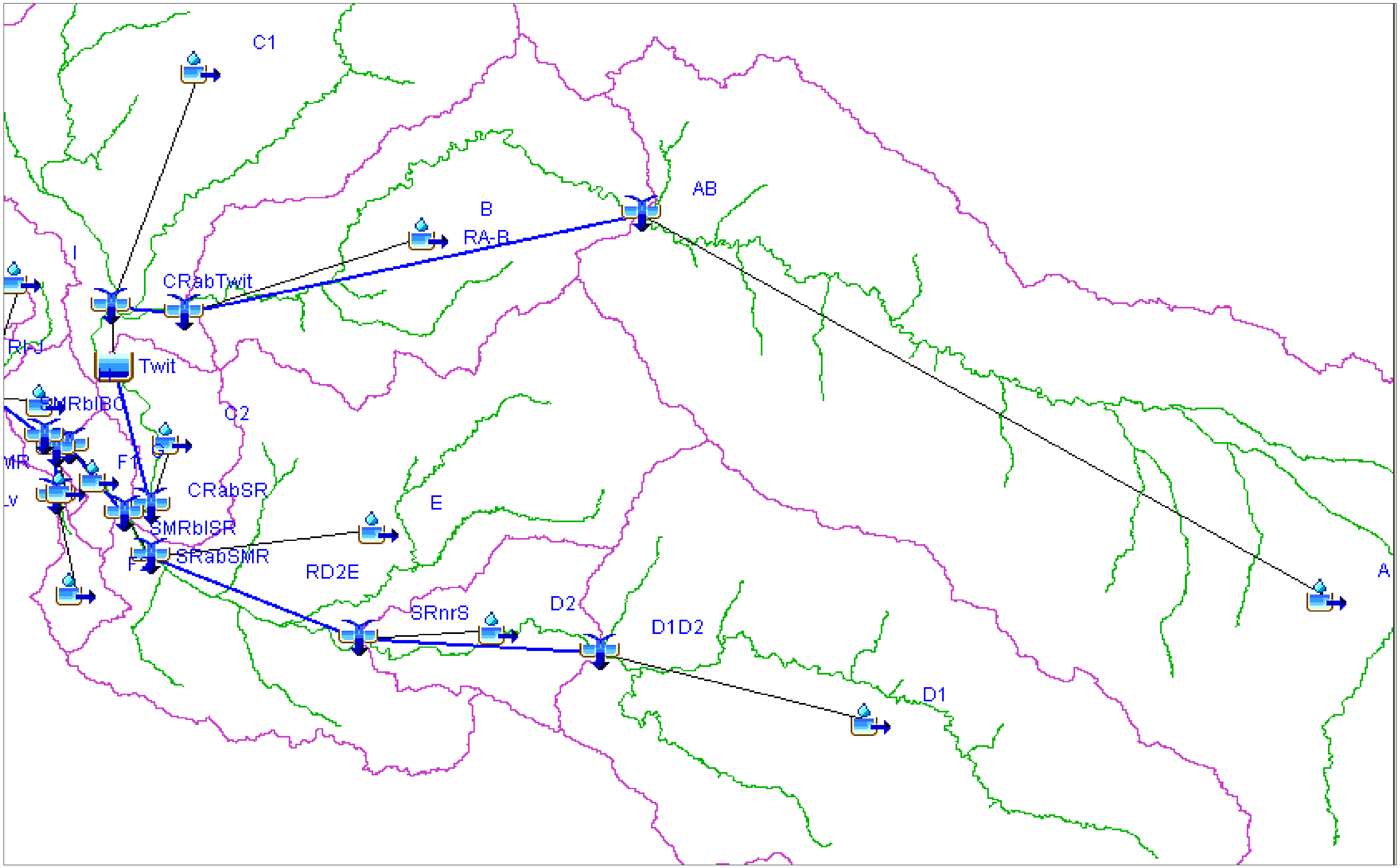


Figure 6: Schematic Diagram – HEC-HMS Model – Portion of Cuyama River - Santa Maria Watershed

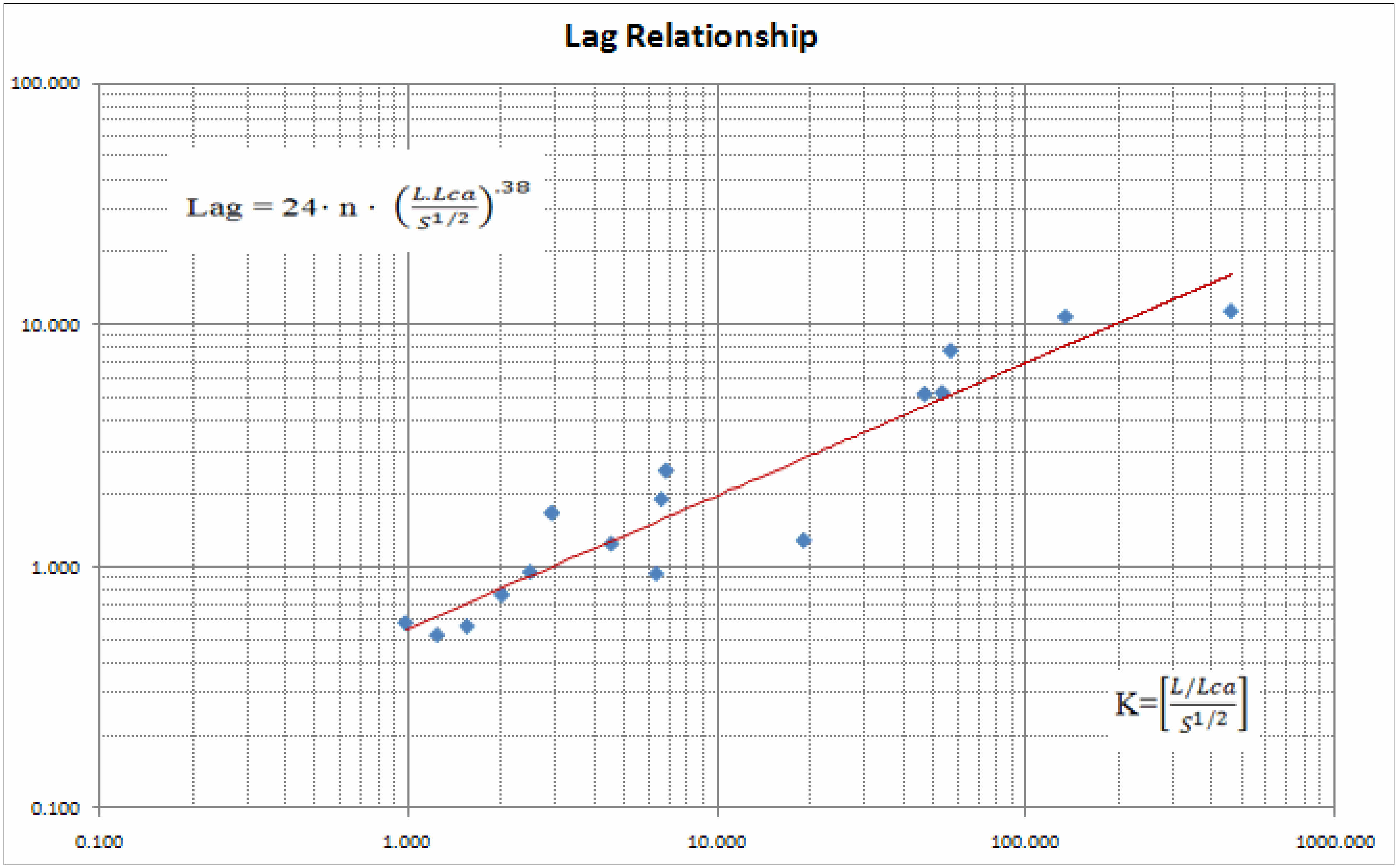


Figure 7: Lag Relationship – for HEC-HMS Models – Santa Maria River Watershed

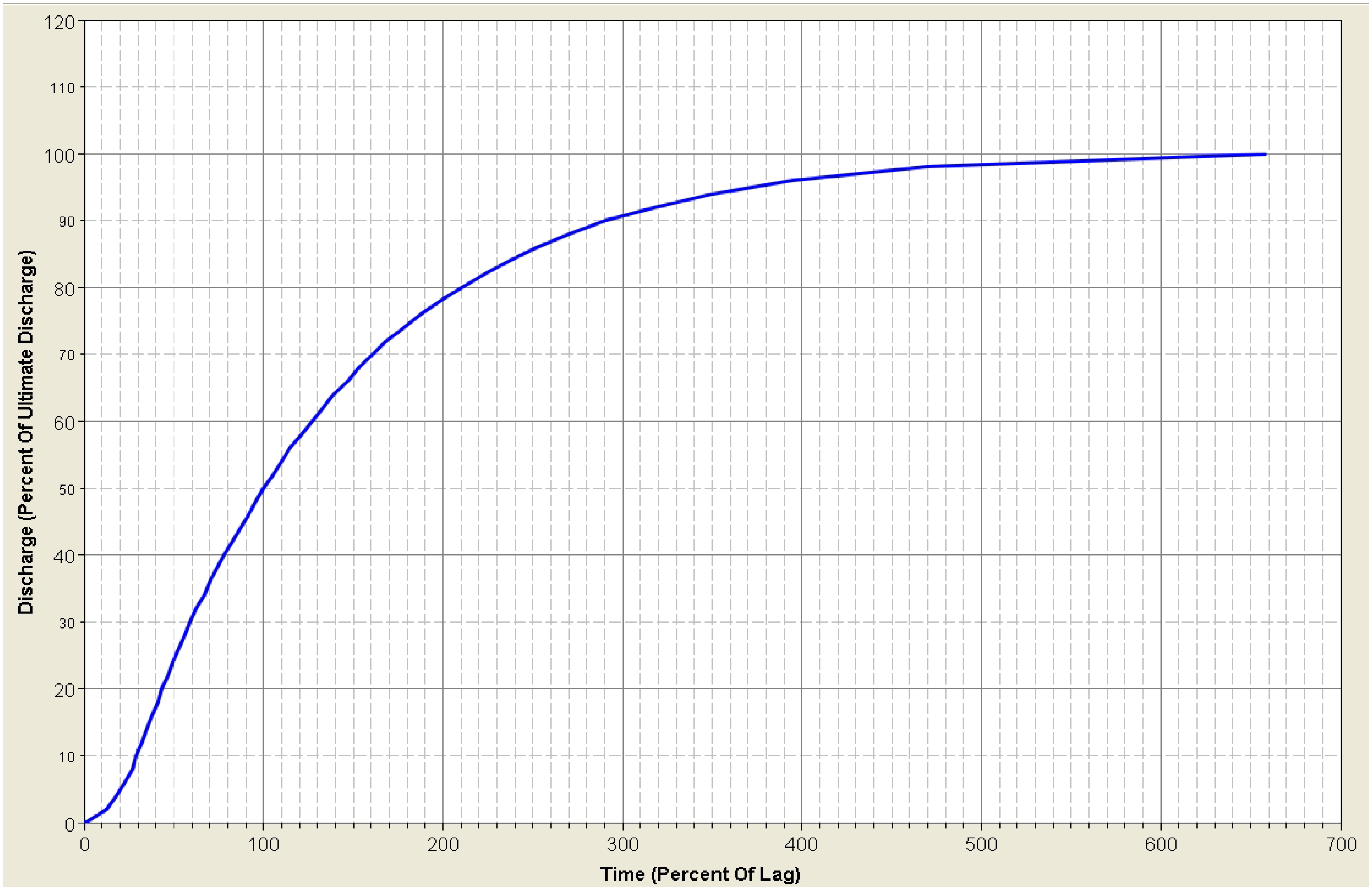


Figure 8: Santa Barbara S-Graph Used in HEC-HMS Models – Santa Maria River Watershed

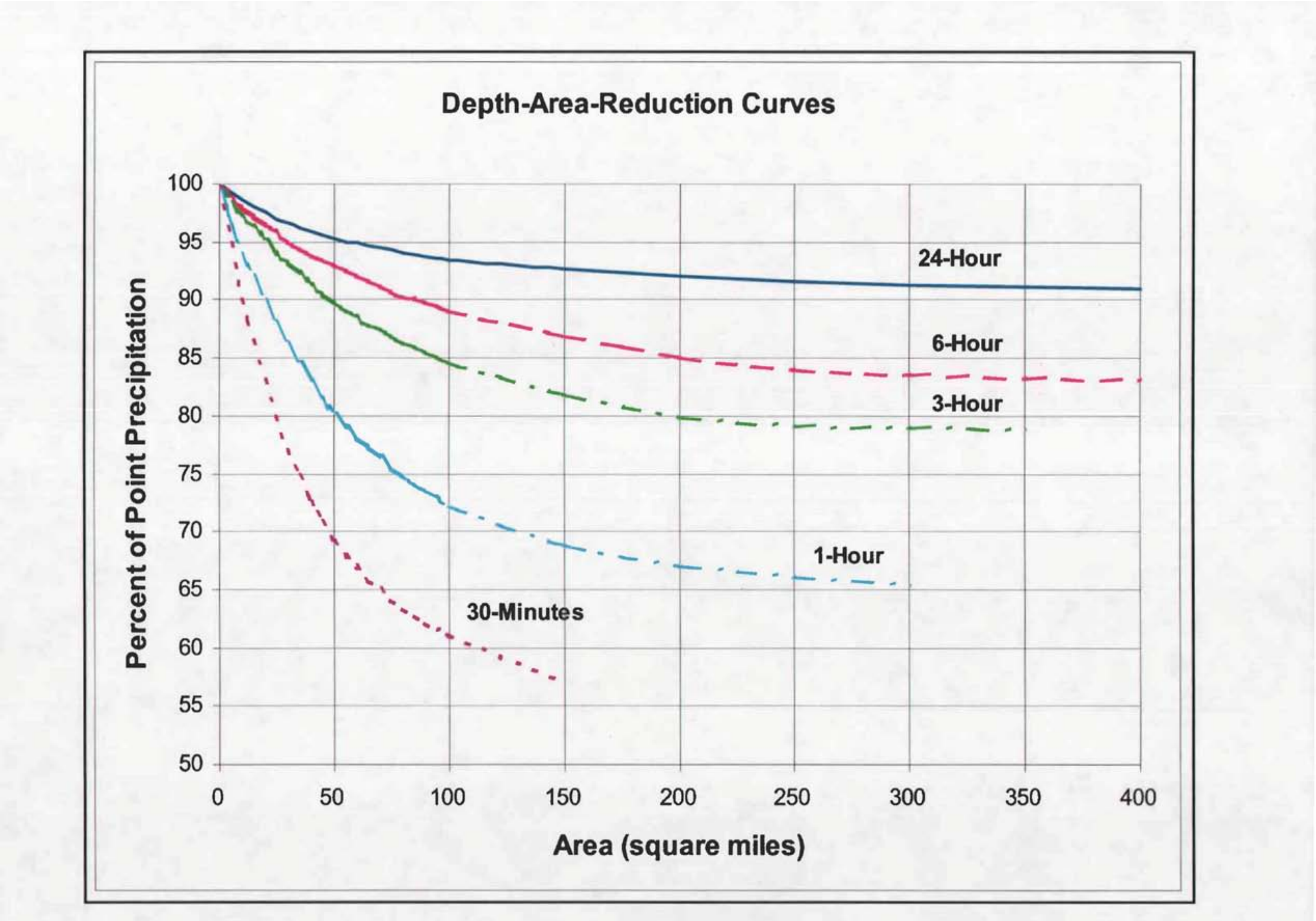


Figure 9: Depth-Area Reduction Curves

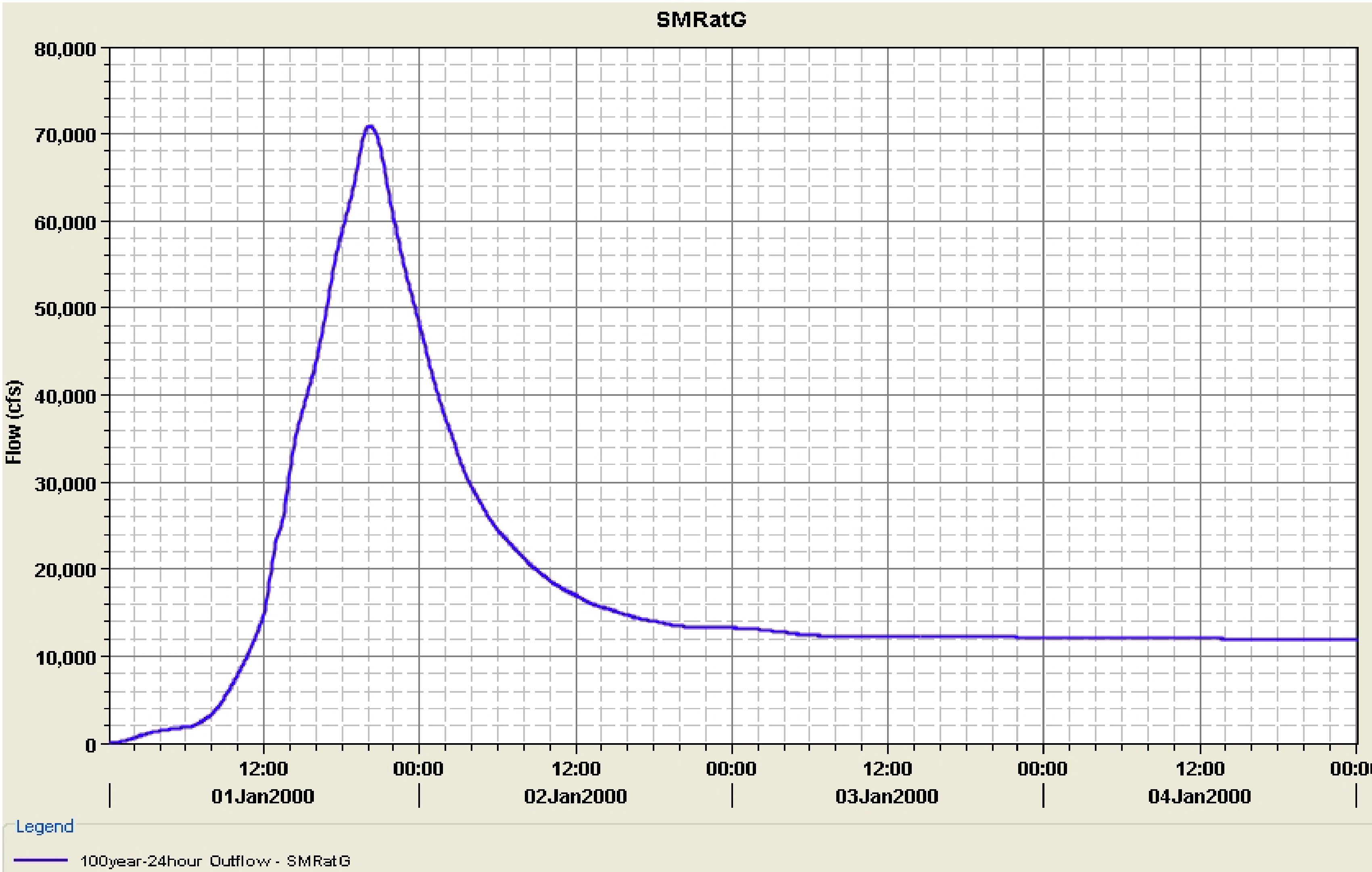


Figure10: 100-yr Hydrograph for Santa Maria River downstream end of levee (SMRatG)

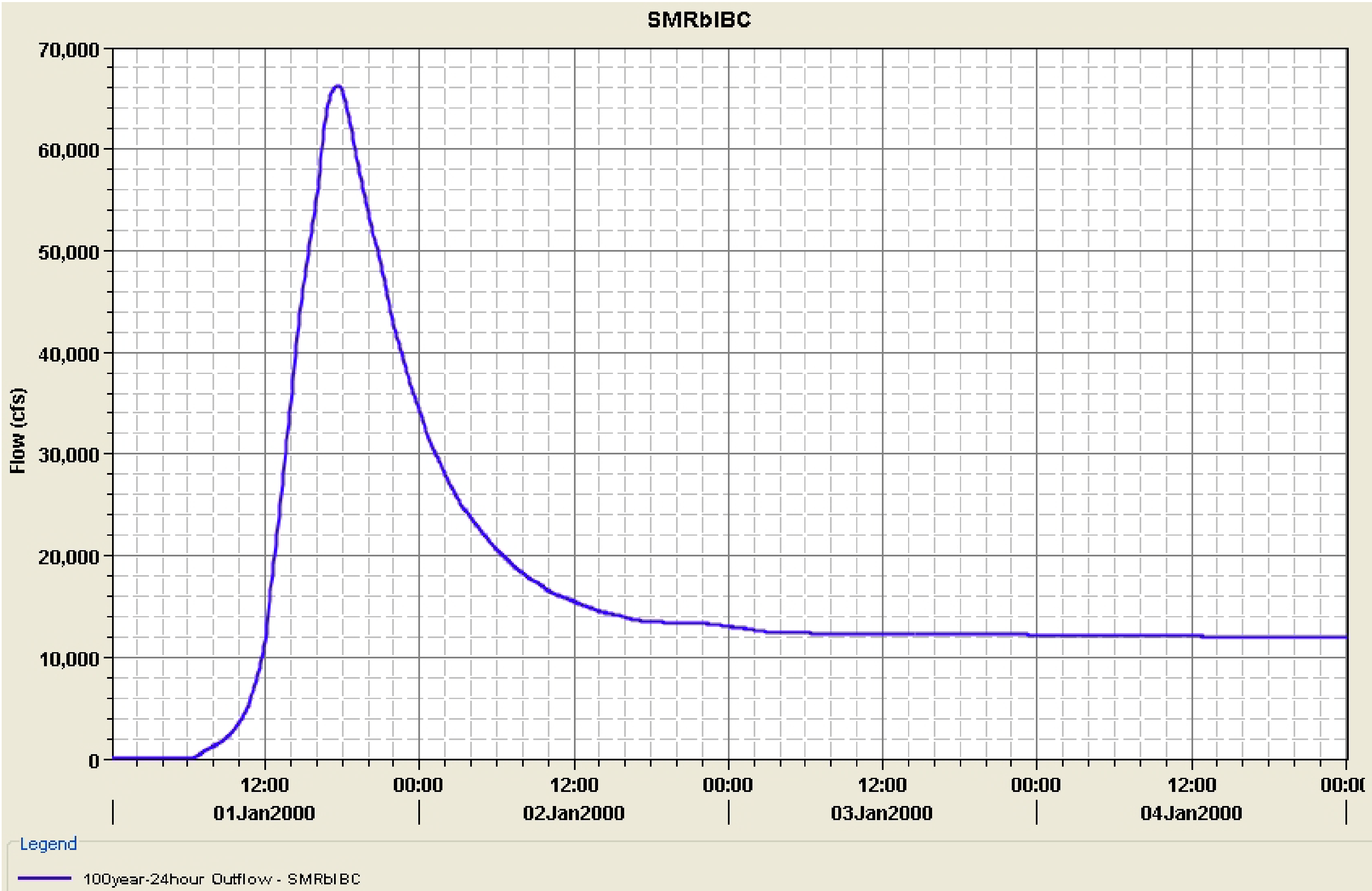


Figure11: 100-yr Hydrograph for Santa Maria River upstream end of levee (SMRabBC)

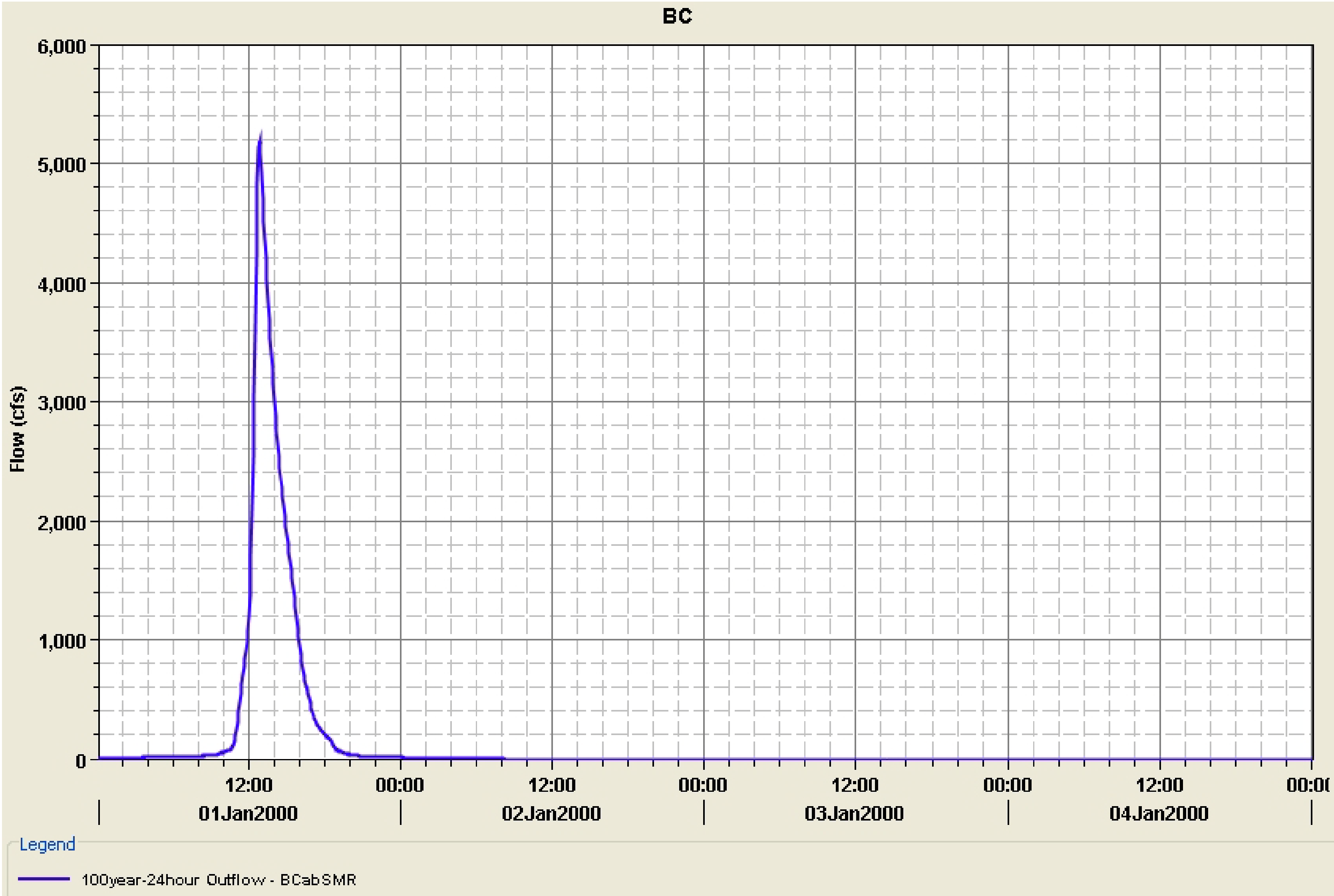


Figure12: 100-yr Hydrograph for Bradley Canyon downstream end of levee (BCabSMR)

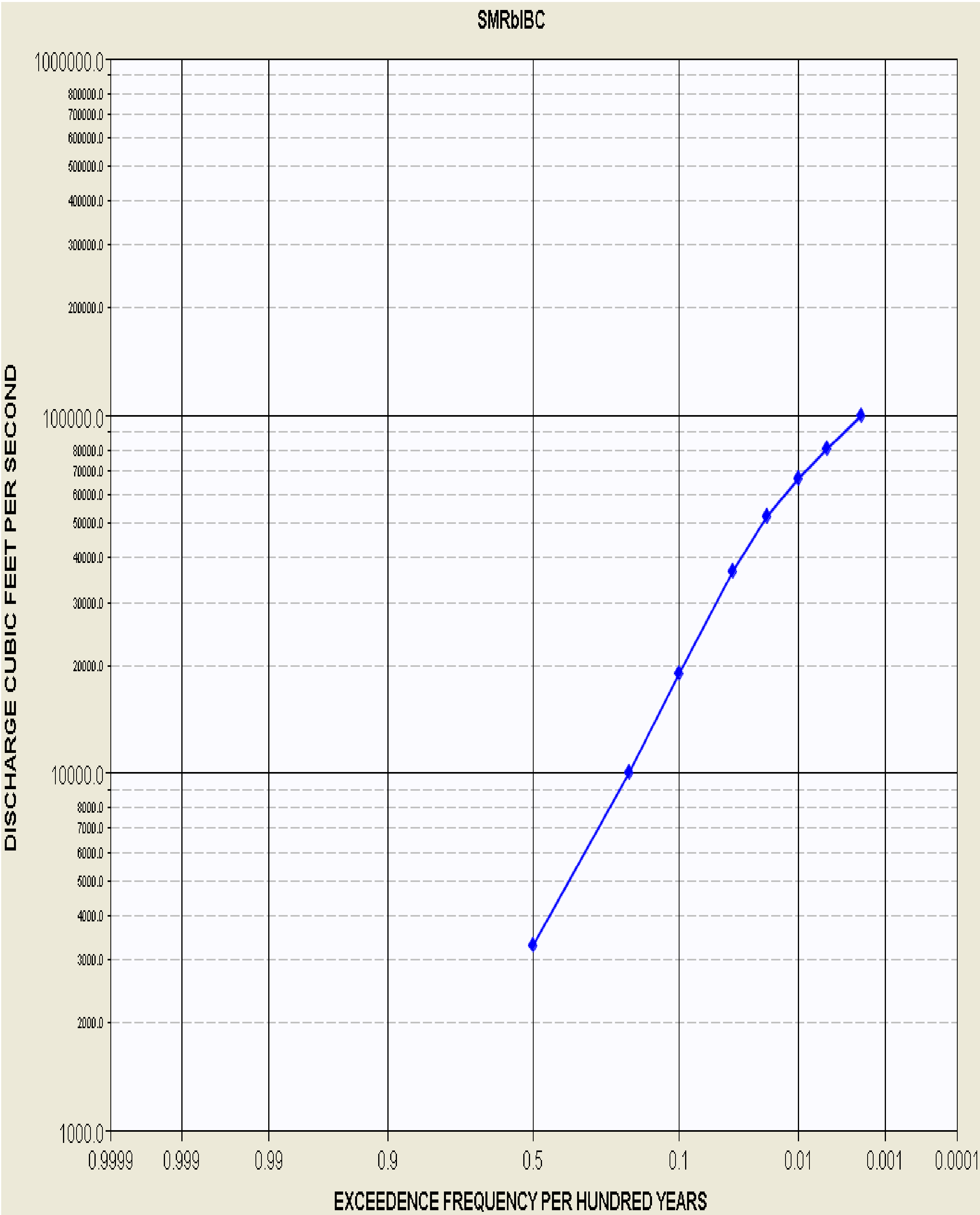


Figure13: Final Frequency Curve for Santa Maria River
upstream end of levee to Bradley Canyon

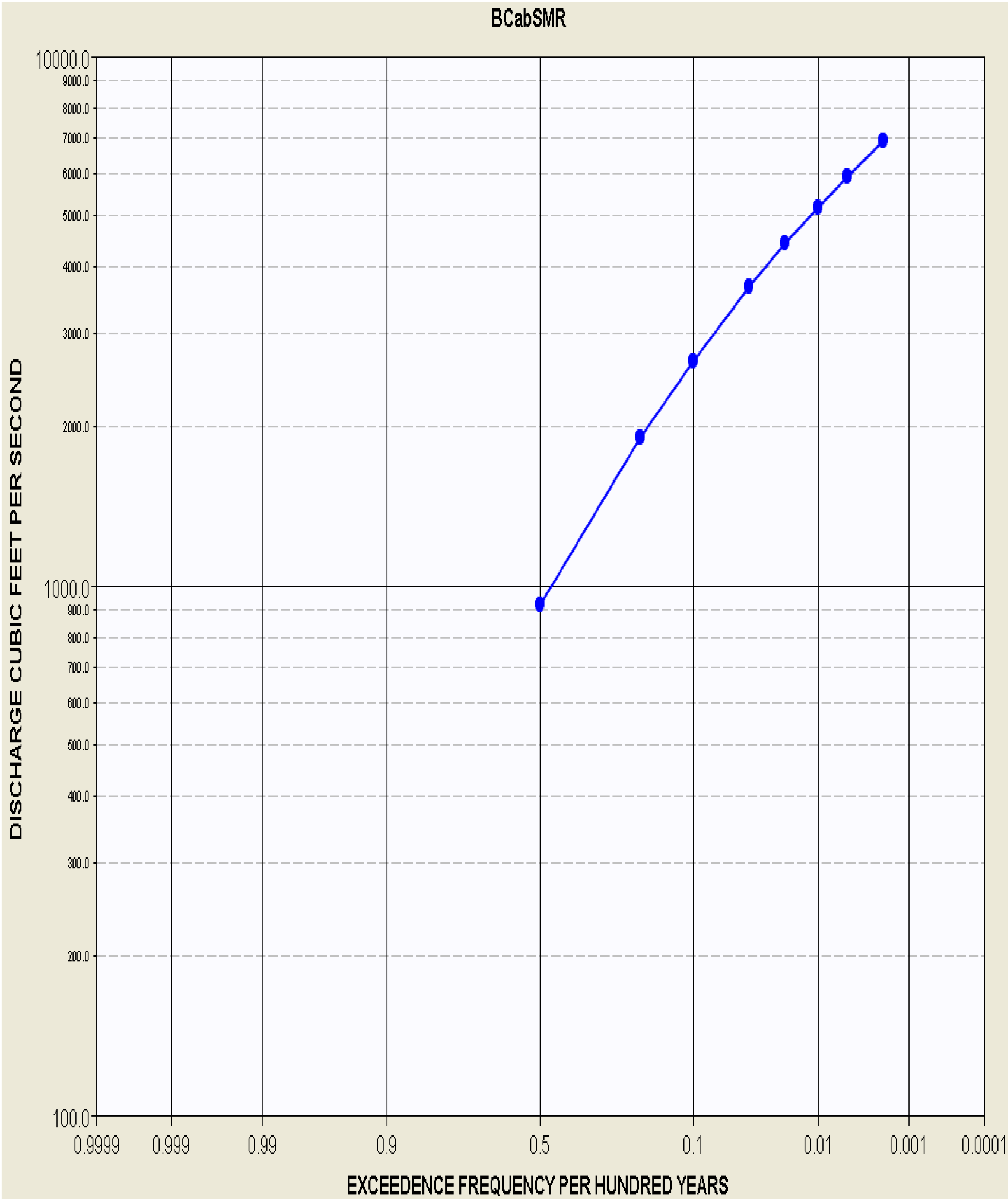


Figure14: Final Frequency Curve for Bradley Canyon
upstream end of levee to downstream end of levee

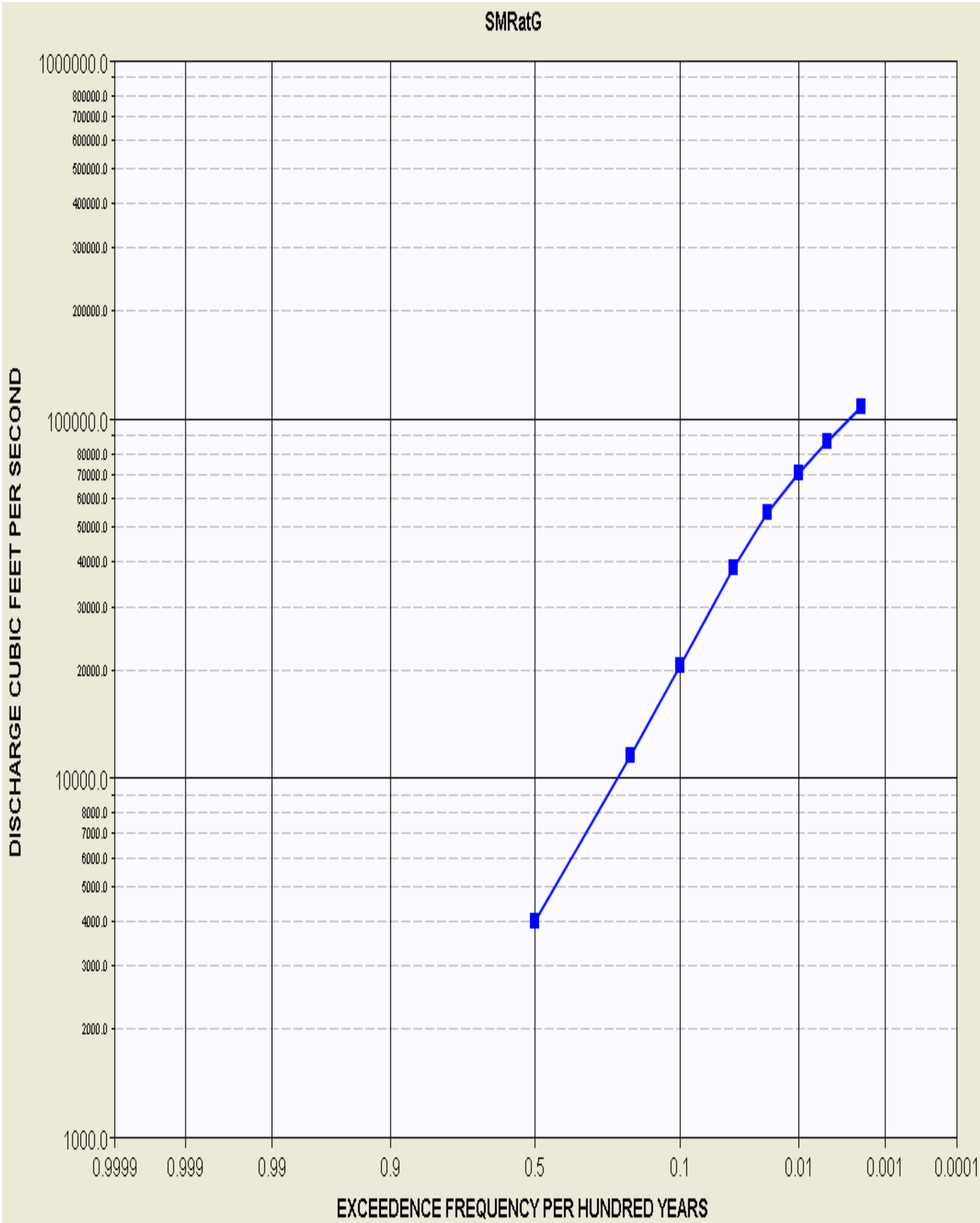


Figure15: Final Frequency Curve for Santa Maria River
Bradley Canyon confluence to downstream end of levee

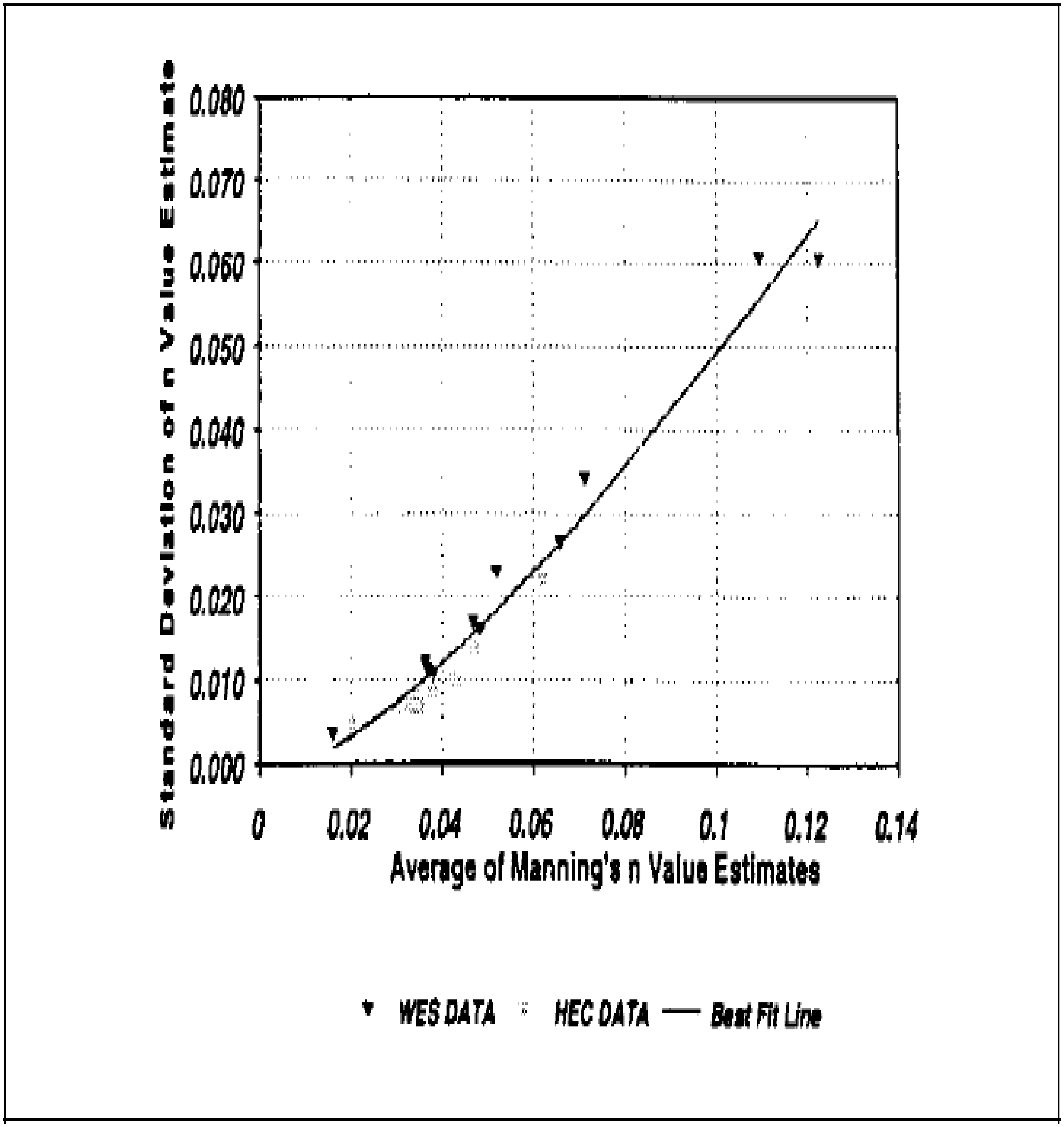
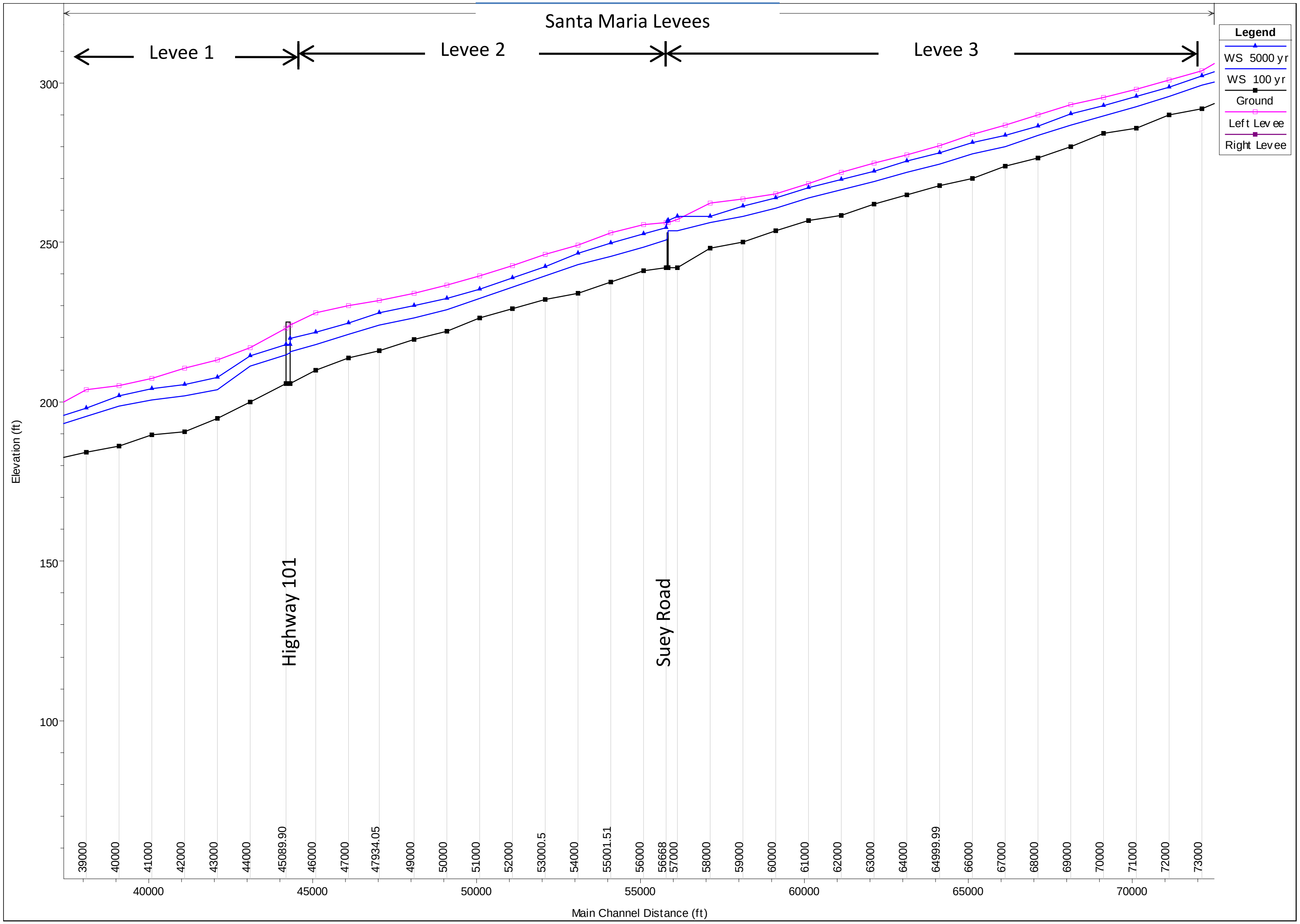
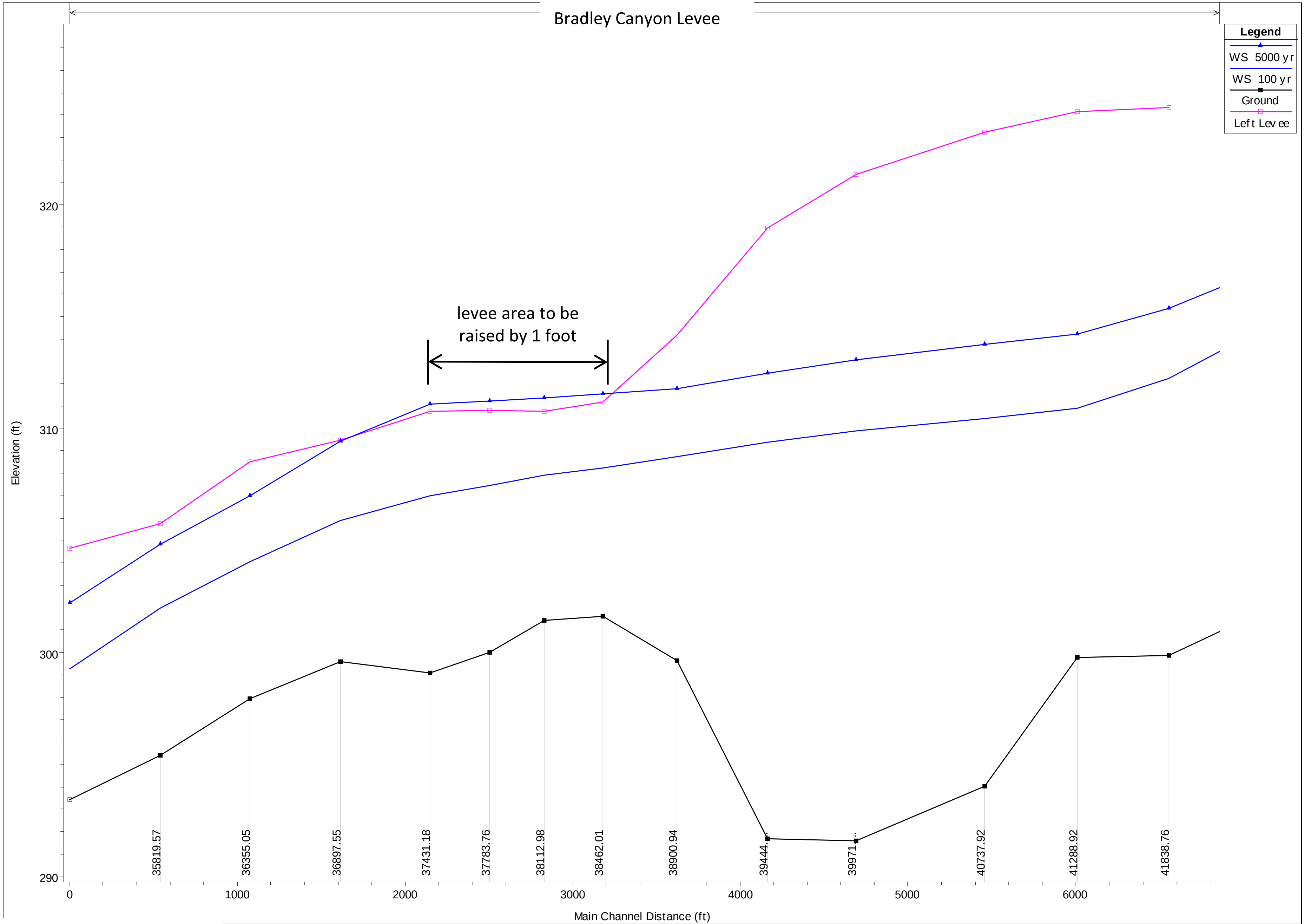


Figure16: Uncertainty of Manning's n value estimates based on estimated mean values (extracted from Reference 4.10, "Figure 5-4")

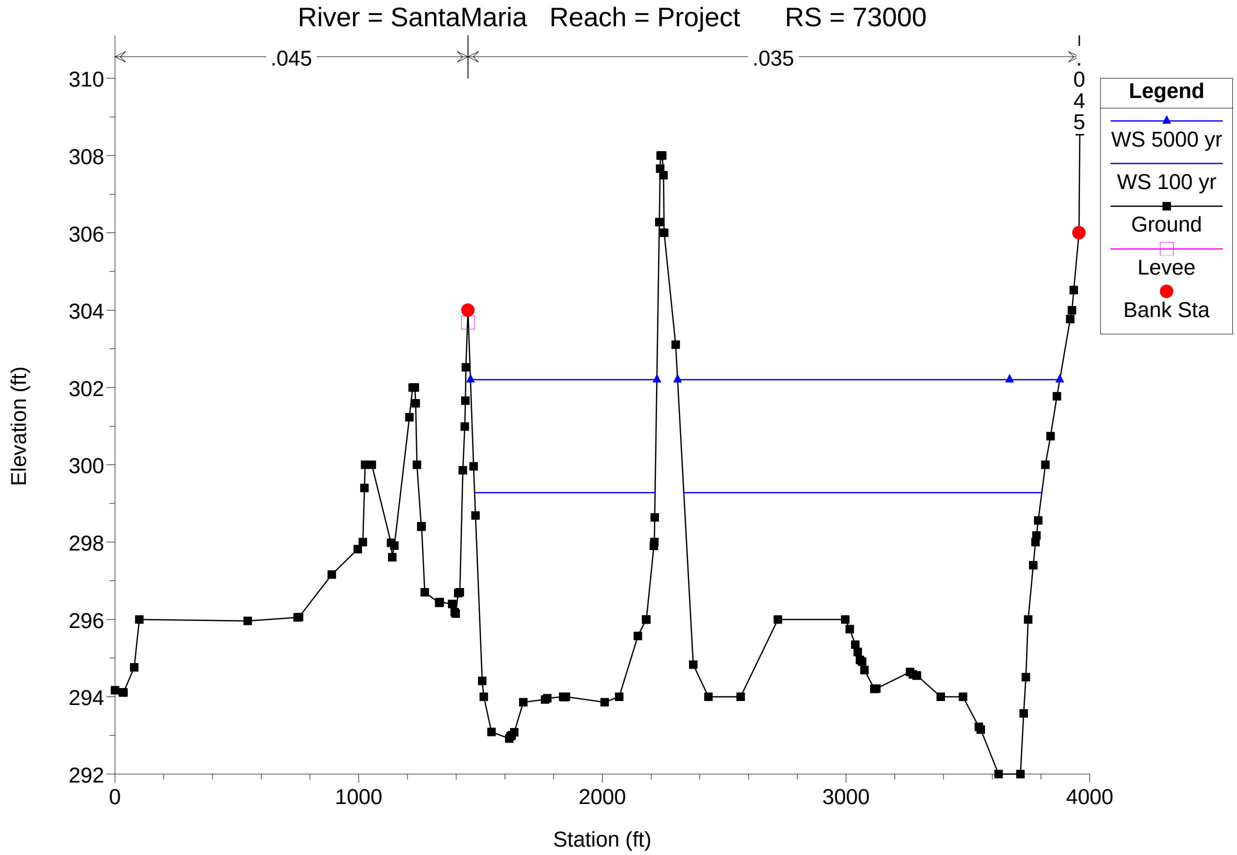
Attachment A: Evaluation Reach HEC-RAS Water Surface Profile

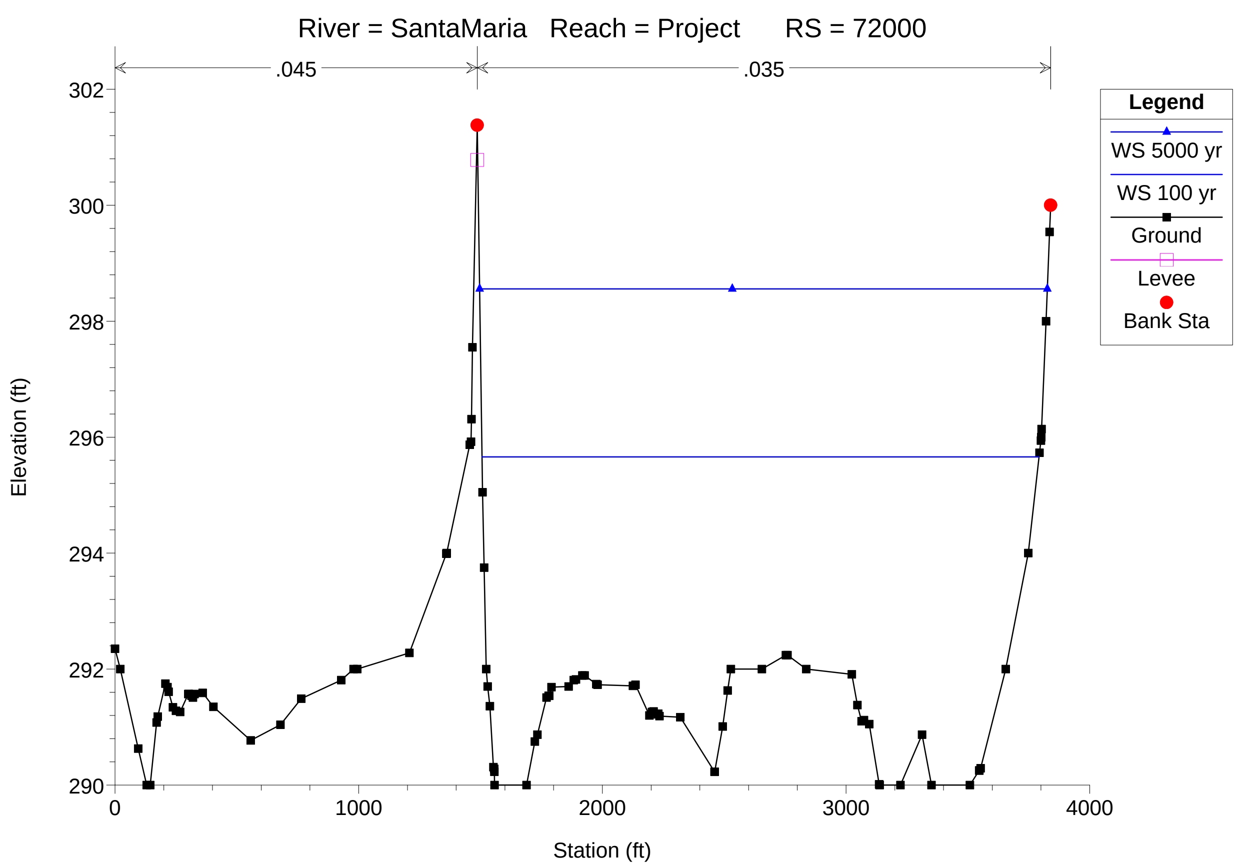


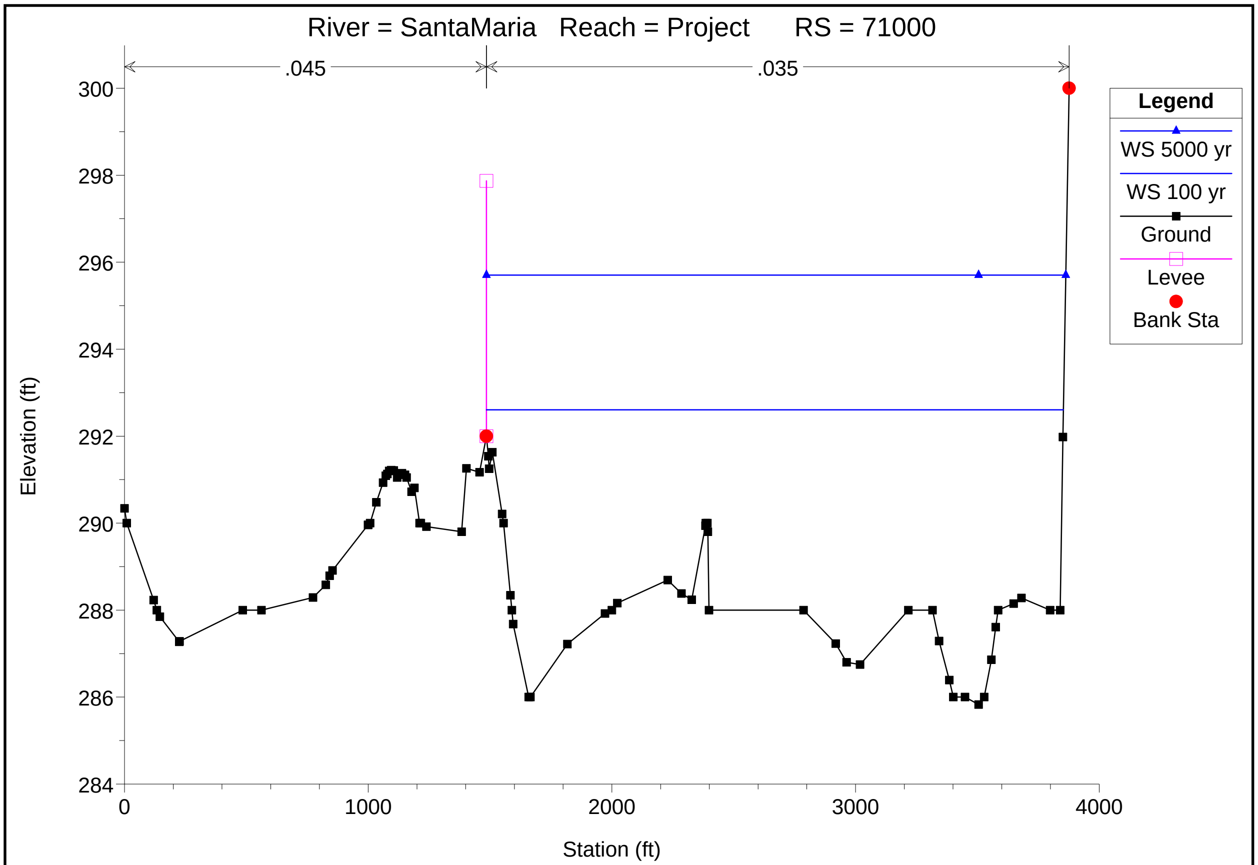


Bradley Canyon Levee
Legend
WS 5000 yr
WS 100 yr
Ground
Left Levee
levee area to be
raised by 1 foot
Elevation (ft)
320
310
300
290
35819.57
36355.05
36897.55
37431.18
37783.76
38112.98
38462.01
38900.94
39444.
39971.
40737.92
41288.92
41838.76
0
1000
2000
3000
4000
5000
6000
Main Channel Distance (ft)

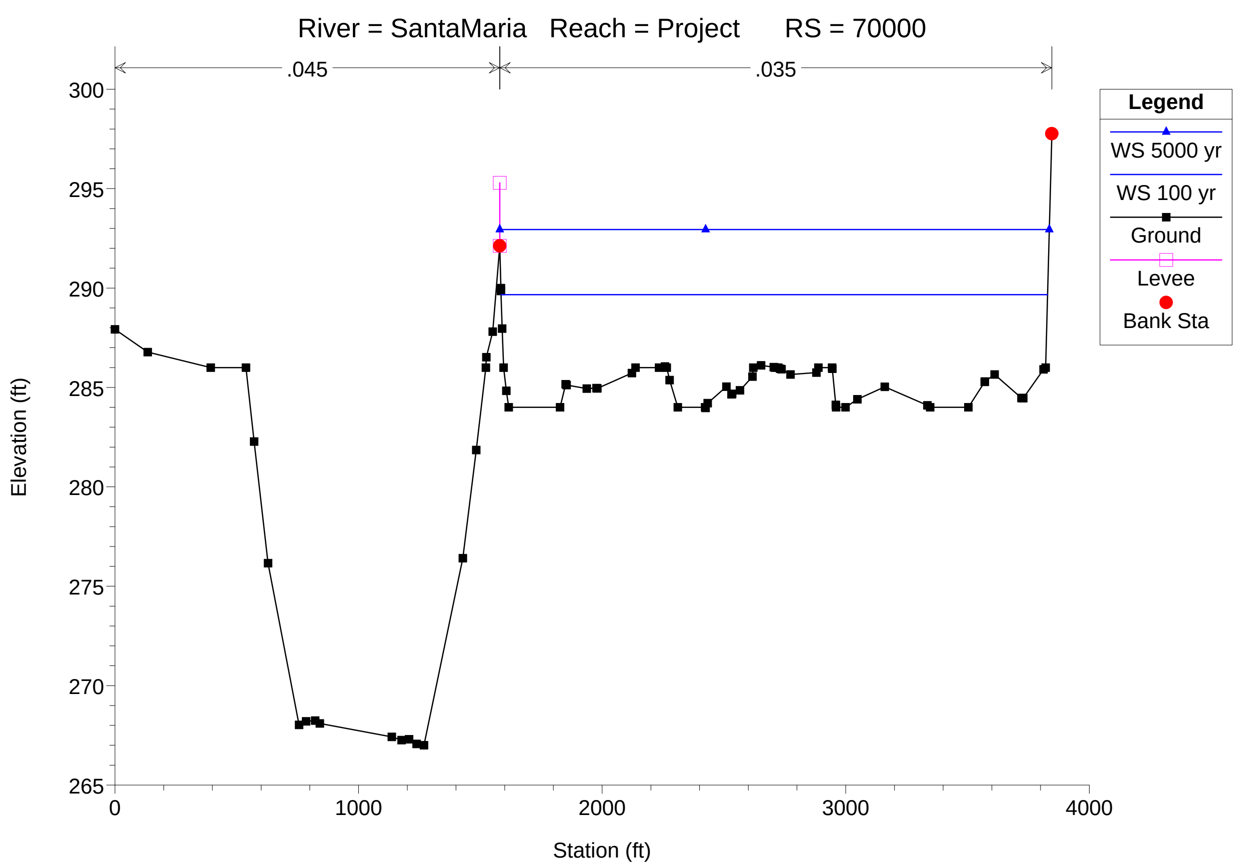
Attachment B: Evaluation Reach HEC-RAS Typical Cross Section Information



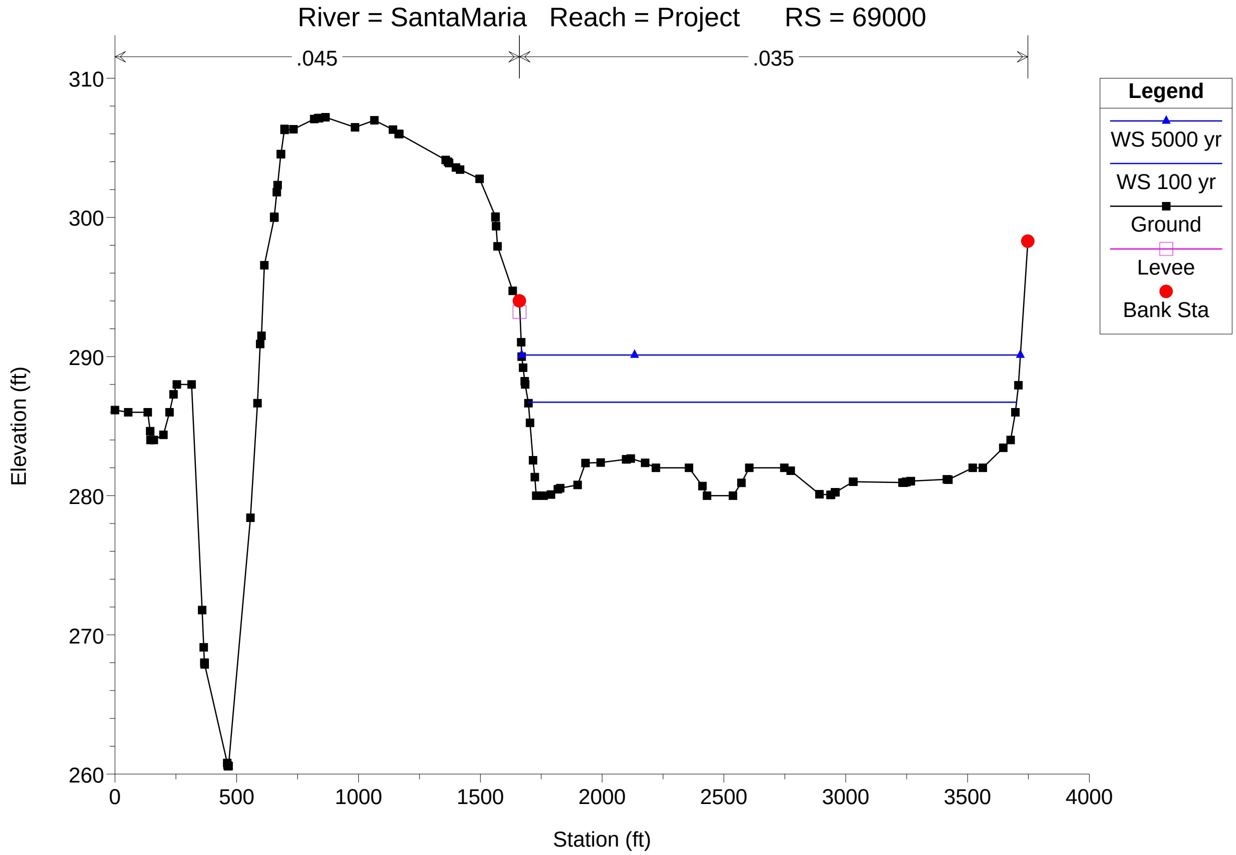




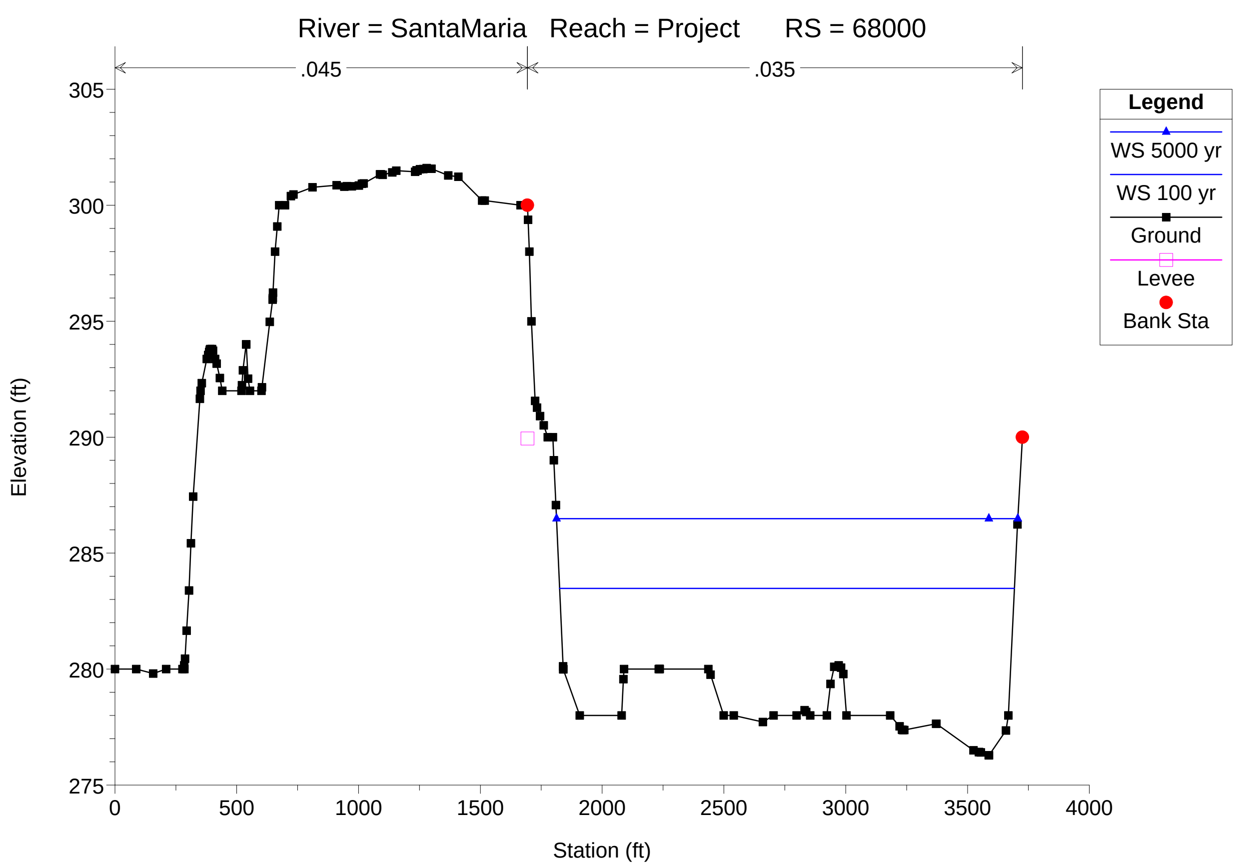
River = SantaMaria Reach = Project RS = 71000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
300
298
296
294
292
290
288
286
284
0
1000
2000
3000
4000



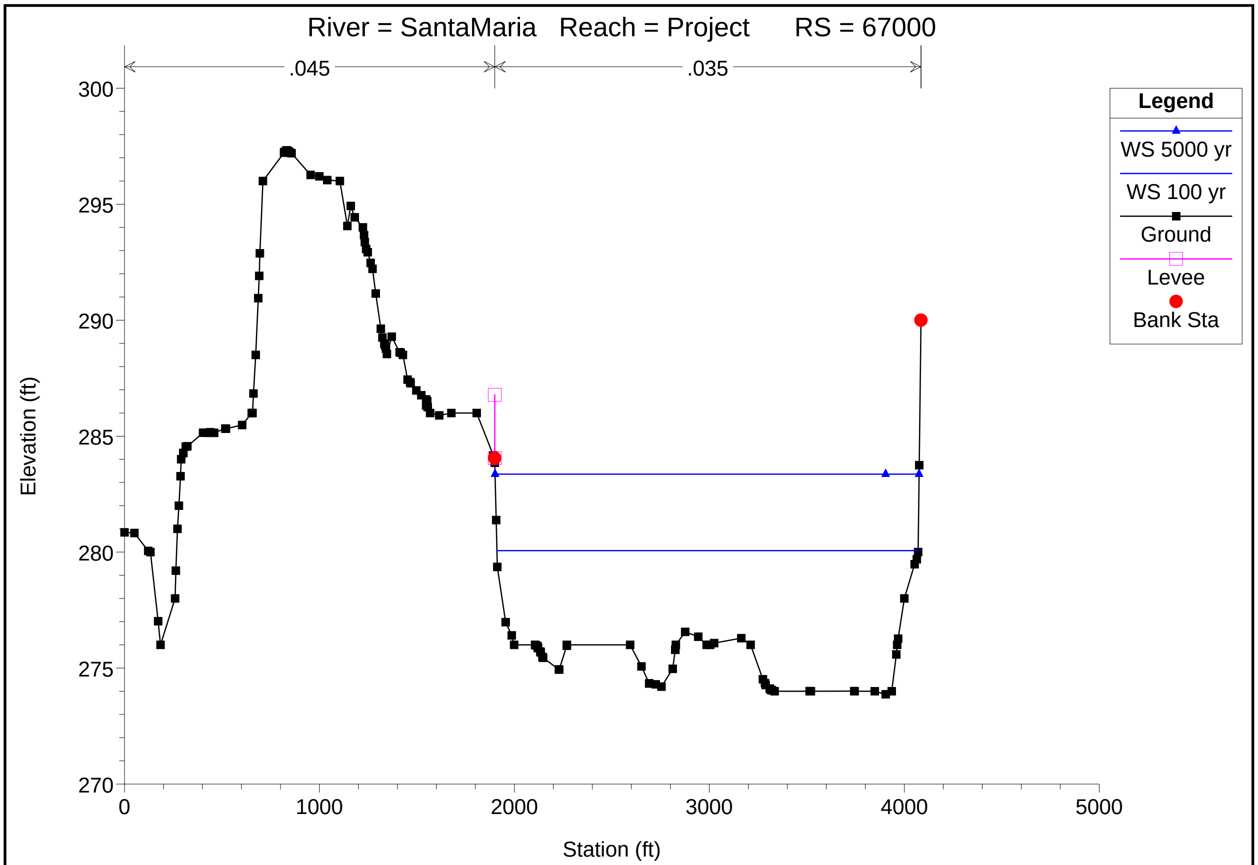
River = SantaMaria Reach = Project RS = 70000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
300
295
290
285
280
275
270
265
0
1000
2000
3000
4000



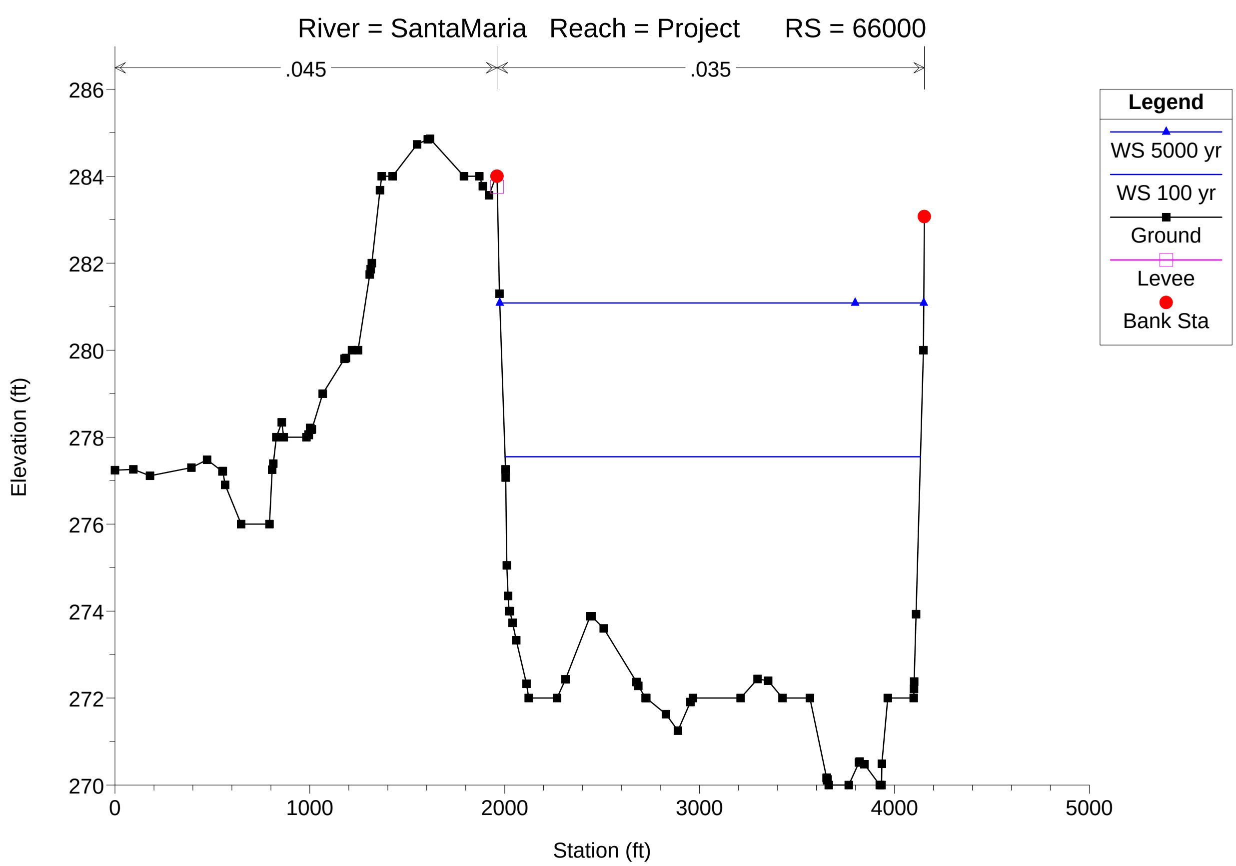
River = SantaMaria Reach = Project RS = 69000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
310
300
290
280
270
260
0
500
1000
1500
2000
2500
3000
3500
4000
Station (ft)



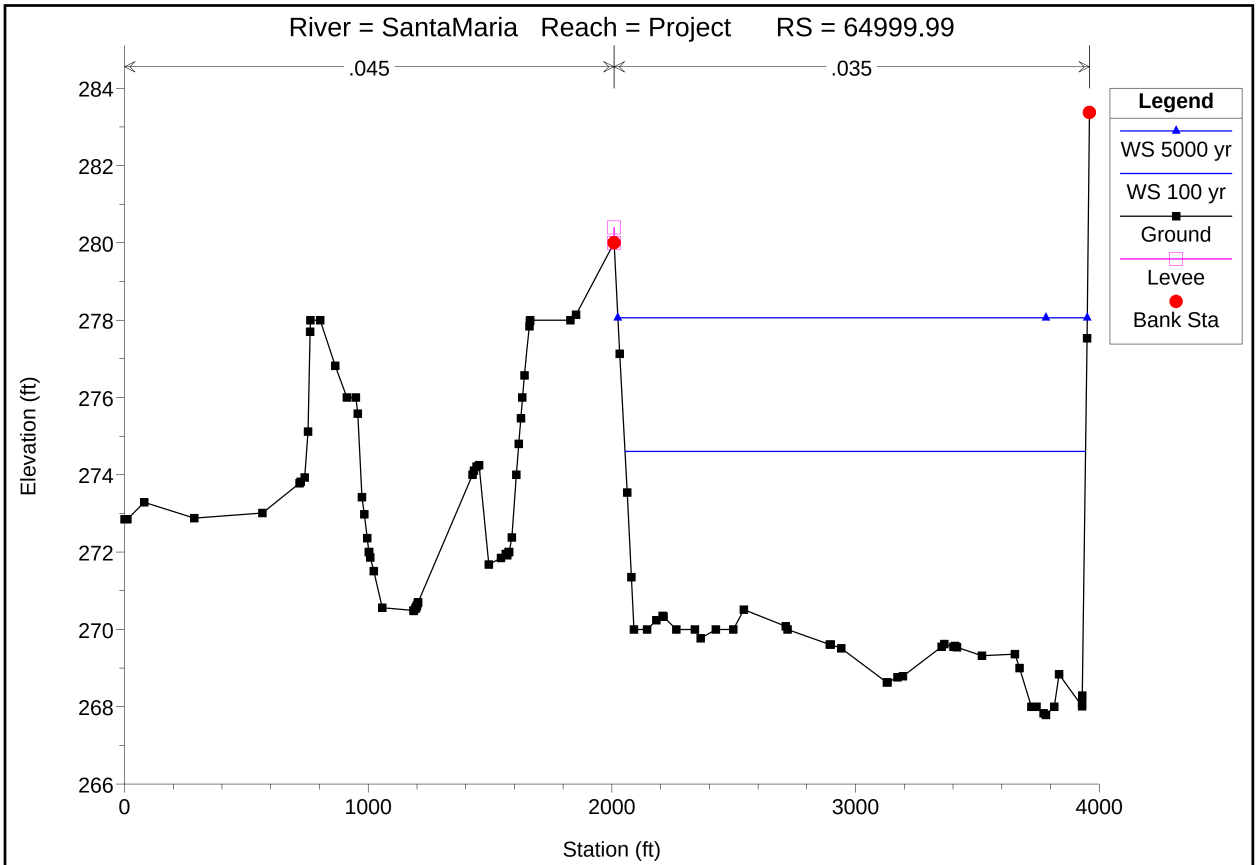
River = SantaMaria Reach = Project RS = 68000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
305
300
295
290
285
280
275
0
500
1000
1500
2000
2500
3000
3500
4000
Station (ft)



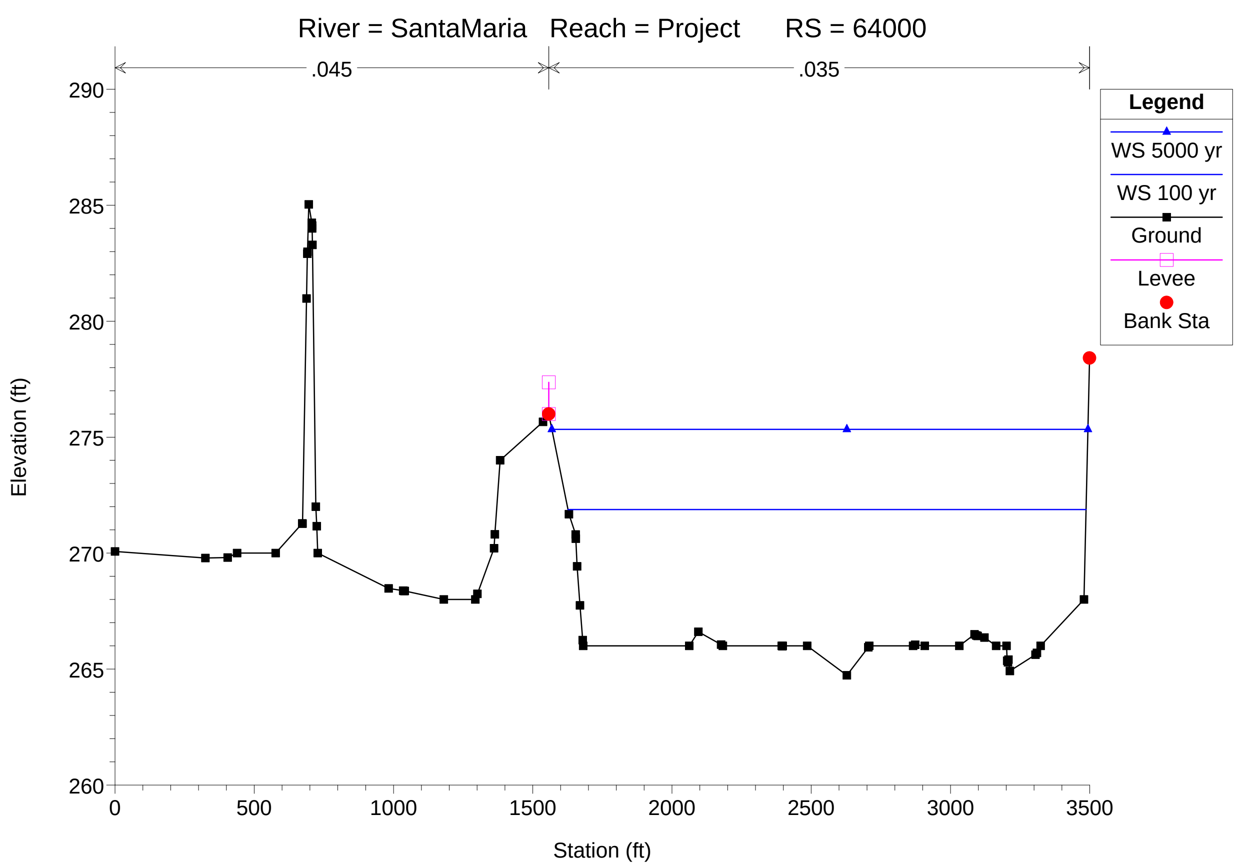
River = SantaMaria Reach = Project RS = 67000
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta



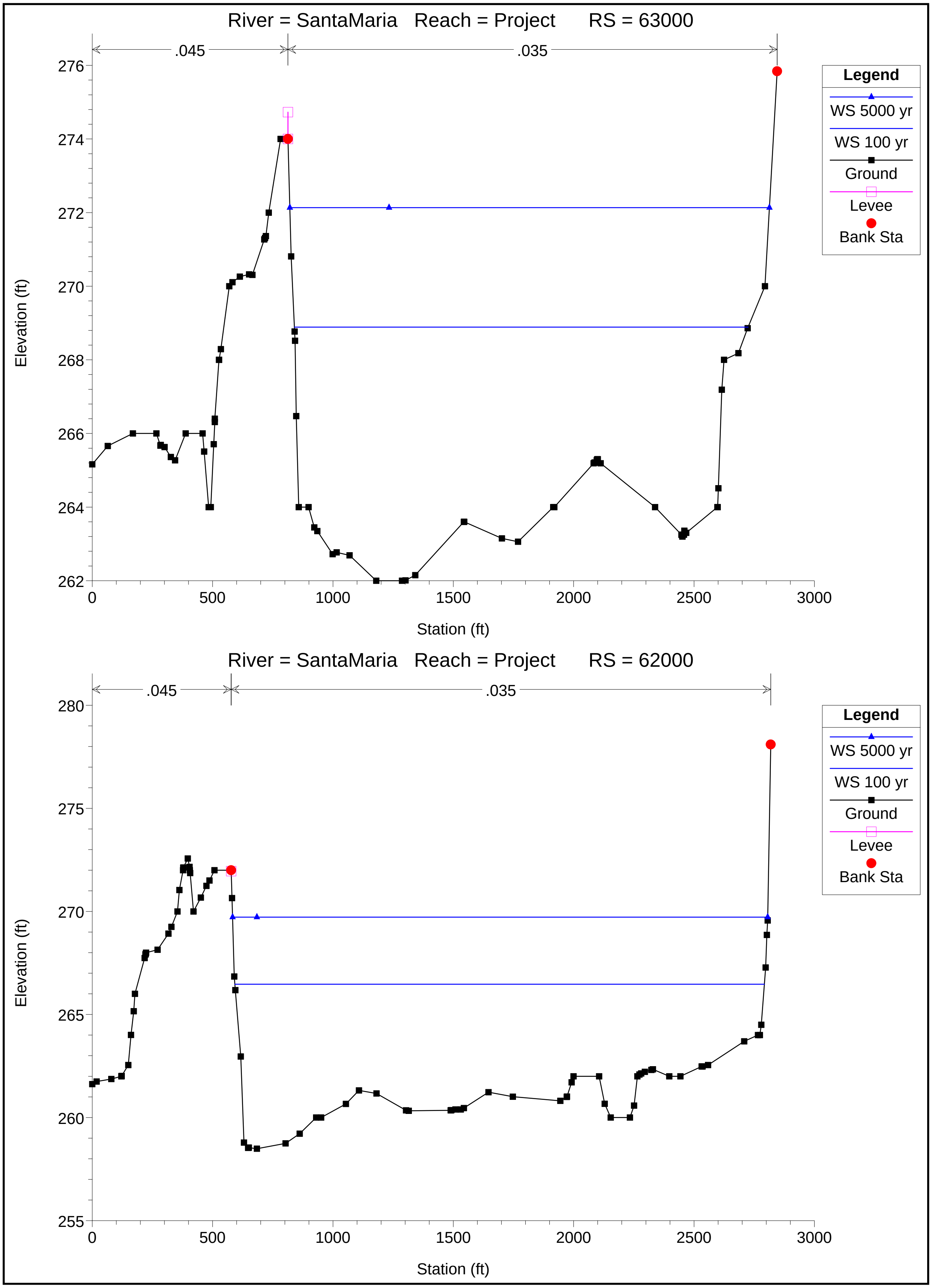
River = SantaMaria Reach = Project RS = 66000
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta



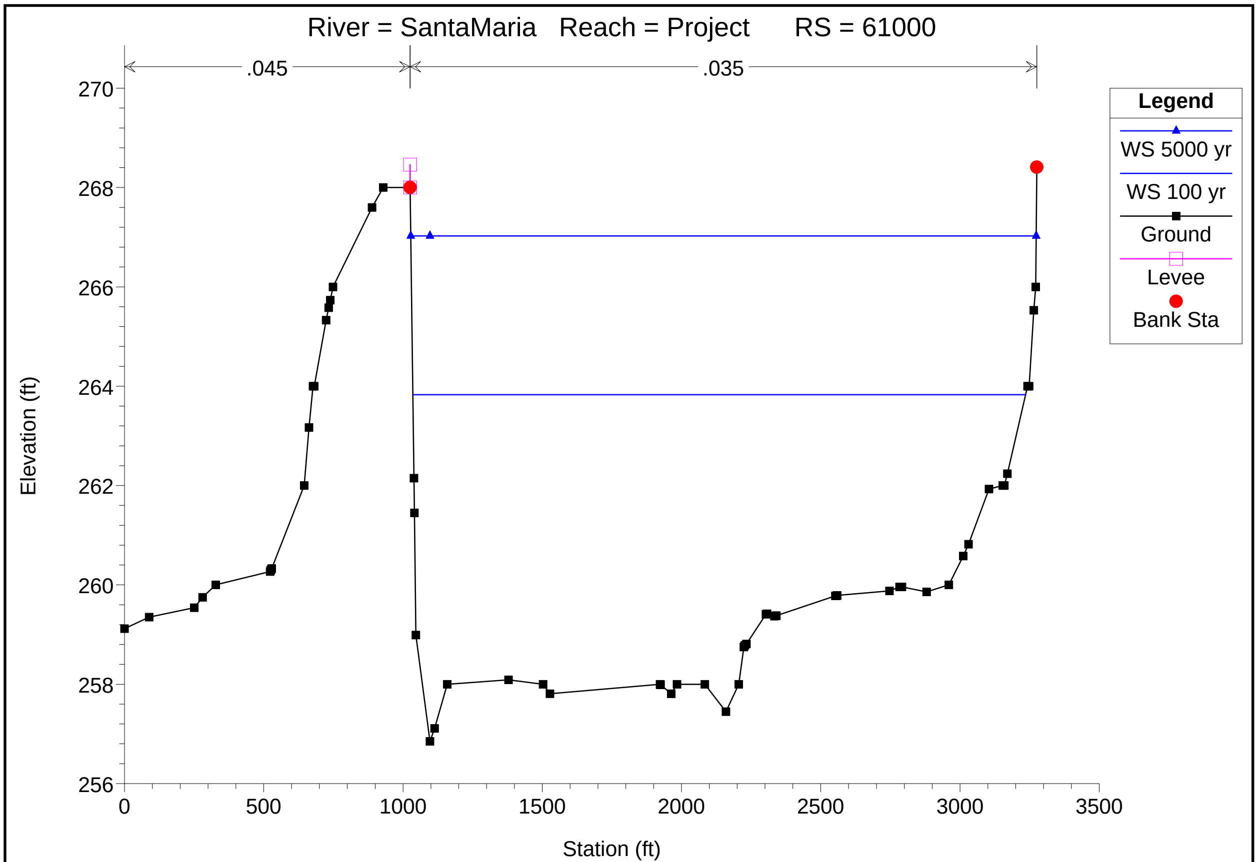
River = SantaMaria Reach = Project RS = 64999.99
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
284
282
280
278
276
274
272
270
268
266
0
1000
2000
3000
4000

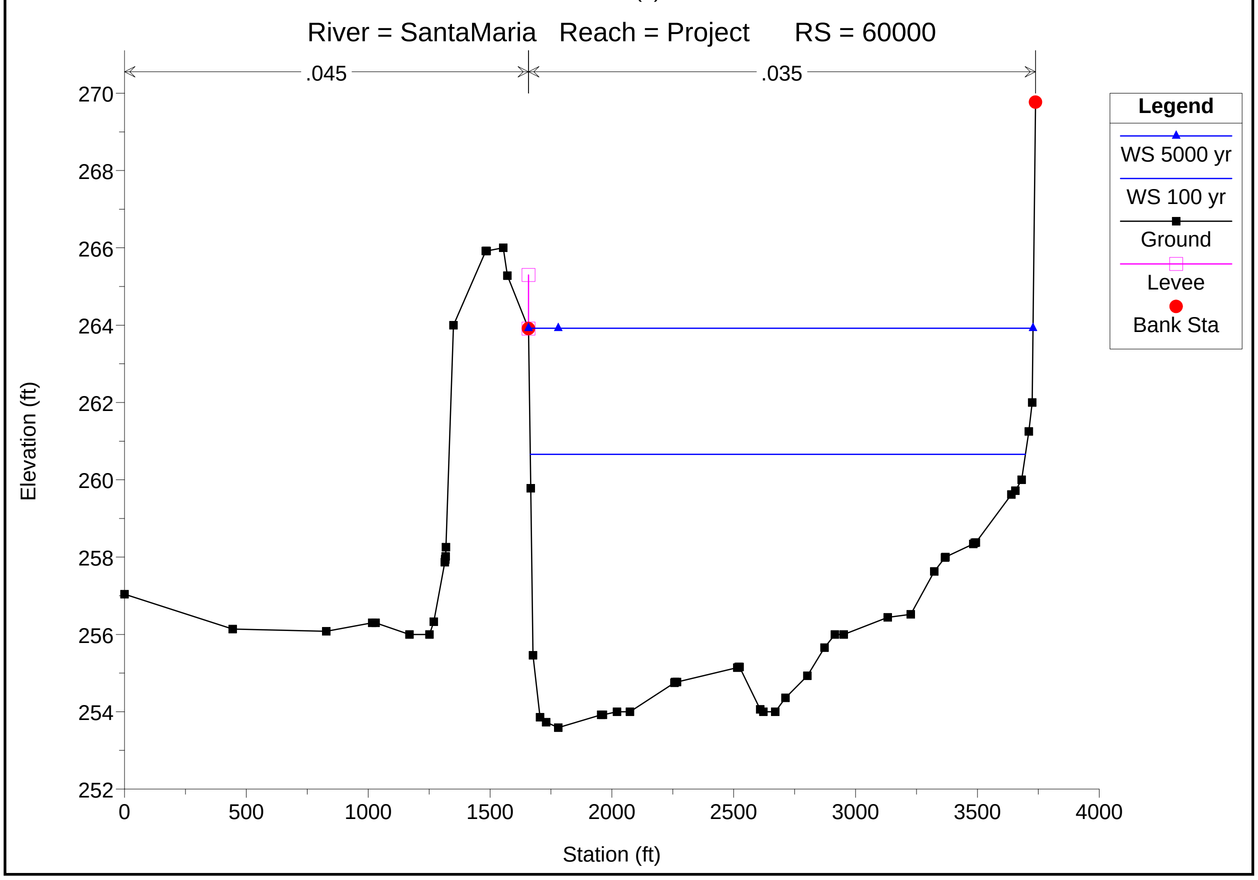


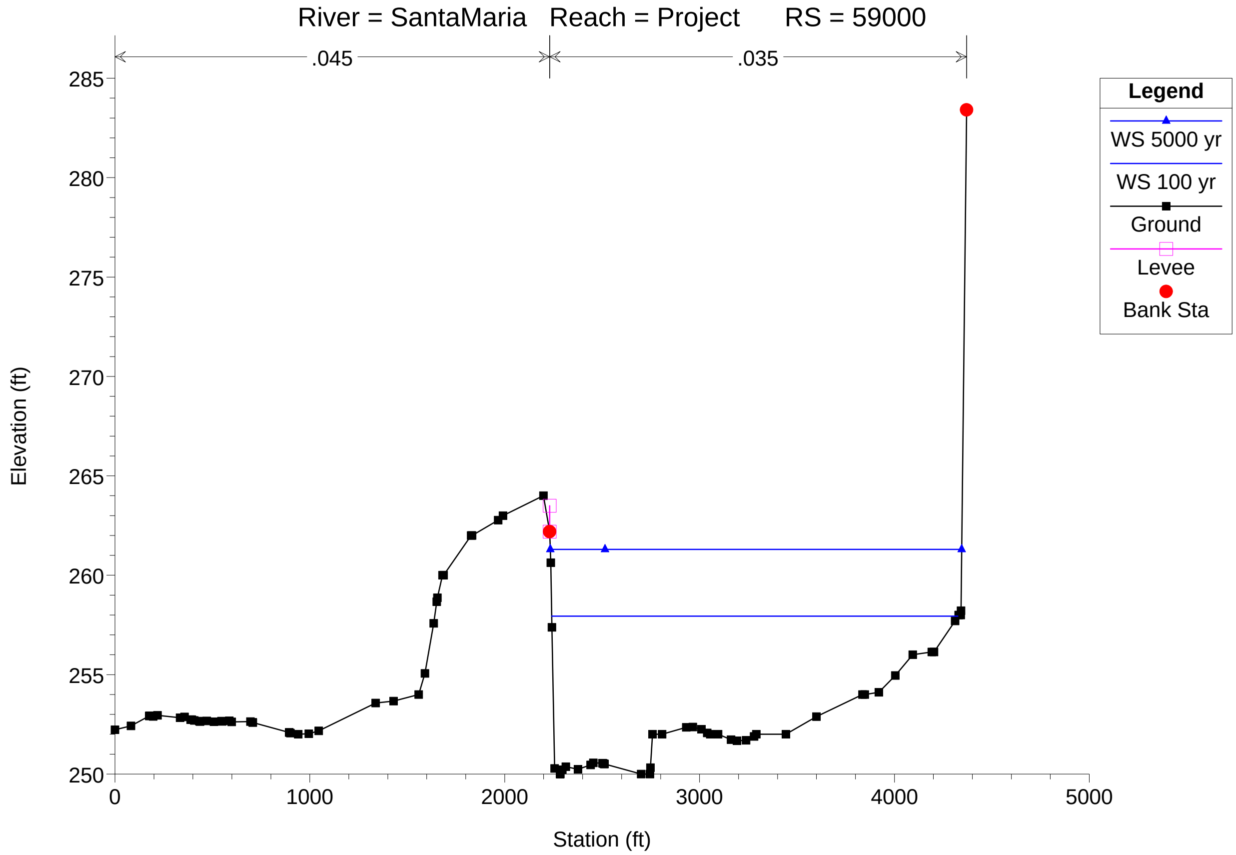
River = SantaMaria Reach = Project RS = 64000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
290
285
280
275
270
265
260
0
500
1000
1500
2000
2500
3000
3500

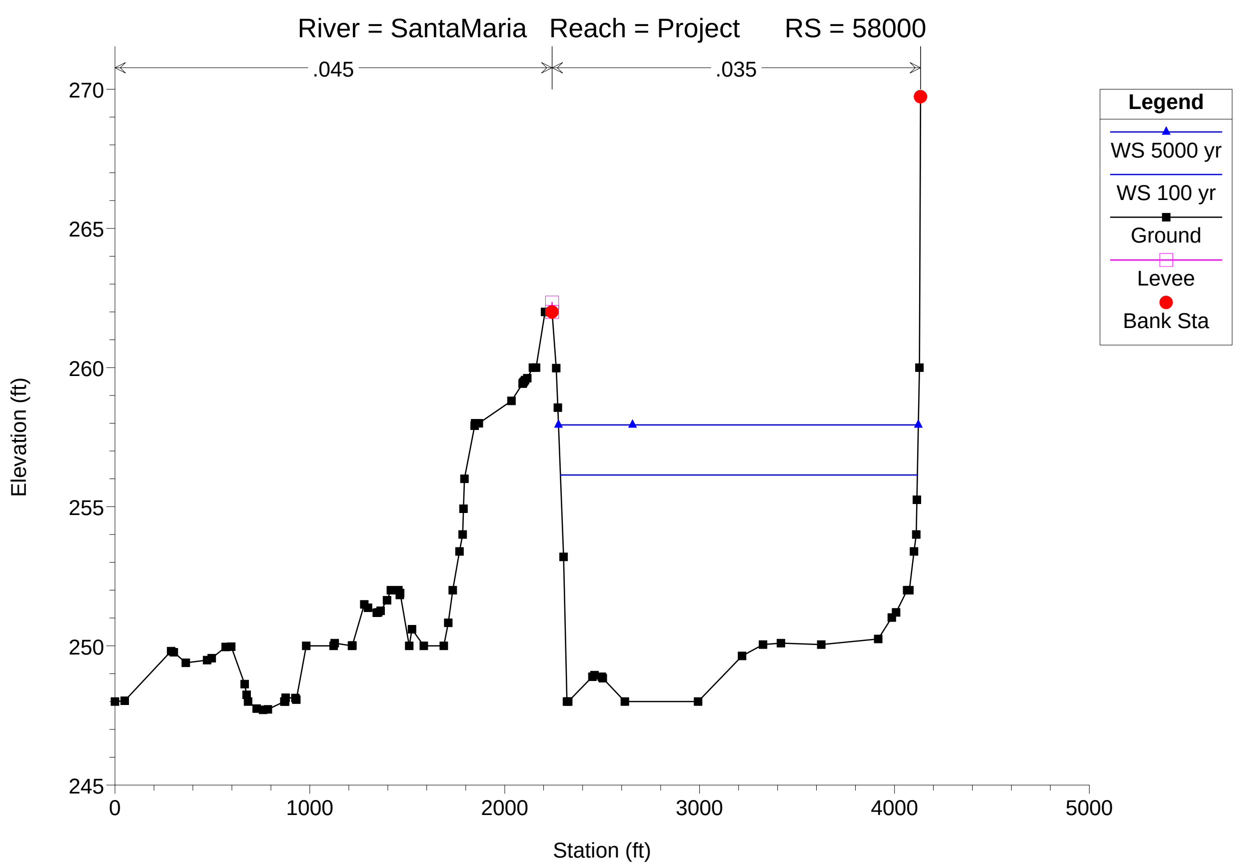


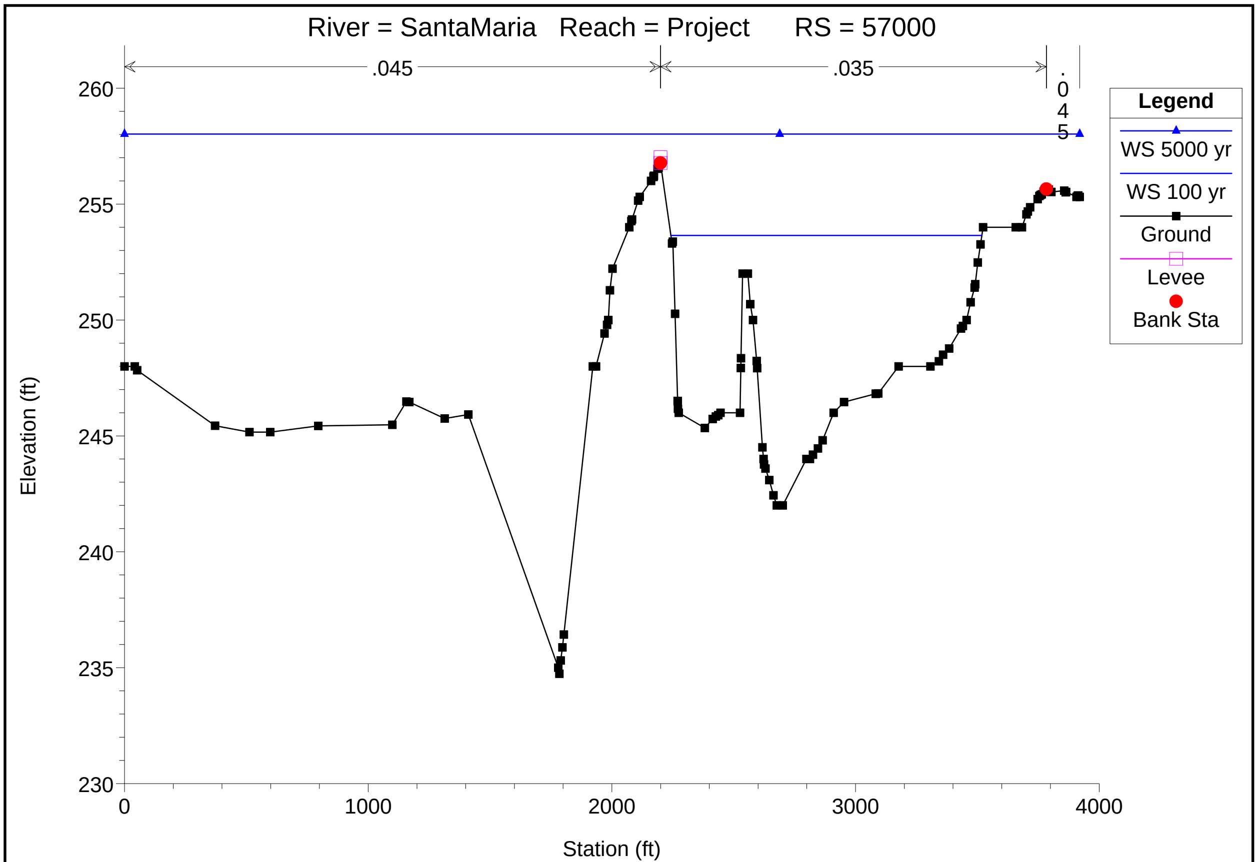
River = SantaMaria Reach = Project RS = 63000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
276
274
272
270
268
266
264
262
0
500
1000
1500
2000
2500
3000
Station (ft)
River = SantaMaria Reach = Project RS = 62000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
280
275
270
265
260
255
0
500
1000
1500
2000
2500
3000
Station (ft)

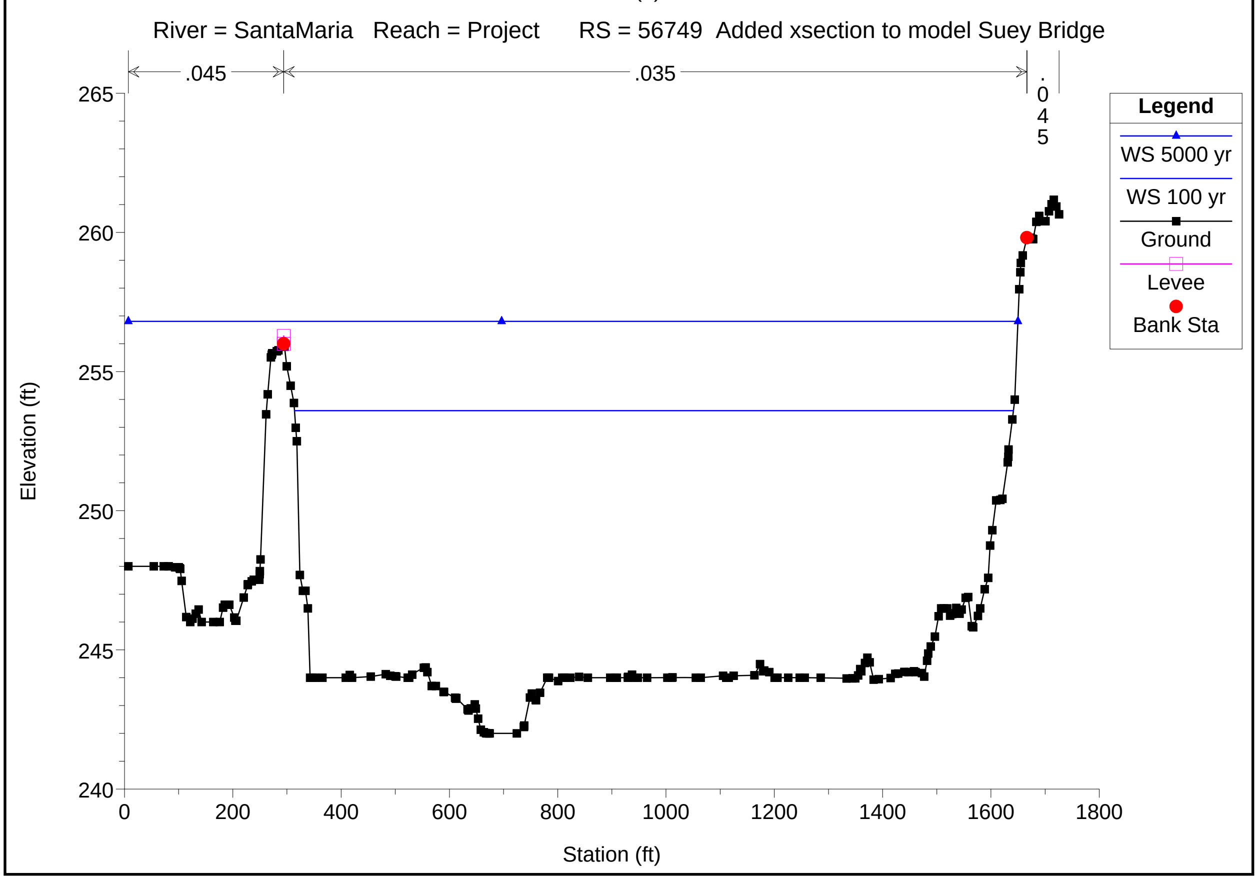

River = SantaMaria Reach = Project RS = 61000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
270
268
266
264
262
260
258
256
0
500
1000
1500
2000
2500
3000
3500

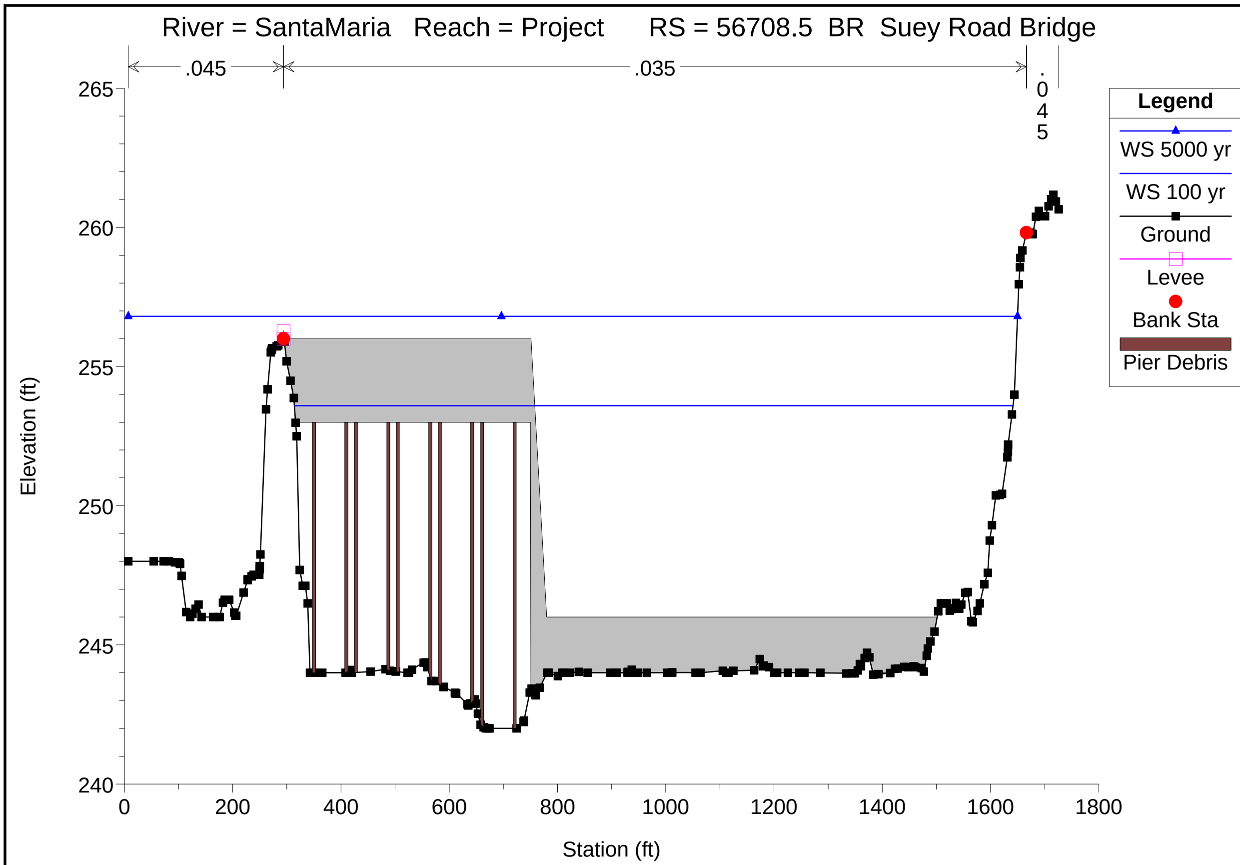

River = SantaMaria Reach = Project RS = 60000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
270
268
266
264
262
260
258
256
254
252
0
500
1000
1500
2000
2500
3000
3500
4000

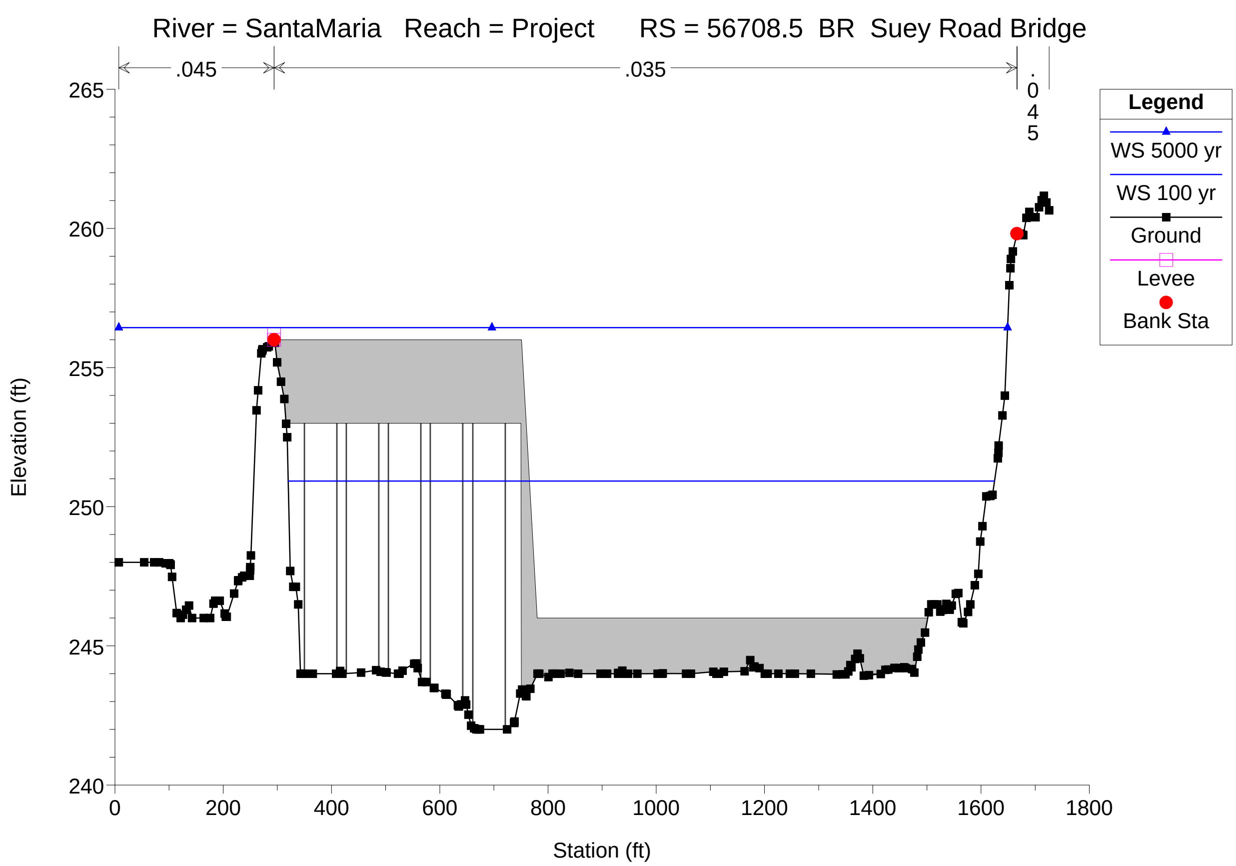

River = SantaMaria Reach = Project RS = 59000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
285
280
275
270
265
260
255
250
0
1000
2000
3000
4000
5000
Station (ft)

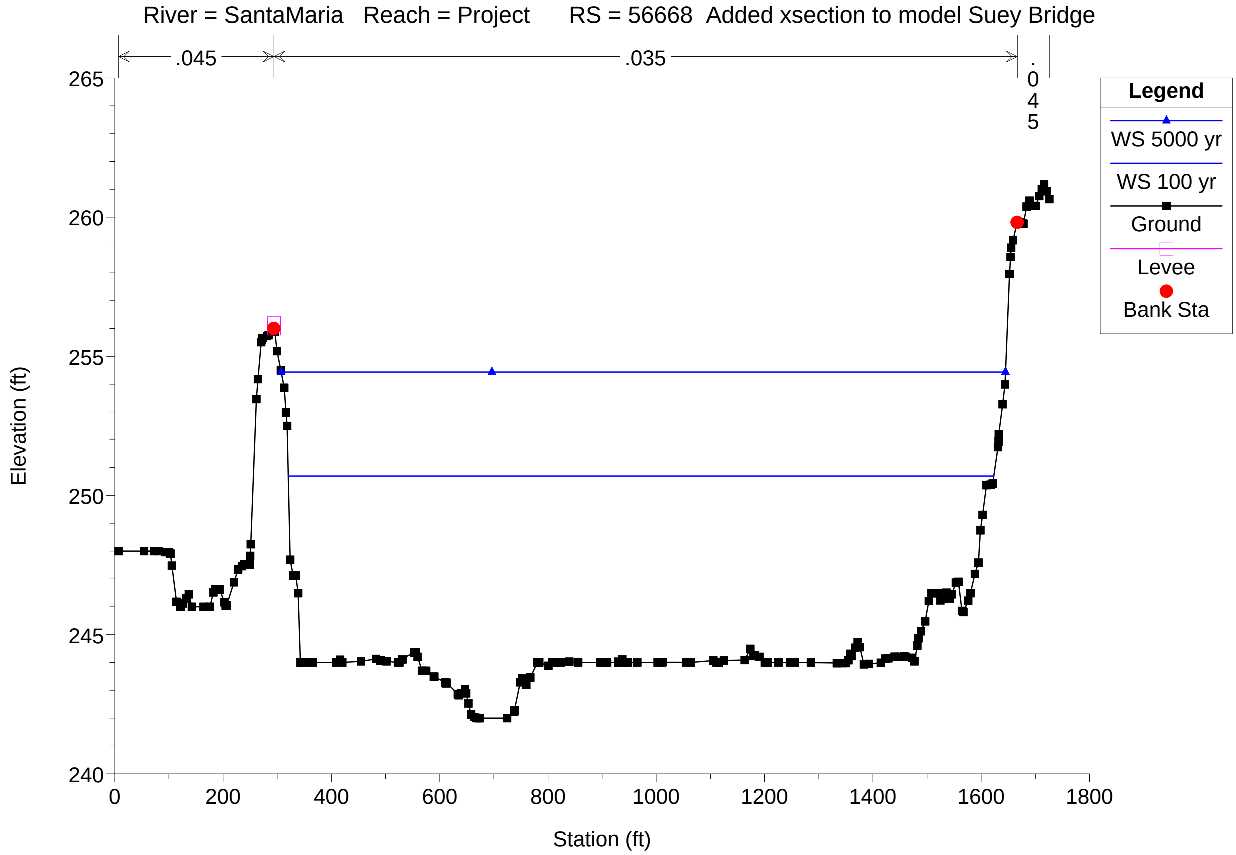

River = SantaMaria Reach = Project RS = 58000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
270
265
260
255
250
245
0
1000
2000
3000
4000
5000
Station (ft)


River = SantaMaria Reach = Project RS = 57000
.045
.035
.045
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
260
255
250
245
240
235
230
0
1000
2000
3000
4000
Station (ft)

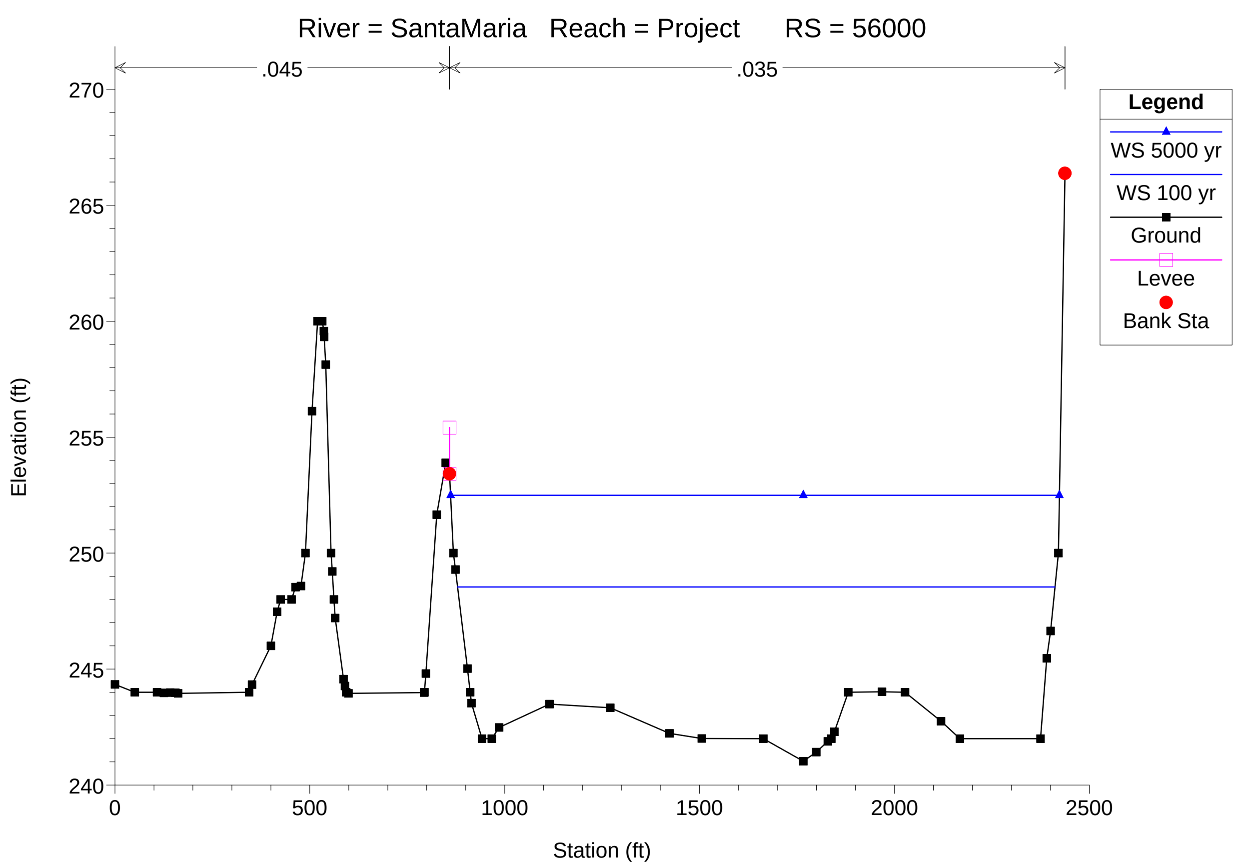

River = SantaMaria Reach = Project RS = 56749 Added xsection to model Suey Bridge
.045
.035
.045
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
265
260
255
250
245
240
0
200
400
600
800
1000
1200
1400
1600
1800
Station (ft)


River = SantaMaria Reach = Project RS = 56708.5 BR Suey Road Bridge
.045
.035
.045
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Pier Debris
Elevation (ft)
Station (ft)
265
260
255
250
245
240
0
200
400
600
800
1000
1200
1400
1600
1800

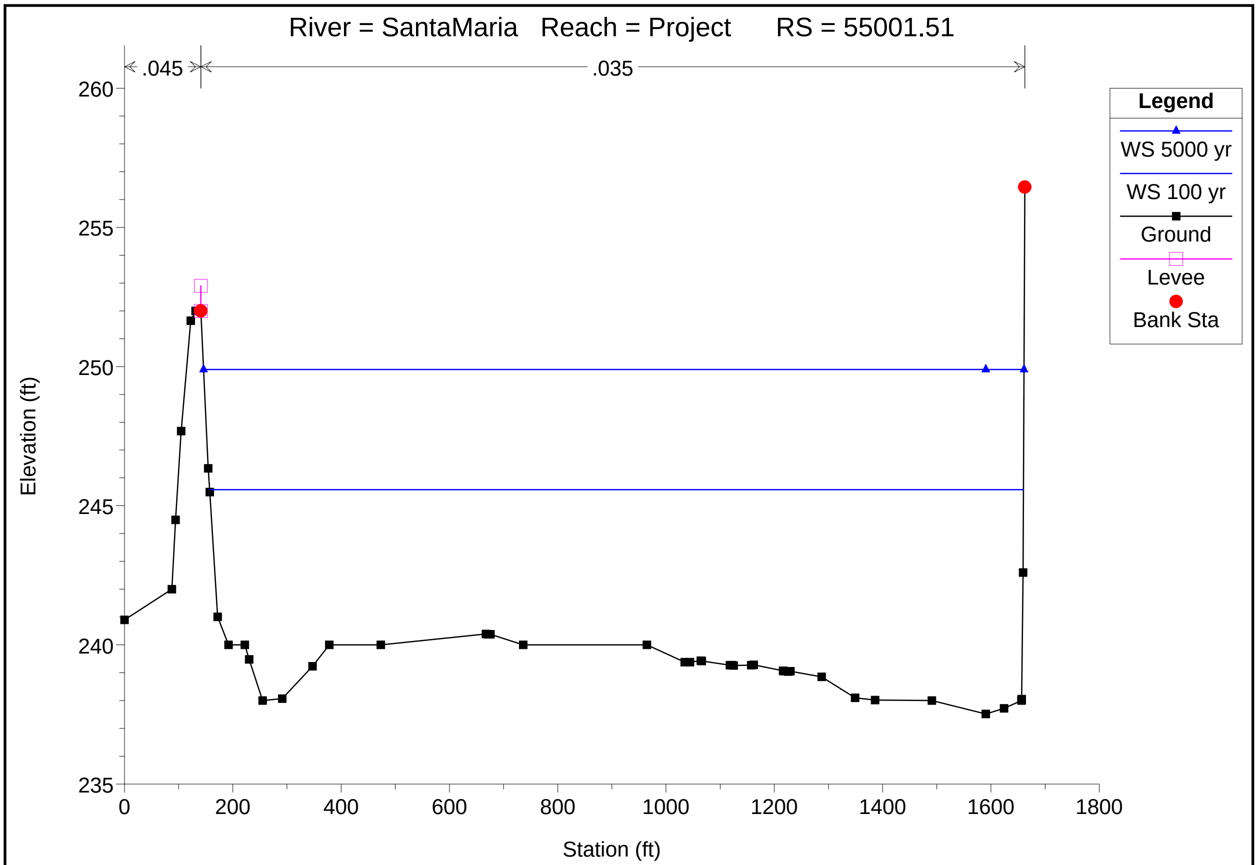

River = SantaMaria Reach = Project RS = 56708.5 BR Suey Road Bridge
.045
.035
.045
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
265
260
255
250
245
240
0
200
400
600
800
1000
1200
1400
1600
1800

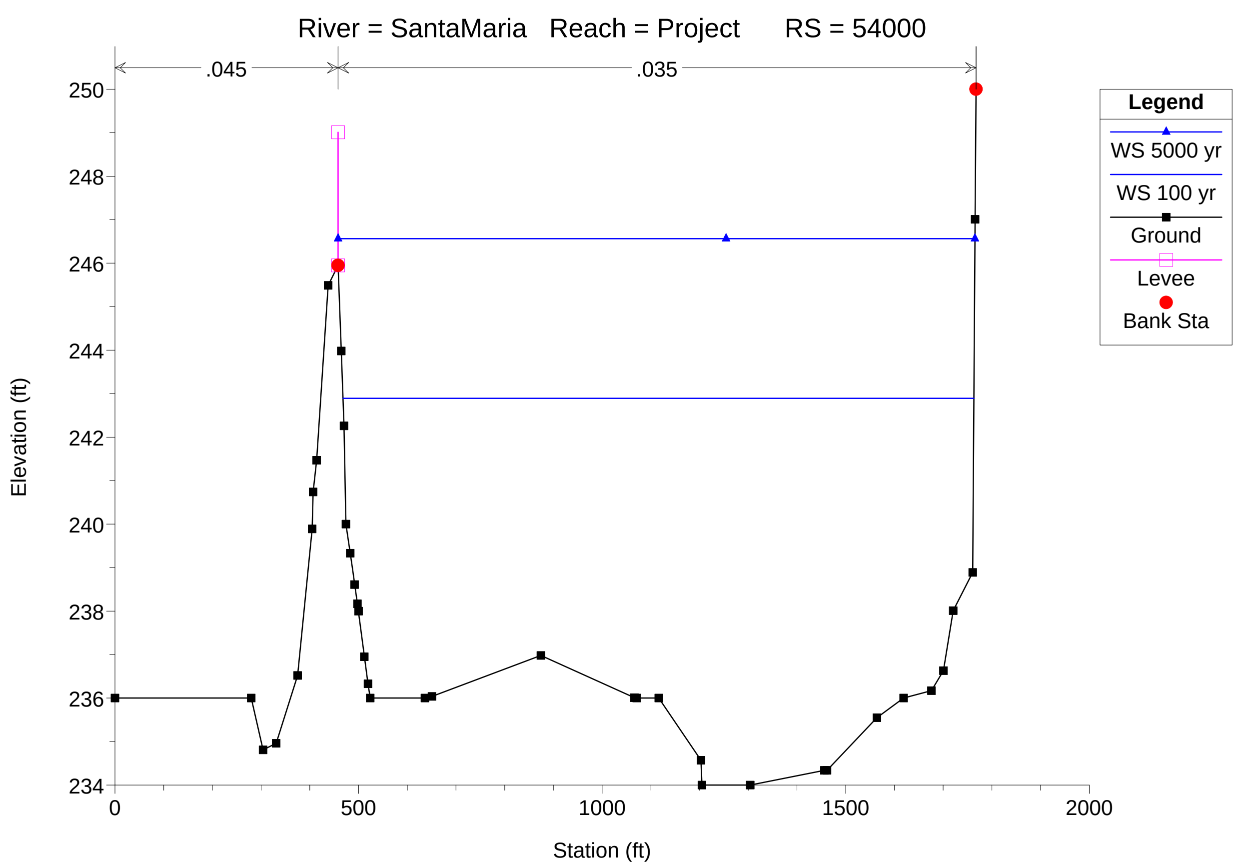


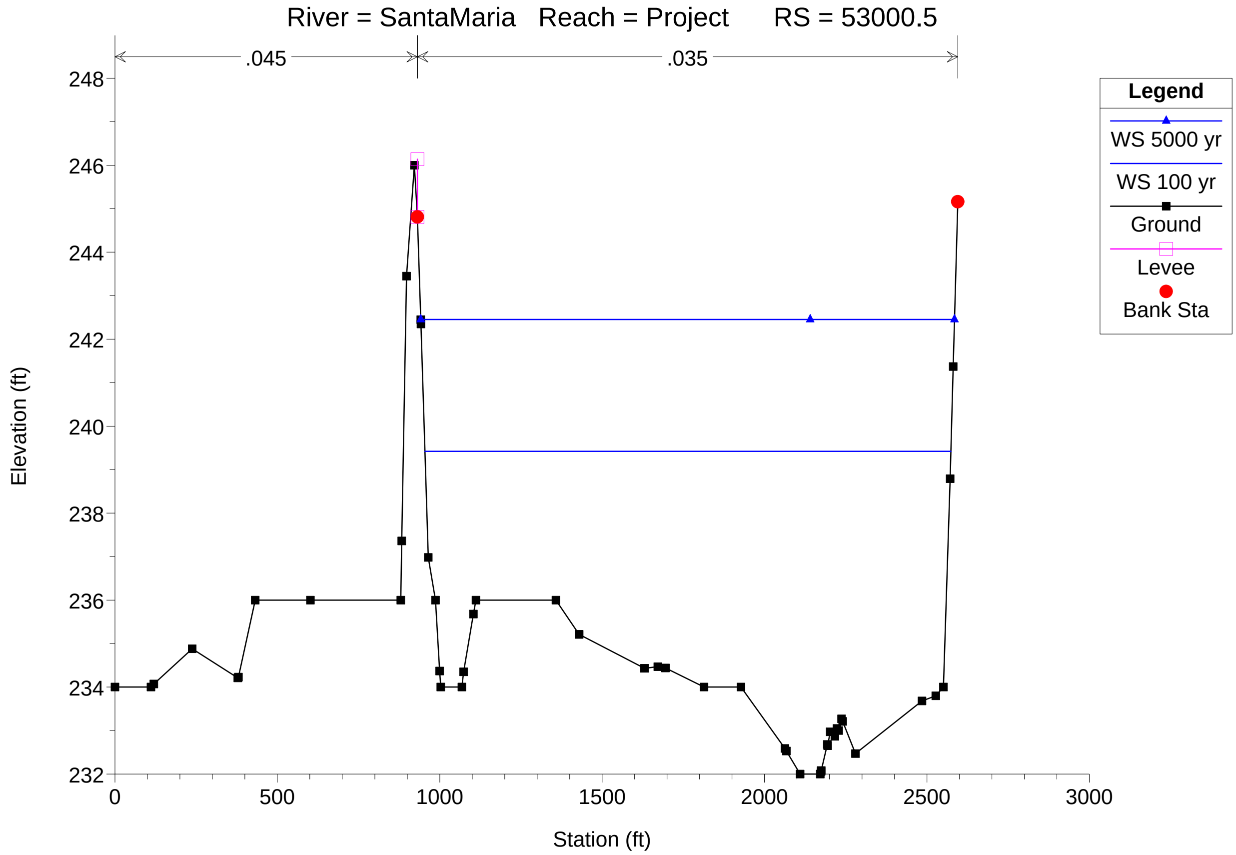
River = SantaMaria Reach = Project RS = 56668 Added xsection to model Suey Bridge
.045
.035
.045
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)



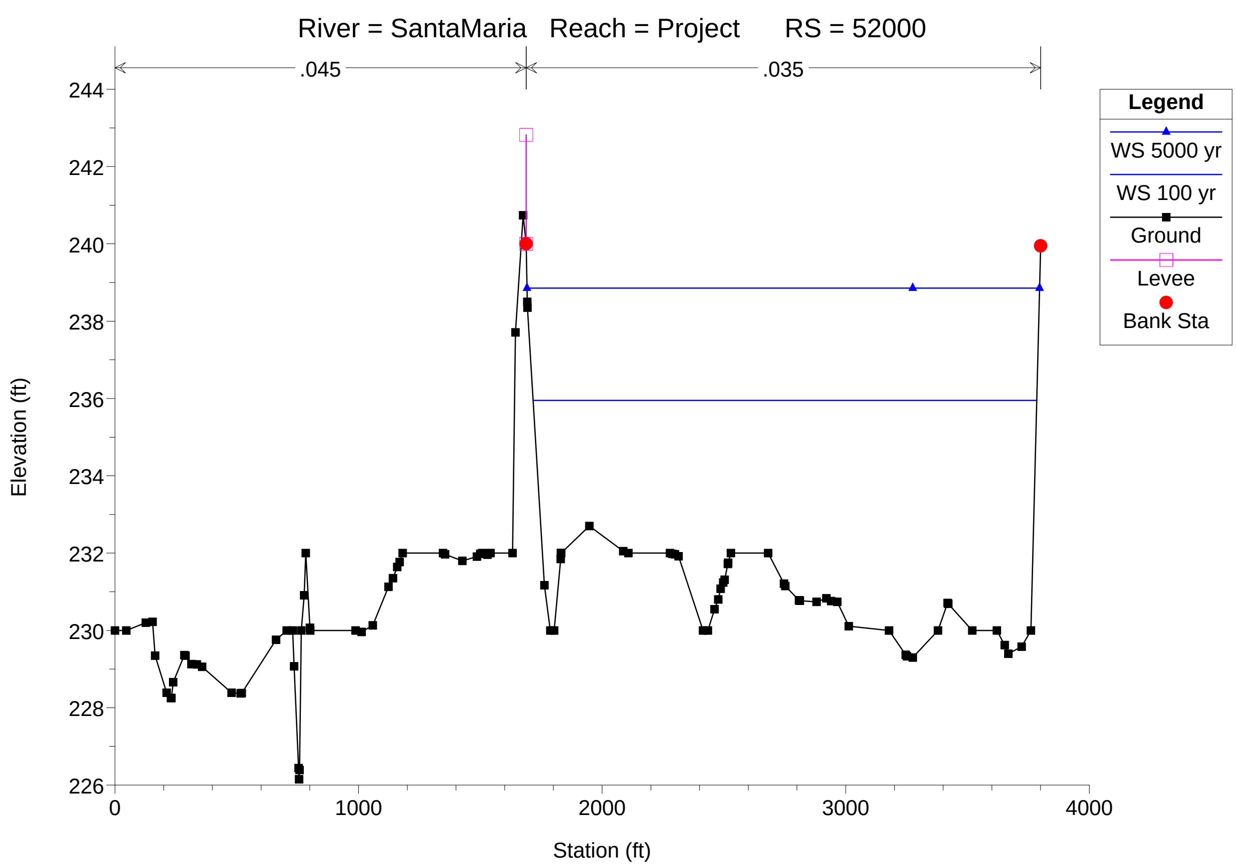
River = SantaMaria Reach = Project RS = 56000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


River = SantaMaria Reach = Project RS = 55001.51
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
260
255
250
245
240
235
0
200
400
600
800
1000
1200
1400
1600
1800
Station (ft)

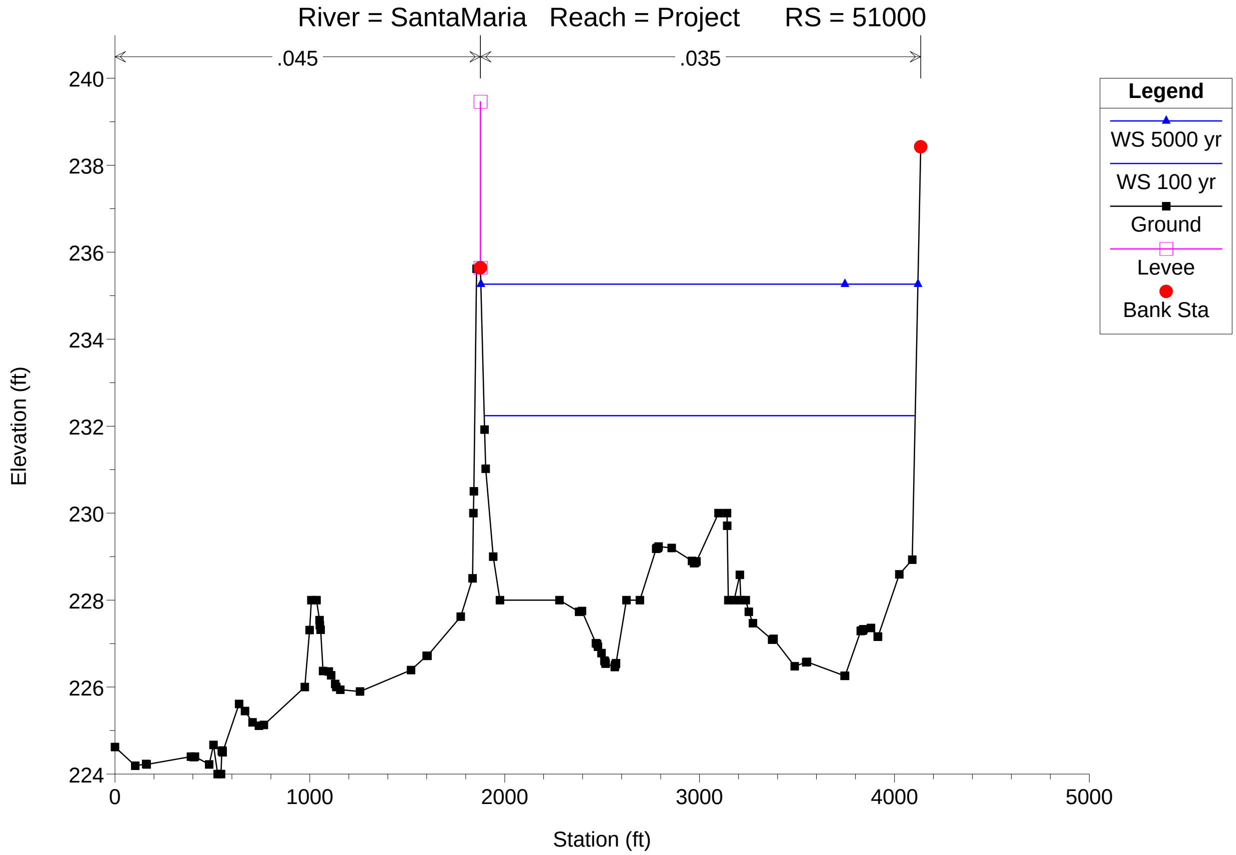

River = SantaMaria Reach = Project RS = 54000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
250
248
246
244
242
240
238
236
234
0
500
1000
1500
2000
Station (ft)

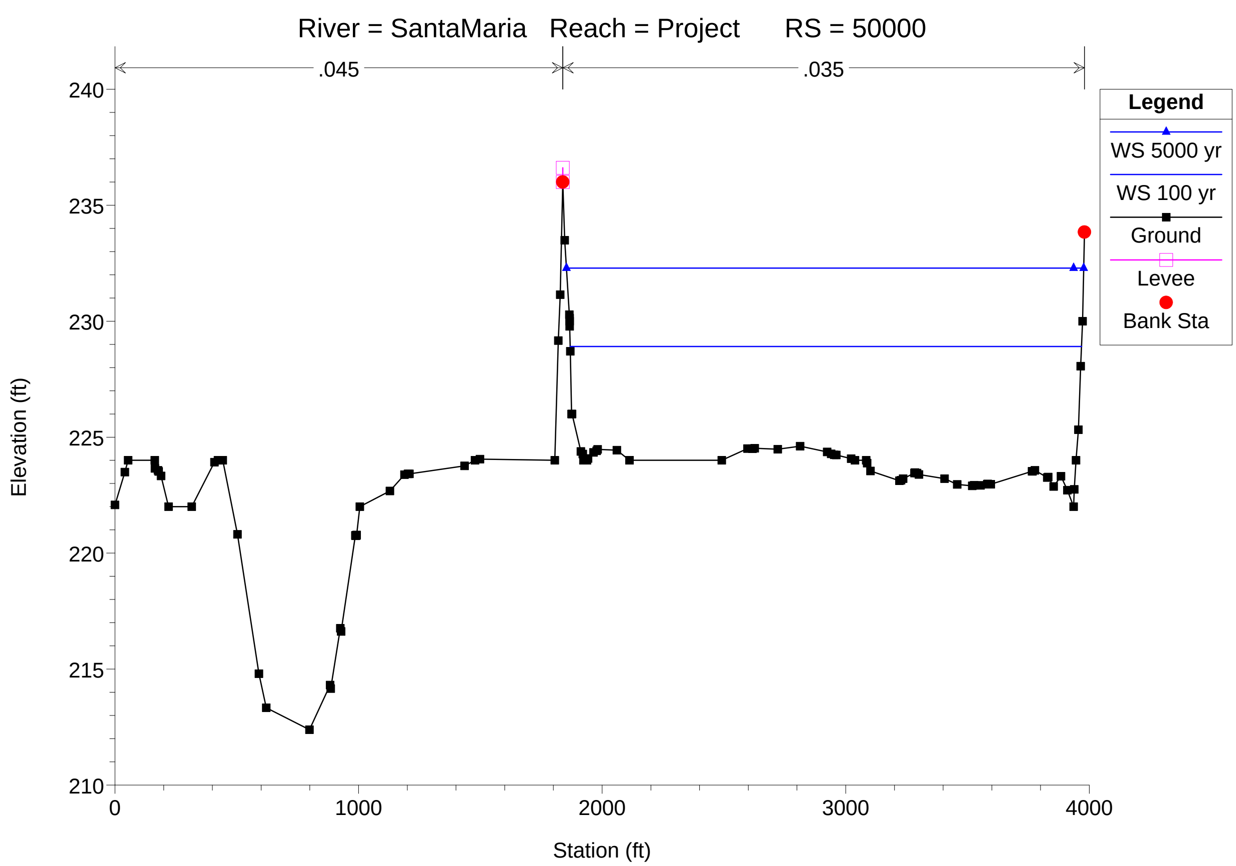


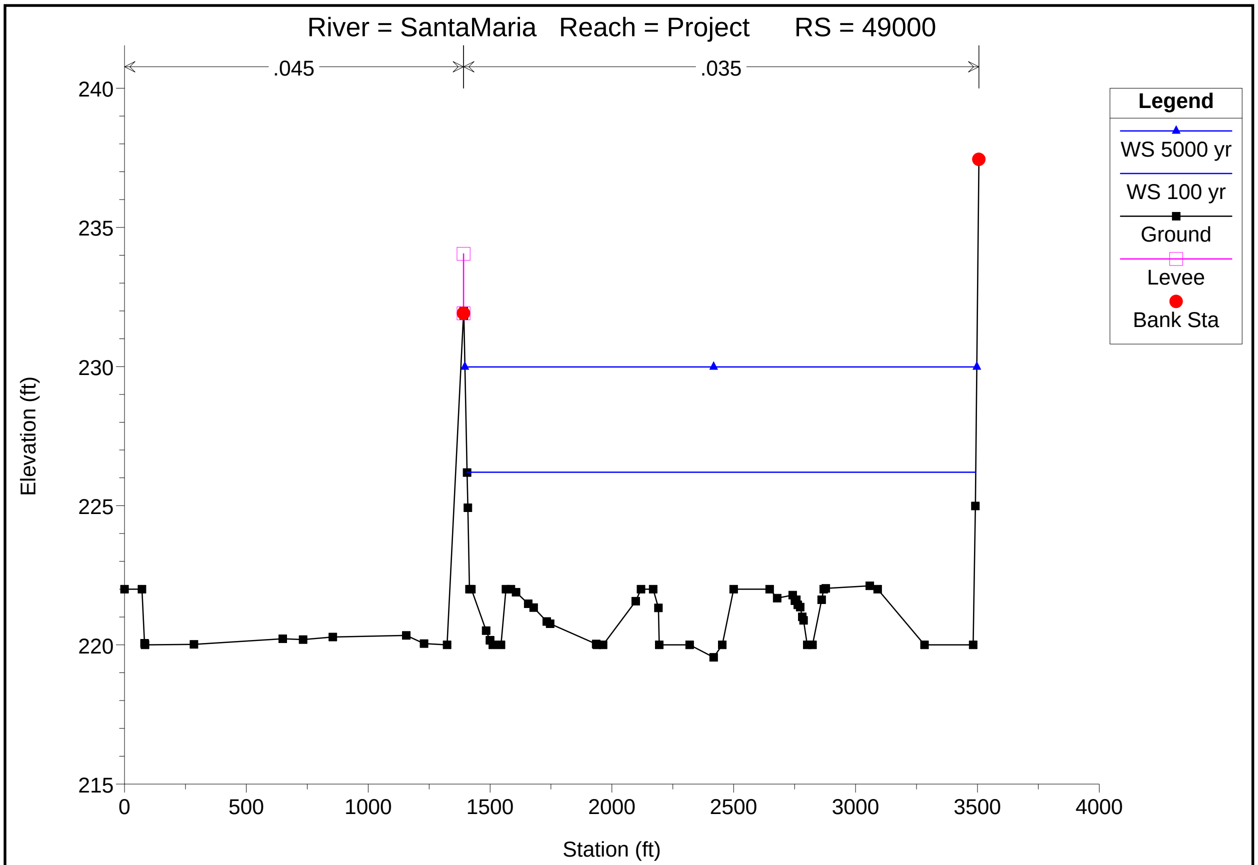
River = SantaMaria Reach = Project RS = 53000.5
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
248
246
244
242
240
238
236
234
232
0
500
1000
1500
2000
2500
3000

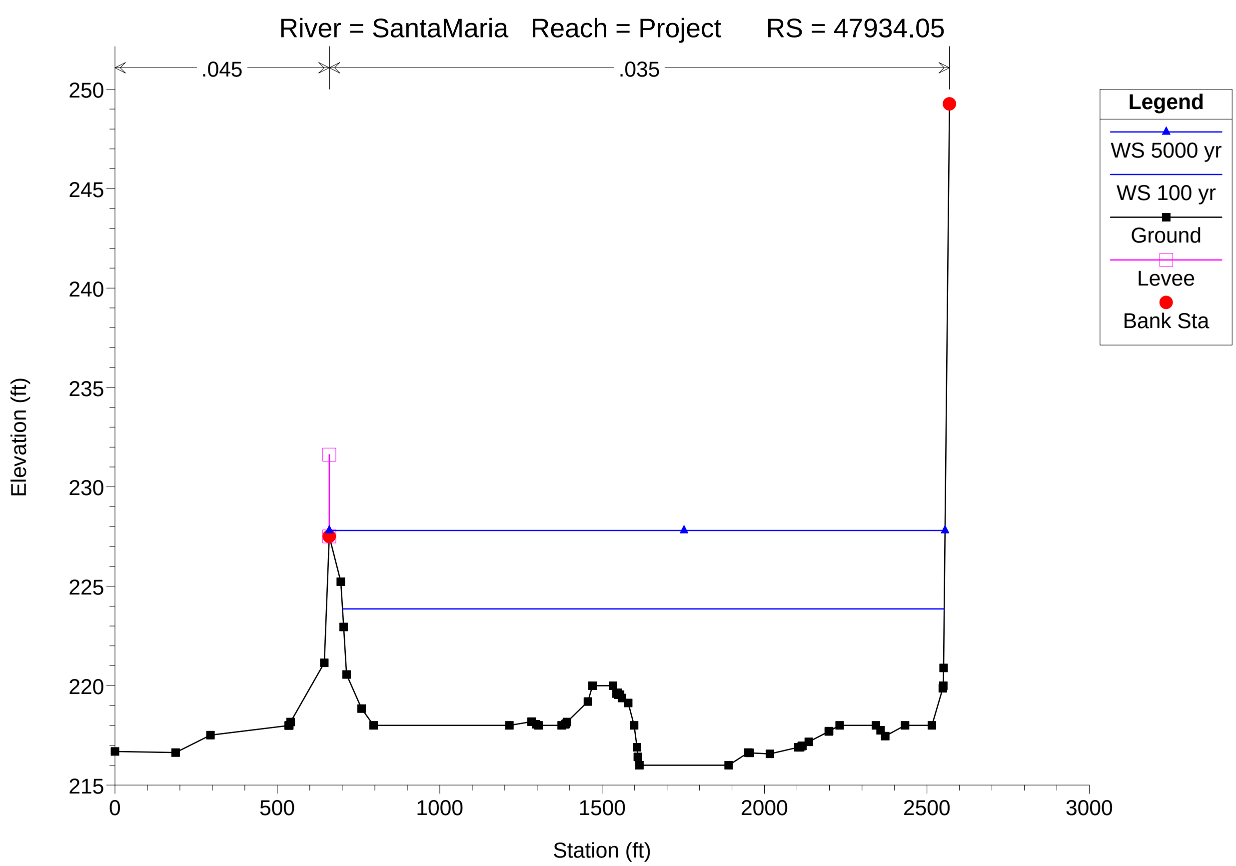


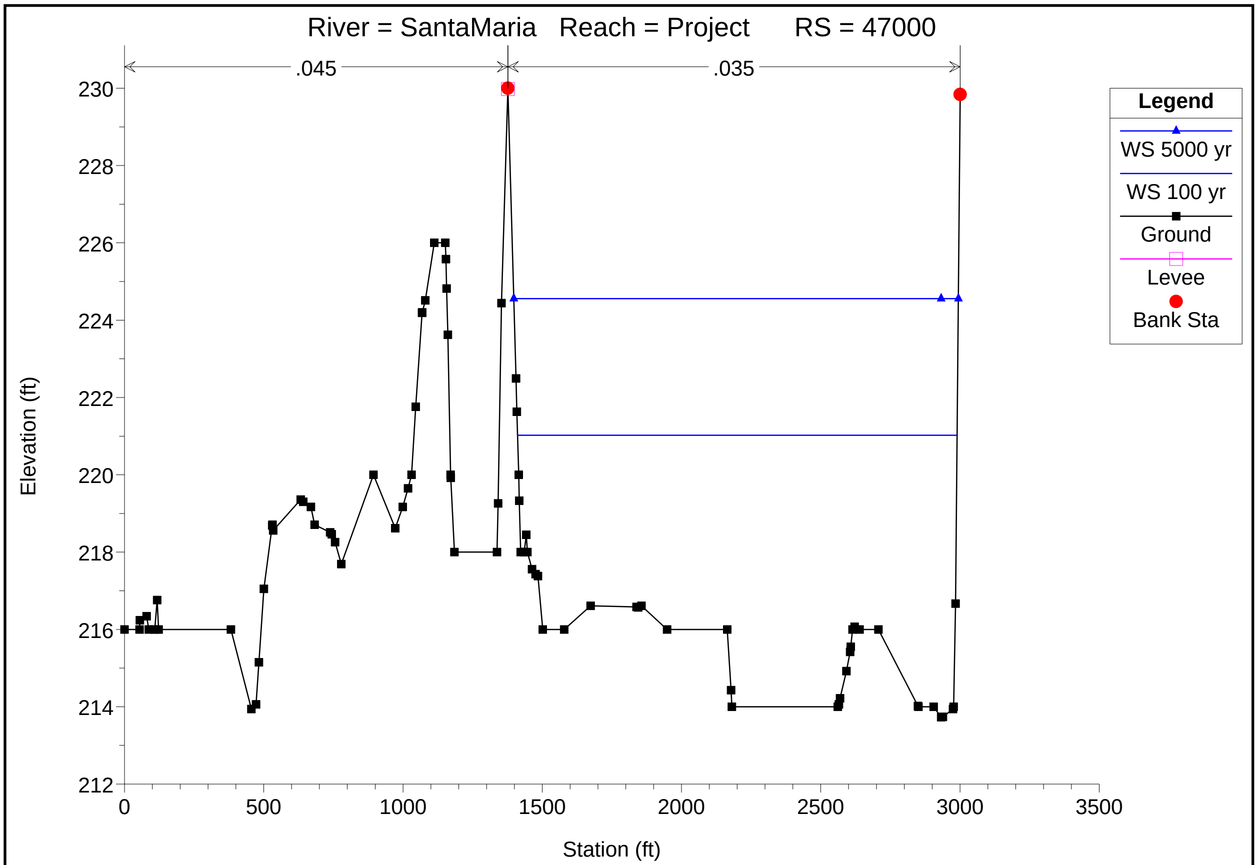
River = SantaMaria Reach = Project RS = 52000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
244
242
240
238
236
234
232
230
228
226
0
1000
2000
3000
4000

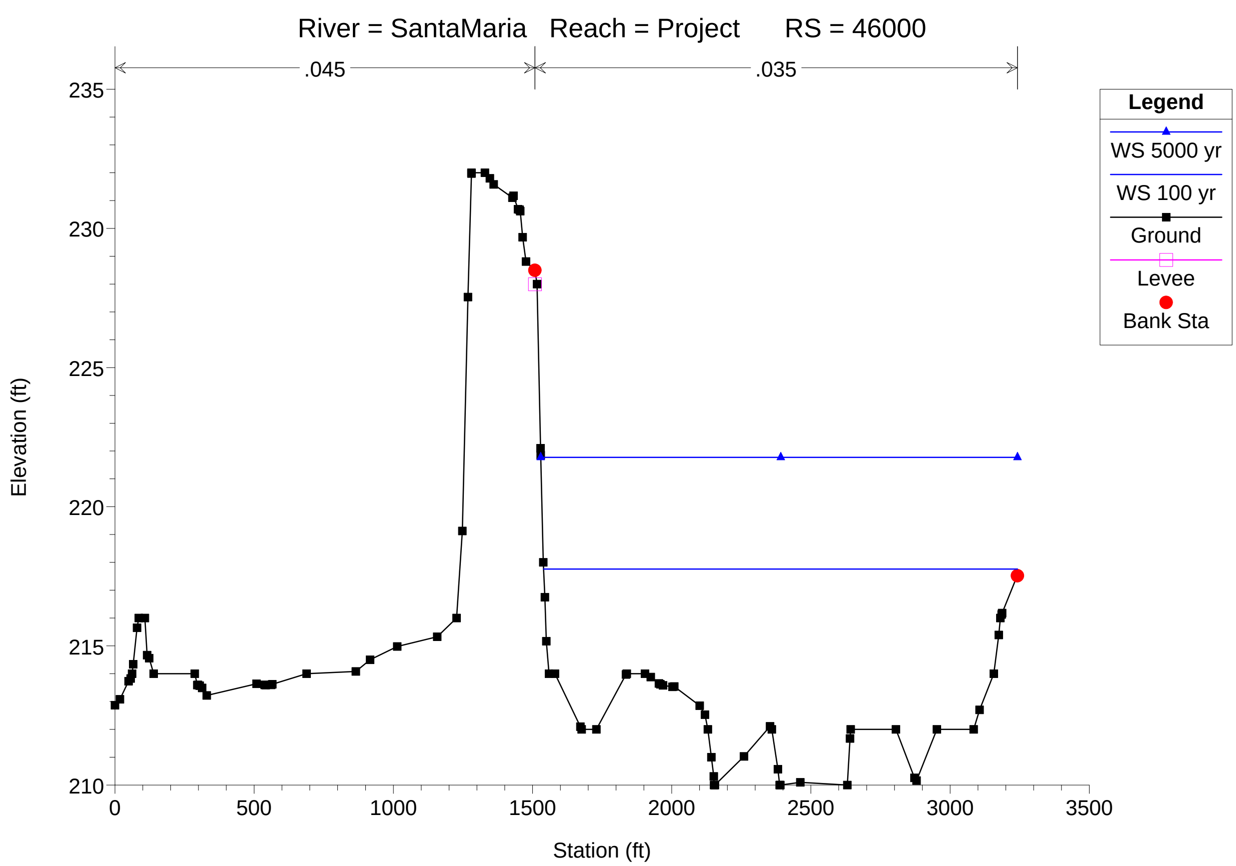

River = SantaMaria Reach = Project RS = 51000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
240
238
236
234
232
230
228
226
224
0
1000
2000
3000
4000
5000

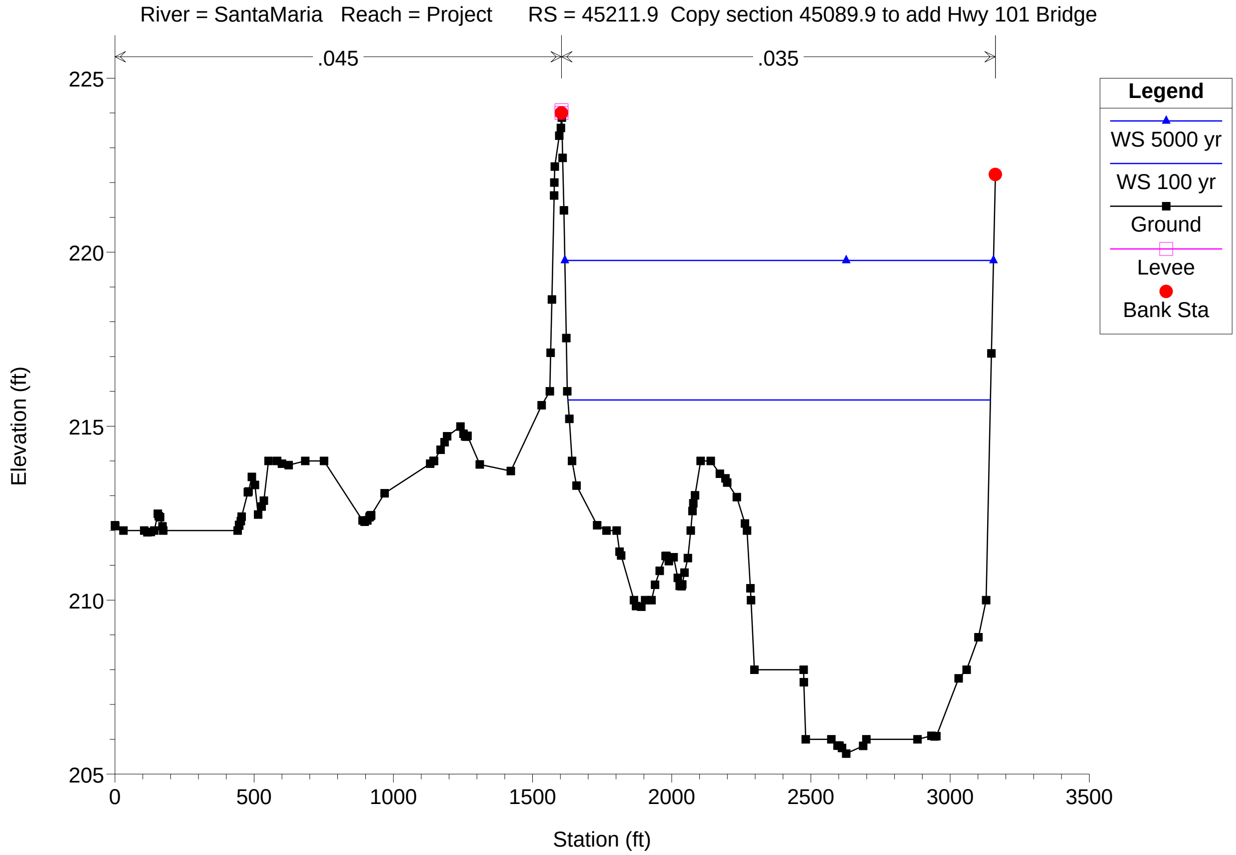

River = SantaMaria Reach = Project RS = 50000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
240
235
230
225
220
215
210
0
1000
2000
3000
4000


River = SantaMaria Reach = Project RS = 49000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
240
235
230
225
220
215
0
500
1000
1500
2000
2500
3000
3500
4000
Station (ft)

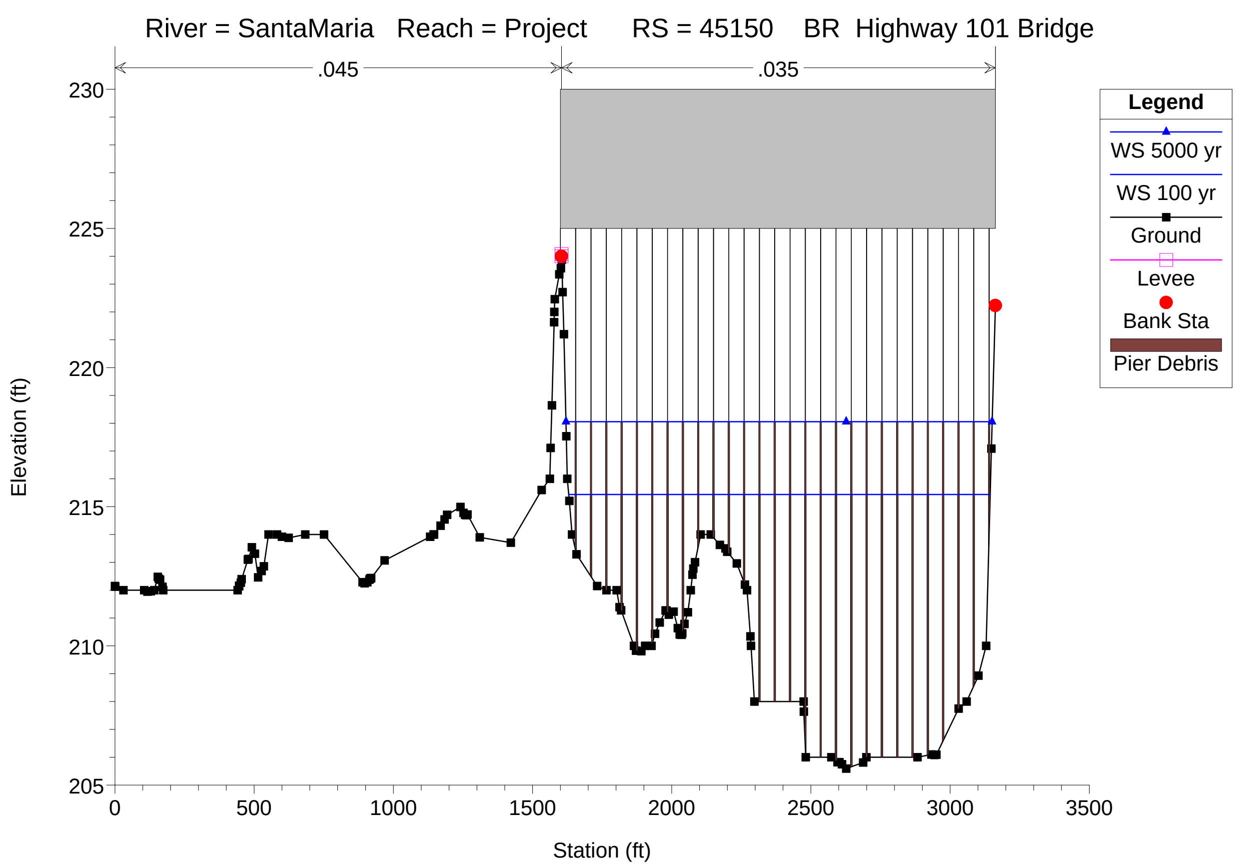

River = SantaMaria Reach = Project RS = 47934.05
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
250
245
240
235
230
225
220
215
0
500
1000
1500
2000
2500
3000
Station (ft)


River = SantaMaria Reach = Project RS = 47000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
230
228
226
224
222
220
218
216
214
212
0
500
1000
1500
2000
2500
3000
3500
Station (ft)


River = SantaMaria Reach = Project RS = 46000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
235
230
225
220
215
210
0
500
1000
1500
2000
2500
3000
3500
Station (ft)

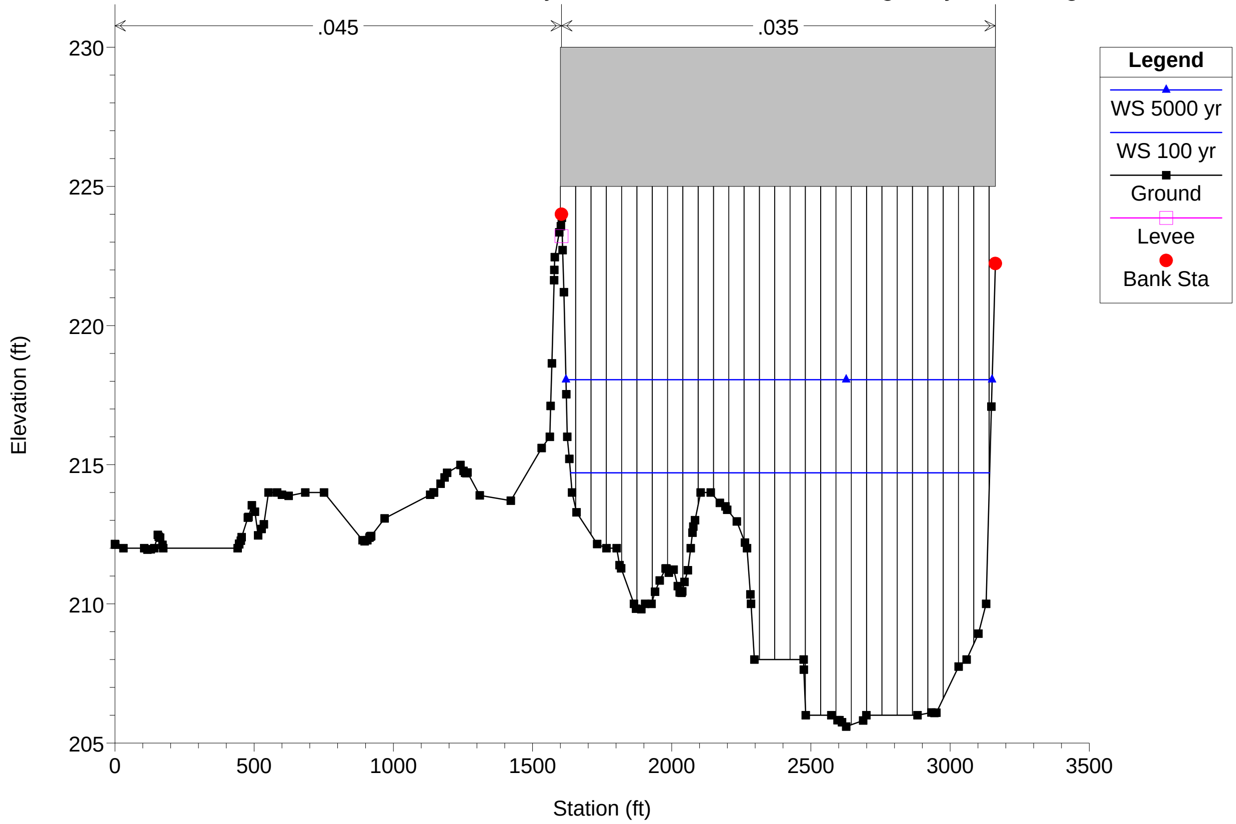


River = SantaMaria Reach = Project RS = 45211.9 Copy section 45089.9 to add Hwy 101 Bridge
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta

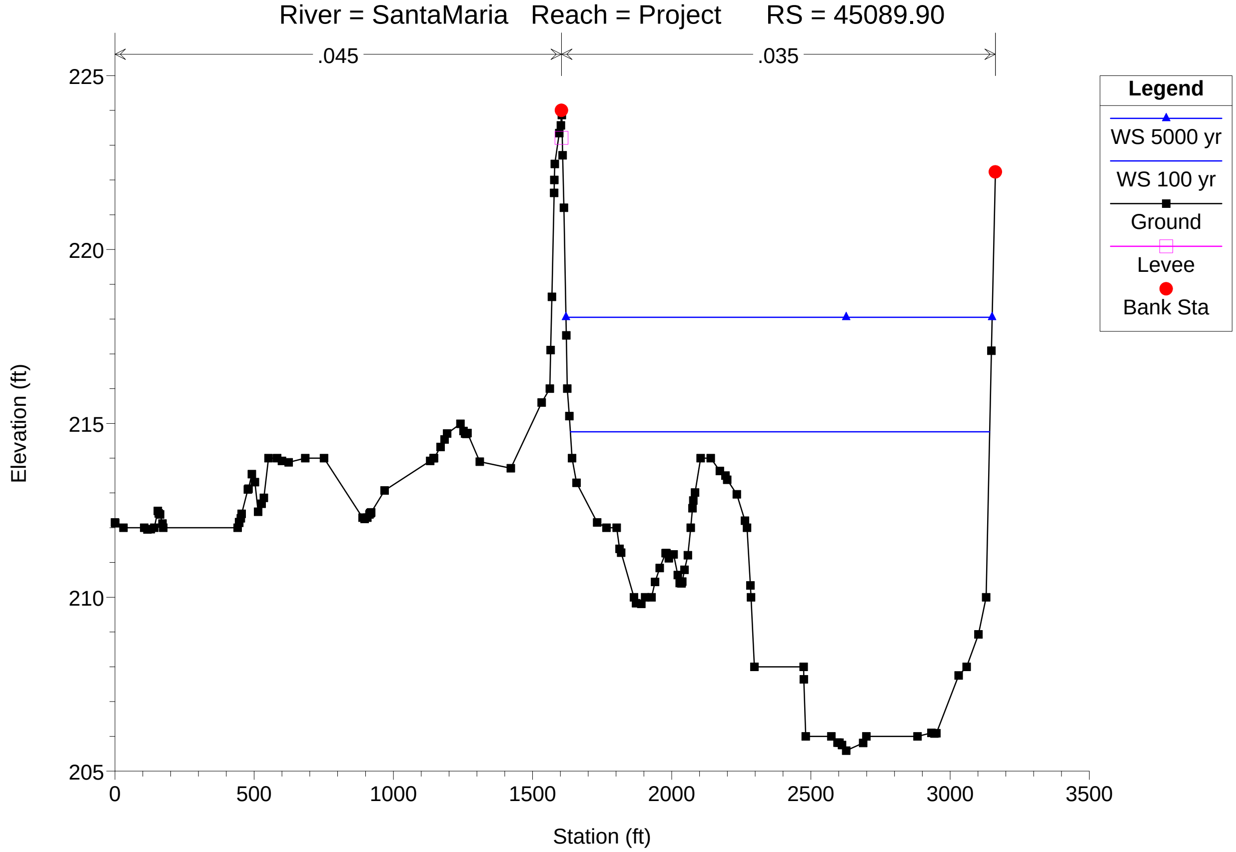


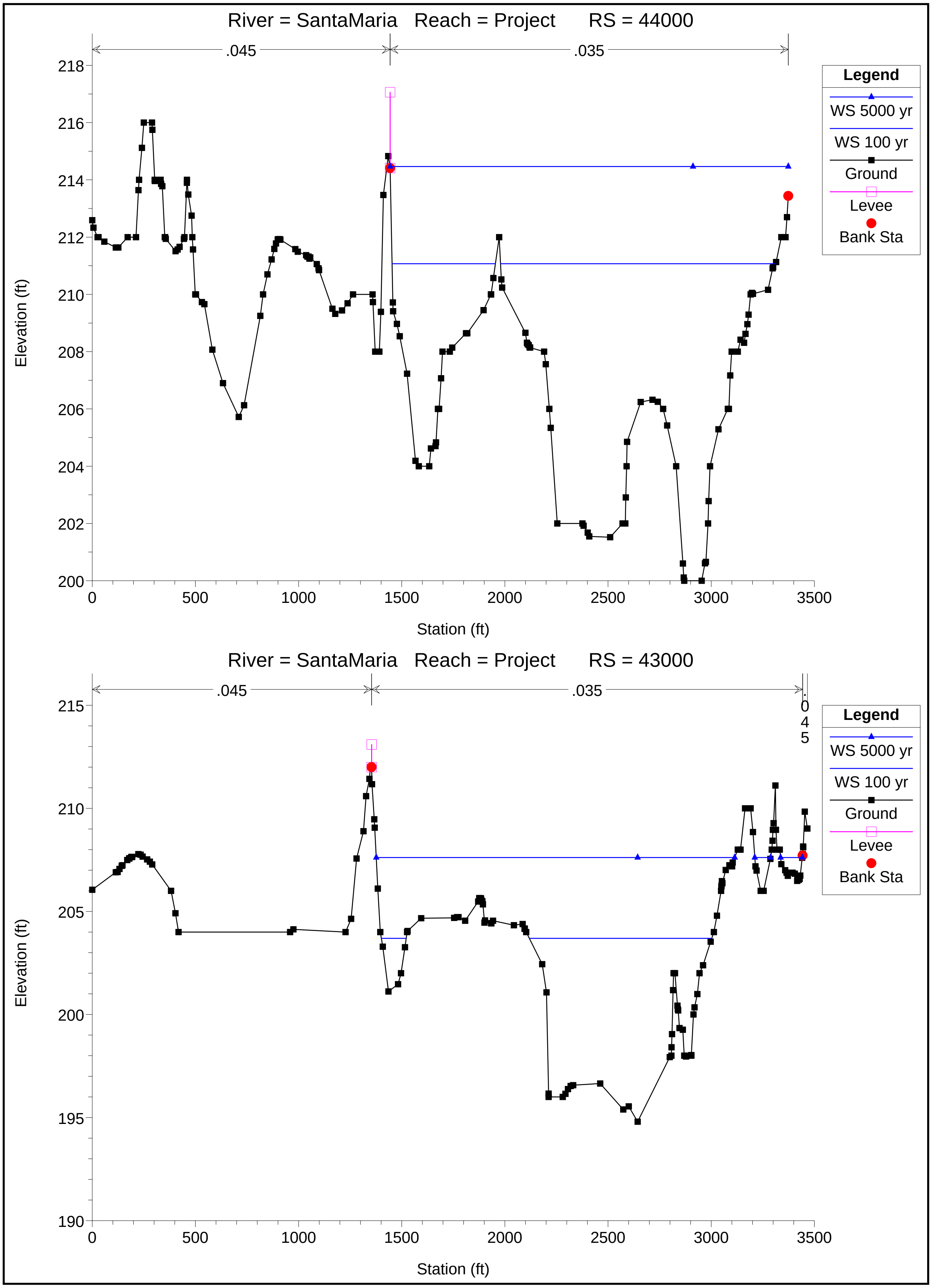
River = SantaMaria Reach = Project RS = 45150 BR Highway 101 Bridge
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Pier Debris

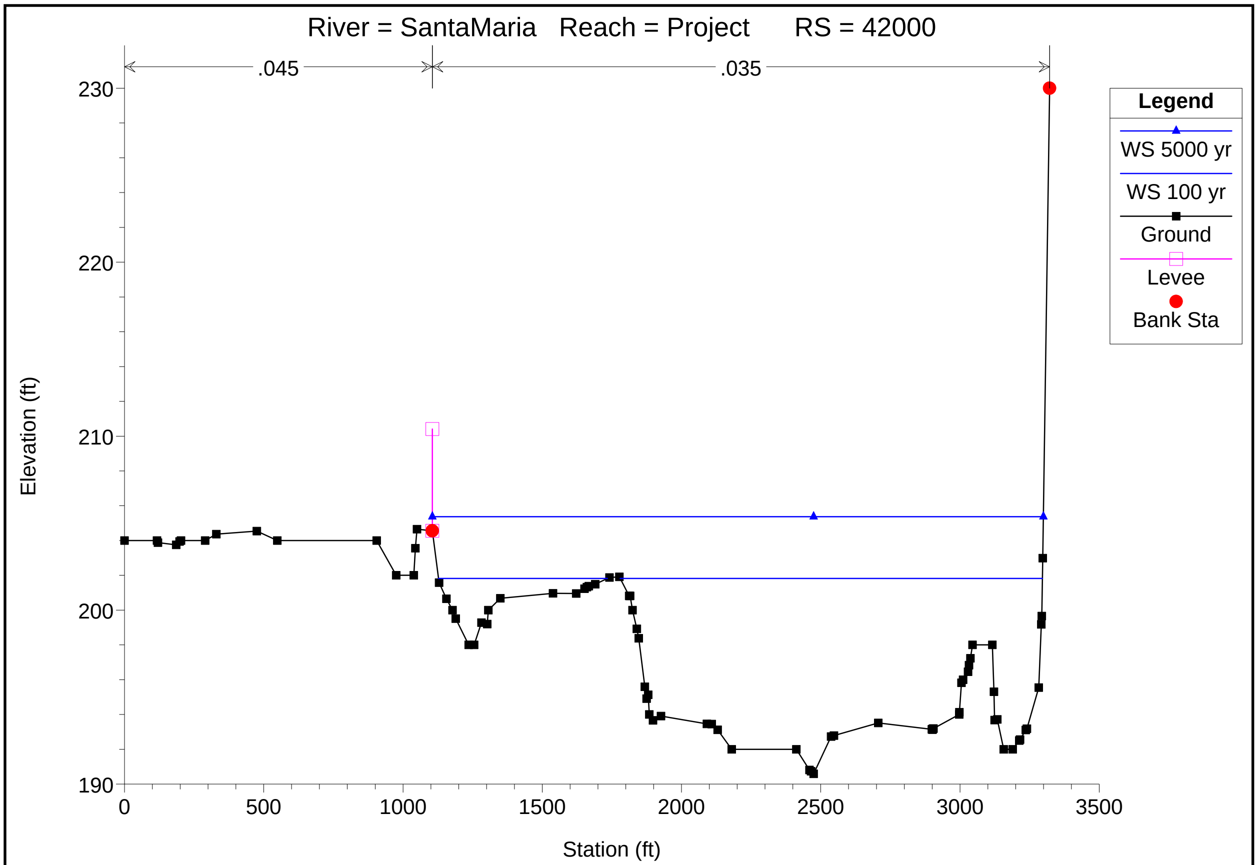
River = SantaMaria Reach = Project RS = 45150 BR Highway 101 Bridge

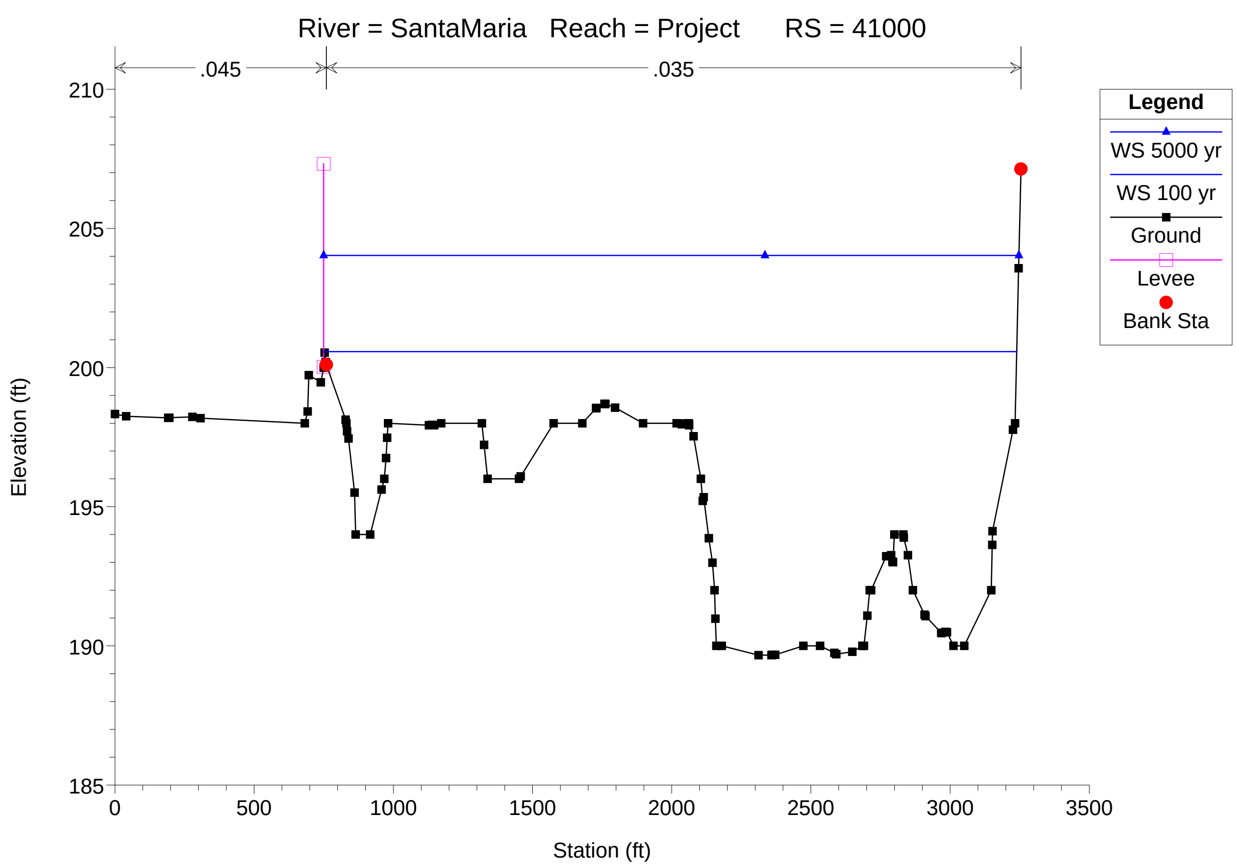


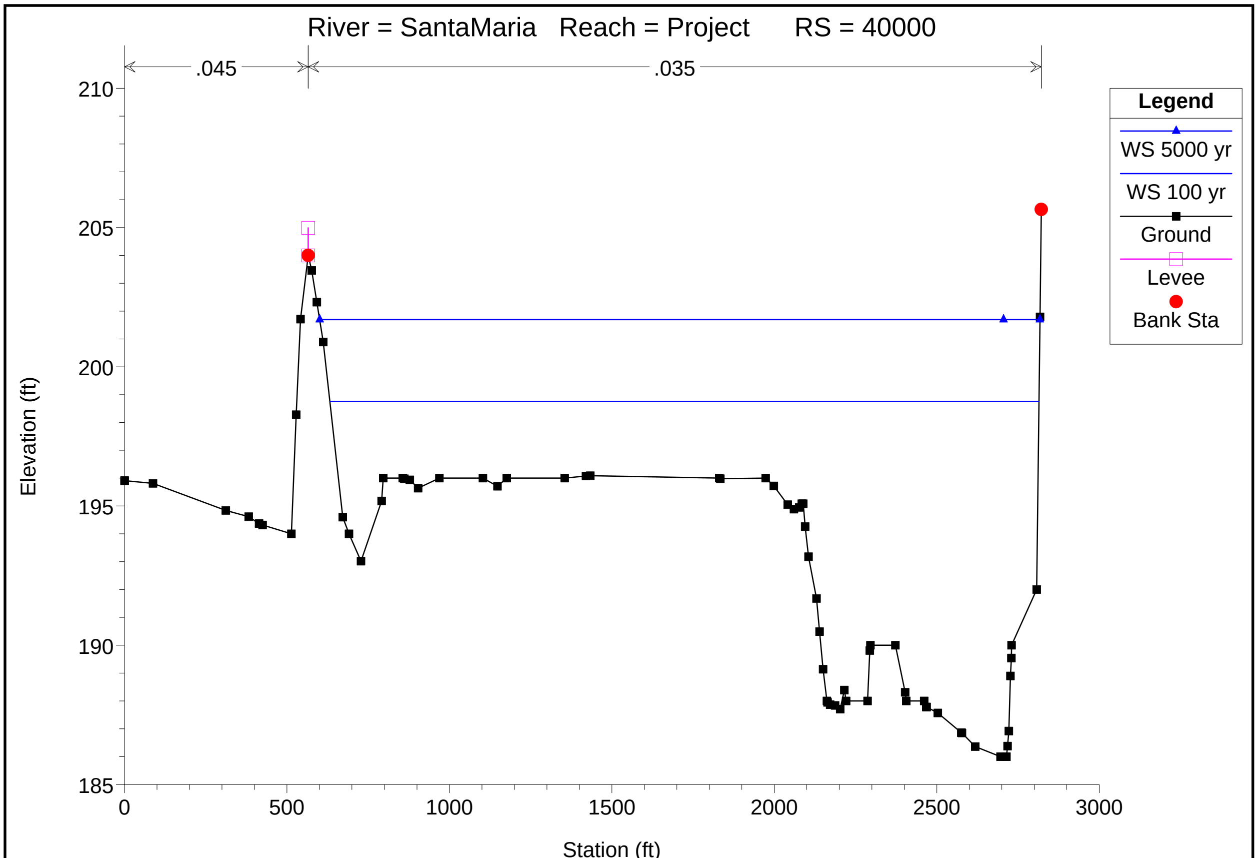
River = SantaMaria Reach = Project RS = 45089.90

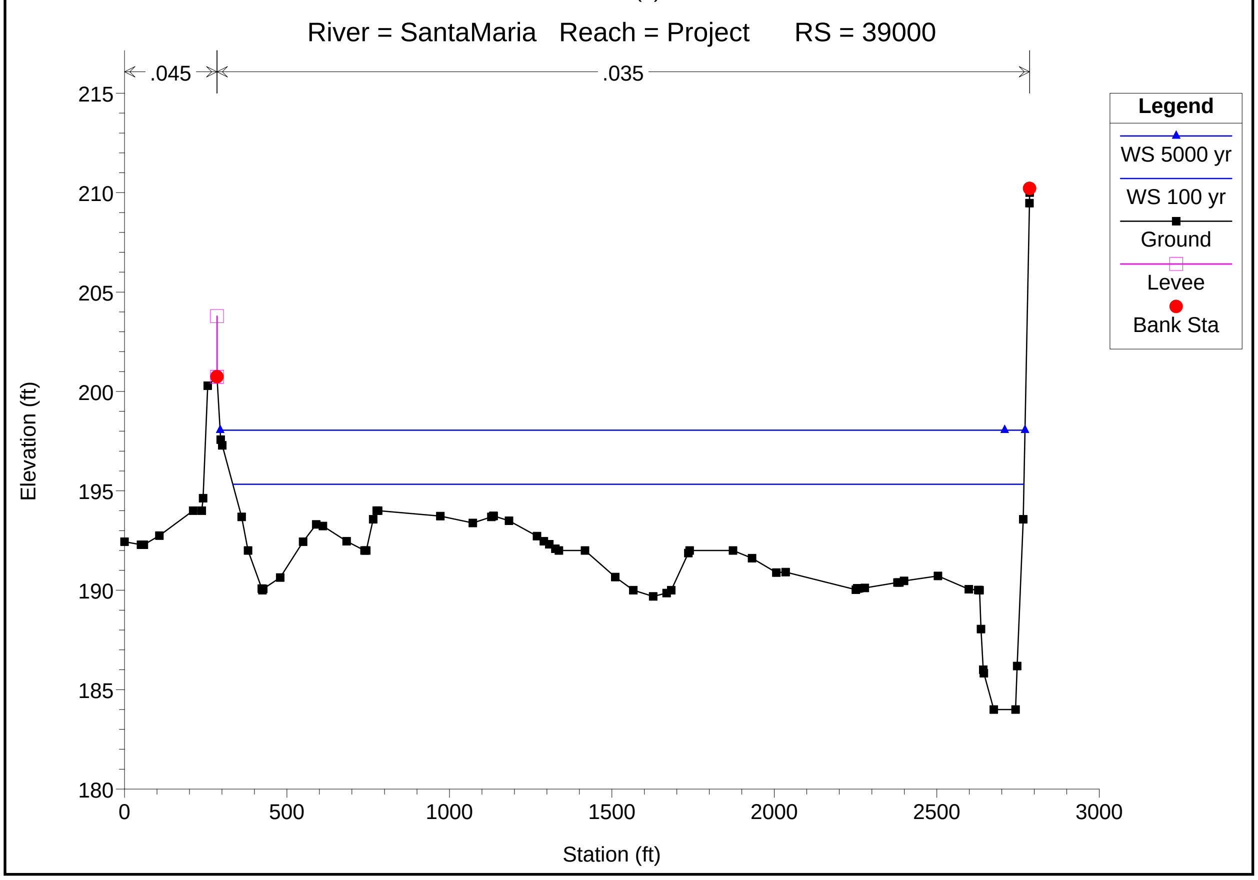


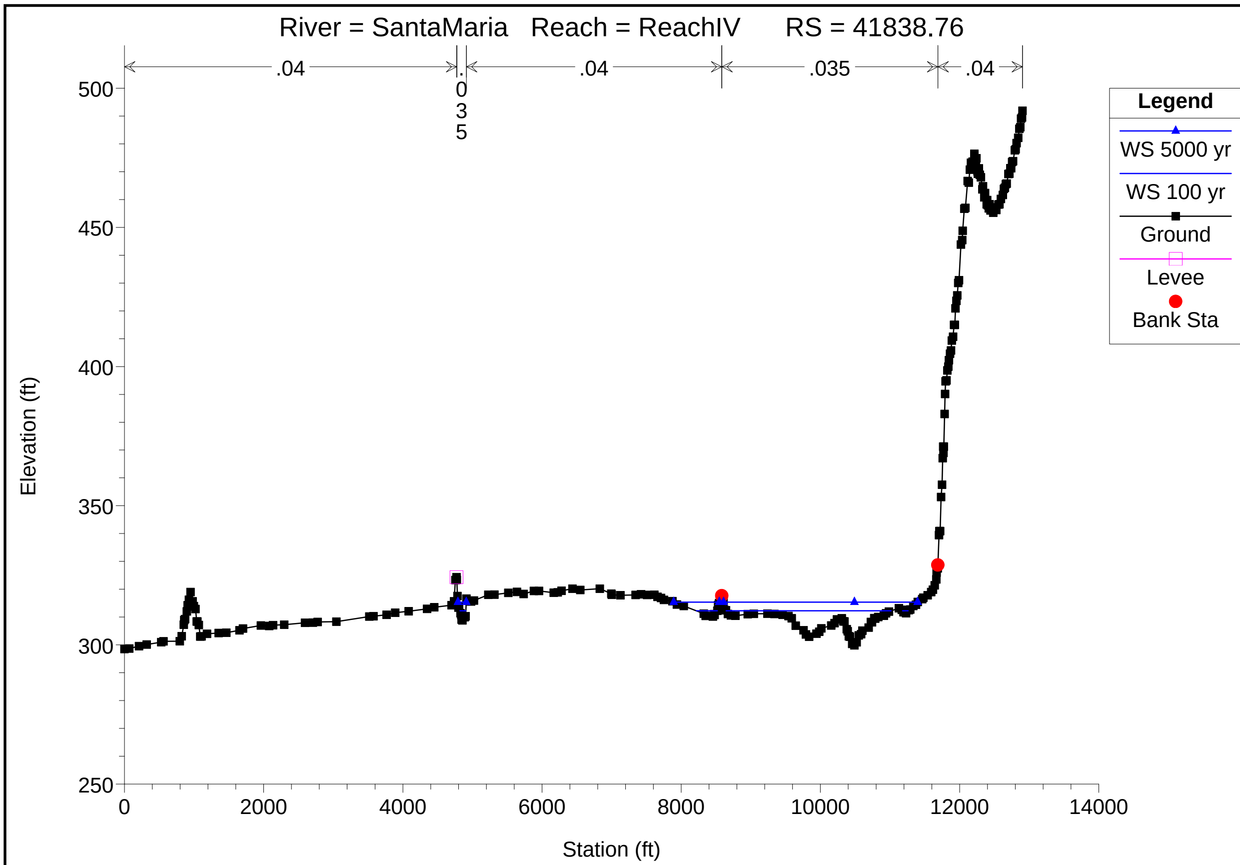

River = SantaMaria Reach = Project RS = 44000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
218
216
214
212
210
208
206
204
202
200
0
500
1000
1500
2000
2500
3000
3500
Station (ft)
River = SantaMaria Reach = Project RS = 43000
.045
.035
.
0
4
5
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
215
210
205
200
195
190
0
500
1000
1500
2000
2500
3000
3500
Station (ft)

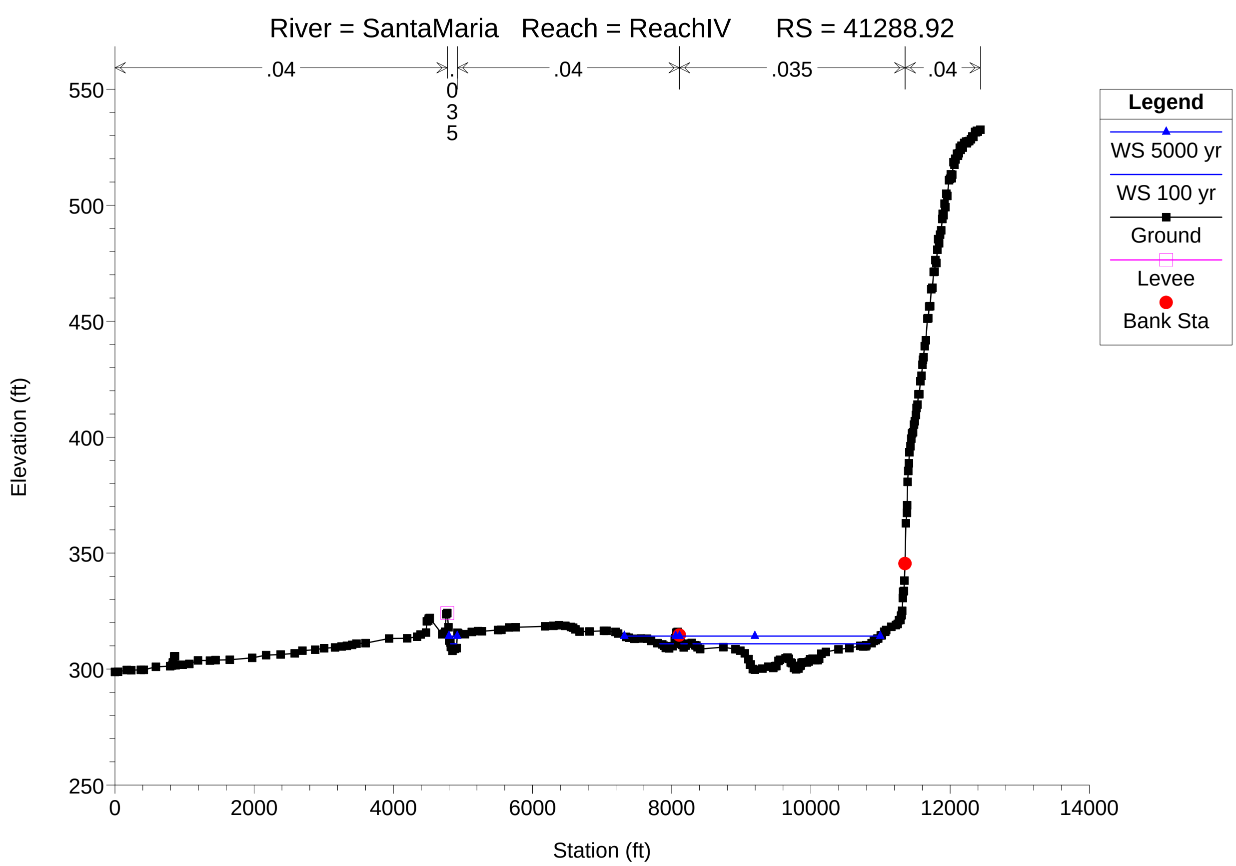

River = SantaMaria Reach = Project RS = 42000
.045
.035
Elevation (ft)
230
220
210
200
190
0
500
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta

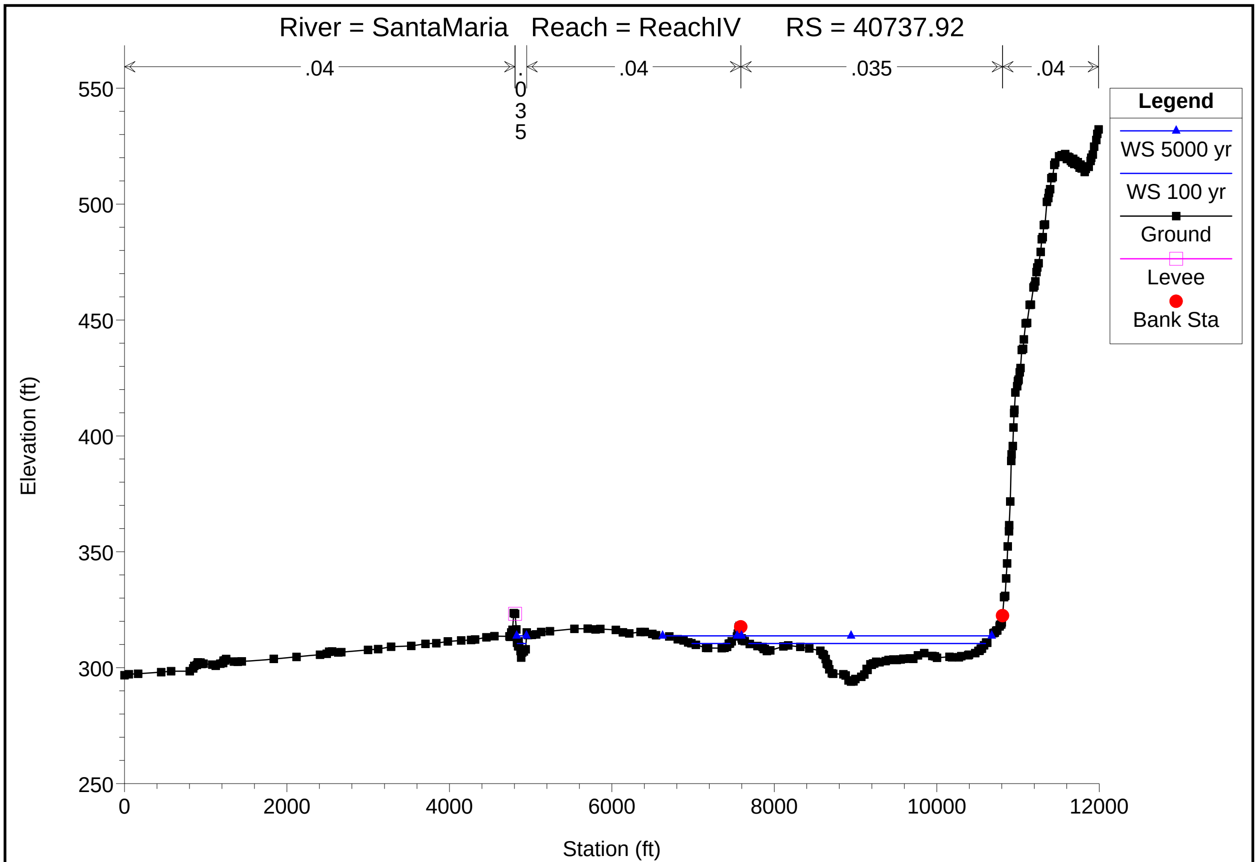

River = SantaMaria Reach = Project RS = 41000
.045
.035
Elevation (ft)
210
205
200
195
190
185
0
500
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta

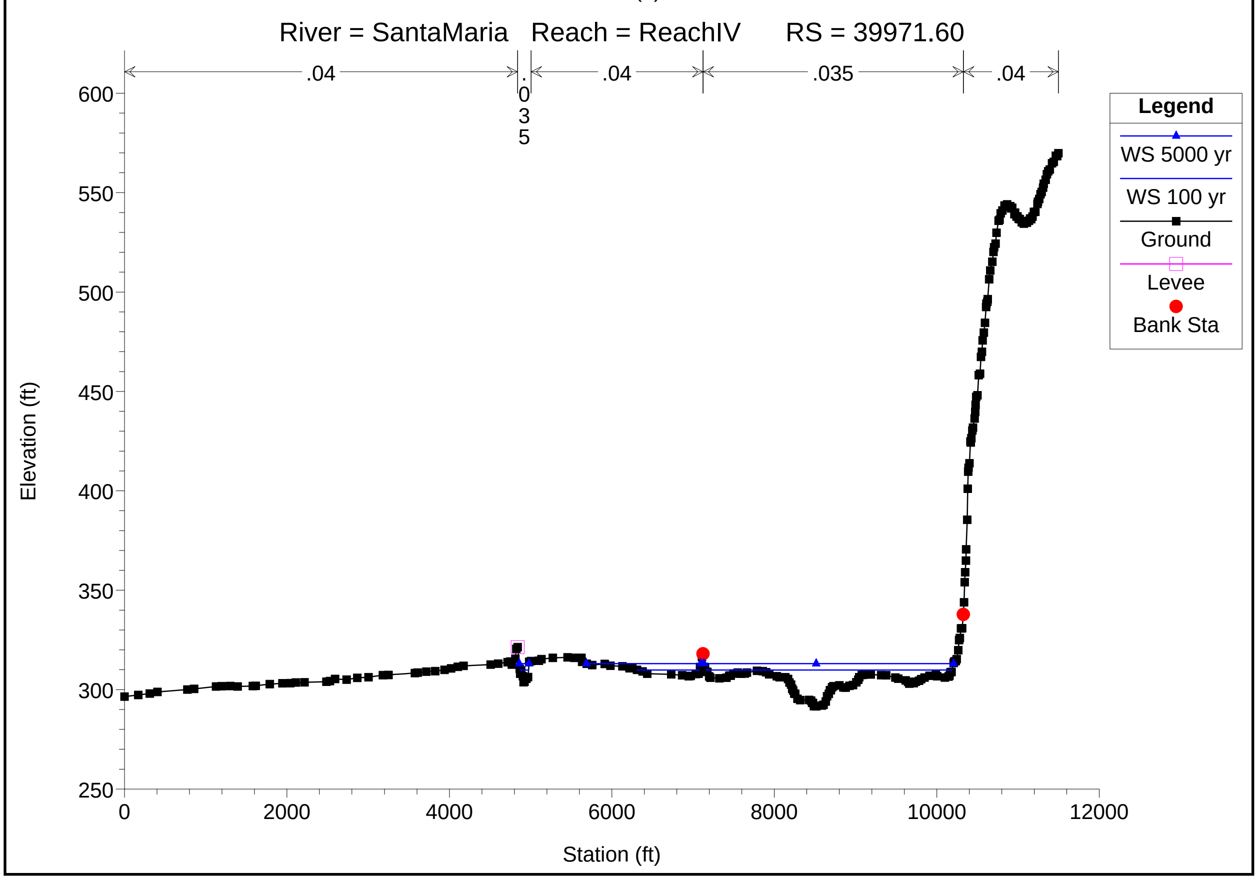

River = SantaMaria Reach = Project RS = 40000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
210
205
200
195
190
185
0
500
1000
1500
2000
2500
3000

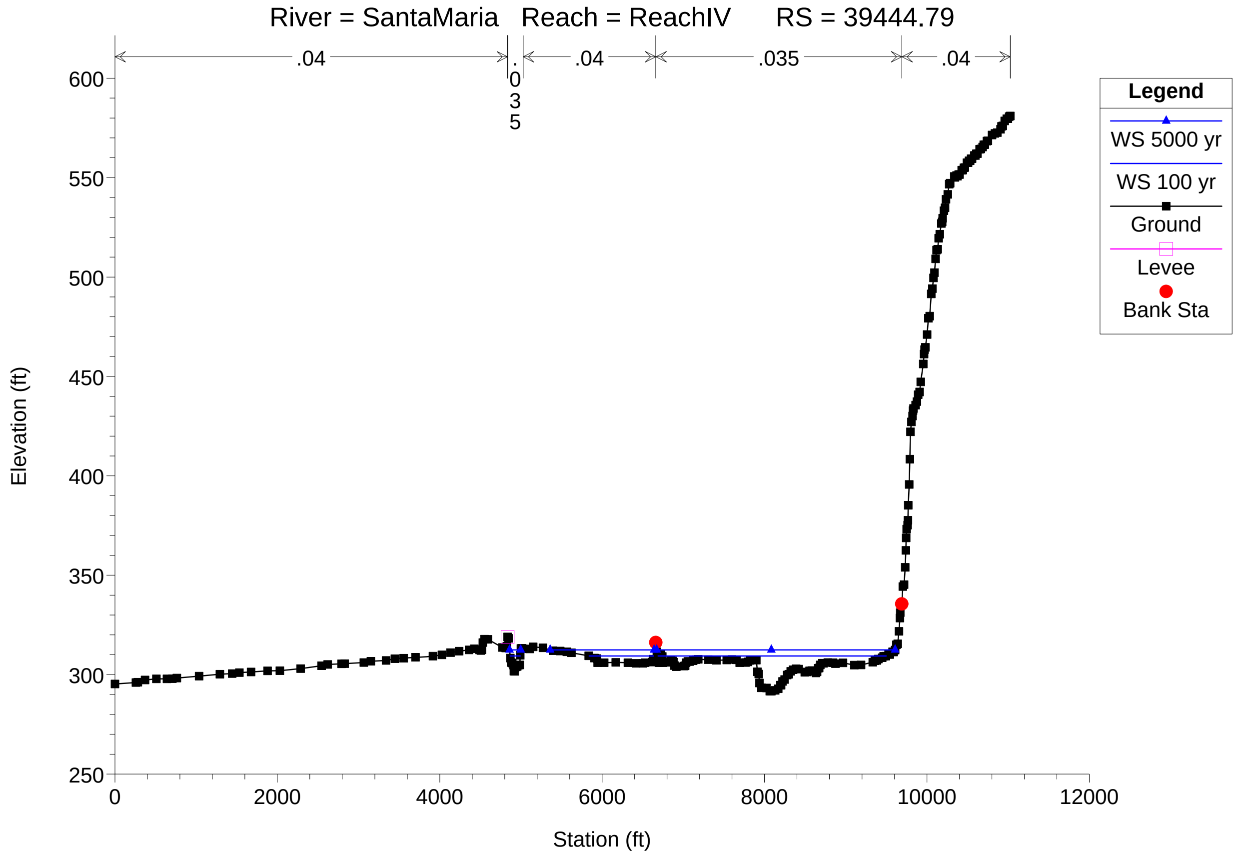

River = SantaMaria Reach = Project RS = 39000
.045
.035
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
215
210
205
200
195
190
185
180
0
500
1000
1500
2000
2500
3000

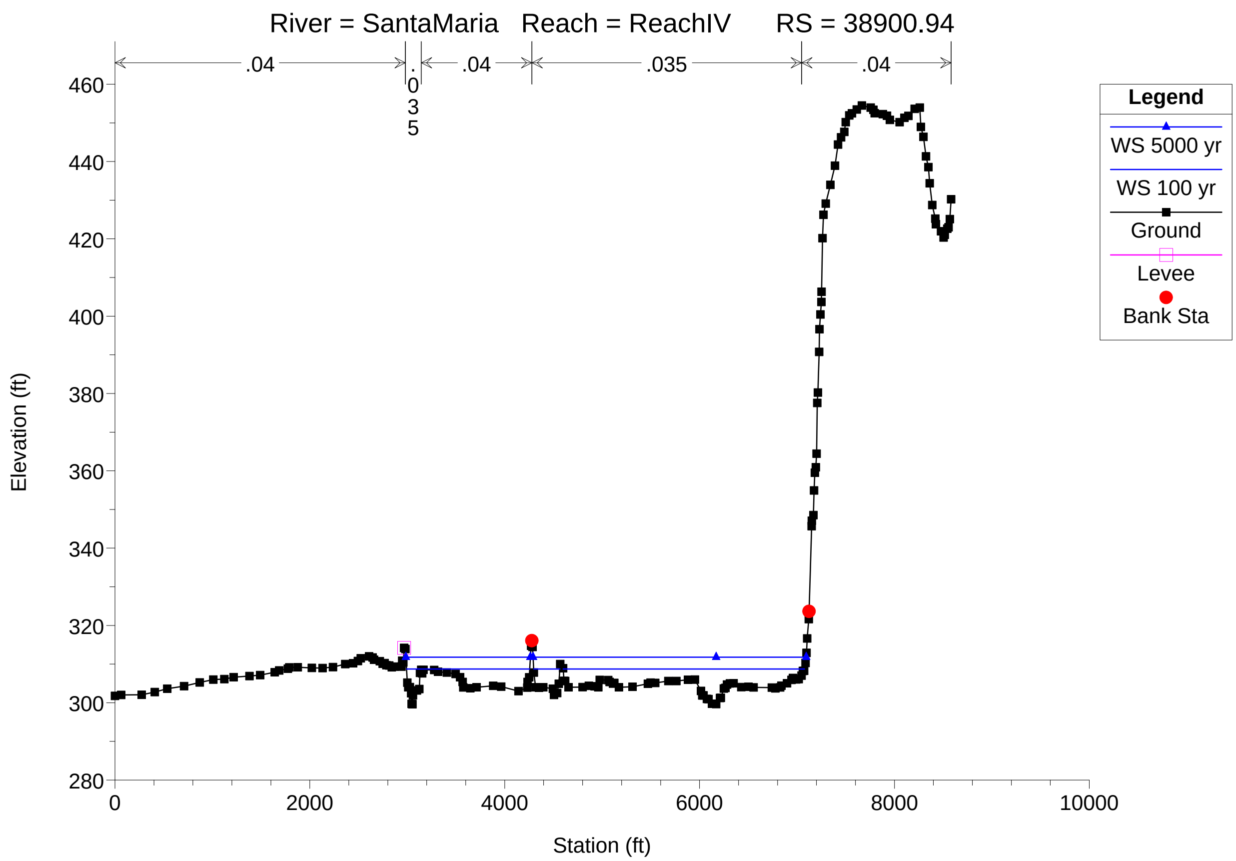

River = SantaMaria Reach = ReachIV RS = 41838.76
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
500
450
400
350
300
250
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)

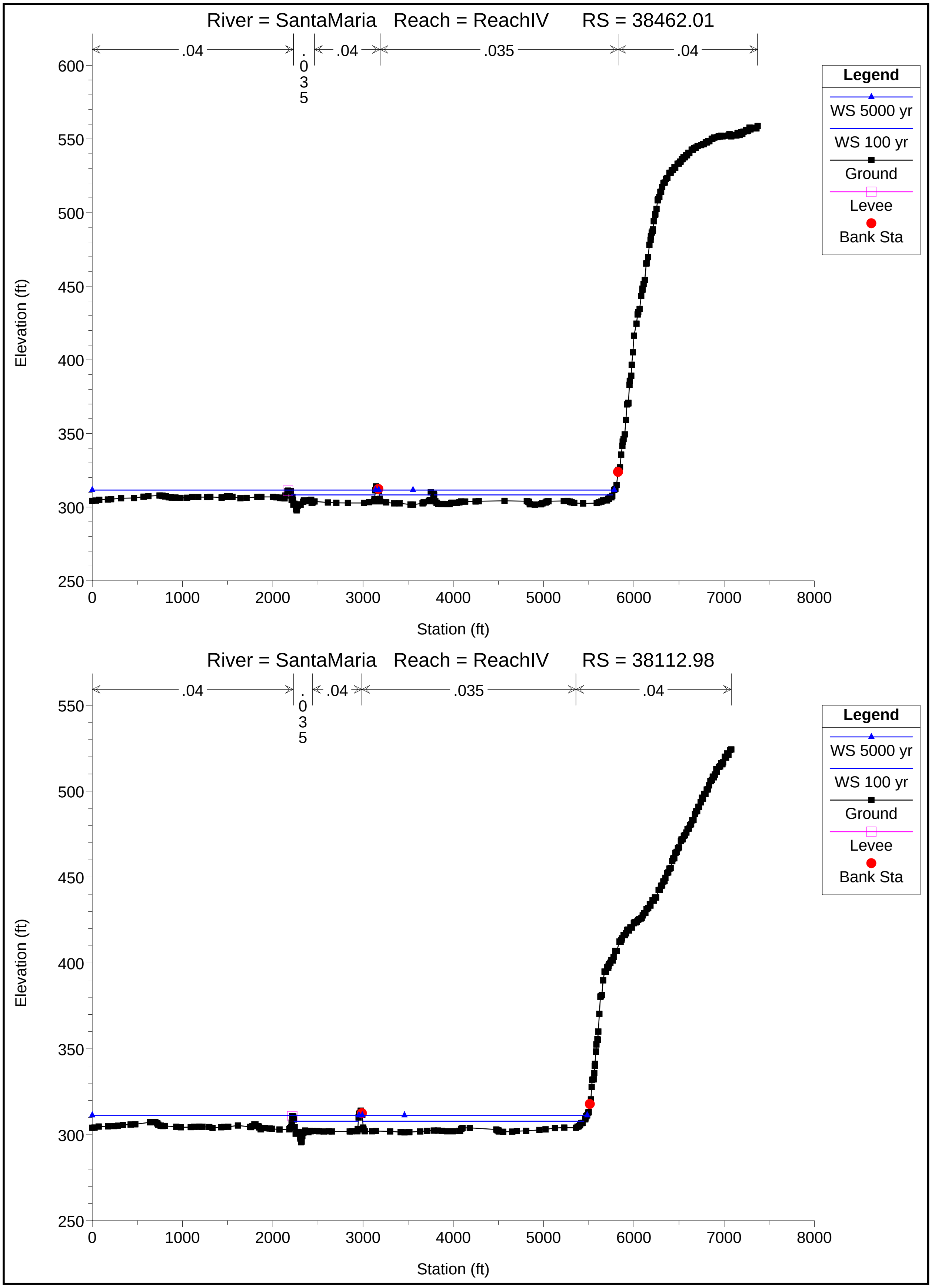

River = SantaMaria Reach = ReachIV RS = 41288.92
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
550
500
450
400
350
300
250
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)

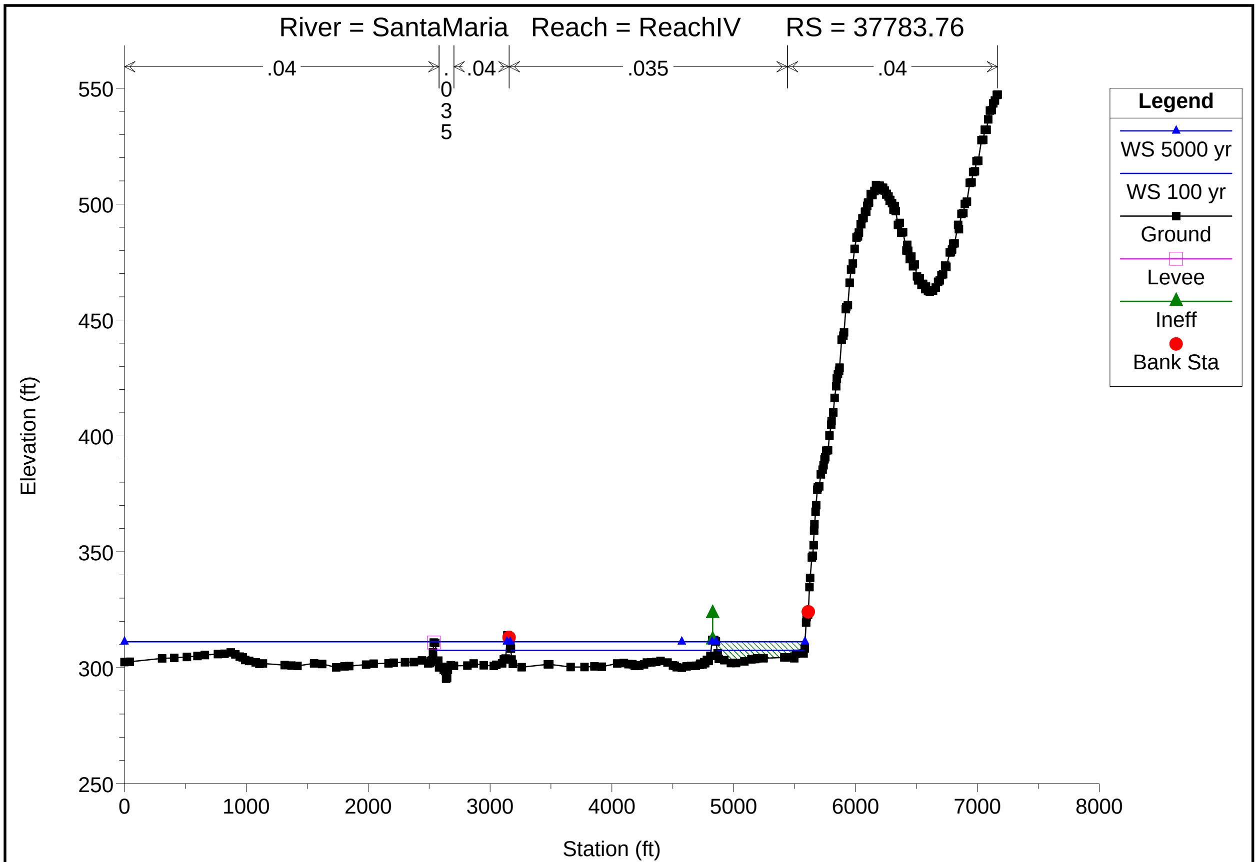

River = SantaMaria Reach = ReachIV RS = 40737.92
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
250
300
350
400
450
500
550
0
2000
4000
6000
8000
10000
12000

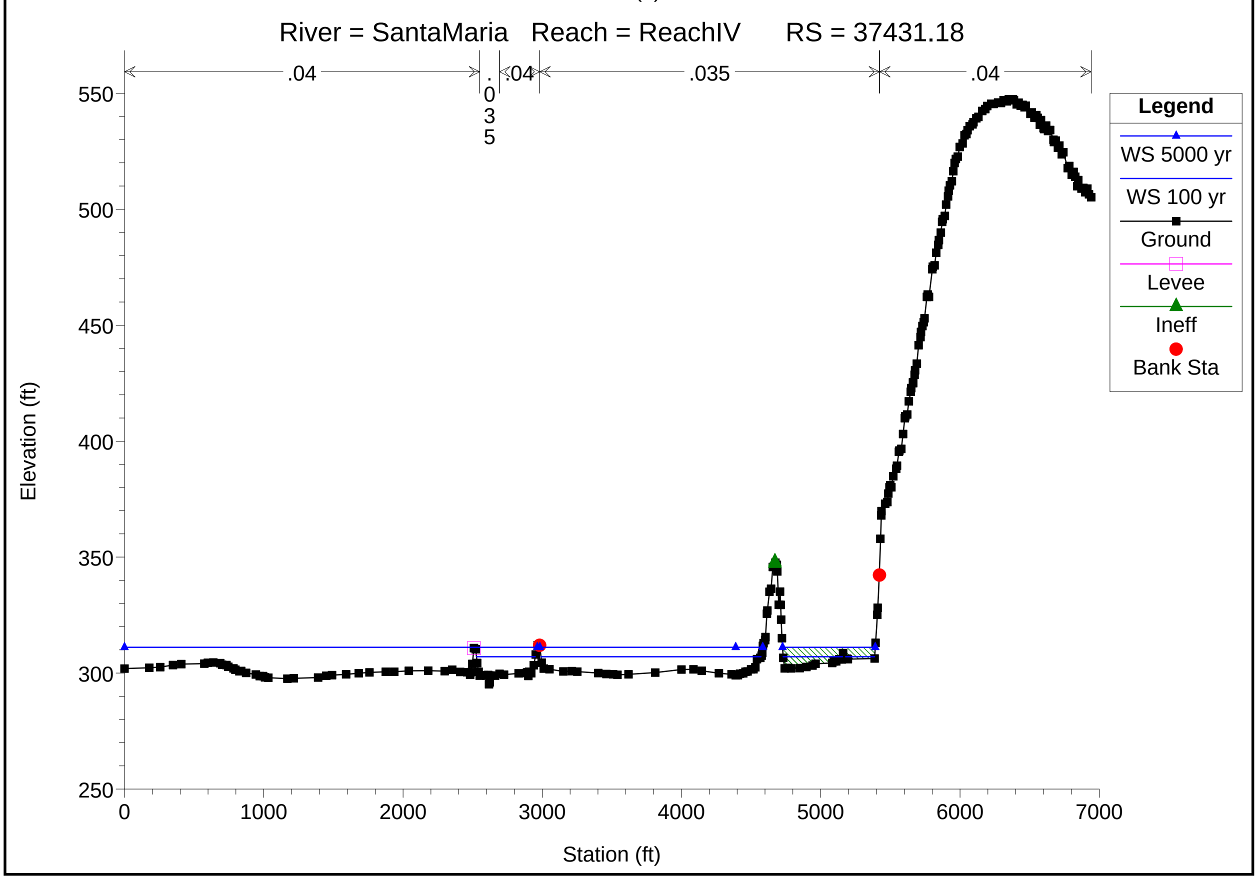

River = SantaMaria Reach = ReachIV RS = 39971.60
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
250
300
350
400
450
500
550
600
0
2000
4000
6000
8000
10000
12000

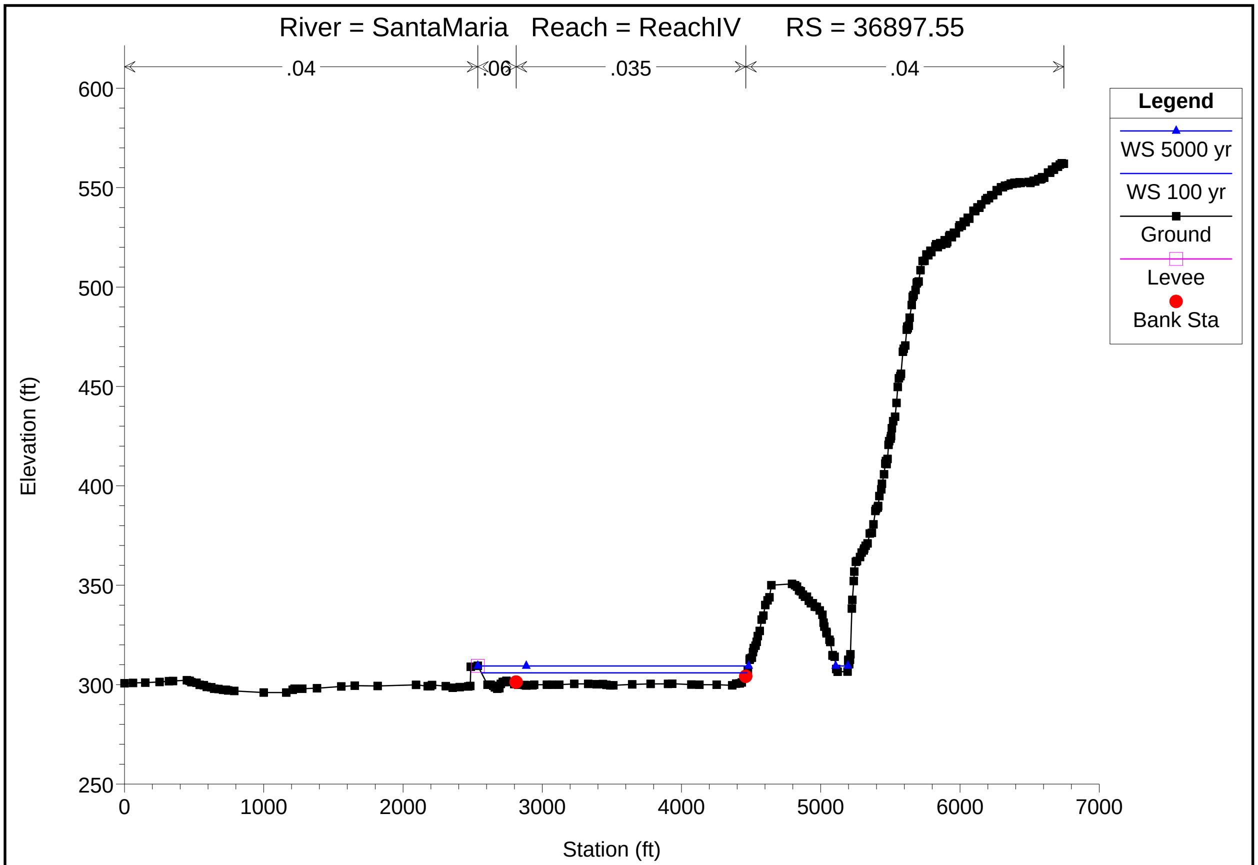

River = SantaMaria Reach = ReachIV RS = 39444.79
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
600
550
500
450
400
350
300
250
0
2000
4000
6000
8000
10000
12000
Station (ft)


River = SantaMaria Reach = ReachIV RS = 38900.94
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
460
440
420
400
380
360
340
320
300
280
0
2000
4000
6000
8000
10000
Station (ft)

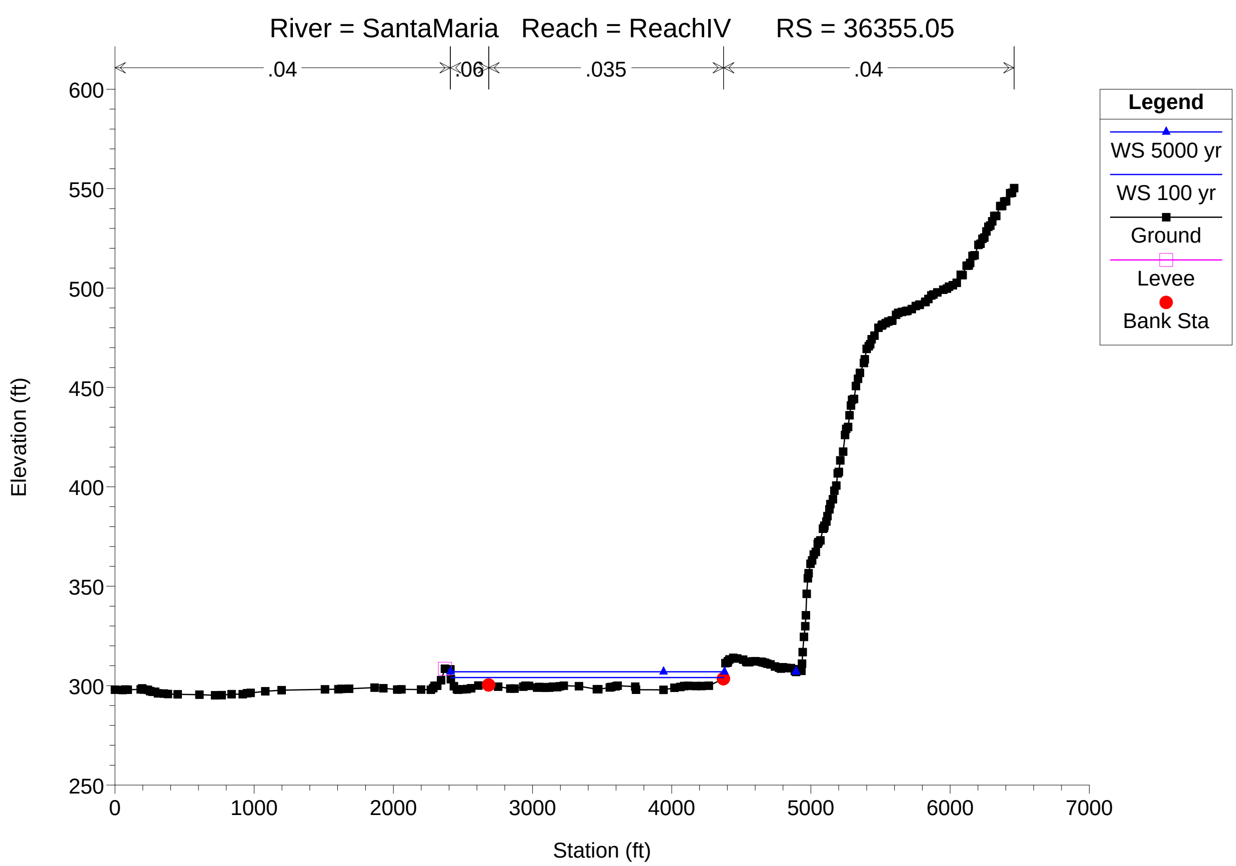

River = SantaMaria Reach = ReachIV RS = 38462.01
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
River = SantaMaria Reach = ReachIV RS = 38112.98
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


River = SantaMaria Reach = ReachIV RS = 37783.76
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
550
500
450
400
350
300
250
0
1000
2000
3000
4000
5000
6000
7000
8000

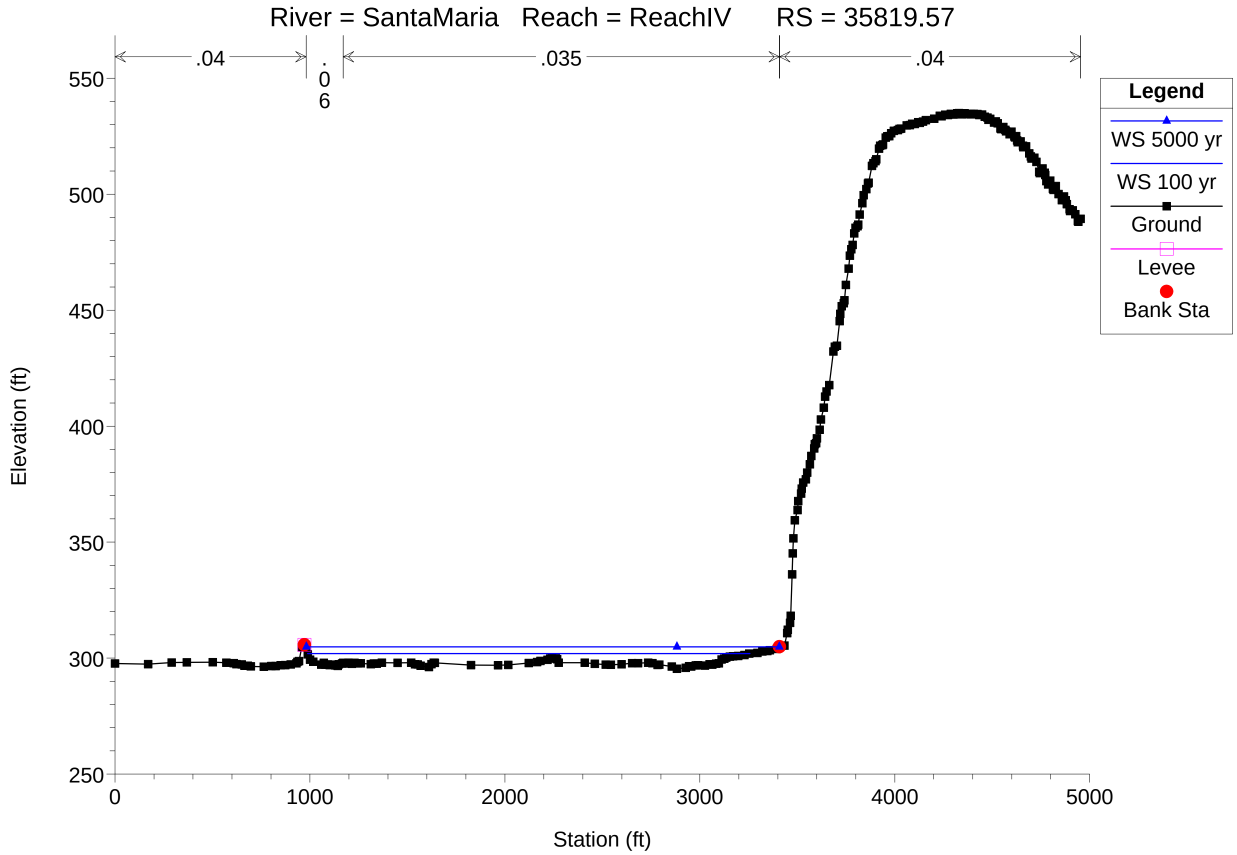

River = SantaMaria Reach = ReachIV RS = 37431.18
.04
.035
.04
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
550
500
450
400
350
300
250
0
1000
2000
3000
4000
5000
6000
7000

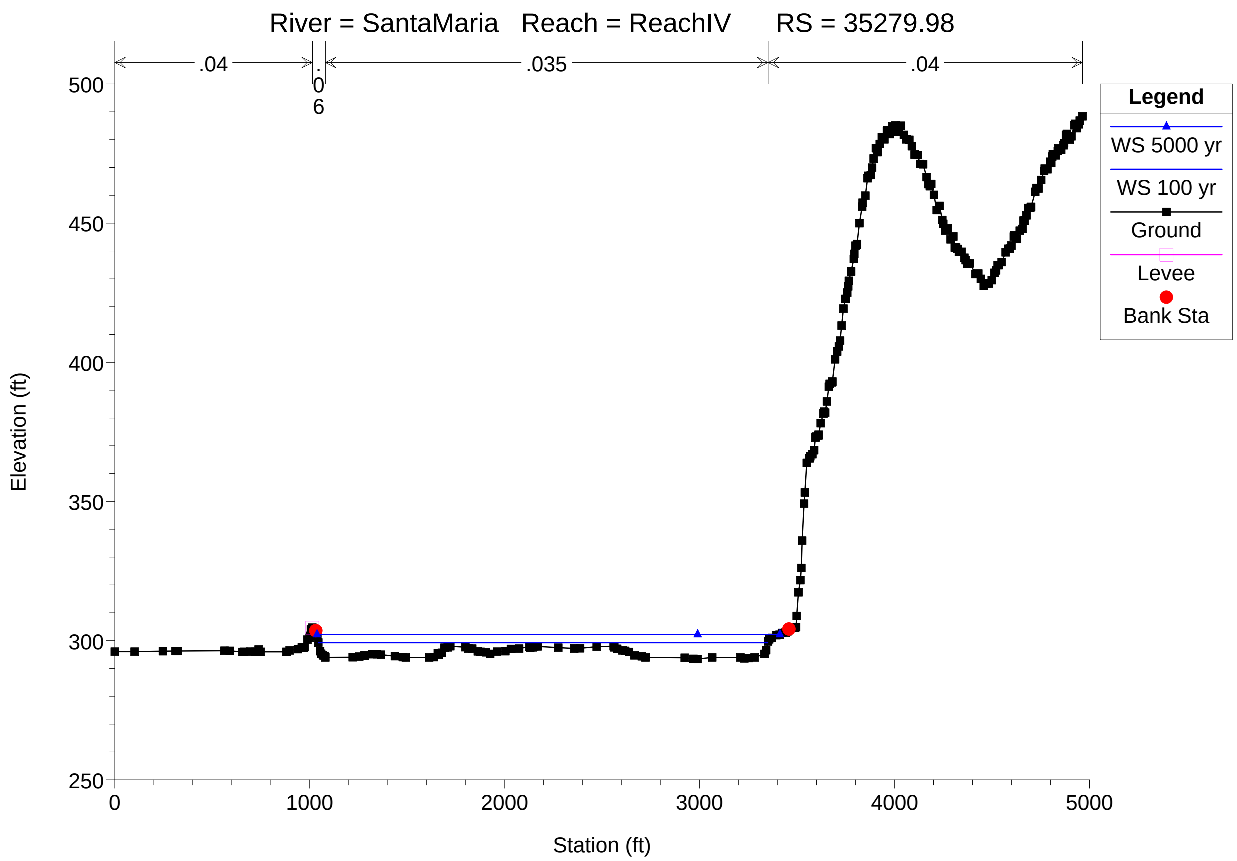


River = SantaMaria Reach = ReachIV RS = 36897.55
.04
.06
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
600
550
500
450
400
350
300
250
0
1000
2000
3000
4000
5000
6000
7000
Station (ft)



River = SantaMaria Reach = ReachIV RS = 36355.05
.04
.06
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
600
550
500
450
400
350
300
250
0
1000
2000
3000
4000
5000
6000
7000
Station (ft)


River = SantaMaria Reach = ReachIV RS = 35819.57
.04
.
0
6
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
550
500
450
400
350
300
250
0
1000
2000
3000
4000
5000
Station (ft)


River = SantaMaria Reach = ReachIV RS = 35279.98
.04
.
0
6
.035
.04
Legend
WS 5000 yr
WS 100 yr
Ground
Levee
Bank Sta
Elevation (ft)
500
450
400
350
300
250
0
1000
2000
3000
4000
5000
Station (ft)

Attachment C: HEC-RAS Summary Output Table for Evaluation Reach

HEC-RAS Plan: p19 River: SantaMaria Reach: Project

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Levee El Left
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
Project	91000	100 yr	66300.00	345.00	352.15	350.66	352.96	0.004861	7.24	9160.96	2391.93	0.65	360.00
Project	91000	5000 yr	160000.00	345.00	355.20	353.61	356.52	0.004448	9.21	17378.24	2956.19	0.67	360.00
Project	90003.45	100 yr	66300.00	343.58	349.24	347.25	349.70	0.002223	5.42	12221.63	2735.08	0.45	360.00
Project	90003.45	5000 yr	160000.00	343.58	352.02	349.52	353.00	0.002727	7.95	20117.79	2953.56	0.54	360.00
Project	89000	100 yr	66300.00	341.12	345.80	344.92	346.48	0.004941	6.65	9976.78	2999.72	0.64	360.00
Project	89000	5000 yr	160000.00	341.12	348.54	346.94	349.74	0.003888	8.77	18239.92	3017.91	0.63	360.00
Project	88000	100 yr	66300.00	335.12	342.74	340.91	343.18	0.002278	5.33	12429.58	2907.73	0.45	355.00
Project	88000	5000 yr	160000.00	335.12	346.35	343.03	347.07	0.001773	6.82	23473.50	3146.81	0.44	355.00
Project	87000	100 yr	66300.00	335.00	341.33	338.26	341.63	0.001078	4.42	15004.52	2654.21	0.33	355.00
Project	87000	5000 yr	160000.00	335.00	344.93	340.50	345.58	0.001241	6.48	24710.27	2735.69	0.38	355.00
Project	86000	100 yr	66300.00	334.58	340.05	337.62	340.39	0.001428	4.67	14203.94	2857.38	0.37	350.00
Project	86000	5000 yr	160000.00	334.58	343.60	339.68	344.27	0.001389	6.57	24355.93	2870.29	0.40	350.00
Project	85000	100 yr	66300.00	331.56	337.38	335.92	338.16	0.003747	7.09	9348.03	2068.13	0.59	350.00
Project	85000	5000 yr	160000.00	331.56	340.11	338.63	341.80	0.004870	10.43	15336.29	2312.96	0.71	350.00
Project	84003.87	100 yr	66300.00	325.77	330.47	330.47	331.83	0.012734	9.35	7094.29	2602.66	1.00	340.00
Project	84003.87	5000 yr	160000.00	325.77	332.76	332.66	335.03	0.009951	12.09	13232.13	2739.20	0.97	340.00
Project	83000	100 yr	66300.00	320.00	327.08	325.07	327.45	0.001828	4.92	13478.13	3017.01	0.41	335.00
Project	83000	5000 yr	160000.00	320.00	330.11	327.04	330.88	0.001904	7.06	22655.26	3036.74	0.46	335.00
Project	82000	100 yr	66300.00	319.84	323.94	322.94	324.67	0.004566	6.87	9644.49	2596.98	0.63	335.00
Project	82000	5000 yr	160000.00	319.84	326.85	325.14	328.19	0.003886	9.29	17224.47	2613.18	0.64	335.00
Project	81000	100 yr	66300.00	315.00	320.45	318.76	321.04	0.002893	6.20	10701.44	2391.57	0.52	335.00
Project	81000	5000 yr	160000.00	315.00	323.49	321.18	324.69	0.003090	8.80	18182.55	2519.26	0.58	335.00
Project	80000	100 yr	66300.00	313.08	318.08	316.22	318.52	0.002144	5.29	12537.40	2837.31	0.44	325.00
Project	80000	5000 yr	160000.00	313.08	321.14	318.29	322.02	0.002187	7.53	21250.44	2869.72	0.49	325.00
Project	79000	100 yr	66300.00	310.59	315.99	314.06	316.39	0.002095	5.10	13012.16	3060.41	0.44	330.00
Project	79000	5000 yr	160000.00	310.59	319.18	316.14	319.94	0.001907	7.01	22834.72	3101.29	0.46	330.00
Project	78000	100 yr	66300.00	307.15	313.72	311.68	314.19	0.002314	5.49	12070.58	2736.55	0.46	318.00
Project	78000	5000 yr	160000.00	307.15	317.19	314.07	317.98	0.001996	7.16	22341.55	3044.85	0.47	318.00
Project	77000	100 yr	66300.00	304.00	311.04	309.29	311.63	0.002825	6.15	10775.09	2391.64	0.51	315.64
Project	77000	5000 yr	160000.00	304.00	314.98	311.75	315.90	0.002150	7.68	20827.49	2699.10	0.49	315.64
Project	76000	100 yr	66300.00	300.00	308.37	306.14	309.02	0.002397	6.49	10210.59	1848.53	0.49	313.70
Project	76000	5000 yr	160000.00	300.00	312.39	309.01	313.62	0.002362	8.88	18013.74	2015.96	0.52	313.70
Project	75000	100 yr	66300.00	298.00	304.78	303.52	305.82	0.004368	8.17	8112.02	1629.84	0.65	311.63
Project	75000	5000 yr	160000.00	298.00	307.89	306.51	310.17	0.005084	12.11	13214.37	1649.27	0.75	311.63
Project	74000	100 yr	70900.00	295.74	302.06	299.92	302.65	0.002276	6.18	11471.18	2151.23	0.47	310.00
Project	74000	5000 yr	160000.00	295.74	305.25	302.29	306.43	0.002447	8.69	18402.17	2181.93	0.53	310.00
Project	73000	100 yr	70900.00	292.00	299.28	297.64	299.99	0.003143	6.74	10526.89	2210.00	0.54	303.68
Project	73000	5000 yr	160000.00	292.00	302.20	299.98	303.55	0.003376	9.32	17162.11	2333.59	0.61	303.68
Project	72000	100 yr	70900.00	290.00	295.66	294.38	296.45	0.003985	7.14	9935.54	2286.09	0.60	300.78
Project	72000	5000 yr	160000.00	290.00	298.56	296.67	299.99	0.003740	9.62	16629.19	2329.86	0.63	300.78
Project	71000	100 yr	70900.00	285.83	292.60	290.77	293.20	0.002612	6.20	11439.10	2367.64	0.50	297.87
Project	71000	5000 yr	160000.00	285.83	295.70	293.00	296.83	0.002563	8.51	18790.74	2377.68	0.53	297.87
Project	70000	100 yr	70900.00	283.97	289.66	288.06	290.35	0.003094	6.66	10641.77	2243.65	0.54	295.29
Project	70000	5000 yr	160000.00	283.97	292.94	290.33	294.17	0.002750	8.88	18011.81	2255.76	0.55	295.29
Project	69000	100 yr	70900.00	280.00	286.72	284.84	287.42	0.002775	6.75	10508.34	2004.60	0.52	293.22
Project	69000	5000 yr	160000.00	280.00	290.11	287.31	291.43	0.002710	9.20	17397.17	2047.61	0.56	293.22
Project	68000	100 yr	70900.00	276.28	283.48	281.89	284.33	0.003439	7.40	9579.66	1867.38	0.58	289.94
Project	68000	5000 yr	160000.00	276.28	286.48	284.46	288.20	0.003809	10.51	15228.32	1894.14	0.65	289.94
Project	67000	100 yr	70900.00	273.87	280.06	278.56	280.83	0.003513	7.03	10087.27	2160.29	0.57	286.78
Project	67000	5000 yr	160000.00	273.87	283.36	280.94	284.70	0.003030	9.28	17236.03	2175.20	0.58	286.78
Project	66000	100 yr	70900.00	270.00	277.55	275.26	278.12	0.002075	6.03	11752.86	2132.06	0.45	283.76
Project	66000	5000 yr	160000.00	270.00	281.08	277.63	282.14	0.002055	8.26	19368.56	2175.95	0.49	283.76
Project	64999.99	100 yr	70900.00	267.79	274.60	273.03	275.45	0.003464	7.38	9604.74	1889.94	0.58	280.40
Project	64999.99	5000 yr	160000.00	267.79	278.06	275.60	279.58	0.003168	9.87	16203.85	1926.46	0.60	280.40
Project	64000	100 yr	70900.00	264.73	271.88	269.64	272.56	0.002370	6.63	10695.51	1860.28	0.49	277.36
Project	64000	5000 yr	160000.00	264.73	275.34	272.26	276.67	0.002575	9.28	17238.42	1925.13	0.55	277.36
Project	63000	100 yr	70900.00	262.00	268.89	267.16	269.73	0.003408	7.35	9639.90	1884.68	0.57	274.73
Project	63000	5000 yr	160000.00	262.00	272.13	269.90	273.69	0.003455	10.00	15998.09	1992.40	0.62	274.73

HEC-RAS Plan: p19 River: SantaMaria Reach: Project (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Levee El Left
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
Project	62000	100 yr	70900.00	258.49	266.47	264.22	267.02	0.002084	5.97	11884.44	2199.68	0.45	271.95
Project	62000	5000 yr	160000.00	258.49	269.72	266.55	270.81	0.002222	8.38	19084.46	2223.15	0.50	271.95
Project	61000	100 yr	70900.00	256.85	263.83	262.11	264.52	0.003020	6.67	10634.24	2200.31	0.53	268.46
Project	61000	5000 yr	160000.00	256.85	267.02	264.47	268.28	0.002859	9.01	17766.14	2245.85	0.56	268.46
Project	60000	100 yr	70900.00	253.59	260.66	258.89	261.42	0.003173	6.99	10149.19	2031.80	0.55	265.30
Project	60000	5000 yr	160000.00	253.59	263.92	261.45	265.32	0.003053	9.49	16862.43	2070.45	0.59	265.30
Project	59000	100 yr	70900.00	250.00	257.94	255.71	258.58	0.002495	6.43	11022.39	2084.16	0.49	263.50
Project	59000	5000 yr	160000.00	250.00	261.30	258.34	262.52	0.002477	8.84	18100.79	2111.55	0.53	263.50
Project	58000	100 yr	70900.00	248.00	256.14	252.99	256.66	0.001473	5.78	12259.98	1832.11	0.39	262.34
Project	58000	5000 yr	160000.00	248.00	257.94	255.64	259.58	0.003420	10.28	15568.60	1846.72	0.62	262.34
Project	57000	100 yr	70900.00	242.00	253.65	251.17	254.65	0.002749	8.05	8806.15	1276.50	0.54	257.02
Project	57000	5000 yr	160000.00	242.00	258.02	254.90	258.24	0.000415	3.95	43190.78	3919.92	0.22	257.02
Project	56749	100 yr	70900.00	242.00	253.60	248.67	254.12	0.000961	5.78	12260.22	1327.49	0.34	256.28
Project	56749	5000 yr	160000.00	242.00	256.81	251.98	257.96	0.001553	8.86	19047.15	1642.62	0.45	256.28
Project	56708.5		Bridge										
Project	56668	100 yr	70900.00	242.00	250.70	248.67	251.79	0.003239	8.39	8450.23	1303.07	0.58	256.20
Project	56668	5000 yr	160000.00	242.00	254.44	252.00	256.66	0.003697	11.96	13378.52	1337.56	0.67	256.20
Project	56000	100 yr	70900.00	241.03	248.54	246.78	249.53	0.003439	8.01	8851.87	1532.94	0.59	255.41
Project	56000	5000 yr	160000.00	241.03	252.49	249.74	254.26	0.003108	10.68	14987.40	1561.98	0.61	255.41
Project	55001.51	100 yr	70900.00	237.52	245.58	243.40	246.46	0.002720	7.52	9434.39	1502.89	0.53	252.90
Project	55001.51	5000 yr	160000.00	237.52	249.89	246.37	251.46	0.002445	10.04	15942.21	1514.90	0.55	252.90
Project	54000	100 yr	70900.00	234.00	242.89	240.38	243.83	0.002509	7.79	9101.90	1295.11	0.52	249.01
Project	54000	5000 yr	160000.00	234.00	246.56	243.67	248.63	0.003178	11.53	13882.07	1307.32	0.62	249.01
Project	53000.5	100 yr	70900.00	232.00	239.42	238.14	240.54	0.004477	8.48	8360.27	1619.63	0.66	246.14
Project	53000.5	5000 yr	160000.00	232.00	242.45	240.99	244.70	0.004939	12.02	13308.59	1643.54	0.74	246.14
Project	52000	100 yr	70900.00	229.30	235.95	234.30	236.69	0.003152	6.92	10241.44	2067.88	0.55	242.82
Project	52000	5000 yr	160000.00	229.30	238.86	236.72	240.35	0.003486	9.81	16308.17	2104.43	0.62	242.82
Project	51000	100 yr	70900.00	226.26	232.24	231.04	233.08	0.004181	7.34	9664.50	2211.47	0.62	239.46
Project	51000	5000 yr	160000.00	226.26	235.27	233.33	236.74	0.003726	9.76	16398.07	2242.85	0.64	239.46
Project	50000	100 yr	70900.00	222.00	228.90	227.13	229.60	0.002866	6.69	10602.84	2099.39	0.52	236.61
Project	50000	5000 yr	160000.00	222.00	232.29	229.51	233.55	0.002668	9.02	17738.01	2123.76	0.55	236.61
Project	49000	100 yr	70900.00	219.55	226.20	224.28	226.86	0.002604	6.51	10889.39	2087.23	0.50	234.05
Project	49000	5000 yr	160000.00	219.55	229.99	226.66	231.11	0.002166	8.51	18809.91	2100.70	0.50	234.05
Project	47934.05	100 yr	70900.00	216.00	223.86	221.29	224.47	0.001931	6.24	11357.16	1852.76	0.44	231.62
Project	47934.05	5000 yr	160000.00	216.00	227.81	223.88	228.94	0.001915	8.54	18737.78	1896.21	0.48	231.62
Project	47000	100 yr	70900.00	213.73	221.02	219.39	222.02	0.003602	8.02	8835.99	1578.31	0.60	229.98
Project	47000	5000 yr	160000.00	213.73	224.56	222.27	226.46	0.003624	11.08	14444.02	1596.46	0.65	229.98
Project	46000	100 yr	70900.00	210.00	217.76	215.87	218.63	0.003138	7.47	9488.25	1702.28	0.56	227.99
Project	46000	5000 yr	160000.00	210.00	221.77	218.69	223.26	0.002644	9.79	16336.11	1712.77	0.56	227.99
Project	45211.9	100 yr	70900.00	205.59	215.75	212.91	216.53	0.002245	7.07	10022.13	1517.55	0.49	224.08
Project	45211.9	5000 yr	160000.00	205.59	219.76	216.17	221.29	0.002374	9.90	16160.33	1539.58	0.54	224.08
Project	45150		Bridge										
Project	45089.90	100 yr	70900.00	205.59	214.76	212.91	215.83	0.003808	8.32	8526.49	1506.18	0.62	223.21
Project	45089.90	5000 yr	160000.00	205.59	218.05	216.17	220.22	0.004252	11.82	13534.14	1530.88	0.70	223.21
Project	44000	100 yr	70900.00	200.00	211.07	209.00	211.91	0.003295	7.36	9629.97	1831.47	0.57	217.06
Project	44000	5000 yr	160000.00	200.00	214.47	212.07	216.00	0.003249	9.94	16098.77	1929.84	0.61	217.06
Project	43000	100 yr	70900.00	194.80	203.69	203.69	206.38	0.010219	13.14	5395.22	1004.21	1.00	213.10
Project	43000	5000 yr	160000.00	194.80	207.61	207.61	210.61	0.009843	13.89	11516.91	1919.22	1.00	213.10
Project	42000	100 yr	70900.00	190.59	201.82	197.48	202.27	0.001443	5.42	13089.70	2122.82	0.38	210.41
Project	42000	5000 yr	160000.00	190.59	205.37	201.11	206.28	0.001632	7.68	20839.73	2194.39	0.44	210.41
Project	41000	100 yr	70900.00	189.67	200.57	196.25	200.93	0.001201	4.82	14714.08	2489.42	0.35	207.32
Project	41000	5000 yr	160000.00	189.67	204.03	199.68	204.76	0.001326	6.86	23337.08	2497.21	0.40	207.32
Project	40000	100 yr	70900.00	186.00	198.76	195.52	199.33	0.002175	6.06	11702.52	2182.20	0.46	204.99
Project	40000	5000 yr	160000.00	186.00	201.70	198.90	202.90	0.002617	8.81	18160.13	2216.82	0.54	204.99
Project	39000	100 yr	70900.00	184.00	195.33	194.36	196.18	0.004858	7.38	9605.71	2434.66	0.65	203.79
Project	39000	5000 yr	160000.00	184.00	198.05	196.52	199.55	0.004357	9.82	16287.15	2476.98	0.68	203.79
Project	38000	100 yr	70900.00	182.00	192.12	190.31	192.67	0.002546	5.98	11852.20	2537.51	0.49	198.00
Project	38000	5000 yr	160000.00	182.00	194.77	192.42	195.92	0.002908	8.59	18616.41	2556.14	0.56	198.00

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Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Levee El Left
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
Project	37000	100 yr	70900.00	182.00	189.38	187.59	189.97	0.002867	6.16	11506.49	2576.05	0.51	191.67
Project	37000	5000 yr	160000.00	182.00	192.36	189.85	193.26	0.002347	7.77	21429.39	3047.57	0.50	191.67
Project	36000	100 yr	70900.00	178.00	186.62	184.84	187.21	0.002638	6.16	11505.00	2419.53	0.50	191.22
Project	36000	5000 yr	160000.00	178.00	189.64	187.00	190.76	0.002630	8.49	18841.64	2442.91	0.54	191.22
Project	35000	100 yr	70900.00	176.00	183.55	182.06	184.26	0.003305	6.74	10526.30	2294.21	0.55	188.91
Project	35000	5000 yr	160000.00	176.00	186.55	184.30	187.86	0.003169	9.18	17436.63	2314.72	0.59	188.91
Project	34000	100 yr	70900.00	174.00	180.59	178.80	181.23	0.002755	6.42	11040.21	2254.56	0.51	186.00
Project	34000	5000 yr	160000.00	174.00	183.49	181.08	184.77	0.002992	9.08	17628.84	2277.85	0.57	186.00
Project	33000	100 yr	70900.00	170.00	176.75	175.73	177.64	0.004791	7.58	9359.63	2260.13	0.66	180.61
Project	33000	5000 yr	160000.00	170.00	179.59	177.99	181.18	0.004296	10.12	15809.16	2277.14	0.68	180.61
Project	31999.99	100 yr	70900.00	166.00	173.36	171.59	174.00	0.002757	6.41	11060.02	2267.49	0.51	180.00
Project	31999.99	5000 yr	160000.00	166.00	176.37	173.85	177.61	0.002861	8.92	17939.41	2303.67	0.56	180.00
Project	31000	100 yr	70900.00	162.00	170.22	168.74	170.94	0.003391	6.82	10402.63	2271.11	0.56	174.81
Project	31000	5000 yr	160000.00	162.00	173.24	171.01	174.57	0.003209	9.25	17304.19	2293.18	0.59	174.81
Project	30000.66	100 yr	70900.00	158.85	167.32	165.47	167.94	0.002635	6.33	11203.93	2263.34	0.50	172.00
Project	30000.66	5000 yr	160000.00	158.85	170.40	167.75	171.59	0.002701	8.78	18224.08	2293.97	0.55	172.00
Project	28898.92	100 yr	70900.00	156.00	164.42	162.61	165.03	0.002636	6.24	11363.24	2344.03	0.50	170.00
Project	28898.92	5000 yr	160000.00	156.00	167.44	164.83	168.60	0.002712	8.65	18494.41	2386.34	0.55	170.00
Project	28054.31	100 yr	70900.00	156.00	162.17	160.38	162.77	0.002711	6.24	11367.34	2394.87	0.50	168.00
Project	28054.31	5000 yr	160000.00	156.00	165.12	162.60	166.29	0.002764	8.67	18446.63	2400.89	0.55	168.00
Project	27000	100 yr	70900.00	152.00	158.57	157.29	159.36	0.003898	7.10	9988.81	2278.71	0.60	164.00
Project	27000	5000 yr	160000.00	152.00	161.44	159.55	162.89	0.003736	9.66	16557.70	2302.66	0.64	164.00
Project	26000	100 yr	70900.00	148.00	155.11	153.56	155.80	0.003204	6.69	10592.70	2277.41	0.55	158.20
Project	26000	5000 yr	160000.00	148.00	157.98	155.81	159.33	0.003338	9.31	17190.27	2324.03	0.60	158.20
Project	25000	100 yr	70900.00	145.92	151.39	150.15	152.19	0.004083	7.20	9842.56	2274.21	0.61	156.19
Project	25000	5000 yr	160000.00	145.92	154.22	152.42	155.71	0.003894	9.81	16309.63	2292.34	0.65	156.19
Project	24000	100 yr	70900.00	141.11	147.89	146.32	148.58	0.003169	6.67	10621.97	2274.52	0.54	151.15
Project	24000	5000 yr	160000.00	141.11	150.84	148.58	152.16	0.003163	9.21	17369.08	2287.17	0.59	151.15
Project	23000	100 yr	70900.00	138.00	144.05	142.93	144.86	0.004384	7.25	9780.38	2360.80	0.63	148.00
Project	23000	5000 yr	160000.00	138.00	146.19	145.14	147.99	0.005587	10.76	14871.70	2381.09	0.76	148.00
Project	22102.69	100 yr	70900.00	134.88	141.07	139.36	141.69	0.002813	6.35	11169.40	2358.64	0.51	144.00
Project	22102.69	5000 yr	160000.00	134.88	144.13	141.56	144.90	0.001967	7.35	23451.16	3229.73	0.47	144.00
Project	20997.06	100 yr	70900.00	132.00	138.33	136.28	138.89	0.002268	6.01	11798.95	2301.30	0.47	142.00
Project	20997.06	5000 yr	160000.00	132.00	141.48	138.51	142.57	0.002363	8.38	19086.33	2328.96	0.52	142.00
Project	20000	100 yr	70900.00	127.79	136.00	134.03	136.57	0.002381	6.08	11666.51	2320.94	0.48	140.00
Project	20000	5000 yr	160000.00	127.79	138.92	136.26	140.07	0.002647	8.63	18604.16	2376.52	0.54	140.00
Project	19794	100 yr	70900.00	127.92	134.82	133.59	135.62	0.004200	7.20	9852.17	2326.52	0.62	
Project	19794	5000 yr	160000.00	127.92	137.59	135.87	139.06	0.004118	9.72	16455.56	2431.65	0.66	
Project	19737		Bridge										
Project	19680	100 yr	70900.00	125.78	133.32		134.14	0.004498	7.29	9728.75	2372.43	0.63	
Project	19680	5000 yr	160000.00	125.78	136.11		137.58	0.004128	9.73	16446.88	2430.58	0.66	
Project	19000	100 yr	70900.00	124.00	131.24	129.37	131.83	0.002522	6.15	11534.04	2354.24	0.49	134.16
Project	19000	5000 yr	160000.00	124.00	133.70	131.58	135.02	0.003336	9.22	17349.36	2376.60	0.60	134.16
Project	18000	100 yr	70900.00	122.00	128.42	126.77	129.08	0.002987	6.53	10860.43	2300.02	0.53	130.77
Project	18000	5000 yr	160000.00	122.00	131.44	129.02	132.27	0.002108	7.55	22119.86	2888.42	0.48	130.77
Project	17000	100 yr	70900.00	119.72	125.82	123.85	126.39	0.002392	6.09	11641.28	2316.08	0.48	135.00
Project	17000	5000 yr	160000.00	119.72	128.83	126.09	129.97	0.002557	8.58	18637.93	2324.57	0.53	135.00
Project	16000	100 yr	70900.00	116.16	122.53	121.29	123.32	0.004031	7.16	9900.80	2285.47	0.61	125.91
Project	16000	5000 yr	160000.00	116.16	125.39	123.53	126.85	0.003812	9.70	16488.03	2313.09	0.64	125.91
Project	15000	100 yr	70900.00	112.00	119.09	117.48	119.78	0.003089	6.63	10689.44	2266.19	0.54	123.06
Project	15000	5000 yr	160000.00	112.00	121.92	119.75	123.27	0.003315	9.34	17132.57	2291.57	0.60	123.06
Project	13994.78	100 yr	70900.00	109.39	115.71	114.38	116.42	0.003618	6.75	10500.39	2438.10	0.57	121.70
Project	13994.78	5000 yr	160000.00	109.39	118.42	116.52	119.77	0.003654	9.36	17099.88	2448.90	0.62	121.70
Project	13000	100 yr	70900.00	106.00	112.12	110.76	112.82	0.003612	6.74	10525.94	2453.41	0.57	118.57
Project	13000	5000 yr	160000.00	106.00	115.08	112.92	116.33	0.003223	8.97	17830.68	2480.63	0.59	118.57
Project	12000	100 yr	70900.00	102.00	109.66	107.47	110.14	0.001985	5.57	12730.00	2518.58	0.44	115.00
Project	12000	5000 yr	160000.00	102.00	112.73	109.61	113.68	0.002078	7.81	20492.95	2521.57	0.48	115.00

HEC-RAS Plan: p19 River: SantaMaria Reach: Project (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Levee El Left
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
Project	11000	100 yr	70900.00	99.87	106.52	105.33	107.33	0.004158	7.22	9826.68	2295.07	0.61	112.00
Project	11000	5000 yr	160000.00	99.87	109.14	107.57	110.72	0.004342	10.08	15868.51	2316.78	0.68	112.00
Project	10000	100 yr	70900.00	95.78	103.57	101.74	104.07	0.002481	5.67	12501.94	2839.68	0.48	110.00
Project	10000	5000 yr	160000.00	95.78	106.23	103.79	107.22	0.002627	7.98	20042.13	2839.68	0.53	110.00
Project	9000	100 yr	70900.00	94.00	101.14	99.36	101.60	0.002434	5.44	13028.94	3106.58	0.47	106.11
Project	9000	5000 yr	160000.00	94.00	103.70	101.31	104.60	0.002552	7.63	20970.71	3117.16	0.52	106.11
Project	8000	100 yr	70900.00	92.00	98.31	96.87	98.84	0.003147	5.85	12110.44	3141.00	0.53	104.00
Project	8000	5000 yr	160000.00	92.00	100.68	98.76	101.72	0.003248	8.18	19564.83	3146.72	0.58	104.00
Project	7000	100 yr	70900.00	89.44	94.91	93.72	95.48	0.003580	6.05	11722.02	3186.68	0.56	100.00
Project	7000	5000 yr	160000.00	89.44	98.26	95.52	99.05	0.002115	7.14	22407.25	3196.71	0.48	100.00
Project	6091.076	100 yr	70900.00	86.62	92.96	90.76	93.32	0.001609	4.76	14894.74	3184.05	0.39	100.00
Project	6091.076	5000 yr	160000.00	86.62	97.24	92.56	97.73	0.000943	5.59	28643.02	3219.83	0.33	100.00
Project	4992.652	100 yr	70900.00	84.00	91.84	88.37	92.08	0.000790	3.95	17970.90	2984.44	0.28	97.97
Project	4992.652	5000 yr	160000.00	84.00	96.49	90.29	96.88	0.000600	5.02	31869.28	2993.76	0.27	97.97
Project	4000.387	100 yr	70900.00	80.76	90.25	87.10	90.90	0.001817	6.50	10905.59	1600.52	0.44	100.00
Project	4000.387	5000 yr	160000.00	80.76	94.62	90.19	95.84	0.001814	8.87	18041.16	1656.88	0.47	100.00
Project	3000	100 yr	70900.00	79.30	87.36	85.51	88.44	0.003394	8.31	8530.19	1382.99	0.59	95.00
Project	3000	5000 yr	160000.00	79.30	91.41	88.68	93.38	0.003260	11.28	14188.42	1410.30	0.63	95.00
Project	1999.999	100 yr	70900.00	76.29	85.07	82.14	85.81	0.001950	6.93	10233.39	1438.23	0.46	95.00
Project	1999.999	5000 yr	160000.00	76.29	88.90	85.23	90.49	0.002394	10.14	15778.65	1457.16	0.54	95.00
Project	999.9999	100 yr	70900.00	72.00	79.79	79.79	81.80	0.011248	11.37	6233.67	1551.95	1.00	86.00
Project	999.9999	5000 yr	160000.00	72.00	82.71	82.71	86.08	0.009466	14.72	10867.79	1613.77	1.00	86.00

HEC-RAS Plan: plan 14 River: SantaMaria Reach: ReachIV

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Levee El Left
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
ReachIV	54541.65	100 yr	66300.00	324.73	347.11		347.95	0.001830	7.37	8992.75	1097.01	0.45	
ReachIV	54541.65	5000 yr	160000.00	324.73	352.92		353.83	0.002603	7.69	20854.87	3261.08	0.52	
ReachIV	54031.44	100 yr	66300.00	324.69	345.63		346.75	0.002986	8.48	7819.36	1116.30	0.56	
ReachIV	54031.44	5000 yr	160000.00	324.69	350.87		352.14	0.004156	9.07	17723.69	3226.19	0.65	
ReachIV	53453.78	100 yr	66300.00	324.43	341.86		344.45	0.004754	12.92	5132.66	551.96	0.75	
ReachIV	53453.78	5000 yr	160000.00	324.43	349.27		350.16	0.002584	7.59	21295.99	3546.89	0.52	
ReachIV	52923.87	100 yr	66300.00	323.58	340.54		342.33	0.002765	10.73	6179.71	584.15	0.58	
ReachIV	52923.87	5000 yr	160000.00	323.58	347.49		348.62	0.003209	8.50	18931.70	3201.50	0.58	
ReachIV	52418.78	100 yr	66300.00	321.67	339.47		340.85	0.002598	9.46	7011.95	765.92	0.55	
ReachIV	52418.78	5000 yr	160000.00	321.67	345.98		347.04	0.002967	8.26	19654.61	3453.18	0.56	
ReachIV	51840.92	100 yr	66300.00	321.60	337.47		339.13	0.003359	10.34	6409.79	742.42	0.62	
ReachIV	51840.92	5000 yr	160000.00	321.60	343.85		345.05	0.003986	8.81	18568.34	3896.86	0.64	
ReachIV	51338.72	100 yr	66300.00	320.97	336.60		337.53	0.002273	7.74	8569.14	1144.68	0.50	
ReachIV	51338.72	5000 yr	160000.00	320.97	342.73		343.51	0.002084	7.14	22944.66	4106.68	0.47	
ReachIV	50843.08	100 yr	66300.00	317.96	336.16		336.84	0.000781	6.60	10042.88	762.73	0.32	
ReachIV	50843.08	5000 yr	160000.00	317.96	341.80		342.55	0.001781	6.96	23699.38	3778.15	0.44	
ReachIV	50171.85	100 yr	66300.00	317.44	335.67		336.14	0.001167	5.51	12041.08	1625.64	0.36	
ReachIV	50171.85	5000 yr	160000.00	317.44	340.77		341.47	0.001428	6.72	24862.24	4109.96	0.40	
ReachIV	49626.03	100 yr	66300.00	316.64	335.05	328.42	335.49	0.001184	5.32	12472.05	1794.53	0.36	
ReachIV	49626.03	5000 yr	160000.00	316.64	339.91	334.35	340.66	0.001493	6.94	23047.12	4558.66	0.41	
ReachIV	48982.38	100 yr	66300.00	322.54	333.00	331.82	334.07	0.004723	8.33	7962.43	1875.70	0.67	
ReachIV	48982.38	5000 yr	160000.00	322.54	337.57	334.82	339.07	0.004275	9.83	16272.06	4443.89	0.67	
ReachIV	48482.98	100 yr	66300.00	320.00	331.14	329.40	332.04	0.003366	7.60	8728.93	1801.03	0.58	
ReachIV	48482.98	5000 yr	160000.00	320.00	335.60	332.52	336.88	0.004195	9.08	17626.64	5017.37	0.65	
ReachIV	47982.07	100 yr	66300.00	317.01	329.98	327.64	330.60	0.002232	6.34	10460.06	2090.27	0.47	
ReachIV	47982.07	5000 yr	160000.00	317.01	334.36	330.53	335.22	0.002342	7.47	21419.67	5430.50	0.50	
ReachIV	47453.89	100 yr	66300.00	317.17	329.06	326.15	329.56	0.001632	5.71	11617.70	2612.81	0.41	
ReachIV	47453.89	5000 yr	160000.00	317.17	333.36	328.98	334.09	0.001831	6.89	23785.18	5787.52	0.45	
ReachIV	46828.49	100 yr	66300.00	313.66	327.32	325.57	328.10	0.003480	7.09	9345.84	2757.62	0.57	
ReachIV	46828.49	5000 yr	160000.00	313.66	331.28	328.49	332.43	0.003923	8.66	18909.32	5982.66	0.63	
ReachIV	46303.55	100 yr	66300.00	313.07	325.83	323.43	326.50	0.002579	6.56	10109.17	2757.71	0.50	
ReachIV	46303.55	5000 yr	160000.00	313.07	329.27	326.60	330.61	0.003025	9.31	17362.57	5078.42	0.58	
ReachIV	45783.47	100 yr	66300.00	313.18	323.97	322.42	324.79	0.004241	7.27	9116.45	2970.84	0.62	
ReachIV	45783.47	5000 yr	160000.00	313.18	327.40	325.31	328.82	0.003907	9.57	16838.90	5149.80	0.64	
ReachIV	45277.26	100 yr	66300.00	309.92	322.94	319.99	323.40	0.001673	5.46	12143.79	3277.66	0.41	
ReachIV	45277.26	5000 yr	160000.00	309.92	326.26	322.87	327.20	0.002270	7.79	21043.57	6268.05	0.50	
ReachIV	44774.28	100 yr	66300.00	312.73	321.65	319.64	322.28	0.003014	6.37	10450.21	3822.49	0.53	
ReachIV	44774.28	5000 yr	160000.00	312.73	324.72	322.60	325.86	0.003057	8.67	19714.69	7200.21	0.57	
ReachIV	44216.29	100 yr	66300.00	308.99	320.10	317.90	320.69	0.002676	6.18	10894.30	3699.51	0.50	
ReachIV	44216.29	5000 yr	160000.00	308.99	323.15	320.97	324.21	0.002798	8.41	20567.50	7145.09	0.55	
ReachIV	43405.90	100 yr	66300.00	305.28	317.56	315.42	318.24	0.003427	6.62	10102.08	3893.31	0.56	
ReachIV	43405.90	5000 yr	160000.00	305.28	320.48	318.66	321.71	0.003462	9.04	18921.46	6579.55	0.61	
ReachIV	42862.97	100 yr	66300.00	302.26	315.96	313.57	316.54	0.002772	6.11	10912.13	4394.44	0.51	
ReachIV	42862.97	5000 yr	160000.00	302.26	318.73	316.74	319.87	0.003240	8.69	19578.29	6836.23	0.59	
ReachIV	42337.70	100 yr	66300.00	301.63	314.25	312.89	314.87	0.003644	6.36	10590.22	4840.29	0.57	
ReachIV	42337.70	5000 yr	160000.00	301.63	316.96	315.24	318.08	0.003572	8.64	19691.71	7027.65	0.61	
ReachIV	41838.76	100 yr	66300.00	299.85	312.24	310.42	312.93	0.004138	6.76	10082.60	2834.69	0.60	324.32
ReachIV	41838.76	5000 yr	160000.00	299.85	315.35	313.45	316.37	0.003207	8.31	20293.65	3561.05	0.58	324.32
ReachIV	41288.92	100 yr	66300.00	299.76	310.90	307.31	311.33	0.001992	5.30	12731.54	2919.26	0.43	324.18
ReachIV	41288.92	5000 yr	160000.00	299.76	314.23	311.14	314.97	0.001871	7.04	23888.48	3741.70	0.45	324.18
ReachIV	40737.92	100 yr	66300.00	294.02	310.45	305.33	310.66	0.000700	3.71	18439.13	3480.63	0.27	323.25
ReachIV	40737.92	5000 yr	160000.00	294.02	313.75	308.60	314.19	0.000903	5.48	30995.47	4116.93	0.32	323.25
ReachIV	39971.60	100 yr	66300.00	291.61	309.89	303.72	310.10	0.000776	3.71	18826.87	3905.58	0.28	321.36
ReachIV	39971.60	5000 yr	160000.00	291.61	313.08	308.66	313.51	0.000924	5.44	32110.61	4601.13	0.33	321.36
ReachIV	39444.79	100 yr	66300.00	291.66	309.41	304.70	309.64	0.000974	3.98	17635.46	3721.12	0.31	318.96
ReachIV	39444.79	5000 yr	160000.00	291.66	312.49	308.53	312.96	0.001166	5.79	30026.40	4354.03	0.36	318.96
ReachIV	38900.94	100 yr	66300.00	299.64	308.74	306.44	309.00	0.001452	4.29	16352.06	4009.13	0.36	314.18
ReachIV	38900.94	5000 yr	160000.00	299.64	311.80	308.27	312.29	0.001352	5.85	28743.96	4079.76	0.38	314.18

HEC-RAS Plan: plan 14   River: SantaMaria   Reach: ReachIV (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Levee El Left
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
ReachIV	38462.01	100 yr	66300.00	301.63	308.23	305.48	308.47	0.001032	3.92	17187.63	3471.45	0.31	311.17
ReachIV	38462.01	5000 yr	160000.00	301.63	311.54	307.32	311.80	0.000717	4.55	39687.59	5747.53	0.28	311.17
ReachIV	38112.98	100 yr	66300.00	301.41	307.90	304.88	308.14	0.000922	3.88	17028.16	3162.84	0.30	310.79
ReachIV	38112.98	5000 yr	160000.00	301.41	311.36	306.80	311.58	0.000556	4.19	42401.98	5446.58	0.25	310.79
ReachIV	37783.76	100 yr	66300.00	300.02	307.45	304.14	307.80	0.001119	4.83	13990.48	2931.76	0.34	310.83
ReachIV	37783.76	5000 yr	160000.00	300.02	311.21	306.58	311.43	0.000446	4.14	43832.53	5527.33	0.23	310.83
ReachIV	37431.18	100 yr	66300.00	299.07	307.01	303.59	307.41	0.001173	5.02	13198.71	2635.87	0.35	310.78
ReachIV	37431.18	5000 yr	160000.00	299.07	311.11	306.22	311.29	0.000331	3.68	47275.41	5231.32	0.20	310.78
ReachIV	36897.55	100 yr	66300.00	299.58	305.90	303.62	306.53	0.002294	6.52	10767.98	1907.06	0.48	309.50
ReachIV	36897.55	5000 yr	160000.00	299.58	309.42	306.39	310.79	0.002669	9.67	17775.95	2031.54	0.56	309.50
ReachIV	36355.05	100 yr	66300.00	297.92	304.06	302.66	304.90	0.004028	7.59	9271.53	1960.48	0.62	308.50
ReachIV	36355.05	5000 yr	160000.00	297.92	306.98	305.36	308.86	0.004720	11.33	15015.02	1970.48	0.72	308.50
ReachIV	35819.57	100 yr	66300.00	295.42	301.97	300.64	302.70	0.004098	6.89	9628.77	2269.03	0.59	305.75
ReachIV	35819.57	5000 yr	160000.00	295.42	304.84	303.14	306.31	0.004397	9.74	16432.72	2426.51	0.66	305.75
ReachIV	35279.98	100 yr	66300.00	293.42	299.28	298.42	300.16	0.005383	7.55	8783.09	2305.38	0.68	304.65
ReachIV	35279.98	5000 yr	160000.00	293.42	302.20	300.78	303.84	0.004704	10.27	15579.44	2373.79	0.71	304.65

Attachment D: Hydraulic Pertinent Data and Risk & Uncertainty Input Results

SANTA MARIA LEVEES PROJECT PERFORMANCE RELIABILITY
Computation of Uncertainty of Stage-Discharge Relationships - Santa Maria Reach 1, 2, 3, and Bradley Canyon Extension
Mylene Guron, 20 April 2011

Refs.

1. HEC-RAS project "SantaMaria.prj" and "SMReachIV_new.prj"
2. Engineer Manual EM 1110-2-1619, *Risk-Based Analysis for Flood Damage Reduction Studies* , 1 August 1996.

Basic uncertainty relationships from Ref. 2:

$S_t = (S_{natural}{}^2 + S_{model}{}^2)^{0.5}$ (Eqn. 5-6, page 5-5)

where S_t = standard deviation of total uncertainty
$S_{natural}$ = standard deviation of uncertainty related to watershed characerstitics
S_{model} = standard deviation of uncertianty related to computations from hydraulic model

$S_{natural} = (0.07208 + 0.04936\ I_{Bed} - 2.262\text{x}10^{-7} A_{basin} + 0.02164\ H_{range} + 1.4194\text{x}10^{-5} Q_{100})^2$ (m) (Eqn. 5-5, page 5-4)

where I_{Bed} = stream bed identifier related to bed material
A_{basin} = drainage basin area (km^2)
H_{Range} = maximum expected or observed range in stage (m)
Q_{100} = peak discharge from 100-year flood (m^3/sec)

$S_{Model} = E_{Mean} / 4$ (ft) (Eqn. 5-7, page 5-6)

where E_{Mean} = mean difference in stage between upper and lower limit water surface profiles (ft)

Values for I_{bed} assigned using Ref. 2, Table 5-1, based on bed material noted in Ref. 5.

For H_{Range} the minimum water surface elevation is the channel invert, since the channel is essentially ephemeral with no flow for much of the year. The maximum water surface elevation is assumed to be a foot above the lower levee top elevation.

				Snatural															Smodel				Stotal			
	Index Reach No.	Cross Section No.	100-year Discharge (ft^3/sec)	100-year Discharge (m^3/sec)	Drainage Area mi^2	Drainage Area (km^2)	Bottom Material	I_{Bed}	Channel Invert Elevation (ft NAVD)	Left Top of Levee Elevation (ft NAVD)	Right Top of Levee Elevation (ft NAVD)	Higher Top Elevation (ft NAVD)	Max. Possible Water Surface Elevation (ft NAVD)	H_{Range} (ft)	H_{Range} (m)	Natural Uncertainty S_n (m)	Natural Uncertainty S_n (ft)	Reach Average S_n (ft)	Minimum Water Surface Elevation Low N (ft)	Maximum Water Surface Elevation High N (ft)	Model Uncertainty *Smodel* (ft)	Reach Average *Smodel* (ft)	Total Uncertainty *Stotal* (ft)	Best Estimate Water Surface Elevation (ft NAVD)	Freeboard (ft)	Remarks
Upstrm	3	73000	70900	2008.5	1634	4232.1	Sand	4	292.00	303.7	0.0	303.7	304.7	12.7	3.9	0.14	0.48	0.50	298.51	300.01	0.38	0.41	0.64	299.3	4.4	
	3	72000	70900	2008.5	1634	4232.1	Sand	4	290.00	300.8	0.0	300.8	301.8	11.8	3.6	0.14	0.46		294.74	296.44	0.42			295.6	5.2	
	3	71000	70900	2008.5	1634	4232.1	Sand	4	285.83	297.9	0.0	297.9	298.9	13.0	4.0	0.15	0.48		291.77	293.37	0.40			292.6	5.3	
	3	70000	70900	2008.5	1634	4232.1	Sand	4	283.97	295.3	0.0	295.3	296.3	12.3	3.8	0.14	0.47		288.74	290.49	0.44			289.6	5.7	
	3	69000	70900	2008.5	1634	4232.1	Sand	4	280.00	293.2	0.0	293.2	294.2	14.2	4.3	0.15	0.50		285.75	287.55	0.45			286.7	6.6	
	3	68000	70900	2008.5	1634	4232.1	Sand	4	276.28	289.9	0.0	289.9	290.9	14.7	4.5	0.16	0.51		282.66	284.28	0.40			283.5	6.5	
	3	67000	70900	2008.5	1634	4232.1	Sand	4	273.87	286.8	0.0	286.8	287.8	13.9	4.2	0.15	0.50		278.99	280.93	0.48			280.0	6.8	
	3	66000	70900	2008.5	1634	4232.1	Sand	4	270.00	283.8	0.0	283.8	284.8	14.8	4.5	0.16	0.51		276.72	278.37	0.41			277.5	6.2	
	3	64999.99	70900	2008.5	1634	4232.1	Sand	4	267.79	280.4	0.0	280.4	281.4	13.6	4.1	0.15	0.49		273.50	275.53	0.51			274.5	5.9	
	3	64000	70900	2008.5	1634	4232.1	Sand	4	264.73	277.4	0.0	277.4	278.4	13.6	4.2	0.15	0.49		270.93	272.76	0.46			271.8	5.5	
	3	63000	70900	2008.5	1634	4232.1	Sand	4	262.00	274.7	0.0	274.7	275.7	13.7	4.2	0.15	0.49		267.75	269.82	0.52			268.8	5.9	
	3	62000	70900	2008.5	1634	4232.1	Sand	4	258.49	272.0	0.0	272.0	273.0	14.5	4.4	0.15	0.51		265.57	267.27	0.42			266.4	5.5	
	3	61000	70900	2008.5	1634	4232.1	Sand	4	256.85	268.5	0.0	268.5	269.5	12.6	3.8	0.14	0.47		262.92	264.63	0.43			263.8	4.7	
	3	60000	70900	2008.5	1634	4232.1	Sand	4	253.59	265.3	0.0	265.3	266.3	12.7	3.9	0.15	0.48		259.67	261.54	0.47			260.6	4.7	
	3	59000	70900	2008.5	1634	4232.1	Sand	4	250.00	263.5	0.0	263.5	264.5	14.5	4.4	0.15	0.51		256.73	258.90	0.54			257.8	5.7	
	3	58000	70900	2008.5	1634	4232.1	Sand	4	248.00	262.3	0.0	262.3	263.3	15.3	4.7	0.16	0.52		255.21	256.96	0.44			256.1	6.3	
	3	57000	70900	2008.5	1634	4232.1	Sand	4	242.00	257.0	0.0	257.0	258.0	16.0	4.9	0.16	0.53		253.41	253.93	0.13			253.7	3.3	
Downstrm	3	56749	70900	2008.5	1634	4232.1	Sand	4	242.00	256.3	0.0	256.3	257.3	15.3	4.7	0.16	0.52		253.60	253.60	0.00			253.6	2.7	Index location.
	3	56708.5	Suey																							
Upstrm	2	56668	70900	2008.5	1634	4232.1	Sand	4	242.00	256.2	0.0	256.2	257.2	15.2	4.6	0.16	0.52	0.53	249.56	251.72	0.54	0.49	0.72	250.6	5.6	Index location.
	2	56000	70900	2008.5	1634	4232.1	Sand	4	241.03	255.4	0.0	255.4	256.4	15.4	4.7	0.16	0.52		247.41	249.56	0.54			248.5	6.9	
	2	55001.51	70900	2008.5	1634	4232.1	Sand	4	237.52	252.9	0.0	252.9	253.9	16.4	5.0	0.16	0.54		244.31	246.64	0.58			245.5	7.4	
	2	54000	70900	2008.5	1634	4232.1	Sand	4	234.00	249.0	0.0	249.0	250.0	16.0	4.9	0.16	0.53		241.97	243.82	0.46			242.9	6.1	
	2	53000.5	70900	2008.5	1634	4232.1	Sand	4	232.00	246.1	0.0	246.1	247.1	15.1	4.6	0.16	0.52		238.32	240.30	0.50			239.3	6.8	
	2	52000	70900	2008.5	1634	4232.1	Sand	4	229.30	242.8	0.0	242.8	243.8	14.5	4.4	0.15	0.51		235.18	236.69	0.38			235.9	6.9	
	2	51000	70900	2008.5	1634	4232.1	Sand	4	226.26	239.5	0.0	239.5	240.5	14.2	4.3	0.15	0.50		231.33	233.03	0.42			232.2	7.3	
	2	50000	70900	2008.5	1634	4232.1	Sand	4	222.00	236.6	0.0	236.6	237.6	15.6	4.8	0.16	0.52		227.99	229.76	0.44			228.9	7.7	
	2	49000	70900	2008.5	1634	4232.1	Sand	4	219.55	234.1	0.0	234.1	235.1	15.5	4.7	0.16	0.52		225.11	227.14	0.51			226.1	7.9	
	2	47934.05	70900	2008.5	1634	4232.1	Sand	4	216.00	231.6	0.0	231.6	232.6	16.6	5.1	0.17	0.54		222.95	224.74	0.45			223.8	7.8	
	2	47000	70900	2008.5	1634	4232.1	Sand	4	213.73	230.0	0.0	230.0	231.0	17.3	5.3	0.17	0.55		219.98	221.95	0.49			221.0	9.0	
Downstrm	2	46000	70900	2008.5	1634	4232.1	Sand	4	210.00	228.0	0.0	228.0	229.0	19.0	5.8	0.18	0.59		216.62	218.74	0.53			217.7	10.3	
Upstrm	1	45211.9	70900	2008.5	1634	4232.1	Sand	4	205.59	224.1	0.0	224.1	225.1	19.5	5.9	0.18	0.59	0.59	215.30	216.59	0.32	0.44	0.74	215.9	8.1	
	1	45150	101 FWY																							
	1	45089.9	70900	2008.5	1634	4232.1	Sand	4	205.59	223.2	0.0	223.2	224.2	18.6	5.7	0.18	0.58		213.71	215.72	0.50			214.7	8.5	
	1	44000	70900	2008.5	1634	4232.1	Sand	4	200.00	217.1	0.0	217.1	218.1	18.1	5.5	0.17	0.57		209.51	211.87	0.59			210.7	6.4	
	1	43000	70900	2008.5	1634	4232.1	Sand	4	194.80	213.1	0.0	213.1	214.1	19.3	5.9	0.18	0.59		203.69	205.24	0.39			204.5	8.6	
	1	42000	70900	2008.5	1634	4232.1	Sand	4	190.59	210.4	0.0	210.4	211.4	20.8	6.3	0.19	0.62		200.59	202.74	0.54			201.7	8.7	
	1	41000	70900	2008.5	1634	4232.1	Sand	4	189.67	207.3	0.0	207.3	208.3	18.7	5.7	0.18	0.58		199.67	201.37	0.43			200.5	6.8	
	1	40000	70900	2008.5	1634	4232.1	Sand	4	186.00	205.0	0.0	205.0	206.0	20.0	6.1	0.18	0.60		198.06	199.46	0.35			198.8	6.2	Index location.

	Index Reach No.	Cross Section No.	100-year Discharge (ft^3/sec)	100-year Discharge (m^3/sec)	Drainage Area mi^2	Drainage Area (km^2)	Bottom Material	I_{Bed}	Channel Invert Elevation (ft NAVD)	Left Top of Levee Elevation (ft NAVD)	Right Top of Levee Elevation (ft NAVD)	Higher Top Elevation (ft NAVD)	Max. Possible Water Surface Elevation (ft NAVD)	H_{Range} (ft)	H_{Range} (m)	Natural Uncertainty S_n (m)	Natural Uncertainty S_n (ft)	Reach Average S_n (ft)	Minimum Water Surface Elevation Low N (ft)	Maximum Water Surface Elevation High N (ft)	Model Uncertainty *Smodel* (ft)	Reach Average *Smodel* (ft)	Total Uncertainty *Stotal* (ft)	Best Estimate Water Surface Elevation (ft NAVD)	Freeboard (ft)	Remarks
				Snatural															Smodel				Stotal			
Downstrm	1	39000	70900	2008.5	1634	4232.1	Sand	4	184.00	203.8	0.0	203.8	204.8	20.8	6.3	0.19	0.62		194.45	196.08	0.41			195.3	8.5	
SMu 100yr	4	41838.76	66300	1878.2	1634	4232.1	Sand	4	299.85	324.32	0.0	324.3	325.3	25.5	7.8	0.21	0.70	0.57	310.86	313.11	0.56	0.41	0.70	312.0	12.3	
SMu 100yr	4	41288.92	66300	1878.2	1634	4232.1	Sand	4	299.76	324.18	0.0	324.2	325.2	25.4	7.8	0.21	0.70		309.71	311.8	0.52			310.8	13.4	
SMu 100yr	4	40737.92	66300	1878.2	1634	4232.1	Sand	4	294.02	323.25	0.0	323.3	324.3	30.2	9.2	0.24	0.80		309.46	311.27	0.45			310.4	12.9	
SMu 100yr	4	39971.6	66300	1878.2	1634	4232.1	Sand	4	291.61	321.36	0.0	321.4	322.4	30.8	9.4	0.25	0.81		308.97	310.69	0.43			309.8	11.5	
SMu 100yr	4	39444.79	66300	1878.2	1634	4232.1	Sand	4	291.66	318.96	0.0	319.0	320.0	28.3	8.6	0.23	0.76		308.51	310.2	0.42			309.4	9.6	
SMu 100yr	4	38900.94	66300	1878.2	1634	4232.1	Sand	4	299.64	314.18	0.0	314.2	315.2	15.5	4.7	0.16	0.52		307.79	309.57	0.44			308.7	5.5	
SMu 100yr	4	38462.01	66300	1878.2	1634	4232.1	Sand	4	301.63	311.17	0.0	311.2	312.2	10.5	3.2	0.13	0.44		307.29	309.07	0.44			308.2	3.0	
SMu 100yr	4	38112.98	66300	1878.2	1634	4232.1	Sand	4	301.41	310.79	0.0	310.8	311.8	10.4	3.2	0.13	0.43		306.97	308.73	0.44			307.9	2.9	Index location
SMu 100yr	4	37783.76	66300	1878.2	1634	4232.1	Sand	4	300.02	310.83	0.0	310.8	311.8	11.8	3.6	0.14	0.46		306.53	308.28	0.44			307.4	3.4	
SMu 100yr	4	37431.18	66300	1878.2	1634	4232.1	Sand	4	299.07	310.78	0.0	310.8	311.8	12.7	3.9	0.14	0.47		306.18	307.8	0.41			307.0	3.8	
SMu 100yr	4	36897.55	66300	1878.2	1634	4232.1	Sand	4	299.58	309.50	0.0	309.5	310.5	10.9	3.3	0.13	0.44		305.11	306.65	0.38			305.9	3.6	
SMu 100yr	4	36355.05	66300	1878.2	1634	4232.1	Sand	4	297.92	308.50	0.0	308.5	309.5	11.6	3.5	0.14	0.45		303.28	304.81	0.38			304.0	4.5	
SMu 100yr	4	35819.57	66300	1878.2	1634	4232.1	Sand	4	295.42	305.75	0.0	305.8	306.8	11.3	3.5	0.14	0.45		300.97	302.75	0.44			301.9	3.9	
SMu 100yr	4	35279.98	66300	1878.2	1634	4232.1	Sand	4	293.42	304.65	0.0	304.7	305.7	12.2	3.7	0.14	0.46		299.28	299.28	0.00			299.3	5.4	
SMu 100yr	4r	41838.76	66300	1878.2	1634	4232.1	Sand	4	299.85	324.32	0.0	324.3	325.3	25.5	7.8	0.21	0.70	0.57	310.86	313.11	0.56	0.41	0.70	312.0	12.3	
SMu 100yr	4r	41288.92	66300	1878.2	1634	4232.1	Sand	4	299.76	324.18	0.0	324.2	325.2	25.4	7.8	0.21	0.70		309.71	311.8	0.52			310.8	13.4	
SMu 100yr	4r	40737.92	66300	1878.2	1634	4232.1	Sand	4	294.02	323.25	0.0	323.3	324.3	30.2	9.2	0.24	0.80		309.46	311.27	0.45			310.4	12.9	
SMu 100yr	4r	39971.6	66300	1878.2	1634	4232.1	Sand	4	291.61	321.36	0.0	321.4	322.4	30.8	9.4	0.25	0.81		308.97	310.69	0.43			309.8	11.5	
SMu 100yr	4r	39444.79	66300	1878.2	1634	4232.1	Sand	4	291.66	318.96	0.0	319.0	320.0	28.3	8.6	0.23	0.76		308.51	310.2	0.42			309.4	9.6	
SMu 100yr	4r	38900.94	66300	1878.2	1634	4232.1	Sand	4	299.64	314.18	0.0	314.2	315.2	15.5	4.7	0.16	0.52		307.79	309.57	0.44			308.7	5.5	
SMu 100yr	4r	38462.01	66300	1878.2	1634	4232.1	Sand	4	301.63	313.81	0.0	313.8	314.8	13.2	4.0	0.15	0.48		307.29	309.07	0.44			308.2	5.6	
SMu 100yr	4r	38112.98	66300	1878.2	1634	4232.1	Sand	4	301.41	311.69	0.0	311.7	312.7	11.3	3.4	0.14	0.45		306.97	308.73	0.44			307.9	3.8	Index location.
SMu 100yr	4r	37783.76	66300	1878.2	1634	4232.1	Sand	4	300.02	311.26	0.0	311.3	312.3	12.2	3.7	0.14	0.46		306.53	308.28	0.44			307.4	3.9	
SMu 100yr	4r	37431.18	66300	1878.2	1634	4232.1	Sand	4	299.07	311.15	0.0	311.2	312.2	13.1	4.0	0.15	0.48		306.18	307.8	0.41			307.0	4.2	
SMu 100yr	4r	36897.55	66300	1878.2	1634	4232.1	Sand	4	299.58	309.50	0.0	309.5	310.5	10.9	3.3	0.13	0.44		305.11	306.65	0.38			305.9	3.6	
SMu 100yr	4r	36355.05	66300	1878.2	1634	4232.1	Sand	4	297.92	308.50	0.0	308.5	309.5	11.6	3.5	0.14	0.45		303.28	304.81	0.38			304.0	4.5	
SMu 100yr	4r	35819.57	66300	1878.2	1634	4232.1	Sand	4	295.42	305.75	0.0	305.8	306.8	11.3	3.5	0.14	0.45		300.97	302.75	0.44			301.9	3.9	
SMu 100yr	4r	35279.98	66300	1878.2	1634	4232.1	Sand	4	293.42	304.65	0.0	304.7	305.7	12.2	3.7	0.14	0.46		299.28	299.28	0.00			299.3	5.4	

			SPF																							
Upstrm	3	73000	160000	4532.6	1634	4232.1	Sand	4	292.00	303.7	0.0	303.7	304.7	12.7	3.9	0.17	0.57	0.59	301.00	303.41	0.60	0.63	0.86	302.2	1.5	
	3	72000	160000	4532.6	1634	4232.1	Sand	4	290.00	300.8	0.0	300.8	301.8	11.8	3.6	0.17	0.55		297.02	299.86	0.71			298.4	2.3	
	3	71000	160000	4532.6	1634	4232.1	Sand	4	285.83	297.9	0.0	297.9	298.9	13.0	4.0	0.18	0.58		294.31	296.99	0.67			295.7	2.2	
	3	70000	160000	4532.6	1634	4232.1	Sand	4	283.97	295.3	0.0	295.3	296.3	12.3	3.8	0.17	0.56		291.38	294.26	0.72			292.8	2.5	
	3	69000	160000	4532.6	1634	4232.1	Sand	4	280.00	293.2	0.0	293.2	294.2	14.2	4.3	0.18	0.60		288.79	291.38	0.65			290.1	3.1	
	3	68000	160000	4532.6	1634	4232.1	Sand	4	276.28	289.9	0.0	289.9	290.9	14.7	4.5	0.18	0.61		284.98	287.86	0.72			286.4	3.5	
	3	67000	160000	4532.6	1634	4232.1	Sand	4	273.87	286.8	0.0	286.8	287.8	13.9	4.2	0.18	0.59		281.67	284.78	0.78			283.2	3.6	
	3	66000	160000	4532.6	1634	4232.1	Sand	4	270.00	283.8	0.0	283.8	284.8	14.8	4.5	0.19	0.61		279.76	282.4	0.66			281.1	2.7	
	3	64999.99	160000	4532.6	1634	4232.1	Sand	4	267.79	280.4	0.0	280.4	281.4	13.6	4.1	0.18	0.59		276.33	279.51	0.80			277.9	2.5	
	3	64000	160000	4532.6	1634	4232.1	Sand	4	264.73	277.4	0.0	277.4	278.4	13.6	4.2	0.18	0.59		274.01	276.67	0.67			275.3	2.0	
	3	63000	160000	4532.6	1634	4232.1	Sand	4	262.00	274.7	0.0	274.7	275.7	13.7	4.2	0.18	0.59		270.39	273.56	0.79			272.0	2.8	
	3	62000	160000	4532.6	1634	4232.1	Sand	4	258.49	272.0	0.0	272.0	273.0	14.5	4.4	0.18	0.60		268.32	271	0.67			269.7	2.3	
	3	61000	160000	4532.6	1634	4232.1	Sand	4	256.85	268.5	0.0	268.5	269.5	12.6	3.8	0.17	0.57		265.64	268.32	0.67			267.0	1.5	
	3	60000	160000	4532.6	1634	4232.1	Sand	4	253.59	265.3	0.0	265.3	266.3	12.7	3.9	0.17	0.57		262.29	265.29	0.75			263.8	1.5	
	3	59000	160000	4532.6	1634	4232.1	Sand	4	250.00	263.5	0.0	263.5	264.5	14.5	4.4	0.18	0.60		259.79	262.56	0.69			261.2	2.3	
	3	58000	160000	4532.6	1634	4232.1	Sand	4	248.00	262.3	0.0	262.3	263.3	15.3	4.7	0.19	0.62		257.16	259.09	0.48			258.1	4.2	
	3	57000	160000	4532.6	1634	4232.1	Sand	4	242.00	257.0	0.0	257.0	258.0	16.0	4.9	0.19	0.63		257.92	258.61	0.17			258.3	-1.2	Index location.
Downstrm	3	56749	160000	4532.6	1634	4232.1	Sand	4	242.00	256.3	0.0	256.3	257.3	15.3	4.7	0.19	0.62		256.81	257.41	0.15			257.1	-0.8	
	3	56708.5	Suey																							Suey Bridge
Upstrm	2	56668	160000	4532.6	1634	4232.1	Sand	4	242.00	256.2	0.0	256.2	257.2	15.2	4.6	0.19	0.62	0.63	252.48	256.14	0.91	0.75	0.98	254.3	1.9	Index location.
	2	56000	160000	4532.6	1634	4232.1	Sand	4	241.03	255.4	0.0	255.4	256.4	15.4	4.7	0.19	0.62		250.50	254.14	0.91			252.3	3.1	
	2	55001.51	160000	4532.6	1634	4232.1	Sand	4	237.52	252.9	0.0	252.9	253.9	16.4	5.0	0.19	0.64		248.13	251.41	0.82			249.8	3.1	
	2	54000	160000	4532.6	1634	4232.1	Sand	4	234.00	249.0	0.0	249.0	250.0	16.0	4.9	0.19	0.63		245.10	247.96	0.72			246.5	2.5	
	2	53000.5	160000	4532.6	1634	4232.1	Sand	4	232.00	246.1	0.0	246.1	247.1	15.1	4.6	0.19	0.61		240.99	243.85	0.71			242.4	3.7	
	2	52000	160000	4532.6	1634	4232.1	Sand	4	229.30	242.8	0.0	242.8	243.8	14.5	4.4	0.18	0.60		237.59	240.1	0.63			238.8	4.0	
	2	51000	160000	4532.6	1634	4232.1	Sand	4	226.26	239.5	0.0	239.5	240.5	14.2	4.3	0.18	0.60		233.73	236.65	0.73			235.2	4.3	
	2	50000	160000	4532.6	1634	4232.1	Sand	4	222.00	236.6	0.0	236.6	237.6	15.6	4.8	0.19	0.62		230.60	233.76	0.79			232.2	4.4	
	2	49000	160000	4532.6	1634	4232.1	Sand	4	219.55	234.1	0.0	234.1	235.1	15.5	4.7	0.19	0.62		228.32	231.47	0.79			229.9	4.2	
	2	47934.05	160000	4532.6	1634	4232.1	Sand	4	216.00	231.6	0.0	231.6	232.6	16.6	5.1	0.20	0.64		226.53	229.17	0.66			227.9	3.8	
	2	47000	160000	4532.6	1634	4232.1	Sand	4	213.73	230.0	0.0	230.0	231.0	17.3	5.3	0.20	0.65		222.72	226.13	0.85			224.4	5.6	
Downstrm	2	46000	160000	4532.6	1634	4232.1	Sand	4	210.00	228.0	0.0	228.0	229.0	19.0	5.8	0.21	0.69		221.25	223.21	0.49			222.2	5.8	
Upstrm	1	45211.9	160000	4532.6	1634	4232.1	Sand	4	205.59	224.1	0.0	224.1	225.1	19.5	5.9	0.21	0.70	0.70	220.53	220.91	0.09	0.56	0.89	220.7	3.4	
	1	45150	101 FWY																							
	1	45089.9	160000	4532.6	1634	4232.1	Sand	4	205.59	223.2	0.0	223.2	224.2	18.6	5.7	0.21	0.68		216.51	219.51	0.75			218.0	5.2	
	1	44000	160000	4532.6	1634	4232.1	Sand	4	200.00	217.1	0.0	217.1	218.1	18.1	5.5	0.20	0.67		212.50	215.27	0.69			213.9	3.2	
	1	43000	160000	4532.6	1634	4232.1	Sand	4	194.80	213.1	0.0	213.1	214.1	19.3	5.9	0.21	0.69		207.61	209.12	0.38			208.4	4.7	
	1	42000	160000	4532.6	1634	4232.1	Sand	4	190.59	210.4	0.0	210.4	211.4	20.8	6.3	0.22	0.73		203.82	206.72	0.73			205.3	5.1	
	1	41000	160000	4532.6	1634	4232.1	Sand	4	189.67	207.3	0.0	207.3	208.3	18.7	5.7	0.21	0.68		202.79	205.2	0.60			204.0	3.3	
	1	40000	160000	4532.6	1634	4232.1	Sand	4	186.00	205.0	0.0	205.0	206.0	20.0	6.1	0.22	0.71		200.68	202.81	0.53			201.7	3.2	Index location.
Downstrm	1	39000	160000	4532.6	1634	4232.1	Sand	4	184.00	203.8	0.0	203.8	204.8	20.8	6.3	0.22	0.72		196.56	199.25	0.67			197.9	5.9	
SM SPF	4	41838.76	160000	4532.6	1634	4232.1	Sand	4	299.85	324.32	0.0	324.3	325.3	25.5	7.8	0.25	0.82	0.67	313.84	316.54	0.68	0.35	0.76	315.2	9.1	
SM SPF	4	41288.92	160000	4532.6	1634	4232.1	Sand	4	299.76	324.18	0.0	324.2	325.2	25.4	7.8	0.25	0.82		312.95	315.36	0.60			314.2	10.0	
SM SPF	4	40737.92	160000	4532.6	1634	4232.1	Sand	4	294.02	323.25	0.0	323.3	324.3	30.2	9.2	0.28	0.93		312.75	314.73	0.50			313.7	9.5	
SM SPF	4	39971.6	160000	4532.6	1634	4232.1	Sand	4	291.61	321.36	0.0	321.4	322.4	30.8	9.4	0.29	0.94		312.28	313.96	0.42			313.1	8.2	

				Snatural															Smodel				Stotal			
	Index Reach No.	Cross Section No.	100-year Discharge (ft^3/sec)	100-year Discharge (m^3/sec)	Drainage Area mi^2	Drainage Area (km^2)	Bottom Material	I_{Bed}	Channel Invert Elevation (ft NAVD)	Left Top of Levee Elevation (ft NAVD)	Right Top of Levee Elevation (ft NAVD)	Higher Top Elevation (ft NAVD)	Max. Possible Water Surface Elevation (ft NAVD)	H_{Range} (ft)	H_{Range} (m)	Natural Uncertainty S_n (m)	Natural Uncertainty S_n (ft)	Reach Average S_n (ft)	Minimum Water Surface Elevation Low N (ft)	Maximum Water Surface Elevation High N (ft)	Model Uncertainty *Smodel* (ft)	Reach Average *Smodel* (ft)	Total Uncertainty *Stotal* (ft)	Best Estimate Water Surface Elevation (ft NAVD)	Freeboard (ft)	Remarks
SM SPF	4	39444.79	160000	4532.6	1634	4232.1	Sand	4	291.66	318.96	0.0	319.0	320.0	28.3	8.6	0.27	0.89		311.86	313.27	0.35			312.6	6.4	
SM SPF	4	38900.94	160000	4532.6	1634	4232.1	Sand	4	299.64	314.18	0.0	314.2	315.2	15.5	4.7	0.19	0.62		311.46	312.41	0.24			311.9	2.2	
SM SPF	4	38462.01	160000	4532.6	1634	4232.1	Sand	4	301.63	311.17	0.0	311.2	312.2	10.5	3.2	0.16	0.53		311.41	311.99	0.14			311.7	-0.5	
SM SPF	4	38112.98	160000	4532.6	1634	4232.1	Sand	4	301.41	310.79	0.0	310.8	311.8	10.4	3.2	0.16	0.53		311.33	311.71	0.09			311.5	-0.7	Index location.
SM SPF	4	37783.76	160000	4532.6	1634	4232.1	Sand	4	300.02	310.83	0.0	310.8	311.8	11.8	3.6	0.17	0.55		310.4	311.49	0.27			310.9	-0.1	
SM SPF	4	37431.18	160000	4532.6	1634	4232.1	Sand	4	299.07	310.78	0.0	310.8	311.8	12.7	3.9	0.17	0.57		309.89	310.14	0.06			310.0	0.8	
SM SPF	4	36897.55	160000	4532.6	1634	4232.1	Sand	4	299.58	309.50	0.0	309.5	310.5	10.9	3.3	0.16	0.54		308.39	310.13	0.44			309.3	0.2	
SM SPF	4	36355.05	160000	4532.6	1634	4232.1	Sand	4	297.92	308.50	0.0	308.5	309.5	11.6	3.5	0.17	0.55		305.59	308.09	0.63			306.8	1.7	
SM SPF	4	35819.57	160000	4532.6	1634	4232.1	Sand	4	295.42	305.75	0.0	305.8	306.8	11.3	3.5	0.17	0.55		303.49	305.54	0.51			304.5	1.2	
SM SPF	4	35279.98	160000	4532.6	1634	4232.1	Sand	4	293.42	304.65	0.0	304.7	305.7	12.2	3.7	0.17	0.56		302.2	302.2	0.00			302.2	2.4	
SM SPF	4	41838.76	160000	4532.6	1634	4232.1	Sand	4	299.85	324.32	0.0	324.3	325.3	25.5	7.8	0.25	0.82	0.68	313.84	316.54	0.68	0.35	0.76	315.2	9.1	
SM SPF	4	41288.92	160000	4532.6	1634	4232.1	Sand	4	299.76	324.18	0.0	324.2	325.2	25.4	7.8	0.25	0.82		312.95	315.36	0.60			314.2	10.0	
SM SPF	4	40737.92	160000	4532.6	1634	4232.1	Sand	4	294.02	323.25	0.0	323.3	324.3	30.2	9.2	0.28	0.93		312.75	314.73	0.50			313.7	9.5	
SM SPF	4	39971.6	160000	4532.6	1634	4232.1	Sand	4	291.61	321.36	0.0	321.4	322.4	30.8	9.4	0.29	0.94		312.28	313.96	0.42			313.1	8.2	
SM SPF	4	39444.79	160000	4532.6	1634	4232.1	Sand	4	291.66	318.96	0.0	319.0	320.0	28.3	8.6	0.27	0.89		311.86	313.27	0.35			312.6	6.4	
SM SPF	4	38900.94	160000	4532.6	1634	4232.1	Sand	4	299.64	314.18	0.0	314.2	315.2	15.5	4.7	0.19	0.62		311.46	312.41	0.24			311.9	2.2	
SM SPF	4	38462.01	160000	4532.6	1634	4232.1	Sand	4	301.63	313.81	0.0	313.8	314.8	13.2	4.0	0.18	0.58		311.41	311.99	0.14			311.7	2.1	
SM SPF	4	38112.98	160000	4532.6	1634	4232.1	Sand	4	301.41	311.69	0.0	311.7	312.7	11.3	3.4	0.17	0.54		311.33	311.71	0.09			311.5	0.2	Index location.
SM SPF	4	37783.76	160000	4532.6	1634	4232.1	Sand	4	300.02	311.26	0.0	311.3	312.3	12.2	3.7	0.17	0.56		310.4	311.49	0.27			310.9	0.3	
SM SPF	4	37431.18	160000	4532.6	1634	4232.1	Sand	4	299.07	311.15	0.0	311.2	312.2	13.1	4.0	0.18	0.58		309.89	310.14	0.06			310.0	1.1	
SM SPF	4	36897.55	160000	4532.6	1634	4232.1	Sand	4	299.58	309.50	0.0	309.5	310.5	10.9	3.3	0.16	0.54		308.39	310.13	0.44			309.3	0.2	
SM SPF	4	36355.05	160000	4532.6	1634	4232.1	Sand	4	297.92	308.50	0.0	308.5	309.5	11.6	3.5	0.17	0.55		305.59	308.09	0.63			306.8	1.7	
SM SPF	4	35819.57	160000	4532.6	1634	4232.1	Sand	4	295.42	305.75	0.0	305.8	306.8	11.3	3.5	0.17	0.55		303.49	305.54	0.51			304.5	1.2	
SM SPF	4	35279.98	160000	4532.6	1634	4232.1	Sand	4	293.42	304.65	0.0	304.7	305.7	12.2	3.7	0.17	0.56		302.2	302.2	0.00			302.2	2.4	

Appendix I.

Biological Opinion for California Red-Legged Frogs

U.S ARMY
CORPS OF ENGINEERS

BIOLOGICAL OPINION FOR CALIFORNIA RED-LEGGED FROGS

FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT

November 2011

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
81440-2011-F-0303

October 27, 2011

Josephine R. Axt, Chief
Planning Division, Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Subject: Biological Opinion for the Bradley Canyon Levee Extension Project, Santa Maria, Santa Barbara County, California (8-8-11-F-25)

Dear Dr. Axt,

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion regarding the proposed Bradley Canyon Levee Extension Project, in the city of Santa Maria, Santa Barbara County, California, and its effects on the federally threatened California red-legged frog (*Rana draytonii*). This biological opinion is issued in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your request for formal consultation, dated April 28, 2011, was received by our office on May 2, 2011.

This biological opinion is based on information which accompanied your April 28, 2011 request for consultation, including the Biological Assessment (U.S. Army Corps of Engineers (Corps) 2011), and information in our files. A complete file of this consultation can be made available at the Ventura Fish and Wildlife Office.

Consultation History

The Corps began coordination on this project with Chris Dellith, Senior Biologist with the Service, in March 2010 regarding potential project impacts on California red-legged frogs. Surveys for the California red-legged frog according to Service protocol were conducted on the project site. The survey results indicated that the project site supports potential habitat for the California red-legged frog. The Corps then developed avoidance and minimization measures for the California red-legged frog and its habitat during coordination with the Service. In February 2011, representatives of the Corps met with Roger Root, Assistant Field Supervisor, and David Simmons, Staff Biologist, to discuss the proposed project. The Corps made the determination that the proposed project would not affect the federally endangered least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), arroyo toad (*Anaxyrus californicus*), California tiger salamander (Ambystoma californiense?), or tidewater goby (*Eucyclogobius newberryi*). On August 10, 2011, the Service submitted a draft biological opinion for the Bradley Canyon Levee Extension Project to the Corps for review. On October 12, 2011, we received a signed copy of the Corps comments on the draft biological opinion via electronic mail (email) from your staff. On October 24, 2011, we responded to your comments on the draft biological opinion. We have incorporated any appropriate changes in this final biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following description of the proposed action has been summarized from the Biological Assessment (Corps 2011), unless otherwise noted.

The purpose of the proposed project is to provide flood protection to an urbanized area of the city of Santa Maria. The Corps has initiated repair of the Santa Maria Levee, which is scheduled for completion in June 2011. However, additional analysis revealed that there may be a breach in the levee and additional repair is needed along Bradley Canyon.

The Bradley Canyon Levee Extension project involves the repair of 3,700 feet of the existing Bradley Canyon Levee. The proposed project consists of repairing the existing rip-rapped levee with a combination of sheet pile and soil cement. About 1,000 feet of sheet pile would be installed in a section that supports riparian habitat downstream of Bradley Canyon Channel, and the remaining 2,700 feet would be repaired using soil cement.

Sheet pile
The proposed project would repair a 1,000 foot section of the levee with sheet pile to minimize impacts to riparian habitat and reduce impacts to waters of United States. The sheet piling would consist of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. The top of the levee would require minimal excavation to provide access to install the tiebacks and concrete pile cap. No excavation would occur within the channel within this reach.

Soil cement
The upstream end of the sheet pile extension would transition to a soil cement revetment in the 3,700 foot long proposed levee repair. The soil cement revetment would extend 2,700 feet upstream along the inside face of the levee. The Corps would excavate 15 feet below the existing grade and would extend upwards at a 2:1 slope along the inside face of the levee until the top of the revetment matches the top of the existing levee. The excavation would extend down 15 feet at a 2:1 slope, extending laterally approximately 80 feet from the tow of the levee within the 120 foot wide temporary construction easement corridor to protect against estimated scour depth. The proposed revetment would extend approximately 7 feet below the existing riprap revetment. The existing riprap revetment would not be removed from the inside face of the levee prior to placement of the soil cement. The soil cement would be installed on top of the existing riprap. The batch plant would be located outside of the channel. The soil cement would

be compacted in 1 foot thick and a minimum of 8 foot wide layers. This operation would be repeated until cement reaches the top of the levee. Once the soil cement is installed, the excavation area would be backfilled with earthen fill material that is not utilized for the mixing of the soil cement. Because the volume of soil cement below the surface of the ground would reduce the volume of backfill needed, the backfill would only be a few inches shallower than the original channel bed elevation.

Installation of soil cement would include the following main steps: (1) temporary diversion of the low-flow Bradley Canyon Channel within the 2,700 foot long soil cement construction project area approximately 40 to 60 feet away from the existing alignment towards the eastern edge; (2) clearing and grubbing vegetation within 120 foot wide temporary construction easement corridor by 2,700 foot long section of the soil cement construction project area; (3) approximately 90,000 cubic yards of material would be temporarily excavated to construct the soil cement revetment. Approximately 36,000 cubic yards of imported borrow material would be utilized in the soil cement mixture. After the soil cement revetment was constructed, approximately 80,000 cubic yards of fill material would be required to back fill to the original grade. It is anticipated that approximately 30,000 cubic yards of fill material would be imported; (4) mixing soil/sand with concrete to create soil cement at the upland portable batch plant near the project area; (5) trucking soil cement from the portable batch plant to the construction area; (6) benching the face of the exposed slope with soil cement; and (7) backfilling the soil/sand and restoring the low-flow channel.

Temporary diversion channel
A temporary diversion channel would be created along the soil cement section of levee repair (2,700 foot long) to avoid construction activities and equipment movement within flowing water, and to minimize impact to biological resources within the existing Bradley Canyon low-flow channel. The water diversion channel construction would be monitored by a qualified biologist and it would be maintained to minimize impacts to the California red-legged frog and water quality. The temporary diversion channel would be approximately 40 to 60 feet away from the existing alignment of the Bradley Canyon Channel towards the eastern edge of the 120 foot wide corridor. Upon completion of the project, the flow would be restored to its original position. A temporary water diversion plan would be developed and followed throughout the construction period. All activities related to water diversion would be monitored by a qualified Corps biologist.

Batch plant and staging area
The upland portable batch plant and staging area for the soil cement and sheet pile would be located adjacent to the existing landfill facilities outside of the channel on the landside area. This location is currently being used for the repair of the Santa Maria River levees. The area is mostly denuded of vegetation with patches of non-native-grassland and barren land.

Borrow material
The project would excavate approximately 90,000 cubic yards of fill material from the 120 foot wide temporary construction easement in order to conduct construction activities.

Approximately 36,000 cubic yards of borrow material would be utilized in the soil cement mixture. After the soil cement revetment is constructed, approximately 80,000 cubic yards of excavated material would be used to back fill to the original grade. Approximately 30,000 yards of native fill material would be imported from onsite. The fill material would be borrowed from an outside source outside the river channel in the vicinity of the project.

Construction equipment
Construction equipment for the proposed soil cement would include a bulldozer, scrapers, dump trucks, hydraulic excavator, skip loader, vibratory roller, and water truck. Construction equipment for the proposed sheet pile would include a pile driver, crane, and material handling equipment. All construction equipment would be able to access the soil cement and sheet pile operations from the maintenance road on the top of the levee.

Haul/access road
The levee would be accessed at various locations, including (1) to the west end of the Santa Maria River via a gated entry from Suey Crossing Road; (2) to the east end of Bradley Canyon via gated entry from Betteravia Road to the top of the levee, and (3) a gated entry at the east end of the active Santa Maria Regional Landfill, adjacent to the levee.

Construction duration
Construction would commence by early 2012 and would take up to 8 to 12 months to complete. Prior to construction, vegetation within the temporary construction easement would be cleared and grubbed and the Bradley Canyon low-flow channel would be diverted around the construction area to minimize impact to California red-legged frogs and water quality. To minimize temporary construction impacts to wildlife, vegetation clearing and grubbing would be performed prior to migratory bird nest season (February 15 through September 15) and California red-legged frog breeding season. Sheet pile installation and soil cement placement on the existing riprapped levee would occur between April 1 and November 30 to minimize impacts to the California red-legged frog. Construction activities associated with the installation of sheet pile can be initiated in 2 to 3 months and soil cement can be placed in 6 to 8 months which can be worked on simultaneously.

Future operation and maintenance
The constructed levee in Bradley Canyon would require periodic maintenance after large storm events. The maintenance work would be accomplished quickly because of public safety concerns. The Santa Barbara County Flood Control and Water Conservation District would conduct all future operations and maintenance activities within the Bradley Canyon Channel, pursuant to the Service's July 25, 2005 biological opinion (1-8-04-F-46). The Corps would prepare an operations and maintenance manual upon completion of construction. The manual would include all similar environmental commitments for the proposed project. Any required permits would be obtained by the Santa Barbara County Flood Control and Water Conservation District from the resource agencies and the Corps Regulatory Division prior to commencement of the operations and maintenance activity.

The Corps proposes to implement the following summarized protective measures, as described in various sections of the Biological Assessment (Corps 2011):

1. A qualified biologist would perform California red-legged frog surveys 2 days prior to the initiation of the project construction. If California red-legged frogs are found, the permitted biologist would relocate frogs from the project area to an appropriate habitat location in accordance with the incidental take statement of this biological opinion;
2. The California red-legged frog would be relocated the shortest distance possible to an area which contains suitable habitat free from exotic predatory species and would not be affected by construction activities;
3. The biologist would maintain detailed records of any individuals that are moved (e.g. size, discoloration, any distinguishing features, digital photographs) to assist him or her in determining whether translocated animals are returning to the original points of capture;
4. The existing Bradley Canyon Channel would be diverted away from the temporary construction area prior to construction. All activities would be monitored by a qualified biologist;
5. If a work site is to be temporarily dewatered by pumping, intakes would be completely screened with wire mesh not larger than five millimeters to prevent California red-legged frogs from entering the pump system. Water would be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow would be removed in a manner that would allow flow to resume with the least disturbance to the substrate;
6. Work activities would be completed between April 1st and November 30th. Should the contractor need to conduct activities outside this period, the construction area would be surveyed for presence of California red-legged frogs. If they are found, they would be relocated to the suitable habitat in accordance with the conditions of this biological opinion. The Corps biologist would coordinate with the Service, and direction would be provided to the construction field representative how to schedule the project construction so that California red-legged frogs would not be affected;
7. Construction activities would be monitored daily all the time during construction by a qualified biologist;
8. Water would not be impounded in a manner that may attract California red-legged frogs within the construction site. A Corps qualified biologist would ensure that the spread or introduction of invasive exotic species such as bullfrogs (*Rana catesbeiana*), crayfish, and centrarchid fishes (*Centrarchus* spp.), would be prevented to the maximum extent possible during construction;
9. Field personnel would be trained to recognize and avoid California red-legged frogs. If found during construction the field personnel would immediately contact the Corps biologist, and stop work in the area where California red-legged frogs were found. A Corps/qualified biologist would be present at the work site until the removal of California red-legged frogs, instruction of workers, and habitat disturbance has been completed;
10. During project activities and upon completion of the project, all trash that may attract predators would be properly contained, removed from the worksite, and disposed of;

11. Project sites would be revegetated with an appropriate assemblage of native seed mix suitable for the area;
12. Upon completion of the project, the Corps biologist would ensure that a project completion report is completed and sent to the Service (Ventura Field Office);
13. All workers would be advised that equipment and vehicles must remain within the designated work areas;
14. The work area would be delineated with fencing;
15. Equipment would be cleaned prior to working in the riparian corridor;
16. Fueling and maintenance activities for vehicles and construction equipment would be placed at the staging area, about 20 to 30 meters away from riparian vegetation and suitable habitat for the California red-legged frog;
17. Construction would be avoided during the California red-legged frog breeding season (December 1st through March 31st) in areas with the potential for California red-legged frog to occur;
18. Prior to construction, a qualified biologists would delineate suitable areas of habitat where California red-legged frogs may occur; and
19. The Corps would provide a briefing to the construction crew prior to initiation of the project construction to provide information and commitments to be followed during construction to avoid and minimize impacts to the federally listed species, specifically the project area that supports the California red-legged frog and its critical habitat. All workers would be advised that equipment and vehicles must remain within the designated work areas and out of the waters of the U.S.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Jeopardy Determination

The jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species*, which describes the range-wide condition of the California red-legged frog, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the California red-legged frog in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the California red-legged frog; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the California red-legged frog; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the California red-legged frog.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed federal action in the context of the current status of the California red-legged frog, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the California red-legged frog in the wild.

STATUS OF THE SPECIES

The California red-legged frog was federally listed as threatened on May 23, 1996 (Service 1996), and critical habitat was designated for the subspecies on April 13, 2006 (Service 2006). On March 17, 2010, the Service designated 1,636,609 acres as critical habitat for the California red-legged frog; an area more than three times larger than the 2006 designation for the subspecies (Service 2010). The Service completed a recovery plan for the subspecies in 2002 (Service 2002).

Detailed information on the biology of California red-legged frogs can be found in Storer (1925), Stebbins (2003), and Jennings et al. (1992). This species is the largest native frog in the western United States, ranging from 1.5 to 5.1 inches long. The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers, and dorsolateral folds are prominent on the back. Tadpoles range from 0.6 to 3.1 inches long and are dark brown and yellow with dark spots.

The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. The diet of California red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food item of adults. Vertebrates, such as Pacific treefrogs and California mice (*Peromyscus californicus*), represented over half of the prey mass eaten by larger frogs (Hayes and Tennant 1985). Feeding activity occurs along the shoreline and on the surface of the water. Hayes and Tennant (1985) found juveniles to be active diurnally and nocturnally, whereas adults were largely nocturnal.

California red-legged frogs breed from November through March; earlier breeding has been recorded in southern localities (Storer 1925). Males appear at breeding sites from 2 to 4 weeks before females (Storer 1925). California red-legged frogs are often prolific breeders, typically laying their eggs during or shortly after large rainfall events in late winter and early spring.

Female California red-legged frogs deposit egg masses on emergent vegetation so that the masses float on the surface of the water (Hayes and Miyamoto 1984). Egg masses contain about 2,000 to 5,000 moderately-sized (0.08 to 0.11 inch) in diameter, dark reddish brown eggs (Storer 1925, Jennings and Hayes 1985). Eggs hatch in 6 to 14 days (Storer 1925). Larvae undergo metamorphosis between 3.5 to 7 months after hatching (Storer 1925, Wright and Wright 1949). Sexual maturity can be attained at 2 years of age by males and 3 years of age by females and is usually reached at 3 to 4 years of age (Jennings and Hayes 1985); adults may live 8 to 10 years (Jennings et al. 1992) although the average life span is considered to be much lower. Juveniles have been observed to be active diurnally and nocturnally, whereas adults are mainly nocturnal.

California red-legged frogs spend most of their lives in and near sheltered backwaters of ponds, marshes, springs, streams and reservoirs. Deep pools with dense stands of overhanging willows and an intermixed fringe of cattails (*Typha* spp.) are considered optimal habitat. California red-legged frogs breed in aquatic habitats. Eggs, larvae, transformed juveniles and adults also have been found in ephemeral creeks and drainages and in ponds that do not have riparian vegetation. California red-legged frogs frequently breed in artificial impoundments such as stock ponds, if conditions are appropriate. Although California red-legged frogs successfully breed in streams and riparian systems, high seasonal flows and cold temperatures in streams often make these sites risky environments for eggs and tadpoles. The importance of riparian vegetation for this species is not well understood. When riparian vegetation is present, California red-legged frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community likely provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting population numbers and distribution.

Juvenile and adult California red-legged frogs may disperse long distances from breeding sites throughout the year. They can be encountered living within streams at distances exceeding 1.8 miles from the nearest breeding site, and have been found up to 400 feet from water in adjacent dense riparian vegetation (Bulger et al. 2003). Some California red-legged frogs have moved long distances over land between water sources during winter rains. Adult California red-legged frogs have been documented to move more than 2 miles in northern Santa Cruz County “without apparent regard to topography, vegetation type, or riparian corridors” (Bulger et al. 2003). Most of these overland movements occur at night. These individual frogs were observed to make long-distance movements that are straight-line, point to point migrations over variable upland terrain rather than using riparian corridors for movement between habitats. For the California red-legged frog, suitable habitat is considered to include all aquatic and riparian areas within the range of the species and includes any landscape features that provide cover and moisture (Service 1996).

California red-legged frogs have been found at elevations that range from sea level to about 5,000 feet. In the Sierra Nevada Mountains, California red-legged frogs typically occur below 4,000 feet in elevation (Service 1996). The historical range of the California red-legged frog extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Jennings and Hayes 1985, Storer 1925). The California red-legged frog has been extirpated or nearly extirpated from 70 percent of its former range. Historically, this subspecies was found throughout the Central Valley and Sierra Nevada foothills. At present, California red-legged frogs are known to occur in 243 streams or drainages in 22 counties, primarily in central coastal California. Four additional occurrences have been recorded in the Sierra Nevada foothills since listing, bringing the total to five extant populations, compared to approximately 26 historical records (Service 1996). Currently, California red-legged frogs are known from three disjunct regions in 26 California counties and one region in Baja California, Mexico (Grismer 2002, Fidenci 2004, Smith and Krofta 2005). The most secure aggregations of California red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack non-native predators. Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, Hayes and Jennings 1988). Habitat loss and degradation, combined with over-exploitation and introduction of exotic predators, were important factors in the decline of the California red-legged frog in the early to mid-1900s. Continuing threats to the California red-legged frog include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, competition or predation from non-native species including the bullfrog, catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquitofish, and crayfish. Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations, and is considered a threat to California red-legged frog populations.

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 1.6 feet, riparian shrubbery and emergent vegetation (Jennings and Hayes 1985), there are numerous locations in the species' historical range where these elements are well represented yet California red-legged frogs appear to be absent. The cause of local extirpations does not appear to be restricted solely to loss of aquatic habitat. The most likely causes of local extirpation are thought to be changes in faunal composition of aquatic ecosystems (i.e., the introduction of non-native predators and competitors) and landscape-scale disturbances that disrupt California red-legged frog population processes, such as dispersal and colonization. The introduction of contaminants or changes in water temperature may also play a role in local extirpations. These changes may also promote the spread of predators, competitors, parasites and diseases.

Santa Barbara County (County) contains a relatively strong population of California red-legged frogs. On March 10, 2010, the Service designated over 100,000 acres of critical habitat for the California red-legged frog within Santa Barbara County alone (Service 2010). On Vandenberg Air Force Base and the Los Padres National Forest, California red-legged frog populations are largely secure as a result of comprehensive management plans; although military and recreational activities do cause habitat disturbance, mortality, and other adverse effects. In the balance of the County, all of the aforementioned threats to the species are ongoing with the exception of overharvesting. Urbanization and agricultural activities likely have the most substantial adverse effects on habitat quality and availability for local populations of California red-legged frogs. Expansion and maintenance of row-crop agriculture removes breeding and foraging habitat, increases nutrient and sediment loads in aquatic habitat, and can cause direct mortality. Livestock grazing practices can introduce nutrients and sediment into aquatic habitat, reduce herbaceous cover, and some livestock water sources support non-native predators of the California red-legged frog. However, responsible livestock management in some parts of the County, including keeping livestock out of riparian areas and constructing stock ponds has improved existing habitat, created new habitat, and improved habitat connectivity for the species. On a smaller scale, oil exploration and extraction has directly impacted California red-legged frogs and removed or degraded habitat in the western/northwestern region of the County.

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 Code of Federal Regulation 402.02). For the purposes of this biological opinion, we consider the action area to include the entire work area along the Bradley Canyon Levee Extension project including the sheet pile and soil cement sections of levee repair, haul/access roads, staging and batch plant areas, and areas where California red-legged frogs within the work area would be relocated. Specifically:

- The sheet pile section of the levee repair would be approximately 1,000 feet long at the downstream portion of the site.
- The soil cement section is approximately 2,700 feet long by 120 feet wide at the upstream portion of the site. This section would include soil excavation and a temporary water diversion in the active channel for a total area of disturbance of approximately 9.2 acres.

In addition, we consider an area 500 feet in all directions of the project site in natural areas to be part of the action area. This area is intended to account for the indirect effects of noise, dust, sedimentation, and disturbance on the California red-legged frog.

The following discussions of the action area, vegetation and wildlife are based on biological field surveys and research as reported in the Biological Assessment (Corps 2011). We have no reason to conclude that this discussion is incorrect.

The Bradley Canyon Levee Extension project area encompasses 3,700 feet of the existing Bradley Canyon Levee adjacent to the Santa Maria Landfill, starting at the Bradley Canyon confluence with the Santa Maria River and continuing upstream within Bradley Canyon. Construction activities to repair and strengthen the soil cement portion of the levee would extend 120 feet (80 feet for excavation and 40 feet for stockpile and soil cement processing) from the toe of the existing levee into the low-flow channel of Bradley Canyon. The low-flow channel is approximately 10 feet wide and 3 to 4 feet deep. Much of the upland area adjacent to the action has been subject to rapid changes in land use. Agricultural fields are located adjacent to and within some sections of the floodplain and occur on both the north and south sides of the project site. The Bradley Canyon Channel can support wildlife species including the California red-legged frog within and adjacent to the action area. Santa Maria Landfill is located on the southwest side of the levee.

The 1,000 foot section of the floodplain along the downstream end of the Bradley Canyon drainage within the action area has a well-defined secondary channel with multiple terraces. The Bradley Canyon Channel terminates in the Santa Maria River via a pipe culvert. This 1,000 foot reach supports riparian vegetation consisting of willow (*Salix* spp.), mulefat (*Baccharis salicifolia)*, and several other native plants, scalebroom (*Lepidospartum squamatum*), rabbits foot grass (*Polypogon monspeliensis*), curly doc (*Rumex crispus*), nut sedge (*Cyperus eragrostis*), and algal mats (*Cara* spp.).

Denuded vegetation, barren substrate and agricultural fields are located adjacent to the Bradley Canyon Channel along the 2,700 foot upstream reach of the proposed action area. This reach is subject to high disturbance due to agricultural fields and the Santa Barbara County Flood Control and Water Conservation District routine maintenance activities. The levee forms a steep riprap slope along the southern edge of the channel. Almost throughout the year, surface water is present in the Bradley Canyon Channel because it receives run-off from agricultural irrigation of adjacent properties.

Numerous small mammal burrows were observed along the banks and near the base of the Bradley Canyon Levee during April 2010 and March 2011 surveys.

Vegetation communities identified during the surveys include arroyo willow riparian scrub, central coast riparian scrub, mulefat scrub, non-native grasslands, disturbed/ruderal non-native vegetation, active agriculture, active channel/Bradley Canyon. These plant communities were identified using aerial photographs and field surveys by the Corps biologists in April 2010 and March 2011. In total, approximately 13.12 acres of habitat consisting of 2.79 acres of native habitat, 0.83 acre of active channel, and 9.5 acres of non-native plant communities or agriculture/barren land would be located within the project work area and would be disturbed by the proposed project.

Riparian communities along the downstream end of the Bradley Canyon drainage support diverse assemblages of wildlife by providing access to water, shade and protection from predation. These areas also provide foraging habitat and breeding habitat for a number of fish and wildlife species. The riparian and non-native plant community types that occur within and adjacent to the Bradley Canyon Channel and Santa Maria River provide habitat for a variety of resident and migratory wildlife species. Riparian areas provide potential habitat for several special status species including the California red-legged frog.

The California red-legged frog has been consistently reported from the Santa Maria region. The Corps and Aspen Environmental Group performed surveys for the California red-legged frog between March 4, 2010, and April 22, 2010. During an initial survey, Bradley Canyon Channel was identified as having potentially suitable habitat (i.e. standing water). A wetted area between Bradley Canyon and Suey Crossing Road downstream on the Santa Maria River was also surveyed. Survey activities in Bradley Canyon were focused on suitable habitat present within the action area.

At the time of the initial survey, the flows within the Bradley Canyon Channel were moderate to slow with heavily silted water. The land adjacent to the ditch had recently been disked and was generally void of vegetation for the first two surveys. Subsequent surveys found non-native grasses growing in the previously disked areas and in some areas hanging over the bank. By the final survey on April 22, 2010, the area again showed evidence of recent disking. Downstream of the disked region, the riparian vegetation was denser, running adjacent to the channel from where the agricultural field ended to a culvert over the channel. Water was flowing under the culvert through a corrugated plastic pipe approximately 2.5 feet in diameter. The water spills out of the pipe into a large pool approximately 10 feet in diameter with several willows in and adjacent to the water. The water flows out of the pool and through shallow riffles cutting northward until it joins the Santa Maria River. The banks along the riffle section are high and steeply downcut. Water flow from Bradley Canyon tapered off to nothing during the final survey on April 22, 2010.

California red-legged frogs were observed in Bradley Canyon from 34.936780°N, -120.356380°W to the culvert pool at 34.940114°N, -120.358676°W. Adult frogs were observed within Bradley Canyon Channel, but the species was not observed downstream of the culvert pool or downstream in the Santa Maria River where surveys were conducted within suitable habitat. The area was revisited during the daytime on March 25, 2010 and April 22, 2010 to look for egg masses because an amplexing couple was previously observed. A second night visit was made on April 8, 2010 to confirm that the frogs were still occupying the area within Bradley Canyon Channel. No California red-legged frog tadpoles or egg masses were observed during any of the surveys.

According to the surveys conducted in 2010, we know that California red-legged frogs are present within the action area in the Bradley Canyon Channel. Ten adult California red-legged frogs were observed during 2 nighttime protocol-level surveys conducted within the proposed action area. Surveys for the California red-legged frog conducted according to our protocol are designed to determine the presence or absence of the California red-legged frog and are not intended for population census. Therefore, while you conducted surveys according to our protocol for the California red-legged frog within the action area and detected 10 individual adults, it is possible that more individuals were present within Bradley Canyon, which were not detected during these surveys. Spadefoot toads (*Spea hammondii*), western toads (*Anaxyrus boreas*), and treefrogs (*Pseudacris hypochondriaca*) were also found within the action area, including the egg masses of both spadefoot toads and treefrogs. Bullfrogs were observed downstream on the Santa Maria River.

Because California red-legged frogs were observed in amplexus, it is assumed that the species may be attempting to breed within the action area; however, no egg masses or tadpoles were seen during surveys. The water had a high silt content during the surveys, which provides less than optimal conditions for the detection of egg masses or tadpoles.

The Santa Barbara County Flood Control and Water Conservation District has also conducted surveys for the California red-legged frog within the project action area. In 2008, the Santa Barbara County Flood Control and Water Conservation District biologists conducted surveys for the California red-legged frog according to Service protocol pursuant to their biological opinion (1-8-04-F-46). The surveys were conducted within the downstream 1,000 foot portion of the proposed action area in Bradley Canyon Channel. Three sub-adult California red-legged frogs were identified near the downstream terminus of the Bradley Canyon Channel. The Santa Barbara County Flood Control and Water Conservation District has observed California red-legged frogs within the action area in Bradley Canyon and upstream to Betteravia Road since at least 2003.

EFFECTS OF THE ACTION

California red-legged frogs within the footprint of the proposed action may be killed or injured during ground disturbing activities or sediment stockpiling, or by construction equipment, personnel and vehicle movement through the action area. This effect would be minimized by the

Corps' use of biological monitors to survey the area prior to construction activities and remain onsite until habitat disturbance has been completed. All workers would be advised that equipment and vehicles must remain within the designated work areas and outside of waters of the U.S., and work areas would be delineated by fencing. Equipment access routes and staging areas would be outside of riparian areas or other water bodies. Work activities would be completed outside the breeding season, as feasible. Construction staff would be trained to recognize and avoid the California red-legged frog and in the event that they are found during construction, stop work until individuals could be relocated. Any California red-legged frogs found within the action area and determined by the project biologist to be at risk would be relocated the shortest distance possible to a nearby suitable habitat, as proposed by the Corps. In addition, the existing Bradley Canyon Channel would be diverted away from the temporary construction area prior to construction, which could encourage individuals to move away from construction areas. Water would not be impounded in a manner that would attract California red-legged frogs within the construction site. It is possible that not all California red-legged frogs within the proposed disturbance area would be detected during these surveys, and may be injured or killed despite survey efforts intended to detect their presence.

The proposed activities could adversely affect California red-legged frogs in their upland habitat throughout the proposed action area. However, the agricultural fields adjacent to Bradley Canyon are routinely disked, likely rendering any upland habitat unsuitable for the California red-legged frog. Because the Corps would implement the protective measures described above, we anticipate that only a small portion of the California red-legged frog individuals that may be present on the site or its uplands would be injured or killed as a result of the proposed project.

Construction of the proposed project within suitable habitat for the California red-legged frog is expected to occur between April 1 and November 30. Therefore, construction may occur during the beginning of the typical rain season in Southern California and the typical breeding season for California red-legged frogs. Some California red-legged frogs may make overland excursions through upland habitats during periods of wet weather, starting with the first rains of autumn. If sufficient precipitation falls during project construction, California red-legged frogs may be injured or killed as they attempt to disperse through the project site to nearby breeding pools.

California red-legged frogs could be injured or killed if they are improperly handled or contained during capture and relocation efforts. These effects could be increased or prolonged if a suitable relocation area is not identified prior to initiating surveys. These threats would be minimized by the Corps' use of Service-approved biologists with experience to survey for, capture, and relocate the species to an appropriate habitat that is the shortest distance possible from the capture site. However, if relocation areas are not identified prior to initiating surveys California red-legged frogs could be contained for a prolonged period and could be at risk of injury or death.

Individual California red-legged frogs attempting to return to the project site following relocation efforts may be exposed to increased predation, exhaustion, starvation, desiccation, or barriers to dispersal. Relocated California red-legged frogs may be at risk of injury or death. This risk may increase with the distance of the relocation site from the work area. California red-legged frogs have been documented to travel as far as 2.2 miles from non-breeding to breeding habitats (Bulger et al. 2003). Because a portion of the proposed project site contains suitable breeding habitat, it is possible that some relocated frogs may attempt to journey back to the project site. However, adverse effects to suitable habitat are expected to be temporary in nature, and permanent impacts are not likely to occur. The project is not likely to permanently affect dispersal, or block or degrade links between aquatic sites. Relocating individuals will also minimize the direct risk of injury or mortality as a result of construction activities. These effects would be minimized because the Corps proposes to relocate individuals the shortest distance possible to suitable habitat that is free from exotic predatory species. The biologist would maintain detailed records of any individuals that were moved to assist them in determining whether relocated individuals were returning to original points of capture. While the Corps proposes to have a qualified biologist onsite during habitat disturbance, California red-legged frogs may move back into a work area overnight and could be at risk of injury or death due to project activities.

Handling California red-legged frogs, or introducing equipment into occupied habitat, can also result in the spread of chytrid fungus, a pathogen linked to declines in amphibians. Chytrid fungus is a water-borne fungus that can be spread through direct contact between aquatic animals and by a spore that can move short distances through the water. The fungus can decimate amphibian populations, causing fungal dermatitis, which usually results in death in 1 to 2 weeks. Infected animals may spread the fungal spores to other ponds and streams before they die. Once a pond has become infected with chytrid fungus, the fungus stays in the water for an undetermined amount of time. If California red-legged frogs that are relocated from the project are infected with chytrid fungus, they may spread the fungal spores to uninfected individuals in the relocation areas. If they are not infected, they may become infected through exposure to infected amphibians inhabiting the relocation area. The effect of biologists spreading diseases between worksites or habitats could be reduced by implementing the fieldwork code of practice developed by the Declining Amphibian Populations Task Force; however, this would not reduce the risk of spreading disease through exposure to infected animals during relocation efforts.

California red-legged frogs may be killed or injured by inadvertent trampling by workers from foot traffic and operation of construction equipment during construction activities, revegetation efforts, and monitoring or surveying activities. This effect would be minimized by providing worker education to assist in the identification and avoidance of California red-legged frogs as proposed by the Corps.

California red-legged frogs may also become trapped in steep-walled holes or trenches, making them vulnerable to desiccation, starvation, and predation and may also be injured or killed by the impact of a fall into a deep excavation. Additionally, California red-legged frogs may become entangled in mesh used in erosion control products if they are used to control sediment during construction or during the revegetation effort.

California red-legged frogs were observed in the action area in amplexus, suggesting the species is attempting to breed within the action area. The protocol-level surveys did not find positive evidence of breeding activities (i.e. tadpoles and egg masses); however, as described in the Environmental Baseline section above, protocol-level surveys are only intended to determine the presence or absence of the California red-legged frog. Therefore, California red-legged frogs may be successfully breeding within the action area even though definitive evidence of breeding activities (e.g., egg masses or tadpoles) was not observed. If the species is using habitat within the action area for breeding purposes and the habitat would be impacted directly or indirectly by the proposed project, reproduction rates are likely to decrease within the action area. Suitable breeding habitat within the action area is not likely to be permanently impacted by the proposed project. Therefore it is likely that reproduction rates, should the species be breeding onsite, would return to normal levels after the proposed project is completed. According to the Description of the Proposed Action section of this biological opinion, the project should be completed within 12 months, so project impacts are likely to only occur through 1 breeding season. Long-term impacts to suitable breeding habitat are not likely because the Bradley Canyon Channel will be returned to its original location after construction, and the sheet pile and soil cement levee repairs are not likely to alter the existing conditions of suitable breeding habitat for the California red-legged frog. Working outside the breeding season, as proposed in protective measure #6 by the Corps, would reduce the effect of the proposed project on breeding activities of the California red-legged frog within the action area.

Construction activities, including noise, vibration, traffic, lighting, and disturbance of habitat, especially during the sheet pile construction, may cause California red-legged frogs to temporarily abandon habitat adjacent to work areas. While these indirect effects are likely to occur, the observation of California red-legged frogs within Bradley Canyon immediately adjacent to ongoing agricultural activities including disking, and maintenance activities by the Santa Barbara County Flood Control and Water Protection District indicates that the species has already habituated to some level of disturbance in and around the Channel. In the long-term, the proposed project is not likely to exacerbate the disturbance of the area to such an extent that California red-legged frogs would discontinue utilizing the site. However, temporary disturbance within the action area as a result of the proposed project may increase the potential for predation and desiccation when California red-legged frogs leave shelter sites.

Frogs and tadpoles may be entrained by pump intakes if such devices are used to dry out work areas. Water diversion activities may also alter the rate of flow of the Bradley Canyon Channel for habitats downstream, and tadpoles may become stranded. However, the Corps proposes to ensure that pump intakes are covered with wire mesh not larger than 5 millimeters to preclude juvenile California red-legged frogs and tadpoles from entering pump intakes, and water would be released at an appropriate rate to maintain downstream flows. The Corps also proposes to have a qualified biologist monitor all water diversion activities; however, some tadpoles may remain undetected and die.

Some potential also exists for disturbance of habitat to cause the spread or establishment of non-native invasive plant species. Once established, non-native invasive plants degrade habitat values through several mechanisms (Service 1999). The Corps has proposed measures to prevent the spread or introduction of these species, such as cleaning equipment prior to working in the riparian corridor, and revegetating project sites with an appropriate assemblage of native seed mix. These measures should reduce this adverse effect.

If water that is impounded during or after work activities creates favorable habitat conditions for non-native predators, such as bullfrogs, crayfish, and centrarchid fishes, California red-legged frogs may suffer abnormally high rates of predation. Additionally, any time California red-legged frogs are concentrated in a small area at unusually high densities, native predators such as herons, egrets, opossums (*Didelphis virginiana*), and raccoons (*Procyon lotor*), or construction worker pets (e.g. domestic dogs), may feed on them opportunistically. Finally, if impoundments occupied by California red-legged frogs were to dry out as a result of construction activity, California red-legged frogs may die of desiccation or be eaten by predators as they attempt to find other suitable habitat. The Corps proposes to avoid creating impoundments of water within the action area that may attract California red-legged frogs, and the qualified biologist would ensure that invasive exotic species would not be spread to the maximum extent feasible. These protective measures are likely to reduce these effects; however, California red-legged frogs could be at risk of injury or death due to predation from the domestic pets of construction workers.

Trash left during or after project activities could attract predators to work sites, which could, in turn, prey on California red-legged frogs. For example, raccoons are attracted to trash and also prey opportunistically on California red-legged frogs. This potential impact will be reduced or avoided by the regular containment and removal of all trash from the worksite that may attract predators, as proposed by the Corps.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade aquatic or upland habitat to a degree where California red-legged frogs are adversely affected or killed. The potential for this impact to occur will be reduced by the Corps' proposal to require all fueling and maintenance activities for vehicles and construction equipment to be placed at the staging area, approximately 20 to 30 meters away from riparian vegetation and suitable habitat for the California red-legged frog.

Work in streams or in floodplains could cause unusually high levels of siltation downstream. This siltation could smother eggs of the California red-legged frog and alter the quality of habitat to the extent that use by individuals of the species is precluded. Avoiding work in flowing water by temporarily dewatering work sites will likely assist in reducing the amount of sediment that is washed downstream, as proposed by the Corps. However, the temporary water diversion is proposed to be located within the temporary construction zone, and it is possible that an increase in sedimentation within the Bradley Canyon Channel will occur as a result of the proposed project. Substantial increases in sedimentation of the Bradley Canyon Channel during sheet pile and soil cement construction or during channel excavation may alter the natural processes of the culvert pool and riparian habitat downstream of the project area, rendering the habitat unsuitable for the California red-legged frog.

We are unable to determine how many California red-legged frogs would be encountered during the proposed project, possibly more than 10 individuals as observed during surveys, but it is likely to be low because the project site is relatively small in size and no tadpoles, egg masses, or juveniles were found during surveys, although they may occur onsite. The proposed activities could adversely affect California red-legged frogs in their upland, aquatic, or dispersal habitat throughout the proposed action area. Because the Corps would implement the minimization measures described above, we anticipate that only a small portion of the California red-legged frog individuals that may be present on the site would be injured or killed. As stated above in the Status of the Species section of this biological opinion, the County contains a relatively strong population of California red-legged frogs. We do not expect the proposed project would substantially affect the survival and recovery of the California red-legged frog within the County because: the proposed project is small in size (approximately 3,700 linear feet of work within Bradley Canyon); impacts associated with the proposed project on the species and its habitat are expected to be temporary in nature (approximately 12 months) and the culvert pool downstream of the work area, which may function as breeding habitat, would not be directly impacted; only a small number of frogs were detected (10 adults during protocol-level presence/absence surveys) in comparison to the number of individuals expected to occur within the County and across the species current range; and the population of California red-legged frogs in Bradley Canyon is relatively small and isolated and the effects of the project are not likely to appreciably reduce the reproduction, numbers, or distribution of the California red-legged frog.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any other non-federal actions that are reasonably certain to occur and are likely to adversely affect the California red-legged frog.

CONCLUSION

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, the effects of the proposed Bradley Canyon Levee Extension Project and the cumulative effects, it is the Service's biological opinion that the Bradley Canyon Levee Extension Project, as proposed, is not likely to jeopardize the continued existence of the California red-legged frog. The proposed project is not likely to appreciably reduce the likelihood of survival and recovery of the California red-legged frog by reducing the reproduction, numbers, or distribution of the species. Critical habitat for this species has been designated; however, this action does not affect designated critical habitat and no destruction or adverse modification of that critical habitat is anticipated. We have reached this conclusion because:

1. No breeding or upland habitat for the California red-legged frog would be destroyed by the proposed action;

2. The Corps has proposed numerous protective measures to minimize the adverse effects of the proposed action on the California red-legged frog;

3. The Corps has proposed to restore the project site after the completion of the proposed project by revegetating construction areas and returning the low-flow channel in Bradley Canyon to its original location; and

4. Few, if any, California red-legged frogs are likely to be killed or injured during project activities.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Corps for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps fails to assume and implement the terms and conditions the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR 402.14(i)(3)]

We cannot determine the precise number of California red-legged frogs that may be killed, injured, harassed, or harmed as a result of the proposed project. Numbers and locations of California red-legged frogs within a population vary from year to year. Incidental take of the species would be difficult to detect because of their small body size and finding dead or injured specimens is unlikely. Finding carcasses and assigning a cause of death are problematic, especially in the presence of numerous scavengers that are likely to find dead animals soon after they die and because dense vegetation near the culvert pool may make detection especially difficult. We anticipate the number of California red-legged frogs taken by the Bradley Canyon Levee Extension Project will be low for the following reasons: the Corps has proposed numerous protective measures to reduce project related effects on the California red-legged frog; protocol-level surveys conducted in the area by qualified biologists discovered a relatively small population of the species (i.e.10 adults), in comparison to population numbers throughout the species range; the habitat that would be impacted by the proposed project is relatively small in size, in comparison with other suitable habitat within dispersal distance for the species; and the Corps would implement measures to decrease the effects of the project on occupied habitat areas within the action area, including the use of sheet pile near habitat areas instead of soil cement.

California red-legged frogs may be taken only within the defined boundaries of the action area. Given the avoidance and minimization measures proposed by Corps, we anticipate that take of the California red-legged frog will be limited to:

1. Harm or harassment due to: work activities including noise, vibration, traffic, lighting and temporary disturbance of habitat; reduction in reproductive rates for the period of one breeding season while construction activities occur; handling during capture and relocation efforts; degradation of habitat due to increased levels of non-native plant and animal species and increased sediment deposition in suitable habitat areas; and

2. Injury or death of individuals by: construction equipment, ground disturbing activities, or personnel and vehicle movement through the action area if they remain undetected following preconstruction surveys, if they attempt to disperse through the action area during rain events or if they attempt to disperse back into the action area after relocation efforts; spread of pathogens (e.g., chytrid fungus); improper handling or containment during capture and relocation efforts; entrapment in steep-walled holes or trenches; spill of hazardous materials; and predation due to increased density at suitable habitat locations or project related attraction of predators into the action area.

All California red-legged frogs captured and relocated from the project area are considered taken as a result of their capture. It may be difficult to detect the number of California red-legged frogs killed or injured as a result of capture and relocation efforts, and we expect that a majority of the handled individuals will be safely relocated because the Corps has proposed protective measures to reduce the likelihood of injury or mortality during relocation efforts. Nonetheless, a small subset of captured and relocated individuals may be injured or killed during capture, handling, and relocation efforts.

Because we are unable to reasonably anticipate the actual number of California red-legged frogs that would be taken by the proposed project, we are including within the Terms and Conditions a measure that defines the limit at which we believe consultation should be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to California red-legged frogs would likely be low given the small population of

California red-legged frog in Bradley Canyon. The trigger for reinitiation takes that analysis into consideration.

This biological opinion provides an exemption from the prohibition against the taking of listed species, contained in section 9 of the Act, only for the activities described in the Description of the Proposed Action section of this biological opinion. California red-legged frogs may be taken only within the defined boundaries of the action area. Take that occurs outside of the action area or from any activity not described in this biological opinion is not exempted from the prohibitions against take described in section 9 of the Act.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the California red-legged frog:

1. Biologists must be authorized by the Service before conducting any activities for the California red-legged frog in the action area;

2. During project implementation, the Corps must use well-defined operational procedures to minimize adverse effects to California red-legged frogs; and

3. The Corps must monitor activities to ensure that the level of incidental take of California red-legged frog is commensurate with the analysis contained in the biological opinion.

Our evaluation of the effects of the proposed action includes consideration of the measures to minimize the adverse effects of the proposed action on the California red-legged frog that were developed by the Corps and repeated in the Description of the Proposed Action portion of this biological opinion. Any subsequent changes in these measures proposed by the Corps may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR 402.16. These reasonable and prudent measures are intended to supplement the protective measures that were proposed by the Corps as part of the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure 1:

    a. The Corps must request our written approval of any biologists it wishes to survey for, capture, handle, and relocate California red-legged frogs. The request must be in writing and be received by the Service's Ventura Fish and Wildlife Office at least 15 days prior to the commencement of any of these activities.

On October 12, 2011, Naeem Siddiqui of the Corps requested Service approval of Maureen Spencer, Andrew Raaf, Cindy Hitchcock and himself to survey for, capture, handle, and relocate the California red-legged frog for the subject project. Maureen Spencer and Andrew Raaf are currently authorized to conduct these activities for the California red-legged frog under the biological opinion for the Santa Barbara County Flood Control projects in the Santa Maria River, which includes Bradley Canyon (1-8-04-F-46). Cindy Hitchcock is currently listed in Recovery Permit TE-045994-14 to conduct these activities for the California red-legged frog. Ms. Spencer, Ms. Hitchcock, and Mr. Raaf have demonstrable experience to independently survey for, capture, handle and relocate California red-legged frogs and have been approved by us to conduct similar activities in the past. Therefore, we approve Ms. Spencer, Ms. Hitchcock, and Mr. Raaf as authorized biologists to conduct activities associated with the California red-legged frog pursuant to this biological opinion.

We do not authorize Naeem Siddiqui to independently survey for, capture, handle, and relocate California red-legged frogs. The supporting résumé of Mr. Siddiqui did not provide substantial evidence of suitable experience to conduct these activities with the California red-legged frog. However, Mr. Siddiqui may conduct all activities pursuant to this biological opinion for the California red-legged frog under the direct supervision of Ms. Spencer, Ms. Hitchcock, or Mr. Raaf to gain the experience necessary to independently conduct these activities independently in the future.

Authorization of Service-approved biologist(s) is valid for this project only;

b. Only Service-approved biologists may conduct the pre-construction surveys for the California red-legged frog as proposed by the Corps in the Description of the Proposed Action section of this biological opinion. These surveys must be conducted prior to initial ground disturbance or removal of any riparian vegetation within the action area for California red-legged frogs;

c. The authorized biologist(s) must be onsite during the initial ground disturbing activities, including initial vegetation clearance and water diversion. Thereafter, the authorized biologist may designate a biological monitor to be onsite throughout project implementation to ensure California red-legged frogs are not killed or injured as described in above in the incidental take statement of this biological opinion. The designated biological monitor must have completed the species specific training proposed by the Corps in the Description of the Proposed Action section of this biological opinion;

d. The authorized biologist(s) or designated biological monitor must conduct routine surveys of work areas, including each morning before construction activities resume, to ensure California red-legged frogs have not moved back into a work area overnight. As a reminder, only authorized biologist(s) may capture, handle, or relocate California red-legged frogs. If the species is discovered in a work area and is at risk of harm from project related activities, the Corps must suspend work on that particular phase of the project until the animal voluntarily leaves the area or until an authorized biologist is available to capture and relocate the individual; and

e. The authorized biologist and designated biological monitor, in full coordination with the Corps, must be a liaison between resource agencies and construction staff regarding compliance with these requirements. If the Corps is not in compliance with these requirements, the Corps must suspend work on that particular phase of the project until such time that the project is again in full compliance.

2. The following terms and conditions implement reasonable and prudent measure 2:

a. Construction activities must be halted when a rain event of 1/2 inch or more is forecast within 48 hours as predicted by the National Weather Service. After a rain event, the authorized biologist must conduct a pre-construction survey for California red-legged frogs dispersing through the project site. Construction must resume only after the site has sufficiently dried and the authorized biologist determines that California red-legged frogs are unlikely to be dispersing through the project site;

b. Before project activities begin, the Service-authorized biologist must identify appropriate areas to receive relocated California red-legged frogs. These areas must be in proximity to the capture site, support suitable vegetation, and be free of exotic predatory species (e.g., bullfrogs) to the best of the authorized biologists' knowledge. The authorized biologist must be allowed sufficient time to move California red-legged frogs from the site before work activities begin;

c. When capturing and removing California red-legged frogs from work sites, the Service-approved biologist(s) must minimize the amount of time that animals are held in captivity. During this time, they must be maintained in a manner that does not expose them to temperatures or any other environmental conditions that could cause injury or undue stress. California red-legged frogs must be captured by hand or dipnet and transported in buckets separate from other species;

d. To avoid transferring disease or pathogens between aquatic habitats during the course of surveys for and handling of California red-legged frogs, the Service-authorized biologist must follow the Declining Amphibian Population Task Force's Code of Practice. A copy of this Code of Practice is enclosed. You may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care must be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat. Biologists must also avoid using latex gloves, which are toxic to amphibians;

e. All steep-walled holes or trenches that may act to trap California red-legged frogs must be covered at the end of each work day, or a wildlife escape ramp must be installed so that any California red-legged frogs that become trapped have the opportunity to escape;

f. The Corps must implement Best Management Practices to reduce the amount of erosion and sedimentation that occurs within the reaches of the Bradley Canyon Channel as a result of the proposed project, as described in Section 6 of the Biological Assessment (Corps 2011); and

g. No pets will be allowed on the construction site.

3. The following term and condition implements reasonable and prudent measure 3:

a. We believe that a relatively small population of California red-legged frogs is present in the action area. If 4 California red-legged frogs of any lifestage are found dead or injured, or if more than a combined total of 40 adult, sub-adults, juveniles, or tadpoles are captured and relocated, the Corps must contact our office immediately so we can review the project activities to determine if additional protective measures are needed. Project activities resulting in take (as identified in the Incidental Take Statement above) should cease until the reinitiated consultation is completed because the take exemption provided pursuant to section 7(o)(2) would have lapsed once the anticipated take level had been exceeded.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the Corps must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. The Corps must provide a written final report to the Service's Ventura Fish and Wildlife Office (2493 Portola Road, Suite B; Ventura, California 93003) within 90 days following completion of the proposed project. The report must describe all activities that were conducted under the auspices of this biological opinion, including activities that were described in the proposed action and required under the terms and conditions. It must also contain a brief discussion of any problems encountered in implementing minimization measures, the results of surveys and monitoring, and any other pertinent information. The report must document the number of California red-legged frogs that were found, the number that were captured and relocated, and the anticipated number that were taken during project activities. The Corps must provide the Service with the detailed records that the biologist kept, as described in the Description of the Proposed Action section of this biological opinion, of any individuals that are moved (e.g. size, discoloration, any distinguishing features, digital photographs) to assist them in determining whether translocated animals are returning to the original points of capture.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured California red-legged frog, initial notification within three working days of its finding must be made by telephone and in writing to the Ventura Fish and Wildlife Office telephone (805-644-1766). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. Injured animals must be transported to a qualified veterinarian. Should any treated California red-legged frogs survive, the Service should be contacted regarding the final disposition of the animals. The remains of listed species must be placed with educational or research institutions holding the appropriate State and Federal permits, such as the Santa Barbara Natural History Museum (Contact: Paul Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department, 2559 Puesta Del Sol, Santa Barbara, California 93460, 805-682-4711, extension 321.)

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend the following conservation measures to promote recovery of the California red-legged frog.

1. We recommend that the Corps investigate the presence, distribution, and effects of parasites, such as *Batrachochytrium dendrobatidis* (i.e., chytrid fungus) in the Santa Ynez River system, including the Bradley Canyon Channel, to determine the effects that these are having on California red-legged frogs. Where effects are detected, we recommend the Corps take measures to minimize them. Please contact the Ventura Fish and Wildlife Office if you are willing to conduct tests for parasites, such as chytrid fungus, on frogs captured during the proposed project. We will help coordinate your efforts with local researchers, which will help the Service understand the extent of chytrid fungus in the Santa Maria area.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding effects or benefiting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the Bradley Canyon Levee Extension Project. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions regarding this consultation, please contact Colleen Mehlberg of my staff at (805) 644-1766, extension 221.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

cc:
Maureen Spencer, Santa Barbara County Flood Control and Water Protection District

Enclosure

REFRENCES CITED

Bulger, J. B., N. J. Scott Jr., and R. B. Seymour. 2003. Terrestrial activity and conservation of adult California red-legged frogs Rana aurora draytonii in coastal forests and grasslands. Biological Conservation 110:85-95.

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The Declining Amphibian Populations Task Force Fieldwork Code of Practice

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires, and all other surfaces. Rinse cleaned items with sterilized (e.g., boiled or treated) water before leaving each study site.
2. Scrub boots, nets, traps, and other types of equipment used in the aquatic environment with 70 percent ethanol solution or a bleach solution of one-half to one cup of bleach in one gallon of water and rinse clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond, wetland, or riparian area.
3. In remote locations, clean all equipment with 70 percent ethanol or a bleach solution, and rinse with sterile water upon return to the lab or a "base camp." Elsewhere, when laundry facilities are available, remove nets from poles and wash (in a protective mesh laundry bag) with bleach on a "delicate" cycle.
4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable gloves and change them between handling each animal. Dedicate separate sets of nets, boots, traps, and other equipment to each site being visited. Clean and store them separately at the end of each field day.
5. Safely dispose of used cleaning materials and fluids. Do not dispose of cleaning materials and fluids in or near ponds, wetland, and riparian areas; if necessary, return them to the lab for proper disposal. Safely dispose of used disposable gloves in sealed bags.
6. When amphibians are collected, ensure the separation of animals from different sites and take great care to avoid indirect contact (e.g., via handling or reuse of containers) between them or with other captive animals. Do not expose animals to unsterilized vegetation or soils which have been taken from other sites. Always use disinfected and disposable husbandry equipment.
7. If a dead amphibian is found, place it in a sealable plastic bag and refrigerate (do not freeze). If any captured live amphibians appear unhealthy, retain each animal in a separate plastic container that allows air circulation and provides a moist environment from a damp sponge or sphagnum moss. For each collection of live or dead animals, record the date and time collected, location of collection, name of collector, condition of animal upon collection, and any other relevant environmental conditions observed at the time of collection. Immediately contact the Ventura Fish and Wildlife Office at (805) 644-1766 for further instructions.

The Fieldwork Code of Practice has been produced by the Declining Amphibian Populations Task Force with valuable assistance from Begona Arano, Andrew Cunningham, Tom Langton, Jamie Reaser, and Stan Sessions.

For further information on this Code, or on the Declining Amphibian Populations Task Force, contact John Wilkinson, Biology Department, the Open University, Walton Hall, Milton Keynes, MK7 6AA, UK.
Email: DAPTF@open.ac.uk
Fax: +44 (0) 1908-654167

Appendix J.

Public Comments, Correspondence, and Responses

U.S ARMY
CORPS OF ENGINEERS

PUBLIC COMMENTS, LETTERS, AND RESPONSES

FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT

November 2011

Comments on the Draft SEA/MND

The public comment and response component of the National Environmental Policy Act (NEPA) process serves an essential role. It allows the respective lead agencies to assess the impacts of a project based on the analysis of other responsible, concerned, or adjacent agencies and interested parties, and it provides the opportunity to amplify and better explain the analysis that the lead agencies have undertaken to determine the potential environmental impacts of a project. To that extent, responses to comments are intended to provide complete and thorough explanations to commenting agencies and individuals and to improve the overall understanding of the project for the decision-making body.

The USACE received three comment letters on the Draft EA/MND during the public review period. Table 1 presents a list of those agencies, organizations, and individuals who provided comment on the Draft SEA/MND.

Table 1 - Public Comments Received on the Draft EA/MND

Letter Code	Date	Individual/Organization
		Federal Government
NMFS1	10/17/11	National Marine Fisheries Service
		State Government
	9/29/11	Native American Heritage Commission
		Regional/Local Government
SBAPCD	10/11/11	Santa Barbara County Air Pollution Control District

Responses to Comments

In accordance with NEPA (23 CFR Part 771), the Corps has evaluated the comments on environmental issues received from agencies and other interested parties and has prepared written responses to each comment pertinent to the adequacy of the environmental analysis contained in the Draft EA/MND. In specific compliance with implementing regulations 23 CFR Part 771 of the NEPA Guidelines, the written responses address the environmental issues raised. In addition, where appropriate, the basis for incorporating, or not incorporating specific suggestions into the Proposed Action is provided. In each case, the Corps has expended a good faith effort, supported by reasoned analysis, to respond to comments.

This section includes responses to written comments received during the 30-day public review period of the Draft EA/MND. A copy of each comment letter is provided with responses to each comment presented after the comment letters.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

In response refer to:
2011/04907:BMW

OCT 17 2011

Ms. Josephine R. Axt, PhD.
Chief, Planning Division
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Attn: Naeem Siddiqui

Dear Ms. Axt:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the Army Corps of Engineers' (Corps) draft Supplemental Environmental Assessment/Mitigated Negative Declaration (SEA/MND) for the proposed Santa Maria River Bradley Canyon Levee Extension Project (Project), Santa Barbara County, to repair the existing Bradley Canyon Channel Levee (Levee) upstream of the terminus of Bradley Canyon. Bradley Canyon is a tributary to the Santa Maria River. The proposed Project supplements a previously completed repair of the Levee on the Santa Maria River downstream of the Bradley Canyon confluence. These combined actions propose to provide standard flood protection to the City of Santa Maria. The proposed Project and associated activities will be confined to Bradley Canyon, which is adjacent to designated critical habitat for endangered Southern California Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) in the Santa Maria River.

Based on the information included in the draft SEA/MND, NMFS anticipates that the Project's activities will potentially cause onsite water quality alterations to extend offsite in Santa Maria River and, therefore designated critical habitat for endangered steelhead. During sediment excavation from the Channel for the soil-cement revetment and associated construction, in-channel sediments could be mobilized and transported by flow into the Santa Maria River. For this reason, NMFS recommends that the erosion and sediment discharge anticipated with preferred *Alternative 2A: Repair of 3,700 feet of Bradley Canyon Levee with Combination of Sheet Pile and Soil Cement*, be carefully monitored. Physical characteristics of surface water such as turbidity will be important to measure throughout the duration of the Project to determine when corrective actions are necessary to correct project-induced turbidity concentrations in the Bradley Channel, which, in turn, would reduce the likelihood of diminishing water quality offsite in the Santa Maria River, the surrounding habitat and the Project area.

To further minimize the potential for negative impacts to adjacent designated critical habitat for endangered steelhead, NMFS reinforces the importance of a stringent erosion and sediment control plan as proposed in the SEA/MND. Implementation of this plan is important when trying to avoid potential impacts to the existing habitat for steelhead adjacent to the project area. In this context, NMFS recommends on-going monitoring and maintenance, as appropriate, during project activities to avoid further degrading the structure and function of habitat on which steelhead depend during various life stages.

Additional proposed actions under *Alternative 2A* include mitigating for the permanent loss of 0.5 acre of non-native grassland and barren substrate. The proposed newly planted native vegetation, adjacent to the existing riparian woodland at the Bradley Channel confluence, should maintain ecological functions and value of the current habitat. Furthermore, the newly planted vegetation should enhance the adjacent riparian area by reducing erosion and providing functional habitat for species present.

NMFS appreciates this opportunity to review the draft SEA/MND. Please call Brittany White at (562) 432-3905 if you have any questions concerning this letter, or if you require additional information.

Sincerely,

Rodney R. McInnis
Regional Administrator

cc: Roger Root, USFWS, Ventura
Mary Larson, CDFG, Los Alamitos
Marilyn Fluharty, CDFG, San Diego
Copy Administrative File: 151422SWR2011PR00477

Response to Comment Set NMFS: National Marine Fisheries Service

NMFS-1: Thank you for your comment letter. Your comments on the Draft Supplemental Environmental Assessment/ Mitigated Negative Declaration (SEA/MND) for the Bradley Canyon Levee Extension Project have been noted. As discussed in the document, potential erosion, sediment discharge and water diversion will be carefully monitored during construction. The following environmental commitments shall be implemented at all times during construction: S-1: prepare and implement an erosion and sedimentation control plan; S-2: prepare and implement a Storm water Pollution Prevention Plan (SWPPP); S-3: limit grading and excavation activities within the channel to the dry season; and BR-13: presence of a qualified Corps biologist at the work site at all times during project construction.

STATE OF CALIFORNIA
Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

September 29, 2011

Naeem A. Siddiqui
U.S. Army Corps of Engineers
915 Wilshire Blvd., 14th Floor CESPL-PD-RN
Los Angeles, CA 90017

RE: SCH# 2011091067 Santa Maria River Bradley Canyon Levee Extension Project; Santa Barbara County.

Dear Mr. Siddiqui:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Completion (NOC) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.

✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. . **USGS 7.5 minute quadrangle name, township, range and section required.**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached.**

✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Katy Sanchez

Katy Sanchez
Program Analyst
(916) 653-4040

cc: State Clearinghouse

Native American Contact List
Santa Barbara County
September 29, 2011

Ernestine DeSoto
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Santa Barbara CA 93101
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Chumash

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Chumash

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Chumash

Santa Ynez Band of Mission Indians
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Chumash

John Ruiz
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Chumash

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2011091067 Santa Maria River Bradley Canyon Levee Extension Project; Santa Barbara County.

Native American Contact List
Santa Barbara County
September 29, 2011

Gilbert M. Unzueta Jr. 571 Citation Way Thousand Oaks, CA 91320 (805) 375-7229	Chumash	Coastal Band of the Chumash Nation Vennise Miller, Chairperson P.O. Box 4464 Santa Barbara CA 93140 805-305-5517	Chumash
Stephen William Miller 189 Cartagena Camarillo , CA 93010 (805) 484-2439	Chumash	Charles S. Parra P.O. Box 6612 Oxnard , CA 93031 (805) 340-3134 (Cell) (805) 488-0481 (Home)	Chumash
Santa Ynez Tribal Elders Council Adelina Alva-Padilla, Chair Woman P.O. Box 365 Santa Ynez , CA 93460 elders@santaynezchumash.org (805) 688-8446 (805) 693-1768 FAX	Chumash	Richard Angulo 2513 Laney Circle Denton , TX 76208	Chumash
Randy Guzman - Folkes 655 Los Angeles Avenue, Unit E Moorpark , CA 93021 **ndnRandy@yahoo.com** (805) 905-1675 - cell	Chumash Fernandeño Tataviam Shoshone Paiute Yaqui	Santa Ynez Band of Mission Indians Tribal Administrator P.O. Box 517 Santa Ynez , CA 93460 info@santaynezchumash. (805) 688-7997 (805) 686-9578 Fax	Chumash

This list is current only as of the date of this document.

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This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2011091067 Santa Maria River Bradley Canyon Levee Extension Project; Santa Barbara County.

Response to Comment Set NAHC: Native American Heritage Commission

NAHC-1: Thank you for your comment letter on the Draft Supplemental Environmental Assessment/ Mitigated Negative Declaration (SEA/MND) for the Bradley Canyon Levee Extension Project. The SEA has been sent to the contact list as requested in your letter.

Our Vision Clean Air

Santa Barbara County
Air Pollution Control District

October 11, 2011

Ms. Josephine R. Axt, PhD.
Chief, Planning Division
U.S. Army Corps of Engineers
Attn: Naeem Siddiqui
P.O. Box 532711
Los Angeles, CA 90053-2325

Re: APCD Comments on the Draft Supplemental Environmental Assessment/Mitigated Negative Declaration (SEA/MND) for the Santa Maria River Levee Improvement Bradley Canyon Levee Extension Project

Dear Ms. Axt:

The Air Pollution Control District (APCD) has reviewed the referenced Draft SEA/MND, which consists of the strengthening of a 3,700 linear foot reach of the Bradley Canyon Levee. As currently designed, approximately 1,000 feet of sheet pile would be installed in areas supporting riparian habitat and would transition to soil cement applied to the face of the levee for the remaining 2,700 feet. Grading and earth-moving associated with the proposed project includes approximately 90,000 cubic yards (cy) of materials excavated from temporary construction easement area to be balanced onsite. The proposed project is located in Bradley Canyon channel, north and south of Foxen Canyon Road (Betteravia Road) and west of Dominion Road in the City of Santa Maria.

The SEA/MND indicates that a portable batch plant will be used as part of the proposed project and will be located adjacent to the existing landfill facilities, outside of the channel. Please be advised that **all portable diesel-fired construction engines rated at 50 brake-horsepower or greater must have either statewide Portable Equipment Registration Program (PERP) certificates or APCD permits prior to operation**. Construction engines with PERP certificates are exempt from APCD permit, provided they will be on-site for less than 12 months. The SEA/MND indicates that construction is estimated to occur over 8 to 12 months but may be longer due to "weather or project-specific technical, mechanical, and funding constraints". **Therefore, if the portable batch plant will be on-site for more than 12 months, an APCD permit will be required. Please contact APCD's Engineering & Compliance Division staff (805-961-8800) at approximately the 8-month mark of the project to discuss whether the portable batch plant will be on-site for more than 12 months and thus will require an APCD permit.**

Air Pollution Control District staff offers the following comments on the Draft SEA/MND:

1. **Chapter 3 Existing Conditions, Section 3.2 Air Quality, Page 3-3 – Local Ambient Air Quality Standards and Attainment Status:** We suggest adding a table under Section 3.2 that summarizes the federal and state ambient air quality standards and attainment status of criteria pollutants for Santa Barbara County. The APCD has posted the most up-to-date attainment status for the County on the APCD website at www.sbcpacd.org/sbc/attainment.htm.

Louis D. Van Mullem, Jr. • Air Pollution Control Officer
260 North San Antonio Road, Suite A • Santa Barbara, CA • 93110 • www.sbcapcd.org • 805.961.8800 • 805.961.8801 (fax)

2. **Chapter 4 Environmental Consequences, Section 4.2 Air Quality, Page 4-6 – GHG Significance Determination:** Global climate change is a growing concern that must be addressed in CEQA documents. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of greenhouse gases. California State Senate Bill 97 (SB 97), enacted in 2007, required that the CEQA Guidelines be amended to include "guidance for the mitigation of greenhouse gas (GHG) emissions or the effects of GHG emissions." The California Office of Planning & Research (OPR) developed amendments to the CEQA Guidelines, which were adopted by the California Natural Resources Agency on December 30, 2009 and became effective March 18, 2010. These amendments establish a framework for addressing global climate change impacts in the CEQA process, and include revisions to the Environmental Checklist Form (Appendix G) as well as to the Energy Conservation appendix (Appendix F). A new section (§15064.4) has been added that provides an approach to assessing impacts from GHGs. The Guidelines now require that greenhouse gases be quantified, that a determination of significance be made, and that impacts be mitigated as necessary.

3. **Chapter 4 Environmental Consequences, Section 4.2 Air Quality, Page 4-7 – Emission Calculation Documentation:** This page indicates that URBEMIS 2007, Version 9.2.4 was used to calculate air emissions associated with the proposed project's construction schedule. It is recommended that air emission calculations are documented in the SEA/MND by including the URBEMIS emission summary reports in the appendices.

4. **Chapter 4 Environmental Consequences, Section 4.2 Air Quality, Page 4-8 – Incorrect Rule Citations:** The applicable SBCAPCD Rules and regulations references on this page are cited with incorrect rule numbers. Please see http://www.sbcapcd.org/rules/dlrules.htm for a list of current APCD rules, and revise as appropriate. APCD Rule 302 concerns visible emissions (opacity), APCD Rule 303 concerns nuisance, APCD Rule 345 concerns fugitive dust from construction and demolition activities, and APCD Rule 201 concerns permits required.

Air Pollution Control District staff suggests that the following measures be implemented for this construction project:

1. Standard dust mitigations (**Attachment A**) are recommended for all construction and/or grading activities. The name and telephone number of an on-site contact person must be provided to the APCD prior to commencement of construction activities.

2. APCD Rule 345, *Control of Fugitive Dust from Construction and Demolition Activities,* establishes limits on the generation of visible fugitive dust emissions at demolition and construction sites. The rule includes measures for minimizing fugitive dust from on-site activities and from trucks moving on- and off-site. The text of the rule can be viewed on the APCD website at www.sbcapcd.org/rules/download/rule345.pdf.

3. Fine particulate emissions from diesel equipment exhaust are classified as carcinogenic by the State of California. Therefore, during project grading, construction, and hauling, construction contracts must specify that contractors shall adhere to the requirements listed in **Attachment B** to reduce emissions of ozone precursors and fine particulate emissions from diesel exhaust.

4. All portable diesel-fired construction engines rated at 50 brake-horsepower or greater must have either statewide Portable Equipment Registration Program (PERP) certificates or APCD permits prior to operation. Construction engines with PERP certificates are exempt from APCD permit, provided they will be on-site for less than 12 months.

5. At all times, idling of heavy-duty diesel trucks must be limited to five minutes; auxiliary power units should be used whenever possible. State law requires that drivers of diesel-fueled commercial vehicles:
   - shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location
   - shall not idle a diesel-fueled auxiliary power system (APS) for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle.

If you or the project applicant have any questions regarding these comments, please feel free to contact me at (805) 961-8890 or via email at cvw@sbcapcd.org.

Sincerely,

Carly Wilburton

Carly Wilburton,
Air Quality Specialist
Technology and Environmental Assessment Division

Attachments: Fugitive Dust Control Measures
Diesel Particulate and NO_x Emission Measures

cc: Project File
TEA Chron File

Santa Barbara County
Air Pollution Control District

ATTACHMENT A
Fugitive Dust Control Measures

These measures are required for all projects involving earthmoving activities regardless of the project size or duration. Proper implementation of these measures is assumed to fully mitigate fugitive dust emissions.

- During construction, use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this should include wetting down such areas in the late morning and after work is completed for the day. Increased watering frequency should be required whenever the wind speed exceeds 15 mph. Reclaimed water should be used whenever possible. However, reclaimed water should not be used in or around crops for human consumption.

- Minimize amount of disturbed area and reduce on site vehicle speeds to 15 miles per hour or less.

- If importation, exportation and stockpiling of fill material is involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin.

- Gravel pads shall be installed at all access points to prevent tracking of mud onto public roads.

- After clearing, grading, earth moving or excavation is completed, treat the disturbed area by watering, <u>or</u> revegetating, <u>or</u> by spreading soil binders until the area is paved or otherwise developed so that dust generation will not occur.

- The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holiday and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the Air Pollution Control District prior to land use clearance for map recordation and land use clearance for finish grading of the structure.

  Plan Requirements: All requirements shall be shown on grading and building plans and as a note on a separate information sheet to be recorded with map. **Timing**: Requirements shall be shown on plans or maps prior to land use clearance or map recordation. Condition shall be adhered to throughout all grading and construction periods.

  <u>**MONITORING**</u>: Lead Agency shall ensure measures are on project plans and maps to be recorded. Lead Agency staff shall ensure compliance onsite. APCD inspectors will respond to nuisance complaints.

Santa Barbara County
Air Pollution Control District

ATTACHMENT B
DIESEL PARTICULATE AND NO_x EMISSION MEASURES

Particulate emissions from diesel exhaust are classified as carcinogenic by the state of California. The following is an updated list of regulatory requirements and control strategies that should be implemented to the maximum extent feasible.

The following measures are required by state law:

- All portable diesel-powered construction equipment shall be registered with the state's portable equipment registration program OR shall obtain an APCD permit.
- Fleet owners of mobile construction equipment are subject to the California Air Resource Board (CARB) Regulation for In-use Off-road Diesel Vehicles (Title 13 California Code of Regulations, Chapter 9, § 2449), the purpose of which is to reduce diesel particulate matter (PM) and criteria pollutant emissions from in-use (existing) off-road diesel-fueled vehicles. For more information, please refer to the CARB website at www.arb.ca.gov/msprog/ordiesel/ordiesel.htm.
- All commercial diesel vehicles are subject to Title 13, § 2485 of the California Code of Regulations, limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and unloading shall be limited to five minutes; electric auxiliary power units should be used whenever possible.

The following measures are recommended:

- Diesel construction equipment meeting the California Air Resources Board (CARB) Tier 1 emission standards for off-road heavy-duty diesel engines shall be used. Equipment meeting CARB Tier 2 or higher emission standards should be used to the maximum extent feasible.
- Diesel powered equipment should be replaced by electric equipment whenever feasible.
- If feasible, diesel construction equipment shall be equipped with selective catalytic reduction systems, diesel oxidation catalysts and diesel particulate filters as certified and/or verified by EPA or California.
- Catalytic converters shall be installed on gasoline-powered equipment, if feasible.
- All construction equipment shall be maintained in tune per the manufacturer's specifications.
- The engine size of construction equipment shall be the minimum practical size.
- The number of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number is operating at any one time.
- Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.

Plan Requirements: Measures shall be shown on grading and building plans. **Timing:** Measures shall be adhered to throughout grading, hauling and construction activities.

MONITORING: Lead Agency staff shall perform periodic site inspections to ensure compliance with approved plans. APCD inspectors shall respond to nuisance complaints.

Response to AQ Comment: Santa Barbara County Air Pollution Control District

AQ-1 Thank you for your comment on the Draft SEA/MND. The commenter recommends adding the federal and state ambient air quality standards and attainment status of criteria pollutants for Santa Barbara County. In consideration of feedback from the Santa Barbara County Air Pollution Control District (SBCAPCD), a table for standards summary (Table 3.2-1) and a table for attainment status including both the federal and state status (Table3.2-2) are added in Section 3.2 Air Quality.

AQ-2 The commenter states that global climate change is a growing concern that must be addressed in CEQA documents and the California Office of Planning & Research (OPR) developed amendments to the CEQA guidelines, which became effective March 18, 2010. The commenter recommends including quantified greenhouse gas emissions, determination of significance, and mitigation measures to reduce impacts in the SEA/MND as required in the guidelines. In response to this comment, discussion about California Air Resource Board interim significance thresholds for GHG (7,000 metric tons of CO_2 equivalent emissions) and the SBCAPCD Guidelines have been added to Section 4.2.1. Since the mitigation measures for GHG/Climate Change suggested in the SBCAPCD guidelines would not be feasible or very effective for a small project, like the proposed Project, no additional measures to mitigate GHG emissions have been added. However, as noted on page 4-10, implementation of mitigation measures AQ-1 through AQ-16 would further reduce GHG emissions. The Draft SEA/MND is also revised to include a table for GHG emissions summary (Table 4.2-4) in Section 4.2.3, and it was determined, under CEQA, that the Project would have less-than-significant GHG/Climate Change impacts because GHG emissions are below 7,000 metric tons of CO2e per year.

AQ-3 The commenter recommends including air emission calculation by presenting the URBEMIS emission summary reports in the appendices. The Project emissions are estimated based on the total emissions estimated for the original 2009 Santa Maria River Levee Improvement Project and the ratio of the length of the levee to be repaired for the proposed Project and that for the 2009 Project. The proposed Project would require additional vehicle trips to import 30,000 cubic yards of fill material and emissions associated with these vehicles trips are estimated separately using URBEMIS 2007 (ver. 9.2.4), and added to the overall emissions estimated based on total emissions for the 2009 Project using the interpolation method. Emission summaries for the proposed Project and the URBEMIS reports prepared for the original Santa Maria River Levee Improvement Project and the additional truck trips are included in AQ Appendix K.

AQ-4 The commenter noted that the Draft SEA/MND cited incorrect numbers for rules regarding visible emissions, nuisance, fugitive dust emissions, and permits required. These rule numbers are corrected (page 4-11).

AQ-MM-1 The commenter recommends standard dust mitigations for all construction and/or grading activities. The commenter provided the standard dust mitigations in Attachment A and these mitigation measures are carefully review and considered. These mitigation measures are already included in the list of mitigation measures in the Draft SEA/MND, and no significant differences are found between the mitigation measure in the Draft SEA/MND and the measures in Attachment A. The only difference reserved is a measure regarding minimizing disturbed area and limiting vehicle speeds. This measure has been added to AQ-1 (page 4-10).

AQ-MM-2 and -3 The commenter recommends standard dust mitigation measures as listed in APCD Rule 345 and Attachment B of the comment. Recommended measures are carefully reviewed for consideration. It should be noted that some of these measures are already listed in the Draft SEA/MND, and some of these (such as first three bullets in Attachment B) are strictly rule compliance issues, not mitigation measures. Additionally, there are measures that are strictly an issue for the mitigation monitoring plan. Regarding these measures, the Corps will ensure that the contractor complies with all federal, state and local regulations and adheres to all mitigation measures.

AQ-MM-4 The commenter notes that all portable diesel-fired construction engines rated at 50 brake-horsepower or greater must have either statewide Portable Equipment Registration Program (PERP) certificates or APCD permits prior to operation. The Corps will ensure compliance with state/local rules including obtaining require permits and registrations to the extent applicable.

AQ-MM-5 The commenter notes that limits on idling of heavy-duty trucks, use of auxiliary power units, and state requirements for drivers of diesel-fueled commercial vehicles. The Corps will ensure that the contractor complies with all federal, state and local regulations and adheres to these requirements.

Appendix K.

Air Quality

APPENDIX K

U.S ARMY
CORPS OF ENGINEERS

AIR QUALITY

FOR THE SANTA MARIA RIVER LEVEE IMPROVEMENT PROJECT

November 2011

Santa Maria River Levee Improvement Bradley Canyon levee Extension
- Alternative 2A:

Assumption:
Construciton would start in September 2012, and would occur for 12 months.

Lengths of levee proposed to be repaired
Final EA/MND: 6.3 miles
Proposed: 3,700 feet

Final EA/MND 2009 - Sheet Pile and Soil Cement: Reach 2 and 1 (tons/year)

	ROG	NOx	CO	SO2	PM10	PM2.5
2009	1.14	6.4	4.88	0.00	0.87	0.24
2010	2.67	14.96	11.33	0.00	2.54	0.67
2011	0.45	2.49	1.92	0.00	0.4	0.11

Final EA/MND 2009 - Sheet Pile and Soil Cement: Reach 3 (tons/year)

	ROG	NOx	CO	SO2	PM10	PM2.5
2010	1.63	9.36	6.92	0.00	1.54	0.44
2011	2.33	13.37	9.93	0.00	2.57	0.7

Maximum Annual Construction Emissions (tons/year)

	ROG	NOx	CO	SO2	PM10	PM2.5
Final EA/MND 2009 Emissions						
2009	1.14	6.40	4.88	0.00	0.87	0.24
2010	4.30	24.32	18.25	0.00	4.08	1.11
2011	2.78	15.86	11.85	0.00	2.97	0.81
Total	8.22	46.58	34.98	0.00	7.92	2.16
SEA/MND 2011 - Proposed Project Emissions						
2012	0.30	1.73	1.30	0.00	0.29	0.08
2013	0.61	3.47	2.59	0.00	0.59	0.16
Total	0.91	5.20	3.89	0.00	0.88	0.24

* Emissions for the Proposed Project include emissions from vehicle trips for 30,000 cy of fill material import.

Total Construction GHG Emissions

	Emissions (CO2e, kg)			Total (MT)
	CO_2	CH_4	N_2O	CO2e
Final EA/MND 2009 Emissions				
Offroad - Diesel	6,828,755	19,780	20,856	6,869.39
Onroad - Passenger	163,011	561	11,821	175.39
Onroad - Delivery	585,974	890	10,943	597.81
Total	7,577,740	21,230	43,620	7,642.59
SEA/MND 2011 - Proposed Project Emissions				
2012				
Offroad - Diesel	253,191	733	773	255
Onroad - Passenger	6,044	21	438	7
Onroad - Delivery	21,726	33	406	23
Total	280,961	787	1,617	284
2013				
Offroad - Diesel	506,381	1,467	1,547	509
Onroad - Passenger	12,088	42	877	13
Onroad - Delivery	43,452	66	811	46
Total	561,922	1,574	3,235	569
Total				
Offroad - Diesel	759,572	2,200	2,320	764.09
Onroad - Passenger	18,132	62	1,315	19.51
Onroad - Delivery	65,179	99	1,217	69.55
Total	842,882	2,361	4,852	853.16

* Emissions for the Proposed Project include emissions from vehicle trips for 30,000 cy of fill material import.

Santa Maria River Levee Improvement Bradley Canyon levee Extension
- Alternative 2C

Assumption:
Construciton would start in September 2012, and would occur for 12 months.

Lengths of levee proposed to be repaired

Final EA/MND:	6.3	miles
Proposed:	3,700	feet

Final EA/MND 2009 - Sheet Pile (tons/year)

	ROG	NOx	CO	SO2	PM10	PM2.5
2009	0.48	3.38	1.90	0.00	2.12	0.48
2010	1.36	9.37	5.37	0.00	6.28	1.42
2011	1.27	8.57	5.08	0.00	6.25	1.40
2012	1.02	6.60	4.07	0.00	5.23	1.16

Maximum Annual Construction Emissions (tons/year)

	ROG	NOx	CO	SO2	PM10	PM2.5
Final EA/MND 2009 Emissions						
2009	0.48	3.38	1.90	0.00	2.12	0.48
2010	1.36	9.37	5.37	0.00	6.28	1.42
2011	1.27	8.57	5.08	0.00	6.25	1.40
2012	1.02	6.60	4.07	0.00	5.23	1.16
Total	4.13	27.92	16.42	0.00	19.88	4.46
SEA/MND 2011 - Proposed Project Emissions						
2012	0.15	1.04	0.61	0.00	0.74	0.17
2013	0.31	2.08	1.22	0.00	1.47	0.33
Total	0.46	3.13	1.83	0.00	2.21	0.50

URBEMIS SUMMARY REPORT FOR 2009

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Documents and Settings\IHwang\Application Data\Urbemis\Version9a\Projects\Santa Maria\05272009\Soil Cement Reach 2 and 1.urb924

Project Name: Santa Maria Levee - Soil Cement Alt

Project Location: Santa Barbara County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (tons/year unmitigated)	1.14	10.28	4.88	0.00	13.02	0.45	13.46	2.72	0.41	3.13	971.43
2009 TOTALS (tons/year mitigated)	1.14	6.40	4.88	0.00	0.79	0.08	0.87	0.17	0.08	0.24	971.43
Percent Reduction	0.00	37.78	0.00	0.00	93.94	81.23	93.52	93.92	81.25	92.26	0.00
2010 TOTALS (tons/year unmitigated)	2.67	23.91	11.33	0.00	38.60	1.03	39.63	8.06	0.95	9.01	2,432.23
2010 TOTALS (tons/year mitigated)	2.67	14.96	11.33	0.00	2.34	0.20	2.54	0.49	0.18	0.67	2,432.23
Percent Reduction	0.00	37.42	0.00	0.00	93.94	80.62	93.59	93.92	80.64	92.53	0.00
2011 TOTALS (tons/year unmitigated)	0.45	4.01	1.92	0.00	6.06	0.17	6.23	1.27	0.16	1.42	432.02
2011 TOTALS (tons/year mitigated)	0.45	2.49	1.92	0.00	0.37	0.03	0.40	0.08	0.03	0.11	432.02
Percent Reduction	0.00	37.83	0.00	0.00	93.94	81.29	93.59	93.92	81.30	92.54	0.00

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Mitigated Emissions (Tons/Year)

File Name: C:\Documents and Settings\IHwang\Application Data\Urbemis\Version9a\Projects\Santa Maria\05272009\Soil Cement Reach 3.urb924

Project Name: Santa Maria Levee - Soil Cement Alt

Project Location: Santa Barbara County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
2010	1.63	9.36	6.92	0.00	1.38	0.16	1.54	0.29	0.15	0.44	1,474.60
Fine Grading 06/01/2010-12/31/2011	1.41	8.18	5.99	0.00	1.38	0.15	1.53	0.29	0.14	0.42	1,292.75
Fine Grading Dust	0.00	0.00	0.00	0.00	1.38	0.00	1.38	0.29	0.00	0.29	0.00
Fine Grading Off Road Diesel	1.34	7.35	5.26	0.00	0.00	0.12	0.12	0.00	0.11	0.11	1,154.73
Fine Grading On Road Diesel	0.05	0.79	0.24	0.00	0.00	0.03	0.03	0.00	0.03	0.03	106.80
Fine Grading Worker Trips	0.02	0.04	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.23
Building 11/01/2010-01/31/2011	0.22	1.18	0.93	0.00	0.00	0.01	0.01	0.00	0.01	0.01	181.85
Building Off Road Diesel	0.22	1.18	0.93	0.00	0.00	0.01	0.01	0.00	0.01	0.01	181.85
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: C:\Documents and Settings\IHwang\Application Data\Urbemis\Version9a\Projects\Santa Maria\05272009\Sheet Pile.urb924

Project Name: Santa Maria Levee - Sheet Pile Alt

Project Location: Santa Barbara County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (lbs/day unmitigated)	10.92	103.39	43.25	0.01	285.79	4.34	290.13	59.69	3.99	63.68	11,326.40
2009 TOTALS (lbs/day mitigated)	10.92	76.88	43.25	0.01	47.03	1.21	48.24	9.83	1.11	10.94	11,326.40
2010 TOTALS (lbs/day unmitigated)	10.42	96.67	41.15	0.01	285.79	3.98	289.77	59.69	3.66	63.35	11,326.31
2010 TOTALS (lbs/day mitigated)	10.42	71.80	41.15	0.01	47.03	1.11	48.15	9.83	1.02	10.85	11,326.31
2011 TOTALS (lbs/day unmitigated)	9.76	88.79	39.10	0.01	285.79	3.67	289.46	59.69	3.38	63.07	11,326.24
2011 TOTALS (lbs/day mitigated)	9.76	65.92	39.10	0.01	47.03	1.03	48.06	9.83	0.94	10.77	11,326.24
2012 TOTALS (lbs/day unmitigated)	9.34	81.58	37.30	0.01	285.79	3.29	289.08	59.69	3.02	62.71	11,326.19
2012 TOTALS (lbs/day mitigated)	9.34	60.52	37.30	0.01	47.03	0.92	47.95	9.83	0.84	10.67	11,326.19

URBEMIS Summary Report for Additional Truck Trips

10/27/2011 3:52:43 PM

Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Documents and Settings\IHwang\Application Data\Urbemis\Version9a\Projects\Santa Maria Levee 2011.urb924

Project Name: Santa Maria Levee 2011

Project Location: Santa Barbara County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99
2012 TOTALS (tons/year mitigated)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013 TOTALS (tons/year unmitigated)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.01
2013 TOTALS (tons/year mitigated)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.01
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix L.

Habitat Mitigation and Monitoring Plan

U.S ARMY
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HABITAT MITIGATION AND MONITORING PLAN FOR BIOLOGICAL RESOURCES FOR THE BRADLEY CANYON LEVEE EXTENSION IMPROVEMENT PROJECT

November 2011

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EXECUTIVE SUMMARY

The existing habitat within the Project site consists of a mixture of native, non-native and degraded vegetation made up of upland and riparian vegetation; areas where riparian habitat will be established currently exist as barren land, fallow agriculture land and non-native habitat species such as non-native grassland.

Execution of the proposed Project would result in the disturbance of approximately 6.85 acres of habitat. Implementation of this comprehensive Mitigation and Monitoring Program (MMP) will result in the restoration of 5.74 acres of the degraded vegetation communities present in the Project area with a grass mix and establishment of 0.5 acre of riparian habitat near the Bradley Canyon confluence. Temporary impacts to the active channel would be mitigated by returning the re-routed channel to its pre-construction alignment and contours as shown in figure 2 below.

Implementation of the proposed mitigation will result in a higher functioning drainage course than currently exists by creating a more stabilized environment subject to reduced erosion and scour possibilities, eliminating non-native invasive plant species, installing high quality native riparian species, and providing wildlife with improved cover, food, and reproductive opportunities.

In summary, the main goals of this MMP are to:

- Develop a watershed-based mitigation approach whereby largely contiguous areas within the same watershed are established, restored, and enhanced in order to improve the quality and success of the mitigation program;
- Mitigate for all temporary and permanent impacts related to the proposed construction activities.
- Increase functions and values provided by the existing drainage and associated riparian habitats.
- Maintain the 0.5-acre riparian habitat establishment area and the 5.74 acres revegetated with grass mix over a minimum of a 5-year monitoring period to ensure the vegetation becomes established to meet the required performance criteria and trends toward establishment of native vegetation common to the area. Maintenance strategies will include irrigation, weeding, and replanting as needed, per results of the monitoring plan.

1. INTRODUCTION

1.1 SANTA MARIA RIVER LOCATION AND PROJECT OVERVIEW

The Santa Maria River levee project was originally constructed in 1963 by the U.S. Army Corps of Engineers, Los Angeles District (Corps). Those levee improvements consisted of a levee system constructed with compacted fill embankments with riprap revetment. There are approximately 17 miles of existing levees along the left (south) bank, 5 miles of existing levees along the right (north) bank, and 1.8 miles of existing levees along Bradley Canyon. The Santa Maria River levee project provides flood protection to the Santa Maria Valley, which includes the entire city of Santa Maria.

In 1966, within three years of the original construction, during a moderate flood event, the levee was almost breached in two locations because flows along the meandering low flow channel impinged on the levee at a nearly perpendicular angle. While the levee revetment had been designed to handle 160,000 cubic feet per second (cfs) in bank to bank flow, the failure mode of directly impinging flows from the meandering low flow had not been addressed in the original project design. From 1966 to 1998, the design deficiency resulted in similar major damage to the levee, in spite of remedial construction efforts. The February 1998 flood caused damage so severe that a 600 foot-long breach actually did occur in the levee. Fortunately, the breach was in the levee on the opposite side from the City of Santa Maria and was downstream in an agricultural area. Therefore, the resulting flood damage was relatively minor.

In 2005, the Federal Emergency Management Agency (FEMA), responsible for administering the National Flood Insurance Program, requested the Corps to certify that the Santa Maria River Levee Project meets the Corps' criteria for levee systems identified in ER 1165-2-119. Based on hydraulic and geotechnical analysis and review of documented failures, the Corps was not able to certify that the levee system would contain the Standard Project Flood (SPF) and satisfy the legal requirements set forth in the Code of Federal Regulations, National Flood Insurance Program (1 October 2003 edition, Article 44, Section 65.10, Mapping of Areas Protected By Levee Systems). The assumptions that were part of the original project design did not completely identify the potential failure modes that impact this levee system. Although the original design accommodates flood flows at the SPF level of flood protection (160,000 cfs), it did not address the failure mode of directly impinging flows from the meandering low flow during moderate flood events. Over the last four decades, these impinging flows have resulted in one complete breach and several near breaches of the levee system. In the early 1980s, the Corps attempted to remedy this condition by designing and constructing an extensive system of groins and training fences located at points of probable impingement. However, these mitigation measures did not perform as expected, and the potential failure condition remains.

The 2009 Supplemental Design Deficiency Report (SDDR) described a design deficiency in the Santa Maria River levee that makes the levee vulnerable to breakage from impinging flows. The 2009 EA/MND analyzed impacts to environmental resources along the 6.5-mile-long levee, which is divided into Reaches 1, 2, and 3 (Figure 1). The extent of the project described in the 2009 EA/MND and 2009 SDDR began at the downstream end of Reach 1 (Blosser Road) and ended at the upstream end of Reach 3 (upstream of the confluence of Bradley Canyon channel). The repair of Reaches 1, 2, and 3 has been completed.

In 2011, the Corps performed a subsequent hydraulic analysis on the Santa Maria River levee system upstream of the Bradley Canyon confluence (SDDR Addendum 2011). The hydraulic analysis indicates that, despite the lack of historical evidence, the potential exists for impinging flows to act on the southern levee upstream of Bradley Canyon. This analysis included an examination of the topography of the Santa Maria riverbed which indicated that the upstream riverbed is susceptible to low flow meanders. Because the levee upstream of the Bradley Canyon confluence was constructed with the same design as the downstream levees, they are in danger of breaching due to the impinging low flows. The hydraulic analysis determined that, should a breach occur along the upstream Santa Maria River levee during a high flow event, flows proceeding through the breach would attack the Bradley Canyon Levee and possibly overwhelm the levee and cause it to fail. If the Bradley Canyon Levee failed, in this scenario, approximately 30,000 cfs could inundate the development downstream

The proposed Project is located in Bradley Canyon channel, north and south of Foxen Canyon Road (aka Betteravia Road) and west of Dominion Road, in the City of Santa Maria, County of Santa Barbara, California (Figure 1). The main objective of the proposed Project is to correct the deficiency and provide the SPF level of flood protection to the City of Santa Maria which would protect the lives and properties (homes and businesses) of individuals residing in the vicinity of the Project area.

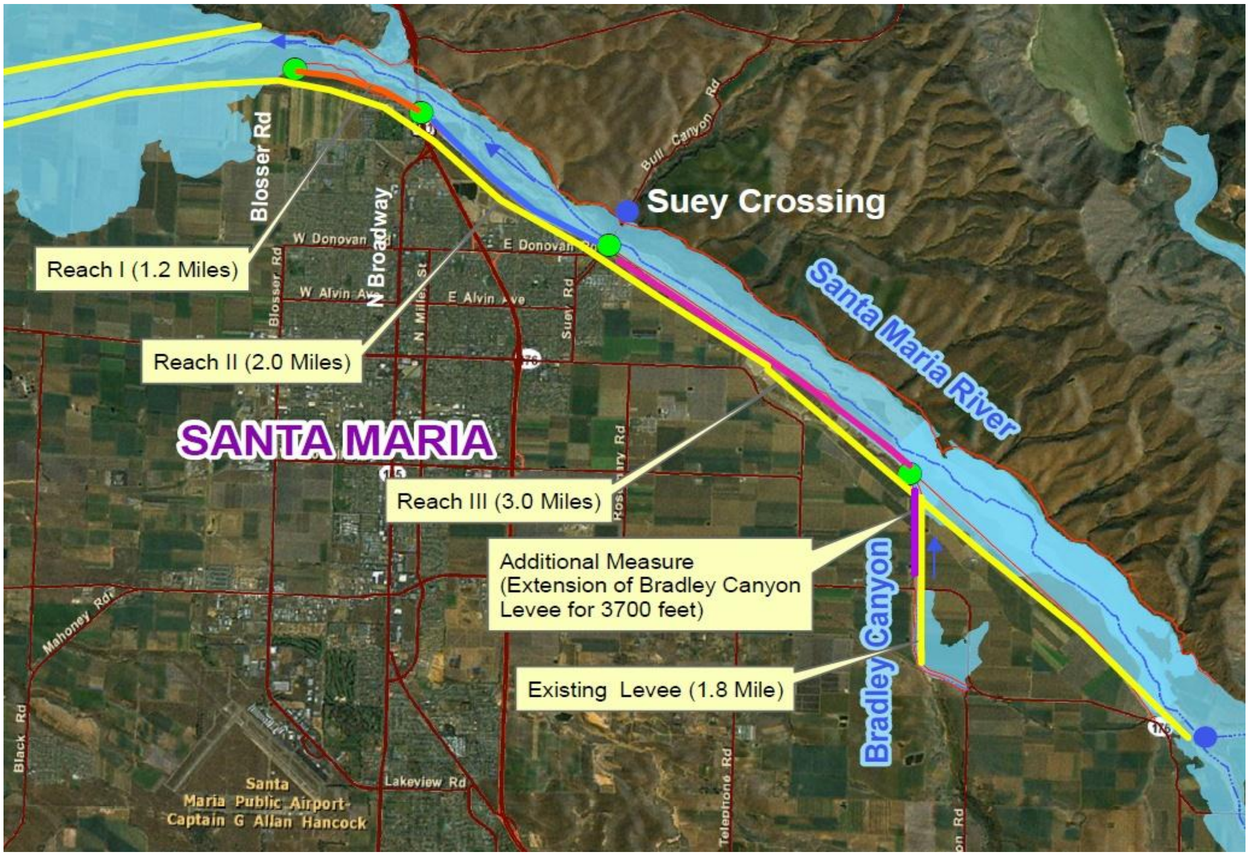

Figure 1: Project location of Reaches 1, 2, and 3 and the proposed Bradley Canyon Project

1.2 PROJECT DESCRIPTION

The proposed Project involves repairing 3,700 feet of the Bradley Canyon Levee. This consists of repairing the levee using a combination of sheet pile and soil cement. Approximately 1,000 feet of sheet pile would be installed in areas supporting riparian habitat and the remaining 2,700 feet would be repaired using soil cement. The ground-disturbing construction activities due to soil cement include clearing and grading for levee preparation, widening access roads, temporary diversion of Bradley Canyon channel. The construction processes for sheet pile and soil cement are provided in Section 2.2.2 of the Final SEA/MND.

SHEET PILE

An approximately 1,000-foot-long section of the levee would be repaired with sheet pile to avoid impacts to riparian habitat, and it would also reduce impacts to waters of the United States. The sheet piling consists of a series of panels with interlocking connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. The top of the levee would require minimal excavation to provide access to install the tiebacks and a concrete pile cap. No excavation is proposed within the channel.

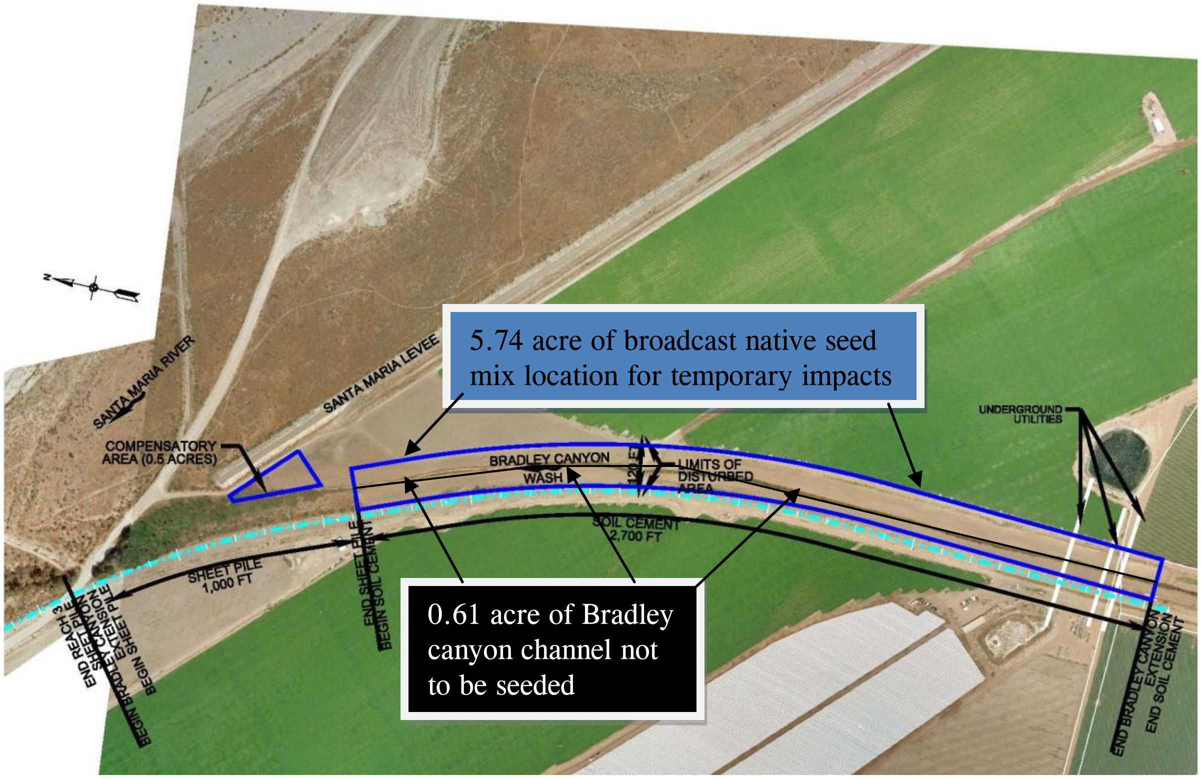

Figure 2: Proposed Restoration/ Mitigation locations for Temporary and Permanent Impacts

SOIL CEMENT

The upstream end of the sheet pile extension would transition into a soil cement revetment for approximately 2,700 feet along the inside face of the levee. The Corps would excavate 15 feet below the existing grade and would extend upward at 2H:1V slope along the inside face of the levee until the top of the revetment matches the top of the existing levee. The excavation would extend down 15 feet at a 2H:1V slope, extending laterally approximately 80 feet from the toe of the levee within a 120 foot wide temporary construction easement (TCE) corridor to protect against the estimated scour depth.

The proposed revetment would extend approximately seven feet below the existing riprap revetment. The existing riprap revetment would not be removed from the inside face of the levee prior to placement of the soil cement. The soil cement would be installed on top of the existing riprap. The batch plant would be located outside of the channel (Figure 3). The soil cement would be compacted in 1-foot-thick and a minimum of 8-foot-wide layers. This operation would be repeated until the soil cement reaches the top of the levee. Once the soil cement is installed, the excavation area would be backfilled with the earthen fill material that is not utilized for the mixing of the soil cement. Because the volume of soil cement below the surface of the ground would reduce the volume of back fill needed, the backfill would only be a few inches shallower than the original channel bed elevation. Soil cement is a densely compacted mixture of cementitious material, soil aggregate, and water. The mixture is compacted to form a hardened structure with specific engineering properties. Soil-cement is useful as a liner because the material has higher compressive strength and lower hydraulic conductivity than the non-cemented soil. The soil cement slope protection is economically attractive in Santa Maria because suitable rock is not available within economical haul distances.

Installation of soil cement would include the following main steps: (1) Temporary diversion of the low flow Bradley Canyon channel within the 2,700-foot-long soil cement construction project area by constructing a temporary diversion channel (Figure 5); (2) Clearing and grubbing vegetation within an area 120-feet wide by 2,700-feet-long within the soil cement section of the Project area; (3) Relocating a 12-inch diameter irrigation water line and two oil pipelines located within the 120 foot TCE; (4) Excavating approximately 90,000 cubic yards of material from the channel to construct the soil cement revetment. Approximately 36,000 cubic yards of imported borrow material would also be utilized in the soil cement mixture. After the soil cement revetment is constructed, approximately 80,000 cubic yards of fill material would be needed to backfill to original grade. It is anticipated that approximately 30,000 cubic yards of fill material would need to be imported from onsite, but outside of the channel; (5) Mixing soil/sand with concrete to create soil cement at the upland portable batch plant near the Project area; (6) Trucking soil cement from the portable batch plant to the construction area; (7) Benching the face of the exposed slope with soil cement; and (8) Backfilling soil/sand and restoring low flow channel.

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Figure 3: Proposed Batch Plant and Staging Area on the Upland Side of the Proposed Bradley Canyon Levee Extension Project

Figure 4 Proposed Mitigation location for permanent impacts

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Of Engineers
Los Angeles District

Figure 5 Habitat impacted and protected within proposed Bradley Canyon Levee Extension Project Footprint. The Temporary Construction Easement (TCE) is 120-feet from the toe of the Levee as marked on the figure.

Installation of the soil cement levee would result in 0.5 acre of permanent loss of habitat and 6.35 acres of temporary impacts to habitat due earth moving activities in the channel during construction. To compensate for the 0.5 acre of permanent impacts, approximately 0.5 acre of habitat would be established with native riparian habitat onsite adjacent to the existing riparian woodland at the Bradley Channel confluence (Figure 4). Temporary impacts to native and non-native plant communities (approximately 5.74 acres) would be restored by revegetating with a native grass seed-mix for erosion control in disturbed areas located outside of the SBCFCWCD routine maintenance area. The 0.61 acre of the active channel rerouted for construction would be returned to pre-construction contours and the original alignment as shown in Figure 2 above.

1.3 PROJECT CONTACT

This proposed Project is sponsored by the Corps. The Corps is the responsible party for implementing this MMP. The Corps' point of contact is:

Naeem Siddiqui
U.S. Army Corps of Engineers
Los Angeles District
Environmental Resources Branch
915 Wilshire Boulevard, 14th Floor
Los Angeles, CA 90017
213-452-3852

2. REGIONAL SETTING, PHYSICAL CONDITIONS, AND VEGETATION

2.1. CLIMATE

The Santa Maria Valley is located in the central coast region of northern Santa Barbara County, California. The climate is mild with average annual temperatures falling between 40 and 75 degrees Fahrenheit. Coastal fog during the summer months often modulates early summer temperatures and provides a degree of soil moisture. This semi-arid environment receives an average of 14-17 inches of rainfall per year with average precipitation higher in winter months (November through March) and low throughout the rest of the year. In 2007, the highest level of precipitation occurred in February (3.23 inches), while the lowest level of precipitation occurred in July (0.03 inch), with an annual total of 14.01 inches (DWR, 2008).

2.2 HYDROLOGY AND SOILS

Hydrology

The proposed levee repairs would occur on the Bradley Canyon Channel Levee, tributary to the Santa Maria River. Bradley Canyon Channel begins approximately 0.7 miles upstream of Betteravia Road (Foxen Canyon Road) and flows northward to the Santa Maria River, a total distance of approximately 2 miles. This drainage is confined by a Bradley Canyon Levee on the west side of the 100-foot wide channel. An established earthen low flow channel ranging from 5 to 10 feet wide flows down the middle of the drainage. Surface water, almost entirely attributed to agriculture run-off, ranges from three feet to only a few inches in depth. Downstream (north) of Betteravia Road, the area outside of the low flow channel is dry, occasionally disked, and predominantly bare soil with hemlock, wild radish, and other non- native species. The channel remains wetted throughout the year upstream of the Betteravia Road through the agricultural areas. Over the last 3-5 years, agriculture adjacent to Bradley Canyon Channel downstream of Betteravia Road, that would consistently deliver agriculture tailwater into the system, has changed from row crops that were flood irrigated to strawberries that are drip irrigated. As such, Bradley Canyon Channel has markedly less water overall and the lower portions of the channel (where the project is proposed) dry up during the summer months where it remained wetted in previous years.

Soils

The Project site is located within an area of alluvial deposits and artificial fill materials which compose the levee and adjacent Santa Maria landfill and agricultural fields. The soils on the Project site are designated as sandy alluvial land (along and adjacent to the levee). The floor of the Santa Maria Valley, including the lower reaches of tributaries such as the Bradley Canyon drainage, is an alluviated plain of the Cuyama and Sisquoc Rivers. These rivers flow into one another near Fulger Point forming the Santa Maria River. The surface geology of the site consists mainly of units of floodplain alluvium (Qa) and channel deposits (Qg) associated with the river. Various rocks and formational materials crop-out or are mapped along the bluff and hillsides along the north side of the river and valley floor. These units typically consist of relatively thin units of stabilized dune sand (Qds) or older alluvial or terrace deposits (Qoa or Qt) overlying formational materials of Orcutt Formation (Qo), Paso Robles Formation (QTp), Careaga Sand (Tc), Monterey Shale (Tm), Obispo Tuff (Tot), and Franciscan mélange (KJfm). Locally the units are displaced by landslide deposits (Qls) or by faulting. Artificial fill materials (af) compose the levee embankments and roadways in the site vicinity.

2.3 VEGETATION

The 1,000-foot section of the floodplain along the downstream end of the Bradley Canyon channel within the Project area is an approximately 2.75-acre area and has a well-defined secondary channel with multiple terraces. The Bradley Canyon channel terminates at the Santa Maria River via a PVC pipe culvert. This 1,000-foot reach supports riparian vegetation consisting of willow, mulefat and several other native plants, including scalebroom (*Lepidospartum squamatum*), rabbits foot grass (*Polypogon monspeliensis*), curly doc (*Rumex crispus*), nut sedge (*Cyperus eragrostis*), and algal mats (*Cara* sp.).

Denuded vegetation, barren substrate and agricultural fields occur within the 2,700-foot reach of the Project area. This reach is subject to high disturbance due to agricultural operations and SBCFCWCD routine maintenance activities. The levee forms a steep riprap slope along the southern edge of the channel. A detailed description of the vegetation communities located within the Project area is provided in Section 3.3.2 (Vegetation Communities) in the Final SEA/MND.

Vegetation communities within the Project area include:

Arroyo willow riparian scrub	Non-native grasslands
Central coast riparian scrub	Disturbed/ruderal non native vegetation
Mulefat scrub	Active agriculture
Coyote bush scrub	Active channel/Bradley Canyon

These plant communities were identified using aerial photographs and field surveys by Corps biologists in April 2010 and March 2011. Community definitions are derived from Holland (1986), Munz (1974), and Sawyer and Keeler-Wolfe (1995).

Arroyo Willow Riparian

In the Project area this community is characterized by dense, broad-leafed, winter-deciduous riparian thickets dominated by arroyo willow (*Salix lasiolepis*), and scattered cottonwoods with patches of sand bar willow (S. exigua) along the margins of the reach. This community is generally found in moist to saturated sandy or gravelly soil, especially on riparian bottomlands within low gradient stream reaches.

Riparian Scrub

This community is generally found along streams and rivers but may also occur in floodplain areas. Central coast riparian scrub communities vary from open to impenetrable and are dominated by any of several willow species. The vegetation on the bars and banks of river channels generally require seasonal flooding. This community typically consists of newly emerging willows including sand bar willow, arroyo willow, mulefat, and cottonwood. In addition, Mexican elderberry (*Sambucus mexicanus*) is also known to occur in this habitat type.

Mulefat Scrub

Mulefat scrub is an open dense scrub community dominated by mulefat, coyote brush, and white clover. In the project area summer mustard, annual grasses, and western ragweed are common. Other species include willows, isolated golden bush, and scale broom.

Coyote Bush Scrub

Coyote bush scrub is a woody scrub community dominated by coyote bush, and typically occurs as a pioneering community on loamy soils. Other elements to this community include California sagebrush (*Artemesia californica*), sticky monkeyflower (*Mimulus* sp.), poison oak (*Toxicodendron diversilobum*), and black sage (*Salvia melifera*). Coyote bush scrub communities are low (generally 3-6 feet tall) with an herbaceous understory. Both the density and the composition of the shrub cover vary from site to site as does the herbaceous understory.

Active Channel/river wash

The channel itself consists primarily of sands, small gravel and river cobbles with minimal vegetation (except for the 1,000 foot downstream end). This area may be subject to annual flooding and little established vegetation is present. Vegetation was generally absent to sparse and consisted of a mix of native and non-native species. White sweet clover, wild radish, tree tobacco, and fennel are locally dense in many areas.

Agriculture

Active agricultural fields are a main feature of the landscape in Santa Maria. There are several agricultural fields present within and adjacent to the Project area. The main crops grown in the area include strawberries, wine grapes, celery, lettuce, peas, squash, cauliflower, spinach, broccoli, and beans. Surrounding lands are also used for cattle ranching.

Non-Native Grassland

Non-native grassland communities consist of predominantly low-growing herbaceous and invasive vegetation that forms either a continuous ground cover on open hillsides and terraces or understory patches below emergent shrubs and woodlands. Many native flowering annual herb and perennial bulb species (wildflowers), as well as naturalized annual forbs and invasive exotics, are important components of grassland communities. Within the upper 2,700 feet of the Project area, this communitiy are dominated by brome and oat grasses (*Avena* sp.). Slender hair grass (*Deschampsia elongata*), veldt grass (*Ehrharta calycina*), barley (*Hordeum murinum*), and golden top (*Lamarckia aurea*) are other common elements.

Disturbed/Ruderal Habitat

Disturbed plant communities, also known as ruderal communities, are dominated by herbaceous, introduced, pioneering plant species that readily colonize open disturbed soil and thrive as a result of human impacts. The community is found along the 2,700 foot upstream end of the Project area. Ruderal communities may provide a certain degree of erosion control for recently disturbed or graded areas, but such communities are also a threat to the natural biodiversity of an area. Invasive species continually distribute highly competitive propagules into otherwise native vegetation; however, if ruderal grassland stands remain undisturbed for more than five years they can undergo succession towards more stable and less weedy plant communities, such as coastal or riparian scrub (Zedler et al., 1993). In the Project area, disturbed habitats support thick weedy mats of summer mustard, field mustard (*Brassica rapa*), wild radish (*Raphanus raphanistrum*), tocalote, and Russian thistle. Cheeseweed (*Malva parviflora*), Italian thistle (*Carduus pycnocephalus*) and white sweet clover are also locally dense in some locations.

2.4 SENSITIVE SPECIES AND HABITATS

Vegetation

Listed plant species were not identified within the Project area during surveys conducted in April 2010 and March 2011 by Corps biologists.

Wildlife

Special-status species include those listed as threatened or endangered under the federal or California Endangered Species Acts, species proposed for listing, species of special concern, and other species which have been identified by the USFWS, CDFG, or local jurisdictions as unique or rare and which have the potential to occur within the study area. A complete discussion of these species is presented in Section 3.0 of the SEA/MND. These species include:

- Tidewater goby (*Eucyclogobius newberryi*)
- Steelhead trout (*Oncorhynchus mykiss*)
- Arroyo toad (*Anaxyrus californicus*)
- California red-legged frog (*Rana draytonii*)
- Southwestern willow flycatcher (*Empidonax traillii extimus)*
- Least Bell's vireo (*Vireo bellii pusillus*)
- Western spadefoot toad (*Spea hammondii*)
- Burrowing owl (*Athene cunicularia*)

Jurisdictional Habitats

"Waters of the United States," as defined in 33 CFR 328.3, includes, but is not limited to, lakes, rivers, and perennial or intermittent streams. The geographic extent of Corps jurisdiction of "Waters of the United States" in non-tidal areas extends to the Ordinary High Water Mark (OHWM), in the absence of adjacent wetlands. A delineation of wetlands was conducted using the routine method as described in the *Regional Supplement to the Corps of Engineering Wetland Delineation Manual: Arid West Region, Version 2.0* (U.S. Army Corps of Engineers 2008). Topographic maps, aerial photos, and other available information sites were reviewed to better determine potential Corps jurisdictional areas within the Project area.

On April 29, 2010, Naeem Siddiqui (Project Biologist) and Crystal Huerta (Corps Regulatory Division Biologist) conducted field work to delineate waters of the U.S., including wetlands. Sample points were taken in order to determine wetland and upland boundaries and areas of potential jurisdiction and to note general hydrology characteristics such as channel width and characteristic morphology. Field indicators were examined and Wetland Determination Data Form-Arid West Region were completed to record the site number, latitude, longitude, Cowardin class, estimated aquatic resources, and class of aquatic resources and other parameters including hydrophytic vegetation, wetland hydrology, and hydric soils.

Data forms included the recordation of plant species and the presence or absence of indicators of wetland hydrology. Observed indicators for hydrology included surface water, saturation, high water table, surface soil cracks, sediment deposits, oxidized rhizospheres along living roots, and biotic crust. The location of the OHWM along the stream banks was based on the presence of physical evidence of an OHWM including presence of rack/debris and evidence of recent bank erosion. Based on the positive identification of hydrophytic vegetation, hydric soils, and wetland hydrology, a portion of the Project area was identified as a jurisdictional wetland. Data points with less than three indicators but with positive evidence of hydrology indicators and physical evidence of an OHWM were considered “Waters of the United States” under Corps jurisdiction. The Project area supports 7.4 acres of non-wetland waters of the United States and 2.75 acres of wetland waters of the United States.

2.5 HABITAT FUNCTIONS AND SERVICES

The hydrological, geological, and vegetation conditions described above are integral components of the functions and services provided by the Santa Maria riparian system. In general, wetland and riparian functions and services include groundwater recharge, floodwater storage and variability, dissipation of erosive forces, sediment trapping, nutrient retention and removal, wildlife habitat, and recreational values (Mitsch and Gosselink (2007). These functions and services serve as a conceptual basis for the goals of this MMP.

2.5.1 Dissipation of Erosive Forces and Sediment Trapping

Riparian vegetation and upland vegetation of adjacent floodplains stabilizes soil materials and sediments in a variety of ways. Root masses stabilize stream banks, bind and hold soil particles and minimize downstream erosion. Upland terrestrial vegetation reduces the erosive force of falling rain, and slows surface flow velocities of overbank floodwaters through friction and roughness, thereby reducing the erosive force of the water.

2.5.2 Nutrient and Pollutant Retention and Removal

Plant nutrients include a variety of chemical compounds occurring naturally in the soil and often added in quantity to agricultural lands. At high concentrations, plant nutrients may be toxic or may cause algae “blooms,” leading to oxygen depletion and high mortality among aquatic animals. In riparian systems, nutrients and pollutants originate from upstream watershed sources such as urban and agricultural runoff (pollutants and fertilizers) or natural landscapes (e.g. decomposing plant materials). They are carried to stream systems by surface sheet flows, groundwater seepage, storm drains, or drainage ditches. Trapping occurs when chemical nutrients or pollutants originating upstream are retained by existing vegetation and flat topography (by ponding and inundation). Once the chemicals are trapped in a local riparian system, the riparian vegetation can reduce their impacts to downstream water quality directly or indirectly (e.g., absorbing nutrients or reducing organic carbon compounds in the rooting zone (reviewed by Sohsalam et al. 2006; Mitsch and Gosselink 2007). Bradley Canyon is currently listed on the 2006 CWA Section 303(d) List of Water Quality Limited Segments Requiring Total Maximum Daily Loads (TMDL) for the following pollutants: nitrate, fecal coliform, and pesticides (ammonia, chlorpyrifos, name, Dichloro-Diphenyl-Trichloroethane (DDT), dieldrin, endrin). The overall ability of Bradley Canyon to trap additional nutrients and pollutants is low due to the existing water quality and limited vegetation in the Project area. These pollutants most likely originate from agricultural sources that commonly occur throughout the watershed. However, the slow flow rates and existing vegetation probably do serve to trap and absorb nutrients and pollutants, somewhat reducing their concentrations in downstream habitats.

The planting of native vegetation would serve to help in the overall water quality for the watershed. These native plants would help to absorb and/or filter out some of the toxic pollutants and elevated nutrient levels often found in watersheds of this nature. In some cases the native vegetation may actually thrive with some of the elevated nutrient levels often associated with agricultural and landscape runoff which is present in the Santa Maria River system.

2.5.3 Food Chain Support, Wildlife Habitat, and Wildlife Movement

Riparian and wetland habitats are highly productive ecosystems that also provide foraging, nesting, cover habitat; and drinking water source, for a variety of wildlife species that occur both within the riparian habitats and adjacent upland habitats. Many wildlife species are wholly dependent on riparian habitats throughout their life cycles, and may others use riparian habitats during only certain seasons or life history phases. For example, certain mammals require daily access to drinking water or cool shaded cover during summer but otherwise may live in upland habitats. Similarly numerous amphibians breed in aquatic habitats but spend most of their lives in uplands.

In an otherwise arid landscape, primary productivity in riparian habitats is high due to year-around soil moisture. High plant productivity leads to increased habitat structural diversity and increased food availability for herbivorous and (in turn) predatory animals (reviewed by Faber et al. 1989). Insect productivity is also high, among both aquatic and terrestrial species. Insect numbers are very high during warm months, and serve as a prey base for a diverse breeding bird fauna, including several special status birds. Habitat structure in riparian vegetation is also more diverse than in most regional uplands. The relatively diverse vertical habitat structure provides a greater diversity of nesting and feeding sites for birds. Similarly, mammal diversity can be greater in riparian communities due to high biological productivity, denning site availability, thermal cover, and water availability.

Development including farming and more urban uses along many sections of the Santa Maria River near the Project area limits wildlife access. However, relatively undisturbed areas are present to the north and east. The Santa Maria River watershed provides an important movement corridor between coastal and mountain systems.

Given the diversity of riparian habitat region-wide; the function of the Project area in wildlife movement; and the local importance due to encroaching land uses, the project area's ability to provide wildlife habitat values is high.

2.5.4 Recreation Use/Public Access

Wetland and riparian habitats are relatively unique in Southern California; the contrasting lines, forms, colors, and textures between riparian areas and adjacent upland areas are visually appealing. Wetlands and riparian areas also provide passive and active recreational opportunities such as sightseeing, fishing, and bird/wildlife watching. Public access to the Project area does not currently exist.

2.5.5 Site Access and Accessibility

The entire Project area is near established roads. Vehicle and equipment access for revegetation will be via those roads or, in some cases, temporary access roads built for project construction.

3. REVEGETATION OPPORTUNITIES AND CONSTRAINTS

Due to its location within the watershed, Bradley Canyon Channel is subject to periodic flooding. As such, the site is well-suited to support native riparian and scrub vegetation but also is at risk of destructive flooding. An additional challenge or constraint to successful revegetation in this portion of the Santa Maria River watershed results from surrounding land uses. The Project site is partially isolated from other native landscapes (due to presence of other levee structures and agriculture), which will introduce a variety of "edge effects" into the revegetation site. Many native plants and animals are largely unable to colonize isolated sites surrounded by agriculture or other unsuitable habitat. This is especially true of small mammals, reptiles and amphibians, which are generally unable to cross large expanses of intervening unsuitable habitat. By contrast, many birds are able to colonize isolated habitats patches. Similarly, many plants have seeds adapted for long-distance dispersal by wind or wildlife. Other plants with no special seed dispersal adaptations are unlikely to disperse to isolated sites, even where habitat is suitable.

The term "edge effect" describes effects of developed land uses on adjacent natural habitat areas (e.g., habitat adjacent to new development or in set-aside areas surrounded by development). Examples include habitat damage (e.g., digging) or predation by domestic or feral dogs and cats on native species; disturbances to vegetation and wildlife by recreational visitors, including especially trespass users who leave designated trails; noise and commercial lighting from surrounding traffic and businesses; or other land uses that disturb wildlife species and adversely affect their ability to successfully carry out various behaviors (e.g., nesting, breeding, foraging); altered hydrology caused by irrigation overspray, road runoff, or water diversions installed for erosion control; pollution from oversprayed or runoff landscaping chemicals (insecticides, herbicides, fertilizers); and introduction of invasive plants (including weeds and accidental introductions via escaped landscaping species) into native or restored habitat. Labor-intensive management may be needed to minimize adverse edge effects.

Conservation planners design "buffer areas" to separate managed sensitive species or habitat reserves from the indirect effects of adjacent land uses. Due to existing adjacent land uses, much of the Project area has only minimal buffer area available between the revegetation sites and the sources of edge effects.

The Project area offers opportunities to restore native riparian plant communities and other native grassland along the Bradley canyon channel after project construction throughout the remainder of the Project area. The restoration of this site would increase the functional value of the area and provide riparian habitat for a variety of native species.

3.1 PROJECT ALTERATIONS TO CHANNEL HYDROLOGY

Project implementation will result in the construction of a reinforced levee system and sheet piling. With the exception of the downstream 1,000 feet where sheet piling would occur, the new levee would extend further into the floodplain. The new levee is not expected to alter channel hydrology in either up or downstream reaches. The overall project design is to protect the city of Santa Maria from future floods by increasing the strength of the existing levee system.

The Project is not expected to alter surface hydrology or the availability of soil moisture. Subsequently the Project is not expected to alter plant habitat or affect the vegetation types the Project area is capable of supporting. For example, we anticipate that, after construction, some parts of the Project area now supporting exotic habitats will support more native plant communities.

3.2 FLOOD DAMAGE

The second principal constraint or threat to successful revegetation will be damage from future floods. By its nature, native riparian vegetation is subject to periodic flood damage. In unconstrained systems, it occurs in a mosaic pattern of forest, woodland, shrublands in various stages of development. These stages occur principally as a result of periodic flooding. During periods of intense rainfall it is likely that Bradley Canyon would convey flow at rates that would produce scour and deposit fine sediments. Depending on the rate of flow the resulting scour may damage the restoration site; however, as riparian vegetation is well adapted to seasonal inundation and periodic scour it is possible the flows would not result in extensive damage to the site. In some cases, it may be necessary to repair flood damage to revegetation sites. But even with periodic scouring floods, the Project area will be capable of supporting a mix of riparian vegetation types resembling those found in natural systems.

3.3 WEEDS

Invasive annual weeds are abundant throughout the region and will become established throughout the Project area, especially where soils have sufficient seasonal moisture availability without saturation. Successful revegetation will be dependent on weed control, at least until native vegetation cover becomes established. While weeds cannot be fully controlled and it is reasonable to assume a percentage of exotic species will occur in the restoration area. This MMP includes measures to minimize weed abundance and establishes quantitative criteria to evaluate performance.

3.4 IRRIGATION

Because of the seasonal nature of the channel, riparian mitigation areas will likely require temporary irrigation until native shrubs become established. Over-irrigation, however, is likely to cause increased weed cover and must be avoided. Annual grasslands can be irrigated as needed by installing and maintaining temporary irrigation systems. Once concern is that in areas of expected scour temporary irrigation systems may be impractical due to expected flood damage (flooding will likely damage pipes, bury them beneath silt, or obstruct drip systems with silt). Depending on the flow this may necessitate periodic repairs. However, if supplemental irrigation is required it may be possible to place the irrigation system in areas less prone to inundation.

4. PROJECT IMPACTS

4.1 IMPACTS TO HABITAT

Implementation of the proposed Project would result in both temporary and permanent impacts to various habitat types within the Bradley Canyon Channel. Table 1 Vegetation, Habitat and Other Non-Habitat Elements provides detail to the specific habitat or non-habitat element including access roads, the existing levee, and disturbed areas that would be subject to both temporary and permanent disturbance.

Table 1 Vegetation, Habitat and Other Non Habitat Elements Proposed Action

Community Type/Non Habitat Element	Temporary Habitat * Disturbance In acres		Permanent Habitat ** Disturbance in acres		Total Habitat*** Disturbance Combined
	Within Levee	Outside Levee	Within Levee	Outside Levee	
Native Plant Communities					
Arroyo Willow Riparian	0.10	0.00	0.00	0.00	0.10
Riparian Scrub	0.13	0.00	0.00	0.00	0.13
Mulefat Scrub	0.001	0.00	0.00	0.00	0.001
Coyote Bush Scrub	0.01	0.00	0.00	0.00	0.01
Central Coast Scrub	0.003	0.00	0.00	0.00	0.003
Subtotal	0.24	0.00	0.00	0.00	0.24
Non-Native Plant Communities/Other Habitat Types					
Non-native Grassland	1.00	1.00	0.20	0.00	2.20
Ruderal	1.00	1.00	0.10	0.00	2.10
Barren	1.50	2.00	0.20	0.00	3.70
Agricultural/Disked	2.00	0.00	0.00	0.00	2.00
Subtotal	5.50	4.00	0.50	0.00	10.00
Total Habitat	**5.74**	**4.00**	**0.50**	**0.00**	**10.24**

*Temporary disturbance includes areas 112 feet from the permanent disturbance zone for the 3,700-foot reach less 1,000 feet where sheet pile would be installed. Disturbance also includes areas where batch plants would be placed outside of the levee during construction. "Outside of Levee" is an area out of waters of the United States where the staging area and batch plant will be located.

Community Type/Non Habitat Element	Temporary Habitat * Disturbance In acres		Permanent Habitat ** Disturbance in acres		Total Habitat*** Disturbance Combined
	Within Levee	Outside Levee	Within Levee	Outside Levee	
**Permanent Disturbance includes areas 8 to 10 feet from the toe of the levee for 3,700-foot reach less 1,000 feet where sheet pile would be installed. Permanent disturbance would result from an expanded levee footprint.					
***Total Habitat includes all areas both within and outside the levee where construction activities would occur. Within the levee this includes an area 120 feet from the toe of the levee for 3,700 feet less 1,000 feet where sheet pile would be installed. Areas outside the levee include temporary storage areas, staging areas, spoil storage, and batch plant sites. "Outside of Levee" is an area out of waters of the United States where the staging area and batch plant will be located.					

In total, the proposed Project would temporarily disturb 6.35 of habitat (0.24 acre to native habitat, 5.50 acres to non-native habitat and 0.61 acre to Bradley Canyon Channel) and 0.50 acre of habitat would be permanently removed. Affected communities include highly disturbed naturally-occurring vegetation, good quality native scrub and riparian habitats, and sites planted by the Santa Barbara County Flood Control District (SBCFCD) for flood control. In areas where sheet piling would be installed, impacts to vegetation would not occur. This includes riparian vegetation communities that occur in the lower 1,000 feet of the Project area.

Existing Habitat Quality

Many scrub and riparian communities within the Project area have been subject to colonization by exotic plants. In many areas this consists of dense carpets of weedy annuals and perennials including brome grasses, summer mustard, and tocolote. These species can inhibit the recruitment of native plants and compete for soil moisture and nutrients. Generally, plant communities containing a high percentage of exotic plants provide lower functional value for native plant and wildlife species.

While soil cement would not allow for revegetation of the levee slope, the Corps intends to restore and enhance disturbed vegetation communities in the Project area. In addition, some of the best quality riparian habitat present in the Project area would be avoided and not be removed in areas subject to sheet pile construction.

Installation of the soil cement levee would result in 0.5 acre of permanent loss of habitat and 6.35 acres of temporary impacts due to earth moving activities in the channel during construction. To compensate for the 0.5-acre of permanent impacts, approximately 0.5 acre of habitat would be established with native riparian habitat onsite adjacent to the existing riparian woodland at the Bradley Channel confluence. Temporary impacts to native and non-native plant communities (approximately 5.74 acres) would be restored by revegetating with a native grass seed-mix for erosion control in disturbed areas located outside of the SBCFCWCD routine maintenance area. The 0.61 acre of the active channel rerouted for construction would be returned to pre-construction contours and the original alignment.

4.2. MITIGATION PLAN GOALS AND OBJECTIVES

The following objectives have been defined by the Corps for this MMP. Specific objectives and quantitative performance criteria (Section 5) were developed from these goals.

- GOAL 1: Comply with all mitigation measures as stated in SEA/MND and performance criteria outlined in this MMP.
- GOAL 2: Fully mitigate project construction-related temporary and permanent impacts.

  OBJECTIVE 2.1: Select and establish native riparian vegetation within the identified mitigation area where compatible with Project requirements for flood control or site management.

  OBJECTIVE 2.2: Preferentially select and establish native riparian vegetation within the 0.5-acre establishment area (the area shall not be mowed, cleared, or otherwise maintained for flood control purposes).

OBJECTIVE 2.3: Select and establish native grasslands throughout the 5.74 acres of temporarily disturbed habitat at the Project siteoutside of areas subject to routine maintenance by Santa Barbara County at shown in figure 2.

- GOAL 3: To the extent practicable, increase or replace the functional values of the riverine system and maximize habitat value within the project area by replicating natural vegetation and habitat and increasing structural diversity.

  OBJECTIVE 3.1: Establish native riparian trees and shrubs within the proposed establishment area to create a habitat mosaic similar to that found in comparable local stream systems; provide riparian habitat in contiguous patches throughout the proposed mitigation.

- GOAL 4: To establish vegetation suitable to site conditions so that it can become self-sustaining over the long term, in the absence of manipulation, irrigation, or maintenance at the close of the monitoring period.

  OBJECTIVE 4.1: To plant species mixes suited to long-term future site conditions.

  OBJECTIVE 4.2 To maintain the revegetation area over a 5-year minimum monitoring period to ensure that vegetation becomes established as planned and trends toward establishment of native vegetation common to the area. Maintenance strategies will include irrigation, weeding, and replanting as needed, per results of monitoring .

  OBJECTIVE 4.3: To monitor each revegetated area over a minimum 5-year period to document (1) completion of revegetation plan elements (site preparation, seeding, maintenance, etc.) as they occur; (2) progress of vegetation establishment in revegetated areas; (3) need for weeding or other maintenance or remediation, and (4) achievement of quantitative performance criteria (Section 5, below).

  OBJECTIVE 4.4: Native vegetation to be planted and established through this plan should become self-sustaining over the course of the monitoring period.

4.2.1 Avoidance and Minimization Measures (GOAL 1)

The following is a list of avoidance and minimization measures established for the Project. Some of the measures in this list are not directly applicable to temporarily impacted areas, but are included because they provide relevant information for establishing performance criteria.

Measures from the Final SEA/MND for the Santa Maria Levee Project, Bradley Canyon Levee Extension (2011)

BR-1 Prior to site disturbance, the Corps' contractor shall clearly delineate the limits of construction on project plans with the coordination of the Corps biologist. All new construction, site disturbance, and vegetation removal shall be located within the delineated construction boundaries. The storage of equipment and materials and temporary stockpiling of soil shall be located within designated staging areas only. The limits of construction shall be delineated in the field with temporary construction fencing, staking, or flagging.

BR-2 Prior to initial ground disturbance or removal of any riparian vegetation with the project area, a USFWS-approved biologist shall survey the construction site and adjacent areas to determine if any sensitive plants, fish, or wildlife species are present. If the species are present, the Corps shall modify construction activities to avoid removal or substantial disturbance to the key habitat areas or features where possible. Avoidance and minimization measures shall be described in a pre-construction briefing report for the construction contractor. All terms and conditions included in the biological opinion rendered by the USFWS shall be followed prior to and during construction.

BR-3 Prior to initiation of construction activities, a USFWS-approved biologist shall conduct pre-construction environmental training for all construction crew members. The training shall focus on required mitigation measures and a summary of sensitive species and habitats potentially present within and adjacent to the Project area.

BR-4 The construction contractor shall clear vegetation associated with project construction only during periods when migratory birds are not nesting and California red-legged frogs (CRLF) are not breeding (15 September through 30 November). The Corps contractor shall limit grading and excavation activities within the channel to the dry season (April 1 to November 30).

BR-5 Construction activities shall be monitored by a USFWS- approved biologist during the initial ground disturbing activities, including vegetation clearance and water diversion. Thereafter, a designated biological monitor shall be onsite throughout project implementation to ensure CRLFs are not killed or injured as described in the USFWS's biological opinion. The designated biological monitor shall have completed the species specific training specified in BR-3.

BR-6 The Corps shall restore disturbed areas (temporary and permanent) as restoration/compensation for impacts to native and non-native vegetation communities. The Corps shall prepare a Habitat Restoration and Revegetation Plan for the project. Plans for restoration, enhancement/revegetation and/or establishment shall include at a minimum: (a) the location of the restoration site; (b) the plant species to be used; (c) a schematic depicting the restoration area; (d) time of year that the planting will occur; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation onsite; (g) performance criteria; (h) detailed monitoring and maintenance program; (i) adaptive management measures; (j) long-term management plan; and (k) site protection. Restoration shall include the revegetation of stripped or exposed work areas. Permanent impacts will be mitigated onsite through the establishment of riparian habitat in compliance with the Corps' Mitigation Rule at 33 CFR Part 332 and as described in the Habitat Restoration and Revegetation Plan.

BR-7 Upon completion of construction, the Bradley Canyon low flow channel shall be returned to its pre-construction location and contours.

BR-8 The Corps shall ensure that all vehicles and large equipment utilized on the Project have been washed prior to commencing work on the Project. This includes wheels, undercarriages, bumpers, and all parts of the vehicle. The Corps' contractor shall keep a written log documenting that vehicles have been cleaned prior to use on the Project site. Once equipment and vehicles have been staged on the job site no further washing would be required unless the vehicles or equipment are moved offsite and then returned.

BR-9 Before project activities begin, the USFWS-approved biologist must identify appropriate areas to receive relocated CRLFs . These areas must be in proximity to the capture site, support suitable vegetation, and be free of exotic predatory species (e.g., bullfrogs) to the best of the USFWS-approved biologist' knowledge. The USFWS- approved biologist must be allowed sufficient time to move CRLFs from the site before work activities begin. When capturing and relocating CRLFs from work sites, the USFWS-approved biologist must minimize the amount of time that the animals are held in captivity. During this time, they must be maintained in a manner that does not expose them to temperatures or any other environmental conditions that could cause injury or undue stress. CRLFs must be captured by hand or dipnet and transported in buckets separate from other species. The USFWS-approved biologist is to maintain detailed records of any individuals that are moved (e.g. size, discoloration, any distinguishing features, digital photographs) to assist him or her in determining whether translocated animals are returning to the original points of capture.

BR-10 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to prevent CRLFs from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

BR-11 Water will not be impounded in a manner that may attract CRLFs within the construction site. A USFWS-approved biologist shall ensure that the spread or introduction of invasive exotic species such as bullfrogs, crayfish, and centrarchid fishes are avoided to the maximum extent possible during construction.

BR-12 Field personnel will be trained to recognize and avoid CRLF and the field personnel shall alert the USFWS-approved biologist or designated biological monitor if a CRLF is found in the project area.

BR-13 A qualified Corps biologist shall be present at the work site at all times during project construction or other habitat disturbance.

BR-14 As identified in the amended Clean Water Act section 401 Water Quality Certification issued by the Regional Water Quality Control Board, the contractor shall implement best management practices for erosion control during and after project implementation (e.g., silt fences, settling basins, and/ or other sediment traps will be temporarily used).

BR-15 During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas (e.g., trash left during or after project activities may result in an increased number of predators, such as raccoons (*Procyon lotor*) or opossums (*Didelphis virginiana*), that may injure or kill CRLFs).

BR-16 All steep-walled holes or trenches that may act to trap CRLFs must be covered at the end of each work day, or a wildlife escape ramp must be installed so that any CRLFs that become trapped have the opportunity to escape;

BR-17 No pets will be allowed on the construction site.

BR-18 The USFWS-approved biologist(s) or designated biological monitor must conduct routine surveys of work areas, including each morning before construction activities resume, to ensure CRLFs have not moved back into a work area overnight. If the species is discovered in a work area and is at risk of harm from project related activities, the Corps will suspend work on that particular phase of the project until the animal voluntarily leaves the area or until a USFWS-approved biologist is available to capture and relocate the individual.

BR-19 The USFWS-approved biologist and designated biological monitor, in full coordination with the Corps, will be a liaison between resource agencies and construction staff regarding compliance with the USFWS's biological opinion.

BR-20 Construction activities must be halted when a rain event of 1/2 inch or more is forecast within 48 hours as predicted by the National Weather Service. After a rain event, the USFWS-approved biologist must conduct a pre-construction survey for CRLFs dispersing through the project site. Construction must resume only after the site has sufficiently dried and the USFWS-approved biologist determine that CRLFs are unlikely to be dispersing through the project site.

WR-2 Soil and sand excavation and construction within the Bradley Canyon channel shall not occur during the rainy season and California red-legged frog breeding season (November 30 through March 31) or when flowing and/or ponded water is present and shall not occur prior to a predicted significant rain event. If surface water is present it shall be diverted around the work area prior to ground disturbance in the presence of a USFWS-approved biologist. If groundwater resources are encountered during excavation activities required during construction, the affected area will be dewatered to avoid groundwater contamination.

WR-7 A pre-construction biological survey shall be conducted by a USFWS-approved biologist for facilities with potential habitat for native aquatic species prior to initiation of the water diversion and any construction work.

4.3 TYPES OF HABITATS TO BE REVEGETATED (GOAL 2)

Approximately 5.74 acres of habitat would be subject to temporary disturbance and approximately 0.50 acre of vegetation would be permanently removed. Of that, 0.244 acre is native scrub or riparian plant communities. Riparian vegetation will be replaced to the maximum extent feasible. Performance criteria (Section 5 below) for the specified plant species in the 0.5-acre establishment area will provide cover required for foraging for wildlife species typical of the channel.

This MMP describes planting and seeding specifications for the following habitat types:

1. Riparian scrub: The 0.5-acre establishment area mitigating for permanent impacts will be planted with a variety of woody and herbaceous riparian species. Riparian scrub establishment will be considered successful when revegetation sites develop characteristics of native local riparian areas. In the absence of scouring floods, some of these areas may develop woodland structure (i.e., shrubby willows maturing to small trees) over the course of several years. Periodic flooding and channel meandering will prevent woodland development in scoured or eroded areas. Ecological succession should lead to replacement of shrublands in those areas by natural processes.
2. Native Grassland: Temporarily impacted areas totaling 5.74 acres, outside of the 0.5 acre establishment area and outside of Santa Barbara County maintenance areas, will be planted with local native annual/perennial grass seed mix.

Descriptive data of natural vegetation will be collected within or near the project area to determine structure and species composition of local riparian woodland and riparian scrub. Specific data to be collected and analyzed are described in Monitoring (Section 9, below). Performance criteria (Section 5, below) are stated in terms of baseline vegetation structure and composition data. The performance criteria are intended to document and ensure that revegetated sites achieve an acceptable level of structure and species composition during the monitoring phase of this Plan to so that further growth and development will follow a trend toward native vegetation communities common to the area.

During the 5-year monitoring period, riparian vegetation should reach structure and composition comparable to undisturbed vegetation in the general area. Habitat structure and stratification will not reach natural conditions of riparian woodlands during the 5-year monitoring period, but riparian shrublands should show a trend toward developing those conditions.

4.4 HABITAT FUNCTIONS AND SERVICES (GOAL 3)

Goal 3 of this MMP is to restore the diversity of riparian habitat types in terms of their functions and services to wildlife. This goal is intended to reflect ecological function, as intended by Ewel (1987), where he noted that biotic interactions are an important characteristic of successful revegetation. This goal is served, in large part, by replicating natural vegetation and habitat and increasing structural diversity, as described in Section 6.2. In addition, Goal 3 is served by the locations and diversity of the revegetated areas and their protection from human disturbances (e.g., by screening and buffer areas between the riparian corridor and surrounding land uses).

The the 0.5-acre establishment area should provide suitable habitat for a diverse range of wildlife species typical of riparian habitats within the area. Suitable habitat includes opportunities for nesting, sheltering, foraging, etc., by providing diversity in plant species composition and age and size structure, site topography, surface and soil hydrological features, layers of plant detritus or leaf litter, etc. No wildlife goals are specified in the environmental documents that are applicable to the Project area; however, the species listed in Section 8 below shall be used as indicators of success. Their occurrence within revegetation areas are included in project performance criteria and revegetation monitoring includes wildlife surveys to evaluate wildlife use of the area.

One goal of the restoration is to replace some of the existing vegetation that currently exhibits reduced functional capacity with habitat of higher quality. While it is recognized that temporary disturbance of the Project area will remove functional use of the area during construction, a large portion of Bradley Canyon Channel is compromised.

4.5 HABITAT MAINTENANCE AND ESTABLISHMENT (GOAL 4)

Each revegetation area is to be monitored and maintained over a minimum 5-year monitoring period. During this period, herbaceous and shrub vegetation should approach structure and function comparable to similar undisturbed habitats in the area. Woodland vegetation is not expected to attain height, vertical structure, or microhabitat diversity of undisturbed woodlands over the monitoring period. However, revegetated woodland areas should trend toward native woodland habitats.

Invasive plants will be removed by various treatments. Eradication efforts will continue throughout the monitoring period. The simultaneous establishment and increasing coverage of native plant species during the establishment period should facilitate a decrease in weed establishment and coverage without further maintenance.

Irrigation systems will be installed for the establishment area, if necessary, and for irrigation to areas temporarily disturbed by construction (See Figure 2) and used to supplement natural rainfall during the establishment period within the proposed mitigation area. Irrigation systems may not be installed at riparian sites where natural hydrology should support vegetation establishment. In any revegetated area where irrigation is used, performance criteria will require that revegetation areas must be without irrigation for a minimum of three years prior to sign-off.

Sustainability and resistance to invasion are two of the characteristics Ewel recommended as indicators of ecological function in revegetation projects. Once vegetation is established, it should become self-sustaining (in the absence of further disturbance) and characteristic species should persist and reproduce.

5. PERFORMANCE CRITERIA

Mitigation goals and objectives are described in Section 4 (above). The following performance criteria were developed as objective measures to track and verify revegetation success in terms of these goals. Revegetation sites will be considered "complete" upon meeting all of the performance criteria. The Implementation Plan (Section 9, below) is designed to achieve these performance criteria, and the Monitoring Plan (Section 10, below) is designed to determine objectively whether each revegetation site meets the criteria.

Performance criteria for the seed mix, container and cuttings are defined in Table 2.

Table 2. Performance Criteria

Type of Vegetation	Criteria	Alternative Actions
Seeded Species	75% cover after one year, 100% survival thereafter for a minimum of 5 years and/or attain 75% cover after 3 years and 75% cover after 5 years for the life of the project.*	Determine cause of failure; reseed where necessary.
Live Cuttings/Container Plants	75% cover after one year, 100% survival thereafter for a minimum of 5 years and/or attain 75% cover after 3 years and 75% cover after 5 years for the life of the project.*	Determine cause of failure and replant.
*No single species shall constitute more than 50% of the vegetative cover, no more than 5% woody invasive species shall be present, and herbaceous invasive species shall not exceed 5% cover.		

5.1 PLAN COMPLIANCE

Revegetation implementation will conform to the site-specific plan (Site Plan) to be prepared by a qualified biologist/landscape architect upon completion of construction. The revegetation contractor will implement revegetation as shown on the Site Plan, and as described in this MMP. Compliance will be documented in writing, in a monitoring report to be prepared by the biological monitor and maintained in duplicate by the Corps, the revegetation contractor, and the biological monitor. Deviations (if any) from the Site Plan, and as described in this MMP, must be approved in writing by the Corps and maintained in those files. Initial revegetation implementation will be judged successful if (1) there is no deviation from the Site Plan, as documented in the monitoring report; (2) any deviation has been corrected and documented in addenda to the monitoring report; or (3) any deviation has been approved by the Corps and documented in an attachment to the monitoring report.

5.2 VEGETATION STRUCTURE AND COMPOSITION

1. Regardless of the date of initial planting or seeding, any given site must have been without active manipulation by irrigation, planting, or seeding for a minimum of three years prior to evaluation for successful completion.
2. Native shrub and tree cover will be at least 75% of pre-disturbance cover in reference data..
3. Native tree and shrub species richness will average at least 50% the native tree and shrub species richness in pre-disturbance cover in reference sites..
4. Sapling tree density (i.e., trees/acre) will reach at least 75% of overstory tree density in undisturbed reference vegetation.

5.3 WILDLIFE HABITAT FUNCTIONS AND SERVICES

Within five years following implementation of revegetation, a variety of characteristic local upland and riparian wildlife species are anticipated to occupy the revegetated areas, such as

Amphibians
Pacific tree frog (*Hyla regilla*)
western toad (*Bufo boreas*)

Reptiles
fence lizard (*Sceloporus occidentalis*)
common kingsnake (*Lampropeltis getulus*)

Birds
song sparrow (*Melospiza melodia*)
yellow-breasted chat (*Icteria virens*)

Mammals
coyote (*Canis latrans*)
striped skunk (*Mephitis mephitis*)
raccoon (*Procyon lotor*)

5.4 ESTABLISHMENT AND SUSTAINABILITY

1. Seedling or sapling native plants *other than those planted* or those documented during the first year following implementation, will be found in numbers or densities reaching 50% their numbers or densities in reference vegetation data.
2. Non-native species cover will be no more than 20% absolute cover and annual monitoring data will show a downward trend documented by a declining regression coefficient.
3. Large exotics such as gum, castor bean, and tree tobacco and any species listed on California Dept. of Agriculture's list of noxious weeds will not be present on the revegetation site as of the date of approval.

6. IMPLEMENTATION PLAN

6.1 OVERVIEW OF RESTORATION IMPLEMENTATION

Prior to beginning of construction, the biological monitor will estimate acreages of each habitat type to be replanted and will contract with seed suppliers, nurseries, and other suppliers as needed to ensure availability of needed materials when revegetation begins. At the completion of construction, the landscape architect and the biological monitor will review Site Plans and ensure that conditions present in the field are likely to support the proposed restoration and establishment activities. Large scale scour events may have altered the existing conditions and minor adjustments to the MMP may be required.

Table 3. Schedule of Restoration and Establishment Tasks and Activities for Project

Task	Start/ End Dates	Responsibility	Frequency	Task	Reporting
Before/ During construction					
1		Reveg. contractor	annual	Review availability of seed & containers; collect or purchase seed for revegetation and inventory as needed & available	Letter to file
		Construction contractor in consultation w/ Reveg. contractor	Throughout	Protect extant native vegetation	Letter & photos to file
		Construction contractor	As needed	Fill soil handling at borrow and construction sites	Letter & photos to file
		Construction contractor in consultation w/ Reveg. contractor	Once, at start of construction	Seed stockpiles for erosion control and to maintain biological activity (if determined to be appropriate by the qualified biologist)	Letter & photos to file
Installation / Implementation at completion of construction					
	yr. 1	Construction contractor in consultation w/ Reveg. contractor	once	Final contouring, deep ripping as needed, remove debris, certify site as contaminent free, replace topsoil as applicable	As-built plan w/ photos to file
	Yr 1	Reveg. contractor	Once	Install irrigation systems for establishment area and areas subject to temporary disturbance.	Letter & photos to file
		Reveg. contractor	Once	seed & mycorrhizae application; container planting; live-staking	Letter & photos to file
	Yr. 1	Biol. monitor	Once	Compliance monitoring	Report to Corps, Reveg. Contractor, and Biol. Monitoring, to incorporate all letters/memos above
	Yr 1	Reveg. contractor in consul. w./ Biol. Monitor	Once or as needed for completion	Remediation as needed to meet recommendations of compliance monitoring report	Report addenda
	Yr. 1	Reveg. contractor in consul. w./ Corps and Biol. monitor	Once	Prepare as-built map of revegetation site, indicating all seeding and planting treatments and indicating intended future conditions (riparian,)	Map to Corps, Reveg. Contractor, and Biol. Monitoring
Maintenance & Monitoring					
	See below	Reveg. contractor in consul. w./ Biol. monitor		Irrigation, weeding, maintenance or remediation as needed (per maintenance & remediation specs. below)	Letter to file
		Reveg. contractor in consul. w./ Biol. monitor	Once	Cessation of irrigation (date to be determined)	Letter to file

Task	Start/ End Dates	Responsibility	Frequency	Task	Reporting
	See below	Biol. monitor	annual	Qualitative and quantitative monitoring (per monitoring plan, below)	Monitoring report w/ photos to Corps, Reveg. contractor & Biol. Monitor
	As needed	Reveg. contractor in consul. w./ Biol. monitor	as needed for completion	Maintenance and remediation as needed to meet Biol. Monitor's recommendations	Report addenda

6.2 REVEGETATION SPECIFICATIONS

Prior to revegetation, the sites will be graded to establish the natural contours that occurred prior to construction. In certain situations grading and/or hydrology may be altered to facilitate specialized planting. On the completion of construction activities, the revegetation contractor and the Corps (or its representative) will review the site and as-built construction drawings. By this date, no construction debris will remain on the site. Site preparation, planting schedules, and other treatments will be based on the following specifications.

Protection for Extant Vegetation: Established native plants within revegetation sites can provide seed sources, bird perches, and other natural functions to accelerate revegetation. Wherever remnant patches of native vegetation occur post-construction within areas to be revegetated, or if native shrubs have volunteered onto revegetation sites, these plants will be protected as feasible. If they occur where heavy equipment will be operating, then the plants and buffer areas surrounding them will be delineated with brightly colored barriers (e.g., orange plastic mesh construction fencing) to prevent equipment damage. It should be the goal of the contractor to remove as little existing vegetation as possible prior to the revegetation, especially any established trees except any within the vegetation free zone. No trees have been identified within the vegetation free zone.

6.3 SITE PREPARATION INCLUDING SOIL AND IRRIGATION PREPARATION

Erosion Control: Upon completion of Project construction and prior to revegetation, the site will likely be vulnerable to erosion. To prevent the transport of sediment-laden water off the Project site, the contractor will implement an erosion control plan during all phases of construction. Jute netting, mulch, hay or wattles, silt fencing, seeding, or other erosion control measures may be employed to decrease sheet flows, furrowing, or gullying. Only sterile certified weed free hay bales or hay wattles may be used. If the contractor elects to hydroseed the area, the seed mix will be reviewed in advance by the Revegetation Contractor to ensure that it will be compatible with follow-up revegetation work. Preferably, the Construction Contractor will use the native species and stabilized fiber matrix identified in Table 6.

CLEARING DEAD BIOMASS. If dead biomass (e.g., cleared riparian vegetation) remains on the revegetation site at the completion of construction activites, the material should be removed with minimal soil disturbance. For best results, hand raking and disposal of this material at an appropriate off-site location should be completed prior to seeding. Where possible this material will be salvaged and returned to the site.

6.4 SOIL TREATMENT

To the extent feasible, any suitable topsoil will be salvaged on the construction site and used for revegetation. Where no topsoil is available, final surface contours will be formed of soil and subsoil from the construction site.

Ripping/Decompaction. Although the area is characterized by sandy soils some of the restoration areas may have become compacted due to construction activities, especially in areas used for equipment access or staging, or may have already been compacted prior to construction. Deep ripping (i.e., using a tractor to pull tines through the compacted soil to a minimum of 15 inches depth) shall be conducted prior to seeding to allow good soil and seed contact. The Site-specific Revegetation Plan shall identify all areas where soil ripping or decompaction is necessary.

Fill. No fill material from offsite sources is planned for inclusion in Project construction. But if fill material is required for the Project, then the Corps will certify that it is free of contaminants that could affect revegetation or habitat. Due to the likelihood that fill material will contain weed seed, it should be deposited at depth in the construction area and covered by at least 10 inches of native soil or subsoil so that any seed is buried deeply enough to inhibit germination. If construction logistics do not permit deep burial of off-site fill, then it should be treated by repeated watering and weed control to minimize abundance of invasive species.

Fertilizers: No fertilizers will be used in the Project area. In general, native plants have very low nutrient requirements and fertilizer application in restoration projects tends to encourage invasive weeds at the expense of native plant establishment. Moreover, fertilizers would tend to increase chemical runoff from the Project site into the channel further degrading downstream water quality.

Irrigation: Temporary irrigation systems will be installed in all revegetation areas. The Revegetation Contractor will select and recommend a system design (e.g., overhead sprinklers or drip system) based on site needs. Upon agreement by the Corps and the Biological Monitor, the system will be installed. In general, drip systems would be most effective for large container stock. Overhead sprinklers would generally be most appropriate for areas planted by seeding or with larger numbers of small nursery container stock, or "live staking." The irrigation system will be removed upon establishment of the revegetated habitat (upon agreement by the Corps, Revegetation Contractor, and Biological Monitor). In general, irrigation will be intended to provide water as needed for plant establishment but no more than needed. Over-irrigated plants tend to develop more surface roots and fewer of the deeper roots needed to reach natural soil moisture during dry seasons. Over-irrigation also tends to favor invasive weeds to the detriment of native species. The revegetation effort is intended to establish self-sustaining habitats throughout the project area. Note that success criteria (above) require that each revegetated site may not be irrigated for a minimum three-year period prior to its completion.

6.5 PLANTING TREATMENTS: SEEDING

It is recommended that a seed- mix be applied to the temporarily impacted areas outside of the County maintenance areas. All seed to be used in revegetation will originate from local sources below about 1500 ft. elevation. The Revegetation Contractor will require seed vendors to provide location and elevation for each seed lot, and will not purchase or use seed originating outside these geographic and elevational bounds. As needed, the Revegetation Contractor will contract local or on-site seed collector to supplement or replace vendor supplies if seeds are in short supply or are unavailable.

6.5.1 Broadcast seeding. Broadcast seeding distributes the seed on the soil surface and should be followed by a seed covering operation (raking or other method). Application rates for hand broadcast seeding must be increased to 150% to 200% of the rates listed in Table 6. For broadcast seeded areas, the seed mix shall be pre-mixed in the proportions specified. Five cubic feet per acre of damp fine grade plaster sand shall be added to the total seed mix. The seed and sand shall be thoroughly mixed (preferably in a cement mixer) for ten minutes to provide a thorough integration of seed and sand prior to broadcasting. The seed and sand mix shall be broadcast over designated areas, following appropriate soil preparation methods listed above, using a hand-held whirly-bird broadcaster or other feasible method so that 0.9 pound of seed and sand mix covers 1,000 square feet.

For even distribution the seed mix will be applied in a two-step application. Step one consists of the landscaping crew walking in a slow and even pace while hand-broadcasting half the seed mix across the planting areas while moving in a north-to-south direction. In step two, the remaining half of the seed mix is broadcast over the same area while moving in a west-to-east direction. This ensures even coverage. After seeding, the seeded area will be thoroughly raked or dragged with a chain link or cyclone fence to cover the seed with soil (to increase germination and reduce loss to small mammals and foraging birds).

Broadcast seeding should be performed only when winds are calm to minimize accidental drift. After seeding and raking are completed, the planting areas will be lightly watered to settle the soil and form a surface crust. Watering aids in the movement of the seeds into surface depressions and cracks and the movement of small soil particles downward, resulting in a thin soil covering over the seeds.

Seeding Schedule

Seeding should be performed between October 1 and January 31 of any year and during those periods when weather and soil conditions are suitable. This schedule allows for seasonal rains to facilitate appropriate germination and coverage. Timing will be approved in advance by the biological monitor.

6.6 SEED MIX

The proposed seed mix for use in temporarily disturbed areas is listed below for application in sections of the Project area to be restored as native grassland. The 5.74 acre-temporary disturbed areas of the channel will be seeded with a native grass seed mix (Table 4). A seed mix for use in within the proposed riparian mitigation area for ground cover, if required/desired (the MMP only provides details on cuttings/container plants for riparian mitigation [see below]), should be developed in conjunction with the qualified biologist.

Seed Supplier. Seed will be obtained from a local seed supplier familiar with native species (such as S&S Seeds of Carpinteria, CA). Seed will be limited to the species and quantity specified in the seed mix palette (see below). All seed will originate from the project region, within +/- 1000 feet elevation of the Project site. The seed supplier chosen will provide a list of three references with the bid proposal. The references will include year, contact names, and telephone numbers.

Seed Quality Control Requirements. Seeds will be tested for percent purity, percent germination, number of pure live seeds per pound, and weed seed content. Seed testing will be the responsibility of the seed supplier. Results of the seed tests will be made available to the restoration monitor prior to planting.

This seed mix was prepared to achieve terrace cover with a combination of shrub, perennial, and annual species commonly found in local, native riparian habitats. The annual species and perennial herbs are intended to provide interim soil stabilization and protection until the slower growing shrubs develop significant cover. All species proposed for inclusion in the seed mix (Table 4) occur in the

Project area or in the region, are elements of native vegetation types, and are commercially available. Salvaged topsoils (if available and/or determined to be appropriate by the qualified biologist) will also contain a seed bank that will increase species diversity.

Table 4. Native Grassland Seed Mix

Common Name	Scientific Name	Type	*Min% Purity/ Germination	Pounds/Acre
Required species and specifications				
California brome	*Bromus carinatus*	Perennial grass	TBD	2.0
Coast range melic	*Melica imperfect*	Perennial grass	TBD	3.0
Nodding needle grass	*Nassella cernua*	Perennial grass	TBD	7.0
Purple needle grass	*Nassella pulchra*	Perennial grass	TBD	7.0
Pine bluegrass	*Poa secunda*	Perennial grass	TBD	3.0
Small fescue	*Vulpia microstachys*	Annual grass	TBD	2.0

* **% Minimum purity/Germination**. % minimum purity refers to the percent of vegetative product that contains seed (the remainder consisting of byproduct from seed collection such as chaff, etc). Germination refers to the percent of the seed that consistently germinates successfully for that species. Seed rates (lb./ac.) must be increased at least 50% for hand broadcast seeding (above) and must be increased proportionally if purity or germination rates in a seed lot are below

Mycorrhizal Inoculum

Most native plants have symbiotic relationships with soil microorganisms, called mycorrhizal fungi, which enhance the plant's ability to take up mineral nutrients from the soil. Exposed barren soil on the work sites will have little or no living mycorrhizae. Mycorrhizae spores disperse naturally via wind or animal dispersal vectors, but may not reach the site in sufficient quantities to improve revegetation success within the monitoring period (Walker and del Moral 2003).

A commercially available mycorrhizal inoculum, such as AM-120 or Grolife, shall be applied in conjunction with broadcast seeding. Mycorrhizal fungi are an especially important component of a healthy functional ecosystem (St. John 1988). Mycorrhizae in the root zone of sage scrub plants contribute to the ability of these plants to fix nitrogen, facilitate uptake of phosphorous from the soil, and increase absorption of soil moisture. AM-120 is commercially available through Reforestation Technologies International (RTI) and is incorporated into the fertilizer mix and Grolife is a product of a joint venture between GroPower and Tree of Life, available from S&S Seeds. Broadcast application shall be at a rate of 30 liters per acre.

Legume seeds, as indicated in the plant palette, to include the genera *Lotus*, *Lupinus*, and *Trifolium*, shall be inoculated with *Rhizobium* bacteria prior to seeding. Inoculation shall be in accordance with the University of California, Division of Agriculture and Natural Resources Bulletin 1842 for “Range-Legume Inoculation and Nitrogen Fixation by Rood-Nodule Bacteria” or inoculants shall be added at a minimum rate of 2 lbs of inoculation bacteria per 100 lbs of legume seed. Legume seed inoculated shall be hand seeded.

6.7 PLANTING TREATMENTS: NURSERY STOCK

Container Stock

Container-grown plant materials will be planted in the 0.5-acre riparian establishment area to ensure representation of dominant species, to accelerate habitat development, and to increase structural diversity in the developing habitat as early as possible in the revegetation process. In riparian areas, container plantings will mainly be used to ensure presence of woody species that do not readily germinate from seed.

Container stock must be ordered from a supplier well in advance to allow collection and production from appropriate source material.

Container Plant Supplier. All container stock will be supplied by a local native plant nursery. The supplier will be limited to the species and quantity specified in the plant palette (Table 5). The supplier will obtain source material for all nursery stock provided for the Project from Santa Barbara County and from other appropriate nearby counties at elevations below about 1500 feet, and will certify those origins. The supplier also will certify that container stock is provided in soil free of pathogens or other incompatible microorganisms or contaminants. The supplier will be obligated to replace any container stock judged unfit for the project due to shipping damage, disease, pests, weed infestations, or rootbinding. The supplier chosen will submit a list of three references with the bid proposal. The references will include year, contact names, and telephone numbers.

Table 5 Container Stock and Cuttings Option

Common Name	**Scientific Name**	**Minimum Density ***	**Spacing**
Riparian Habitat	***(Containerized plants/cuttings - one gallon size)***		
arroyo willow	*Salix lasiolepis*	300/acre	6-8 ft.
sandbar willow	*Salix exiqua*	75/acre	6-8 ft.
mule fat	*Baccharis salicifolia*	50/acre	4-6 ft.

Container Stock Size. Generally, larger container plants require increased maintenance and lead to higher cost of replacement of failed plantings. In general, container stock will be in relatively small sizes (one-gallon or less). This strategy allows for purchasing and planting larger numbers of plants. Overall numbers of surviving plants should be greater because more will be planted. Larger container plants will be reserved for visual screening and buffer areas. The use of linear plantings will be avoided, however, pole and cuttings may be used.

Container Stock Quality Control. All container stock will be inspected by both the revegtation contractor and the biological monitor prior to acceptance. Should any container plants show sign of disease (rusts, fungi, severe insect damage, etc.), they will be deemed unfit and the supplier will replace them at the supplier's cost. All container-grown plants will be well-rooted in containers, but not root-bound. Any container stock root-bound, old or abnormal (e.g., sprawling, decumbent, or rangy) will be rejected and replaced by the supplier. Because mycorrhizal fungi will be included in the seed mix, container stock will be inoculated with mycorrhizal fungi only if deemed necessary by the landscape contractor and the supplier. Container stock may be in bud or early flower stage but not in seed or past seed set.

Container plants will be handled or moved no more than necessary. Once they are delivered to the site they should be kept at a central, shaded and protected site and planted as soon as possible. If plants must be stored on site for more than several days, they must be monitored and irrigated regularly.

Container Planting Methods

General Methods for All Sites:

- Prior to planting, the Revegetation Contractor or biological monitor will mark and label locations and planting palettes for each revegetation area in the field, using colored pin flags, using the planting schematics in the Site Plan for guidance. Pin flags will be marked with two numbers separated by a backslash (example: 2/3). The first number will denote the species used and the second number will indicate the number of plants required for that cluster.
- Plantings will occur between November and February.
- Prior to planting all container stock will be stored in a cool shaded area and kept watered.
- Prior to planting all container stock will be inspected by the biological monitor.

- Like species will be planted in clusters (groupings) of three to five containers per group. In riparian areas, tree containers will be scattered throughout the planting area to ensure complete coverage and avoid open or barren areas.
- All planting activities will be inspected by the biological monitor to ensure that adequate planting densities are obtained.
- Prior to planting, holes will be filled with water, backfilled with native soil, and refilled with water to create a moisture reserve in the soil. This will provide beneficial soil conditions for plant roots to develop deep root systems.
- Plants shall be removed from the containers by tapping the sides and bottom of the container while holding the plant by the stem at the soil surface. The plant may also be loosened from the container by gently rolling the container on its side. Some plants may require carefully cutting the container away with clippers or shears, avoiding any root damage.
- During planting the soil will be tamped down around the plants and a small earthen berm will be constructed around the plant to collect water.
- All container stock will be gently scraped by hand to loosen roots on the sides and bottom of the rootball.
- Empty containers, pony packs, plant tags, and any other debris will be removed for off-site disposal at the completion of planting.
- If available, leaf litter salvaged from the project area will be scattered across the planting area.
- No plant protection will be installed upon planting. However, the biological monitor will visit the sites regularly following planting and will recommend protection if needed. Based on that recommendation, the Revegetation Contractor will install plant protection devices as soon as practicable (see Maintenance section below).

Habitat-specific Planting Methods and Plant Palettes:

Riparian

Recommended Plant Palette

Container stock will consist only of the species identified in the plant palette listed in Table 7. The plant palette below was developed to provide for the establishment of riparian habitats. The plan consists of a dense mixture of one-gallon willow containers and mulefat. This planting scheme provides a variety of native plants species and would increase both the structural heterogeneity and species diversity within the Santa Maria River watershed. As the hydrology of this area can leave many areas with little soil moisture the intent is to increase functional habitat while not planting excessive numbers of trees or shrubs. Table 7 contains the list of container size and planting densities for planting option.

If for any reason a substitute species is required, the biological monitor will select the species. No species may be planted into the revegetation site that is not locally native to the Santa Maria River watershed. Any substitutions to the species list should be noted in the Final Restoration Plan.

Riparian Container Stock. The planting pits will be backfilled with the salvaged soil placed as in the original soil horizon and filled with water. Plants will be placed in the planting pits, with the root crown approximately one inch above the surrounding grade. A basin built around each plant will measure approximately two feet in diameter. The basins will be filled with water, allowed to drain, and refilled. Riparian species will be placed within moisture ranges that best suit their physiological requirements and provide for a natural structurally diverse habitat.

6.8 PLANTING TREATMENTS: RIPARIAN TREE CUTTINGS (LIVE-STAKING)

Several riparian trees and shrubs propagate well from rooted cuttings. Willows and mulefat are in the riparian scrub and woodlands in the Santa Maria River area. In addition to the one-gallon containers described above, these species will also be planted as cuttings from on-site material. This planting method is called "live staking," "willow staking," or "sprigging."

Collection of Local Stock. Willow, and mulefat cuttings shall be collected if possible from trees or shrubs growing within the Santa Maria River watershed to maintain local genetic integrity. Willow branches (or whips) from healthy trees will be collected using chain saws, hand saws, or lopping shears. Source stems should be between one and three years old with a diameter of 0.5 inch to 2 inches. Where possible, they will be salvaged from trees to be mown or removed for channel maintenance. Branches will be collected at least 24 hours prior to planting and preferably longer than that to allow root development before replanting. Long straight whips are ideal. Branches will be collected conservatively so that no more than ten branches are culled from any single tree and no more than 5 from any single shrub (not applicable for branches salvaged from trees to be removed). Branches showing signs of disease (such as rusts or numerous insect galls) will not be collected. During cool moist weather, harvested branches may be stored in a shaded area on-site for up to 24 hours before preparing them for planting (below).

Cuttings will not be harvested after 28 February of any year, until the end of the nesting season, to avoid potential damage to migratory bird nesting habitat.

Pre-planting Preparation: Branches will be cut to lengths of 3 to 5 feet. Leaves and lateral branches, if present, should be carefully removed, without damaging lateral buds. The top 2" of the cuttings will be removed to remove the apical bud, which consumes too much stored energy from the cutting (St. John et al, 2009). A few small twigs with immature leaves may remain on the upper 20% of the cutting's length. Cuttings will be bundled with all planting ends orientated in the same direction, tied with string and placed in tubs of water, wet peat moss or wet sawdust until they are treated and planted. If the basal ends become dried out, a fresh cut must be made about 1 inch above the original cut.

If willow or cottonwood cuttings must be stored more than 24 hours (up to about 10 days), they will be transferred off-site and maintained in buckets of water or in wet burlap or in plastic trash bags containing moist newsprint, peat moss or sawdust, at a cool shade house or similar structure. The water must be changed regularly (every 2-3 days) to prevent rotting. If longer storage is needed, then the cuttings should be kept slightly moist in cold storage until planting. Mulefat cuttings should be planted shortly after collecting and preparing them because they tend to form roots very quickly during storge and these roots are inevitably damaged or destroyed during subsequent planting.

Shortly before planting, the lower end (i.e., the end to be planted downward into the soil) will be cut with a sharp knife or pruning shears at a 45-degree angle. The angled cut helps facilitate insertion into the ground and helps minimize damage to stem tissue. The upper (non-planted) end shall be cut horizontally.

Before planting, the lower ends (ca.1 foot) of each cutting shall be treated with a combination growth hormone and fungicide such as Rootonel, which contains indolebutyric acid, napthaleneacetic acid, or naphthalene-acetamide. Following this treatment, cuttings shall be allowed to dry in the open air for 30 minutes to 1 hour to form a callus and to minimize the loss of rooting hormone through handling and planting. If cuttings have already begun to form roots then this step is omitted.

Planting: Planting will take place during cool season and no later than February. This will maximize opportunity for root formation before soil moisture is depleted by warmer weather.

Planting methods will vary depending on the condition of the cuttings and the planting sites. Planting must be done carefully to minimize damage to the cuttings, especially to roots that may have formed during storage or treatment and to lateral buds in the upper ends of the cuttings. They must be planted deeply enough to reach moist soil. Deeper planting also will minimize likelihood of losing the cuttings if high stream flows erode the planting site. At least 2/3 of the length of each cutting will be planted below ground. Wherever soil conditions permit, 75 to 80% of the length will be planted below ground.

Cuttings can be planted directly into soft, moist sandy soil by pressing them in as deeply as possible by hand (without damaging lateral buds) and then driving them to needed depth with a rubber or wooden mallet. If the upper ends of the cuttings are damaged by the mallet they should be trimmed (horizontally) or treated with tree sealant after planting. If the soil is hard or if the depth to year-around moisture is deep, it will be necessary to auger planting holes or pre-punch them with a wooden stake, steel "re-bar," or similar tools. Even in pre-punched or augered holes, the cuttings should be pressed by hand as deeply as possible and then tapped or driven slightly farther to be sure they are firmly in place.

After planting, soil contact should be maximized by tamping the soil around the cuttings. Each cutting must be firmly in the ground so it cannot be easily moved or pulled up. If there is a space between the hole and cutting, then water can be poured in to help collapse soil into contact with the cutting. After planting, the cuttings will be watered.

Willow cuttings may attract herbivores (e.g., cottontail rabbits). All cuttings shall be monitored closely during the first few weeks after planting for damage. If herbivory is noted, cuttings may require wire protective cages as described above.

7 MAINTENANCE

7.1 MAINTENANCE PROGRAM

Maintenance operations will begin immediately after the completion of seeding and planting, estimated to begin in 2013/2014. The maintenance tasks described below will be performed by the Revegetation Contractor under the direction of the biological monitor. The biological monitor will approve any needed revisions to the specified maintenance schedule and methodologies.

7.1.1 Maintenance Measures

Maintenance will include site protection, erosion control, weed removal, trash removal, and pest control. Maintenance activities will occur for a minimum period of five years. However maintenance for riparian areas will be extended if necessary to provide compliance with required performance criteria.

Plant Protection

The Revegetation Contractor/maintenance personnel will be responsible for providing, as feasible, adequate protection of all seeded and planted areas against herbivores, traffic, vandalism, or other intrusions by erecting fencing, caging, or other acceptable structures as needed.

Where large container tree stock is planted, tree stakes may be used if needed for a period of up to one year to help keep the tree upright. After one year the stakes will be removed to allow the tree to build up resistance to wind and grow in a more natural manner. Herbivory (especially by rabbits and ground squirrels) on newly planted container stock can greatly affect the success of the restoration efforts during the first 90 days of establishment. Young plants and grasses are particularly attractive to herbivores and are easily accessible in newly planted restoration areas due to the lack of dense cover. If monitoring indicates a need for plant protection from herbivores, then riparian container plantings will be protected.

Irrigation

A temporary irrigation system will be installed in advance of planting and will be utilized to supplement natural rainfall during the establishment phase of each revegetation site.

Irrigation Methods. Drip irrigation systems, sprinklers, or hand watering will be employed as needed to ensure the successful revegetation of the project area. Drip systems, if installed, will provide individual emitters to the base of each container plant or cutting to ensure survival criteria are met during the restoration efforts. Sprinklers may be utilized for rapid seedling establishment of coastal sage scrub species. The intent of irrigation is strictly to enhance plant establishment and early growth and not to permanently sustain the revegetation sites. Irrigation rates will be managed to provide for total coverage, particularly during periods of low rainfall.

Watering Schedule. Depending on rainfall, revegetation sites may be watered for the first 90 days of the vegetation establishment period. The system will be maintained for a period of not less than three year to ensure the successful restoration of the riparian corridor. Watering will be no more than once every three days for no more than three hours daily. Watering schedule will be adjusted by agreement of the Revegetation Contractor and Biological Monitor, based on natural rainfall and condition of plants on the site.

Erosion Control

The Revegetation Contractor/maintenance personnel will be responsible for identifying and repairing excessively eroded areas within the revegetation sites that are due to the removal of vegetation, soil compaction, or other construction-related activities. All upland and river banks within the restoration areas will be monitored for erosion and other significant topographic changes throughout the rainy season (i.e., between October and March) each year. Implementation of restorative actions will be determined on a case-by-case basis. In some cases, erosion in the revegetation area may be consistent with overall goals of this revegetation plan and it may be unnecessary to repair any flood damage (i.e. the development of secondary channels, hillocks, depressions). If needed, any repairs will be based on bioengineering methods that are compatible with sustaining native vegetation, do not reduce the surface of the revegetated area from that defined in Table 1, and do not introduce additional hard surface to the site.

Supplemental Planting

During the maintenance period widespread plant mortality, non-compliance with coverage and survival rate standards, mechanical damage to plant species, and poor health will be compensated for by reseeding and replanting using species and quantities specified by the biological monitor. Supplemental planting may occur any time during the maintenance period. However, if replacement of more than 50 percent of the revegetated area is required in years four or five, the planting and seeding approach should be reevaluated and the maintenance period will be extended until the performance criteria are met (see Extended Maintenance below). Replacement will occur during appropriate planting periods from October 1 to March 1, but may be extended to avoid losses during a heavy rainfall year.

The plan for replacement will be based on the cause of any loss or damage. For example, widespread mortality in years three to five of the maintenance period may have different causes than mortality experienced in the first year or two. The biological monitor will make regular inspections of the sites to assess the condition of revegetated areas and determine remedial measures necessary to provide adequate coverage. Losses or damage due to washout or other events that occur after the site has achieved the performance criteria will not be the responsibility of the Revegetation Contractor/ maintenance personnel.

Trash Removal

The deposition of debris, herbicides, fertilizers, pesticides, petroleum products, or any other pollutants within the re vegetation sites will be prohibited. The mitigation areas will be kept clear of all trash and debris throughout the maintenance program.

Pest Control

Damage to the revegetation areas caused by insects, plant disease, herbivores, or other pests will be monitored during the maintenance period. Diseased or infected plants will be immediately removed. Biological controls will be considered instead of chemical or mechanical means. Pesticide use, if any, will comply with local codes and regulations and the recommendations of the biological monitor. If revegetation success necessitates control of rodents, then live traps rather than poisons will be used. Because the Project area is readily accessible, the area will be posted to warn the public of any pest control activity.

Extended Maintenance

When, in the opinion of the Corps, the revegetation area is not on schedule to meet performance criteria due to an unhealthy condition of plant materials, inadequate control of weed species, or other issues, then maintenance will be extended to facilitate successful habitat establishment and compliance with performance standards.

7.2 WEED CONTROL

A wide variety of invasive weeds are problematic in native vegetation and revegetation projects throughout southern California. Weeds will be controlled on the Project site by any of several measures, as judged most appropriate on a case-by-case basis. To the extent feasible, non-native species will not be allowed to mature or set seed, to minimize their abundance in future years. However, complete control for many species, especially annual grasses (brome grasses, wild oats, and foxtail barley) and other herbs (several mustard species, sweet-clovers, and others) is unrealistic. These plants are well established and abundant in disturbed or ruderal areas, annual non-native grasslands, and native upland or riparian vegetation throughout the region. As described above exotic plants are well established in the project area and have in many cases degraded habitat values in this section of the river. Weeds generally originate from the Mediterranean region and are well-adapted to regional conditions. They already exist on-site and their seed banks will be present even after project construction. Further, there are abundant seed sources nearby, and these plants will continually disperse into the revegetation sites despite any eradication efforts. Even with eradication efforts, these weeds will likely remain in the revegetation areas at some chronic, permanent level of infestation. Control is difficult, except by meticulous weeding or by measures that would destroy native species (e.g., herbicides or discing [Brooks, 2000]). If these plants become dominant, to the point where native species reestablishment is prevented, then herbicide treatment to eliminate weeds, followed by reseeding with native species may be necessary. If reseeding is implemented, a new revegetation monitoring period will begin the first year after reseeding. Further eradication methods are described below.

Generally, larger non-natives are removed manually by hand pulling during the first two years following seeding and planting efforts because herbicides can damage newly volunteering natives and seeded species both before and after germination. However, careful spot herbicide application is the most successful at eradicating several herbaceous species such as white sweet clover, summer mustard, Spanish sunflower, and others due to their (usually) extensive infestations and large seed banks. When in close proximity to native species, tall invasive plants or large infestations of herbaceous weeds will be prepped before spraying by bending the plants inward on themselves and trimming or tying back adjacent native vegetation to avoid herbicide contact. All weeds removed shall be collected and disposed of off-site within three days of removal. Weeds shall be collected and piled on burlap to be bundled to avoid any seed dispersal during weeding.

Maintenance crews must be able to distinguish native plant materials from non-native plants. Before non-native species are removed, the biological monitor will educate the Revegetation Contractor/

maintenance personnel and crew regarding differences in desirable and undesirable plant materials. Photographs of target non-native species will be provided to the Revegetation Contractor/maintenance personnel as necessary. In addition, spraying should not be completed beyond the number of days recommended by the manufacturer for areas where revegetation is planned (e.g., for glyphosate the half-life is 3 to 130 days in soil and 35 to 63 days in water). This means that spraying should be discontinued in areas slated for fall planting and only manual or mechanical methods should be used if possible. Non-native species removal throughout the maintenance period will employ the techniques and target the invasive species described below (Table 6).

Table 6. Invasive Non-native Species of Concern

Scientific Name	Common Name
1. Target Species for full Eradication (present or high potential in Project area; high probability of hindering long-term revegetation success; good potential for full eradication)	
Eucalyptus spp.	Ornamental Eucalyptus (e.g., Tasmanian blue gum)
Foeniculum vulgare	wild fennel
Nicotiana glauca	Tree tobacco
2. Target species for control throughout establishment phase (present or high potential in Project area; high probability of hindering revegetation success during establishment phase; poor potential for full / long-term eradication)	
Avena barbata, A. fatus	Wild oats
Bassia hyssopifolia	Fivehook bassia
Brassica nigra, Hirschfeldia incana, Brassica spp., and Sisymbrium spp.	Black mustard, summer mustard, other mustards and related species
Bromus madritensis subsp. rubens, B. diandrus, B. hordeaceus	Brome grasses
Centaurea melitensis	Tocalote
Cirsium vulgare	Bull thistle
Conium maculatum	Poison hemlock
Cynodon dactylon	Bermuda grass
Erodium cicutarium, E. moschatum, E. brachycarpum, E. botrys	Filaree
Hordeum murinum	Hare barley (foxtail barley)
Malva parviflora	Cheeseweed
Schismus barbatus	Mediterranean (splitgrass)
Melilotus alba	White sweet clover
Pennisetum setaceum	Fountain grass
Polypogon monspeliensis	Rabbit foot grass
*Ehrharta calycina**	Veldt grass
Salsola tragus	Russian thistle, tumbleweed
Sorghum halepense	Johnson grass
Vulpia myuros, V. megalura	Foxtail fescue, Rattail fescue, Zorro fescue
Not Present –Potential Future Problem Species to be controlled if found in revegetation area	
Ailanthus spp.	Chinese tree of Heaven
Carpobrotus edulis	iceplant, sea fig
Fraxinus udeii	Tropical ash
Schinus molle	Peruvian pepper tree
Centaurea solstitalis	Yellow star thistle
Myoporum laetum	Myoporum
Sources: California Exotic Pest Plant Council and Aspen Environmental Group, 2005	

Weed Removal Schedule

For all non-native species removal will occur as needed on a monthly, quarterly, or annual basis for 5 years following seeding and live-staking in winter, while the potted nursery stock and seedling plants are becoming established. Nevertheless, weeding will continue on an as needed basis for the next 3 years in non-riparian areas, for a total of 8 years of active management in those areas.

Foliar Herbicide Application

Herbicide (approved for use in aquatic environments) may be applied to invasive non-native species or in some cases invasive native species, which could include castor bean, tree tobacco, wild mustard and any other weed species that become established within the restoration sites. Herbicide treatments will be applied by a licensed pesticide applicator under the direction of the biological monitor, and as authorized under federal and state laws. In addition, the following specifications have been and will continue to be met by the Corps' restoration contractor for invasive species removal within the revegetation sites.

- The Revegetation Contractor shall coordinate any applications of herbicide with the biological monitor prior to use.
- Herbicide application prior to planting shall not occur beyond the manufacturer specifications regarding the length of time that must pass following herbicide application prior to planting cuttings or seeding. Note that the half-life of glyphosate in the soil and water can range from 3 to 130 days and 35 to 63 days, respectively (http://infoventures.com/e-hlth/pestcide/glyphos.html).
- Prior to 15 August, the biological monitor shall verify that no truck spraying occurs within 500 feet of areas potentially occupied by least Bell's vireo or other special status breeding bird species.
- Prior to 15 August, the biological monitor shall verify that no hand spraying occurs in areas potentially occupied by least Bell's vireo or other special status breeding bird species where such areas may be affected by herbicide or herbicide drift.
- Truck sprayers shall access the site from existing roads as approved by the biological monitor and only be used in areas where exotic species cover is > 80%.
- Herbicide shall be applied to exotic plant species only during weather conditions that will not cause significant drift to adjacent native plant species.
- No herbicide shall be applied to exotic plant species submerged within the channel.
- Herbicide contact with native species should be avoided as much as possible. Native shrubs or trees may be trimmed to avoid contact with herbicide since they will readily grow back. Also, target species may be prepped by bending away from native vegetation.
- In the event of gusty winds or winds in excess of five miles per hour, all work should be temporarily discontinued as a means of protecting applicators and adjacent natural resources. Treatments should also be temporarily discontinued during rainfall or if weather reports predict measureable rain within 24 hours (rainfall reduces the effectiveness of the herbicide).
- It is not known how long sprayed arundo should be left intact before cutting to ensure maximum translocation of the herbicide. There are differing opinions on this however and some believe that it may take up to a full year before sprayed arundo should be cut. Others have found that waiting a minimum of four to six months before cutting may be an adequate amount of time. These time frames may conflict with the planting schedule, with the sprayed plants will be left as long as possible, but no longer than six months in areas where planting or seeding will occur.
- For broad-leaved plants, vegetation shall be left undisturbed for at least seven days after spraying to allow the herbicide to be distributed throughout the entire plant. Visible effects of herbicide application consist of wilted and brown foliage and disintegration of root material.
- Once desiccated, all treated plant materials shall be cut and left in place as long as this does not interfere with plant installation in which case the material shall be stockpiled or disposed of offsite.

Cut-Stump or Cut-and-Spray Method

An alternate herbicide application method is to cut the aboveground portion of the plants and immediately spray herbicide onto the cut stems (cut-stump or cut-and-spray method). The plants should be treated in spring when actively growing. A phased treatment is recommended.

Phase 1: The plants should be cleanly cut, horizontally, close to the ground (using a saw, rotary brush cutter, or similar tool). All the cut vegetation shall be removed from the Project area the same day it is cut and disposed of legally off-site.

Phase 2: The stumps or stems are re-cut, cleared of sawdust, and immediately painted with 100 percent glyphosate within two minutes of cutting, i.e., before the cut surface begins to congeal, to ensure penetration of the herbicide.

Plants should be checked a month after application to determine the success of the herbicide treatment. Any re-growth from the treated stumps should be treated with the foliar herbicide application in the same season or as re-growth appears in the next growing season.

Mechanical Removal

Minor infestations of non-native species can be eradicated by manual methods, especially where sensitive native plants, wildlife, or habitat may be damaged by other methods. Hand pulling works with new plants less than 6 feet in height, but with respect to giant reed care must be taken that all rhizome material is removed (Hoshovsky, 1988). Removal of dense belowground roots and rhizomes shall also be necessary when it may interfere with planting. This may be most effective in loose soils and after rains have made the substrate workable. Plants can be dug using hand tools (pick-ax, mattock and shovel), especially in combination with cutting of stems near the base with pruning shears, machete, or chainsaw. Stems and roots should be removed to avoid re-rooting, or a chipper can be used to reduce the size of the material. Removal of non-native species with large, heavy machinery such as bulldozers or backhoes is unnecessary and prohibited.

The Bradley Method of Restoration

The Bradley Method of restoration is a widely used practical method of restoration based on giving natives initial help by controlling invasive weeds in their immediate vicinity. The premise is that the natural vigor and adaptation to local conditions will enable the natives to sustain and eventually dominate, if they can be helped past the superior pioneering capabilities of some of the more invasive non-native weeds which use soil and other nutrients more efficiently. Developed in the 1960s, the Bradley Method works on three general principles: (1) work from areas with native plants toward weed-infested areas, (2) make minimal disturbance, and (3) let native plant regeneration dictate the rate of weed removal. These principles prioritize the protection of intact areas, remove the pressure that invasive plants place on native plants, and encourage the natural recruitment and spread of plants into degraded areas by means of seeds and spores. Particularly important is the suppression of the vigorous annuals within the restoration sites. Annuals of highest concern include tocalote star thistle, summer mustard, and white sweet clover.

Giant Reed (*Arundo donax*)

This species was not observed within the Project area. However, for the purposes of long term restoration, this species has been included in the plan. Herbicides are most effective on giant reed if they are applied after the active growing season, but before the annual dormancy season. Giant reed generally goes dormant during fall and winter, and most new growth occurs during spring. Therefore, herbicide application is most effective between late spring and early fall (May to September), when the plants actively translocate materials from leaves down into root and rhizome systems. Spraying dormant or drought-stressed plants results in low eradication success because little of the herbicide is translocated to roots and rhizomes.

A recent study showed that construction disturbance in giant reed stands breaks up the rhizome material and causes much more downstream dispersal than natural flooding (Boland 2008). Wherever Project construction work includes mechanical disturbance in giant reed stands, grading and soil handling techniques should be designed to prevent downstream dispersal or on-site re-burying of any viable rhizomes. All giant reed material, including all soil containing rootstocks, should be separated from other soil and treated to eliminate any living giant reed rhizomes. Potential treatments include screening out rootstocks; heat treatment; or spreading contaminated soil thinly in a disturbed upland area where rootstocks could not acquire enough water to survive. If live giant reed rhizomes are returned to the revegetation site, they will resprout, even if they are buried beneath 3.3 to 9.9 feet of alluvium resprout (R. Dale, personal communication cited in Dudley, 2000).

Tree Tobacco (*Nicotiana glauca*)

For larger individuals, cut-stump or cut-and-spray treatment with glyphosate based herbicide should be used. The plants should be treated in spring when they are actively growing. Plants should be checked a month after application to determine the success of the herbicide treatment. Any regrowth from the treated stumps should be treated with the foliar herbicide application in the same season or as regrowth appears in the next growing season. Seedling plants can be removed by hand pulling.

Salt cedar (*Tamarisk* sp.)

This species was not observed within the Project area. However, for the purposes of long term restoration, this species has been included in the plan. Salt cedar resprouts vigorously from below-ground rootstocks after cutting or clearing. Young plants can be removed effectively by uprooting them completely. Larger plants or wider infestations must be treated by initial cutting or clearing, usually followed by retreatment to remove resprouts or seedlings. Initial clearing should be conducted by manual removal of the trees and, if possible, the roots and the associated duff. Alternately, cut-stump herbicide application can be used (Lovich, 2000). The cleared area should be monitored and retreated with foliar herbicides or repetition of cut-stump application as needed.

Castor Bean (*Ricinus communis*)

Seedling plants can be removed manually; larger individuals should be treated using either the foliar spray treatment method or the cut-stump treatment and their vegetative mass removed completely for legal disposal. Plant material should be cut and removed before the plants go to seed. If seeds have begun to mature, then no castor bean material should be transported across open ground where seeds could be accidentally dispersed during eradication efforts. Instead, cut material should be placed directly onto tarps or pavement and wrapped up before moving it to trucks for off-site transport. The plants should be sprayed during active growth in the spring. Foliar spray shall be with glyphosate at the prescribed minimum 2 percent solution. For very large individuals, the stump treatment described above may be used. Plants should be checked a month after application to determine the success of the herbicide treatment. Re-application may be necessary for mature castor bean individuals. Areas where castor bean plants have been removed should continue to be monitored annually because the castor bean seeds are thought to be quite long-lived.

Pampas Grass (*Cortaderia selloana* and *Cortaderia jubata*)

This species was not observed within the Project area. However, for the purposes of long term restoration, this species has been included in the plan. These species have the ability to reach distant open spaces and colonize them quickly due to the light wind-dispersed seed and very rapid growth (Department of Conservation, 2003). They can invade disturbed areas such as cleared brush margins and firebreaks where they compete with native vegetation. Dry biomass from pampas grass, such as dead leaves, leaf bases, and flowering stalks creates a significant fire hazard. Manual removal using mattocks, shovels, or similar tools is effective for established plants. Pampas grass resprouts from rootstocks; therefore the entire root crown must be removed. Foliar herbicide application is also effective. Follow-up monitoring and retreatment is necessary following either manual or herbicide treatment.

Herbaceous Annual and Perennial Weeds

Annual weeds, including black mustard, tocalote star thistle, sweet clover, bur clover, brome grasses, foxtail barley, and wild oats should be controlled by hand pulling and weed whipping when in close proximity to native plants using the Mechanical or Bradley Method. However, it is likely that for the first two years of this Plan's implementation, herbicide treatments may be the most effective for large infestations. Care must be taken to trim or tie-back natives and to limit overspray. Weed control during the first two years after planting should allow native shrubs enough time to establish. After that, the mechanical or Bradley methods would become most appropriate.

Herbaceous perennials including summer mustard and white sweet clover will be controlled by similar methods. Maintenance for herbaceous weeds is not limited to the above-mentioned species, but will include any invasive and/or non-native plant species present that would threaten the establishment of the scrub or riparian communities. In general, the most appropriate time to spray these herbs is from late winter to early spring (March to June) before or during the flowering period and before seed set. In order to target all the flowering periods of the annual species of primary concern within the Project restoration sites, two treatments should be applied when using herbicide. The first treatment should be applied in March and the second in June.

These herbaceous species tend to produce copious annual seed crops, and many of their seeds remain dormant in the soil over one to several years. Thus, even when a standing crop of weed species is removed, dormant seed remains in the soil (termed a "seed bank"). A proportion of the seed bank germinates each year or each time germination conditions reoccur (e.g., soil temperature and moisture, light availability). Most research into weed seed banks has been with agricultural weeds (Thompson 1992). Seed banks can be reduced over time by continually inducing germination and then killing the plants (e.g., by herbicide or weed-whipping) before they produce new seed. In parts of the project area where weed seed banks are present, pre-planting treatment will include efforts to reduce seed banks by repeatedly inducing germination and then destroying the above-ground plants. This cycle will be repeated as necessary and practical before seeding the sites with native seeds.

7.2.1 Maintenance Schedule

A schedule of the maintenance work tasks described above is provided in Table 7. Maintenance task schedule and frequency will be adjusted as appropriate depending on site conditions and in coordination with the biological monitor.

Table 7 Maintenance Program Schedule

Work Tasks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Plant Protection												
Erosion Control												
Weeding - Herbicide Treatment		x								x	X	
Weeding – Hand Removal	X	X	X	X	X	X	X	X	X	X	X	X
Supplemental seeding (if needed)	X	X	X							X	X	X
Supplemental Planting (if needed)												
Trash Removal	X	X	X	X	X	X	X	X	X	X	X	X
Pest Control												

Shaded = ongoing task, heavy shaded cells requiring the most intense activity; **X** = Task performed one or more times per month.

8 MONITORING

Monitoring will be performed by the Biological Monitor throughout the restoration and monitoring period to assess conditions and to make recommendations for successful habitat establishment. This section describes the monitoring methods used to evaluate site progress and compliance with performance criteria, guidelines for developing mitigation documentation, and a summary of the anticipated monitoring schedule. It is anticipated that the mitigation area will meet or exceed the established performance criteria within a 5 year monitoring window.

8.1 MONITORING METHODS

The biological monitor will continue to be involved with near-term as well as long-term maintenance and site performance for successful habitat establishment and compliance with final performance criteria. Initial and long-term monitoring guidelines are described below.

8.1.1 Monitoring Initial Installation (Initial Seeding/Spraying Activities)

Meetings between the Revegetation Contractor, the Corps, biological monitor, and any other appropriate entities will be held as necessary prior to and during construction, initial site preparation (soil treatment, irrigation installation) and revegetation implementation (seeding and planting) to map proposed riparian areas; identify and clarify specified planting methods; and to resolve any questions or issues that may arise. Revegetation implementation will conform to this Plan and any modifications or amendments will only occur as agreed to by the Corps and documented in writing. Compliance will be documented by comparison of on-site revegetation implementation with the performance criteria in this Plan (Section 5). The biological monitor would inform the on-site field representative for Corps to stop work immediately, if needed. Deviations from specified methodology will require prior approval from the Corps, biological monitor. Site inspections will be performed on an as-needed basis during site preparation and implementation. The monitor will visit each site during and after implementation and related work. The monitor will confirm that the work is competed per specifications. Any deviations from specifications will be noted. The biological monitor will prepare a short memo to document restoration work performed by the Revegetation Contractor describing the revegetation work, site-by-site, and if needed, any recommendations for contractor follow-up or remediation work. The report will include Photo documentation of pre-existing site conditions, and installation procedures, and completed revegetation sites; summaries of site preparation (soil de-compaction, irrigation systems, etc); a drawing of the as-built Project area showing seeding and planting treatment areas.

8.1.2 Monitoring Long-Term Maintenance Activities

The biological monitor will monitor the long-term maintenance activities performed by the Revegetation Contractor/maintenance personnel to facilitate successful revegetation in compliance with performance criteria. The biological monitor will meet with the Revegetation Contractor/maintenance personnel, and resource agencies as necessary, during regularly scheduled site visits as specified below, to discuss site conditions and recommended remedial measures. Potential remedial maintenance measures to be recommended to the Revegetation Contractor/ maintenance personnel will include, but not be limited to, the measures listed below.

- **Protection.** In the event of herbivore damage, pedestrian damage, vandalism, or other types of site damage, the biological monitor will make appropriate recommendations to minimize future damage to the site. Possible recommended protection measures may include additional fencing, caging, live traps, or signage.
- **Weed Control.** The biological monitor will educate the field crews as necessary regarding the differences between invasive, problem weed species and desired native species on an as-needed basis (frequency will be based on field personnel changes and field conditions). The biological monitor will coordinate with the Revegetation Contractor/maintenance personnel on an ongoing basis regarding appropriate problem weed control measures to facilitate the successful control of weed species and establishment of native plant species.
- **Replacement Seeding and Planting.** The biological monitor will coordinate with the Revegetation Contractor regarding appropriate replacement seeding and planting measures in the event of widespread plant failure and non-compliance with specified performance criteria. Recommended replacement container stock or seed mixes will include plant species and application quantities as needed to remediate specific problems or failures.
- **Pest Control.** The biological monitor, in coordination with the field representative for the Corps, will coordinate the Revegetation Contractor/maintenance personnel regarding the control of insects, ground squirrels, and other herbivores, and fungi, rust, and other plant diseases and infestations. Recommended control measures will include, but will not be limited to, biological control methods and herbicides.

The biological monitor will review and report to the Corps quarterly on acreages and plan compliance and revegetation activity for each of the following MMP components.

1. A. Soil treatment

   B. Irrigation system installation

   C. Seeding and planting

   D. Maintenance and irrigation (including weed removal)

   E. Completion of scheduled monitoring, including baseline vegetation data.

8.1.3 Monitoring Long-Term Site Performance

The biological monitor will qualitatively and quantitatively monitor site performance throughout the restoration period to evaluate progress towards achieving performance criteria. The biological monitor will coordinate as necessary with the Revegetation Contractor/maintenance personnel regarding overall site performance. Monitoring will consist of the following tasks performed at each site throughout the program:

Develop Baseline. The biological monitor shall review the site to note the presence of suitable vegetative structure. This may include (depending on specific community types) the reestablishment of three vegetation layers: (1) an understory composed of native herbaceous species, grass species, and small shrub species; (2) a midstory (or midstories) composed of larger native shrubs and small trees of varying sizes; and (3) an overstory or canopy composed of larger native trees of varying sizes.

Qualitative Monitoring. Qualitative monitoring surveys will be performed monthly the first year following initial planting. Qualitative monitoring will be on a quarterly schedule thereafter, until final completion approval of mitigation site. Qualitative surveys will assess native plant species performance, including growth and survival, nursery stock mortality, germination success, reproduction, plant fitness and health, pest problems.

The first few years after seeding (particularly in scrub areas), quantitative measures of vegetation cover will not be useful. Plants will be small and typical performance criteria regarding height and cover are difficult to evaluate. At this early stage the critical questions are:

1. Whether native seedling density is sufficient to meet cover requirements once the plants mature: That is, are there enough established seedlings to reach the desired total cover?
2. Whether survival rate will be high enough to sustain needed density. Assuming that seedling density is great enough to meet success criteria, what survivorship rate will be acceptable over the coming few years, and is this a reasonable expectation?
3. Whether growth rates will be high enough to reach successful cover values. If enough plants survive over the specified monitoring period, will they be big enough by then to achieve the success criteria?

Beginning one year after initial seeding at each site and continuing annually for at least three years, the biological monitor will walk “meandering transects” (Nelson 1987) over each site to qualitatively evaluate native and non-native plant seedling density. The biological monitor will decide whether seedling density is roughly homogeneous throughout the site, or whether the site should be subdivided into smaller units for the purpose of evaluating seedling densities. If so, the biological monitor will delineate these subareas on aerial images or topographic maps, as available. These maps will be used as a basis for quantitative monitoring (below). In addition, the biological monitor will make qualitative judgments about revegetation progress, including seedling establishment, weed density, irrigation needs, erosion or other hydrology problems and observations, and other observations as appropriate.

In addition, qualitative surveys will note and record evidence of hydrologic functions, topographic conditions, and wildlife species use. A wildlife biologist will assist in monitoring surveys and will actively search for amphibians and reptiles by lifting, overturning, and carefully replacing rocks and debris. Birds will be identified by the use of standard visual and auditory recognition. The presence of nests, or other evidence of breeding activity will be noted. Searches for mammals will include searching for and identifying diagnostic sign, including scat, footprints, scratch-outs, dusting bowls, burrows, and trails of various mammal species.

Monitoring at this stage will indicate need for remediation or maintenance work well in advance of final success/failure determination. Likelihood of sufficient survival and growth to eventually meet success criteria is subjective, to be estimated by the monitor’s best professional judgment. Monitoring results cannot formally conclude “success” or “failure” at this stage. Instead, the monitoring reports will describe site progress and conditions and list all observations pertinent to eventual success, and make recommendations as appropriate reg. remedial work, maintenance, etc.

Quantitative Monitoring

A. Annual Pre-completion Data Collection. Within each revegetation unit as shown on the As-built Revegetation Map, the biological monitor will collect data in a series of 1 m^2 quadrats to estimate cover and density of each plant species within the revegetated areas. Quadrats will be located haphazardly, though not necessarily randomly in the strict sense, throughout each unit. All plants within each 1 m^2 quadrat will be obtained by species. A minimum of 15 quadrats will be sampled in the mitigation area. Data analysis in this phase will be informal. The intent will be to determine whether revegetation sites have sufficient native plant seedling density to reach project objectives.

Data also will be used to measure native species growth performance, to estimate native and non-native species coverage, seed mix germination, native species recruitment and reproduction, species diversity, habitat structural diversity, and tree growth performance. Based on these results, the biological monitor will make recommendations for maintenance or remedial work on the site and for adjustments to seed or container.

B. Baseline Vegetation Data. The biological monitor, in consultation with the field representative for the Corps, will select a series of sites within or near the Project area to represent “target” vegetation characteristics for the revegetation sites. Target sites will include riparian and coastal scrub vegetation types. The biological monitor will collect data along a series of transects (Evans and Love 1957) in each selected site to provide cover data by species. Associated with each transect, density of native tree saplings, shrubs and perennial herbs within a 25 square meter (5 m x 5 m) plot will be obtained and projected to estimate average densities per acre. These data will be used as baseline for quantitative comparison of revegetated areas, based on the performance criteria (Section 5). At each target site, enough transect lines will be sampled so that mean native species richness and cover values can be calculated with 80% confidence that sample means are within 20% of actual means (Bonham 1989).

C. Completion Monitoring. Beginning in year five (earlier or later if recommended) data will be collected at a series of toepoint transects (Evans and Love 1957) to provide cover data by species. Associated with each toepoint transect, density of native tree saplings, shrubs and perennial herbs within a 25 square meter (5 m x 5 m) plot will be censused and projected to estimate average densities per acre. These data will be used to evaluate revegetation success in terms of the success criteria (i.e., plant cover and species richness, by stratum. Enough transect lines will be sampled so that mean native species richness and cover values can be calculated with 80% confidence that sample means are within 20% of actual means (Bonham 1989).

Photo Documentation. Photo points will be established to document changing vegetative structure along each of the three reaches.

8.1.4 Monitoring Schedule

A schedule of site monitoring tasks is provided in Tables 8 and 9.

Table 8. Monitoring Schedule for Year One (2013 or 2014)

Work Tasks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Site Monitoring												
Qualitative Surveys	X	X	X	X	X	X	X	X	X	X	X	X
Quantitative Surveys							X					
Photo-documentation	X	X	X	X	X	X	X	X	X	X	X	X
Onsite Meetings[1]	X	X	X	X	X	X	X	X	X	X	X	X
Site Status Documentation												
Installation Completion (initial seeding and spraying)	X											
Progress Reports	X	X	X	X	X	X	X	X	X	X	X	
Annual Status Reports												X

[1] Onsite meetings will include, as needed, the biological monitor, the Revegetation Contractor/maintenance personnel, resource agencies, and any other appropriate parties and will occur as necessary during regularly scheduled site monitoring visits.

Table 9. Monitoring Schedule for Years Two through Five

Work Tasks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Site Monitoring												
Qualitative Surveys			X			X			X		X	
Quantitative Surveys							X					
Photo-documentation	X	X	X	X	X	X	X	X	X	X	X	X
Onsite Meetings[1]			X			X			X		X	
Site Status Documentation												
Progress Reports			X			X			X			
Annual Status Reports												X

1 Onsite meetings will include, as needed, the biological monitor, the Revegetation Contractor/maintenance personnel, resource agencies, and any other appropriate parties and will occur as necessary during regularly scheduled site monitoring visits.

8.2 REPORTING

All reports described below will be maintained in duplicate files by the Corps. Two documents will be completed prior to implementing revegetation areas, and regular progress reports will be prepared upon completion of initial revegetation work and on a regular basis thereafter until final approval of each Reach.

Pre construction supply schedule: Upon initiation of construction of the project, the Corps field representative, the Revegetation Contractor, and the biological monitor will review the planned construction area and estimate acreages of each habitat type to be revegetated on completion. They will prepare a schedule (items and quantities) of seed, nursery stock, irrigation supplies, and any other materials needed for the expected revegetation implementation. The Materials Schedule will be maintained in duplicate project files. The Revegetation Contractor will be responsible for ordering materials and arranging with suppliers to ensure that all needed materials will be available when needed. The Revegetation Contractor will notify the Corps field representative and the biological monitor when needed arrangements are in place or whether substitutions may be necessary due to unavailability. No substitutions will be made except with written agreement by the Corps and the biological monitor.

As-built Revegetation Map: The Corps shall identify on a plan view drawing the intended habitat type to be revegetated. For each mapped habitat type, it shall identify all applicable specifications as needed, to include soil treatment, seeding or planting methods, seed mixes, irrigation installation and usage.

The biological monitor will document initial and ongoing site conditions and performance throughout the monitoring period. This will include the development of an installation completion letter report, and regular progress reports.

- **Initial Installation Summary.** A letter report that summarizes initial installation (spraying and seeding) activities and final as-built conditions (including an as-built map) will be submitted to the Corps within six weeks of completion of initial mitigation installation. The report will include any revisions to site locations, site boundaries, plant materials, etc. listed in the approved mitigation program. The report will include a summary of all seed species broadcast and staked, and photographs of installation activities and site conditions immediately following installation.
- **Progress Reports.** Progress reports summarizing site status and recommended remedial measures will be prepared by the biological monitor in coordination with the Revegetation Contractor/maintenance personnel quarterly, with the exception of the site visits immediately preceding the development of each annual status report (see below). Each progress report will list estimated native species coverage and diversity, native species health and overall vigor, the establishment of volunteer native species, topographical/soils conditions, problem weed species, the

use of the site by wildlife species, significant drought stress, and any recommended remedial measures deemed necessary to ensure compliance with specified performance criteria.

- **Annual Status Reports.** One annual site status report that summarizes site conditions will be prepared by the biological monitor and sent to the Revegetation Contractor/maintenance personnel, the State Water Board, USFWS and CDFG at the end of each year following implementation of this plan. Each annual report will list native species coverage and diversity measured during yearly quantitative surveys, estimated tree heights, compliance/non-compliance with required performance standards, native species health and overall vigor, the establishment of volunteer native species, hydrological and topographical conditions, the use of the site by wildlife species, and the presence of invasive weed species. In the event of substantial non-compliance with the required performance criteria, the reports will include remedial measures deemed necessary to ensure future compliance with specified performance criteria. Each annual report will include:

  1. The name, title, and company of all persons involved in mitigation monitoring and report preparation
  2. Maps or aerials showing mitigation area location, transect locations, and photo documentation locations
  3. One or more photographs or reproductions of photographs that show the following
  4. The mitigation area before the start of work for that year
  5. The work in progress
  6. The mitigation area after the completion of work for that year
  7. An explanation of the methods used to perform the work, including the number of acres treated for removal of non-native plants
  8. An assessment of the treatment success.

9. FINAL REPORT

When this mitigation and monitoring plan has been completed, or when all specified performance criteria have been met, the Corps will prepare a final annual status report and forward it to the appropriate resource agencies.

10. ADAPTIVE MANAGEMENT

If at the end of monitoring years three or four, there is little or no indication that performance criteria will be met; the biological monitor will analyze site conditions and poor performance and recommend appropriate remedial measures. The biological monitor and the Corps will meet with the appropriate resource agencies regarding site performance and to discuss possible adaptive management measures that may be necessary to facilitate the establishment of riparian habitat to ensure successful attainment of performance criteria. Adaptive management may include supplemental planting with a revised plant palette, a new seed mix, a modified irrigation schedule, or increased weed control efforts. Because it is unknown what conditions may have contributed to the decline of the proposed vegetation it is speculative to provide a comprehensive strategy at this time.

11. REFERENCES

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