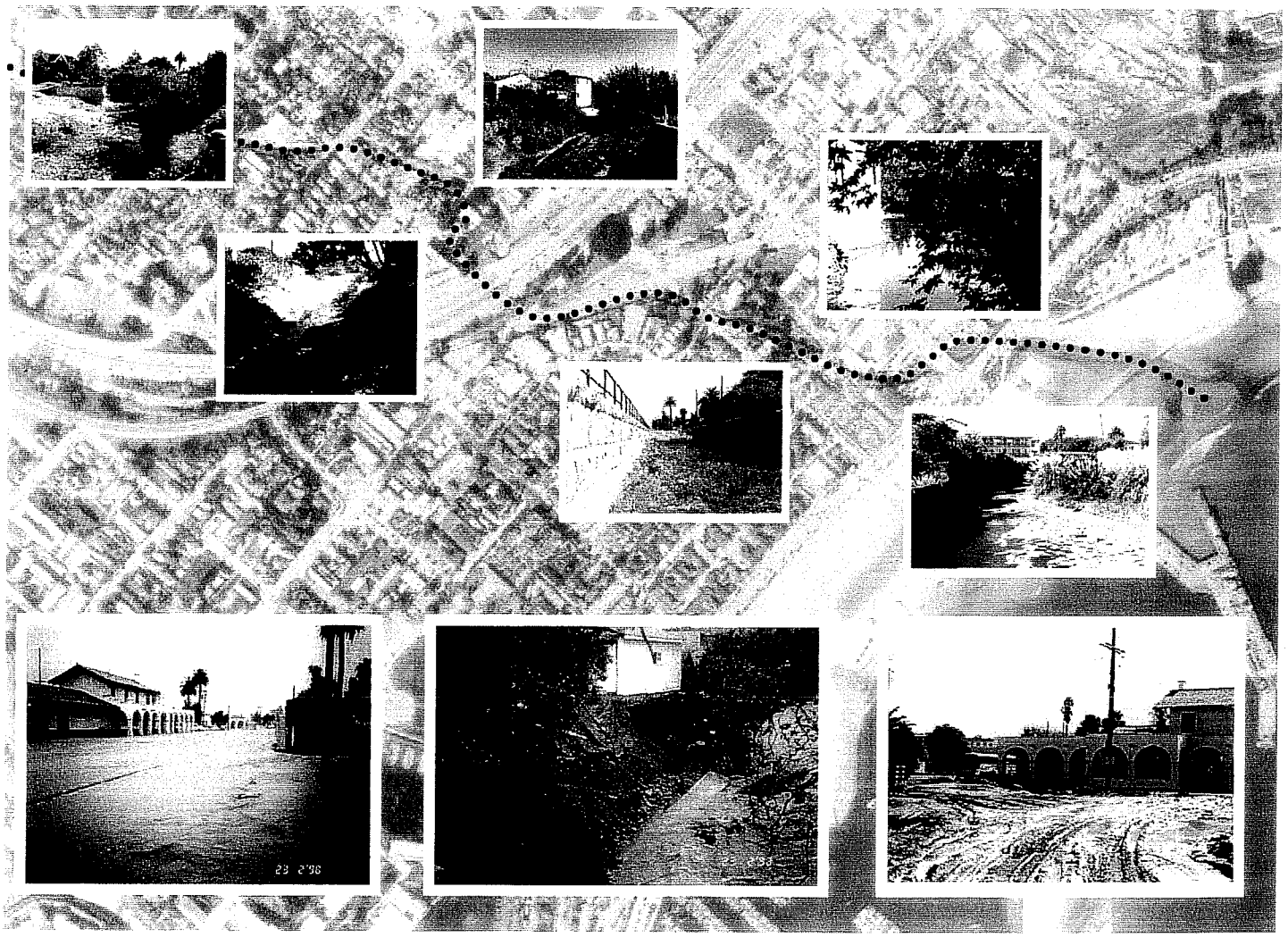
US Army
Corps of Engineers
Los Angeles District
South Pacific Division

FEASIBILITY REPORT, September 2000

SANTA BARBARA COUNTY STREAMS

LOWER MISSION CREEK
FLOOD CONTROL FEASIBILITY STUDY



Los Angeles District, Corps of Engineers
Planning Division
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SUBJECT: Feasibility Report for Lower Mission Creek, Santa Barbara County Streams, California

DA, South Pacific Division, Corps of Engineers, 333 Market Street, Room 923
San Francisco, CA 94105-2195 28 September 2000

FOR Deputy Commanding General for Civil Works, ATTN: CECW-B, U.S. Army Corps of Engineers, 441 G Street, NW., Washington, DC 20314-1000

I concur in the conclusions and recommendations of the District Commander.

PETER T. MADSEN
Brigadier General, U.S. Army
Commanding

EXECUTIVE SUMMARY

SANTA BARBARA COUNTY STREAMS, LOWER MISSION CREEK FLOOD CONTROL FEASIBILITY STUDY

Authority and Purpose

The Los Angeles District has been directed to perform feasibility level studies of flood control alternatives in the City of Santa Barbara, California as authorized by Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session).

The purpose of this study is to investigate the feasibility of flood control along the lower reach of Mission Creek in Santa Barbara, California. The City of Santa Barbara has experienced approximately 20 damaging floods since 1900.

This feasibility study completes the planning process of formulating and evaluating the array of alternative plans identified in the reconnaissance study and additional alternatives developed during the feasibility study, and selects a plan that maximizes net economic benefits while addressing flood control, environmental restoration and other needs identified and defined throughout the planning process. The results presented in this report were developed in accordance with Federal water resources planning principles, guidelines, procedures, and policies.

Study Participants

The Feasibility Report, together with the Environmental Impact Statement / Environmental Impact Report (EIS/EIR) was prepared by the U.S. Army Corps of Engineers, Los Angeles District, in cooperation with the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD) and the City of Santa Barbara (City). The SBCFC&WCD is the non-Federal Sponsor of this study and together with the City, is expected to share the non-Federal cost of implementing the recommended project. Coordination was also conducted with the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), California Coastal Commission (CCC), Regional Water Quality Control Board (RWQCB), State Historic Preservation Office (SHPO), other interested organizations and parties.

Problem Description

The primary problem affecting the lower Mission Creek area is the threat of flooding to property, which affects the health, safety and well being of the residents of Santa Barbara.

Secondary problems are the environmental impacts of flooding, urbanization, and the uncoordinated individual bank stabilization measures. The bank stabilization efforts have

degraded the natural characteristics of the creek bottom by unconfined placement of concrete material found in numerous locations along the creek. Persistent non-native vegetation, especially giant reed, has invaded and overwhelmed the creek's environs because of the loss of the riparian community. Inhospitable patchy bank treatments, and periodic maintenance is necessary, in part, to control bank erosion and prevent further encroachment of those weedy species and subsequent loss of conveyance capacity.

Planning Objectives

The Federal objective of water and related land resources project planning is to contribute to the overall National Economic Development (NED) and National Environmental Quality (NEQ). NED contributions include increases in the net value of the national output of goods and services, expressed in monetary units. NED contributions are consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other Federal planning requirements.

The following specific objectives of the feasibility study were based on review of problems and needs and in coordination with the desires of the local sponsors and the Mission Creek Consensus Group:

- Provide increased flood protection for the residents and businesses of Santa Barbara along the lower mile of Mission Creek;
- Restore the major species of a native riparian community along the project reach;
- Remove and suppress invasive non-native vegetation and replace with native plants;
- Remove man-made construction materials along the creek bottom and restore to natural; and
- Enhance the aquatic habitat by changing the streambed characteristics.

Plan Formulation

At the request of the local sponsor and as indicated in earlier Corps studies whereby expected flood control benefits for the upper reaches of Mission Creek would not likely warrant federal participation, this study focuses on the reach most prone to flooding; approximately the last mile of Mission Creek, beginning just downstream of Canon Perdido, across 13 bridges, and ends at Cabrillo Boulevard near the Pacific Ocean. It also includes the Laguna Drainage area, which is reach by overflows from Mission Creek.

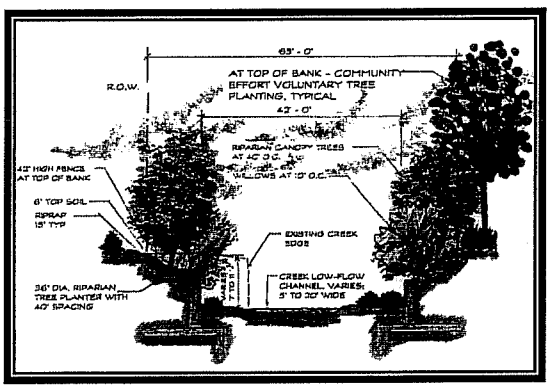
A total of 12 alternatives were developed in the feasibility study including the "No Action" alternative. Alternatives 2 and 3 were designed while placing high emphasis on using as much of the creek's existing footprint as possible with minimal creek widening allowed while replacing only the most constricted bridges. These alternatives would consequently have limited conveyance capacity estimated at 2500 cubic feet per second (cfs), which would provide approximately 15-year level of flood protection. Alternatives 2 and 3 were found to be not economically feasible and will not warrant federal participation. Subsequently they were eliminated from further consideration.

Nine other alternatives were developed with a 3400 cfs conveyance capacity (approximately 20-year level of flood protection). Alternatives 4 through 7 would use the creek's existing

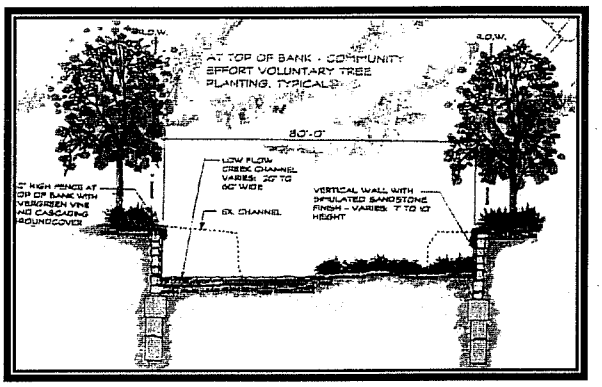
alignment throughout the project reach. The section of the creek between Gutierrez and Chapala Streets (referred to as the "oxbow"), has the sharpest bends and the least conveyance capacity. This reach would be widened to accommodate flows of up to 3400 cfs. Seven bridges would be removed and replaced. Alternatives 4 would use vertical wall sides, while Alternatives 5 to 7 would use varying amounts of vegetated-stepped walls and vertical walls would then be used where right-of-way is constricted.

Alternatives 8 through 11 differs from the earlier alternatives in that, it would incorporate an overflow culvert that would convey a significant amount of higher stormwater flows across the oxbow. The oxbow would not require any modification and would remain to carry low flows. Five bridges would be removed and replaced.

Alternative 12 has the same alignment as alternatives 8-11. It would incorporate a longer overflow culvert and would require the removal and replacement of four bridges. The creek banks would be protected using a combination toe wall and vegetated-riprap slope. Vertical walls would be used along the most constricted rights-of-way.



Creek Banks with Combination toe wall and vegetated riprap slope



Creek Banks with Vertical wall sides

The proposed alternatives except for the No Action, would have natural bottom. They would include the creation of numerous habitat expansion areas created on excess land from property acquisitions. For all the structural alternatives, future maintenance is an integral part of the project design in order to maintain its form and function.

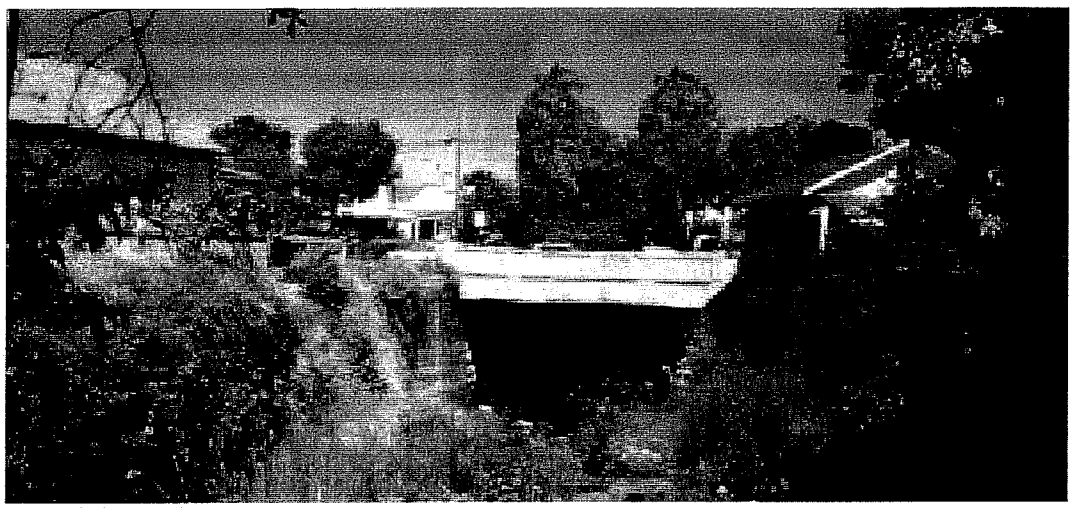
Together with the No Action alternative, Alternatives 6, 8, and 12, which best represent the project objectives and meet federal economic requirements were carried forward for full development and evaluation in the EIS/R. This combined environmental document has been prepared in compliance with the National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA).

In order to select the proposed Recommended Plan, the final alternatives were evaluated based on comparison to the No Action Plan on meeting the project objectives, their contributions to National Economic Development (NED), and their environmental benefits and impacts, and their compliance with environmental laws, policies, and other guidelines.

Recommended Plan

Alternative 12 best satisfies the project objectives. It provides the desired level of flood protection, produces the highest environmental outputs, and yields the highest monetary net benefits. It is therefore designated as the NED and NEQ plan. It is supported and preferred by the non-Federal sponsor. Alternative 12 is estimated to cost about $18.3 Million and has a benefit-to-cost ratio of 1.2.

Alternative 12, where the creek banks are protected with the toe wall and vegetated riprap is expected to resemble the conditions depicted in the following digital photograph simulation. The section of the creek between Ortega and Bath Street Bridges is shown in these photos.



Existing Condition (August 2000):

Expected Future With-Project Appearance after Vegetation has established:

Environmental Impacts of the Recommended Plan

The feasibility report and the combined environmental document fully describe the environmental impacts and mitigation requirements for the recommended plan.

Short term less than significant impacts to water quality, air quality, noise conditions, and other resources are expected during construction and future maintenance activities. However, no change from the existing conditions is expected in the long term. Impacts to two Endangered Species; Steelhead and tidewater goby, could be avoided or minimized by suspending construction activities within flowing water between December to March, and by scheduling future maintenance activities between April and November. Short-term impact to the tidewater gobies during construction would be minimized to insignificant level by dewatering one side of the estuary at a time for construction activities. However, future maintenance is expected to have minimal incidental take of tidewater gobies, the scheduling of maintenance would instead avoid impacts to steelhead. The anticipated impacts to the aesthetics would be short term during the construction activities. In the long term, the improvements that are proposed in this project would enhance the aesthetic values along the project reach and nearby communities by the re-vegetation of creek banks and the creation of the habitat expansion zones with recreational features. This recreational feature would be added and paid for by the City of Santa Barbara. Impacts and mitigation measures for other resources are described in the Feasibility Report and the EIS/EIR.

Plan Implementation Requirements

The District Engineer's recommendation proposes to seek new Congressional Authorization for this project and de-authorize the project authorized by the Congress in 1998. In accordance with the Water Resources Development Act (WRDA) of 1986, as amended, flood control projects are typically cost shared on a 65%-35% basis with the cost for lands, easements, rights-of-way, relocations, and disposal sites (LERRDS) as non-Federal responsibility. For this project the sponsor's project share would reach the maximum 50% allowed by law. The expected project cost-sharing apportionment would be $9.1 Million for the SBCFC&WCD and $9.2 Million for the Corps. The difference is associated with cultural resources costs, which would be shared fully by the Corps.

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Exhibit 4. Laguna Channel Drainage Map
Exhibit 5. Mission Creek Floodplain Map
Exhibit 6. Mission Creek Floodplain Map 3400 cfs Project
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Environmental Impact Statement / Environmental Impact Report

(MAY BE FOUND FOLLOWING THE EXHIBITS)

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I. STUDY AUTHORITY

A. Authority

The Los Angeles District has been directed to perform feasibility level studies of flood control alternatives in the City of Santa Barbara, California as authorized by Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), which reads in part as follows:

> "Sec. 209. The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, . . . to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities [including]:
>
> All streams in Santa Barbara County, California, draining the Santa Ynez Mountains, except Santa Ynez River and tributaries."

B. Local Sponsorship

This Feasibility Study is cost shared on a 50/50 basis with the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD). The City of Santa Barbara has worked with SBCFC&WCD and the Corps during the study phase of this project. The SBCFC&WCD is expected to share the non-Federal cost of project implementation and would be the non-Federal Sponsor responsible for the items of local cooperation requirements.

II. STUDY PURPOSE AND SCOPE

A. *Study Purpose*

The purpose of this study is to investigate the feasibility of flood control along Lower Mission Creek in Santa Barbara, California. The City of Santa Barbara has experienced approximately 20 damaging floods since 1900. Urbanization over the course of the century has undoubtedly contributed to the increased runoff within the watershed. Unless some flood control precautions are taken within the watershed, the City would continue to sustain damages due to inadequate channel size and undersized bridges.

This Feasibility Study completes the planning process of formulating and evaluating the array of alternative plans identified in the reconnaissance study and additionally, alternatives developed during the feasibility study, and selects a plan that maximizes net economic benefits while addressing flood control, environmental restoration and other needs identified and defined throughout the planning process. The results presented in this report were developed in accordance with Federal water resources planning principles, guidelines, procedures, and policies.

B. *Study Scope*

The study is limited to approximately the last one mile of the creek, beginning just downstream of Canon Perdido Street to Cabrillo Boulevard bridge at the tidal estuary before the creek reaches the Pacific Ocean (See Exhibit 2, "Location Map" following the Main Report). The scope of this study includes engineering, economic, environmental, real estate, and other planning activities as necessary to define problems and needs, develop alternatives and evaluate potential benefits, impacts, and necessary mitigation requirements associated with flood control measures within the Lower Mission Creek Area. The study identifies the costs and benefits of necessary improvements related to flood control. The study also makes a determination of the Federal interest and whether potential solutions exist that are in concert with current policies and budgetary priorities. Due to the recency of the last Corps feasibility study, which indicated that

sediment detention measures are not economically feasible, no detention basin is being considered in this study.

The study was conducted in coordination with public agencies, organizations and concerned individuals within the realm of Federal participation as defined by law and current planning regulations. The study also includes analyses, documentation, and coordination to meet NEPA and CEQA requirements as well as other Federal and State laws, policies and guidelines. The analysis was accomplished for present (year 1999) and future (year 2050) conditions, with a base operational year of 2001.

C. Study and Report Process

This is the Final Feasibility Study Report and EIS/EIR. The Reconnaissance Study Report (November 1995) determined that the investigation should proceed further into the more detailed cost shared Feasibility Phase Study. While the Reconnaissance Study was fully Federally funded, the cost for this Feasibility Study is cost shared on a 50/50 basis with a non-Federal sponsor, Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD).

III. PRIOR STUDIES, REPORTS, AND EXISTING WATER PROJECTS

A. *Prior Studies and Reports*

The Corps of Engineers first studied the flood problem along Mission Creek in the late 1960's. At that time, an improvement plan was developed. The improvements consisted of: (1) a debris basin on Mission Creek just downstream from Foothill Road; (2) a concrete channel extending from the debris basin along Mission Creek to Oak Park just above U.S. Highway 101; (3) a covered concrete channel to divert flows under the U.S. Highway 101 freeway, Union Pacific Railroad and under Modoc Road to Las Positas Road in the adjoining Arroyo Burro drainage area; and (4) a concrete channel along Las Positas Road and Arroyo Burro Creek to the Pacific Ocean. The estimated cost of the plan was approximately $9.5 million in 1969 dollars (about $41.1 million in 1995 dollars) with a benefit cost ratio of 1.3.

At a public meeting held in Santa Barbara on June 12, 1969, community interests objected to the proposed plan on the basis that it was insensitive to environmental values, especially in the reach upstream from State Street and through Oak Park. The community objected to: (1) the destruction of trees and brush in and along the creek that serve as wildlife habitat, provide shade and have aesthetic values; (2) the substitution of a concrete channel for an aesthetic natural channel; (3) despoiling of the natural environment, beauty and ecology of the area which is enjoyed by residents and visitors (adults and children) alike; (4) the adverse impact on the facilities and natural setting of the Museum of Natural History; and (5) the impact on ground water recharge along Mission Creek. Community interests emphasized the need for keeping the Mission Creek channel upstream from State Street and in Oak Park in its natural state.

In the early 1970's, the Corps of Engineers conducted further studies in coordination with an Environmental Quality Advisory Board established by the City of Santa Barbara. The Corps of Engineers and the advisory board considered various alternatives but could not agree upon a solution to the flood problems along Mission Creek.

A *Flood Plain Information Report* covering streams in the City of Santa Barbara (including Mission Creek) was prepared in April 1975. This report delineated the overflow areas and presented hydraulic characteristics of the *standard project flood* and an *intermediate regional*

flood, whose peak discharge would have a one percent chance of being equaled or exceeded in any year (this flood is generally referred to as the 100-year flood event). This report did not propose solutions to the flood problem, but did supply a basis for the adoption of land use controls to guide flood plain development and thereby preclude increased flood loss problems.

A Flood Insurance Study covering streams in the City of Santa Barbara, including Mission Creek, was prepared in June 1978 for the Federal Insurance Administration. Flood Insurance Rate Maps were prepared in December 1978. The Study and Maps enabled the City of Santa Barbara to convert to the regular program of flood insurance by the Federal Insurance Administration and to aid local and regional planners in their efforts to promote sound land use and flood plain development. The Study was performed under the authority of the National Flood Insurance Act of 1968, as amended.

The floods of 1978 and 1980 reawakened interest in flood protection for Mission Creek. On April 1, 1980, the City Council of the City of Santa Barbara requested, by resolution, the resumption of Mission Creek flood control studies. They believed that a feasible plan could be developed through public participation and an examination of alternatives. The Santa Barbara County Board of Supervisors sitting as the Board of Directors of the Santa Barbara County Flood Control and Water Conservation District on April 21, 1980 passed a similar resolution.

The Corps of Engineers concluded a feasibility study in 1986 with several structural, non-structural and no-action alternatives considered. The alternative recommended in the study, referred to as the *Lower Mission Creek Project* was authorized by Congress in the Water Resources Development Act (WRDA) of 1988. Given the narrow right-of-way constraints and national economic development criteria, the fully concrete-lined channel project was widely accepted as the only feasible alternative for controlling flooding along Lower Mission Creek.

The Corps conducted sediment analysis studies between June 1990 and May 1993, which revealed that the project would not provide the authorized level of protection due to sedimentation problems at the channel outlet. Sedimentation and various environmental concerns prompted the Santa Barbara City Council and the County Board of Supervisors to commission a *Mission Creek Consensus Group*. The Consensus Group worked with the Corps of Engineers and the Santa Barbara County Flood Control District, and the City of Santa Barbara

to identify other alternatives to the flood control problem. The City contracted with Kennedy/Jenks Consultants to analyze the alternatives, the result of which is the Kennedy/Jenks final report entitled, "The Mission Creek Flood Control Project, Alternatives Analysis" (August 1994).

In July 1995, the City of Santa Barbara requested assistance from the Corps of Engineers under their Section 206 Program. The City requested that the Corps help the City mitigate flood losses in the Laguna Channel Watershed. Hydrologic and hydraulic analyses were conducted as part of the project. The results of the analyses can be found in *Laguna Channel, City of Santa Barbara, California, Section 206 - Special Study, Floodplain Management Services,* dated June 1997. Also as part of the City's request, the *Final Non-Structural Flood Proofing Study for the Laguna Channel Watershed, Santa Barbara, California*, prepared by Simons, Li & Associates, Inc. was completed in September 1997. This study suggested several different methods of flood proofing including installing temporary closures, raising existing structures, and constructing floodwalls around the structures in the floodplain.

Other Studies in the Area

Since the construction of Santa Barbara Harbor in 1928, both the Corps of Engineers and private engineering firms have conducted numerous studies on the expansion of the harbor, the problem of shoaling at the harbor entrance and related down beach erosion. The most current of these studies, "The Final Feasibility Report for Santa Barbara Harbor" (August 1993) determined the Federal interest to improve upon the shoaling problem and reviewed the City's desire to be responsible for maintenance dredging. Currently, the Corps of Engineers maintains the harbor and will continue to do so unless Congress approves the 1993 feasibility study and thereby, relinquishes dredging equipment and operations to the City. To date, no other harbor studies are being conducted which may impact the Mission Creek Feasibility Study.

Several authorities are conducting water supply studies in the Mission Creek area. The California Department of Water Resources (DWR), in conjunction with San Luis Obispo and Santa Barbara Counties, has constructed Phase II, Reaches 5 and 6 of the California Aqueduct Coastal Branch. The project was completed in July 1997. The Coastal Branch has the capability to deliver 47,816 acre-feet of water to the Central Coast annually.

The Bureau of Reclamation completed a study in 1990 to enlarge Lake Cachuma and bring Bradbury Dam into compliance with the Bureau of Reclamation's Safety of Dam Criteria. Bradbury Dam is under going seismic retrofitting; however, the extension of the California Aqueduct has minimized the need to enlarge Lake Cachuma for water supply needs. The Santa Barbara County Flood Control and Water Supply District is conducting several groundwater management plans to study water quality and water supply in Santa Barbara County. None of these water supply studies will impact the Lower Mission Creek Study. No other water supply studies are being conducted in Santa Barbara County.

Both the Corps of Engineers and private engineering firms have conducted studies of the Santa Barbara County coastline since the construction of Santa Barbara Harbor in 1928. In 1987, the Corps initiated the "Santa Barbara County Beach Erosion and Storm Damage Reduction Reconnaissance Study" to investigate beach erosion and property damage at the mouth Mission Creek (East Beach). The recommended alternatives included continuing the restoration of East Beach with material dredged from Santa Barbara Harbor and installing protective structures along Carpenteria City Beach. At the conclusion of the reconnaissance study in February 1990, the local sponsors were unable to cost share the feasibility study. To date, no further Federal actions to study the beach erosion problems in Santa Barbara County have been considered.

The City of Santa Barbara has established a certified Local Coastal Program governing land use and establishing Zoning Ordinances and Guidelines. The plan is based on numerous local studies, including "Water and Marine Resources, Local Coastal Program" City of Santa Barbara, 1978.

B. Existing Water Projects and Facilities

Existing flood control projects in the Mission Creek drainage area include two debris basins in the watershed areas of Mission and Rattlesnake Creeks and three reaches of lined channel in the City of Santa Barbara. Existing flood control projects in the Laguna Channel drainage area consist of three storm drain systems including the Victoria Street System, Laguna System and Quarantina System.

Mission and Rattlesnake Creek Debris Basins

In 1964, the Corps of Engineers constructed two emergency debris basins. One basin has 15,900 cubic yards of capacity and is located on Mission Creek just upstream from the Botanic Garden and about one mile upstream from Foothill Road. The second basin has a capacity of 8,300 cubic yards and is located on Rattlesnake Creek about 800 feet upstream from Los Canoas Road (about 1.1 miles upstream from the mouth of Rattlesnake Creek). The debris basins are estimated to be adequate for a slightly greater than a ten-year storm for the first year after a burn and between a 25-year and a 50-year storm for the fourth year after a burn. The differences in capacities is due to the fact that the debris load increases dramatically immediately after a burn. Once vegetation is re-established, probable debris load from any storm is reduced.

Mission Creek Channel Improvements

Three reaches of Mission Creek are concrete lined downstream from Oak Park: (1) a 0.3 mile concrete trapezoidal channel from Los Olivos Street to about Pedregosa Street; (2) a 0.8 mile concrete trapezoidal channel from Arrellaga Street to about Canon Perdido Street; and (3) a 0.1 mile rectangular section with a concrete bottom and stone walled sides located between the Union Pacific Railroad tracks and Chapala Street. The upper two reaches, which adjoin the U.S. Highway 101 Freeway, were built by the California Department of Transportation as part of two phases of freeway construction. The channel between Los Olivos and Pedregosa Streets was built in 1934 and the channel between Arrellaga and Canon Perdido Streets was built in 1964. It is estimated that the capacity of the two upper reaches is about 7,000 cubic feet per second, slightly less than a 100-year flood. The lowest reach of concrete channel has capacity of about 3,000 cubic feet per second.

Mission Creek Bank Stabilization

Many short reaches of Mission Creek are lined with piled stone, sacked concrete, gabions and pipe and wire revetment to prevent localized bank erosion and flooding. These protective efforts are fragmented and have limited capability to control flooding of adjacent residential and commercial developments. Bank stabilization efforts have also impacted the environmental value of Mission Creek in proportion to increased urbanization. This has caused a loss of native vegetation, the introduction of non-native vegetation, a reduction in riparian habitat, reduced habitat for fish, birds and wildlife, and overall deterioration of Mission Creek's aesthetic quality. Bank Stabilization efforts are expected to continue as redevelopment and erosion due to flooding occur.

IV. PLAN FORMULATION

A. *Location and Extent of Study Area*

Location of the Study Area

Mission Creek is located in the City of Santa Barbara, California. Exhibit 1. "Regional Map" shows the location to be approximately 100 miles northwest of the City of Los Angeles in the County of Santa Barbara. The study area is defined as the Lower Mission Creek watershed and the Laguna Channel drainage area. For the purposes of this study, the Lower Mission Creek area is defined as the last mile before the creek enters the Pacific Ocean. This area is shown on Exhibit 2. "Location Map". The Laguna Channel area being studied extends from De la Guerra Street to the Pacific Ocean. The Laguna Channel drainage area is considered part of the study area because a portion of the flood waters from Lower Mission Creek drain into the Laguna Channel drainage area. Thus, any improvements to Lower Mission Creek would also reduce the flooding problems in the Laguna Channel drainage area.

Drainage Basin Description

As discussed above, the study area includes both the Mission Creek watershed and the Laguna Channel watershed. Therefore, the following sections discuss the characteristics of each drainage area.

Mission Creek

The watershed of Mission Creek and its tributary, Rattlesnake Creek, is approximately 11.38 square miles. The watershed drains the southern slopes of the Santa Ynez Mountains and the urban area of Santa Barbara. Rattlesnake Creek joins Mission Creek above Foothill Road outside of the City. Exhibit 3. "Mission Creek Watershed Map" illustrates the drainage area for Mission and Rattlesnake Creeks.

The Santa Ynez Mountains create a narrow coastal zone in the Santa Barbara area. In fact, the rise of the creek in the mountainous area can be between 3000-3500 feet in 3 miles. Crest

elevations in the watershed reach heights of 3500 to 4000 feet above mean sea level. In these upper reaches, maximum slopes can be as much as 2600 feet per mile. Average gradients in the mountainous area are about 1000 feet per mile, which is a sharp contrast to the average alluvial plain gradients of 150 feet per mile in the lower reaches of the creek.

The lower portions of the Creek flow through the urbanized area of downtown Santa Barbara. In this lower reach, the creek parallels Highway 101 until it reaches Canon Perdido Street, where it turns to the east, and crosses Castillo, De la Guerra, Ortega, Bath, Cota, De la Vina, and Gutierrez Streets. The creek then crosses Highway 101, Montecito Street, Union Pacific Railroad tracks, Chapala Street, Mason Street, State Street, and Cabrillo Boulevard before entering the Pacific Ocean just east of Stearns Wharf.

The lower portions of Mission Creek experience perennial flow due to urban runoff. However, significant flow only occurs during and immediately after storm events. Extreme runoff events, such as those that occurred on January 10, 1995, generally are produced by intense rainfall over a short period of time. According to the recent hydrology studies, the 100-year peak flow rate for lower Mission Creek is 7,050 cfs.

Laguna Channel

The area, which drains into Laguna Channel, is bounded by Mission Creek on the west, Sycamore Creek on the north and east and the Pacific Ocean on the south. The upper reaches of the drainage area have a slope of about 300 feet per mile. The slope decreases to approximately 150 feet per mile as it approaches the Pacific Ocean. Exhibit 4. "Laguna Channel Drainage Map" shows the delineation of drainage area for the Laguna Channel.

The Laguna Channel drainage area incorporates the following three storm drain systems: Victoria Street system, the Laguna system and the Quarantina system. The Victoria system collects water from the drainage area and diverts it into Mission Creek upstream of the project reach; the other two systems outlet to the Pacific Ocean.

Physical Setting

The Santa Ynez Mountains are part of the east-west trending Transverse Range geologic province. In the Santa Barbara area, this province consists of complexly folded and faulted igneous rock and sedimentary rock underlain by a basement of igneous rock. Just outside the City of Santa Barbara, the Santa Ynez Mountains rise to heights of more than 4,000 feet. The Santa Barbara Channel west and south of the City extends at least 25 miles to the west to the Channel Islands.

Climate

Santa Barbara has a Mediterranean climate. Mediterranean climates are characterized by warm dry summers and cooler and relatively damp winters. Maximum temperatures during the summer average in the 70's (degrees Fahrenheit). Summer low temperatures average in the 50's to low 60's. During the winter months high temperatures average in the 60's, while the minimums are usually in the 30's and 40's. Average annual precipitation for the area is 18 inches at the airport and over 30 inches in the Santa Ynez Mountains. More than 90 percent of the average annual precipitation occurs between November and April.

B. Problems and Opportunities

Problems and opportunities were identified, defined and assessed through: coordination with local and regional agencies and the public, review of prior studies and reports and an analysis of engineering, environmental and economic effects. The assessment is based on existing and expected future conditions, as described in the following sections.

The following statements were developed for the formulation and evaluation of alternative plans for the Mission Creek Project Study Area. They are based on the identified problems and needs expressed by the local sponsor and residents in the study area throughout the planning process. The statement also reflects the Federal concern for improving national economic development and preserving environmental quality. Plans are being analyzed for a period of study of fifty years from the date of construction.

Problems

The primary problem affecting the lower Mission Creek study area is the threat of flooding to property, which affects the health, safety and well being of the residents of Santa Barbara. This is substantiated by flood records dating back to 1862. Records show that the area has suffered at least 20 considerable floods since 1900. Increased urbanization of the Santa Barbara area over the last century has contributed to increased runoff, and therefore, increased flooding frequencies.

Secondary problems within the study area have been identified as the environmental impacts of flooding, urbanization and bank stabilization. Specifically, individual bank stabilization and uncoordinated improvements to the creek have resulted in the removal of the native riparian community. These bank stabilization efforts have degraded the natural characteristics of the creek bottom by unconfined placement of concrete material found in numerous locations along the creek. Persistent non-native vegetation, especially giant reed, has invaded and overwhelmed the creek's environs because of the loss of riparian community. Inhospitable patchy bank treatments, and periodic maintenance is necessary, in part, to prevent further encroachment of those weedy species and subsequent loss of conveyance capacity. Other secondary problems include the negative effects on water quality as it relates to fish habitat and the establishment of migration barriers preventing fish from reaching primary spawning grounds.

Opportunities

An opportunity exists for improving the physical, emotional and economic health, safety and well being of floodplain residents by reducing flood damages for the City of Santa Barbara. The proposed alternatives would also afford the opportunity to contribute to the restoration of environmental quality, enhancement of fish and wildlife habitat, and preservation of cultural resources within the study area. The existing conditions of the creek bottom can be improved to facilitate migration of steelhead trout and improve the aquatic habitat for fish, amphibians, benthic invertebrates, and wading birds. An opportunity also exists to expand the estuarine environment near the lagoon, which could increase the habitat for an endangered species, the tidewater goby.

C. *Planning Objectives and Constraints*

Planning Objectives

The Federal objective of water and related land resources project planning is to contribute to the overall National Economic Development (NED). NED contributions include increases in the net value of the national output of goods and services, expressed in monetary units. NED contributions are consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other Federal planning requirements.

The general objective of the Feasibility Study Phase is to complete the plan formulation process initiated in the Reconnaissance Study Phase by identifying the most cost-effective means of flood control in the City of Santa Barbara. The most cost-effective means is the plan that maximizes contributions to National Economic Development (the NED plan). Contributions to National Economic Development are the net benefits of a project; these are the total benefits minus the total costs. Notably, the NED plan is the plan that maximizes net benefits rather than maximizes the benefit/cost ratio. The Federal objective for the City of Santa Barbara is to alleviate the flooding problems and realize the opportunities stated above that relate to the output of goods and services and increased economic efficiency. In addition to meeting the criterion of economic efficiency, a federal project must also comply with the National Environmental Policy Act of 1969 (NEPA).

Specifically, the objectives of the Lower Mission Creek Feasibility Study are as follows:

Provide increased flood protection for the residents and businesses of Santa Barbara
Restore the major species of a native riparian community along the project reach
Remove and suppress invasive non-native vegetation and replace with native plants
Remove man-made construction materials along the creek bottom and restore to natural creek
Enhance the aquatic habitat by changing the streambed characteristics.

Planning Constraints

Physical, economic and environmental constraints were identified in the Reconnaissance Study to help formulate and evaluate possible flood control alternatives. No new constraints have been identified for the Feasibility Study. Therefore, the reconnaissance planning constraints were used to establish the framework for the Feasibility Study 's evaluation and selection of alternatives.

Physical

Encroachment by urban development has severely limited the area available for implementation of any flood control alternatives. In addition, any flood control alternative must be able to function while conveying substantial amounts of sediment or debris.

The residential and commercial developments along Mission Creek straddle the existing creek channel and in some cases encroach in the existing waterway. In general, adequate rights-of-way could be obtained at reasonable costs to construct a narrow channel; however, there is insufficient space for recreation trails, bike paths or green belts. The reach of creek downstream from Canon Perdido Street is especially constricted; right-of-way costs increase substantially for discharges in excess of a 20-year flood.

Due to the economic impacts associated with temporary closure and reconstruction of the State Street, Cabrillo Boulevard, and Bath Street bridges, they will not be considered for replacement as part of this study. Both the State Street and Bath Street bridges have recently been replaced; therefore, the design of the alternatives took into account the maximum conveyance capacity of the bridges.

Economic

The 1936 Flood Control Act (Public Law 49-738) established that the Federal Government could participate in flood control improvements if the benefits of the proposed action are in excess of the estimated costs. For an alternative to be recommended in this study, the net economic benefits must exceed the costs. Flood damage reduction benefits cannot be claimed for future

development subject to flooding by the 100-year flood and Executive Order 11988, "Floodplain Management", which prohibits Federal agencies from promoting floodplain development. Therefore, federal plans are based on present floodplain development and future non-floodplain development. The Economic Documentation details the procedure for determining net benefits for the alternatives evaluated in this study.

During the economic analysis performed for this study, it was determined that replacement of the State Street, Cabrillo Boulevard, and Bath Street Bridges would likely produce negative net benefits. These bridges are located in the busiest tourist spot in Santa Barbara. Their replacement would undoubtedly have a significant negative impact to the local economy and the tourist industry of Santa Barbara. Therefore, replacement or reconstruction of the three bridges was not considered in the formulation of alternative plans.

Environmental

Although the County and the City of Santa Barbara recognize the seriousness of the flood problem along Mission Creek, they are very sensitive to the creek's environmental and aesthetic values. Any proposed flood control improvements should not disrupt or significantly modify these existing values.

The Mission Creek estuary provides habitat for a wide variety of birds and animals. Of particular concern is the Tidewater Goby, a Federally Listed Endangered Species. The creek itself may also provide a migratory corridor for Steelhead Trout. East Beach, located near the estuary, provides habitat for the Western Snowy Plover, which is a Federally Listed Threatened Species. By keeping the exiting natural condition of the creek bottom (pervious), the proposed flood control improvements would avoid or minimize biological and aesthetic impacts.

D. Without-Project Conditions

The without-project condition is the condition expected to prevail if no action is taken. The without-project existing condition is based on the year 1999. The without-project, future condition for this study takes place in the year 2050.

Flood History

Historical records of floods along Mission Creek date back to 1862. Most historical data is qualitative; very little quantitative data is available. Records since 1900 show that floods occurred in the Santa Barbara County area in 1906, 1907, 1909, 1911, 1914, 1918, 1938, 1941, 1943, 1952, 1955, 1958, 1962, 1964, 1967, 1969, 1973, 1978, 1980, 1983, 1995 and 1998. Increasing urbanization of the watershed during the historical period has undoubtedly contributed to increased run-off. Continuous records of peak discharges are only available for the last 24 years. A stream gage station was established on Mission Creek in October 1971. A stream gage was established in 1941 on San Jose Creek, draining a similarly sized watershed ten miles to the west of Mission Creek. Flood damage surveys have been conducted since 1969, but even these surveys were not complete for several of the floods. Prior to 1969, the records are mostly from newspaper accounts, field investigations and eyewitness accounts.

The rainfalls that cause flooding in the Santa Barbara area are intense, local storms typical to the south coastal area of California. These floods are of a short duration, with extreme flooding lasting a few hours or less. Past floods in the cities and communities of Santa Barbara, Goleta, Montecito and Carpenteria have demonstrated that localized storms can cause substantial damages in one area while completely bypassing another. Thus, awareness and a record of major damages in the entire south coastal area are helpful in assessing the flood potential along Mission Creek.

Flooding through 1911

The flood of 1862 was reported to have produced very high stages; however, little data is available concerning their severity. Between 24 December 1861 and 31 January 1862, rains fell consistently for 5 weeks. This time was known locally as "the deluge." Ten miles to the west, the Goleta Slough was created by sediment filling what had previously been a salt water harbor used by ocean going vessels. Other areas in Southern California, such as the Santa Ana River, suffered their greatest known flooding (in terms of discharge).

Not much flooding of note or record occurred until 1906 when several feet of water inundated

areas below the railroad tracks between Anacapa and Chapala Streets (about four blocks). During the same flood, the Anapamu Street Bridge over Mission Creek was washed away.

The floods of January 1907 were the worst in the history of Santa Barbara County (according to the Morning Press, Santa Barbara, January 11, 1907) and stopped railroad service to Santa Barbara. The creek overflowed its banks inundating the low lots near the foot of State Street.

The floods of January 1909 resulted in conditions reported as "more serious than they had been in many years." The following account was reported in the Weekly Press (January 28, 1909). "Stores on lower State Street suffered from an overdose of water that flowed into these places from the overflowed Creek." Water was up to three feet over the sidewalks of several blocks along what are now Cabrillo Boulevard and Mason Street. Railroad travel out of the town was cut off and the water came down the Creek in what was reported as "regular waves." The Oak Park area was flooded for the "first time in memory." Some local residents commented that recent street improvements in that vicinity may have aggravated the flooding conditions.

Mission Creek overflowed its banks in a number of places and flooded commercial buildings to a depth of at least two feet during the flood of January 1911. All the stores and buildings below the railroad tracks were reported damaged. Below Yanonali Street, the flood levels were the highest in history, reportedly nearly two feet higher than before. The Rust garage, near the overflowed Mason Street Bridge, had over two feet of water on the floor and a home on Kimberly had six inches in the parlor. At Bastanchury's lemon packinghouse across the street, water stood at one time a foot and a half deep. Several families had to move just before daylight to save themselves. Bridges were saved by men removing floating debris. Water overflowed the State Street bridge for several hours, one time to a depth of two feet; sewerage water added to the floodwaters.

The Flood of 1914

The January 1914 flood was the most destructive flood of record. Information about this flood has been obtained from newspaper articles, unpublished County survey reports and personal interviews of witnesses by County Flood Control personnel (during the 1960's).

Mission Creek overflowed from State Street downstream, completely destroying highway bridges, a dozen homes and several commercial establishments. Many residential and commercial properties were damaged by debris-laden floodwaters that in some areas reached a depth of four feet. Two drowning were reported in a nearby Montecito drainage - Hot Springs Creek. At this time, the community of Goleta was flooded to a depth of more than two feet, many bridges were washed out and many acres of cultivated land were buried in sediment and debris. Crop losses were heavy.

On January 18th, a week before the greatest inundation, a rainstorm filled Mission Creek and flooded lower Chapala and State Streets with one to three feet of water. Damages expressed in newspaper accounts released during the floods often shrank into more modest proportions in post-flood discussion. Many hysteric accounts told of destruction not validated afterward. However, the flood was a most extraordinary event. Rainfall was reported at 9.36 inches in 48 hours, with four inches in two hours, and 4.5 inches in four hours in an afternoon following almost five inches of prior rainfall.

Families living in Mission Canyon behind the Mission were forced to abandon their homes as the torrents poured down the canyon. Vast quantities of sediment were deposited along the channel sides when water overflowed the channel. The Creek overflowed upstream of what is present day De la Vina Street sending a stream of water several hundred yards south of the main current. Water four feet deep reportedly rushed down Alamar Avenue through the Oak Park grocery and blacksmith shop. From this area the floodwaters spread through the Oak Park area until at one time it was 2,000 feet across in the vicinity of the Cottage Hospital. On Third Avenue (now Pueblo Street) near the Creek, two smaller buildings were twisted about and others in that area were flooded. According to eyewitness accounts (data gathered by the Santa Barbara County Flood Control and Water Conservation District in the 1960's), the floodwaters reached across to the west side of the railroad tracks as far as present day La Cumbre Junior High School. At Mission Street below Oak Park, the flood flows continued along the east side of the railroad and also spread out onto the west side along Mission Street. Streets mentioned in the newspaper accounts as flooded in this area included Oak Drive, San Pasqual Street and Modoc Road. The flows rushed down San Andres Street and joined Mission Creek in the vicinity of Micheltorena Street. Downstream from there bridges blocked with debris spread the waters widely.

The numerous newspaper accounts of flood depths and damages along the lower reaches of Mission Creek include the following:

- Flooding of many places on Canon Perdido Street,
- Damages to barns, outhouses and warehouses north of Ortega Street just below the De la Guerra Street Bridge,
- A row of houses swept away on Ortega Street by torrents from the blocked Ortega Street bridge,
- Three feet of water on De la Vina Street,
- Numerous buildings carried downstream or flooded in the vicinity of Bath, Ortega, Cota, De La Vina and Haley Streets,
- Two feet of water and debris (in the form of a mad torrent) swept over the Southern Pacific Railroad tracks,
- Erosion of what is now Cabrillo Boulevard into gullies as much as ten feet deep by The Mission Creek floodwaters,
- Rail and highway traffic severed for days.

Damages from the 1914 floods included damages to many of the bridges below Oak Park. Several bridges were almost completely or totally destroyed (Pedregosa, Valerio, Carrillo, Haley) while others suffered major damage (Ortega, Bath, Cota).

Mission Creek flooding from 1918 to 1983

The flood of March 1918 caused Mission Creek to overflow at Oak Park and resulted in flooding at the Southern Pacific railroad tracks. The lowermost section of the City was flooded locally in the vicinity of State Street.

The flood of March 1938 caused flooding at State Street. The floods of 1941 caused damages to public improvements within the City of Santa Barbara estimated at $30,000 (1941 dollars). There were reports of flooding and sediment deposition, but no estimate is available of damages to the other properties. This season was the wettest in the duration of rainfall records at Santa Barbara at that point in time. But peak flows appeared to have been less than those of many

earlier floods because rainfall was well distributed.

In January 1943, Mission Creek overflowed from De la Vina Street (near Alamar Avenue) to Haley Street (just upstream from U.S. Highway 101). Water, mud and debris flooded the business district at the Alamar Avenue intersection. Small bridges in the Oak Park district were under water, including the Junipero Street Bridge. Minor flood damage to business establishments occurred on the lowermost portions of State Street. Families were evacuated from the lower reaches of Mission Creek.

Mission Creek overflowed several times during three heavy storms between January 12 and 16, 1952. On January 12, 1952, Mission Creek flooded an estimated 50 homes. The west side -- Chino, Gillespie and Mission Streets -- also suffered flooding, possibly as a result of Mission Creek overflows. Nearly all the bridges were blocked off during the peak of the storm, as water was two to three feet over many of the bridges. The bridges were saved by crews removing debris.

Floodwaters entered homes in the Haley and De la Vina Street area. Many parked cars were damaged by silt-laden water up to three or four feet deep. City officials estimated thousands of tons of silt were deposited on the City streets (including the east side near Sycamore Creek). On January 15, Mission Creek again overflowed and caused additional flooding. A house and two garages near Gutierrez Street were washed away. Many bridges were barricaded because of threatening floodwaters including the De La Vina Street Bridge near Alamar Avenue. A storm survey report prepared for the County of Santa Barbara (April 10, 1952) indicated that, in terms of rainfall totals and duration, the 1952 storm was more intense than the 1911 and 1918 storms, but less intense than the 1914 and 1943 storms. The 1914 storm's one-day rainfall greatly exceeded the 1952 storm.

Goleta streams flooded hundreds of acres during this period. U.S. Highway 101 and the community of Goleta were mired in mud. At least 100 residents were evacuated. There was very little development at that time in Goleta Valley.
In September 1964, a fire burned an area in excess of 67,000 acres in the watershed areas above the City of Santa Barbara and the community of Montecito to the east of Santa Barbara. About 30,000 acres were located in the drainage areas on the south slope of the Santa Ynez Mountains,

with the balance of the burned area located in the Santa Ynez River drainage to the north. Recognizing the impending disastrous situation, Congress on October 7, 1964 authorized emergency flood control work for the Santa Barbara area at a Federal cost not to exceed $860,000. This was preventive emergency work. Work was initiated by the Corps of Engineers within one week of authorization of funds, at a total cost of $1,600,000; the County of Santa Barbara contributed nearly $750,000, mostly for rights-of-way and bridge and utility relocations. In the Mission Creek area, two debris basins were constructed - one on Mission Creek with a capacity of 15,900 cubic yards and the other on Rattlesnake Creek with a capacity of 8,300 cubic yards and 4.6 miles of channel were cleared, shaped and revetted, on a temporary basis.

In November 1964, a minor flood caused damage estimated at about $500,000 (1964 dollars) mostly in the Montecito area. During that flood, boulders moved down the streambeds and, together with residue and debris, plugged bridges and obliterated stream channels, causing mudflows over several residential areas. The emergency work prevented substantial additional damages. Very minor damages were reported along Mission Creek; clearing of the channel and some bank protection work was needed.

The January 1967 flood caused moderate to major damage along the lower reaches of Mission Creek, from the Haley Street Bridge, about a quarter mile upstream of U.S. Highway 101, to the Pacific Ocean. Damages for this flood are presented in a *Flood Damage Report for Santa Barbara and Vicinity (December 1966 and January 1967 Floods)*, prepared by the Corps of Engineers in March 1967. This report cited the lack of adequate channel cross-section and bridge openings as reasons for the overflow. The major flood damage occurred along a reach just downstream from Haley Street where many residential and commercial establishments were damaged by debris-laden waters. Considerable debris was deposited on the streets and along the Southern Pacific railroad tracks. Highway traffic was interrupted and rerouted for a period of about two hours until the flood subsided and debris was removed from the highway. Numerous homes on the west side of Mission Creek were flooded and several of the large motels on the ocean frontage were damaged by the flood flow. Many of the establishments along both the ocean frontage and on other streets prevented excess flood damage by sandbagging entrances to their place of business. Heavy deposition of mud occurred in the streets. Bank erosion was severe and several short reaches of creek bank, 100 to 200 feet in length, sloughed off. A minor overflow occurred in the Vicinity of Oak Park and some minor bank protection was lost. It was

estimated that approximately 10,000 cubic yards of debris was trapped in the emergency debris basin on Mission Creek and approximately 4,000 cubic yards in the emergency basin in Rattlesnake Canyon. Damages along Mission Creek were estimated at about $683,000 (1995 dollars). Flooding was much more severe in Goleta Valley. Damage resulted from flooding and heavy deposition of debris on agricultural lands, the airport, streets and commercial and residential properties. Many families were evacuated from low areas where floodwaters reached a depth of about three feet. Passenger and freight trains of the Southern Pacific Company were delayed several hours due to a washout of 850 feet of track, and freeway traffic on U.S. Highway 101 was delayed due to flooding and the required removal of debris from the roadways. Total damage in the Goleta area was estimated at $3,458,000 (1995 dollars).

The January 1969 flood caused only limited damages along Mission Creek. Waters were essentially confined within the channel banks, except at Oak Park, where a small section of the park was flooded. Damages in the Montecito and Carpenteria areas were much more severe during the January and February 1969 floods. Heavy debris flows blocked bridges and obliterated streams in the foothill areas. About 100 homes in the Montecito area and 250 homes and 21 commercial establishments in the Carpenteria area were damaged.

The February-March 1978 floods along Mission Creek required repairs to the channel and removal of debris from the channel at a total cost of $130,000 (1995 dollars). Total utility damages in the City of Santa Barbara amounted to $24,000 (1995 dollars); however, these damages included areas outside of Mission Creek. Overflows near the U.S. Highway 101 crossing flooded in and around 50 structures; damages were limited by the fact that most of the houses are elevated a few feet above grade. Businesses in the area prevented damages by sandbagging. Cost of street cleanup amounted to $3,250 (1995 dollars).

The February 1980 flood along Mission Creek required channel repair at a cost of $241,500 (1995 dollars). Houses between Cota Street and Cottage Grove Avenue on De la Vina Street were flooded. Water was up to the crawl spaces on Gutierrez Street. Water left the channel further upstream on Islay Street and damaged the pipe and wire bank protection. Among the bridges overtopped were the Haley and Chapala Street bridges.

The 1983 floods along lower Mission Creek caused erosion to the banks from Ortega to Haley

Streets. Emergency riprap was placed along the channel to protect several threatened houses. The Mason Street Bridge blocked and diverted floodwaters away from the creek along Mason Street. More than a foot of water above the curbs in the vicinity of the Mason Street Bridge was reported by an eyewitness.

Floods of 1995

On January 10, 1995, Mission Creek overflowed its banks, inundating a narrow strip of the residential area along the creek above Highway 101, as well as most of the floodplain between Highway 101 and the Pacific Ocean. The watershed was saturated as a result of a series of storms delivering measurable precipitation over each of the preceding 10 days. January 10th eight-hour duration rainfall totals for the gauges near the Mission Creek drainage area show a range of values from a low of 5.59 inches to a high of 7.42 inches. A comparison of gauge totals from the January 25, 1969 storm shows values ranging from 2.64 inches to 6.57 inches.

While the watershed was saturated, flooding was less damaging than it might have been for two reasons. First, it has been 30 years since the last major burn in the Mission Creek watershed. While this factor would have greatly reduced the sediment delivered by the flood, and accounted for the lack of debris flows, most of the area of inundation was still covered with fine sediments to an average depth of approximately 1 foot. In addition, sediment delivered by the creek to the harbor was deposited in the vicinity of Stearns Wharf, necessitating emergency dredging to maintain sufficient depth to allow fireboats to approach the Wharf.

The second factor, which lessened the potential impact of the flood, was that the peak flows, as recorded by the U.S.G.S. gauge near Mission Street Bridge, occurred several hours after high tide. Had these peaks coincided with a rising tide, flood depths would have been much more damaging.

The extent of the flooding in Santa Barbara, primarily from Mission Creek, as well as flooding in neighboring Goleta, led to Santa Barbara County being included in a Presidential Disaster Declaration. Emergency floodfighting, clean-up and repair costs associated with Mission Creek flooding are estimated at $4,611,300, based on applications for FEMA assistance provided by the City of Santa Barbara. The approximate area of inundation is shown on a map prepared by the

City (See Plate 4). The peak discharge associated with this flood, 5,120 cubic feet per second, equates to a 50-year flood. Extensive sediment deposition occurred in the open area around the train station, as well as at the intersection of Bath and Ortega Streets.
The magnitude of the flood (50 year) is significantly less than the magnitudes associated with some of the reported precipitation rates. It is important to remember that a variety of factors influence the flood produced by a given storm. In addition to the basin's ability to absorb rainfall, the intensity, duration and distribution (aerial coverage) of the rainfall are all factors, which determine the runoff produced. For example, while some gauges may have recorded precipitation rates significantly greater than 50 year, the rate of precipitation may have varied greatly from one location in the drainage area to another. Also, during this event, there was a channel breakout at Oak Park, upstream of the gaging station, which could have contributed to the reduced peak at the gage.

Local media reported 600 people evacuated and train service was interrupted for several days as track beds had to be restored. As many as 300 homes were estimated to have been damaged, not all within the Mission Creek floodplain. During the flood event, the underpasses providing access across Highway 101 were flooded, with the State Street underpass flooded to overflowing. High water marks indicated overflow depths in excess of three feet and many businesses between Highway 101 and the ocean were still cleaning out debris two days later when the Study Team surveyed the flooded area.

Emergency dredging of the Mission Creek and Rattlesnake Creek debris basins was conducted by the Corps under tasking from FEMA. The total volume of material removed was 3,573 cubic yards from Mission Creek Basin and 7,590 cubic yards from Rattlesnake Basin. The amount taken from Rattlesnake Creek basin, approximately 90% of design capacity is of particular note as the County Flood Control District had the basin dredged to near capacity prior to the start of the 1994/1995 flood season.

Storms on March 10, 1995 caused substantial damages on neighboring watersheds and within the Lower Mission Creek watershed. Damages for the watershed were reported by the City of Santa Barbara to be in the range of $5 million.

Floods of 1998

Once again in 1998, the citizens of Santa Barbara were faced with flooding as Mission Creek overflowed its banks near the railroad tracks. Although there was no major damage due to breakouts, the City did experience nuisance flooding, transportation delays, and inconveniences. Bank erosion resulted in several areas where existing bank protection was inadequate to convey even the small magnitude floods such as the results of the 1998 storm events. The February 1998 storm, however, verified the previous estimates of the non-damaging capacity of the creek, subsequent to the creek being cleared of debris and outgrowth. The Corps of Engineers and the Santa Barbara County Flood Control District performed emergency clean-up work to remove deposited debris in the Mission Canyon and Rattlesnake debris basins at a cost of $1.2 Million. The United States Geological Survey stream gage at Mission Street indicated that the February 23, 1998 flow measured 1960 cfs. The following photos along State Street and Yanonali Street show some of the flooding that took place during the storm.

Summary

There are many accounts of one to two feet or more of flooding along lower Mission Creek, especially between 1906 and 1918. As the recent flooding shows, the same storms today result in more floodwaters due to urbanization of the lower watershed and flood plain, and light to moderate development of the middle watershed. More pavement, roofs, concrete and drains in both the middle and lower drainage areas have greatly increased potential for substantial runoff

since the early 1900's. Despite current setback requirements more residual encroachment exists than during the early 1900's. Many bridges and channel reaches still have very limited capacities; several can pass only storm flows with occurrence frequencies ranging from less than two to ten years.

Hydrology

The mean seasonal precipitation for the drainage area is approximately 18 inches along the coast and 30 inches in the mountains. The majority of the precipitation occurs between November and April. Flooding typically occurs between December and March. Occasionally, snow falls in the higher elevations of the Mission Creek watershed; however, the snow seldom remains more than a few days. The majority of the precipitation is a result of general winter storms that are associated with extra-tropical cyclones of North Pacific origin.

Exhibit 3. "Mission Creek Watershed Map" shows the delineated watershed and the flow concentration points. Exhibit 4. "Laguna Channel Drainage Area Map" shows the watershed boundaries and the three storm drain systems in the area.

There are two debris basins located upstream of the confluence of Mission and Rattlesnake Creeks. Due to their limited capacity, these structures do not significantly affect flood flows within the Mission Creek drainage area. They are the 15,900 cubic yard debris basin on Mission Creek and the 8,300 cubic yard debris basin on Rattlesnake Creek. There are several structures, which do affect runoff in the Laguna Channel area. These are storm drains serving the study area including Victoria Street System, Laguna System, and Quarantina System. The Victoria Street System diverts runoff from the Laguna Channel to Mission Creek. The two other systems outlet to the Pacific Ocean. The overflow analysis for the hydrology study accounted for the capacity of the storm drains systems.

Although previous discharge-frequency analyses have been completed using n-year rainfall runoff modeling, a new analytical analysis was performed for this study. The analysis utilized records for the Mission Street gage (29 years of record) and 46 years of historical information to estimate discharge-frequency values. Basin "n" values used in the 100-year rainfall-runoff model ranged from 0.05 in the mountains to 0.02 in the coastal urbanized area. Loss rates were

saturated loss rates of 0.2 inches per hour for all sub areas, which were adjusted to include impervious cover for each sub area.

The statistical analytical model yielded a median probability 100-year peak discharge of 7,050 cfs. Table 1, "Median Probability Peak Discharges, Mission Creek, presents the results of the current hydrology study on Mission Creek.

Table 1. Median Probability Peak Discharges, Mission Creek

Concentration Point	Drainage Area (mi^2)	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
6	7.87	1,400	2,200	3,700	5,100	6,900	12,500
USGS Gage	8.38	1,450	2,300	3,800	5,200	7,050	12,900
7	8.74	1,450	2,300	3,800	5,200	7,050	12,900
8	10.93	1,500	2,400	4,000	5,500	7,500	13,600
9	11.28	1,500	2,350	3,900	5,300	7,300	13,200

Because no stream flow records are available in the Laguna Channel Drainage Area, the Mission Creek model was used. The model produced a hydrograph with a 100-year peak flow rate of 2,550 cfs. The precipitation saturated loss rate of 0.20 inches per hours adjusted to account for 35% impervious cover was used in the modeling. A more detailed explanation of the area hydrology can be found in the "Hydrology Appendix" found under a separate cover "Technical Appendices" dated September 2000.

Hydraulics

The without-project condition hydraulics of Lower Mission Creek has been studied in several past Corps of Engineers reports. From those past studies, it was determined that flows greater than 5-year frequency overflows Mission Creek then travels eastward along the railroad tracks and reaches the Laguna Channel below the railroad tracks. Consequently, the Laguna Channel backs up and causes flooding in the Laguna Drainage area. By increasing the conveyance capacity of Lower Mission Creek, the backwater effect on Laguna Channel would be reduced. The previous studies also indicated that flood storage occurs for both Mission Creek and Laguna Channel. This ponding attenuates flows and affects water surface elevations. The past hydraulic studies used one-dimensional (1-D), steady state models.

This feasibility study used a two-dimensional (2-D) dynamic model to more accurately model the complicated flow patterns associated with both the Mission Creek and the Laguna Channel systems. The model was used to define the 25-, 50-, 100-, and 500-year floodplains. A detailed discussion of modeling analysis is presented as an attachment to the Hydraulics Appendix.

The new 2-D model refined the hydraulic capacity analysis and analyzed the commingling of flows from Mission Creek with the Laguna Drain system. The analysis revealed that the lowest Mission Creek channel capacity is 1500 cfs at Montecito Street Bridge. The 1500 cfs discharge corresponds to approximately a 5-year frequency event for Mission Creek. The channel capacity at this site was verified during the February 23, 1998 storm when the peak discharge of 1920 cfs overflowed the banks at this bridge.

As part of the modeling process, the 2-D model was calibrated using the January 10, 1995 storm. Once the model was calibrated, the floodplain boundaries for the 25-, 50-, 100-, and 500-year events were plotted. Exhibit 5. "Mission Creek Floodplain Map" shows the limits for flooding for both Mission Creek and Laguna Channel for the 25-, 50-, 100-, and 500-year storms. Average flood depths at each node of the 2-D analysis are presented in the Hydraulics Appendix, Plates 9 to 12. It is important to note that these depths are presented for informational purposes only. The results of the hydraulic analysis were used to determine annual damages, which are discussed in the Economics Section of the Without-Project chapter and in the Economic Appendix.

Geotechnical

The area surrounding the existing channel is composed of Quaternary non-marine and marine sediments varying in thickness from 600 to 800 feet, overlaying Tertiary non-marine and marine bedrock.

The non-marine sediments in the area are alluvium from the Santa Ynez Mountains. The most recent alluvial deposits, which are found in the streambed, tend to be poorly graded sands and gravels, with cobble up to 9-inches in diameter. These newer deposits can be classified as brown to reddish-brown sandy clay, clay, clayey sand, silty sand and occasional gravels. The older deposits are only encountered at depths near 30 feet and are mainly composed of sands and gravels. Both deposits range from medium dense to dense according to standard penetration test (SPT) data.

The marine sediments consist of lagoon, estuary, and beach deposits. Both the lagoon and estuary deposits consist of gray, blue-gray and black silty sands, clayey sands, sands, sandy clays, and, lean clays with organic odors. These deposits are found closest to the ocean. These marine deposits are overlaid by approximately 1 foot of poorly graded sands and gravels. Visual inspection of the beach deposits indicates that deposits are composed of fine to medium grained sand-silty sand.

No bedrock was encountered in the channel area. There are bedrock outcrops one mile to the west in the coastal bluffs, and on the southern edge of the Santa Ynez Mountains where Mission Creek flows onto the alluvial fan, about 2 2 miles north of the project area.

Mineral Resources

The predominant mineral resources in the vicinity of Santa Barbara are petroleum products. Asphalt deposits were first found in the area in the late 1700's. The deposits form a belt, which extends from Carpenteria to Point Conception. Both onshore and offshore oil and tar seeps have been discovered since 1792. Currently, most of the gas and oil production occurs offshore in the Santa Barbara Channel. In 1995, Santa Barbara County produced 4.7 million barrels of oil and 3 million cubic feet of gas. There are no mineral resources, mining, or petroleum production in the project area.

Seismicity

The project is located near two significant parallel faults, the Santa Ynez to the north, and the Mission Ridge-Arroyo Parida, to the south. Table 2, "Faults in the Vicinity of Mission Creek" list the faults surrounding the project site. All of the faults listed in Table 2 are believed to be potentially active.

Table 2. Faults in the Vicinity of Mission Creek

Fault Name	Distance to Project Site
Santa Ynez	5 to 6 miles north
Mission Ridge-Arroyo Parida	1 to 1.5 miles north
Lavigia	2.5 miles south-southwest
Mesa-Rincon Creek Fault	0.25 to 0.5 miles east
Montecito	1 to 2 miles northeast
Sycamore	1 to 2 miles northeast
Lagoon	1 to 2 miles northeast

There are at least 12 other faults offshore in the Santa Barbara Channel. These faults are located in the 25 miles between Santa Barbara and the northern Channel Islands. The faults are also considered active. Four other major faults are in the regional vicinity of the project. They are: (1) Big Pine; (2) San Andreas; (3) Santa Cruz Island-Santa Monica, and (4) Malibu-Anacapa-Pt. Dume Faults.

Over the last 96 years nineteen earthquakes with Magnitude 6.0 or greater have occurred within a 100-mile radius of the project site. The largest earthquakes known to have occurred in the Santa Barbara Channel faults was estimated to be Magnitude 7.0+. This earthquake, which occurred in 1823, was centered about 16 miles south and west of Mission Creek. The most recent event that caused measurable damage to the area was a Magnitude 6.8 earthquake in 1925 about 12 miles south of the project site within the Santa Barbara Channel. The closest 5.0+ Magnitude event occurred in August of 1978 and was located 3.25 miles southwest of the project area in the

channel. The event caused minor damage to both Goleta and Santa Barbara. This event produced a maximum acceleration of 0.21g at the Santa Barbara County Court House, which is located less than a mile from the project site.

Several of the active faults discussed in the previous paragraphs have the potential to produce significant bedrock accelerations at the site. A complete discussion of the potential seismicity in the area is included in the Geotechnical Appendix. The maximum expected bedrock acceleration of 0.5g could be produced by a 6.0 Magnitude event on the Mesa-Rincon Creek fault.

Groundwater

The project lies within the Santa Barbara Groundwater Basin. The basin has been divided into five aquifers: (1) the shallow aquifer, (2) upper producing aquifer, (3) middle aquifer, (4) lower producing aquifer, and (5) deep aquifer. The shallow aquifer varies in thickness from 200 to 300 feet and is not considered a source of good water due to pollution. Any water wells penetrating the shallow aquifer are usually cased.

Six test holes were drilled on the banks of the creek in the fall of 1990 for foundation studies. Four of the six wells were left as observation wells to monitor and further define the shallow ground water aquifer. The water level measurements indicate that groundwater from the shallow aquifer will be encountered during excavation of any project within the creek. Water generally stands all year long in Mission Creek from the railroad tracks and Highway 101 downstream to the Pacific Ocean. High ground water and tidal water will be encountered in this reach during construction.

Various studies on ground water recharge in the area indicate the improvements along the creek between Carrillo Street and the Pacific Ocean will have minimal effect on ground water recharge. Ground water recharge is discussed more extensively in the Geotechnical Appendix.

Real Estate

The project is located in the southwestern part of the City of Santa Barbara's downtown area. The area includes part of the downtown commercial area and part of an older residential area. The project area is approximately 2.35 acres. Above Highway 101, the study area is predominantly residential. The majority of the area consists of older, single family homes. The area does include a few newer multiple apartment dwellings as well as a few stores. Between the railroad plaza and Mason Street, there are several large, old houses, many of which have been converted into multiple apartment dwellings. A commercial area, with stores, hotel, restaurants and office buildings is located between Mason Street and Cabrillo Boulevard.

Mission Creek is not owned in fee or controlled by easements held by the city or county. Most of the creek is held by the property owners whose lots cross the creek. There are 73 lots in the study area, of which there are 63 different owners. Two lots are owned by the City of Santa Barbara and by the County. The owner of a foot wide piece of property is unknown. It is presumed that the property has been taken over by the adjacent property owners.

Santa Barbara County Flood Control and Water Conservation District has 22 easements and three small fee takings over properties where the creek flows. Most of the easements grant the District the right to construct, maintain and repair the flood control channel. These easements also include the right to remove debris, silt and vegetation. The total acreage of the easements is 1.59 acres, however only 0.32 acres of the easements extend into the creek bed.

The city ordinance on Watercourses and Storm Drain Systems, Chapter 14.56, deals with the definition of "Watercourse" and other matters such as obstructions, placement of fill, and placement of structures within the watercourse. There is no map, which officially delineates the watercourse along Lower Mission Creek; however, it is usually taken to be the top of bank. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) shows that the creek above Gutierrez Street is designated as a large floodway.

No evidence of oil, gas or mineral deposits has been identified in the study area as part of the real estate investigation.

No relocations are being considered as part of the without-project conditions; however, some buildings are located in areas subject to flooding.

A survey conducted for the real estate investigation indicated that Southern California Edison, the Gas Company, GTE, and the City of Santa Barbara all have utilities within the project site. The Southern California Edison electrical lines are located overhead, and will not likely be affected by proposed plans for the creek. The Gas Company's subsurface pipes cross the creek through the bridges at De La Guerra, Ortega, Bath, Gutierrez, Montecito and Mason Streets. Relocation of gas lines at one or more of the crossings is likely. Most of the telephone lines are overhead, except for two locations were the cable crosses the creek by means of the Canon Perdido Street Bridge and the Cota Street Bridge. Water lines cross the creek at the following bridges: De la Guerra, Ortega, Bath, Cota, De la Vina, Gutierrez, Montecito, Yanonali, Chapala, Mason, and State Streets and Cabrillo Boulevard. One water line is located in the part of Castillo Street, which is just south of the Canon Perdido Street under-the-street telephone conduit. Sewer lines also meet at this location. A branch from the junction continues east to the properties on the south side of Canon Perdido Street. Other sewer lines run under the bridges at Ortega, Bath, De La Vina and Haley Streets, as well as Gutierrez Street and Mason Street. Due to its proximity to the creek, it is important to note that there is a 12-inch sewer pipe at the corner of Yanonali and Chapala Streets.

Economics

There are several types of damages identified in the economic analysis found in the Technical Appendix C. Damages were categorized as either being structural or nonstructural. Structural damages include damages to buildings and their contents within the Lower Mission Creek and Laguna Drainage Channel floodplains. Nonstructural damages include emergency repairs, cleanup costs, and transportation losses.

Flooding along Lower Mission Creek dates back to 1862. A list of historical flood and corresponding known damages in the Santa Barbara area is shown in Table 3, "Historical Flood Damages". The damages reported in Table 3 include damage to both structures and contents in 1999 dollars.

Table 3. Historical Flood Damages (1998 Price Levels)

Date of Flooding	Damages	Annual Exceedance
March, 1995	$5,557,000	9-year
January, 1995	$11,980,000	55-year
January, 1983	$1,872,000	10-year
February, 1978	$2,114,000	11-year
January, 1967	$3,979,000	NA

Source: City of Santa Barbara

For the purposes of this study, damages are expressed as annual values utilizing the fiscal year 2000 discount rate of 6 5/8 percent with a project life of 50 years. All benefits and costs are expressed at 1999 price levels with a base operational year of 2001.

Expected average annual damages to structures were calculated using the HEC-FDA (Hydraulic Engineering Center's Flood Damage Reduction) model. Expected annual structural damage (including risk and uncertainty analysis) in the Lower Mission Creek and Laguna Channel drainage areas are presented in Table 4. The risk and uncertainty analysis performed for this study essentially theoretically shifts structures within a reach or sub reach to a reference point, such as an identified hydraulics cross section, while maintaining the original flood dynamics at the location of the structure. The following variables were subject to risk and uncertainty for the determination of the stage/damage functions: first floor elevation, depreciated replacement cost, and water surface elevation. More information regarding the risk and uncertainty model parameters is located in the Economic Appendix.

Table 4. Expected Annual Without-Project Structural Damages

Type	Structural Damages ($1000)
Mission Creek Drainage Area	$1,884.7
Laguna Channel Drainage Area	$1,831.9
Total	$3,716.3

Annualized nonstructural damages include emergency repair costs, cleanup costs, and traffic delays. Emergency costs include the costs of evacuation, re-occupation, flood fighting, disaster relief, police, fire, medical, and governmental increases in operational costs. Cleanup costs include the costs of removing and disposing of sediment, which may cover streets, parking lots, and public property. Transportation losses in the form of local traffic disruption and railroad delays were also included in the nonstructural damages. Table 5 presents the results of the nonstructural expected annual damages.

Table 5. Expected Annual Without-Project Nonstructural Damages

Type	Expected Annual Damages ($1000)
Clean Up/Emergency/Bank Stabilization	$155.9
Exp. Transp. Damages	$19.2
Total	$175.1

* Annual Damages were Calculated by the Expected Annual Flood Damage Computation

Table 6 represents the summary of total expected annual without-project damages. The structural damages were calculated using risk and uncertainty as described in the Economics Appendix.

Table 6. Total Without Project Expected Annual Damages

Type	Expected Annual Damages
Structural (includes R&U)	$3,716.3
Nonstructural	$175.1
Total	**$3,891.4**

Environmental

A summary of the without-project environmental conditions of the study area and surroundings are discussed below. A detailed assessment may be found in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for Lower Mission Creek Flood Control Project, Santa Barbara, California following the main report.

Surface Water Quality

Water quality in the Lower Mission Creek area is affected primarily by inflows from mountain runoff and localized storm runoff. Common contaminants due to urban runoff include: oil and grease, lead, zinc, copper, pathogens, total suspended solids, and nutrients. A water quality study for the City of Santa Barbara has been completed, which specifically characterizes the contaminants found in the City's urban runoff. Santa Barbara, like many other southern California cities, typically experiences the highest pollutant loads in storm water runoff as a result of the first major storm of the year following the dry season. The lagoon at the outlet of Mission Creek has some specific water quality issues. The tidal lagoon tends to accumulate debris and stagnant creek water because the flow of water is often insufficient to clear the sand Aplug≅ at the outlet. Mission Creek has also been documented as a significant source of bacterial contamination to ocean water.

Ground Water Quality

The groundwater basin associated with Mission Creek includes the shallow zone, upper producing zone, middle zone, lower producing zone, and deep zone. The groundwater in the uppermost zone tends to be polluted in urban areas. Specifically, the shallow zone has high salinity. Increasing pumping rates in Santa Barbara have created the potential for saltwater intrusion into the water-producing aquifers near the coast. In the last 10 years, these wells have been capped or used only for monitoring purposes. The City replaced these wells with new wells drilled further inland. The City's groundwater management program has also been updated in such a way that the future potential to overdraft groundwater supplies is minimized.

Biological Resources

The following paragraphs discuss the biological resources within both the immediate study area and upstream reaches of the creek.

Vegetation - Vegetative cover in Lower Mission Creek is heavily influenced by commercial and residential development. Since the creek is maintained as a flood control channel, periodic maintenance in the form of mechanical scouring to remove vegetation, debris, and litter is used to maintain conveyance prior to the rainy season. This maintenance disturbs the natural habitat within the channel. On a September 1997 field visit, it was observed that some delicate aquatic vegetation appeared undisturbed despite the maintenance. Generally, plants on the side slopes of the channel have not been affected by the maintenance practices.

Some sparse riparian vegetation still exists within the creek. The native species that have been identified along this portion of the creek include: western sycamore (*Plantanus racemosa*), western cottonwood (*Poplulus frremontii*), and coast live oak (*Quercus agrifolia*). Of these three species, seven multiple trunk sycamores were observed, while only one cottonwood and one coast live oak were observed. Isolated willows (*Salix* sp.) grow at various locations along the channel banks. Willows do not constitute an important element of the existing riparian habitat.

Fish - The lower portion of the creek contains significant habitat for the Federally endangered fish species; the tidewater goby (Pices: Gobiidae). Also, Mission Creek is recognized as a migratory corridor for the Southern California steelhead (Pices: Salmonidae); another federally endangered species.

Amphibians - Four species of amphibians once likely inhabited the lower portions of Mission Creek. However, due to increased urbanization these species have been displaced. The four species likely displaced include: the red-legged frogs (*Rana aurora*), the foothill yellow-legged frog (*Rana boyleii*), the southwest arroyo toad (*Bufo microscaphus*), and the tiger salamander (*Ambystoma tigrinum*).

Birds - Two endangered bird species, Least Bell's vireo (*Vireo belli pusillius*) and southwest willow flycatcher (*Empidonax traillii extimus*), might rarely occur as transients in the areas. Several other birds and raptors may have inhabited the site at one time. The tidal lagoon may also occasionally support the following species: snowy plover (*Charadrius alexandrinus nivosus*), California least tern (*Sterna antillarum*), California brown pelican (*Pelecanus occidentalis californicus*), and peregrine falcons (*Falco peregrinus*).

Cultural Resources

Three archeological sites are located very close to the Area of Potential Effect (APE). The first is a prehistoric archeological site, CA-SBA-1958, the Twin Palms/Depot Park was recorded as a Alow-density chipped stone scatter and even lower density shell scatter. Site CA-SBA-27 located west of Mission Creek near Cabrillo Boulevard. SBA-27 was a habitation site with midden debris, house circles, and 11 burials. The third site, CA-SBA-28, previously known as Burton Mound, is the former Chumash village of Syukhtun. During excavation of the site, over 300 burials were discovered. Also, it is believed that as many as two tons of artifacts were shipped back to the Museum of Natural History in New York during the excavation.

Based on a recently completed study and subsequent coordination with State Historic Preservation Office (SHPO), several properties have been identified as eligible for listing on the National Register of Historic Places, which are found within or near the Area of Potential Effect (APE) for this study. These properties and resources are listed below:

- Pony Truss Bridge at Chapala and Yanonali Streets
- Mission Creek Diversion
- 20 West Mason Street
- 118 Chapala Street
- 120 Chapala Street
- 311-313 West Ortega Street

All structures eligible for the National Register are also eligible for inclusion on the California Register. Recent study results indicated that there are several properties and resources that may be eligible for listing on the California Register of Historic Resources or designation as a City Landmark or Structures of Merit within the APE for this study. These properties and resources are listed below:

- 15 West Mason Street
- 134 Chapala Street
- Potter Hotel Footbridge
- 434 De la Vina Street
- 306 West Ortega Street
- 101 State Street
- 116 Chapala Street
- 536 Bath Street
- West Downtown Neighborhood
- Waterfront Neighborhood

Hazardous, Toxic, and Radioactive Wastes

Mission Creek may contain Hazardous, Toxic, and Radioactive Wastes (HTRW). Forty LUFT (Leaking Underground Fuel Tanks) sites were reported as previously occurring within 1/2-mile of the centerline of Lower Mission Creek. Conversations with regulatory staff and review of available databases indicated that, with two significant exceptions, no obvious evidence of existing serious contamination from sites occurring within 1/2- mile of the centerline alignment of Lower Mission Creek were apparent. Several sites still have on-going remediation activities. Current status of the remaining LUFT sites is indicated in the following table.

The two exceptions mentioned above are considered serious situations by the Central Coast Regional Water Quality Control Board. These involve properties at 324 De la Vina Street and 220 West Gutierrez Street. The De La Vina property, which is currently owned by Caltrans, is known to be contaminated by perchlorethylene (PCE), a solvent used in the dry cleaning of fabrics. Cleanup of the site has been delayed partly due to legal proceeding involving the site at 220 West Gutierrez Street. The West Gutierrez Street site formerly had a large above ground tank in which PCE was stored for sale to the dry cleaning industry. The contaminant plume is reported to be migrating southeast toward the Caltrans site. The attorneys representing the property owner at 220 West Gutierrez Street are reportedly attempting to involve Caltrans in sharing the cost of remediation of the plume. It is likely that the threat of litigation has delayed the remediation of the Caltrans site.

Table 7. Recorded Leaking Underground Fuel Tanks

Facility ID No.	Site Description	Substance	Affected Media	Remediation Status
211	Santa Barbara Nissan 36 State Street	Gasoline	Other Groundwater	Post Remedial Monitoring
2093	Former 7-Up Bottling Plant 203 Chapala Street	Gasoline	Undefined	Case Closed
318	Courtesy Motors 527 Chapala Street	Gasoline	Municipal Aquifer	Undergoing Remediation
718	Firestone Tire 506 Chapala Street	Lube Oil	Undefined	Case Closed
270	Hughie's Auto 401 Chapala Street	Gasoline	Soil Only	Case Closed
2489	Hiete Property 414 Chapala Street	Gasoline	Undefined	Undergoing Remediation
5	Cal Trans 324 De la Vina	PCE	Shallow Groundwater	Legal Action Only
2506	403 De la Vina	Waste Oil	Undefined	Tank Closed Work Plan Requested 1994
2295	101 State Street	Diesel	Undefined	Site Assessment Phase
304	Chess Motors Inc. 118 State Street	Waste Oil	Shallow Groundwater	Tank Closed Classified as Low Risk Site
2	Paseo Nuevo Mall 651 Paseo Nuevo Street	PCE	Shallow Groundwater	Case Closed
2907	240 Montecito West	Gasoline	Shallow Groundwater	Case Closed

Noise

The source of most of the noise in the project area is truck, automobile and rail traffic. Generally speaking, noise levels increase as the creek progresses to the ocean. This increase in noise levels is due to the increase in traffic volume and tourist activities. According to a 1997 study, the noise levels within the project area range from 60 to 70 dBA.

Air

The air in Santa Barbara County does not meet the State and Federal standards for clean air. According to the 1995 Annual Air Quality Report, Federal or State standards are violated about 23 days per year. Typically, Santa Barbara has not met State or Federal standards for the following three pollutants: ozone, inhalable particulate matter (PM10), and hydrogen sulfide.

Recreation

The upper portions of Mission Creek above Oak Park are highly used for recreation. The more heavily urbanized lower portion of the creek is sometimes used for passive recreation such as hiking and bird watching. However, there are no parks in the West Downtown area. Several areas along the lower reach are visually and/or physically inaccessible. Chase Palm Park is located on the beach near the Mission Creek outlet. Facilities found at the park include soccer fields and a craft center. The beach area adjacent to the outlet is a widely used recreational facility.

E. Future Without Project Conditions

Since the completion of the Reconnaissance Study in November of 1995 there have been several new structures built along the project reach. Reconstruction of Bath Street Bridge was completed in 1996 and a new office building was built on Kimberly Avenue adjacent to the creek between Yanonali Street and Mason Street. Improvements to the Santa Barbara Train Station have been completed, including a new passenger platform. After the flood events of 1995 and 1998, property owners adjoining the creek who sustained bank erosion damages have constructed

different bank stabilization measures to repair or reclaim the lost property. These stabilization measures include the use of concrete placed in sacks (sack-crete), riprap, pipes and gabions. Some properties have not been stabilized and are continuing to sustain erosion damage.

Future without project conditions will be affected by bridge replacements, continued creek revetment and maintenance of the creek. It is expected that individual property owners will continue to build several types of bank stabilization measures to protect or reclaim property damage after any future damaging flood events. Also, routine maintenance for the channel and the bridges is expected to continue at its current rate in the future. A significant impact on future without project conditions is the scheduled replacement of the De La Vina- Haley Bridge prior to project implementation.

Although significant potential for redevelopment and infill exists, no change in the future without project floodplain inventory was projected in this analysis. New construction in the floodplain was not factored in to the without project damage analysis as existing City Floodplain Management Ordinances require first floor elevations of new construction to be above the base flood elevation. The potential exists for an event severe enough to fill in portions of the existing channel. It is assumed that, following such an event, the existing channel would be reestablished since development in the area precludes allowing the creek to establish a new channel. No other significant changes from the current without project conditions are anticipated.

F. Formulation of Alternative Plans

The process of plan formulation in this study dates back to 1969. Since that time, a multitude of flood control alternatives for Lower Mission Creek have been identified. As the plan formulation process evolved, it has become evident that local concerns over sedimentation, environmental and real estate impacts are paramount issues in the development of alternative plans. The following sections discuss the evolution of the alternative plans beginning with the plan proposed in 1969 and concluding with the plans currently proposed in this Feasibility Study.

Early Plan Formulation

The formulation of alternative plans for Lower Mission Creek has been an iterative process dating back to the first Corps of Engineer's improvement plan in 1969. The 1969 improvement plan included (1) a debris basin just downstream from Foothill Road; (2) a concrete lined channel from the debris basin to Oak Park (just above Highway 101); (3) a covered concrete channel to divert flows under Highway 101, Southern (now Union) Pacific Railroad and under Modoc Road to Las Positas Road in the adjacent Arroyo Burro drainage area; and (4) a concrete channel along Las Positas Road and Arroyo Burro Creek to the Pacific Ocean. This plan was rejected by the local community on the basis that it was environmentally insensitive.

In the early 1970's, the Corps continued their Mission Creek studies in conjunction with an Environmental Quality Advisory Board of the City of Santa Barbara. This effort considered various alternatives, but no conclusions were reached.

The floods of 1978 and 1980 revived local interests in flood protection along Mission Creek. This revival led both the City Council of Santa Barbara and the Board of Directors of the Santa Barbara County Flood Control and Water Conservation District to pass resolutions requesting the Corps to find a feasible solution to the flooding problems along Mission Creek. In response to those resolutions, the Corps of Engineers completed a Feasibility Study in 1986, which included structural, non-structural, and no-action alternatives. The alternative recommended in the 1986 feasibility study, referred to as the *Lower Mission Creek Project*, was authorized by Congress.

Sediment analysis conducted by the Corps in the early 1990's revealed that the proposed project was not feasible due to sedimentation problems at the channel outlet. Concerns over sedimentation and environmental impacts led to the City's establishment of the *Mission Creek Consensus Group*. The Consensus group included the members of the County Board of Supervisors, and the City Council, as well as representatives of affected property owners, environmental groups and the community. The Group worked together with the Corps of Engineers, the Santa Barbara Flood Control District and the City of Santa Barbara to formulate additional flood control alternatives. The city contracted with Kennedy/Jenks Consultants to analyze alternatives in *The Mission Creek Flood Control Project, Alternatives Analysis*, dated August 1994. The Consensus Group worked together for over a year to develop and analyze possible alternatives that would be acceptable to them and to the community. At the conclusion of the analysis, the Consensus Group made the following recommendation:

> *25-year flood protection (3210 CFS) with one half horizontal to one vertical (0.5:1) vegetated stabilized sloped banks along the entire project reach with allowance for vertical walls under bridges and at other points of constraint due to buildings or other right-of-way considerations.*

The recommendation was accepted on a 7-1 vote. It was further explained that Avegetated stabilized banks may be constructed with any combination of the following treatments: stepped walls, partial walls, various reinforced earth treatments and gabions. The Consensus Group also indicated that other alternatives should be considered. These included alternatives very similar to the recommended alternative, except that vertical walls would be allowed to be predominant south of the freeway with allowance for sloped banks where right-of-way allows a more natural treatment. Another alternative consideration was full 100-year flood protection; however, this alternative was ranked substantially lower than the other alternatives to be considered.

Reconnaissance Phase Plan Formulation

The *Lower Mission Creek Reconnaissance Flood Control Study* dated November 1995 studied some of the alternatives from the Kennedy/Jenks report. The Reconnaissance Report looked at several alternatives including non-structural, structural, and no-action alternatives.

Non-Structural Measures

The following non-structural measures were considered in the Reconnaissance Phase (1) flood plain management; (2) flood proofing; and (3) relocation.

The City of Santa Barbara has been a participant in the National Flood Insurance Program, which requires the City to maintain a Flood Plain Management Plan to reduce future flood plain hazards. The Reconnaissance Study also investigated the flood warning system and evacuation element of flood plain management. The study revealed that a flood warning system would be impractical to implement. Storm waters falling in the upper Mission Creek watershed reach the lower Mission Creek area in less than one hour, which would be too short a time for local residents to respond to any flood warning.

Flood proofing measures examined in the Reconnaissance Study include blocking flood water from entering a structure, jacking the first floor of a structure above a flood surface elevation, and constructing a flood wall or ring dike. Blocking the floodwaters at individual structures was not considered feasible due to likely failure of the structures' walls as a result of hydrostatic and hydrodynamic forces. Raising (jacking) structures above floodwater elevations was determined to be too expensive and uneconomical given the frequency of flooding in the area. Floodwalls or ring dikes were not considered a feasible alternative due to inadequate space, aesthetic considerations, and the difficulty in ensuring proper closure of openings in the wall or dike during a flood.

Finally, relocation of structures in the flood plain was considered. However, Santa Barbara is a highly developed area, which has very little space to relocate structures out of the floodplain.

Structural Measures

The Reconnaissance Study focused its structural measures plan formulation in three areas: (1) conveyance improvements; (2) diversion, and (3) environmental restoration.

Essentially, two conveyance improvement alternatives were developed in the Reconnaissance Phase. One Reconnaissance Study alternative would provide approximately a 25-year level of flood protection, as computed by creek hydrology at the time of the study, which corresponds to 3210 cfs conveyance and the other would provide 100-year level of flood protection 5800 cfs conveyance. The 3210 cfs conveyance alternative consisted of a natural bottom channel with vegetated stabilized sloped banks at a 0.5 to 1 slope and vertical walls. Gabions were proposed for the 0.5 to 1 slope upstream of Highway 101 and vertical walls were assumed to be the predominant bank treatment method downstream of Highway 101. The channel bottom width was assumed to be 30 feet with a top width of 40 to 45 feet. The alternative also included an open channel oxbow bypass, which would convey floodwaters downstream while using the oxbow for low flows. (See Exhibit 7. "Engineering Plans", Sheet 15 at the end of the Main Report). The 3210 cfs alternative required the demolition and reconstruction of seven bridges. The second conveyance improvement alternative, 5800 cfs, was developed directly from the Kennedy/Jenks Report. The 5800 cfs alternative is essentially the same as the 3210 cfs alternative with the exception of increased base widths to provide the additional capacity. The invert width would be 40 feet upstream of Cota Street and 50 feet downstream with corresponding top widths of 50 to 55 feet upstream of Cota Street and 60 to 65 feet downstream. In addition, the oxbow bypass would need to be expanded to a triple 8-by-16 box culvert. The Reconnaissance Study evaluation determined that both of the improved conveyance alternatives were economically viable alternatives. The study also determined that there was a potential for sediment transport to be a limiting factor in the 5800 cfs alternative based on observations during the January 10, 1995 flood. The Reconnaissance Guidance Memorandum (RGM) suggested that the feasibility study should be scoped to focus on the 3210 cfs and the 5800 cfs alternatives.

The diversion alternatives considered in the Reconnaissance Report focused on the construction of a diversion structure and accompanying culvert to divert 2000 cfs from a point just upstream of the Bath Street Bridge. Once flow was diverted from the main channel it would travel in a box culvert under Bath Street and outlet at the harbor. The diversion alternative was envisioned as a combination of the conveyance alternatives upstream of Highway 101 and the diversion downstream of Highway 101 with possible channel improvements to increase the downstream capacity to 5200 cfs. The Reconnaissance Study determined that the combination with the greatest net benefits was channel modifications upstream of Bath Street to provide 3210 cfs capacity in combination with the diversion. The Reconnaissance Guidance Memorandum (RGM) noted two areas of concern with respect to the diversion alternative cost estimate, the

dredge disposal and cultural resources mitigation. It was determined that based on the January 1995 storm, the diversion alternative would deliver increased sediment to the harbor. Also, there is likely to be a significant amount of cultural resources impacts associated with excavating along Bath Street. The costs associated with these impacts, while not quantified in the reconnaissance study, would significantly reduce net benefits. The RGM suggested that the diversion alternative not be carried forward into the feasibility study on the basis of significantly greater costs, local opposition, and net benefits which are significantly less than the non-diversion alternatives.

Environmental Restoration

The environmental restoration alternative considered three elements: (1) modification of the estuary to permit more frequent salt water penetration during low flow periods; (2) reestablishment of a riparian corridor along the creek; and (3) upstream improvements to facilitate salmonid migration. The RGM directed that a full range of environmental restoration alternatives be considered in the Feasibility Study.

Feasibility Phase Plan Formulation

The plan formulation efforts for the feasibility study began by examining the reconnaissance alternatives including the approximately 100-year level of protection, 5800 cfs, and the approximately 25-year level of protection, 3210 cfs, conveyance alternatives. Hydraulic modeling of the conveyance alternatives in this feasibility study determined that 5800 cfs conveyance was not obtainable due the bridge constraints at Bath, State Street, and Cabrillo Boulevard Bridges. Replacement of these bridges was considered; however, due to their location, replacement of the bridges was not economically feasible. The added costs of replacing these bridges would likely yield a benefit cost ratio less than unity.

After the record floods of 1995, new hydrology and hydraulic analysis determined that the highest conveyance achievable without replacing the three bridges was 3400 cfs, which corresponds to approximately a 20-year level of protection. Therefore, one of the conveyance alternatives studied in detail in this Feasibility Study is the 3400 cfs alternative.

A second conveyance alternative was developed for the feasibility phase: the 2500 cfs alternative. The objectives in formulating this alternative were to minimize required real estate take while replacing only the most undersized bridges.
Several different methods of bank protection are available for both alternatives. The Hydraulic Appendix discusses the different methods studied. Methods considered include natural bank protection, geotextile bank protection with natural channel bottom, riprap bank protection with natural channel bottom, grouted riprap bank protection with natural channel bottom, fully lined concrete channel, gabion-lined banks with natural channel bottom, and concrete-lined banks with natural channel bottom. The only bank protection methods studied in detail were the vegetated stepped wall, vegetated riprap banked channel, and the concrete-banked channel. All other methods were either not feasible due to right-of-way constraints or they were environmentally unacceptable. The proposed alternatives are discussed in the following section.

The previously authorized plan proposed to concrete line the channel. This design was found to be technically infeasible and did not have strong local community support. In response to public concerns, the Corps conducted a computer simulation and physical modeling at the Waterways Experiment Station (WES). The modeling revealed a fatal flaw in the sediment transport performance of the concrete channel. The flaw would render the channel unable to convey its design capacity. In September of 1993, the Corps informed Santa Barbara that the Lower Mission Creek Project was fatally flawed unless upstream sediment control could be provided. In addition, local opposition to the concrete channel project was strong due to project impacts on biological values and aesthetics, as well as safety concerns with high velocity flows.

In 1993, the tidewater goby, a resident fish of the estuary and the lagoon near the mouth was afforded federal protection under the Endangered Species Act (ESA). Also, resource agencies have identified Mission Creek as a prime migratory corridor for another Federally Endangered Species, the Southern California Steelhead. Implementation of a concrete lined channel for the entire reach, like the previously authorized plan, would result in adverse impacts to these Endangered Species.

Description of Alternative Plans

Twelve alternatives were evaluated in the Feasibility Study. The alternatives include the no action plan, a 2500 cfs capacity with two different channel configurations, and a 3400 cfs capacity with nine different channel configurations. Differences in channel configuration are due to the use of the oxbow-bypass and different combinations of bank protection. (See Exhibit 7. "Engineering Plans", Sheets 1 through 28 at the end of the Main Report). The following paragraphs describe each of the alternatives. Tables 8 and 9, "Alternative Plan Features" provides a summary of the configuration of each of the alternatives.

Maintenance of Alternatives 2 through 12

All of the alternatives require perpetual maintenance to assure design function and form. Therefore, maintenance of the alternatives is considered an integral part of each alternative. Weed and vegetation growth in the channel bottom will at a minimum require partial removal annually to maintain the design capacity. In addition, any areas where sediment deposition occurs will require the removal if more than fifteen percent of the channel capacity is plugged. It is estimated that the average frequency of this removal of plugs is a minimum of every three years. It is important to note that the channel may require maintenance more frequently than the minimum stated above.

Alternative No. 1*: No Action*

In this alternative, there is no change to the existing operating conditions. The residents and business owners in the Lower Mission Creek flood plain would continue to experience flood damage every few years.

Alternative No. 2 - *2500 cfs Capacity - Stabilized sides using combination vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101*

This alternative would increase the channel capacity to 2500 cfs and would provide approximately a 15-year level of protection. The natural bottom would be maintained and would consist of stepped walls at 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment with stepped walls applied whenever practicable. The improved creek would generally follow the existing alignment. Six bridges along the study reach would be replaced including Ortega Street, Cota Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 3*: 2500 cfs Capacity - Stabilized sides using vertical walls*

This alternative is similar to Alternative 2 except that the sides would be stabilized using vertical walls throughout the length of the project. The same bridges as in Alternative 2 would need to be replaced.

Alternative No. 4*: 3400 cfs Capacity - Stabilized sides using vertical walls (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of concrete vertical walls throughout the project reach. The modified creek would generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 5*: 3400 cfs Capacity - Stabilized sides using vegetated stepped walls (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope throughout the study reach, except at the south end of the oxbow along the railroad tracks. The improved creek would

generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 6*: 3400 cfs Capacity - Stabilized sides using predominantly vegetated stepped wall with vertical walls applied for the remaining reaches (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope upstream of Highway 101. Below Highway 101, vegetated stepped walls would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges extending down to the State Street Bridge, and along the middle third of the southwest bank between Mason Street and State Street. Vertical walls would be maintained for the remainder of this reach. The improved creek would generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 7: 3400 cfs *Capacity - Stabilized sides using a combination of vegetated stepped walls and vertical walls (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained and would consist of stabilized banks at 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment. The improved creek would generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 8*: 3400 cfs Capacity - Stabilized sides using vertical walls (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of concrete vertical walls throughout the project reach. This alternative would incorporate a new overflow culvert by passing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Alternative No. 9*: 3400 cfs Capacity - Stabilized sides using vegetated stepped walls (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope throughout the study reach, except through the oxbow and the oxbow bypass. This alternative would incorporate a new culvert bypassing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, Gutierrez Street, and Mason Street Bridges.

Alternative No. 10*: 3400 cfs Capacity - Stabilized sides using predominantly vegetated stepped walls with vertical walls applied for the remaining reaches (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope upstream of Highway

101. Below Highway 101, vegetated stepped walls would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges extending to the State Street Bridge. Vertical walls would be maintained for the remainder of this reach. This alternative would incorporate a new culvert bypassing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Alternative No. 11*: 3400 cfs Capacity -Stabilized sides using combination vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101 (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment with sloped bank treatment wherever practicable. This alternative would incorporate a new culvert bypassing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Alternative No. 12: 3400 cfs Capacity With O*verflow Culvert - Stabilized sides using a combination toe wall and vegetated riprap slope and vertical walls*

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained and creek banks would consist of vertical walls and vegetated riprap sideslopes. The bottom half of the bank would consist of a short vertical wall while the upper half would be covered with vegetated riprap at a 1.5:1 (H:V) or flatter slope. The riprap would be covered with topsoil while concrete

pipes in varying sizes (up to a maximum of three feet in diameter) would be strategically placed in between the riprap to allow planting of native trees and vegetation.

Upstream of Highway 101, the toe wall-riprap sideslope would be the predominant bank treatment, except in two short reaches just upstream of the Haley-De la Vina and De La Guerra Street Bridges, where vertical walls would be maintained.

Downstream of Highway 101, between the Chapala and Mason Street Bridges, the toe wall-riprap sideslope would be applied along the left bank just upstream of Mason Street Bridge. The remainder of the banks would have vertical walls.

Below Mason Street Bridge, the toe wall-riprap sideslope would be applied along the left bank until about halfway to State Street Bridge where it would transition into a vertical wall down to State Street Bridge. The right bank would have vertical walls.

The remainder of the creek between the State Street and Cabrillo Boulevard Bridges would consist of the toe wall-riprap sideslope.

The improved creek would generally follow the existing alignment. It would incorporate an overflow culvert between Highway 101 and Chapala Street Bridge that would bypass the oxbow. The oxbow would be left in place to function as the low flow channel.

Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Chapala Street, and Mason Street Bridges.

Table 8. Alternative Plan Features

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
I. Creek Length (ft)	5320	5320	5320	5320	5320	5320
II. Creek Bank Configuration						
Upstream of Oxbow	vertical/sloped	stepped	vertical	vertical	stepped	stepped
Along Oxbow	vertical	vertical	vertical	vertical	vertical	vertical
Downstream of Oxbow	vertical/sloped	vertical	vertical	vertical	stepped	stepped/vertical
III. Bank Protection						
Upstream of Oxbow	concrete, grouted stone, sackcrete, earth	vegetated step, concrete step wall	vertical concrete wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall
Along Oxbow	concrete, limestone, masonry	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall
Downstream of Oxbow	concrete, wood, piles, gabions, earth	vertical concrete wall	vertical concrete wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall/ vertical concrete wall
IV. Overflow Culvert	No	No	No	No	No	No
V. Bridges to be Replaced	0	6	6	7	7	7
Canon Perdido	No	No	No	No	No	No
De la Guerra	No	No	No	No	No	No
Ortega	No	Yes	Yes	Yes	Yes	Yes
Bath	No	No	No	No	No	No
Cota	No	Yes	Yes	Yes	Yes	Yes
De la Vina/Haley	No	No	No	Yes	Yes	Yes
Gutierrez	No	No	No	No	No	No
Montecito	No	Yes	Yes	Yes	Yes	Yes
UPRR	No	Yes	Yes	Yes	Yes	Yes
Chapala	No	Yes	Yes	Yes	Yes	Yes
Mason	No	Yes	Yes	Yes	Yes	Yes
State	No	No	No	No	No	No
Cabrillo	No	No	No	No	No	No
VI. Creek Top Width (ft)						
Cannon Perdido to De la Guerra	30-50	36	30	50	56	56
De la Guerra to Ortega	25-45	36	30	44	50	50
Oretega to Bath	25-35	36	30	44	50	50
Bath to Cota	40	36	30	44	50	50
Cota to De la Vina/Haley	25-40	36	30	44	50	50
De la Vina/Haley to Gutierrez	25-50	41	35	52	58	58
Gutierrez to Chapala (Box Culvert)	n/a	n/a	n/a	n/a	n/a	n/a
Gutierrez to Highway 101	40-50	46	40	47	53	53
Highway 101 to Montecito	40	46	40	60	60	60
Montecito to UPRR	35	46	40	60	60	60
UPRR to Chapala	35-40	46	40	60	60	60
Chapala to Mason	30-40	46	40	60	70	60-65
Mason to State	30-60	56	50	60	65-70	65-70
State to Cabrillo	60-70	60-70	60-70	60-70	60-70	60-70
VII. Conveyance Capacity (cfs)	1500	2500	2500	3400	3400	3400
VIII. Real Estate Acquisition						
Number of Parcels with Land Take Only	0	33	16	57	60	58
Number of Total Structure Take	0	2	1	9	13	11
Number of Partial Structure Take	0	3	3	7	7	7

Table 9. Alternative Plan Features

	Alt 7	Alt 8	Alt 9	Alt 10	Alt 11	Alt 12
I. Creek Length (ft)	5320	5320	5320	5320	5320	5320
II. Creek Bank Configuration						
Upstream of Oxbow	stepped	vertical	stepped	stepped	stepped	vertical/sloped
Along Oxbow	vertical	vertical	vertical	vertical	vertical	vertical
Downstream of Oxbow	vertical	vertical	stepped	stepped/vert	vertical	vertical/sloped
III. Bank Protection						
Upstream of Oxbow	vegetated step, concrete step wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall	vegetated step, concrete step wall	slopped riprap, lower concrete wall
Along Oxbow	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall
Downstream of Oxbow	vertical concrete wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall/ vertical concrete wall	vertical concrete wall	slopped riprap, lower concrete wall
IV. Overflow Culvert	No	Yes	Yes	Yes	Yes	Yes
V. Bridges to be Replaced	7	4	4	4	4	4
Canon Perdido	No	No	No	No	No	No
De la Guerra	No	No	No	No	No	No
Ortega	Yes	Yes	Yes	Yes	Yes	Yes
Bath	No	No	No	No	No	No
Cota	Yes	Yes	Yes	Yes	Yes	Yes
De la Vina/Haley	Yes	Yes	Yes	Yes	Yes	Yes
Gutierrez	No	No	No	No	No	No
Montecito	Yes	No	No	No	No	No
UPRR	Yes	No	No	No	No	No
Chapala	Yes	No	No	No	No	No
Mason	Yes	Yes	Yes	Yes	Yes	Yes
State	No	No	No	No	No	No
Cabrillo	No	No	No	No	No	No
VI. Creek Top Width (ft)						
Cannon Perdido to De la Guerra	56	50	56	56	56	56
De la Guerra to Ortega	50	44	50	50	50	63
Ortega to Bath	50	44	50	50	50	63
Bath to Cota	50	44	50	50	50	53
Cota to De la Vina/Haley	50	44	50	50	50	53
De la Vina/Haley to Gutierrez	58	52	58	58	58	71
Gutierrez to Chapala (Box Culvert)	n/a	30	30	30	30	30
Gutierrez to Highway 101	53	47	53	53	53	71
Highway 101 to Montecito	60	existing	existing	existing	existing	existing
Montecito to UPRR	60	existing	existing	existing	existing	existing
UPRR to Chapala	60	existing	existing	existing	existing	existing
Chapala to Mason	60	60	70	60-65	60	60-71
Mason to State	60	60	65-70	65-70	60	60-71
State to Cabrillo	60-70	60-70	60-70	60-70	60-70	60-71
VII. Conveyance Capacity (cfs)	3400	3400	3400	3400	3400	3400
VIII. Real Estate Acquisition						
Number of Parcels with Land Take Only	62	57	58	57	57	50
Number of Total Structure Take	10	8	12	10	10	9
Number of Partial Structure Take	7	7	7	7	7	1

G. Evaluation of Alternative Plans

The alternatives described above are evaluated to determine their ability to meet the planning objectives and on how well they meet the following criteria:

- feasibility of modifications to creek,
- minimal environmental impacts,
- minimal real estate impacts,
- demonstration of federal interest based on economic and environmental criteria,
- support of the non-federal sponsor, and
- consistency with current policies and budgetary priorities.

Feasibility level engineering, economic, environmental, and real estate analysis was performed in order to identify the required channel modifications, costs of modifications, real estate requirements, environmental impacts and benefits resulting from flood protection. The following sections summarize information from the technical appendices that are part of this Feasibility Study.

Hydrology

There are no expected changes in hydrology between the without-project and the with-project conditions. Alternatives 2 and 3 would be designed to convey a flow of 2500 cfs, which corresponds to an approximately 15-year level of protection. Alternatives 4 through 12 would be designed to convey a flow of 3400 cfs, which corresponds to an approximately 20-year level of protection.

Hydraulics

Hydraulic engineering efforts associated with the Feasibility Study include: alternative plan formulation, hydraulic modeling, sediment budget analysis, and overflow analysis.

The hydraulics of Lower Mission Creek presented challenges in the flood plain plan formulation. In numerous locations, the capacity of the creek is constrained by the minimal capacity provided by bridge crossings. An HEC-RAS (Hydrologic Engineering Center - River Analysis System)

was used to model the proposed alternatives. Basically, the 3400 cfs capacity alternative (Alternatives 4-12) was modeled once with the following configuration: upstream of Highway 101 channel side slopes of 0.5 horizontal to 1 vertical with reinforced concrete stepped walls, downstream of Highway 101 channel side slopes would be vertical reinforced concrete walls, the entire creek bottom would remain natural, and an oxbow bypass would be used. This configuration corresponds to Alternative 11. The creekbed slope was assumed to be streamlined to improve conveyance. The following bridges were removed and assumed replaced with a clear span structure: Mason Street, Chapala Street, Union Pacific Rail Road, Montecito Street, Gutierrez Street, Cota Street, Ortega Street, and De la Guerra Street.

To aid in plan formulation, several other refinements were made to the model. Although detailed hydraulic computations were not completed, a qualitative analysis was completed for the widening of the oxbow instead of utilizing a bypass culvert. Under this configuration, the oxbow would be widened to 60 feet wide. The use of the widened oxbow instead of the bypass is included in Alternatives 4 through 7.

Further discussions during plan formulation resulted in additional analysis to determine if increasing the width of the Cabrillo Boulevard Bridge would help to increase the capacity of the State Street Bridge. The analysis revealed that the widening of Cabrillo Boulevard Bridge would not significantly increase the capacity of the State Street Bridge. In fact the widening of Cabrillo Boulevard bridge would likely force the water surface to critical depth at the downstream face of the State Street Bridge, which would likely generate higher flow velocities within an unstable flow regime, which in turn may undermine the State Street Bridge abutments.

One final adjustment was made to the 3400 cfs alternative. In the interest of reducing real estate costs with the proposed alternatives, the effects of narrowing the channel vertical walls between State and Mason Streets and between Ortega and Canon Perdido Streets was evaluated on a preliminary basis. The hydraulics analysis associated with the narrowing indicates that narrowing both stretches of creek to 50 feet in width is an acceptable configuration that could be used in the final design. Additional detailed analysis during the design phase will need to be completed to verify findings.

The 2500 cfs capacity alternative was also modeled using HEC-RAS. There are several design constraints associated with this alternative, most notably is the desire to keep real estate impacts to a minimum. For this alternative, only the following most under sized bridges where assumed

to be replaced: Mason Street, Chapala Street, Union Pacific Rail Road, Montecito Street, Cota Street, and Ortega Street. Refinement of the 2500 cfs model was needed to eliminate critical flow locations. The refinements indicated that a 25-foot-wide channel upstream of the highway is the optimum design for the 2500 cfs alternative.

Sediment Budget Analysis

A sediment budget level of analysis was performed for this phase of the Feasibility Study. Detailed information concerning the sediment budget analysis can be found in the Hydraulics Appendix. It is expected for both the 2500 cfs and the 3400 cfs alternative that there will be minimal bed elevation change in the upper reaches. The estimated overall bed change for the study reach for the with-project conditions is less than 1 foot, which is similar to existing conditions.

Effect on the Sediment Budget of the Harbor

Based on the sediment budget analysis, approximately 21 tons (9.2 cubic yards) and 25 tons (10 cubic yards) of sediment are transported to the Santa Barbara Harbor on an average annual basis for the existing and with-project, respectively. These numbers are negligible compared to the 25,000 cubic yards of material that are transported annually from East Beach to West Beach. Based on these results, the with-project conditions for both capacities should have no significant effects on the sediment budget of the harbor.

With-Project Overflow Analysis

The overflow analysis for the with-project alternatives was modeled using the same procedures as outlined in the *Without-Project Conditions Section.* Two different alternatives were evaluated in the overflow analysis. Both alternatives used the top-widths and bridge replacements per the 3400 cfs alternatives. One alternative considered using rough concrete and the other considered using gabions. The analysis revealed that there is not a significant difference between the two bank treatments. However, the rough concrete gives a slightly larger channel capacity due to lower Manning's values. The overflow analysis reveals significant improvements for the 3400 cfs alternative over the without-project conditions (See Exhibit 6 "Mission Creek Floodplain Map 3400 cfs Project").

A formal with-project overflow analysis was not completed for the 2500 cfs alternative. A simplified procedure was used to evaluate residual damages. The existing conditions overflow analysis results were modified by assuming that the channel will handle an extra 1000 cfs (2500 cfs minus 1500 cfs existing capacity), and subtracting the discharge from the overbank flows. Essentially the discharge-frequency curve was shifted. Therefore, a new discharge-frequency curve was calculated at each cross section while keeping the same water surface elevations.

The results of the overflow analysis were tabulated for use as the input of the HEC-FDA program. These input parameters were used to estimate residual damages as discussed in the *Plan Selection Section* of this report.

Geotechnical

The geotechnical evaluation of the with-project alternatives focuses on design requirements. The geotechnical design requirements for Alternatives 2 through 12 are similar and are discussed in the following paragraph.

The design values for the foundation and backfill materials for the alternatives should meet the criteria in Table 10.

Table 10. Mission Creek Design Values

Parameter	Value
Foundation Material	
Allowable Bearing Pressure	1500 psf
Permeability	85 fpd (fine sand)
Backfill Material	
Moist Unit Weight	125 pcf
Saturated Unit Weight	135 pcf
Angle of Internal Friction	20E
Cohesion	200 psf
Active Earth Pressure Coefficient	0.40
Equivalent Earth Fluid Weight	50 pcf
At-Rest Earth Pressure Coefficient	0.55
At-Rest Equivalent Earth Fluid Weight	70 pcf
Passive Pressure	250 pcf

Other requirements include the use of a subdrain system throughout the entire project length, construction slopes graded no steeper than 1 vertical to 2 horizontal, scour protection at footings, and liquefaction protection up to 0.15g seismic acceleration.

Design

Due to the constraints governing the design of the alternatives of minimal real-estate acquisition and the desire to maintain and create habitat conducive to Steelhead migration, all alternatives would consist of natural creek bottom. For Alternatives 2-7, the alignment of the modified channel would generally follow the existing alignment. For Alternatives 8-12, the alignment of the modified channel would follow the existing alignment except around Highway 101, where higher flows would be diverted into a pair of 15-foot-wide by 6-foot-high culvert.

Three types of channel walls were investigated: vertical concrete walls, concrete step walls, and riprap walls. Based on the input from public meetings held in the community, the public would like the local sponsor to consider using the riprap wall as much as possible.

The riprap bank treatment would be placed on top of a short vertical wall with a 1.0 vertical to 1 2 horizontal slope or flatter. The riprap thickness would be 15 inches. The riprap would be recessed and covered with a topsoil layer so that ground cover can be planted. Concrete pipe planters varying in sizes (up to a maximum of 3 feet in diameter) would be placed in between the riprap to allow for planting of native trees and vegetation.

The step wall would allow planting of riparian type vegetation half way up the wall. The idea is that as the vegetation matures, it would obscure the concrete walls to give the stream additional shading and aesthetic appeal. The disadvantage of the step wall is that it would require an increased channel width compared to the vertical wall design. The step walls considered would generally approximate a channel having 2 vertical to 1 horizontal sideslopes.

Preliminary designs were configured for Alternatives 2-12. Plan sheets 1 through 16 show the plan view for various alternatives. Sheets 17, 18, 19, and 20 show typical sections for each type of wall. The Engineering Plans as Exhibit 7 and the Architectural Drawings as Exhibit 8 can be found following the Main Report.

There are nine alternatives for the 3400 cfs capacity. The alternatives are various combinations of vertical walls, step walls, or vertical walls with sloped riprap backfill. Two alignments under Highway101 were considered either using the existing oxbow channel alignment or constructing a new oxbow bypass. The oxbow would carry flow up to its capacity, the rest would flow through the covered box channel. The box channel would be placed under Highway 101 through an existing 40-foot wide opening. The other alternative would widen the oxbow by moving the south side masonry channel wall 20 to the south to create a 60-foot wide channel and widen both the railroad bridge and the Montecito Street Bridge. The following is a list of alternatives for the 3400 cfs capacity and their corresponding plan sheets:

Alternative No. 4: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using vertical walls throughout the entire project reach. Plan sheets 1, 2, 3A, and 4.

Alternative No. 5: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls throughout the entire project reach. Plan sheets 5, 6, 8, with 3A.

Alternative No. 6: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 with mixed vertical walls and vegetated stepped walls applied downstream of Highway 101. Plan sheets 5, 6, 8A, with 3A.

Alternative No. 7: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101. Plan sheets 5, 6, 4, with 3A.

Alternative No. 8: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using vertical walls throughout the entire project reach. Plan sheets 1, 2, 3, and 4.

Alternative No. 9: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls throughout the entire project reach. Plan sheets 5, 6, 7, and 8.

Alternative No. 10: 3400 CFS Capacity With Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 with mixed vertical walls and vegetated stepped walls applied downstream of Highway 101. Plan sheets 5, 6, 7, and 8A.

Alternative No. 11: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101. Plan sheets 5, 6, 7, and 4.

Alternative No. 12: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using predominantly combination vertical wall and riprap. Plan sheets 13, 14, 15, and 16.

The 2500 cfs alternative would extend through the same reach as the 3400 cfs alternative. The existing oxbow would be utilized under Highway 101. The railroad bridge and the Montecito Street Bridge would be widened. Listings of alternatives for 2500 cfs capacity channel and their corresponding plan sheets are as follows:

Alternative No. 2: 2500 CFS Capacity - Stabilized sides using combination vegetated stepped walls and vertical walls. Not shown.

Alternative No. 3: 2500 CFS Capacity - Stabilized sides using vertical walls throughout the entire project reach. Plan sheets 9 through 12.

Access Ramps and Fencing

Approximately four access ramps are to be designed as part of each alternative. The ramps would be designed to access the channel bottom for maintenance. The location of the access ramps are as proposed: (1) north side downstream of Canon Perdido Street with access from adjacent parking lot; (2) south side downstream of Bath Street with access from Cota Street; and (3) south side downstream of Gutierrez Street with access from De la Vina Street; and (4) east side downstream of Gutierrez Street Bridge near the inlet of the overflow culvert.

Due to the steep slopes of the proposed alternatives, channel fencing would be provided to meet safety requirements. Fencing is assumed to be 6 feet high chain link for draft cost estimate purposes. The actual fencing proposed for the design, which might include a simple 4 foot channel barrier or hand rail next to public right-of-way, would be determined during final design. The sponsor may desire to pay for upgraded fencing.

Retaining Wall Preliminary Design

Two types of wall footings were examined for all of the alternatives. The type of wall footing used would depend on adjacent real estate availability. In areas where adequate rights-of-way exist, an inverted "T" type cantilever wall footing would be used. In areas where there is limited right-of-way available, pile footings would be used. Two assumptions were made for the purposes of cost estimating: a scour depth of four feet was assumed and approximately half of the walls were considered to be cantilever footings.

Bridge Relocations and Replacements

For the 3400 cfs alternatives, Alternative 4-7 (without the oxbow bypass) would require the reconstruction of seven bridges as described in Table 8, "Alternative Plan Features," above. Alternatives 8-12 (with the oxbow bypass) would require the reconstruction of four bridges. Alternatives 2 and 3 (2500 cfs alternatives) would require the replacement of six bridges. Alternatives 2-7 would require the widening the existing railroad bridge and Alternatives 8-12 would require construction of the overflow culvert. The bridges are proposed to be either a precast reinforced concrete box, or a precast, prestressed girder on pile abutment configuration and all would be clear span design. Any final design and construction would minimize construction time and impacts to the railroad.

Construction

There are four major factors to be considered as part of the construction of the project: shoring requirements; access during construction; bridge relocation; and disposal. Because of the limited channel right-of-way, approximately 3600 lineal feet of shoring would be needed. The use of shoring is important because it significantly increases construction costs. Access during construction would need to be from within the channel. This restriction would eliminate the use of larger construction equipment such as excavators and cranes. The restriction would require the use of smaller equipment, which would result in above average construction time. The third construction factor is the phasing of the bridge replacements. Construction of the bridge replacements at the road crossings would need to be phased so that the adjacent road crossing can be used as a detour. Approximately 64,000 cubic yards of excess excavated material would need

to be disposed. A possible disposal site has been located 20 miles north of the site at a municipal landfill.

Operation and Maintenance

The modified creek would have structurally adequate bank protection. It is therefore reasonable to expect maintenance needs for the creek banks be reduced compared to existing needs. Currently, the lack of effective bank stabilization in most of the channel creates severe bank erosion during high flows. Since 1995, the local sponsor has spent $95,000 to stabilize eroded banks and $50,000 for channel clean-up and repair in addition to regular annual maintenance costs estimated at $10,000. The cost of channel bank stabilization and repair after flooding would be greatly reduced under the with-project condition. It is estimated that the annual maintenance costs of the structural components could be reduced by as much as one-third depending on the alternative selected. Both the step wall and the riprap wall alternatives would likely have a slightly higher initial annual maintenance cost than the vertical walls until the vegetation is well established with the riprap wall having the highest expected maintenance cost due to the need to replace some of the topsoil after a major flood event.

All alternatives would require some annual maintenance to maintain the design capacity of the channel. Weed and vegetation growth in the channel bottom would at a minimum require partial removal annually (using a mosaic pattern) to maintain the design capacity. In addition, any areas where sediment deposition occurs would require removal if more than fifteen percent of the channel capacity is plugged. It is estimated that the average frequency of this removal of plugs is a minimum of every three years. It is important to note that the channel may require maintenance more frequently than the minimum stated above.

Real Estate

The with-project real estate requirements are an integral part of the plan formulation and plan selection process. The following sections describe the real estate requirements for each of the alternatives formulated in this feasibility study. The properties that would be impacted for each alternative are indicated in the Exhibit 7. "Engineering Drawings" found after the Main Report.

Relocations under P.L. 91-646

Several residences and commercial buildings may be affected by the creek alignment under the with-project conditions. The residences may include 303 W. Ortega Street, 434 De la Vina Street, 631 Bath Street, 633 Bath Street, 129 W. Haley Street, 116 Chapala Street, 2 residences at 306 W. Ortega Street, and 326 W. De la Guerra Street. The commercial properties may include 15 W. Mason Street, 29 State Street, 113 Kimberly Avenue, and a commercial building located at the northeast corner of Mason and Kimberly Streets. Table 11, "With-Project Relocations" shows each alternative and its associated relocations.

Table 11. With-Project Relocations

Alternative	Commercial Building	Small Apartment Building	Residential Building	Metal Building
Alternative 1	n/a	n/a	n/a	
Alternative 2	1 whole take	0	1 whole take	0
Alternative 3	1 whole take	0	0	0
Alternative 4	1 whole take	1 (4 units)	6*	1
Alternative 5	4 whole takes	1 (4 units)	9*	1
Alternative 6	1 whole take	1 (4 units)	9*	1
Alternative 7	1 whole take	1 (4 units)	9*	0
Alternative 8	1 whole take	1 (4 units)	6*	0
Alternative 9	4 whole takes	1 (4 units)	9*	0
Alternative 10	1 whole take	1 (4 units)	9*	0
Alternative 11	1 whole take	1 (4 units)	9*	0
Alternative 12	2 whole takes	1 (4 units)	4 whole takes	0

* Two of the residences may be relocated on their lots instead of being destroyed

Other Improvements (No Relocation)

In addition to the taking of entire buildings which would necessitate the relocation of businesses or inhabitants, the required takes would also involve partial area of buildings, or whole structures which are not used to provide a residence or house a business, e.g. garages, sheds, decks. Table 12, "Other Improvements To Be Taken" describes those required takes.

Table 12. Other Improvements To Be Taken

Alternative	Commercial Building	Railroad Station Platform/Track	Patio Deck	Metal Structure	Garage
Alternative 1	n/a	n/a	n/a	n/a	n/a
Alternative 2	1 partial take	0	1	0	1
Alternative 3	1 partial take	0	1	0	1
Alternative 4	1 partial take	1 partial take	1	1 partial take	3
Alternative 5	1 partial take	1 partial take	1	1 partial take	3
Alternative 6	1 partial take	1 partial take	1	1 partial take	3
Alternative 7	1 partial take	1 partial take	1	1 partial take	3
Alternative 8	1 partial take	2 partial takes	1	0	3
Alternative 9	1 partial take	2 partial takes	1	0	3
Alternative 10	1 partial take	2 partial takes	1	0	3
Alternative 11	1 partial take	2 partial takes	1	0	3
Alternative 12	1 partial take	2 partial takes	1	0	3

Relocation of Bridges

As previously discussed, several bridges must be replaced for any of the alternatives. Table 13, "Bridge Relocation" shows which bridges are proposed to be replaced.

Table 13. Bridge Relocation

Alternative	De la Guerra	Ortega Street	Cota Street	De la Vina Street	Gutierrez Street	Montecito Street	Union Pacific Railroad	Chapala Street	Mason Street	Total
1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
2		X	X			X	X	X	X	6
3		X	X			X	X	X	X	6
4		X	X	X		X	X	X	X	7
5		X	X	X		X	X	X	X	7
6		X	X	X		X	X	X	X	7
7		X	X	X		X	X	X	X	7
8		X	X	X					X	4
9		X	X	X					X	4
10		X	X	X					X	4
11		X	X	X					X	4
12		X	X	X					X	4

Utilities

Any utilities crossing the creek under any of the bridges to be replaced would be affected in the with-project condition. Currently, both water and sewer cross under bridges in the project area. The costs associated with utility relocation have been included as part of the bridge replacement and relocation costs.

Acquisition Costs

Acquisition costs associated with the relocations, structures takes, land takes with easements, land takes without easements, and construction and OMRR&R lands are detailed in the table below. These numbers were used in the development of the NED analysis in the *Plan Selection Section*. The lands and structures costs have been updated based on the most current gross appraisal dated February 2000.

Table 14. Total Real Estate Costs

Alternative	Lands and Structures Costs	Relocation Costs	Total Admin Cost	Contingency (15%)	Total Acquisition Cost
1	n/a	n/a	n/a	n/a	0
2	$3,484,000	$45,000	$185,000	$557,000	$4,271,000
3	$3,202,000	$22,500	$175,000	$510,000	$3,910,000
4	$4,647,000	$315,000	$340,000	$795,000	$6,097,000
5	$5,880,000	$405,000	$335,000	$993,000	$7,613,000
6	$5,062,000	$315,000	$350,000	$873,000	$6,569,000
7	$5,152,000	$315,000	$350,000	$873,000	$6,690,000
8	$4,030,000	$315,000	$320,000	$700,000	$5,365,000
9	$5,533,000	$383,000	$335,000	$938,000	$7,189,000
10	$4,812,000	$270,000	$330,000	$812,000	$6,224,000
11	$4,805,000	$315,000	$330,000	$818,000	$6,268,000
12	$4,567,000	$169,000	$513,000	$787,000	$6,036,000

Environmental

With-Project environmental impacts are a major concern of local residents. This section summarizes the findings of the Environmental Impact Statement/Environmental Impact Report, which can be found following the Main Report Exhibit Section. After the Alternatives Formulation Briefing, based on environmental benefits and the cost benefit ratio, a decision was made that Alternative 12 provides the most incidental environmental benefits and meets the required cost benefit ratio. Twelve alternatives were developed during the feasibility study. However, these alternatives were similar in nature; therefore, based on criteria, similarities and differences in the basic design features, the decision was made to evaluate four Alternatives for detailed environmental analysis in the EIS/EIR. They are Alternatives 1, 6, 8, and 12.

The remaining eight Alternatives were not evaluated further for environmental impacts. Four of them, Alternatives 2, 3, 5, and 9, were not analyzed because they do not achieve a benefit to costs ratio greater than 1. The various design features of Alternatives 4, 6, and 7 have corresponding equivalents in Alternatives 8, 10, and 11, while Alternative 12 corresponds to design features of Alternatives 10 and 11. Based on those equivalencies, further environmental evaluation has not been performed for Alternatives 4, 7, 10, and 11.

During subsequent formulation wherein additional mitigation requirements and the related construction costs were included, including the updated right-of-way costs, it was revealed that only alternatives 4, 8, and 12 would be economically viable.

Water Resources

Impacts to water resources under the with-project condition would be considered significant if any of the following conditions existed:

- if the project would consistently discharge pollutants into the creek during debris removal operations,
- if turbidity levels during excavation, construction, and periodic debris removal are significantly greater than levels encountered during floods on the creek and under anticipated future without-project conditions,
- if the project would have significant adverse impact on groundwater recharge,
- if the penetration rate of water is significantly reduced due to impervious cover of the creek bottom,
- if discretionary development inconsistent with the goals and policies of the City of Santa Barbara and Santa Barbara County's Water Quality Management Plans takes place, and
- if the proposed project is not in compliance with Federal, State, and local water quality regulations.

Alternative 1 - Under the No Action Alternative there would be no project related change in the baseline conditions. To the degree that the City and County of Santa Barbara are successful in developing and implementing BMPs (Best Management Practices) for reduction of stormwater related pollution of Lower Mission Creek, concentrations of contaminants could be expected to decrease over time.

Alternatives 6, 8 and 12 - Impacts to water resources are similar under each of the alternatives. Turbidity levels would increase due to excavation of the creekbed. The construction activity would only occur during non-flood season; therefore, impacts would be short-term and localized. Turbidity levels would also increase during future debris removal. This impact would be short term and localized and would not exceed turbidity levels under the future without project conditions. With utilization of appropriate construction methods and adherence to debris removal permit requirements, with-project conditions would not have a significant impact on water resources.

Compliance with Environmental Laws and Permit Requirements - Project impacts on water quality due to both construction and future sediment removal are anticipated to be adverse but short term and localized. With utilization of measures to reduce turbidity and avoid spills, impacts are not anticipated to be significant. The proposed project would be consistent with the City of Santa Barbara General Plan and Policy guidelines for water quality. A 404(b)(1) water quality evaluation has been included in the EIS/EIR. The permit for future maintenance is currently being coordinated with the Corps Regulatory Branch. A waiver has been obtained from the State for the State Section 401 Water Quality Certification for the project construction and future maintenance of the project.

A Pollution Prevention Plan will be prepared to meet Section 402 of the Clean Water Action and National Pollutant Discharge Elimination System (NPDES) Storm Water Program requirements prior to project construction. The construction contractor will prepare a Storm Water Pollution Prevention Plan (SWPPP) to reduce erosion and degradation to the waters of the United States. A 1603 Streambed Alternation permit would be required prior to construction from the California Department of Fish and Game. If all of these requirements are met, the project will be in compliance with Federal and State water quality regulations.

Ground Water Recharge Impacts - Although creek banks would be stabilized using concrete walls, there would be no measurable decrease in water percolation through the sideslopes because the existing sideslopes consist of various impermeable surfaces. In addition, most of the percolation would continue through the natural creek bed. Construction and maintenance are not anticipated to have an appreciable effect on the amount of groundwater recharge.

Mitigation Measures - The mitigation measures to be used to mitigate increased turbidity during construction require that a diversion pipe or pipes be installed to convey flow across the section that is currently under construction for areas above HWY 101. Diversion structures that divide the creek and allow dewatering of the construction side would be used below HWY 101. The mitigation measures to be used to mitigate short term impacts to surface water quality from fuels, solvents, and lubricants associated with construction equipment include the following:

Equipment shall be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work.
Corps shall develop and implement a spill prevention and remediation plan and workers will be instructed as to its requirements.
Construction supervisors and workers shall be instructed to be alert for indications of equipment related contamination such as stains and odors.
Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan, if indications of equipment related contamination are noted.
Construction equipment shall only be operated within dewatered areas of the creek.
Construction equipment shall not be repaired within the creek.

Biological Resources

The following is a list of biological resources goals and policies set forth by the City of Santa Barbara's General Plan Conservation Element:

Goal - Enhance and preserve the City's critical ecological resources in order to provide a high quality environment necessary to sustain the City's ecosystem.
Policy 4.0 - The habitat of rare and endangered species shall be preserved.
Policy 6.0 - Intertidal and marine resources shall be maintained or enhanced.
Policy 10.0 - Programs shall be developed to maintain a productive urban biotic community.

In addition, the City of Santa Barbara's Local Coastal Plan includes the following policies:

- 6.1 - The City . . . shall protect, preserve and where feasible restore the biotic communities designated in the City's Conservation Element . . .

- 6.8 - The riparian resources, biological productivity, and water quality of the City's coastal creeks shall be maintained, preserved, enhanced, and where feasible, restored.

These goals and policies will be used as the evaluation criteria for the assessment of with-project biological impacts and mitigation.

Impacts to Biological Resources - All alternatives, including the No Action Alternative under the with-project condition have adverse effects on bank vegetation including some large trees, initially the bottom of the channel itself, and temporal impacts due to future maintenance. Construction of a flood control channel would have a direct and beneficial effect on the bottom of the channel by removing existing concrete, building fish related mitigation measures, and creating turbulent conditions that would facilitate both ascent and descent of the creek by steelhead. Construction of stepped walls (Alternatives 2, 5-7 and 9-11) would allow planting of shrubby native species that would grow to the status of an understory plant community. Real estate properties consumed by construction of a channel to convey 3400 cfs would allow planting as many as six parcels with native trees. Maturation of trees in these "habitat expansion zones" would restore important islands of riparian canopy at irregular intervals along the creek's banks. Finally, the combined use of a single lower wall along the channel bottom and riprap bank stabilization above the wall (Alternative 12) would facilitate restoration of bona fide riparian habitat along portions of Mission Creek. Table 15 presents a qualitative summary of anticipated environmental impacts and the proposed mitigation measures. Complete discussion on biological resources can be found in Chapter 10 of the EIS/EIR following the Main Report.

Table 15. Summary of Anticipated Environmental Impacts

Alternative	Net Adverse Impacts	Neutral Effects	Mitigation Measures and Beneficial Project Design Features
No Action	bank vegetation stream channel	steelhead & tidewater gobies water temperature estuarine habitat	
Vertical Walls, 2500 cfs	bank vegetation* isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, expand estuarine habitat
Stepped Walls. 2500 cfs	bank vegetation* isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, slight expansion of estuarine habitat native riparian understory species
Vertical Walls, 3400 cfs	bank vegetation isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, twice the estuarine forging habitat for tidewater gobies bank top coppices of native trees
Stepped Walls, 3400 cfs	bank vegetation isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, expand estuarine habitat twice the estuarine forging habitat for tidewater gobies native riparian understory species bank top coppices of native trees
Low wall with riprap sideslopes 3400 cfs	bank vegetation isolated native trees stream channel	steelhead water temperature	restoration of natural bottom, turbulent, heterogeneous currents and riffles, fish ledges, boulder clusters, fish baffles, hideouts for tidewater gobies, expand estuarine habitat twice the estuarine forging habitat for tidewater gobies, establishment of an integrated riparian corridor having both native canopy and understory species

* Impacts do not lend themselves to full mitigation within project area, therefore, abatement of giant reed stands outside the project's boundaries is suggested.

The following table shows a quantitative summary comparison of the future without project (Alternative 1) and Alternatives 6, 8, and 12. The analysis is detailed in the EIS/EIR. Effects are expressed in habitat units and are based on calculations provided in Appendix C of the EIS/EIR.

Table 16. Quantitative Biological Summary

Habitat Type	No Action Alternative (future without project)	Alternative 6	Alternative 8	Alternative 12
Aquatic	0.66	0.91	0.91	1.08
Stream Bank	0.47	0.40	0.14	0.81
Total	**1.13**	**1.31**	**1.05**	**1.89**

Alternative 12 includes beneficial provisions that are not included in the other 10 structural alternatives. This structural alternative differs from all the other alternatives because it involves construction of a toe wall at the edge of the channel bottom and a slope stabilized by a subsurface layer of riprap leading from the toe wall to the top of the bank. By combining a slope on which native plants could be placed with the conveyance capacity afforded by low vertical walls at the foot of the banks, Alternative 12 would provide the desired flood protection as well as promote the restoration of riparian habitat along Lower Mission Creek. Figure 1. "Toe wall and Riprap Bank Protection " shown on the following page depicts the proposed channel cross section.

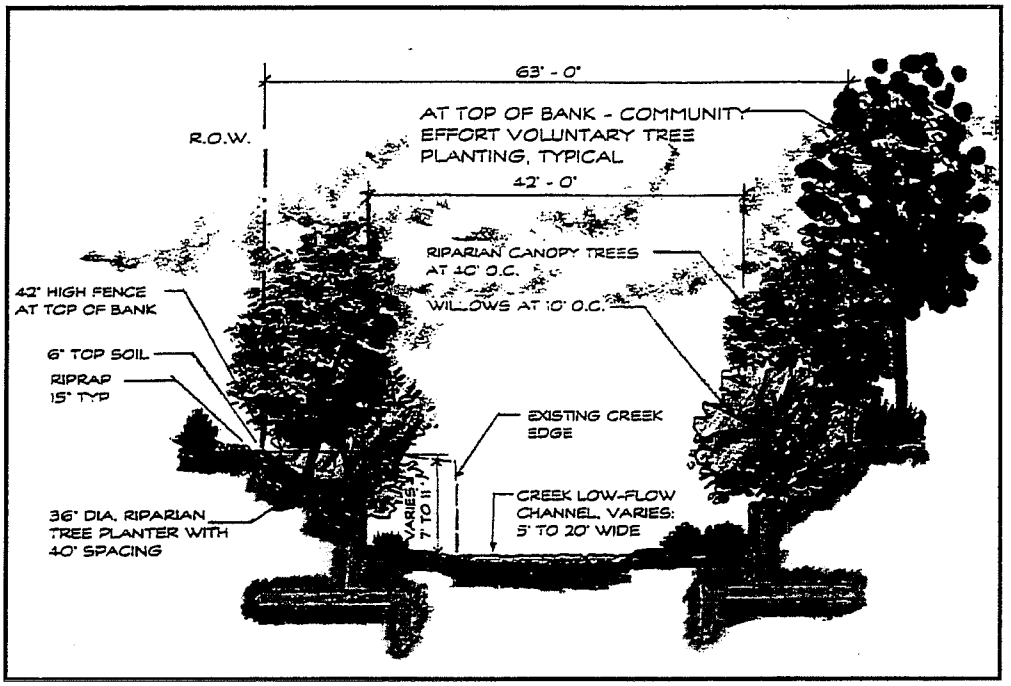


Figure 1. Toe wall and Riprap Bank Protection

Mitigation Measures - Mitigation for with-project impacts would be significant for alternatives 2-11 even with the implementation of mitigation, Alternatives 6 and 8 would result in significant and unavoidable impacts due to the reduction in habitat units as outlined in Table 16. The proposed mitigation measures identified include avoidance of impacts to steelhead, environmental construction commitments to minimize short-term impacts to tidewater gobies, restoration of natural creek bottom, creation of turbulent, heterogeneous currents and riffles, fish ledges, boulder clusters, fish baffles, hideouts for tidewater gobies, expansion of estuarine habitat twice the estuarine forging area for tidewater gobies, establishment of an integrated riparian corridor having both native canopy and understory species, and avoidance of impacts to the Moreton Bay Fig. A detailed description of each of the proposed mitigation measures can be found in Chapter 10 of the EIS/EIR following the Main Report.

Cultural Resources

The City of Santa Barbara's General Plan and Policies has the following restrictions applicable to cultural resources: (1) Sites of significant archaeological, historic, or architectural resources will be preserved and protected wherever feasible and (2) activities and development which could damage or destroy archaeological, historic, or architectural resources are to be avoided. The following paragraphs discuss the impacts associated with each of the alternatives.

Alternative 1 - This alternative would not involve any structural modifications and therefore, will have no adverse impacts to the cultural resources.

Impacts on National Register Listed or Eligible Properties Alt. 6, 8, & 12 – Based on the current design, Alternative 8 and 12 would have no adverse impacts to structures that may be eligible for listing in the National Register of Historic Places. However , Alternative 6 has the potential to require removal of a number of eligible structures. Details on the removal of the structures are listed below:

Alternatives 6:

- Chapala Street Pony Truss Bridge - 1920. National Register eligible. Potential for complete removal.
- Mission Creek Diversion between Chapala Street Pony Truss and Montecito Street Bridges - probably built in 1905. Contributing element to the Railroad Depot National Register listed property. Proposed for complete removal. Sandstone blocks would be reused if possible and/or appropriate.

The following structures are not scheduled to be directly impacted but may suffer some degree of impact, depending on final design:

- 20 W. Mason Street - 1908. Multiple dwelling. National Register eligible.
- 118 Chapala Street - 1911. Triplex, multiple uses. National Register eligible.
- 120 Chapala Street - circa 1913-1914. House. National Register eligible.
- 311/313 West Ortega Street - circa 1907. Duplex. National Register eligible.
- 309 West Ortega Street – circa 1890-1900. House. National Register Eligible.

Impacts on Properties Eligible for or Listed on the California Register or Eligible for or Designated as City Structures of Merit or Landmarks Alt. 6, 8, &12 - All of the properties listed above are also eligible for inclusion on the California Register and for designation as a City Landmark or Structure of Merit. In addition to those properties, the three construction alternatives would have impacts on the following structures.

Alternative 6:

- 15 West Mason Street - 1925. Designated City Structure of Merit. California Register eligible. Potential for complete removal.
- 116 Chapala Street - 1921. Originally a carriage house. National Register eligible. Potential for complete removal.
- 134 Chapala Street - 1960. City Structure of Merit eligible. Potential for complete removal.
- Potter Hotel Footbridge - circa 1905. City Structure of Merit eligible. Potential for complete removal.
- 536 Bath St. - 1910. House. National Register eligible. Potential for complete removal.
- 306 West Ortega Street - 1928. California Register and City Structure of Merit eligible. Potential for complete removal.

Alternative 8:

- Alternative 8 has the same impacts as alternative 6 except for the Potter Street Bridge and that the property at 134 Chapala Street has potential for partial removal rather than complete removal.

Alternative 12:

- 15 West Mason Street - 1925. Designated City Structure of Merit. California Register eligible. Potential for complete removal.

NEPA Mitigation -

Under NEPA, mitigation of cultural resources is confined to those properties that have been evaluated for their eligibility for inclusion in the National Register of Historic Places (NRHP). At that time they become known as "historic properties". Following determinations of eligibility, historic properties are assessed for the criteria of effect and adverse effect. If the

project will adversely affect a historic property, mitigation measures will be required to reduce the impacts to a level of no adverse effect.

A possibility exists that ground disturbing activities, especially near archaeological sites CA-SBA-27 and SBA-28, may uncover subsurface deposits. A qualified archaeological monitor will be in place during all ground disturbing activities and he/she will be empowered to halt construction until the situation is resolved. Local ordinances require the presence of a Native American monitor that has traceable hereditary roots to the Barbareño Chumash. The National Historic Preservation Act has no such requirements for Native American monitoring.

Compliance with Section 106 – Alternative 12 as designed is in compliance with Section 106 of the National Historic Preservation Act. The State Historic Preservation Officer (SHPO) transmitted a letter dated August 3, 2000 that agrees with the Corps' determinations of eligibility, non-eligibility and no adverse effect. The following buildings and structures are eligible for inclusion in the NRHP Places under Criterion C : 118 Chapala Street, 120 Chapala Street, 20 W Mason Street, 309 W Ortega Street, 311/313 W Ortega Street, Chapala Street Pony Truss Bridge, and the Mission Creek Diversion.

SHPO concurred with our determination that the project as planned will have no adverse effects on properties that are eligible for, or included in the NRHP. No further work towards Section 106 compliance is required.

CEQA Mitigation - CEQA requires the development of specific mitigation measures as part of the EIS/EIR. The specific mitigation measures for each of the potentially affected structures can be found in Section 18 of the EIS/EIR.

Residual Impacts – Under CEQA, the project will result in significant and unavoidable cultural resources impacts due to the complete removal of 15 West Mason Street.

Hazardous, Toxic and Radioactive Waste

The City of Santa Barbara General Plan and Policies applicable to HTRW state, Athe City shall support the programs of all governing agencies, including those of the Regional Water Quality Control Board which respect to best management practices for Santa Barbara's watersheds and urban areas. The County and City of Santa Barbara is planning to submit a joint Stormwater Pollution Prevention Plan (SWPPP) to the Central Coast Regional Water Quality Control Board (CCRWQCB) to satisfy requirements of the National Pollution Discharge Elimination System (NPDES).

Alternative 1 - Under the No Action Alternative there would be no project related change in the baseline conditions found in the without-project condition.

Alternatives 6, 8 and 12 - Under project construction Alternatives 6, 8 and 12, foreseeable potential impacts would be related to construction activities. These would include:

- Possible need to dispose of contaminated soils encountered during excavation activities;
- Possible water contamination by excavation of streets and buildings where existing soil contamination is unidentified;
- Possible release of hydrocarbon contaminated groundwater encountered in excavation activities downgradient of Haley Street;
- Possible water contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants;
- Sediment contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants;
- Possibility of encountering PCE contaminated soil and/or shallow groundwater in the vicinity of the West Gutierrez Street Bridge. This event could potentially cause releases of this substance to the environment; and,
- Possibility of encountering deep sediment contaminated by HTRW. Although analysis of shallow sediments did not identify concentrations of target analyses above regulatory action thresholds, there is an unknown degree of probability that excavation activities could encounter previously undetected contamination at deeper levels.

Future Maintenance - During future sediment removal/maintenance all the environmental commitments identified in the mitigation section would be followed to avoid contamination within the project area.

Mitigation Measures - The mitigation measures to be used to mitigate potential HTRW impacts from fuels, solvents, and lubricants associated with construction equipment include the following:

Equipment will be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work.
Corps will develop and implement a spill prevention and remediation plan and workers will be instructed as to its requirements.
Construction supervisors and workers will be instructed to be alert for indications of equipment related contamination such as stains and odors.
Construction supervisors and workers will be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan, if indications of equipment related contamination are noted.
Construction equipment will only be operated within dewatered areas of the creek.

The mitigation measures to be used to mitigate potential HTRW impacts from the possibility of PCE contaminated soil and/or shallow groundwater in the vicinity of West Gutierrez Street Bridge include the following:

Prior to commencement of excavation activities on the downstream side of the West Gutierrez Street Bridge, a shallow groundwater, water and soil sampling plan will be developed to detect the presence of PCE and/or toxic byproducts of PCE degradation.
The recommended sampling plan will be implemented prior to commencement of excavation activities.

If PCE or hazardous or toxic byproducts of PCE degradation are detected, the CCRWQCB and County Department of Health and Human Services will be consulted to help assess the situation and an appropriate regulatory response will be developed to remediate the contamination.

The mitigation measures to be used to mitigate potential HTRW impacts from the possibility of encountering deep contaminated sediment includes the following:

When the Corps is prepared to commence excavation activities, samples of creek sediments will be taken to the depth of planned excavation and the same suite of analyses used to characterize the shallow sediments will be used to analyze the deep sediments.
In the event regulatory actionable concentrations of contaminants are detected by the analyses, the Corps will develop a plan to characterize the extent of contamination.
A plan will then be developed to comply with applicable laws and regulations related to the identified contamination so that excavation activities do not result in releases of HTRW into the environment.

Noise

The Noise Element of City of Santa Barbara General Plan points out problem areas and sets goals for maintaining and enhancing good noise conditions and improving areas with noise problems. Policy 6.0 of the Noise Element states that, "noise control activities should be coordinated with those agencies of other local jurisdictions". Noise related impacts would be considered significant if noise level is excessive and results in abusive sound.

Alternative 1 - The past routine maintenance performed in the creek temporarily raised noise levels due to construction equipment and truck transportation. The No Action Alternative will continue routine maintenance.

Alternatives 6, 8 and 12 - Construction equipment would elevate the noise levels within the project area. In commercial areas, noise levels tend to be higher than in residential areas. Therefore, in commercial areas noise impacts would be less compared to the residential area. The residential area would experience elevated noise levels during construction and future maintenance. Increase in noise levels compared to existing noise level is about 10 to 15 dBA. Noise increases would be localized; impacts would be short term.

Mitigation Measures - The following mitigation measures are proposed for noise impacts:

Operation of heavy equipment would be limited to the hours between 8 am and 5 pm. Truck transportation would be permitted between 7 am and 7 pm Monday through Saturday.
No operation or transportation would occur on Sundays and holidays.

Truck traffic would be limited to the designated truck routes.
The construction contractor would follow noise ordinance requirements established by the City.

Air Quality

Air quality impacts would be significant if emissions generated by project construction permanently exceeded the thresholds set by the Federal Government (Environmental Protection Agency) and the Santa Barbara County Air Pollution Control District.

Alternative 1 - Under the No Action Alternative, fugitive dust would increase during periods of debris removal. The impacts would be temporary and short term and conditions would be stabilized after completion of the maintenance.

Alternative 6, 8 and 12 - With-project related activities that contribute to emissions include: removal of existing banks; channel excavation; transporting material from creek bed to stockpile area; processing material on site; and disposal of stockpiled material. A haul route would be developed to transport the material to the staging area. It is assumed that project construction would result in significant amounts of particulate mater and about 90% of this fugitive dust would be created by trucks traveling on unpaved surfaces. Future maintenance activities would increase fugitive dust but would stabilize soon after the maintenance activities.

Mitigation Measures - The following mitigation measures are suggested to mitigate for impacts to air quality:

The contractor will water the excavation site, storage piles and unpaved roads twice each day of construction; once in the morning and at the end of the construction day. This mitigation is applicable for both construction and future maintenance.
Transported material shall be covered to reduce fugitive dust.
Vehicle speed limits will be 15 mph maximum within the construction site and maintenance areas (construction and future maintenance), and cease grading and earth movement when wind speeds exceed 20 mph, or as confirmed by Santa Barbara County Air Pollution Control District during construction and future maintenance activities.

Recreation

Recreation along Lower Mission Creek is an important resource to the residents of Santa Barbara. The creek is used for hiking and bird watching. Also, the Moreton Bay Fig Tree, a prominent City of Santa Barbara landmark, is located adjacent to the creek. For the purposes of the with-project evaluation, impacts are considered significant if project implementation would result in the loss of existing recreational areas or pursuits and loss of access to recreational areas. Only a small amount of park area is available to the residents in the Lower Mission Creek area; therefore, elimination of this resource is considered an adverse impact.

Alternative 1

The No Action alternative would not have any impacts on the existing recreational activities in the Lower Mission Creek area.

Alternative 6

These alternatives consist of the removal of various types of existing banks and development of a natural creek bottom, which would improve the aesthetic and visual quality of the creek. The proposed step walls would be vegetated to simulate a natural creek appearance. Habitat expansion zones would be created along the creek banks where real estate is available. The habitat expansion zone development is part of the biological mitigation as discussed above. The habitat expansion zones should attract birds and people who enjoy bird watching. Compared to the existing conditions, the project would result in long term beneficial impacts.

Also, recreational use of the creek will be restricted during construction. Because construction of the creek will be staged, this impact is considered temporary and not significant.

Alternative 8 (Vertical Walls)

The extensive use of vertical walls in alternative 8 would alter the visual quality of the creek, which is directly related to the recreational activities of walking, hiking, and enjoying the natural environment. Although the creek bottom would be natural, the construction of vertical walls will have adverse impacts on recreational activities such as walking and bird watching.

Also, recreational use of the creek will be restricted during construction. Because construction of the creek will be staged, this impact is considered temporary and not significant.

Alternative 12

This alternative involves construction of a natural bottom channel, stabilizing the creek banks with a combination of vertical walls and vegetated riprap slopes. Compared to any other alternatives, this alternative will provide maximum coverage of natural vegetation within the project area. Native and riparian type of vegetation may increase the bird population. Recreational activities such as bird watching, walking along the creek, viewing of revegetated riparian habitat will be provided by construction of this alternative.

Future Maintenance

All alternatives would require some annual maintenance to maintain the design capacity of the channel. Weed and vegetation growth in the channel bottom would at a minimum require partial removal annually (using a mosaic pattern) to maintain the design capacity. In addition, any areas where sediment deposition occurs would require removal if more than fifteen percent of the channel capacity is plugged. It is estimated that the average frequency of this removal of plugs is a minimum of every three years. It is important to note that the channel may require maintenance more frequently than the minimum stated above.

Mitigation Measures

Mitigation measures included in the alternatives are (1) planting of natural riparian vegetation, (2) creation of small habitat expansion zones, (3) creation of fish related mitigation features, (4) mosaic pattern of vegetation clearing, (5) establishment of a low flow channel, and (6) timing of maintenance activities. These mitigation measures would provide increased opportunity for bird watching and provide maximum access to the residents for recreational use.

H. NED Plan Selection

This Feasibility Study investigates the alternatives for flood control along Lower Mission Creek, and whether a National Economic Development (NED) plan exists for implementation in accordance with Federal water resources planning principles, guidelines, procedures and policies. This section considers the various benefit and cost accounts that would be affected by each alternative, and whether an economically optimal flood control alternative exists.

Benefits

Benefits from the proposed alternatives include reduction of damages to structures and contents, automobile transportation delay, emergency repair and clean-up costs, and FEMA overhead costs. Also, the extended life that is added to bridges in the floodplain is included as a benefit. Annual with-project damages were estimated and subtracted from without-project damages to arrive at damages prevented for each alternative's benefits.

With-Project Damage Reduction for Structures and Contents

The with-project damages for structure and contents were estimated using the HEC-FDA model. Evaluation of damages for the alternatives was based on the configuration of each alternative. Table 17 shows the benefits for structures and contents for both the Lower Mission Creek drainage area and the Laguna Channel drainage area.

Table 17. Reduction in Structural and Content Damages

Alternative	Benefits (Reduction in Structural and Content Damages)
Alternative 2	1,404,000
Alternative 3	1,277,000
Alternative 4	1,617,000
Alternative 5	1,859,000
Alternative 6	1,779,000
Alternative 7	1,757,000
Alternative 8	1,403,000
Alternative 9	1,675,000
Alternative 10	1,582,000
Alternative 11	1,571,000
Alternative 12	1,367,000

Reduction of Bank Stabilization Costs

Since all the proposed alternatives are expected to have a channel that is stabilized by concrete or riprap, each alternative is expected to have zero cost for bank stabilization. The annual benefit from the reduction in bank stabilization is $37,500.

Automobile Transportation Delay

The with-project evaluation of transportation losses is similar to those for the without-project condition. Therefore, there is not a significant benefit associated with reduction in transportation delay. Table 18 shows the benefits associated with reduction in transportation delay.

Table 18. Reduction in Transportation Damages

Design Capacity	Without-Project Damages	With-Project Damages	Reduction in Damages
2500 cfs	$19,200	$17,200	$2,000
3400 cfs	$19,200	$15,200	$4,000

Emergency Repair and Clean-up Costs

The costs relating to evacuation, disaster relief and the clean-up of sediment will be reduced due to the reduction of flooding frequency. Table 19 shows the benefits associated with emergency repair and clean-up costs due to a reduction in flooding frequency.

Table 19. Reduction in Emergency Repair and Clean-up Damages

Design Capacity	Without-Project Damages	With-Project Damages	Benefit (Reduction in Damages)
2500 cfs	$118,400	$68,700	$49,700
3400 cfs	$118,400	$43,600	$74,800

FEMA Overhead Costs

There are certain flood insurance costs that can be saved by reducing the flood threat in the Lower Mission Creek area. The flood insurance costs, which can be reduced, include the overhead and administrative cost of processing applications and operation of the National Flood Insurance Program. The current overhead cost per policy is $138. Annual benefits for the 2500 cfs and the 3400 cfs alternative are equal to $4,000 and $8,700, respectively. The following table details the savings in flood insurance overhead.

Table 20. Savings in Flood Insurance Overhead

Design Capacity	Number of Policies Without Project	Number of Policies With Project	Net Reduction	Overhead Costs per Policy	Savings
2500 cfs	237	208	29	$138	$4,000
3400 cfs	237	174	63	$138	$8,700

Advanced Bridge Replacement

The proposed alternatives include the construction of several new bridges. The expected life of the replacement bridges is expected to be greater than that of the existing structures, thereby extending the service life of the bridges. Since the total cost of the new bridge is included in the first cost of the project (see the following section), a credit for the life extension is calculated as a benefit. A credit is also considered for the reduction in operation and maintenance costs. Table 21 displays the annual benefits associated with each alternative.

Table 21. Annual Benefits for Advanced Bridge Replacement

Bridge	Advance Bridge Replacement	Reduction in Annual Maintenance
Alternative 2	$173,000	$20,000
Alternative 3	$173,000	$20,000
Alternative 4	$189,000	$20,000
Alternative 5	$189,000	$20,000
Alternative 6	$189,000	$20,000
Alternative 7	$189,000	$20,000
Alternative 8	$88,000	$13,000
Alternative 9	$88,000	$13,000
Alternative 10	$88,000	$13,000
Alternative 11	$88,000	$13,000
Alternative 12	$88,000	$13,000

Costs

The construction cost for each of the twelve alternatives will be amortized over the 50 year project life. Project costs include Interest During Construction (IDC) and operation and maintenance costs. Table 22 shows the costs associated with each alternative.

Table 22. With-Project Costs

Description	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 9	Alt 10	Alt 11	Alt 12
Construction First Costs											
Real Estate	$4,272,000	$3,910,000	$6,097,000	$7,613,000	$6,568,000	$6,690,000	$5,365,000	$7,188,000	$6,224,000	$6,268,000	$6,036,000
Channel Construction	$7,282,000	$6,224,000	$7,411,000	$8,903,000	$8,625,000	$8,468,000	$7,536,000	$9,049,000	$8,769,000	$8,612,000	$6,454,000
Bridge Construction	$3,730,000	$3,733,000	$4,084,000	$4,084,000	$4,084,000	$4,084,000	$2,225,000	$2,225,000	$2,225,000	$2,225,000	$2,287,000
Environmental Mitigation	$531,000	$522,000	$987,000	$889,000	$1,149,000	$995,000	$928,000	$890,000	$937,000	$937,000	$801,000
Aesthetic Treatment Mitigation	$334,000	$295,000	$294,000	$349,000	$339,000	$294,000	$290,000	$346,000	$335,000	$329,000	$183,000
Planting and Maintenance	$16,000	$0	$0	$22,000	$18,000	$16,000	$0	$21,000	$18,000	$15,000	$302,000
Subtotal Construction Costs	$16,165,000	$14,684,000	$18,873,000	$21,860,000	$20,783,000	$20,547,000	$16,344,000	$19,719,000	$18,508,000	$18,386,000	$16,063,000
Planning, Engineering And Design	$1,784,000	$1,616,000	$1,916,000	$2,137,000	$2,132,000	$2,079,000	$1,647,000	$1,880,000	$1,843,000	$1,818,000	$1,504,000
Construction Management	$750,000	$679,000	$805,000	$898,000	$896,000	$873,000	$692,000	$789,000	$774,000	$763,000	$632,000
Subtotal Project Cost	$18,699,000	$16,979,000	$21,594,000	$24,895,000	$23,811,000	$23,499,000	$18,683,000	$22,388,000	$21,124,000	$20,967,000	$18,199,000
Total IDC [1]	$1,199,000	$1,089,000	$1,385,000	$1,597,000	$1,527,000	$1,507,000	$1,198,000	$1,436,000	$1,355,000	$1,345,000	$1,167,000
Total Gross Investment	$19,898,000	$18,068,000	$22,979,000	$26,492,000	$25,338,000	$25,006,000	$19,881,000	$23,824,000	$22,479,000	$22,312,000	$19,200,000
Annual Cost for Project	$1,374,000	$1,247,000	$1,587,000	$1,829,000	$1,749,000	$1,727,000	$1,373,000	$1,645,000	$1,552,000	$1,541,000	$1,337,000
Annual Cost for OMRR&R[2]	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Total Annual Cost	$1,404,000	$1,277,000	$1,617,000	$1,859,000	$1,779,000	$1,757,000	$1,403,000	$1,675,000	$1,582,000	$1,571,000	$1,367,000

[1]IDC - Interest During Construction

[2]OMRR&R - Operations, Maintenance, Repair , Replacement, and Rehabilitation

Benefit/Cost Analysis

The total annual cost for each alternative is compared to the expected annual benefits to arrive at a benefit-cost ratio. The alternative with the greatest net benefits is considered the NED plan. Table 23, "Benefit-Cost Summary" shows the benefits, costs, net benefits, and benefit-cost ratio for each alternative. The NED Plan for flood control along Lower Mission Creek is Alternative 12 with net benefits of $225,000 and a B/C ratio of 1.16.

Table 23. Benefit-Cost Summary

Category	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 9	Alt 10	Alt 11	Alt 12
Total Annual Benefits (x1000)	$0	$995	$995	$1,700	$1,705	$1,700	$1,700	$1,592	$1,597	$1,592	$1,592	$1,592
Total Annual Costs (x1000)	$0	$1,404	$1,277	$1,617	$1,859	$1,779	$1,757	$1,403	$1,675	$1,582	$1,571	$1,367
Net Benefits (x1000)	NA	($409)	($282)	$83	($154)	($79)	($57)	$189	($78)	$10	$21	$225
B/C Ratio	**NA**	**0.7**	**0.8**	**1.0**	**0.9**	**0.9**	**0.9**	**1.1**	**0.9**	**1.0**	**1.0**	**1.2**

System of Accounts

The US Water Resources Council System of Accounts was used as a method of displaying the positive and negative effects of the proposed alternatives. The accounts are categories of long-term environmental, economic, and other social impacts of the alternatives. These are displayed in tables that allow efficient consideration of comparative effects. The Water Resources Council suggests using four accounts to compare proposed water resource development plans. These are the national economic development (NED), environmental quality (EQ), regional development (RD), and other social effects (OSE) accounts.

National Economic Development (NED) Account

This account identifies the economic effects of alternative plans on the nation's economic development. Beneficial effects are increases in the economic value of the national output of goods and services attributable to a plan. For the Lower Mission Creek alternatives under consideration, the increases in NED reflect the results of the benefit/cost analysis. For this project, benefits are derived from the reduction in flood frequency in both the Lower Mission Creek and Laguna Channel flood plains. The benefits are measured by the difference in the cost of damages between the without-project and the with-project condition. Adverse NED effects are the costs of the project, and represent the opportunity cost of investing funds on the project rather than other potential economic development opportunities. Table 24, "System of Accounts - National Economic Development Account" compares the alternative plans under consideration using the NED account. This table indicates that Alternative 12 would have the highest net benefits.

Environmental Quality (EQ) Account

The environmental quality (EQ) account displays the long term effects of alternative plans on significant environmental resources. Significant environmental resources are defined by the Water Resources Council as those components of the ecological, cultural and aesthetic environments, which, if affected by the alternative plans, could have a material bearing on the decision-making process of plan selection. Table 25, "System of Accounts - Environmental Quality Account" compares the effects that the alternative plans would have on environmental quality resources. The impacts, especially significant impacts, would be mitigated according to discussions found in Section IV. G, "Evaluation of Alternative Plans" above, and EIS/EIR.

Regional Economic Development (RED) Account

The regional economic development account is intended to illustrate the effects that the proposed plans would have on regional economic activity, specifically regional income and regional emolument. This account was not considered for this analysis because the local sponsor did not request a regional evaluation. Additionally, RED benefits are not considered in determining Federal interest.

Other Social Effects (OSE) Account

This account typically includes long-term community impacts in the areas of public facilities and services, recreational opportunities, transportation and traffic, and man-made and natural resources. Table 26, "System of Accounts - Other Social Effects Account" compares the effects that the proposed alternatives would have on OSE resources.

Table 24. System of Accounts - National Economic Development Account (1999 Price Levels in thousands)

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt.6	Alt. 7	Alt. 8	Alt 9	Alt 10	Alt 11	Alt 12
Reduction in Struct and Content Damages	$0	$709	$709	$1,367	$1,372	$1,367	$1,367	$1,367	$1,372	$1,367	$1,367	$1,367
Advance Bridge Replacement	$0	$173	$173	$189	$189	$189	$189	$88	$88	$88	$88	$88
Reduction in Clean-up/Emergency Costs	$0	$50	$50	$75	$75	$75	$75	$75	$75	$75	$75	$75
Reduction in Transportation Delay	$0	$2	$2	$4	$4	$4	$4	$4	$4	$4	$4	$4
Reduction in Flood Ins. Overhead&Admin	$0	$4	$4	$8	$8	$8	$8	$8	$8	$8	$8	$8
OMRR&R Costs Reduction	$0	$37	$37	$37	$37	$37	$37	$37	$37	$37	$37	$37
Reduction in Bridge Maintenance	$0	$20	$20	$20	$20	$20	$20	$13	$13	$13	$13	$13
Total Annual Benefits	$0	$995	$995	$1,700	$1,705	$1,700	$1,700	$1,592	$1,597	$1,592	$1,592	$1,592
Annual OMRR&R	$0	$30	$30	$30	$30	$30	$20	$30	$30	$30	$30	$30
Total Annual Cost for Project	$0	$1,404	$1,277	$1,617	$1,859	$1,779	$1,757	$1,403	$1,675	$1,582	$1,571	$1,367
Net Benefits	**NA**	**($409)**	**($282)**	**$83**	**($154)**	**($79)**	**($57)**	**$189**	**($78)**	**$10**	**$21**	**$225**
B/C Ratio	**NA**	**0.71**	**0.78**	**1.0**	**0.9**	**0.9**	**0.9**	**1.1**	**0.9**	**1.0**	**1.0**	**1.2**

Notes:

1. New bridge costs (25% contingency) incl. demo and traffic control
2. 20% contingency factor applied to construction costs
3. 15.0% PE&D
4. 6.30% S&A
5. De La Vina Bridge replaced prior to this project, Incremental cost to increase capacity added as NED cost
6. 15% contingency applied to real estate. Real estate costs for Alts 2-11 were adjusted by a magnitude of 2.5 based on gross appraisal results for Alt 12, which was 2.5-3.0 times more than the initial real estate estimates.
7. Annual bridge O&M reduction included as project benefits
8. OMRR&R Costs Reductions is 4-year ave bank stabilization and clean-up costs by County FCD.

Table 25. System of Accounts - Environmental Quality Account

Category	Alt. 1	Alt. 6
I. PHYSICAL ENVIRONMENT		
a. Water Quality	High turbidity during heavy flows	Same as Alt. No. 12
b. Air Quality	No Impacts/ No change to existing conditions	Same as Alt. No. 12
c. Noise Conditions	No Impacts/No change to existing conditions	Same as Alt. No. 12
d. Geology	No Significant Impacts	Same as Alt. No. 12
e. Ground Water Recharge	No change to existing conditions	Same as Alt. No. 12
d. Hazardous, Toxic, and Radioactive Wastes	No Impacts. The two HTRW sites in the project area would continue to be contaminated until such time as clean-up is completed.	Same as Alt. No. 12
II. BIOLOGICAL ENVIRONMENT		
a. Aquatic habitat	Approximately 0.4 habitat units removed by periodic channel maintenance	Net impact to habitat quality equivalent to about 0.5 habitat units in comparison to Alt. 1
b. Isolated Native Trees	No significant impacts	Same as Alt. 12
c. Streambank Vegetation	Projected average environmental quality equivalent to 0.48 habitat units.	Design features yield 0.52 habitat units. Negligible gain in stream bank habitat quality compared to Alternative 1.
d. Endangered Species	No Significant impacts	Same as Alt. No. 12
III. CULTURAL ENVIRONMENT		
a. Cultural Resources	No Impacts	Same as Alt 12, w/o buildings 7-9.
b. Aesthetics	No change to existing conditions	(1) Short-term impact would be same as Alternative 12. (2) Long-term: Compared to existing conditions, the creek course would be wider. More vegetation could be planted on stepped walls. This alternative would have a more pleasing visual appearance compared to existing conditions. Aesthetic treatment would be provided to the vertical walls. Project construction would be performed along oxbow; therefore, meandering course of the creek would be slightly altered. (3) Fencing impacts would be same as alternative No. 12.

Table 26. System of Accounts - Environmental Quality Account

Category	Alt. 8	Alt. 12
I. PHYSICAL ENVIRONMENT		
a. Water Quality	Minor short-term increase in turbidity levels during construction and future maintenance	Minor short-term increase in turbidity levels during construction and future maintenance
b. Air Quality	Same as Alt. No. 12	During construction and future sediment removal, short term increase in fugitive dust; no long term impacts on air quality.
c. Noise Conditions	Same as Alt. No. 12	Short term increase in noise levels due to use of construction equipment and truck traffic. Noise levels will exceed 65 dBA at sensitive receptors. Residents located in the vicinity of the project area will experience increased noise levels during construction as well as during future maintenance.
d. Geology	Same as Alt. No. 12	No Significant long term or short term impacts
e. Ground Water Recharge	Same as Alt. No. 12	In existing condition, hard bottom exists at certain locations within the channel. With the project, the entire project reach would be natural bottom channel, which will result in minor increase in ground water recharge.
d. Hazardous, Toxic, and Radioactive Wastes	Same as Alt. 12	Short-term: During construction, stock piled material, equipment etc. will restrict recreational use of the creek. However, all sections would not be constructed at the same time; therefore, this impact is temporary and not significant. Long-term impacts: This alternative provides maximum recreational opportunity compared to other alternatives. These opportunities includes: bird watching, walking along the creek bank, enjoying natural vegetation planted on upper slope of the creek. However, access to the creek bottom will be restricted and the creek's limited use as a connective corridor may be lost.
II. BIOLOGICAL ENVIRONMENT		
a. Aquatic habitat	Same as Alt. No. 6	Net increase of habitat quality equivalent to about 0.4 habitat units when compared to Alternative 1.
b. Isolated Native Trees	Same as Alt. 12	12 to 15 trees will be removed. Western sycamores at two locations would be among them.
c. Streambank Vegetation	All stream bank vegetation removed without design feature to replace it. Net impact equivalent to 0.48 habitat units.	Projected average environmental quality equivalent to 0.82 habitat units. Stream bank habitat would increase by 0.34 habitat units compared to Alternative 1.
d. Endangered Species	Same as Alt. No. 12	Incidental impact to steelhead and tidewater gobies could occur, but would be of temporary and insignificant level. Environmental commitments and mitigation measures form essential parts of the proposed plan.
III. CULTURAL ENVIRONMENT		
a. Cultural Resources	Same as Alt. 6	No historic structures will be impacted under NEPA: Additional structures impacted under CEQA: 15 W. Mason St, Potter Hotel Footbridge, 134 Chapala St, 434 De la Vina St, E. 306 W. Ortega St, 536 Bath St, 116 Chapala St, West Downtown Neighborhood, Waterfront Neighborhood
b. Aesthetics	(1) Short-term impacts would be same as Alternative No. 12 (2) Long-term: The current creek bank protection consists of various types ranging from vertical walls to gabions, sand bags etc. Compared to the existing banks, conditions would be improved; however, the creek banks would not have a natural look. With vertical walls, the creek aesthetics would be altered like a man made concrete channel. To minimize impacts, aesthetic treatments would be applied to the vertical walls. Project would pass through oxbow; therefore, meandering course of the creek would be slightly altered. (3) Fencing installation impacts would be same as Alternative No. 12.	(1) Short-term: During construction, equipment and stockpile material would degrade aesthetic value of the project area. However, this impact is short term and would not be significant. (2) Long Term: Aesthetics/visuals of the creek banks would be improved with stabilization of banks. Implementation of this alternative will provide maximum aesthetic value. Creek will be more natural looking. Provides maximum vegetation cover. Bottom of the creek can not be seen from top because riprap will be planted with native and riparian vegetation. Aesthetic treatment would be provided to the vertical walls. (3) For safety reasons, some type of fencing shall be installed along the banks. If chain-link type of fencing is used, aesthetic treatment would be needed, including planting of vines to reduce impacts.

Table 27. System of Accounts - Other Social Effects Account

Category	Alt. 1	Alt. 6
a. Public Health and Safety	The City of Santa Barbara would have continuing threat of flooding.	Same as Alt. 12
b. Public Facilities and Services	No Impacts	Same as Alt. 12
c. Recreation and Public Access	No change to existing conditions	Short-term impacts would be same as Alt. No. 12. Long-term Impacts: Partially vegetated walls will provide bird watching and walking type of activities. Like Alt. 12 public would not have access to the creek bottom; therefore, creek's use as a connective corridor may be lost.
d. Traffic/Transportation	No Impacts	Same as Alt. 12
e. Man Made Resources	Within the project reach, no open space or agricultural lands exist in right-of-way, no impacts to existing land use.	(1) Same as Alt. # 12 (2) This alternative would require demolition of about 15 complete and 2 partial structures (includes 1 complete removal of commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 3 garages). Two commercial buildings would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.
d. Natural Resources	No Impacts	No Impacts
Socio-economics	Property located along the creek bank would experience economic damage during each severe flooding season. Some commercial establishments would lose business.	(1) Same as Alt. No. 12. (2) This alternative would require demolition of about 15 complete and 2 partial structures (includes complete removal of 1 commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 3 garages). Two commercial buildings would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.

Table 28. System of Accounts – Other Social Effects

Category	Alt. 8	Alt.12
a. Public Health and Safety	Same as Alt. 12	Short-term Impacts: During construction, truck traffic will increase, potentially causing accidents. Long-term Impacts: After completion of the project, it could be possible that people could enter the creek bed and injured. In addition, people may get into by-pass tunnel and criminals may live and hide in culvert.
b. Public Facilities and Services	Same as Alt. 12	Water, sewer and telephone lines are located within the project reach. Relocation of these utility lines would be required. Residents may experience temporary loss of services for short periods.
c. Recreation and Public Access	Short-term: Same as Alt. 12. Long-term: It would reduce opportunity for bird-watching because this alternative provides less opportunity for vegetation planting. Access to the creek bottom will be restricted and the creek's use as a connective corridor will be lost.	Short-term: During construction, stock piled material, equipment etc. will restrict recreational use of the creek. However, all sections would not be constructed at the same time; therefore, this impact is temporary and not significant. Long-term impacts: This alternative provides maximum recreational opportunity compared to other alternatives. These opportunities includes: bird watching, walking along the creek bank, enjoying natural vegetation planted on upper slope of the creek. However, access to the creek bottom will be restricted and the creek's limited use as a connective corridor may be lost.
d. Traffic/Transportation	Same as Alt. 12	Short-term/Long-term: During project construction and future sediment removal, some residents may not have direct access to their residences. Street closure would be required in some locations. This impact is a short-term, temporary increase in truck traffic along selected haul routes. Particular concerns would arise during the replacement of the De la Vina/ Haley Street bridge, which would impact a major commuter route on Haley Street.
e. Man Made Resources	(1) Same as Alt. No. 12 (2) This alternative would require demolition of about 12 complete and 2 partial structures (includes complete removal of 1 commercial building; 3 single family residential units and 4 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing. Impacts related to installation of culverts are similar to Alternative 12.	(1) No impacts to agricultural lands, Long-term Permanent Impacts: Buildings or property located within the project right-of-way will be removed or demolished for project construction. Therefore, land use would change from residential to natural creek bed or open space. However, most of the buildings located within the project reach are very old and all property located within the flood plains is subject to severe flood damage during heavy rains or flooding. Land use will change from residential to natural creek bed or open space within the construction right-of-way. (2) This alternative would require demolition of 14 complete and 2 partial structures (includes 1 complete removal of commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing. No impact to oxbow area. Culverts would be installed away from the creek. During construction, temporary impacts near fig tree.
d. Natural Resources	During Construction, temporary impacts near the Moreton Bay Fig Tree	During Construction, temporary impacts near the Moreton Bay Fig Tree
e. Socio-economics	(1) Same as Alt. No. 12 (2) (2) This alternative would require demolition of about 12 complete and 2 partial structures (includes complete removal of 1 commercial building; 3 single family residential units and 4 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.	(1) Long Term Impacts: Some of the property located along the creek bank would be removed. There would be economic loss to the property owner. However, property located within the flood plain would be protected from flooding hazards in future. Demolition of structures/ buildings: Refer to Land Use Section. Relocation of existing tenants may be difficult due to the cost of housing. (2) Alternative 12 would require removal of 14 full structures and 2 partial. See details on type of the structures in Land Use Section.

Additional Evaluation Criteria

The alternative plans were also evaluated using the four criteria suggested by the US Water Resources Council. These criteria are completeness, effectiveness, efficiency, and acceptability.

Completeness

Completeness is the determination of whether or not the plan includes all elements necessary to achieve the planned outputs. Alternatives 4, 8, 10, 11, and 12 may be considered as satisfying the criterion. These alternatives are considered cost-effective means of increase flood protection along Lower Mission Creek.

Effectiveness

Effectiveness is defined as a measure of the extent to which a plan achieves its objectives. The objectives as stated in Section IV.C are: (1) provide increased flood protection for the residents and businesses of Santa Barbara; (2) restore the major species of native riparian community along the project reach; (3) remove and suppress invasive non-native vegetation and replace with native plants; (4) remove man-made construction material along the creek bottom and restore to natural creek; and (5) enhance the aquatic habitat by changing the streambed characteristics. Alternatives 2 through 12 achieve the objective of increased flood protection, removal of non-native species, removal of man-mad construction material in the creek bottom, and enhancing the aquatic habitat . The only alternatives with opportunities to restore the major species of native riparian community along the creek are Alternatives 2, 5, 6, 7, 9, 10, 11, and 12. These alternatives either use stepped walls or low vertical walls topped with riprap slopes, which lend themselves to additional riparian planting on the banks.

The degrees to which the plans address these objectives differ. Alternatives 2 and 3 provide a 15-year level of protection, while alternative 4 through 12 provide a 20-year level of protection. Alternative 12 provides the most opportunity for habitat restoration due to the use of plantable riprap, creation of habitat expansion zones, and creation mitigation features to enhance fish habitat and steelhead migration.

Efficiency

Efficiency is the cost effectiveness of the plan in providing the planned outputs. The most efficient plan has the highest B/C ratio. The NED Plan (Alternative 12) produces the greatest B/C ratio and therefore, the most efficient plan. Alternative 8 is the second most efficient alternative. The B/C ratios for the for all alternatives are shown in Table 23, "Benefit/Cost Summary."

Acceptability

Acceptability is defined as acceptance of the plan by the local sponsor and the concerned public. The local sponsor has indicated support for and prefers Alternative 12 for implementation.

V. DESCRIPTION OF THE SELECTED PLAN

This chapter presents the National Economic Development (NED) and presents the rational for plan selection.

A. Selected Plan (Recommended Plan)

The Selected Plan is Alternative 12, which is also the NED Plan. The Non-Federal Sponsor, the SBCFC &WCD supports and prefers the Selected Plan.

This alternative would provide an approximately 20-year level of flood protection. The average annual benefits associated with the NED amount to $1,592,000 equivalent to an annual life cycle costs of 1,367,000. The project would produce $225,000 in net NED benefits annually and would have a B/C ratio of 1.2.

As with any engineering project, there is a certain level of risk and uncertainty associated with the Selected Plan. The following is a brief description of the risk and uncertainty associated with the selected plan, which would increase the conveyance capacity of Lower Mission Creek up to 3400 cfs:

- There is a 42% chance that the channel capacity will be exceeded in 10-years.
- There is a 74% chance that the channel capacity will be exceeded in 25-years.
- There is a 94% chance that the channel capacity will be exceeded in 50-years.

B. Plan Description

The architectural drawings (Exhibit 9) and the engineering plans (Exhibit 7) found at the end of the Main Report show the details of the Recommended Plan.

Since the Draft Feasibility Report, several changes to Alternative 12 have been made part of the recommended plan. The changes were made based on inputs and comments from the public, local governments, sponsor, resource agencies, and within the Corps. These structural changes were incorporated to mitigate, minimize and or avoid cultural resources impacts and biological impacts particularly to the Federally listed species; steelhead and tidewater gobies. Maintenance of the added features is also addressed. These changes are included in the following plan description.

General

The flood control improvement plan would increase the creek capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The project covers approximately the last mile of Mission Creek between Canon Perdido Street Bridge at the upstream end, and Cabrillo Boulevard Bridge near the outlet (Exhibit 1. Location Map). The improved creek would generally follow the existing alignment. The natural creek bottom would be maintained and in some areas existing concrete bottom would be removed and restored to natural. The improvements to the creek would include creek widening, replacing bridges, streamlining bedslope, stabilizing and protecting creek banks using vertical walls and vegetated riprap sideslopes, and installing an overflow culvert that bypasses the oxbow between Highway 101 and the Chapala Street Bridge.

Several land parcels along the stream banks would be designed and planted to expand the corridor of riparian habitat. Additional structural features would be implemented to avoid and mitigate impacts to biological resources. These features include installing fish ledges, Goby current refugia (goby hideouts), fish baffles, boulder clusters and a weir structure at the inlet of the overflow culvert.

Major Design Elements of the Project

Bank Protection Schemes

The existing bank protection would be replaced with either a vertical wall or a combination vertical wall (toe wall) and vegetated riprap sideslope.

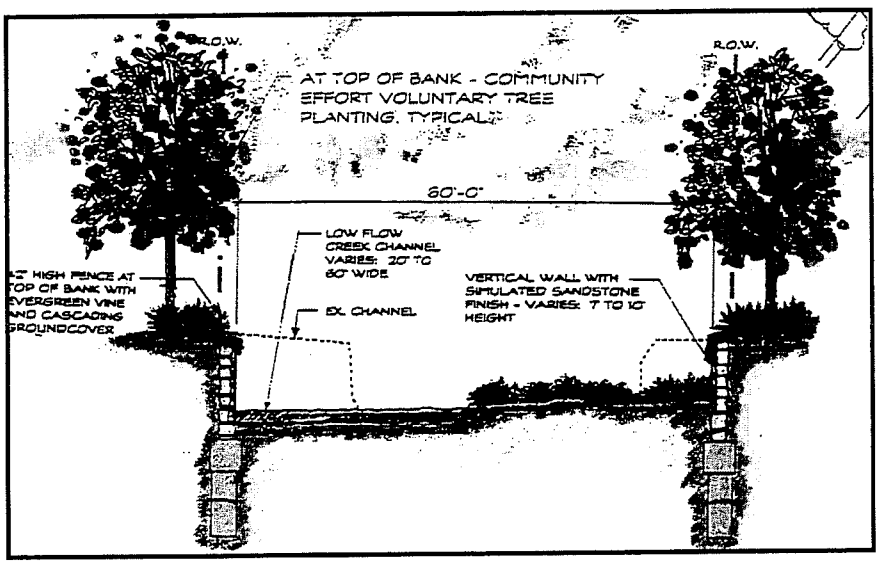


Figure 2. Vertical Wall on Pier Footing Representative Cross Section

The combination toe wall and vegetated riprap sideslope would consist of vertical wall at the bottom half, while the upper half would be sloped and covered with riprap and topsoil.

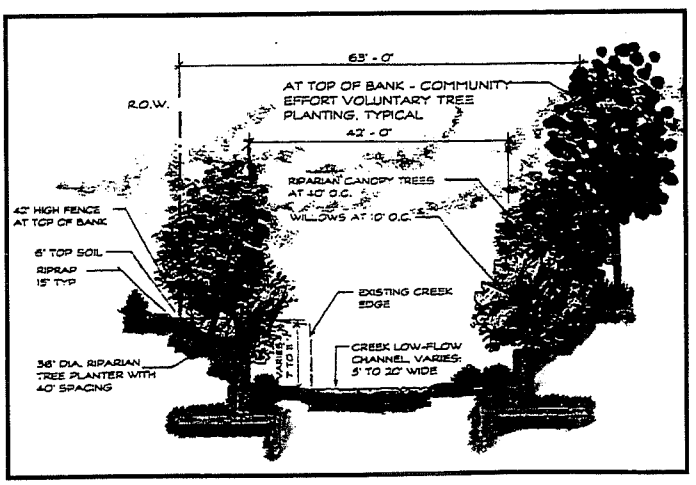


Figure 3. Vegetated Riprap Sideslope on Inverted "T" Footing Representative Cross Section

Concrete pipes in varying sizes (up to a maximum of three feet in diameter) would be strategically placed in between the riprap sideslope to allow planting of native trees and vegetation. This design is intended to help restore the major elements of the riparian corridor along the project reach. Aesthetic treatment of the exposed wall surface would be incorporated into the project design to minimize the visual impacts of the vertical walls. Wherever the combination toe wall-riprap sideslope is used, the height of the toe wall would be approximately half the depth of the creek. The riprap sideslope would be built with a slope of 1.5:1.0 (H:V) at the steepest. Typical cross sectional illustrations of these designs are shown in Exhibit 2, Sheets 1-9.

Upstream of Highway 101, the combination riprap and vertical wall would be the predominant bank treatment, except in two short reaches just upstream of the Haley-De la Vina Bridge and the De La Guerra Bridge. Below Highway 101, the combination riprap and vertical wall would be applied along the southeast bank, starting from the midpoint between the Chapala and Mason Street Bridges down to the midpoint between the Mason and State Street Bridges. Vertical walls would be applied or maintained for the remainder of this reach.

The vertical walls would be constructed in two methods, according to their proximity to any existing structures. The first method would be the use of an inverted "T" footing (See Figure 3). This less expensive construction method would be applied in areas where sufficient rights-of-way are available, without directly impacting existing structures. In areas with limited rights-of-way and close proximity to structures, a pier footing construction design would be applied (See Figure 2).

Replacement of Existing Bridges

To increase the conveyance capacity of existing bridges up to the design flow of 3400 cfs, some form of minor modifications may be required. In four cases, removal and replacement of the entire structure would be needed to increase capacity. These bridges are Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Weir Inlet and Overflow Culvert that Bypasses the Oxbow

The reach referred to, as the "oxbow" is where the sharpest bends of the creek within the project area are found. The oxbow runs the length of the creek between the Gutierrez and the Chapala Street Bridges, where the creek makes several sharp turns while crossing Highway 101, the Montecito Street Bridge, and Union Pacific Railroad before joining its most direct path to the Pacific Ocean (See Figure 17). The culvert (Two 15-foot wide by 6-foot high boxes) connecting both ends of the oxbow is referred to as the overflow culvert or the "oxbow bypass". The overflow culvert would follow a more direct path across the oxbow. It would begin upstream of Highway 101, cross the highway (where Caltrans had built a span to accommodate such a crossing to eliminate impacts to highway traffic), Montecito Street, and the railroad tracks before rejoining the creek along side the downstream end of Chapala Street Bridge (See Figure 4).

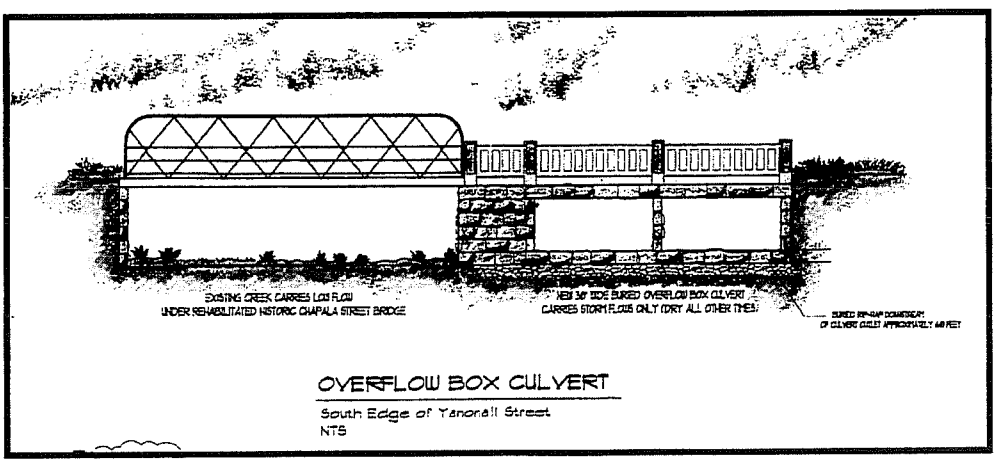


Figure 4. Outlet of Overflow Culvert Alongside Chapala Street Bridge

The culvert alignment would be far outside the Moreton Bay Fig tree dripline to minimize impacts to its major root system. The culvert would not be covered across Highway 101. However, it would be covered across Montecito Street to its confluence at the downstream end of the Chapala Street Bridge.

A weir structure (see Figure 5) would be built at the inlet of the culvert to control the flows across through the culvert and the oxbow. The height of the weir would be set in order to direct lower flows of up to 640 cfs through the oxbow. Also, the weir would split higher flows (up to the design conveyance capacity of 3400cfs) between the culvert and the oxbow.

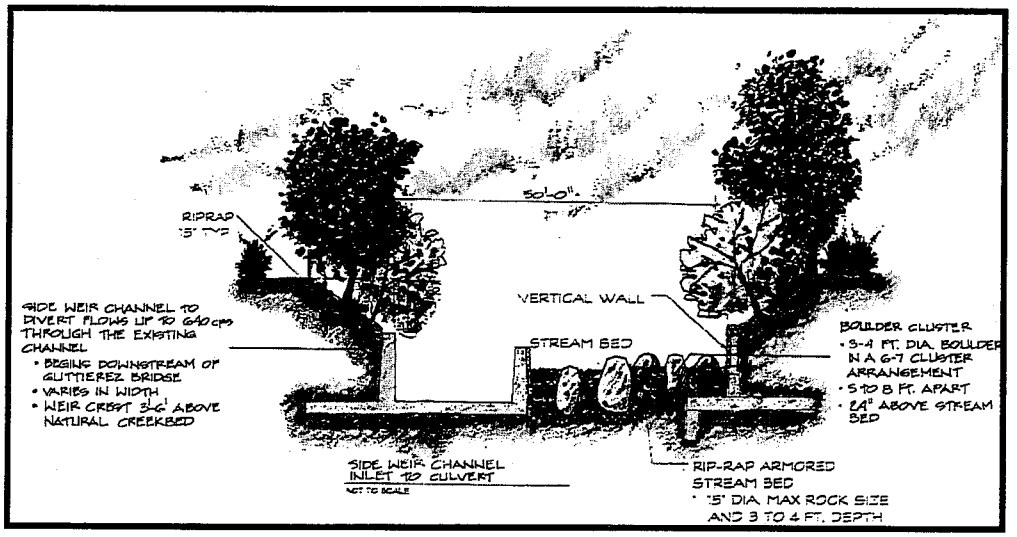


Figure 5. Representative Cross Section of Side Weir Channel Inlet to Overflow Culvert (Looking Downstream).

The culvert divider would be designed to form a "bullnose" and help minimize the potential of debris blockage.

Rocky Energy Dissipaters and Boulder Clusters

In areas where undesirable high velocity flows could be expected, the streambed would be armored with riprap and boulders (see Figure 6).

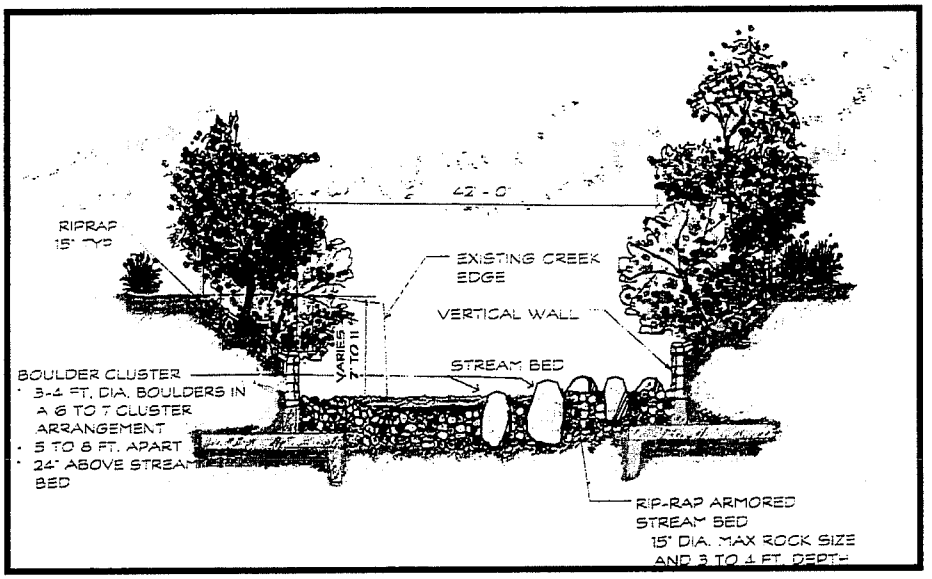


Figure 6. Representative Cross Section of Rocky Energy Dissipaters and Boulder Clusters

These fields referred to as Rocky energy dissipaters would be located in three reaches (See Exhibit 7. "Engineering Plans", Sheets 21-25). The more upstream field would be placed from Canon Perdido Street to below the De La Guerra Street Bridge. The second would extend from upstream of the Gutierrez Street Bridge downstream to the upper bend of the natural oxbow, near US WHY 101. The third would be at the outlet of the overflow culvert. Clusters of large boulders would be embedded into the riprap fields at the first two locations. The rock energy dissipaters and the boulder clusters would have two functions. First, they would dissipate the force of currents at vulnerable places along the creek. Second, they would impart natural turbulence and heterogeneity to the stream as a means to improve the aquatic habitat for steelhead (*Onchoryhncus mykiss*), an endangered species known to migrate through this reach of Mission Creek.

Expanded Habitat Zones

Five small parcels of open land would be left along the banks after completion of project

construction. These parcels range in sizes between 0.03 and 0.52 acres (See Exhibit 8- "Architectural Drawings"). Final calculations for the channel's configuration will determine the availability of all four of these parcels. If these open land parcels are available, each would be designed to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the stream banks and to provide for passive park space for area residents (See Figure 7). Native trees, primarily western sycamores, cottonwoods, and coast live oak, from local nursery stock would be planted in the habitat expansion zones. In time, their canopies would form dense clusters on the overbank and adjacent to the stream corridor. In some of these zones, pathways and benches might also be added to create passive park spaces.

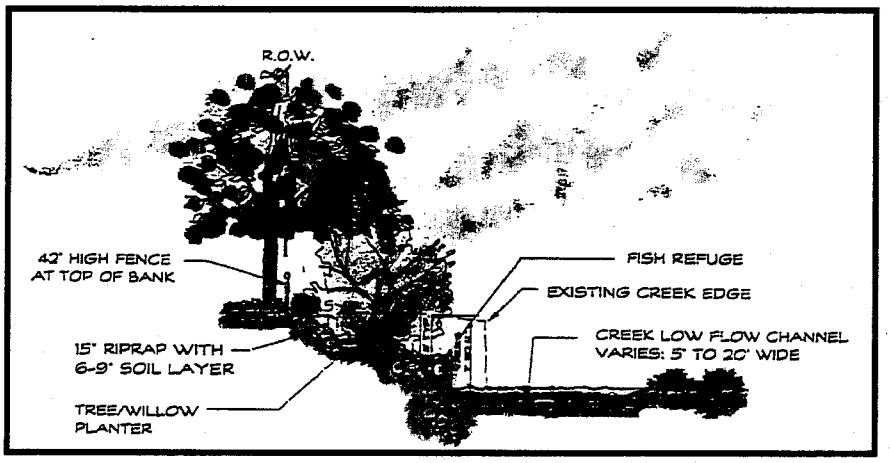


Figure 7. Representative Cross Section of a Habitat Expansion Area

Planting along the riprap and planting of native trees in habitat expansion zones are an integral part of the project design. The ecological values generated by these features would offset the impacts from the implementation of the proposed alternative on existing biological resources.

Structural Features to Mitigate and Avoid Impacts to Biological Resources

Several structural features would be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features would create hiding places where fish may take refuge. They would be composed of three separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), and

placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls (See Figure 8a. "Goby Refugia, Fish Ledges and Fish Baffles Along the Walls in the Estuary (Between Mason Street and Cabrillo Boulevard)"). In combination, they should provide shelter for fish of all sizes.

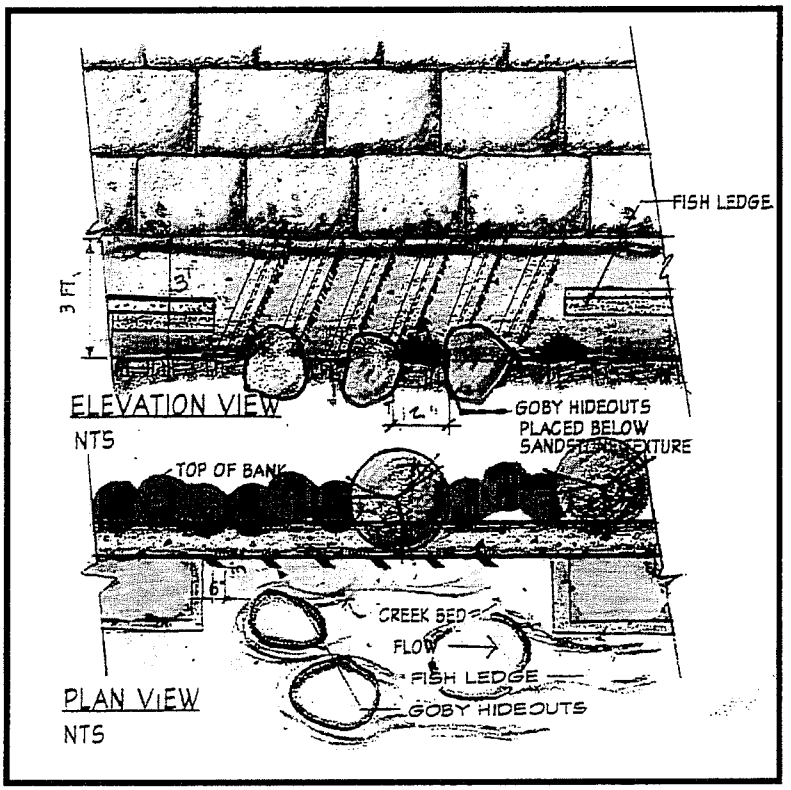


Figure 8a. Goby Refugia, Fish Ledges and Fish Baffles Along the Walls in the Estuary (Between Mason Street and Cabrillo Boulevard)

The combination of these three features would be used within the estuary between Mason and Cabrillo Street Bridges. The fish ledges and the fish baffles would be used for the remainder of the project reach. The locations of these features are shown on Exhibit 7. "Engineering Plans", Sheets 21-25.

The Goby refugia where gobies and other small fish could escape strong currents would be made in a pattern of slanted ribs as illustrated. These molded ridges would extend from the ordinary high water mark to the bottom of the formed wall, roughly eight feet in vertical length. Most of the time water in the estuary would cover them completely and each would extend well below the streambed.

Lower velocity and localized eddy currents would exist around these ribs, primarily caused by the effects of protruding ribs on the boundary layer adjacent to the wall itself. Small fish the size of gobies would easily find the recesses on their downstream side and take advantage of the refugia from currents created by these mitigation structures.

The second component of structural mitigation features, intended primarily for steelhead and other large fish, would consist of projecting ledges (fish ledges). The ledges would cantilever from the wall 2 feet into the flow, be 6 inches thick, and roughly 50 feet long typically. Within the estuary, cantilever ledges would be built at varying heights, say 10 to 20 inches, above the invert of the streambed and substantially below the ordinary high water level. Water would cover these ledges at all times except during the lowest low tides and all fish could easily swim beneath them.

The space between successive fish ledges allows a third mitigation measure. A double row of large, angular rocks would be nestled together and placed against the wall at the foot of the ribs. Ranks of boulders would extend into the creek about 5 feet from each wall. The innumerable crevices, voids between rocks, and spaces between rocks and the wall itself formed in this orderly jumble would provide thoroughly natural habitat for small fish and invertebrates. A fraction of those spaces should prove large enough for steelhead smolt also to find shelter amongst the rocks.

Ribs, boulders, and ledges would line both sides of the estuary between Mason Street and Cabrillo Boulevard. All surfaces in this section of the project would have all three features intermixed, although a ledge on one wall would face ribs and boulders on the opposite wall (accompanying figure, where ledges are not drawn to scale length). Lengths of the walls allow 380 linear feet of fish ribs and boulders and 240 linear feet of overhanging ledges on the left hand side; 360 linear feet of fish ribs and boulders and about 300 linear feet of ledges on the right-hand side.

Fish Ledges upstream of Mason Street

Overhangs of like design would be placed along the riverine sections of the creek (including the length between Mason and Yanonali Streets, otherwise treated as the upper end of the estuary)

where currents should impinge against the wall and scour persistent holes under these ledges (See Figure 8b. "Representative Cross Section Showing Fish Ledges and Baffles along the Walls Upstream of Mason Street"). Adult steelhead would have access to these pools during upstream migration. All manner of aquatic animals would take advantage of these sheltered pools throughout the dry season.

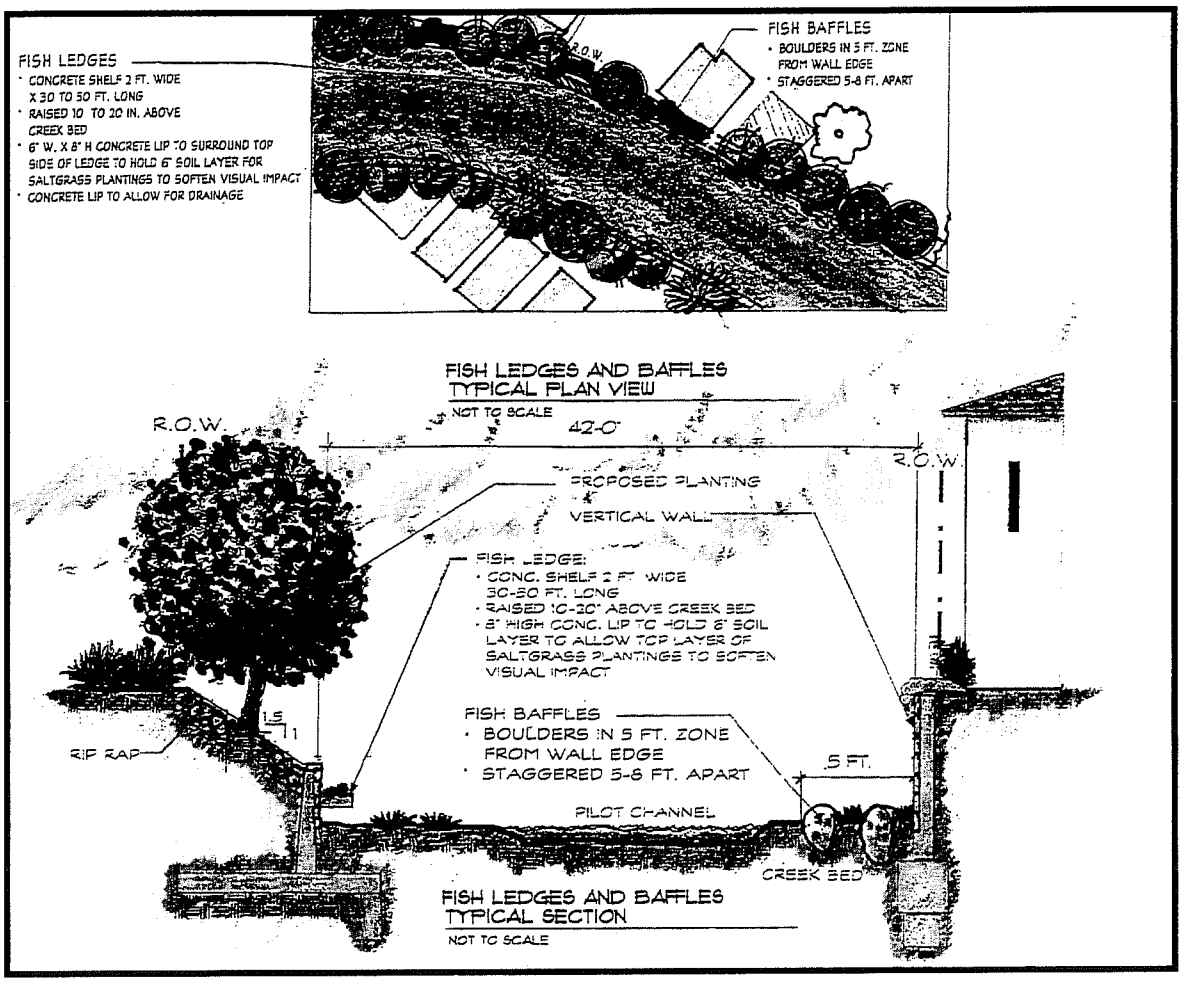


Figure 8b. Representative Cross Section Showing Fish Ledges and Baffles along the Walls Upstream of Mason Street

Walls on both sides of the creek would have them, placed as indicated by current patterns (locations are shown in Exhibit 7. "Engineering Plans", Sheets 21 through 25.). Four would be built along the left hand side (approximately 200 linear feet, in total) and five constructed against the right hand side (total of 250 feet in length).

Fish baffles upstream of Mason Street

Arrays of large boulders placed to the inside of walls ledges (See Figure 8b) would impart diverse flow patterns and a valuable measure of aquatic heterogeneity, lacking which the creek's streambed would mostly resemble an unrelentingly flat surface characterized by steady sheet flows. Their mass and position adjacent to the wall, and thereby within the boundary currents inherent to sides of the channel, would minimize the incidence of currents dislodging them.

Each baffle would consist of a rank of large rocks or derrick stone placed touching the inside surface of the walls, with a second rank inside the first and closer to the creek. Rocks would stand proud of the streambed by 18 to 24 inches. Together, the two ranks would extend inward toward the creek approximately 5 feet. A space of 5 to 8 feet would separate individual rocks, or perhaps pairs of boulders, to facilitate periodic removal of sediments from between them.

Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature (locations are shown in Exhibit 7. "Engineering Plans", Sheets 21 through 25). In certain lengths of the creek side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features. Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

In-Stream Boulder Clusters

Baffle structures the full width of the streambed and 300 feet in length would combine clusters of large boulders and fields of riprap at two locations; immediately upstream and downstream of the De la Guerra and Gutierrez Street Bridges as shown in Exhibit 7. "Engineering Plans", Sheets 21

through 25.

Stone used for riprap would be as large as15 inches in diameter and of angular character. Larger boulders, essentially individual derrick stones of 3 to 4 feet diameter each, would be set down into the surrounding riprap, placed 5 to 8 feet apart, and arranged in clusters of 6 to 9 individual boulders. Tips of the rocks would protrude 1½ to 2 feet above the streambed

The boulder patches would constitute islands of very coarse and permanent streambed irregularities. Upstream of them, Mission Creek would tend to flow as a homogenous, single current. By their placement, these clusters ought to disrupt that flow regime and induce smaller and intertwined subcurrents. These many smaller currents should continually reshape the longitudinal profile over the length of the baffles fields and downstream of them for some way.

Each cluster of boulders would naturally form various internal cross currents and protected patches of water. Placement of clusters within the baffle (Figure 3 and 4) is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

Additional Design Opportunity

An opportunity exists to construct another habitat expansion zone in the vicinity of the oxbow formation area just upstream of Highway 101. The total area to be created would be about 0.6 acres (approximately 25,800 square feet). See Exhibit 8 – "Architectural Drawings", Sheet 4 for location. The construction of this feature would provide additional ecological benefits. However, its construction would be subject to cleanup of the existing known contamination on the site (see details in Section 15, HTRW of the DEIS/EIR). If, prior to the completion of project construction, the designated site is remediated, then the habitat expansion zone would be constructed as planned.

Detailed Description of Creek Improvements Along the Entire Project Reach

The detailed improvements described in the following sections are segmented between successive bridge crossings. For orientation, the left and right banks are described while facing downstream (right would be towards the west and left towards the east). The creek generally flows southeasterly as it heads towards the Pacific Ocean. Reference station markings to Exhibit 7, "Engineering Plans", Sheets 13 through 16.

Canon Perdido Street Bridge to De La Guerra Street Bridge (Station 61+36 to 57+00):

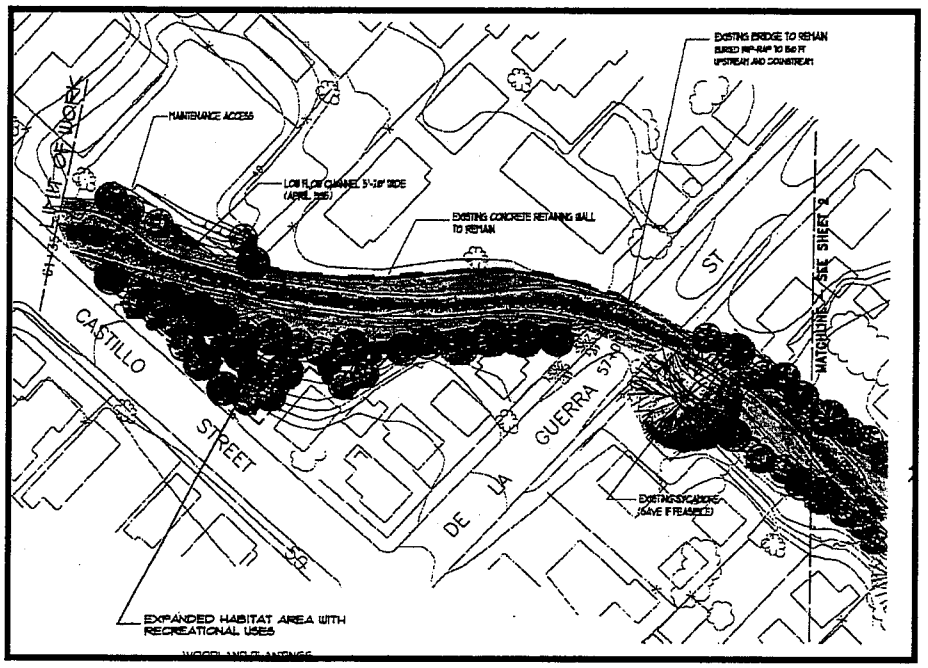


Figure 9. Canon Perdido and De La Guerra Street Bridges (Upstream End of the Project)

Canon Perdido Street Bridge marks the upstream boundary of the project. Immediately upstream of this bridge is an existing channelized portion of the creek, which conveys flows at high velocities into the project area. Between Canon Perdido Street and De la Guerra Street, the creek would be 63 feet wide with an average depth of 7.5 feet. The right bank would mostly consist of the toe wall and riprap sideslope, except for the section just upstream of De La Guerra Street Bridge, where vertical wall would be used. The left bank would maintain the existing retaining wall along the last two-thirds of its length; the upstream remainder of the left bank would consist of vertical wall-riprap sideslope. A maintenance access ramp would be incorporated on the left bank. A habitat expansion area would be created on the creek terrace along Castillo Street. The creek bed along this reach would be armored with riprap and boulder clusters to act as energy dissipaters.

De la Guerra Street Bridge to Ortega Street Bridge (Station 57+00 to 52+30):

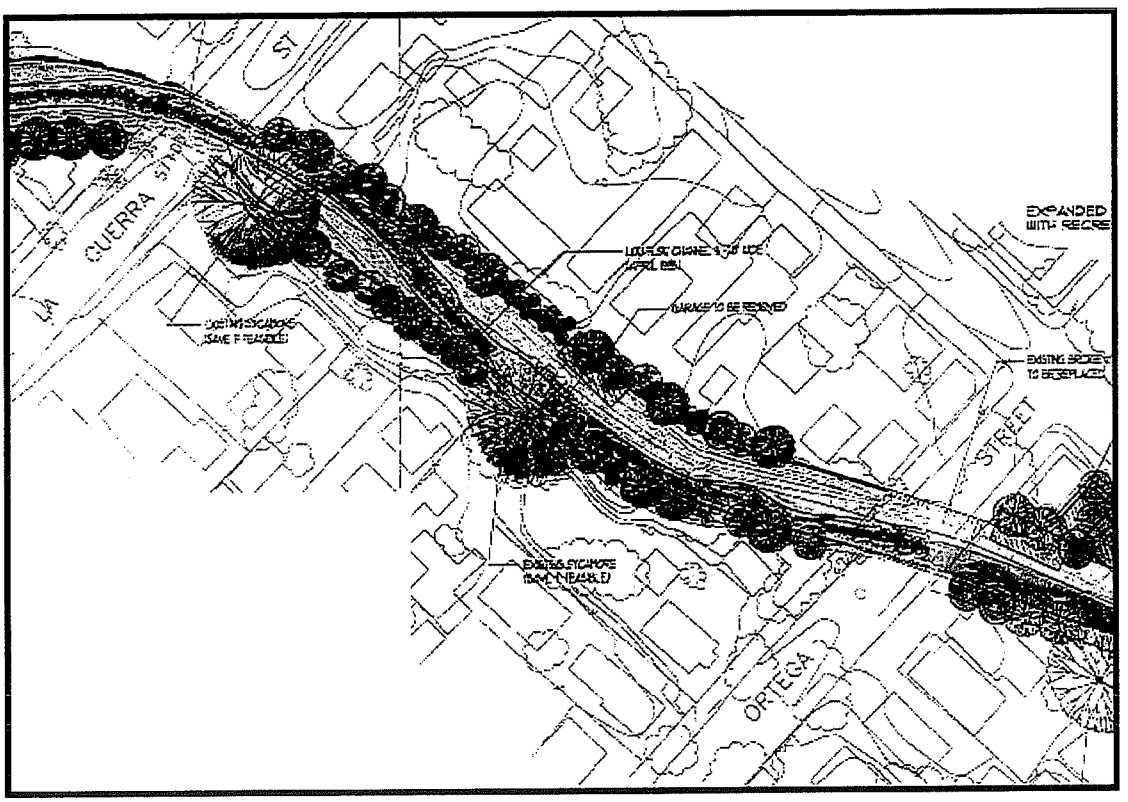


Figure 10. De La Guerra Street Bridge to Ortega Street Bridge

The creek would be 63 feet wide along this reach with both banks consisting of toe wall and riprap sideslope, except for a short reach on the left side immediately upstream of the Ortega Street Bridge where full height vertical walls would be used to avoid impacting a culturally significant structure. This reach would have an average depth of 9 feet. The invert slope would be streamlined, necessitating excavation and removal of one to four feet of streambed. Approximately 150 feet of streambed immediately downstream the Ortega Street Bridge would be armored with riprap and cluster of boulders to act as energy dissipaters. A parking structure located along the left bank at station 54+00 would be removed to accommodate the required wider channel. The Ortega Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Ortega Street Bridge to Bath Street Bridge (Station 52+30 to 49+00):

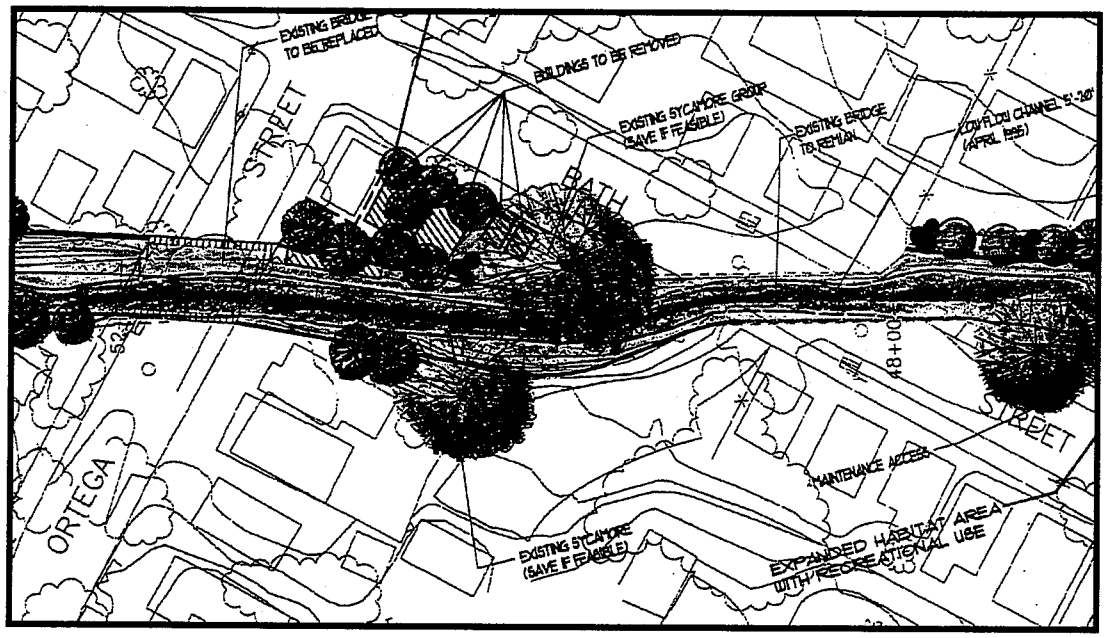


Figure 11. Ortega Street Bridge to Bath Street Bridge

The creek would be 63 feet wide along this reach with both banks consisting of vertical wall-riprap sideslope averaging 9 feet in depth. The invert slope would be streamlined, necessitating excavation and removal of one to three feet of streambed. Three residential properties and two garage structures located along the left bank would be removed to allow for creek widening. The only structure that would remain on the left side is located at the corner of Bath and Ortega Streets. The Bath Street Bridge would remain in place and would convey the design flow. The remnants of the acquired properties would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park space.

Bath Street Bridge to Cota Street Bridge (Station 49+00 to 46+00):

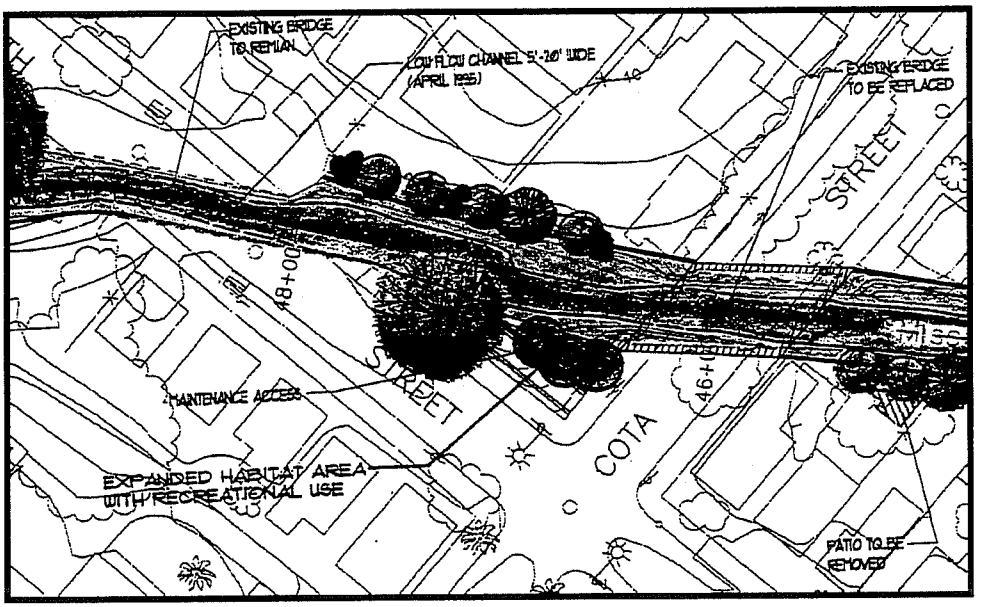


Figure 12. Bath Street Bridge to Cota Street Bridge

This short reach occupies the northeast corner of Cota Street and Bath Street intersection. The creek would be widened to 63 feet. The left bank would be protected with a vertical wall. On the right side, the existing maintenance access ramp fronting Cota Street would be kept in place. Cota Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Cota Street Bridge to Haley-De la Vina Bridge (Station 46+00 to 39+00):

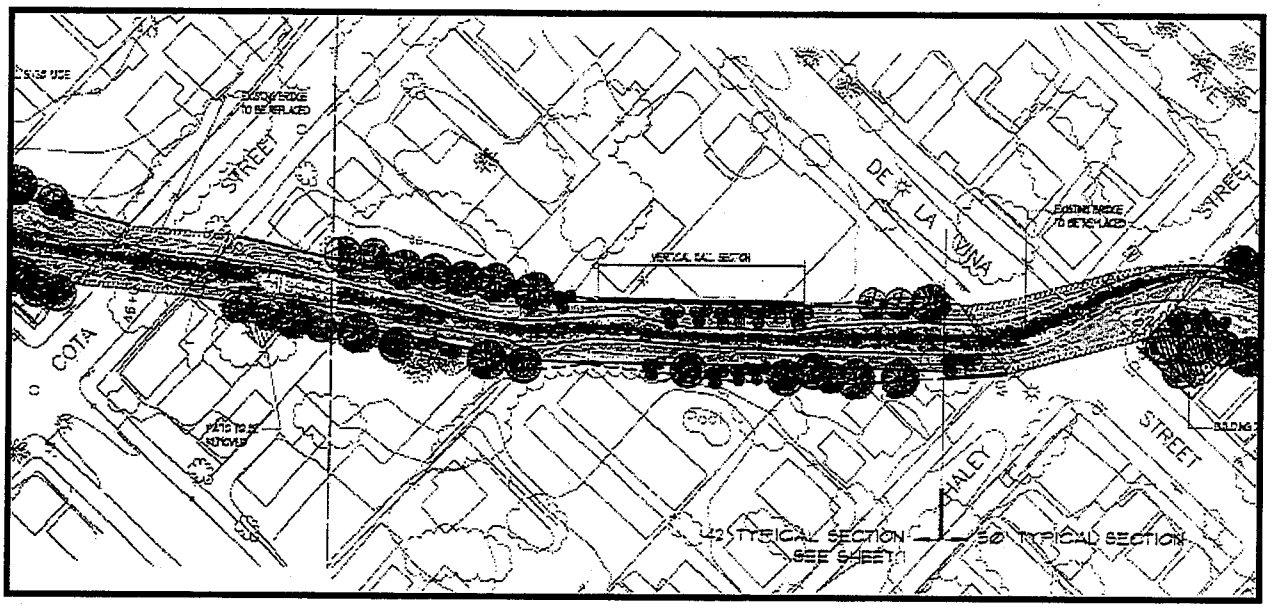


Figure 13. Cota Street Bridge to Haley-De la Vina Bridge

The upper half of this reach (Cota Street Bridge to Station 43+00) would be 63 feet wide with both sides consisting of vertical wall-riprap sideslope, except for a short reach immediately downstream of the Cota Street Bridge where vertical walls would be used to preserve a culturally significant structure. On the downstream half of the left side, the bank protection would transition from a toe wall-riprap sideslope into a vertical wall across the multi purpose property (Apartment and Hardware store) located between Station 43+30 and 41+70, where the width would narrow to 55 feet. The invert slope would be streamlined, necessitating excavation and removal of two to three feet of the streambed. This reach would have an average depth of 9 feet. A patio deck located on 532 Bath Street would be removed, to allow for creek widening. The Haley-De la Vina Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Haley-De la Vina Bridge to Gutierrez Street Bridge (Station 39+00 to 34+00):

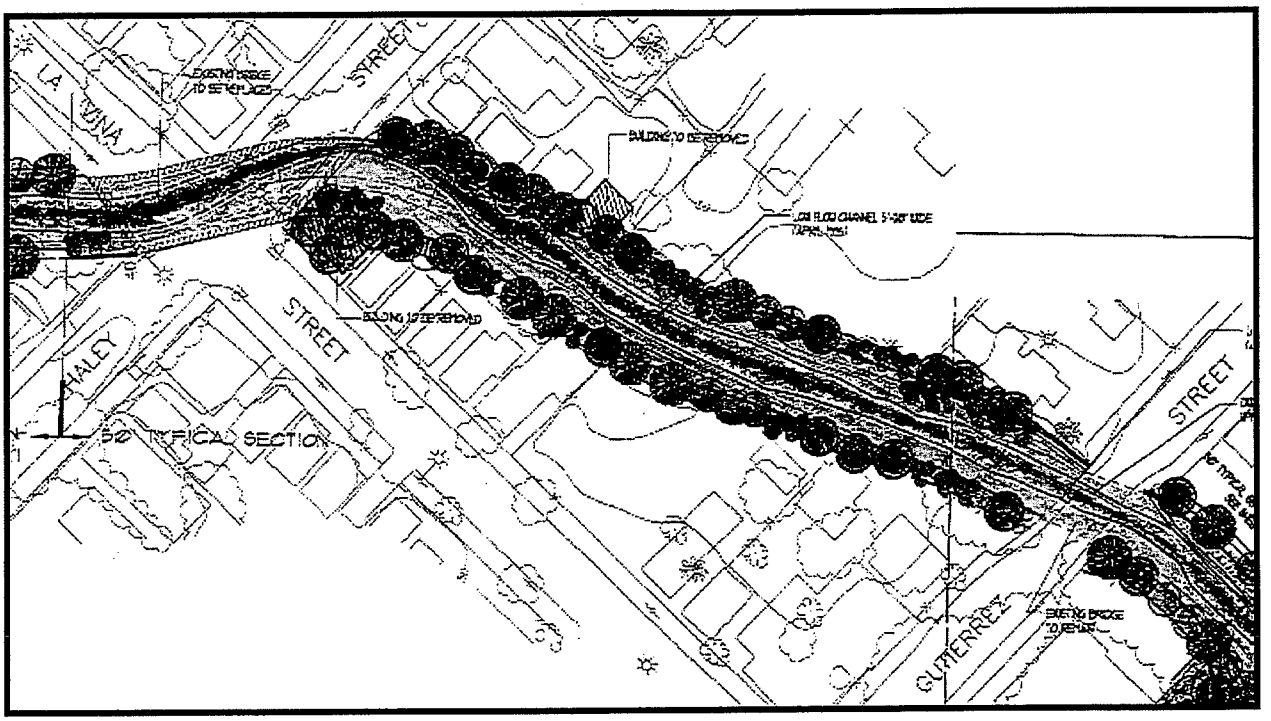


Figure14. Haley-De la Vina Bridge to Gutierrez Street Bridge

The creek would be 71 feet wide along this reach with both banks consisting of the toe wall-riprap sideslope, except for a short reach on the east side immediately upstream of the Gutierrez Street Bridge, where a vertical wall would transition the east bank into the bridge. The reach would have an average channel depth of 9 feet. The invert slope would be streamlined, necessitating excavation and removal of two to four feet of streambed. Two residential properties located at 434 De la Vina Street and at 119 West Haley Street (Parcel Number 037-203-02) would be removed to allow for creek widening. The remnants of the 434 De la Vina Street property would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park space. Approximately 150 feet of streambed immediately upstream the Gutierrez Street Bridge would be armored with riprap and cluster of boulders to act as energy dissipaters.

Gutierrez Street Bridge to Highway 101:

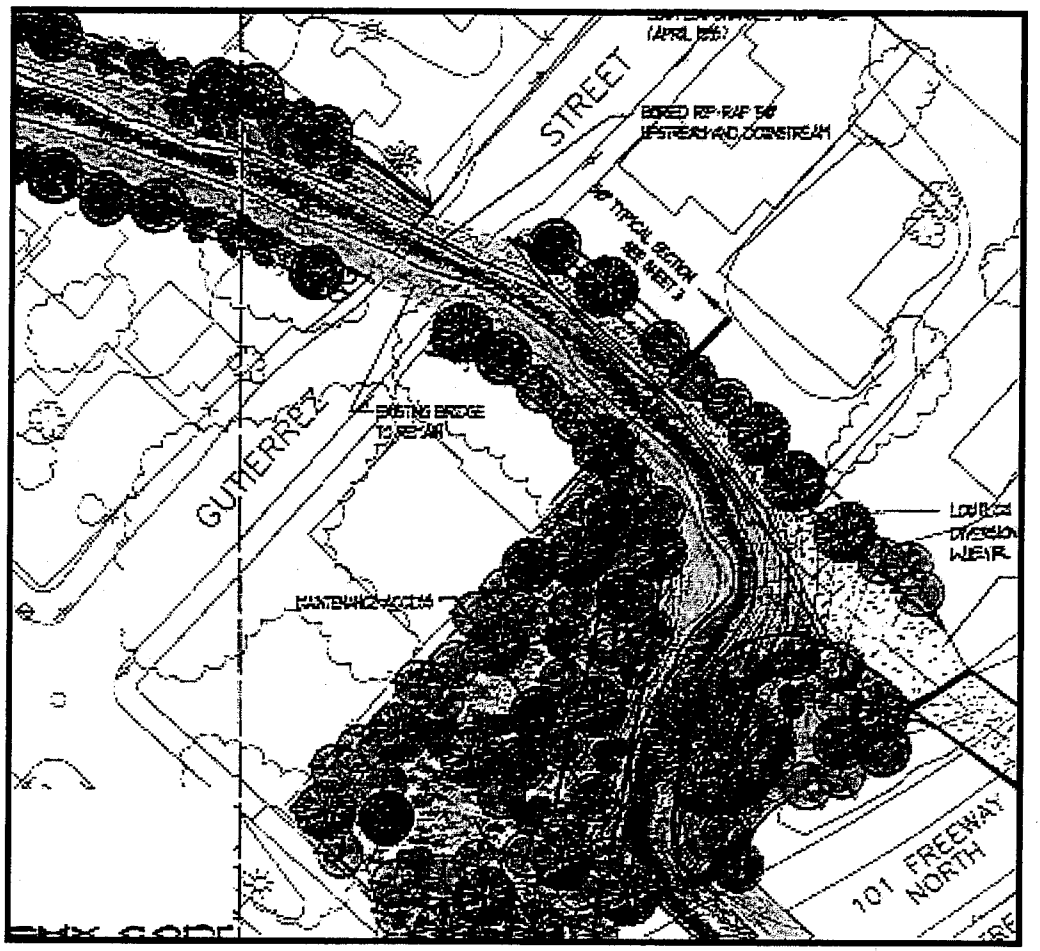


Figure15. Gutierrez Street Bridge to Highway 101

The reach from Gutierrez Bridge to Station 32+50 (beginning of Caltrans property) would continue to be 71 feet wide with banks consisting of the toe wall-riprap sideslope. A low flow diversion weir would run along the left side and connect to the overflow culvert near the upstream face of Highway 101. The depth of the creek along this reach would average about 9 feet. The toe wall-riprap sideslope on the right bank would terminate just inside the Caltrans property line, about 120 feet downstream of the Gutierrez Street Bridge. The remaining section of the right bank would be protected entirely with riprap. Approximately 150 feet of streambed immediately downstream the Gutierrez Street Bridge would be armored with riprap and cluster of boulders to act as energy dissipaters. The rest of the Caltrans lot adjacent to the creek would be created into a habitat expansion area.

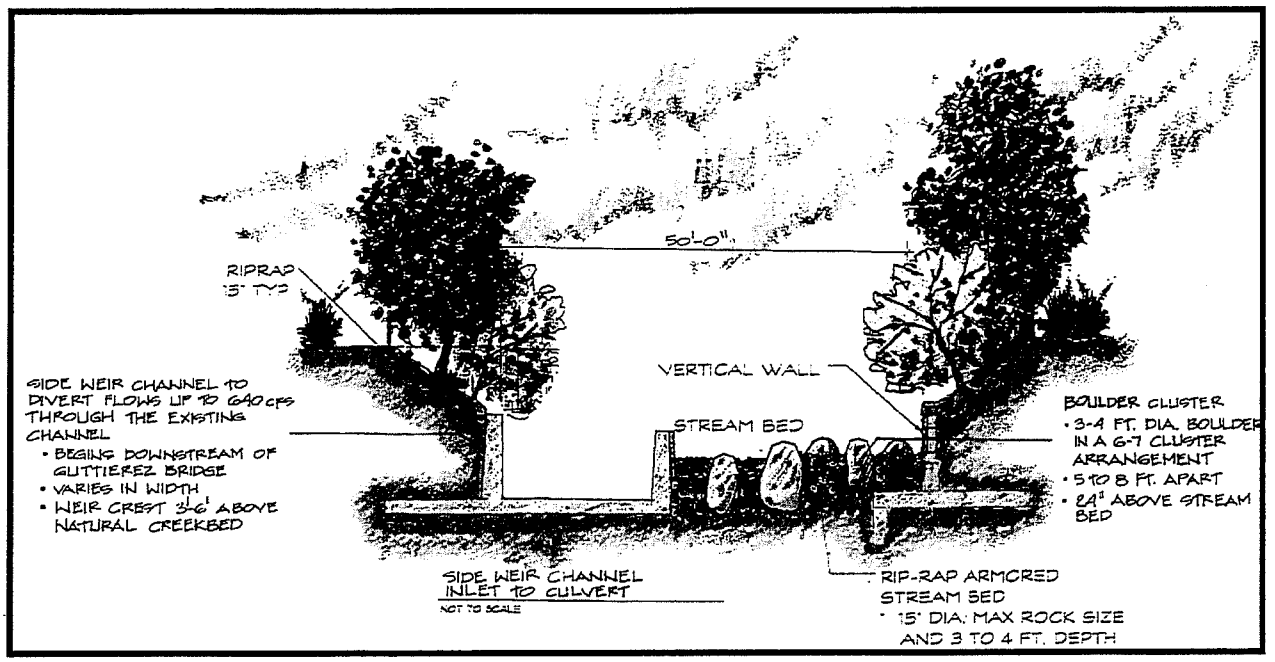


Figure 16. Representative Cross Section of the Side Weir Channel Inlet to Overflow Culvert

The higher flows across this reach would be divided between the existing channel (oxbow) and the overflow culvert. The oxbow would continue to convey the base flow and low-discharge events up to 640 cfs (equivalent to an event with 2.3-year return interval). During larger events, the new culvert would be expected to carry two-thirds of the design capacity, while the remaining third would be conveyed by the oxbow. No modifications would be needed for the oxbow between Highway 101 and the Chapala Street Bridge.

New Overflow Culvert that Bypasses the Oxbow between Highway 101 and Chapala Street Bridge:

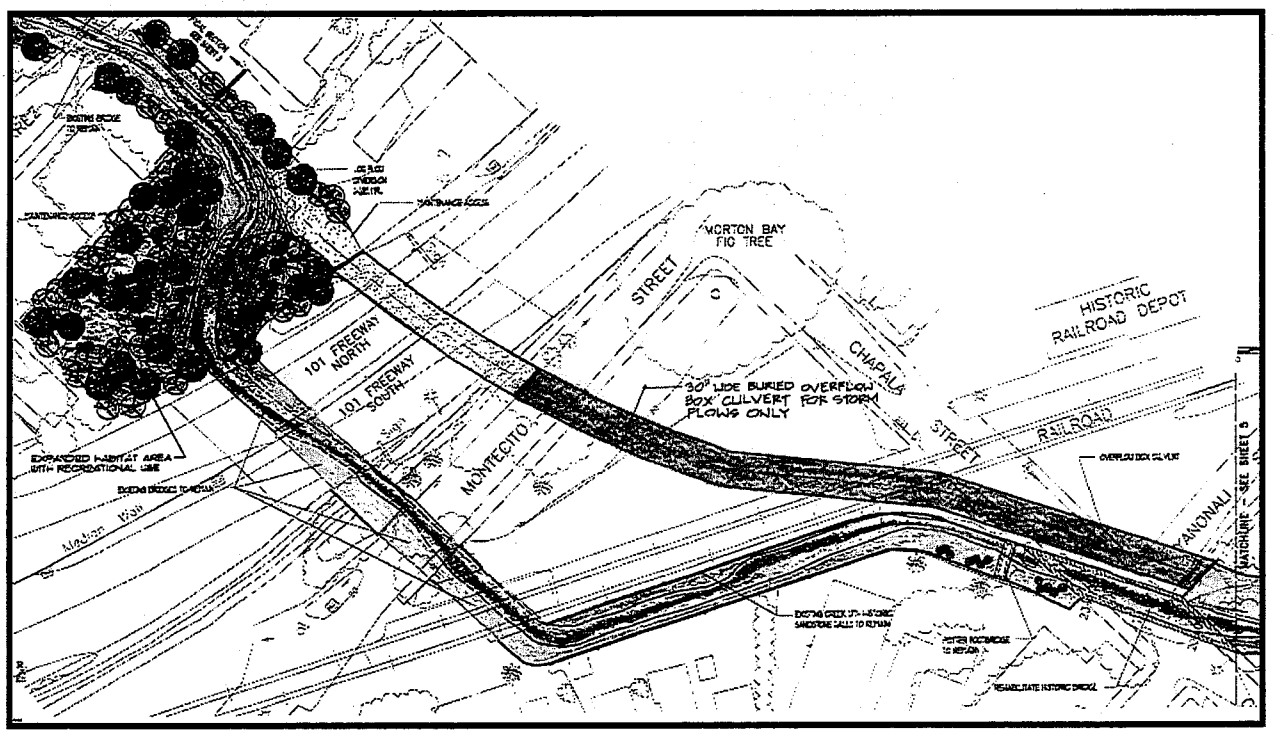


Figure 17. New Overflow Culvert that Bypasses the Oxbow between Highway 101 and Chapala Street Bridge

Across the existing opening underneath Highway 101 (built by Caltrans in the 1980s), the new culvert would be a pair of 15 foot wide by 6 foot high open channels. Below Highway 101, the culvert would be covered before it crosses Montecito Street and until it terminates alongside the downstream end of the Chapala Street Bridge. The open channel would be approximately 200 lineal feet while the covered section would be approximately 640 lineal feet. The covered portion of the culvert would cross under the Amtrak passenger platform before crossing under the railroad tracks. The box would remain covered as it runs along the left side of the sandstone channel. It would continue alongside the Chapala Street Bridge and terminate at the downstream end of the bridge. Approximately 50 feet of streambed immediately downstream the overflow culvert outlet would be armored with riprap to act as energy dissipaters. In order to avoid any potential impacts to the Moreton Bay Fig tree, the culvert is aligned approximately 50 feet outside of its dripline.

Chapala/Yanonali Street Bridge to Mason Street Bridge (Station 25+00 to 17+00):

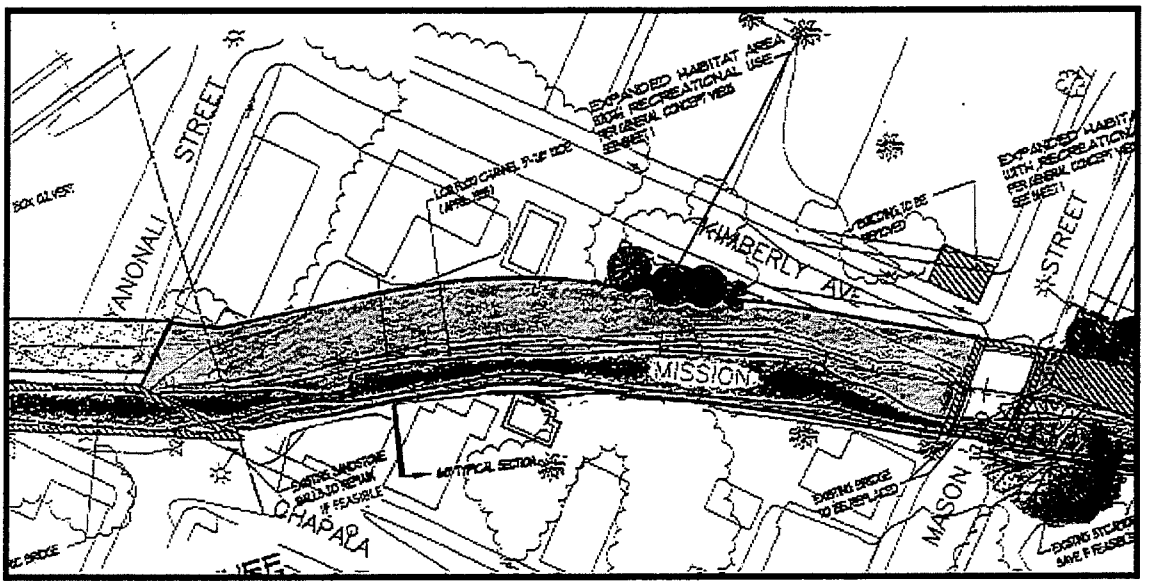


Figure 18. Chapala/Yanonali Street Bridge to Mason Street Bridge

The creek banks would be predominantly vertical walls on both sides, except for approximately 120 lineal feet of the left (east) bank just upstream of the Mason Street Bridge. This portion would be protected by the tow wall-riprap sideslope. The riprap slope will be laid back to cover the entire parcel and create an expanded habitat zone. The creek would be 60 feet wide between the vertical wall sides and 71 feet wide where the toe wall-riprap sideslope is used. This reach would have an average depth of 7.5 feet. The invert slope would be streamlined, necessitating excavation and infill of about one foot of streambed. The Mason Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow. In order to widen the creek and rebuild the bridge, Kimberly Avenue would be partially realigned, which requires the removal of the commercial structure (APN 033-075-006) located at the corner of Kimberly Avenue and Mason Street.

Mason Street Bridge to State Street Bridge (Station 17+00 to 12+50):

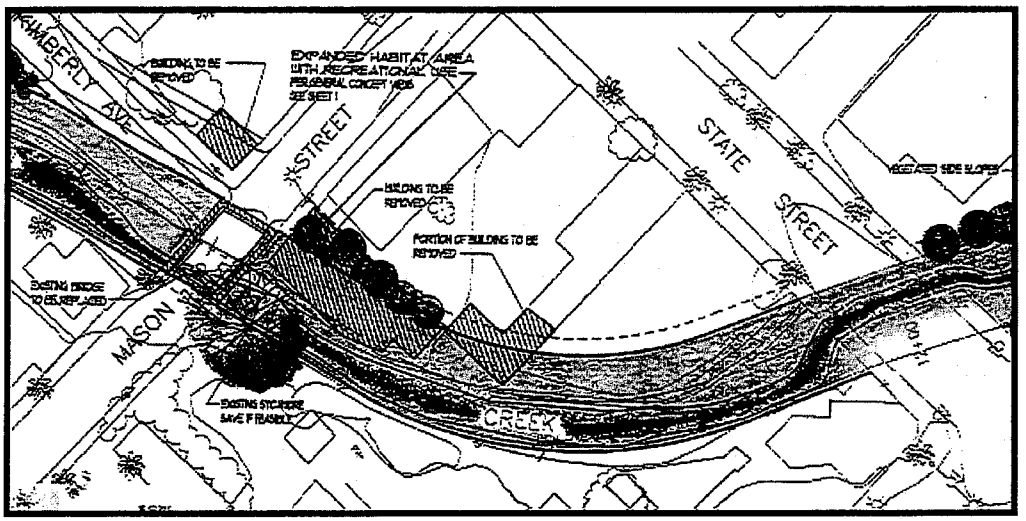


Figure 18. Mason Street Bridge to State Street Bridge

The creek banks would be predominantly vertical walls between Mason and State Streets, except for the left bank immediately downstream of the Mason Street Bridge, which would consist of the toe wall-riprap sideslope. The property located at 15 W. Mason Street would be removed to allow for widening of the creek. The remainder of this lot would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park. Another structure located on 29 State Street would be partially removed. The remainder of this structure would continue to function as a commercial establishment. The creek would be 60 feet wide between the vertical wall sides and 71 feet wide where the toe wall-riprap sideslope is found. The average depth along this reach would be 8 feet. The invert slope would be streamlined, necessitating excavation or fill averaging one foot in depth. The State Street Bridge would remain to convey the 3400-cfs design capacity.

State Street Bridge to Cabrillo Boulevard Bridge (Station 12+50 10+15):

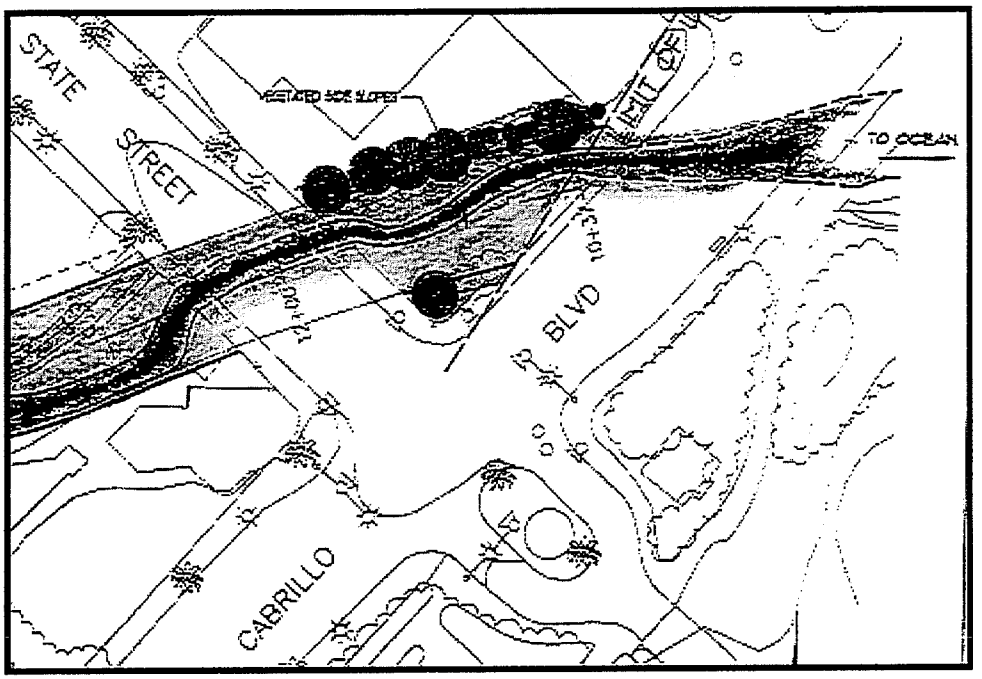


Figure 19. State Street Bridge to Cabrillo Boulevard Bridge

The banks across this short span, located at the corner of State Street and Cabrillo Boulevard, would consist of the toe wall-riprap sideslope. The invert would be cleared of leftover footings from earlier structures. The creek would be widened to approximately 65 feet and is not expected to have any impacts on the adjacent structures. Cabrillo Boulevard Bridge would remain in place and convey the 3400-cfs design capacity. This is essentially the downstream boundary of the project and any associated construction activities. The lagoon is located immediately downstream of the Cabrillo Boulevard Bridge, a short reach before the shoreline of the Pacific Ocean.

Removal of Existing Bank Protection and Earthen Material

The creek bottom and banks for about a mile, between the Canon Perdido Street and Cabrillo Boulevard Bridges, would be excavated to increase the creek capacity to provide an approximately 20-year level of flood protection to the City of Santa Barbara. The removal of all existing banks would occur within the project reach, except for a retaining wall located just upstream of the De La Guerra Street Bridge, and along the oxbow between Highway 101 and the Chapala Street Bridge (Oxbow reach). The excavation of the channel would begin from the downstream end of the project near Cabrillo Boulevard and progress upstream.

The total amount of material to be excavated from creek banks and creek bottom would be about 82,000 cubic yards (cy). Excavated material would be partially stockpiled in a staging area located along the creek bank and remaining material would be transported to disposal sites located within a radius of about 10 to 20 miles from the project site. Channel excavation may last for about 130 to 180 days; however, excavation and construction activities, including bank stabilization and construction of bridges etc., would be accomplished at the same time. The construction would be performed in segments. Therefore, the estimated time frame for project construction is about two years. In case of inclement weather conditions, mechanical failure, funding constraints, or environmental reasons, project construction may be prolonged for three to four years. It is expected that about 150 to 600 Cy of material would be removed each day. About 17,000 to 18,000 Cy of material would be utilized in project construction as fill material.

Creek excavation would occur section by section. Therefore, all 82,000 Cy of material would not be stockpiled at one time. About 3,000 to 4,000 Cy of material would be stockpiled along the creek banks or adjacent streets, which would be closed during the construction of that segment. The remaining approximately 64,000 Cy of excess excavated material would be disposed of either at the Tajiguas Landfill, located 10 miles north of the project site. If this landfill is not available to receive the project spoil and excess excavated materials during time of construction, another suitable site would be found. Often times there are opportunities that arise based on development activities at that time. A reclamation site would be used if one exists at the time of construction.

Existing riprap slope protection can be stockpiled for reuse or be taken to a county yard for storage and reuse depending on whether it meets project specifications. The unusable spoils would be disposed of at the Tajiguas Landfill or as described earlier. These disposal sites would be located within a distance of about 20 miles from the project site. All unusable debris would be disposed of, while the earthen material could be reused as backfill or cover for the riprap slope. Expected debris would include stacked burlap bags filled with concrete, large rocks, mortared riprap, slabs of concrete, grouted stone, jointed masonry walls, shot-crete walls, wire baskets filled with coarse rock (gabions), formed walls, wooden pilings, and other bank material found throughout the length of the project.

Operation and Maintenance

Perpetual maintenance of the creek is an integral part of the Recommended Plan (Alternative 12). To ensure and maintain its design function and form, maintenance would be needed on a regular basis. Future maintenance activities would be associated with the earthen creek bottom, channel walls, creek banks and vegetation, overflow culvert, interior drainage, habitat expansion zones, rocky energy dissipaters, and other appurtenances.

Impact analyses of future operation and maintenance for the life of the project have been included for each resource and addressed in Chapters 6 through 19 of the EIS/EIR. Mitigation measures for future operation and maintenance for the life of the project are also included in the EIS/EIR. Conditions identified in the EIS/EIR would be followed during each operation and maintenance activity.

It is estimated that the average frequency of sediment removal would be as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. Any areas where sediment deposition and/or vegetation growth occur significantly as to impair the designed conveyance capacity of the creek, clearing shall be performed

as soon as possible to restore the creek to its design function and form. The expected maintenance of the creek are addressed in the following sections:

Stream Bed Maintenance

Inspection and maintenance of the streambed would address vegetation control, fish baffles, rocky energy dissipater and boulder fields, desilting, and shaping. Vegetation control would be accomplished by either brushing, spraying, or clearing. Clearing could be done using a mechanical equipment such as a dozer. Partial removal of vegetation would occur yearly. The removal would follow a mosaic pattern, wherein one half the creek bed would be cleared while the other half would be cleared the following year. The alternate clearing method would be repeated for the subsequent years. Fish baffles, rocky energy dissipater and boulder fields shall be periodically inspected. Rip-rap or boulders designed to be placed within the streambed shall be replaced back into the intended design location, if removed or dislodged by any means. Maintenance for the Desilting and streambed shaping would typically be done with a dozer or loader. Typically accumulated sediment would be pushed to an area where the material can be loaded directly into trucks driving on the channel bottom or to an area where a crane (at the top of bank) can access the material, which could then be loaded into trucks and hauled to a suitable disposal site. It is possible that lesser amounts of sediment could be placed on the riprap slope.

Channel Wall Maintenance

Concrete sections of the channel improvements include decorative variable height concrete walls, goby hideouts on the estuary walls, fish ledges, approaches to bridges, and the cut stone channel between Montecito and Yanonali Streets. Inspection and maintenance of the channel walls, fish ledges, and the cut stone channel shall address the following:

- Cracking, chipping or breaking, and eroding of the concrete to an extent, which might affect the stability of the wall or its watertightness.
- Evidence of settlement, uplift, scour or failure of concrete structures shall be given special attention;

- Necessary steps shall be taken to prevent damage to, or loss of, backfill behind wall through settlement, unauthorized removal of soil and sloughing of soil from adjacent property; and
- Weep holes shall be cleaned on a regular basis. Accumulated debris shall be removed from the front of any weep holes.

Any adverse conditions encountered shall be repaired as soon as possible

Overflow Weir Structure

The overflow culvert to bypass high flows around the Mission Creek oxbow will be constructed under Highway 101 (station 25+09 to 30+40). The culvert will be an approximately 34' wide (including wall thickness) with a divider wall down the center. A weir will be constructed at the upstream end of the culvert (station 31+00 to station 33+10). The weir will direct lower flows into the oxbow. Higher flows will go over the weir and into the culvert. Inspection and maintenance of the channel walls and the cut stone channel shall address the following:

- Cracking, chipping or breaking, and eroding of the concrete to an extent, which might affect the stability of the culvert or its watertightness.
- Evidence of settlement, uplift, scour or failure of concrete structures shall be given special attention;
- Weep holes shall be cleaned on a regular basis. Accumulated debris shall be removed from the front of any weep holes;

Sediment and debris deposited within the culvert shall be removed. Sediment removal shall be conducted by pushing the accumulated sediment to the inlet and/or outlet where the material can be removed with a crane or excavator.

Any adverse conditions encountered shall be repaired as soon as possible.

Vegetated Riprap Slope Banks and Other Appurtenances

Channel banks above the vertical concrete walls shall be constructed of 15" rip-rap on 1.5:1 slopes with 6" of fill over the rip-rap. Planting pockets (vertical concrete pipes) would be included for various trees and shrubs to provide habitat and ultimately develop a canopy, which would shade the creek bottom. Inspection of the creek banks shall address the following:

- The growth rates of the trees and shrubs shall be documented for 5 years. As outlined in the Environmental Commitments discussed in the EIS/R. If the plants do not meet pre-determined growth rates, actions shall be taken to improve growing conditions such as fertilization and increased irrigation;
- Trees and shrubs that do not survive shall be replaced as soon as possible with local nursery stocks;
- Rip-rap shall be periodically inspected. If rip-rap is removed or damaged by any means to the extent that the integrity of the project is compromised, it shall be replaced;
- The layer of fill over the rip-rap shall be maintained to encourage understory growth. Periodical soil augmentation on the banks may be accomplished by using deposited streambed sediment or imported soil from other areas. This will typically occur when earthen channel maintenance is required;
- Areas of the bank that are damaged by scour, erosion, or other means shall be replaced as designed as soon as possible. This includes the filter fabric, rip-rap, fill, and plants;
- Obstructive debris shall be removed from the creek banks;
- Non-native vegetation shall be controlled with herbicide and/or removed;
- Access ramps shall be kept clear of debris and obstructions. Grass shall be encouraged on the ramps. Gates at the access ramps shall be locked and kept in good working condition;
- Any damage to fencing and rails along the top of the creek banks shall be repaired as soon as possible; and

- Coordinate trash removal with local volunteer groups or other agencies.

Any adverse conditions encountered shall be documented in the District's Annual Maintenance Plan, the annual re-vegetation monitoring plan, or the annual report.

Habitat Expansion Zone Maintenance

Habitat Expansion Zones shall be created in the vicinity of stations 16+00, 19+00, 38+50, 51+00, and 60+00. Parcels ranging in sizes from 0.03 to 0.52 acres will be planted with native vegetation. The Habitat Expansion Zones will provide riparian habitat along the creek and also provide recreational areas for local residents. Inspection and maintenance of the channel banks shall address the following:

- The growth rates of the trees and shrubs shall be documented for 5 years. As outlined in the Environmental Commitments discussed in the EIS/R. If the plants do not meet pre-determined growth rates, actions shall be taken to improve growing conditions such as fertilization and increased irrigation. Trees and shrubs that do not survive shall be replaced as soon as possible with local nursery stocks;
- Non-native vegetation shall be controlled with herbicide and/or removed.
- Coordinate trash removal with local volunteer groups or other agencies.

Any adverse conditions encountered shall be documented in the District's Annual Maintenance Plan, the annual re-vegetation monitoring plan, or the annual report.

Interior Drainage

Drainage structures, such as stormdrains, are installed through the concrete channel walls and channel banks at strategic locations to pass interior drainage into the channel. The drainage structures such as pipes, headwalls, outlets, etc. shall be maintained to preserve their function.

Inspections

Santa Barbara Flood Control District staff in addition to representatives from regulatory agencies, the Corps of Engineers, and representatives from local public interest groups would conduct periodic inspections to ensure the project is being maintained properly. These inspections shall determine the condition of the various components of the project and disclose any areas that require repair, replacement, or maintenance. Inspections shall occur in the spring after the rainy season, in the fall immediately prior to the rainy season, and after major storms.

The recommendations set forth in this Maintenance Plan shall be incorporated as appropriate into an "Operations and Maintenance Manual" to be prepared by the Corps of Engineers during preparation of final plans for the proposed project.

VI. PLAN IMPLEMENTATION

A. Study Recommendation

The Selected Plan, Alternative 12 is a flood control project, which also contains positive environmental contributions. The Selected Plan provides the desired level of flood protection and affords acceptable environmental improvements and is recommended for implementation.

B. Cost Allocation

The Federal and Non-Federal responsibilities for construction, maintenance, and operation of water resource projects accomplished under the direction of the Corps of Engineers are based on the Water Resources Development Act (WRDA) of 1986 and other applicable administrative policies.

Cost sharing for this construction project would be in keeping with the current Corps policy whereby the non-Federal sponsor shall: provide all lands, easements, rights-of-way and dredged material disposal areas; provide relocations of bridges and roadways; provide alteration of utilities which do not pass under or through the project structures; and maintain and operate the project after construction.

Further project planning, engineering and design (PED), and construction of the selected plan would be conducted in accordance with the cost-sharing principles provided by the Corps of Engineers' Planning Guidance, Engineering Regulation (ER) 1105-2-100, reflecting existing laws and Administration policies. During PED, additional necessary project features may be identified and added to this project. In this event, the project cost sharing would be adjusted accordingly in accordance with the terms that will be included in the Project Cooperation Agreement.

Table 27 and Table 28 present the project first costs and the cost apportionment between the Federal and non-Federal sponsor, respectively. The total project cost is currently estimated at $18,200,000 at December 1999 price levels. The Federal share is estimated at $9,185,000 of which $9,100,000 is for flood control and $85,000 for cultural resources requirements. The non-Federal sponsor's total initial cost for LERRDS, PED, and the five percent cash contribution would exceed the fifty maximum allowed (in accordance with WRDA 1986, as amended). It is currently estimated that the Federal government would reimburse the non-Federal sponsor the amount of $685,000 in order to maintain the fifty–fifty cost-sharing basis. The non-Federal sponsor's fifty percent share is currently estimated at $9,100,000. Table 30 shows the detailed project costs and Table 31 shows how the project costs would be allocated between the Federal government and the local sponsor.

For cost sharing purposes the fully inflated costs have been determined and allocated as shown on Table 29. "Fully Inflated Project Costs and Allocation ". The total fully inflated project cost is $19,977,000 of which, $10,156,000 would be Federal share and $9,821,000 would be non-Federal share.

Table 29. Fully Inflated Project Costs and Yearly Allocation

	Year 2001	Year 2002	Year 2003	Year 2004
Federal	$ 429,000	$ 653,000	$ 3,569,000	$ 5,505,000
Non-Federal	$ 231,000	$ 6,470,000	$ 2,513,000	$ 607,000
Total	$ 660,000	$ 7,123,000	$ 6,082,000	$ 6,112,000

C. Current and Future Work Eligible for Credit

There is no current or future work planned or in construction, which is part of the selected plan, or which would be eligible for Section 104 Credit.

Table 30. MCACES – Project Costs for Recommended Plan

LOWER MISSION CREEK PRELIMINARY PROJECT CONSTRUCTION COST ESTIMATE FY 99								
	DESCRIPTION	Qty	Unit	Unit Price	Cost w/o Contingency	Contingency	Cost w/ Contingency	Contingency Factor(1)
01.18-	Lands and Improvements	1	LS	4,566,608.00	4,566,600.00	685,000.00	5,251,600.00	15.0%
02.03-	Relocations Costs (P.L.91-646)	1	LS	169,000.00	169,000.00	25,400.00	194,400.00	15.0%
01.22-	Non-Federal Admin. Costs	1	LS	342,000.00	342,000.00	51,300.00	393,300.00	15.0%
01.21-	Federal Admin. Costs	1	LS	171,000.00	171,000.00	25,700.00	196,700.00	15.0%
09.01-	Clearing & Grubbing	1	LS	45,547.00	45,500.00	9,100.00	54,600.00	20.0%
09.02-	Remove Ex. Slope Protection	1	LS	82,477.00	82,500.00	16,500.00	99,000.00	20.0%
09.02-	Excavation	81,355	CY	3.00	244,100.00	48,800.00	292,900.00	20.0%
09.02-	Backfill	16,429	CY	5.00	82,100.00	16,400.00	98,500.00	20.0%
09.02-	Pile Wall -1560 lf - Concrete - walls	624	CY	240.00	149,800.00	30,000.00	179,800.00	20.0%
09.02-	Pile Wall - Concrete pile wall Steel Reif.	74,880	LBS	0.55	41,200.00	8,200.00	49,400.00	20.0%
09.02-	Pile Wall -1560 lf - Concrete pile cap	520	CY	85.00	44,200.00	8,800.00	53,000.00	20.0%
09.02-	Pile Wall - Concrete pile cap Steel Reinf.	52,000	LBS	0.55	28,600.00	5,700.00	34,300.00	20.0%
09.02-	Piles - 36"dia, 26 depth	195	EA	2,265.00	441,700.00	88,300.00	530,000.00	20.0%
09.02-	Riprap wall-4370lf - Concrete –wall	2,185	CY	240.00	524,400.00	104,900.00	629,300.00	20.0%
09.02-	Riprap wall-4370lf - Concrete –footing	5,891	CY	167.00	983,800.00	196,800.00	1,180,600.00	20.0%
09.02-	Riprap wall-4370lf – Riprap	3,560	Tons	27.00	96,100.00	19,200.00	115,300.00	20.0%
09.02-	Riprap wall - 4370 lf - Steel Reinforcement	969,120	LBS	0.55	533,000.00	106,600.00	639,600.00	20.0%
09.02-	Filter Material	809	CY	67.00	54,200.00	10,800.00	65,000.00	20.0%
09.02-	Top Soil	1,052	CY	33.00	34,700.00	6,900.00	41,600.00	20.0%
09.02-	12" dia. - 4 ft. cut RCP planter	420	EA	40.00	16,800.00	3,400.00	20,200.00	20.0%
09.02-	36" dia. - 4 ft. cut RCP planter	109	EA	113.00	12,300.00	2,500.00	14,800.00	20.0%
09.02-	Box Culvert - Concrete - invert	876	CY	220.00	192,700.00	38,500.00	231,200.00	20.0%
09.02-	Box Culvert - Concrete – walls	475	CY	250.00	118,800.00	23,800.00	142,600.00	20.0%
09.02-	Box Culvert - Concrete – top	568	CY	230.00	130,600.00	26,100.00	156,700.00	20.0%
09.02-	Box Culvert - Steel Reinforcement	365,000	LBS	0.55	200,800.00	40,200.00	241,000.00	20.0%
09.02-	Box Culvert - Piles 2' Dia. – 60'	46	EA	2,265.00	104,200.00	20,800.00	125,000.00	20.0%
09.02-	Inv T Wall - 360 lf - Concrete - walls	200	CY	240.00	48,000.00	9,600.00	57,600.00	20.0%
09.02-	Inv T Wall - 360 lf - Concrete - footing	330	CY	175.00	57,800.00	11,600.00	69,400.00	20.0%
09.02-	Inv T Wall - 360 lf - Steel Reinforcement	63,600	LBS	0.55	35,000.00	7,000.00	42,000.00	20.0%
	Inv Weir - Concrete	156	CY	220.00	34300.00	6900.00	41200.00	20.0%
	Wall Weir – Concrete	22	CY	220.00	4800.00	1000.00	5800.00	20.0%
	Weir - Steel Reinforcement	2,670	LBS	0.55	1500.00	300.00	1800.00	20.0%
	Fish Baffles/Boulder Clusters	907	Tons	60.00	54400.00	10900.00	65300.00	20.0%
	Fish Ledges – Conc.	48	CY	220.00	10600.00	2100.00	12700.00	20.0%
09.02-	Shoring	33,210	SF	30.00	996,300.00	199,300.00	1,195,600.00	20.0%
09.02-	Channel Fencing	6,920	LF	12.00	83,000.00	16,600.00	99,600.00	20.0%
09.99-	Railroad Temp Detour	1	LS	145,000.00	145,000.00	29,000.00	174,000.00	20.0%
09.99-	Aesthetic Treatment - Color Admixture		CY	12.00	36,100.00	7,200.00	43,300.00	20.0%
09.99-	Concrete Liners for Formwork	38800	SF	3	116,400.00	23,300.00	139,700.00	20.0%
09.02-	Bottom Riprap for Bridges	2222	Tons	27	60,000.00	12,000.00	72,000.00	20.0%
09.30-	Planting and Maintenance	1	LS	187,500.00	187,500.00	37,500.00	225,000.00	20.0%
09.05-	Mitigation	1	LS	562,300.00	562,300.00	112,460.00	674,800.00	20.0%
	SUBTOTAL CONSTRUCTION				11,843,700.00	1,025,600.00	13,950,200.00	
30--	PE&D - Note (2) 15.0% of Construction Costs	1	LS		1,240,042.50		1,504,140.00	20.0%
31--	S&A - Note (3) 6.3% of Construction Costs	1	LS		520,817.85		631,738.80	20.0%
SUBTTL CONSTRUCTION with PED & S&A					13,604,560.35		16,086,080.00	
	BRIDGE COSTS - Note (4)							
08.-								
08.07-	Ortega Street Bridge	1	LS	455,000.00	455,000.00	113,800.00	568,800.00	25.0%
08.07-	Cota Street Bridge	1	LS	500,000.00	500,000.00	125,000.00	625,000.00	25.0%
08.07-	De la Vina Street Bridge	1	LS	282,750.00	282,750.00	94,250.00	377,000.00	25.0%
08.07-	Mason Street Bridge	1	LS	384,100.00	384,100.00	96,000.00	480,100.00	25.0%
08.07-	Utility Relocations (water or sewer lines)	5	EA	10,000.00	50,000.00	12,500.00	62,500.00	25.0%
SUBTOTAL BRIDGE CONSTRUCTION					1,671,850.00	429,050.00	2,113,400.00	
TOTAL PROJECT COSTS (Incl. contingency)					15,276,410.35		18,200,000	
09.99-	Annual OMRR&R Costs	1	LS				30,000.00	
09.99-	Cultural Resources Costs	1	LS				85,000.00	

NOTES:

(1) Contingency percentage is based on ER 1110-2-1302 dated 31 March 1994, recommendation of 20% to 25% contingency factor which represents a reasonable percentage for the construction feature of the cost estimate for a feasibility phase project. 15% contingency factor applied for real estate costs as reasonably based on a gross appraisal of the impacted properties.

(2) Fifteen percent (15.0%) of total construction costs for PE&D, including engineering during construction (EDC)

(3) Six and three tenths percent (6.30%) of total construction costs for S&A

(4) Preliminary cost to construct bridges submitted by the Local Sponsor. Since De la Vina Street bridge is scheduled for replacement prior to project implementation, only the cost of increasing the bridge capacity ($377,000) up to the new design flow is included in the economic analysis and construction costs.

Table 31. Cost Apportionment

Lower Mission Creek Flood Control Project

Item	Federal	Non-Federal
a. LERRDS		
1. Lands and Structures to be Acquired	$0	$5,251,600
2. Relocation Costs (P.L. 91-646)	$0	$194,400
3. Administration Costs	$196,700	$393,300
b. Bridges, Railroad Detour, and Utility Relocations	$0	2,113,425
1. Subtotal (LERRDS)	$196,700	$7,952,725
c. Creek Construction	$5,760,900	$0
d. Box Culvert	$896,500	$0
e. Railroad Detour	$0	$174,000
f. Planting and Maintenance	$225,000	$0
g. Mitigation	$674,800	$0
h. Aesthetics	$183,000	$0
2. Subtotal (Creek Improvement Costs)	$7,740,200	$174,000
i. Plng, Engrg, and Design (PE&D) incl. EDC (Notes 2 &3)	$977,700	$526,500
j. Construction Management (S&A) (Notes 2 &4)	$410,600	$221,100
3. Subtotal	$1,388,300	$747,600
k. 5% Sponsor Cash Contribution	$0	$910,000
l. Credit for Sponsor Cash Contribution. See Note (1)	($910,000)	$0
4. Subtotal (1+2+3+k+l) [1]	$8,416,000	$9,785,000
Percent of Total Project First Cost	**46%**	**54%**
m. Bridge and Utility Relocations Adjustment (Federal share to reduce Sponsor share to 50% max.) [1]	$685,000	($685,000)
n. 50% share of total projects first costs[1] (4.+ m.)	$9,100,000	$9,100,000
o. Cultural Mitigation Costs	$85,000	$0
Total Project Share[1]	**$9,185,000**	**$9,100,000**

[1] Rounded to nearest thousand

(1) The combined Non-Federal share including LERRDS and associated costs, and the required 5% Non-Fed contribution will amount to 54% of the project cost. In order to reduce the Non-Federal Sponsor's share to the maximum allowed (under WRDA 1986, as amended) to 50% of the total project cost, the Federal Gov't would share the cost for bridge and utility relocations in the amount of $910,000.

(2) *Non-federal costs for items i. and j. account for Sponsor's planning, engineering, design, and construction efforts associated with lands easements, relocations, rights of way, and disposal sites (LERRDS)*

(3) *Plng, Engrg, and Design (PE&D) including engr'g during construction assumed to be 15% of total construction costs*

(4) *Construction Management (S&A) assumed to be 6.3% of total construction costs*

D. *Institutional Requirements*

In order to implement the Selected Plan, the Non-Federal Sponsor, the Santa Barbara County Flood Control and Water Conservation District would be required to:

a. Provide a minimum of 35 percent, but not to exceed 50 percent of total project costs as further specified below:

(1) Enter into an agreement, which provides, prior to execution of the project cooperation agreement (PCA), 25 percent of design costs;

(2) Provide during construction, any additional funds needed to cover the non-federal share of design costs;

(3) Provide, during construction, a cash contribution equal to 5 percent of total project costs;

(4) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(5) Provide or pay to the Government the cost of providing all retaining dikes, wastewiers, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(6) Provide, during construction, any additional costs as necessary to make its total contribution equal to 35 percent of total project costs.

b. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

c. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating (OMRR&R) the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto.

d. Comply with section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project of separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation of for the project or separable element.

e. Hold and save the Government free from all damages arising for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way

that the Government determines necessary for the construction, operation, or maintenance of the project.

i. Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and, to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

j. Prescribe and enforce regulations to prevent obstruction of or encroachment on the Project that would reduce the level of protection it affords or that would hinder operation or maintenance of the Project.

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

l. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans.

m. Provide 35 percent of that portion of total cultural resource preservation mitigation and data recovery costs attributable to structural flood control that are in excess of one percent of the total amount authorized to be appropriated for structural flood control.

n. Participate in and comply with applicable Federal floodplain management and flood insurance programs.

o. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

p. Inform affected interests, at least annually, regarding the limitations of the projection afforded by the project.

E. Environmental Requirements

The Selected Plan would result in discharge of fill material into waters of the United States during the period of construction. It would also in discharges associated with operation and maintenance activities. A waiver for Clean Water Act Section 401 certification has been provided by the State for the maintenance of this project. A Section 404(b)(1) evaluation has been prepared to address practicable alternatives and has been made part of this feasibility study. An NPDES permit will also be required for any water discharged to the river.

Based on 404(b)(1) analysis, the feasibility report recommends that the project receive a 404(r) exemption, when Congress authorizes the project. The 404(r) exemption would cover both the construction period and the operation and maintenance activities, for as long as the project remains authorized.

The report and EIS/EIR both include a description of the required O&M activities, including timing, and any required mitigation that will be needed, for as long as the project remains authorized. These activities will be incorporated into an O&M manual that will be provided to the non-Federal sponsor at the end of construction.

The non-Federal sponsor will not need to obtain a Section 404 permit for future O&M activities if the non-Federal sponsor carries out the O&M activities as specified in the O&M manual, without deviation. Anytime during the life of the project should O&M requirements need to be modified or should there be a change in conditions not anticipated during this feasibility study, then an

appropriate NEPA document will need to be prepared to modify the O&M manual and determine the need for any mitigation or 404 permit for O&M activities.

Several structures within the Area of Potential Effect (APE) have been identified as eligible for inclusion in to the National Register of Historic Places. However, the selected plan as designed would not have adverse effect to any of these eligible historic properties. Consultation with the SHPO towards compliance with Section 106 has been completed with their concurrence that the project as designed will have no adverse effect on eligible historic properties. The project is in compliance with Section 106 of the National Historic Preservation Act.

During the construction phase, the possibility exists that ground disturbing activities may uncover subsurface deposits. A qualified archaeological monitor will be in place during all ground disturbing activities and he/she will be empowered to halt construction until the situation is resolved. Local ordinances require the presence of a Native American monitor that has traceable hereditary roots to the Barbareño Chumash. The National Historic Preservation Act has no such requirements for Native American monitoring.

F. Views of the Non-Federal Sponsor

The Santa Barbara County Flood Control and Water Conservation District with the support of the City of Santa Barbara, has expressed interest in continuing to be local sponsor for project implementation. The SBCFCD&WCD and the City have provided Letters of Support acknowledging sponsorship requirements for the lower Mission Creek Flood Control Project. These letters are provided in Exhibit 9. "Letters of Support and Financial Capability". The local sponsor has indicated interest in adding embellishments to the final project. The local sponsor realizes that any costs associated with embellishments would be 100% local responsibility. Specific embellishments would be identified during PED.

G. Sponsor's Financial Analysis

Subsequent to the Feasibility study, project engineering, design, and construction would be conducted in accordance with the cost-sharing requirements provided by the Water Resources Development Act of 1986, as amended. The non-Federal sponsor has indicated its ability and interest to participate in the planning, engineering, and design of the selected plan, and its eventual construction. The non-Federal sponsor has provided the preliminary financing plan and statement of financial capability. The District finds that the non-Federal sponsor has the capability to fund its portion of the implementation responsibilities. The financing plan and statement of financial capability is provided in Exhibit 9. "Letters of Support and Financial Capability".

H. Procedures for Implementation

Future actions necessary for authorization and construction of the selected plan are summarized as follows:

(1) This report will be reviewed by the Headquarters of the U.S. Army Corps of Engineers, Washington D.C.

(2) The Chief of Engineers will seek formal review and comment by the Governor of the State of California and interested Federal agencies.

(3) Following State and Agency review, the report will be sent to the Assistant Secretary of the Army for Civil Works.

(4) Upon approval of the Assistant Secretary, the report will be for-warded to the Office of Management and Budget (OMB) to obtain the relationship of the project to programs of the President.

(5) The final report of the Chief of Engineers will then be forwarded by the Assistant Secretary of the Army for Civil Works to Congress.

(6) Congressional review of the feasibility report and possible authorization of the project would follow.

(7) Pending project authorization for construction, the Chief of Engineers could include funds where appropriate, in his budget requests for preconstruction engineering and design of the project. The objective is to ready the project for a construction start established with the feasibility study.

(8) Following receipt of funds, preconstruction engineering and design would be initiated and surveys and detailed engineering designs would be accomplished.

(9) Following Congressional authorization of the project, plans and specifications would be accomplished by the District Engineer.

(10) Subsequent to appropriation of construction funds by Congress, but prior to construction, formal assurances of local cooperation would be required from non Federal interests.

(11) Bids for construction would be initiated and contracts awarded.

I. Summary of Coordination, Public Views, and Comments

Coordination for this project essentially began in 1963 when the Corps built two debris basins on Mission and Rattlesnake Creeks following the Coyote Fire. In 1970, Congress authorized a project that would concrete-line 12 miles of Mission Creek and build a diversion channel into Arroyo Burro Creek, however due to expected significant loss of biological and aesthetic resources, the project was rejected by the community. Subsequent coordination between the Corps and City of Santa Barbara Environmental Quality Advisory Board were unsuccessful in developing a locally acceptable flood control solution on Mission Creek.

Following the floods of 1978 and 1980, the City and County requested another study of the flooding problem. In 1983, the Corps worked with the Citizen's Advisory Committee established by the City Council to select a project that meets both the flood control and community needs. They met 13 times over the period of three years and in 1986 proposed a project that would fully concrete-lined and provide 100-year flood control protection, however in response to community concerns, no debris basins were included in the design. Upon endorsement by the City Council, Planning Commission and the County Board of Supervisors, the Corps initiated the feasibility study. In 1988, Congress authorized the fully concrete-lined channel project. The City Council formed a Mission Creek Alternatives Task Force to look at other alternatives to the project, based on public concerns regarding the endorsed project. Due to technical problems discovered during design phase, the project was abandoned in 1993. Afterwards, the City Council and the Board of Supervisors established the Mission Creek Consensus Group to develop an alternative that is acceptable to the community as a whole. The Consensus Group includes Board of Supervisors and Council members, environmental community and business/property owners. A series of Consensus Group meetings were held to determine criteria for an acceptable flood control project and selection of alternatives for further study.

At the request of the Board of Supervisors and the City Council, the Corps initiated a Reconnaissance Study in 1994 on the feasibility of the selected alternatives proposed by the Consensus Group and other alternatives not previously studied by the Corps. Two public meetings were held to gather community inputs for Reconnaissance Study and in November 1995, the reconnaissance study recommended further feasibility studies of the alternatives developed.

In July 1997, the Corps initiated this Feasibility Study and held a public workshop in August 1997. An environmental scooping meeting was held in October 1998 to gather input on environmental impacts to be considered in the EIS/EIR. The City and the County held numerous public meetings during the course of the study to present project details and gather community inputs. In December 1999, the Draft Feasibility Report and the EIS/EIR was released for public review and a Public Hearing was held in January 2000. Based on comments from resource agencies and the public, appropriate changes were made and incorporated in Recommended Plan.

Coordination and consultation with various agencies and interested parties were held throughout the study process. Agencies include the U.S. Fish & Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Army Corps of Engineers Regulatory Branch, California Regional Water Quality Control Board (CRWQCB), California Department of Fish and Game (CDFG), California Coastal Commission, and State Historic Preservation Officer (SHPO). Interested parties include the Environmental Defense Council, Urban Creeks Council, and Audubon Society. The correspondence with the agencies is located in Appendix J of the EIS/EIR. A summary of coordination is provided in the following section.

U.S. Fish & Wildlife Service (USFWS):

Informal discussions with USFWS began late in the fall of 1997. Conversations ranged widely over suitability of habitat along Lower Mission Creek for amphibians, benthic invertebrates, riparian species which form both major structural layers in the riparian plant community, historic occurrences of steelhead in Mission Creek, and the nature of spawning areas and feeding areas

used by tidewater gobies. More involved coordination included participation by USFWS at the F4 conference held in April 1999 and the Alternative Formulation Briefing (AFB) in August 1999, including three site visits in the spring of 1999. During one of the field excursions, biologists from USFWS and the USACOE studied examples of eroded stream banks stabilized by riprap and planted in native vegetation. The other two trips involved surveying the entire route of Mission Creek for biological species by walking in it from Canon Perdido Street to Cabrillo Boulevard. Biologists from both agencies, USFWS and NMFS, studied the proposed location and design of structural features to mitigate for impacts to tidewater gobies, water velocity profiles, and the lack of sediment deposition in the estuary. That meeting occurred on site and was intended to refine the placement and design of features, which will improve goby habitat in the estuary.

The USACOE has performed a modified Habitat Evaluation Procedure (HEP) to evaluate project related loss of habitat. Calculations in that HEP indicate that specific design features which the Preferred Alternative embodies will yield greater habitat quality compared with future projections if no flood control project were implemented, including the need for annual future maintenance for the life of the project. Conclusions of that HEP have been discussed at length with the USFWS.

The Draft EIS/EIR was provided to the USFWS for their review during the public review period. A comment letter received from the Department of Interior is located in Appendix K. The USACOE coordinated the modification of the proposed project design, and related changes with the USFWS. On June 7, 2000, the USFWS participated in a meeting with the NMFS via telephone to discuss project design and mitigation features to minimize impacts to the steelhead and tidewater gobies. Subsequent to that meeting, on June 21, 2000, the USACOE provided a revised biological assessment, mitigation monitoring plan, revised project description, hydraulic/engineering analysis, biological assessment for steelhead and project plan. After receipt of the revised biological assessment and supporting information, the USFWS stated that to determine the project related impacts to tidewater gobies, they need additional project specific information.

National Marine Fisheries Service (NMFS):

Starting in January 1998, the USACOE began informal discussions with NMFS regarding many aspects of the life history of steelhead in southern California. These discussions have included, but not been limited to, the fidelity of individuals (and hence their genes) to the stream in which they were spawned, the history of stocking coastal streams with fish derived from hatchery stock, the genetic ambiguity of fish as judged by their phenotypic appearance at different stages of their life cycle, the mal-adaption of hatchery trout to survive ocean conditions, and the stimuli which prompt adult steelhead to swim up streams and young steelhead (also known as smolts) to swim down. NMFS regards Mission Creek as a potentially significant migratory corridor for steelhead, despite the general effects of urban development in Santa Barbara. NMFS participated in the F4 conference held in April 1999. A biologist from NMFS participated in one of the field excursions along Mission Creek in May 1999.

Informal discussions with NMFS have dwelt on the physical arrangement of the oxbow bypass culvert and the properties of water flowing through it. This design element of some flood control alternatives should not affect migrating steelhead, either adults or smolts. Water velocities and depths within this structure were a central matter in Section 7 Consultations between NMFS and USACOE.

A biological assessment was provided to the NMFS with the Draft EIS/EIR in December 1999. The project design was modified after release of the Draft EIS/EIR due to hydraulic/engineering and real estate constraints. The culvert length was increased from the original design. Therefore, the NMFS raised some concerns to determine project related impacts to steelhead. Extensive coordination occurred with their staff to provide satisfactory information. By letter dated March 21, 2000, the NMFS requested of information to analyze project related impacts to steelhead (see Appendix J). They requested detailed project design, cross sections and longitudinal profiles of stream channel throughout the project area, detailed hydraulic analysis, velocity and depths of water within the low flow channel and culvert, scheduling/timing of construction, maintenance procedures, and a detailed monitoring plan.

Since the receipt of the request from the NMFS, the USACOE performed numerous hydraulic/engineering analyses to design the weir to maintain the desired water flow through the oxbow to avoid impacts to migration of steelhead through the constructed channel. The USACOE developed additional structural mitigation features to minimize impacts to steelhead and tidewater gobies. On June 7, 2000, the USACOE staff met with NMFS staff at their office. Mr. Jon Mann (hydrologist) participated in a video conference call and the City staff and USFWS participated via telephone in this meeting. The USACOE provided a brief summary of the modified project design, water velocity within the channel, length, height and location of weir, how a weir would guarantee a minimum flow of 640 cfs through the existing oxbow channel, and implementation of other mitigation features to minimize impacts to steelhead and gobies. Both agencies worked together to achieve a common goal to minimize impacts to steelhead. The USACOE incorporated their recommendations to a maximum extent possible in the project design.

At this meeting, the NMFS stated that minimal daily flow, sediment budget, existing water surface profiles, longitudinal profiles of the creek bed and representative cross-sections of the stream need to be considered in project design. Agreement was reached that a 2.3 year level of flow, equal to about 640 cfs, should pass through the low flow channel. Mitigation features to ensure this flow level and other structural features to be implemented to minimize impacts to steelhead were discussed. The NMFS agreed with the proposed mitigation structural features to minimize impacts to steelhead (see details in biological assessment of steelhead). The USACOE agreed to provide all required detailed hydraulic/engineering analysis, design plan, revised biological assessment, and revised project description by the middle of July 2000. On July 16, 2000, the USACOE provided a revised biological assessment with the supporting information, including revised project description, hydraulic/engineering analysis, mitigation monitoring plan, shade study, revised biological assessment for steelhead, and project plan. The NMFS provided a Final Biological Opinion on August 2, 2000 (see Appendix B).

U.S. Army Corps of Engineers Regulatory Branch:

The Environmental Resources Branch (ERB) initiated coordination with the USACOE Regulatory Branch in March 1999. The Regulatory staff participated in the F-4 conference meeting. A copy of the F-4 package was provided to Regulatory Branch (Ventura Field Office) for their review. Regulatory staff participated in both meetings, the F4 conference and the AFB.

The Regulatory branch received an application from the local sponsor to obtain a Section 404 USACOE Regulatory permit (December 20, 1999, Appendix E-1). Regulatory Branch requested a detailed mitigation monitoring plan identifying goals, success criteria and monitoring of the planted vegetation and other biological resources. The Environmental Resources Branch (ERB) prepared a detailed mitigation monitoring plan and on June 22, 2000, revised information including: revised project description, mitigation monitoring plan, revised biological assessments and hydraulic/engineering analysis and project plans and drawings were provided for their information. The ERB staff will coordinate with the Regulatory Branch of waiver of the Section 404 Water Quality permit under Section 404 (r) regulation.

California Regional Water Quality Control Board (CRWQCB):

On August 17, 1999, the USACOE called CRWQCB staff to inform them the proposed Lower Mission Creek Flood Control Project. Mr. Higgins stated that their concerns would be the restoration of riparian vegetation in the stream, which provides benefits to water quality and improves the environment for steelhead. The CRWQCB would tend to defer to USFWS and NMFS on these issues. The CRWQCB's major goal is improvement of the environmental conditions along Lower Mission Creek. The USACOE invited the CRWQCB to participate in the AFB meeting. Mr. Higgins could not attend the meeting.

On November 9, 1999, the USACOE staff informed CRWQCB that the proposed project construction would be exempted under Section 404(r) regulations. The guideline of 404 (r) has been provided to the CRWQCB staff via e-mail for their information.

On December 20, 1999, the USACOE and the Santa Barbara County Flood Control District submitted a request for a waiver from the Section 401 Water Quality Certification (Appendix E-1) for the proposed project. Future maintenance is a part of the project. Impacts related to future maintenance for the life of the project are included in the EIS/EIR. By letter dated February 2, 2000, the CRWQCB provided a waiver from the Section 401 Water Quality Certification for the project construction and the future maintenance (Appendix E-1). On June 21, 2000, the USACOE provided a revised project description, hydraulics/engineering analysis, biological assessments, and mitigation monitoring plan to CRWQCB for their information. The revised project description did not change impacts to waters of the United States. Therefore, waiver of the Section 401 Water Quality Certification remains in effect.

California Department of Fish and Game (CDFG):

Many informal discussions with CDFG regarding steelhead in Lower Mission Creek have occurred since December 1997. These exchanges centered on details of physiology, historic distribution, fidelity to natal streams, frequency of recognizable genetic stocks of steelhead in southern California streams, and the appearance above the project area of trout with every feature of steelhead after the El Niño rains of 1998. Streambed conditions, which favor migration up and down coastal streams, have been a significant element of discussions and considerations, as well. Following discovery of a pair of steelhead spawning within the project area and numerous malts at Oak Park and other lower sections of the creek in the spring of 2000, further discussions about stream heterogeneity took place. These focus on the benefits of a pilot channel, fish ledges, and side baffles as ways to improve conditions during steelhead migration.

California Coastal Commission:

On November 18, 1999, the USACOE initiated coordination with the California Coastal Commission (CCC) staff (Mr. Jim Raives) of the proposed project. Mr. Jim Raives stated that the proposed project would require a Coastal Consistency Determination (CCD). Informally, the CCD was provided to the CCC for their review and recommendations during preparation of the Draft EIS/EIR.

On December 20, 1999, the USACOE submitted a CCD with project description, HEP analysis report, biological assessments, and Draft Coordination Act Report to CCC. Since submittal of the CCD, extensive coordination has occurred between USACOE, City of Santa Barbara and CCC staff. The CCC staff expressed their concerns for the project design, and required detailed project plans to examine the project features. In addition, they were concerned about construction of vertical walls within the coastal zone, impacts to water quality, non-point source discharge degrading water quality of the creek, goals, success criteria for the planted vegetation, impacts to endangered species, estuarine habitat, mitigation, sand supply, HEP analysis, visual resources and cultural resources. The CCC also desired to have biological opinions from both agencies, USFWS and NMFS, to make their determination. The CCC recommended that the USACOE examine an alternative with vegetated riprap slope or a full vegetated riprap bank below the freeway. The USACOE performed a cursory economic analysis of these alternatives. Results of this conceptual analysis can be found in the Economic Appendix. These alternatives are not economically feasible.

A staff report for the proposed project was prepared in January 2000, and a Draft copy was provided to the USACOE for review. Since then the staff report was revised in July 2000. The USACOE provided response or input formally or informally since January 2000. On June 21, 2000, the USACOE provided revised project description, mitigation monitoring plan, revised biological assessments (steelhead and goby), hydraulics/engineering analysis, and supporting project plans and drawing. The CCC staff again felt that there was not enough information to make their determination and recommendation for the proposed project implementation. The USACOE requested postponement of the public hearing on the proposed project until the biological opinion is received from the USFWS. The CCC staff provided recommendations to incorporate in the project design to minimize impacts to environmental resources. The USACOE will revise the CCD and submit it again to the CCC for their consideration with the biological opinion.

The City of Santa Barbara provided a letter (February 22, 2000, Appendix J) to respond to some of concerns on construction of vertical walls between Yanonali and State Streets, and aesthetics of the coastal zone. The City identified the possibility of using Redevelopment Agency Funds to

improve esthetic resources of the coastal zone within the project area.

State Historic Preservation Officer (SHPO):

Consultation with the SHPO toward Section 106 compliance was completed with receipt of their letter dated August 3, 2000. They concurred with our determinations of eligibility and non-eligibility for the various buildings and structures in the APE. Some structures and both neighborhoods were determined not to be eligible for inclusion on the National Register of Historic Places. They also concurred with our determination that the project as planned will have no adverse effect on properties that are eligible for inclusion or, are included in the National Register of Historic Places. The project complies with Section 106.

Environmental Defense Center:

On July 31, 2000, the USACOE and the City of Santa Barbara met with Mr. Brian Trautwein of the Environmental Defense Center (EDC), Mr. Eddie Harris of the Urban Creeks Council and Ms. Kendy Radasky of the Santa Barbara Audubon Society to discuss their concerns and modifications of the mitigation measures. The concerns discussed at this meeting included, were not limited to, use of vertical walls, loss of streambed habitat, creating a pilot channel (bank-full channel), cleanup of contaminated sites along the creek bank, removal avoidance of vegetation in bank-full channel, planting riparian vegetation should be closer than identified in the EIS/EIR, use of black cottonwood instead of Fremont cottonwood, and fish passage improvements in the Caltrans channel. The USACOE and the City provided a brief summary of the revised mitigation measures, how impacts would be minimized to the listed species and aquatic habitat. The Revised Biological Assessments, Mitigation Monitoring Plan, Revised Project Description and Hydraulic/Engineering Analysis were provided to EDC staff for their information.

Summary of Public Comments

Public comments were solicited throughout the study process through public workshops, meetings, and public review of the Draft Feasibility Report and Draft EIS/R. The bulk of the

public comments and concerns were received during the public review of the Draft Feasibility Report and Draft EIS/EIR between December 1999 and February 2000. The following list summarizes the public comments and concerns:

- impacts to existing structures and lands adjoining the creek;
- limited level of flood protection (20-yr protection);
- consider sedimentation issues during project design;
- loss of setback or buffer zone between creek and development;
- impacts to Endangered Species; steelhead and tidewater gobies;
- impacts to water quality and temperature;
- impacts to culturally significant structures;
- temporal loss of existing creek bank and creek bed vegetation;
- potential loss of mature "skyline" trees;
- potential impact to the Moreton Bay Fig tree;
- potential impacts of future maintenance activities;
- loss of natural bank protection
- loss of aesthetic values due to the presence of concrete walls, wider creek bottom, loss of several mature trees, and project elements not blending with local character;
- providing safety measures from accidentally falling into the creek;
- increased trash and debris collecting in the creekbed;
- impacts from construction activities including traffic congestion, noise, dust;
- etc…

The complete compilation of public comments and concerns, as well as the corresponding responses can be found in Appendix K - "Public Comments and Responses" of the EIS/R.

VII. CONCLUSION

Implementation of a plan to provide flood control along Lower Mission Creek presents an opportunity to decrease flooding frequency while affording much needed environmental benefits. Removal of "patchwork" flood control measures along the creek will aid in restoring the riparian habitat and provide increased conveyance. This Feasibility Study has identified that Alternative 12 as the most economical means of increasing flood protection. Plantings on the sideslopes and within the expanded habitat areas will provide much needed riparian habitat and help restore the major components of the riparian corridor along the creek.

Alternative 12 would provide an approximately 20-year level of flood protection. The average annual benefits associated with the NED amount to $1,592,000. The project would have an annual life cycle costs of $1,367,000. The project would produce $225,000 in net NED benefits annually and would have a B/C ratio of 1.2.

VIII. RECOMMENDATION

I recommend that Alternative 12 as described herein be authorized for implementation as a Federal project. This plan achieves all of the study objectives including flood protection for the residents and businesses of Santa Barbara and restoration of the major elements of a natural riparian corridor along Lower Mission Creek. The total first cost of the project is currently estimated at $18,300,000 under 1999 price level. The Federal share is estimated at $9,200,000 of which $9,100,000 is for flood control and $85,000 for cultural resources requirements.

The non-Federal sponsor's total initial cost for LERRDS, PED, and the five percent cash contribution would exceed the fifty percent maximum allowed (in accordance with WRDA 1986, as amended). It is currently estimated that the Federal government would reimburse the non-Federal sponsor the amount of $685,000 in order to maintain the fifty–fifty cost-sharing basis. The non-Federal sponsor's fifty percent share is currently estimated at $9,100,000.

As a result of the feasibility study recommendations for a new authorization of the selected plan, I recommend de-authorization of the plan previously authorized under the Water Resources Development Act of 1988.

I recommend that the plan recommended herein be exempt from regulations of the Clean Water Act pursuant to Section 404(r) of the Act. The 404(r) exemption will cover the construction period and the operation and maintenance activities for as long as the project remains authorized.

My recommendation is subject to cost sharing, financing, and other applicable requirements of Federal and State laws and policies, including Public Law 99-663, the Water Resources Development Act of 1986, as amended by Section 202 of Public Law 104-303, the Water Resources Development Act of 1996, and in accordance with the following requirements, which the non-Federal sponsor must agree to prior to project implementation.

a. Provide a minimum of 35 percent, but not to exceed 50 percent of total project costs as further specified below:

(1) Enter into an agreement, which provides, prior to execution of the project cooperation agreement (PCA), 25 percent of design costs;

(2) Provide during construction, any additional funds needed to cover the non-federal share of design costs;

(3) Provide, during construction, a cash contribution equal to 5 percent of total project costs;

(4) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(5) Provide or pay to the Government the cost of providing all retaining dikes, wastewiers, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(6) Provide, during construction, any additional costs as necessary to make its total contribution equal to 35 percent of total project costs.

b. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

c. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating (OMRR&R) the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific

directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto.

d. Comply with section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project of separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation of for the project or separable element.

e. Hold and save the Government free from all damages arising for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

i. Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and, to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

j. Prescribe and enforce regulations to prevent obstruction of or encroachment on the Project that would reduce the level of protection it affords or that would hinder operation or maintenance of the Project.

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

l. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans.

m. Provide 35 percent of that portion of total cultural resource preservation mitigation and data recovery costs attributable to structural flood control that are in excess of one percent of the total amount authorized to be appropriated for structural flood control.

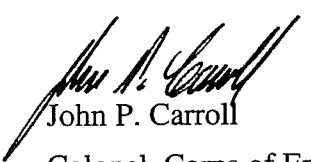
n. Participate in and comply with applicable Federal floodplain management and flood insurance programs.

o. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

p. Inform affected interests, at least annually, regarding the limitations of the projection afforded by the project.

The plan presented herein is recommended with such modifications thereof as in the discretion of the Commander, HQUSACE, may be advisable.

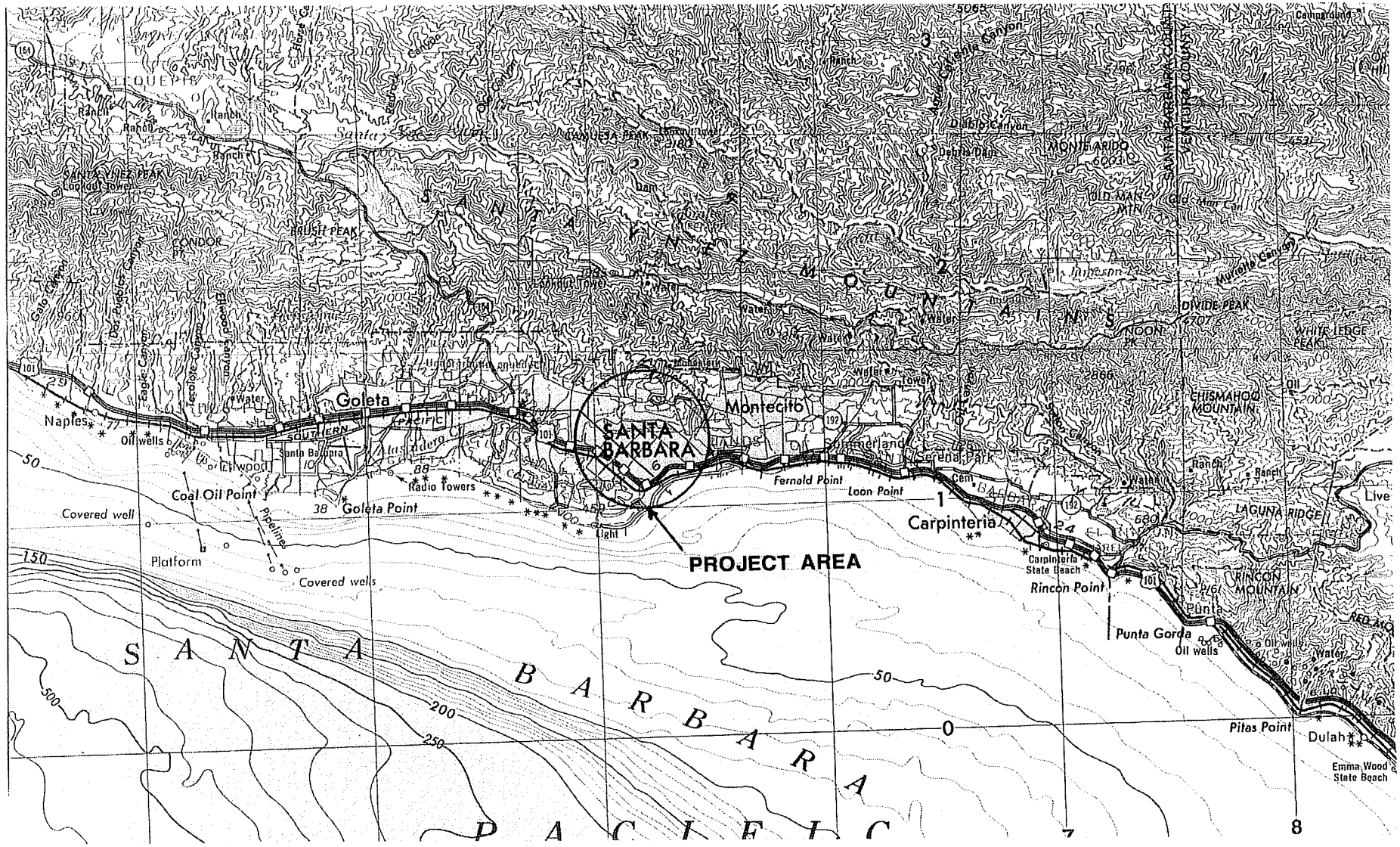
The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the non-Federal sponsor, the State, interested Federal Agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.



John P. Carroll
Colonel, Corps of Engineers
District Engineer

EXHIBITS

Exhibit 1. Regional Map
Exhibit 2. Location Map
Exhibit 3. Mission Creek Watershed Map
Exhibit 4. Laguna Channel Drainage Map
Exhibit 5. Mission Creek Floodplain Map
Exhibit 6. Mission Creek Floodplain Map 3400 cfs Project
Exhibit 7. Engineering Plans
Exhibit 8. Architectural Drawings
Exhibit 9. Letter of Support and Financial Capability



Source: USGS 1:250,000, Los Angeles, California

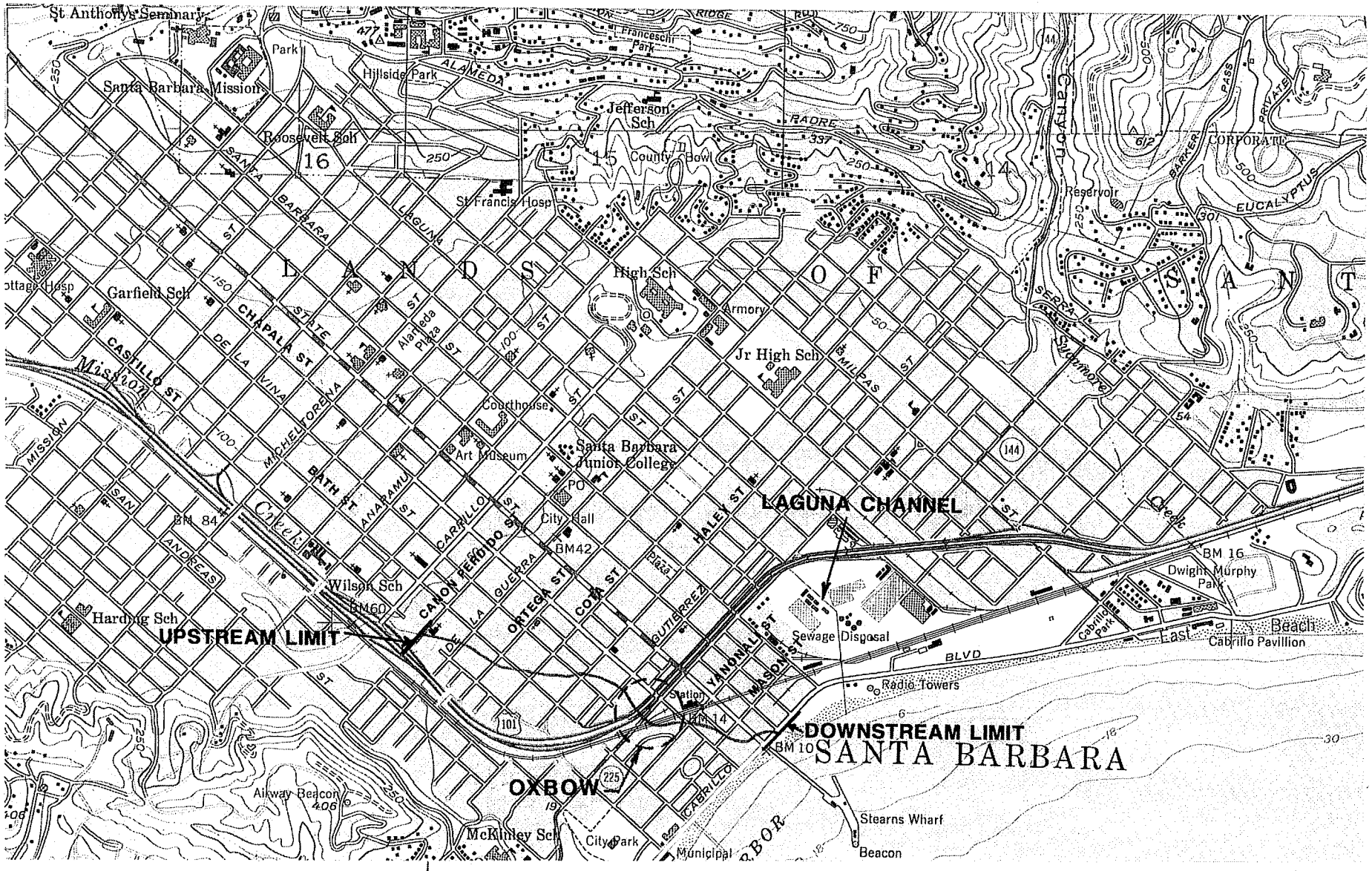
0" 250,000" 500,000"

GRAPHIC SCALE: 1"=250,000"

SANTA BARBARA COUNTY STREAMS
LOWER MISSION CREEK

REGIONAL MAP

Exhibit 1



Source: USGS 1:24,000, Santa Barbara, California

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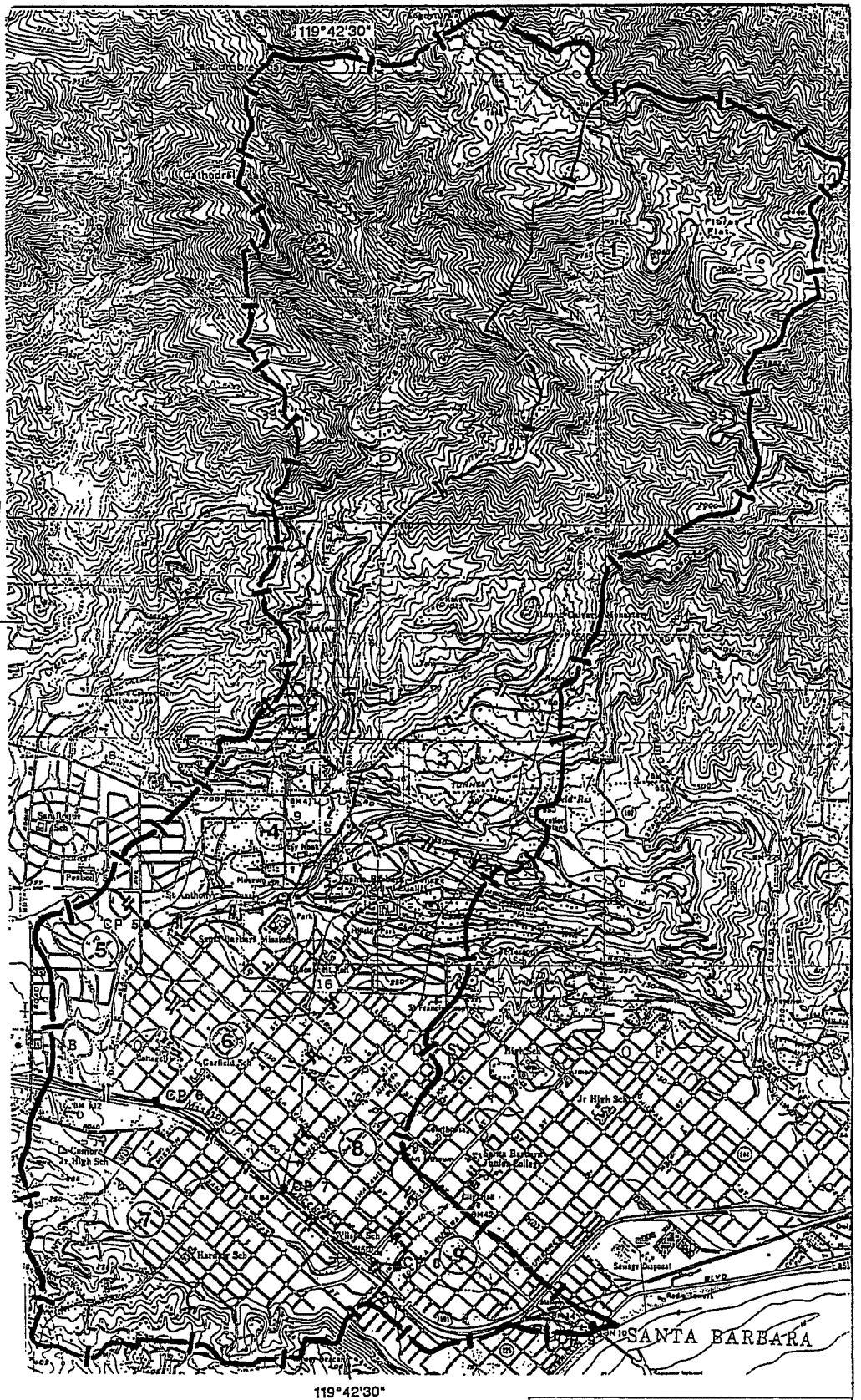
GRAPHIC SCALE: 1″=2000′

SANTA BARBARA COUNTY STREAMS
LOWER MISSION CREEK

LOCATION MAP

Exhibit 2



LEGEND

— | — Boundary of Drainage Area

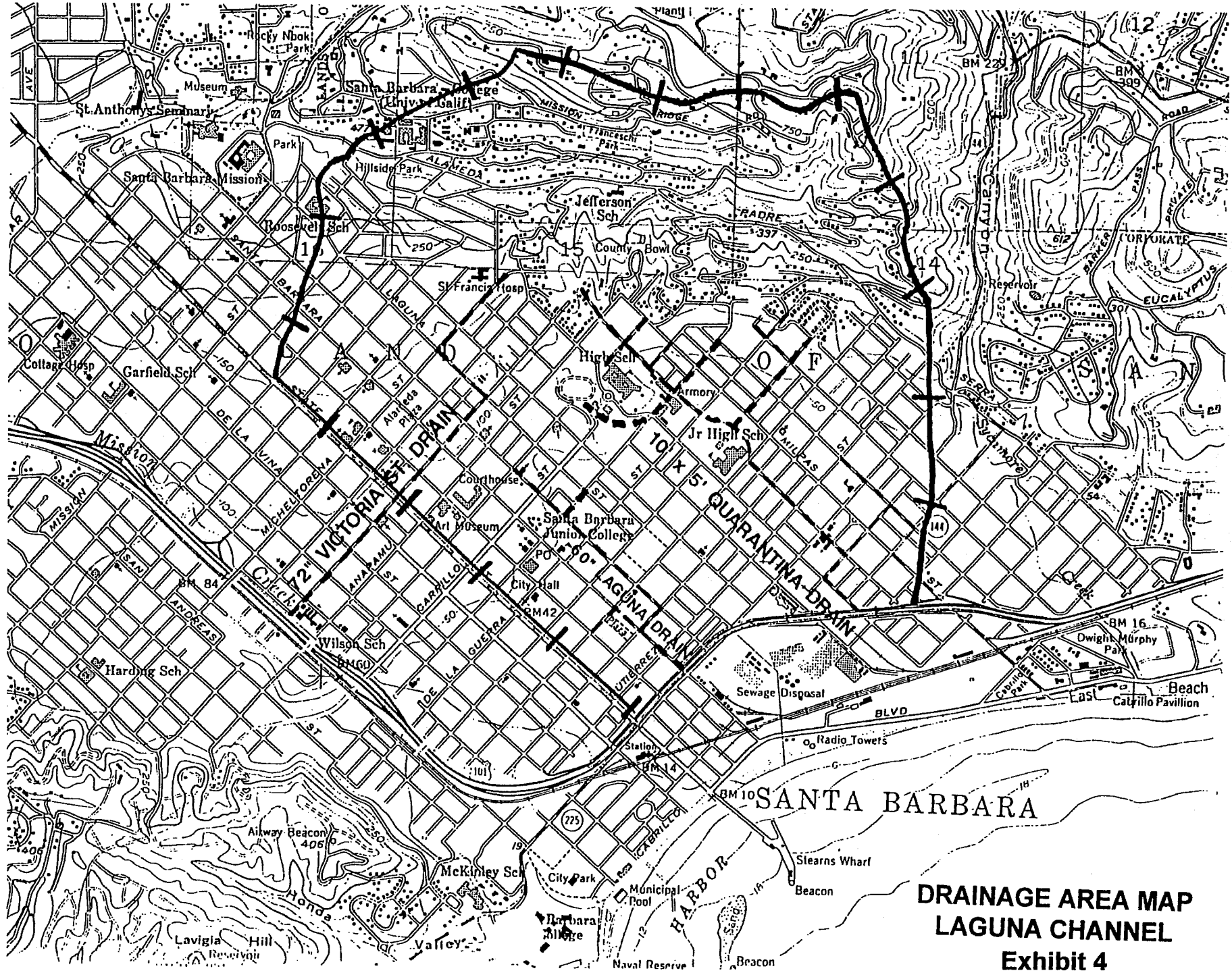
—|| — Boundary of Subarea

(7) Subarea Designation

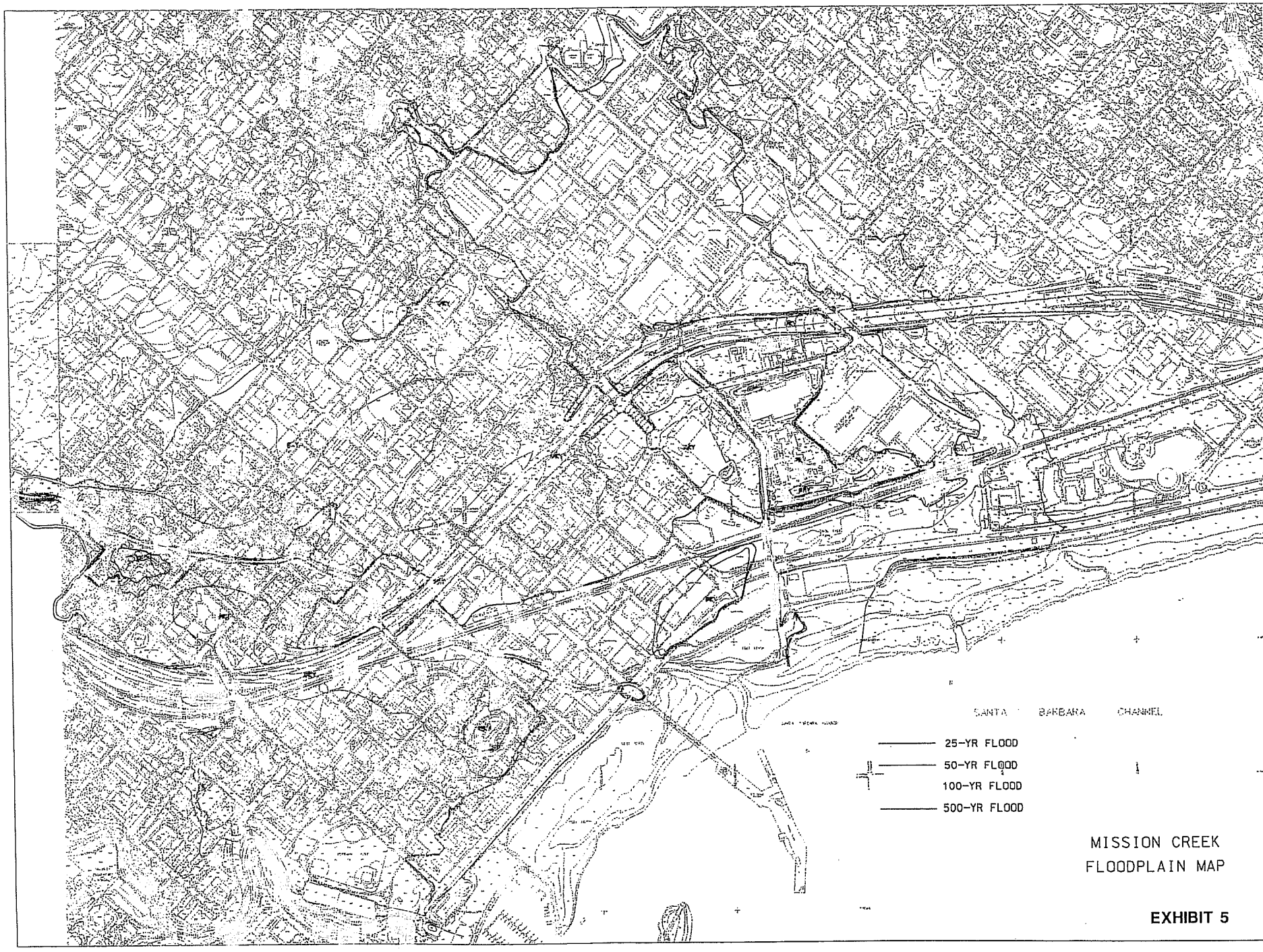
● Concentration Point

SANTA BARBARA COUNTY STREAMS MISSION CREEK
DRAINAGE AREA MAP SHOWING CONCENTRATION POINTS
U. S. ARMY CORPS OF ENGINEERS LOS ANGELES DISTRICT

Exhibit 3



DRAINAGE AREA MAP
LAGUNA CHANNEL
Exhibit 4



MISSION CREEK
FLOODPLAIN MAP

EXHIBIT 5

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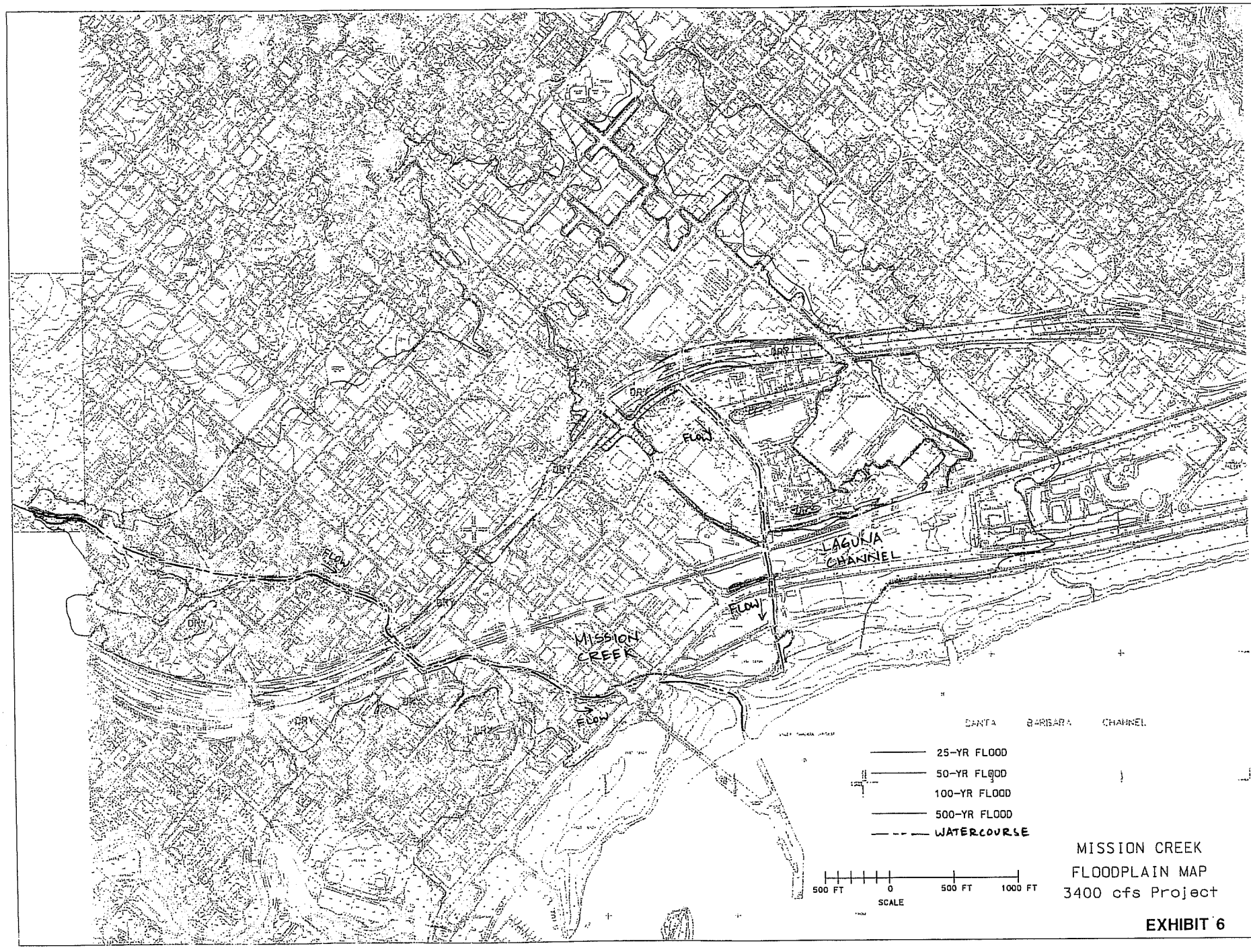

MISSION CREEK
FLOODPLAIN MAP
3400 cfs Project

EXHIBIT 6

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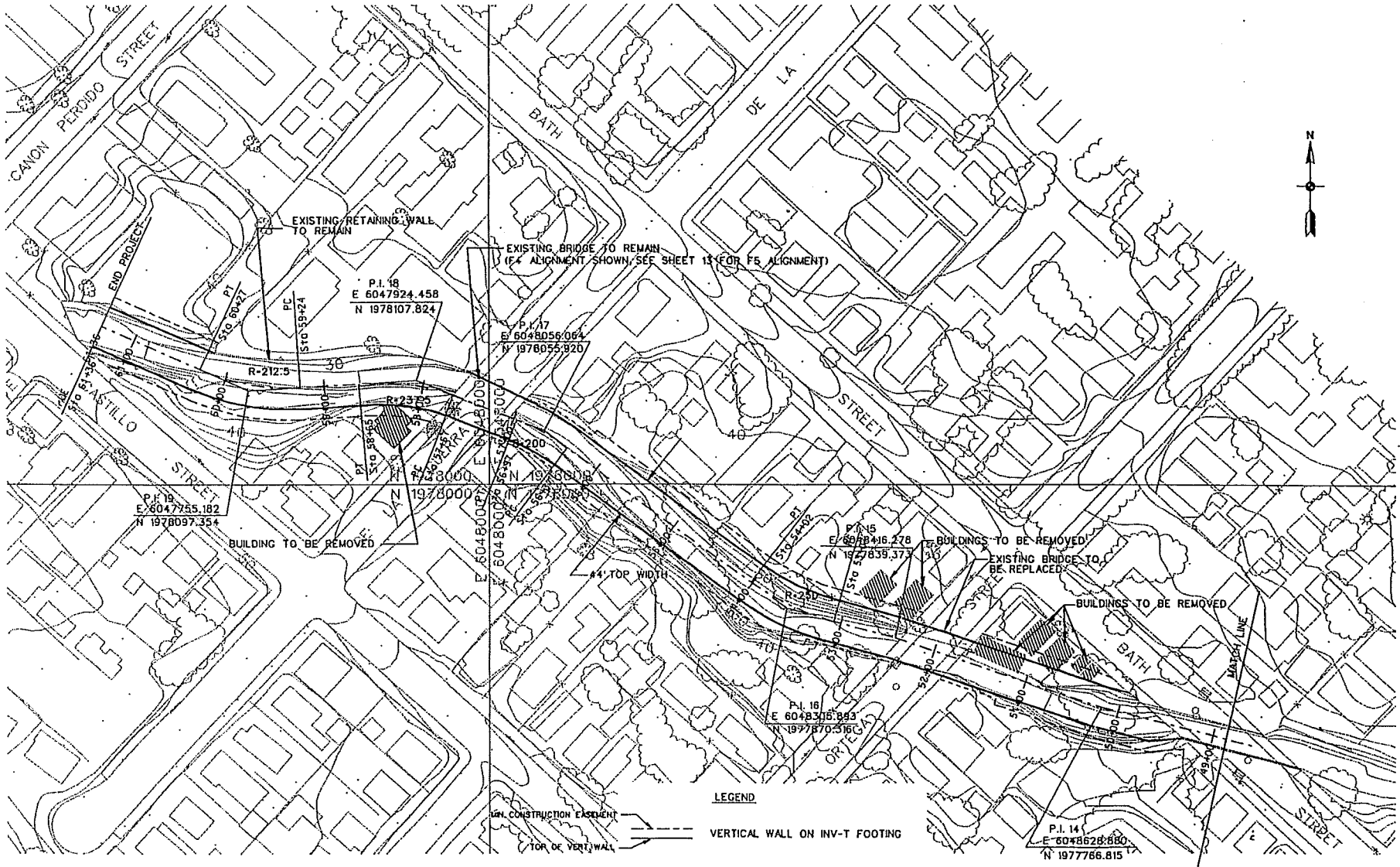
Exhibit 7.

ENGINEERING PLANS

Sheets 1 - 28

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVES 4 & 8

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DRAWN BY:
TRACED BY:
CHECKED BY:

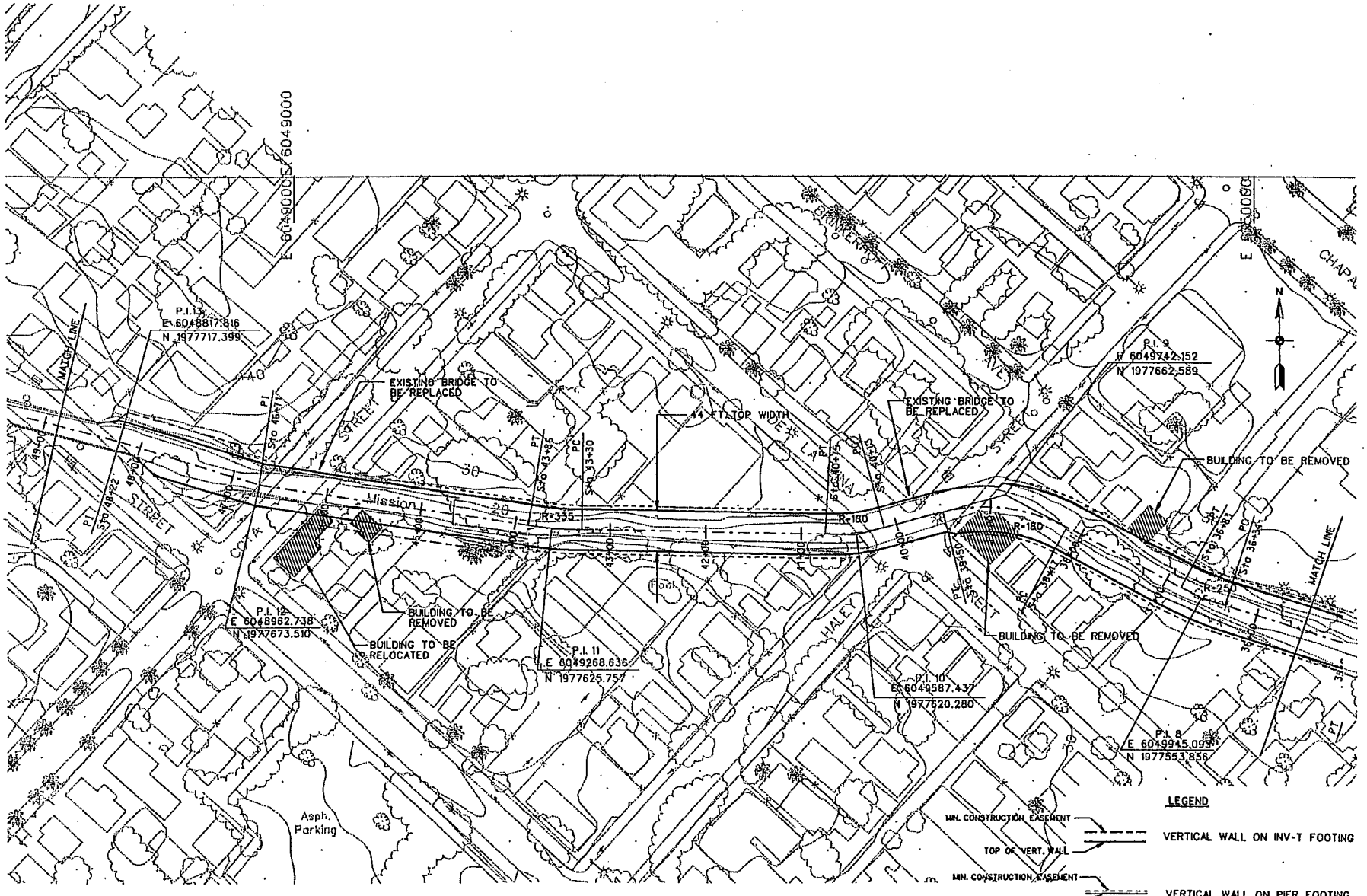
CADD FILE NAME SHEET 3 OF 4

DISTRICT FILE NO. 3400

SHEET 1

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVES: 4 & 8

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY:
DRAWN BY:
CHECKED BY:

SUBMITTED BY:
THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

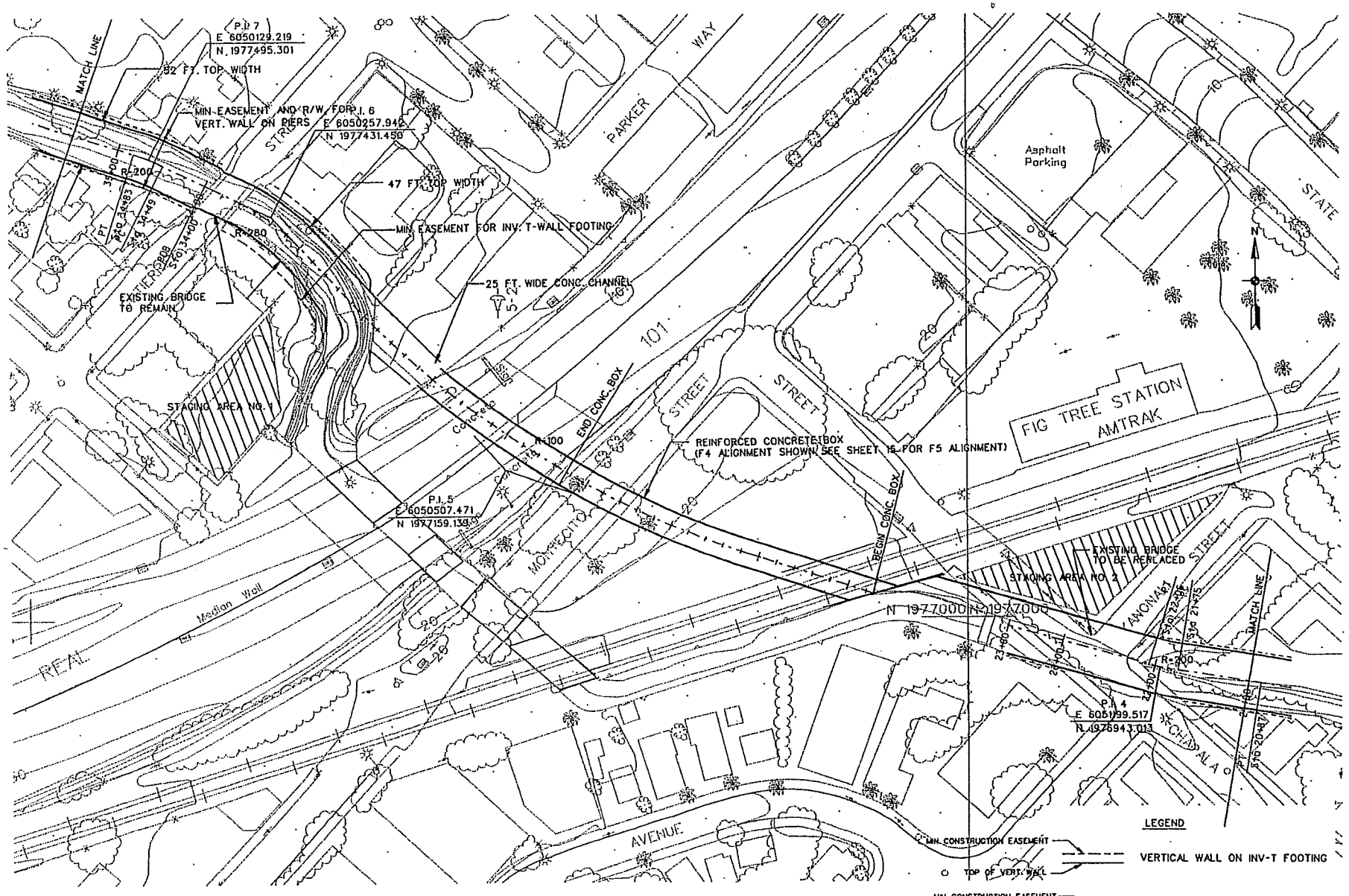
CADD FILE NAME/SHEET 3 of 3

DISTRICT FILE NO. 24AU

SHEET
2

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVE 8

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

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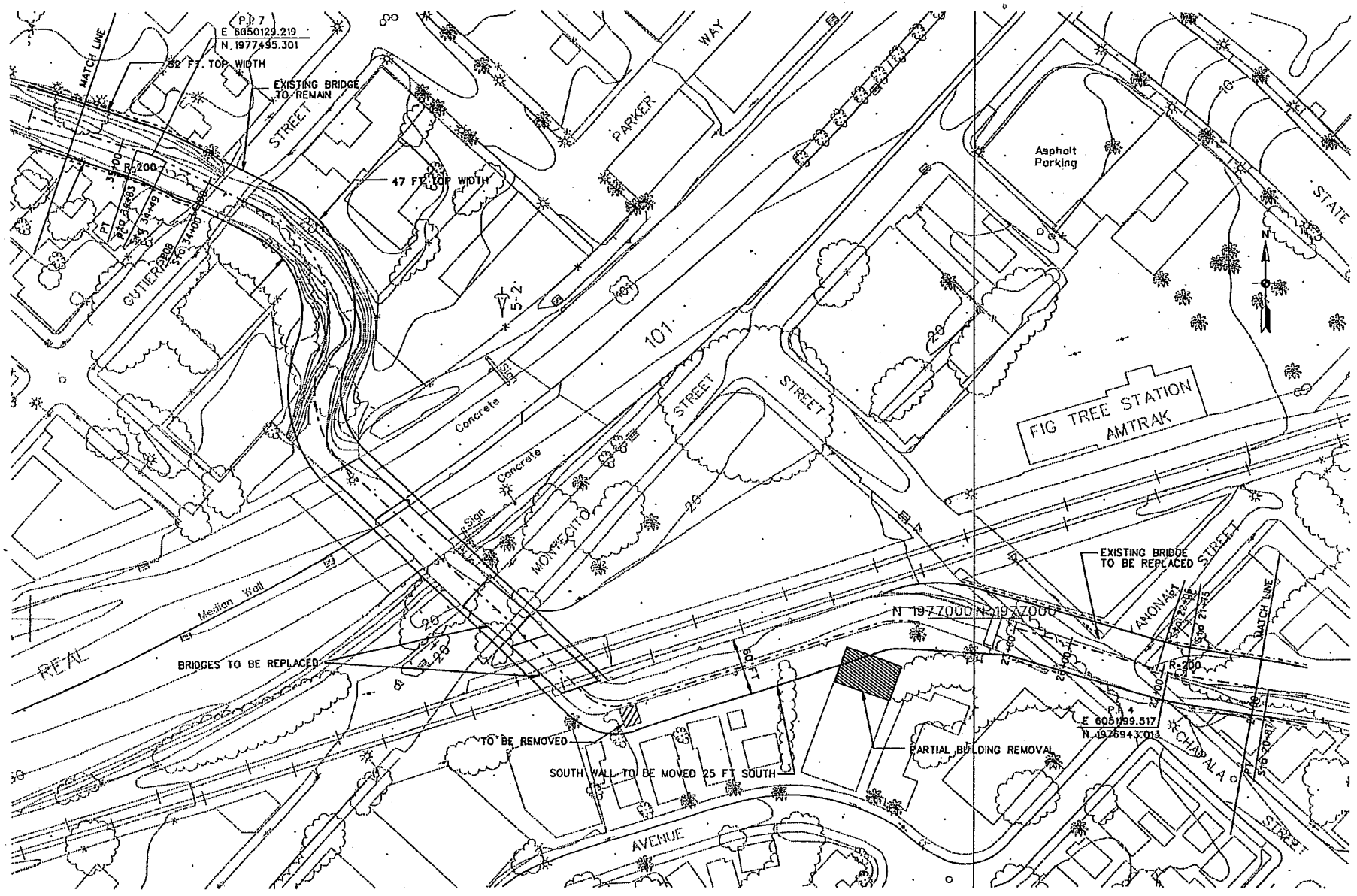
DISTRICT FILE NO. 2660

SHEET 3

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
WIDENED OX-BOW ALTERNATIVE
ALTERNATIVE 4,5,6,7

REVISIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

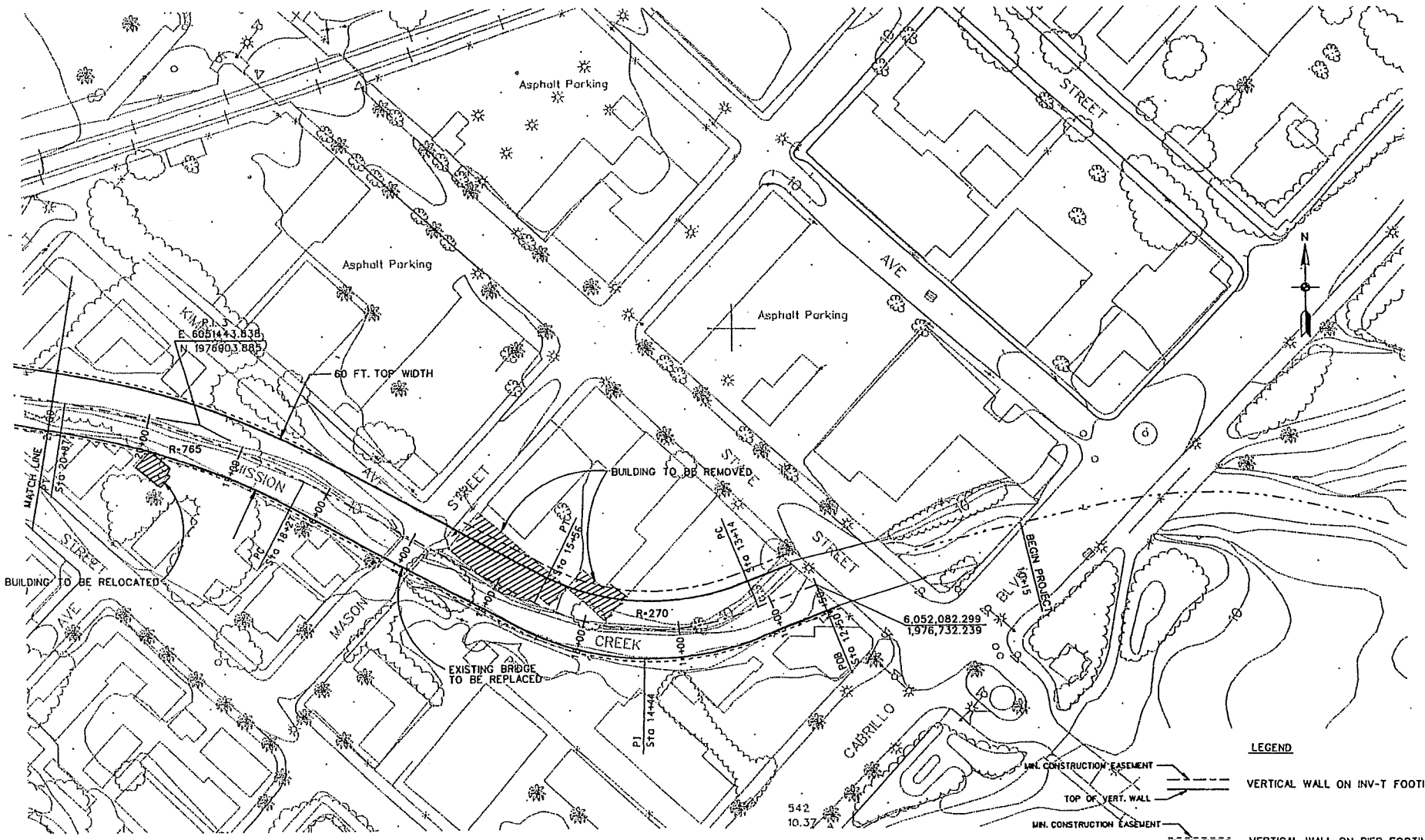
SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY:
DRAWN BY:
CHECKED BY:

SHEET
3A

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVES: 4, 7, 8, 11

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: PT
DRAWN BY: PT
CHECKED BY: PT

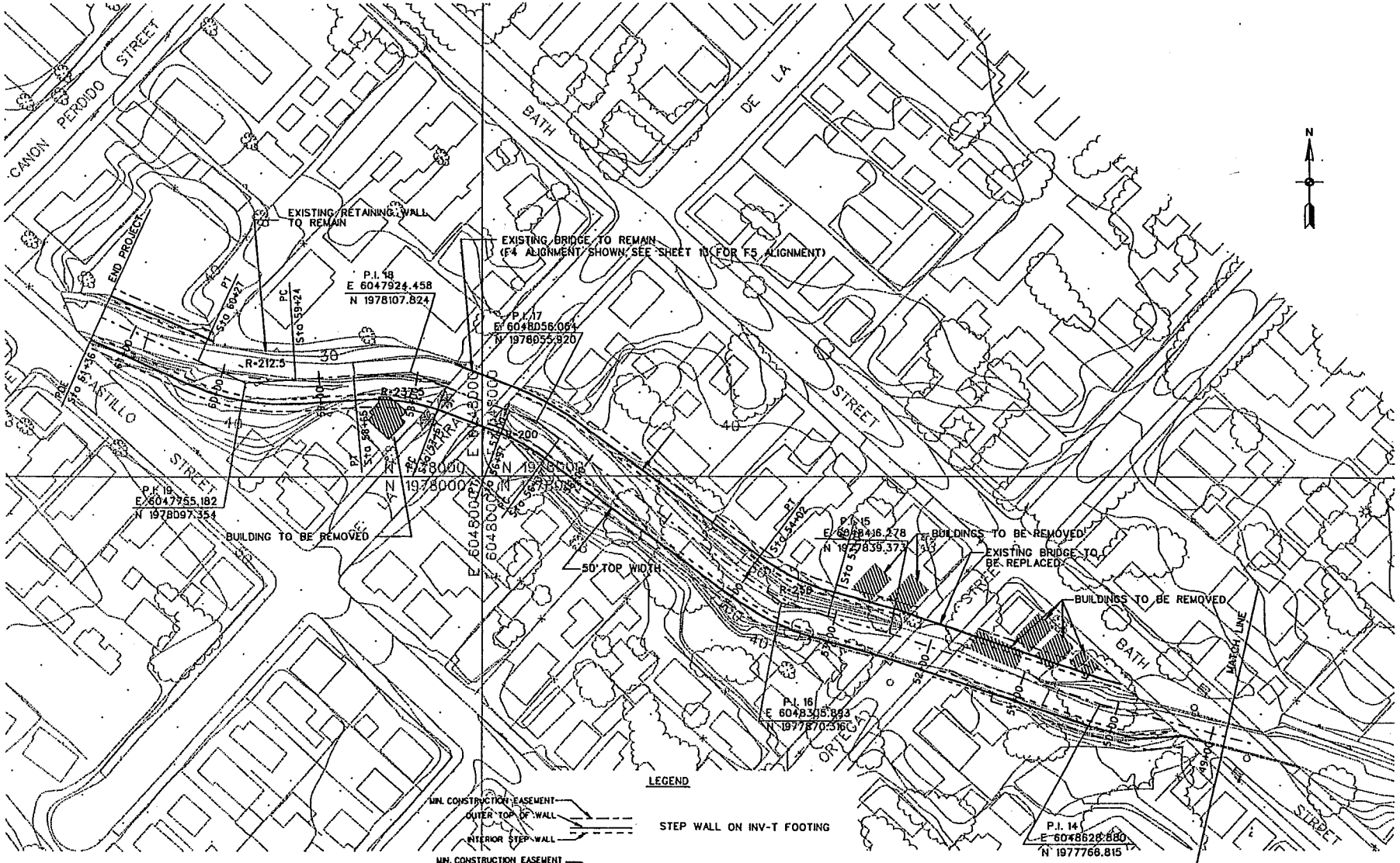
CADD FILE NAME: SHEET 34P1

DISTRICT FILE NO. 2604

SHEET 4

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 5, 6, 7, 9, 10, 11

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY:
DRAWN BY:
CHECKED BY:

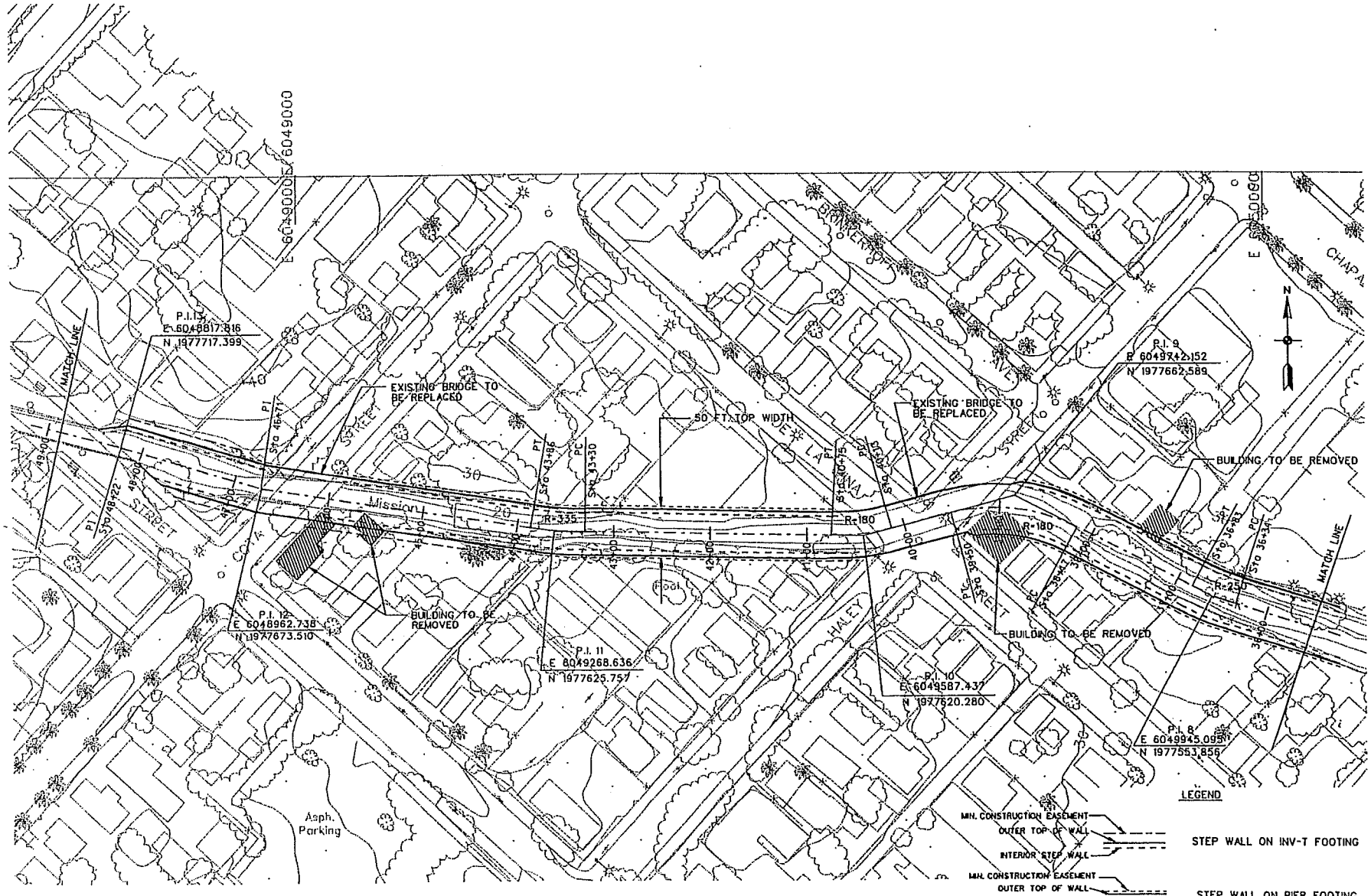
CADD FILE NAME:

DISTRICT FILE NO. 260V

SHEET 5 OF 34 SHEETS

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 5, 6, 7, 8, 10, 11

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

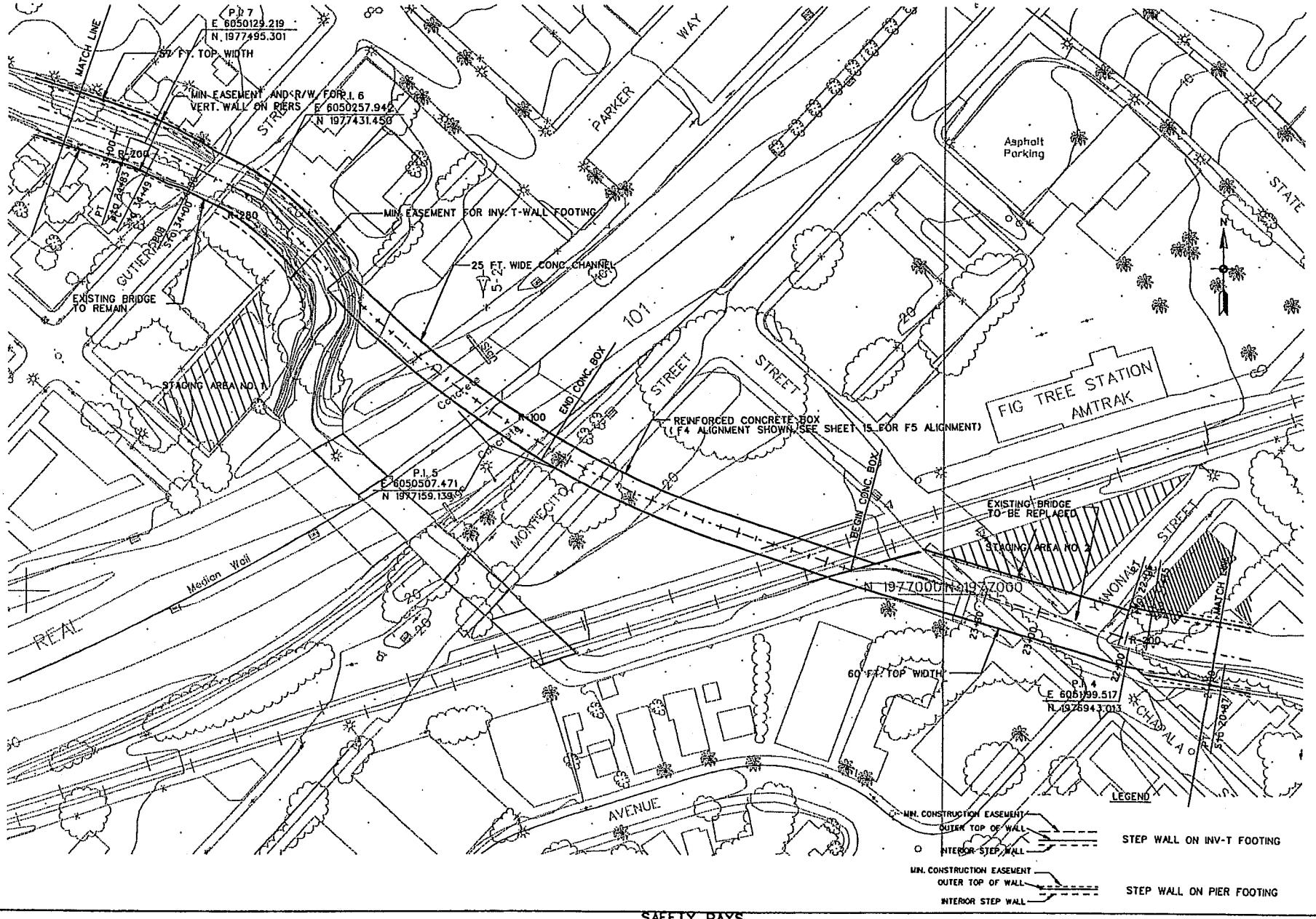
CADD FILE NAME: SHEET 3493

DISTRICT FILE NO. 2567

SHEET 6

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 8, 10, 11

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

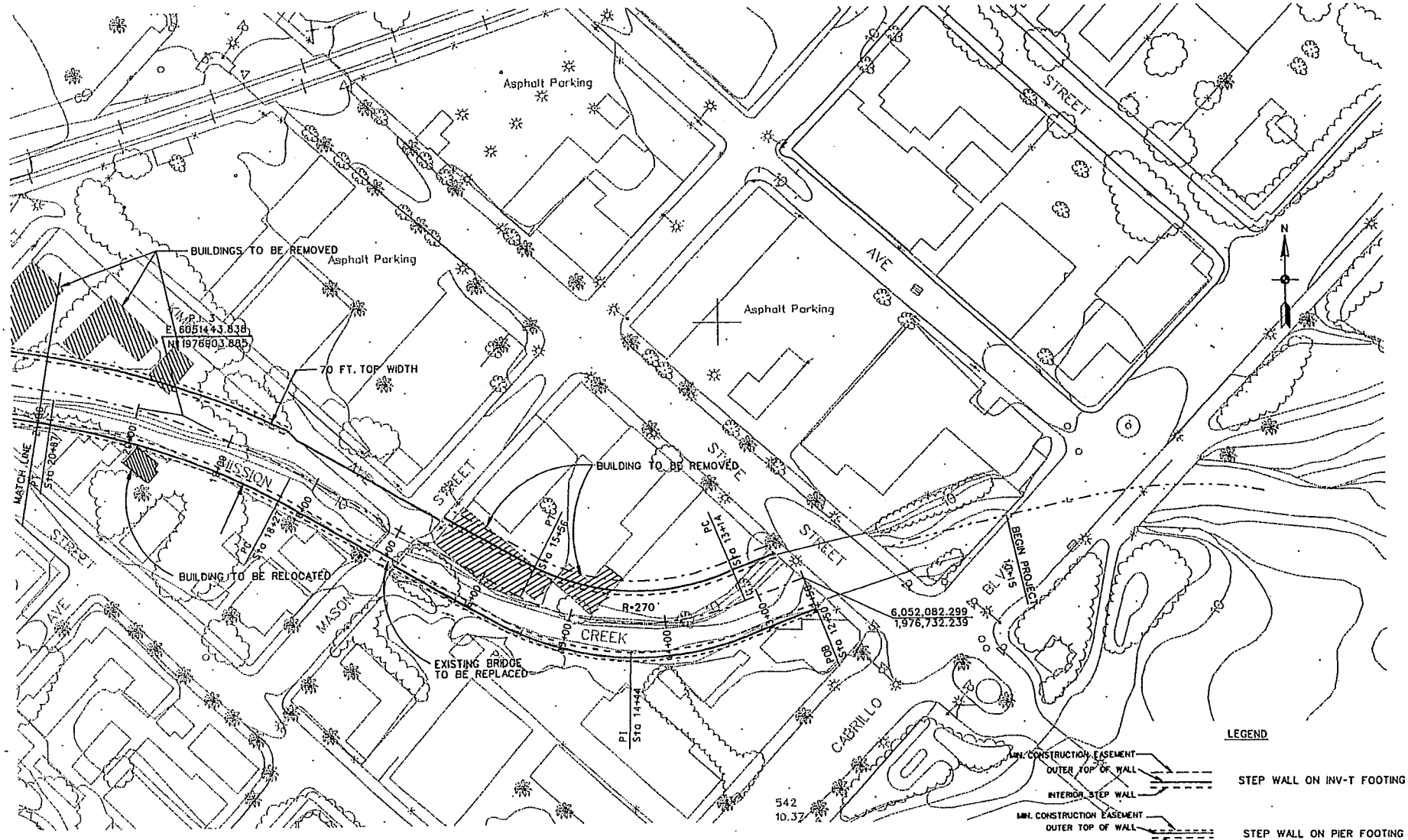
CADD FILE NAME: SHEET 3 of 12

DISTRICT FILE NO. 24567

SHEET 7

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 5 & 9

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: BT
DRAWN BY: BT
CHECKED BY: BT

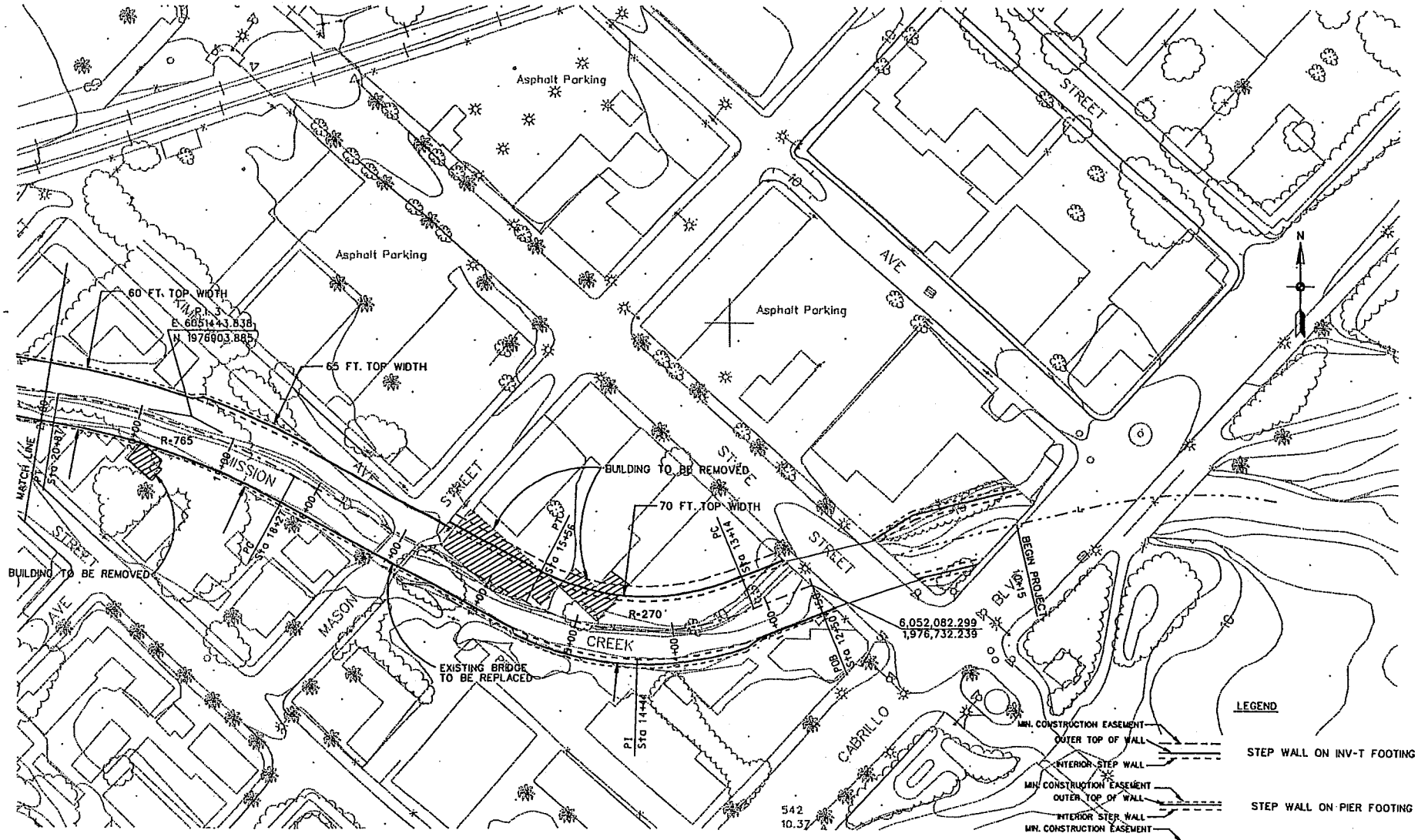
CADD FILE NAME: SHEET 3.4P1

DISTRICT FILE NO. 2680

SHEET
8

SAFETY PAYS

VALUE ENGINEERING PAYS



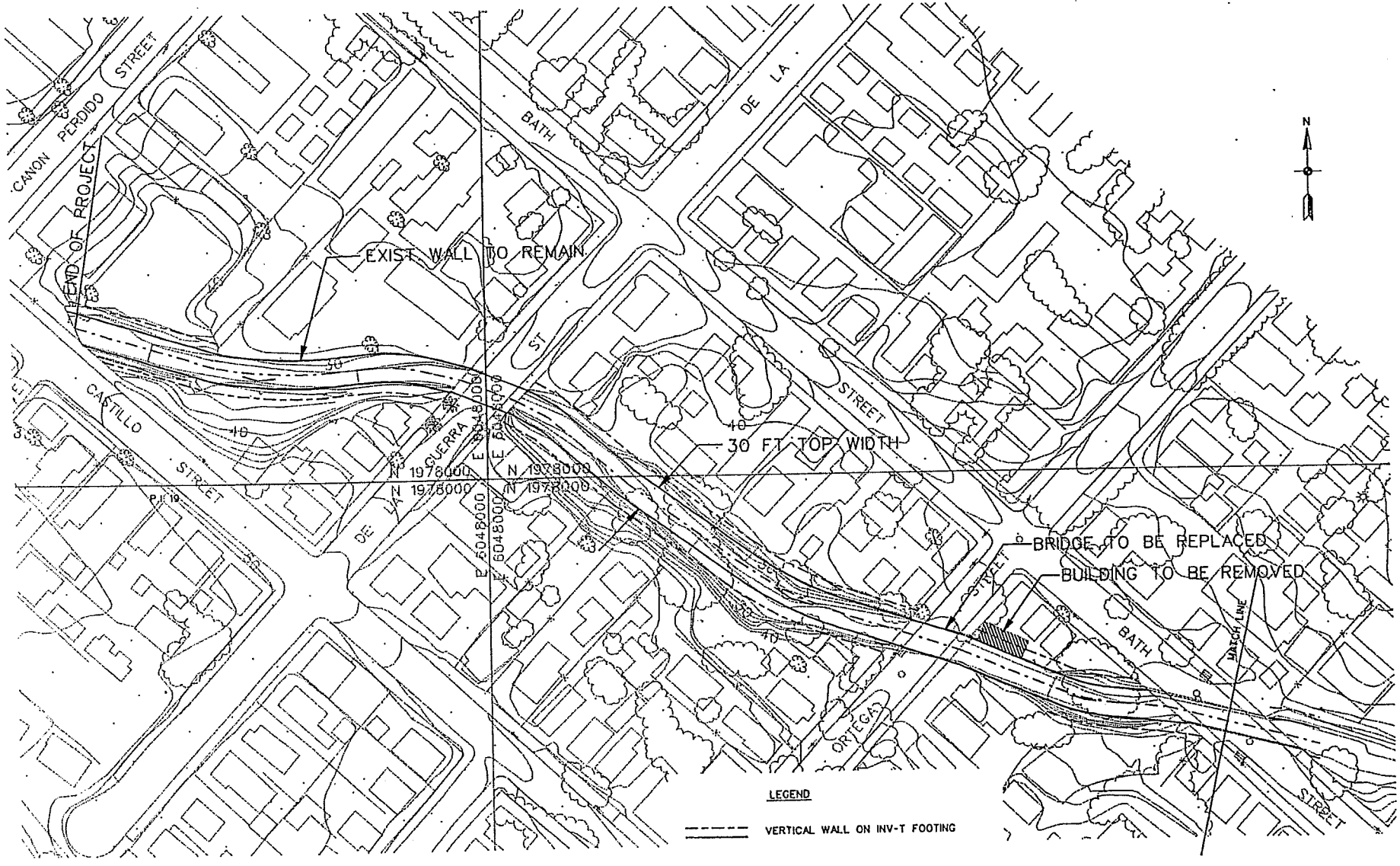
LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
ALTERNATIVE 6 AND ALTERNATIVE 10
PARTIAL STEP WALLS D/S OF HWY 101

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SHEET 8A

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

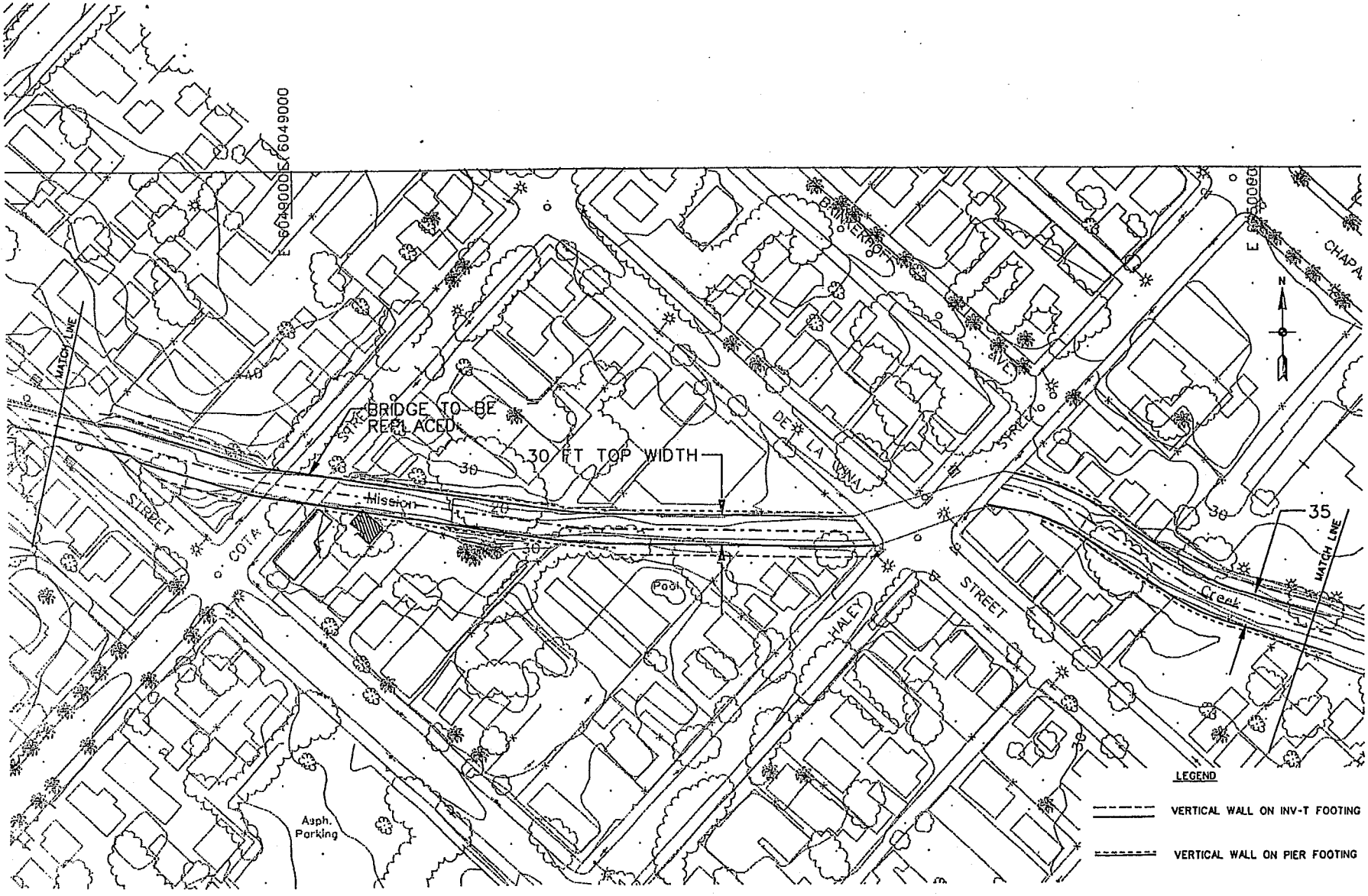
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

SHEET 9

SAFETY PAYS



U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E. CHIEF, DESIGN BRANCH

DISTRICT FILE NO. 3650

DESIGNED BY: DRAWN BY: CHECKED BY:

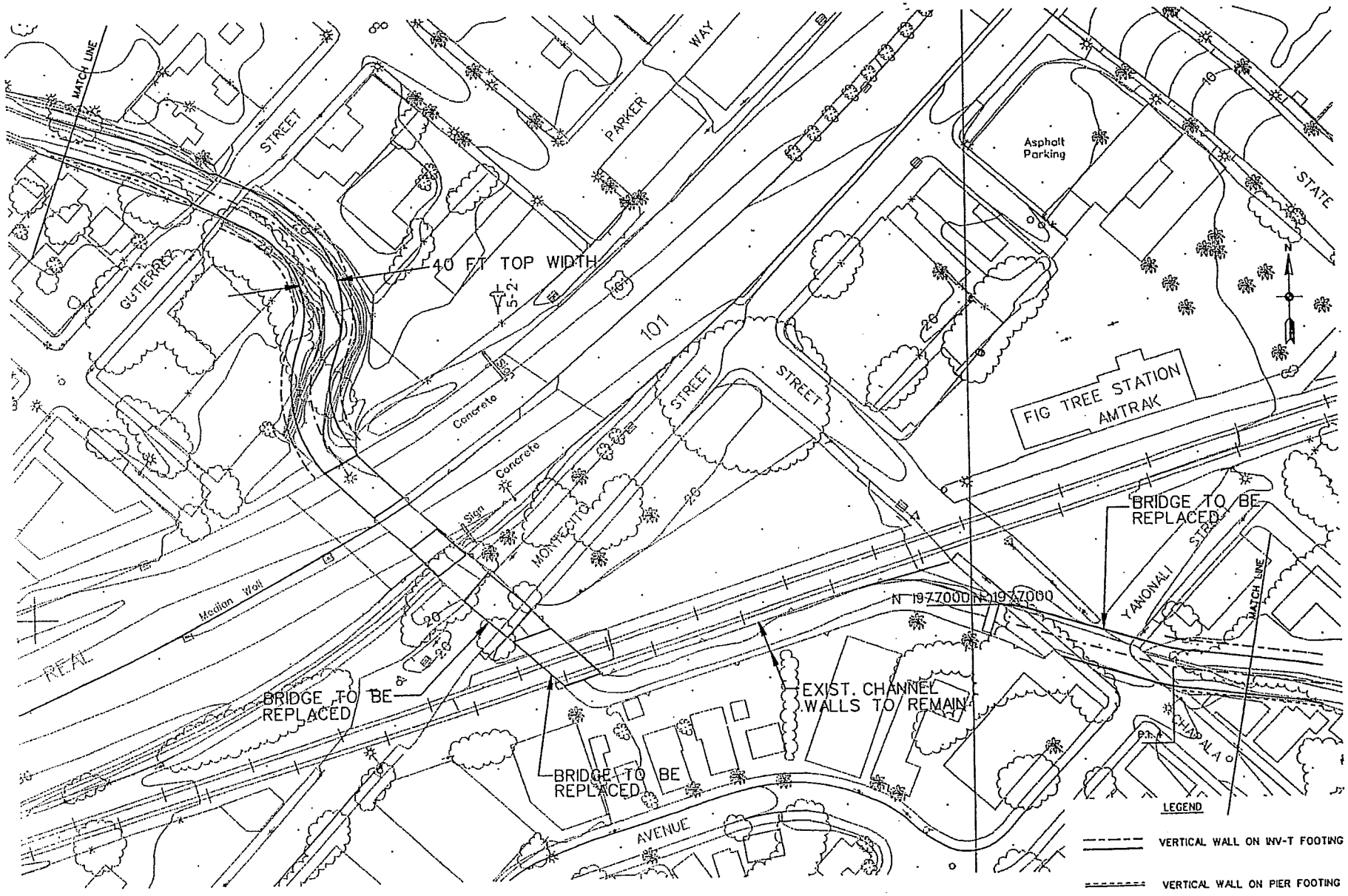
CAD FILE NAME/SHEET 2593

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

SHEET 10

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

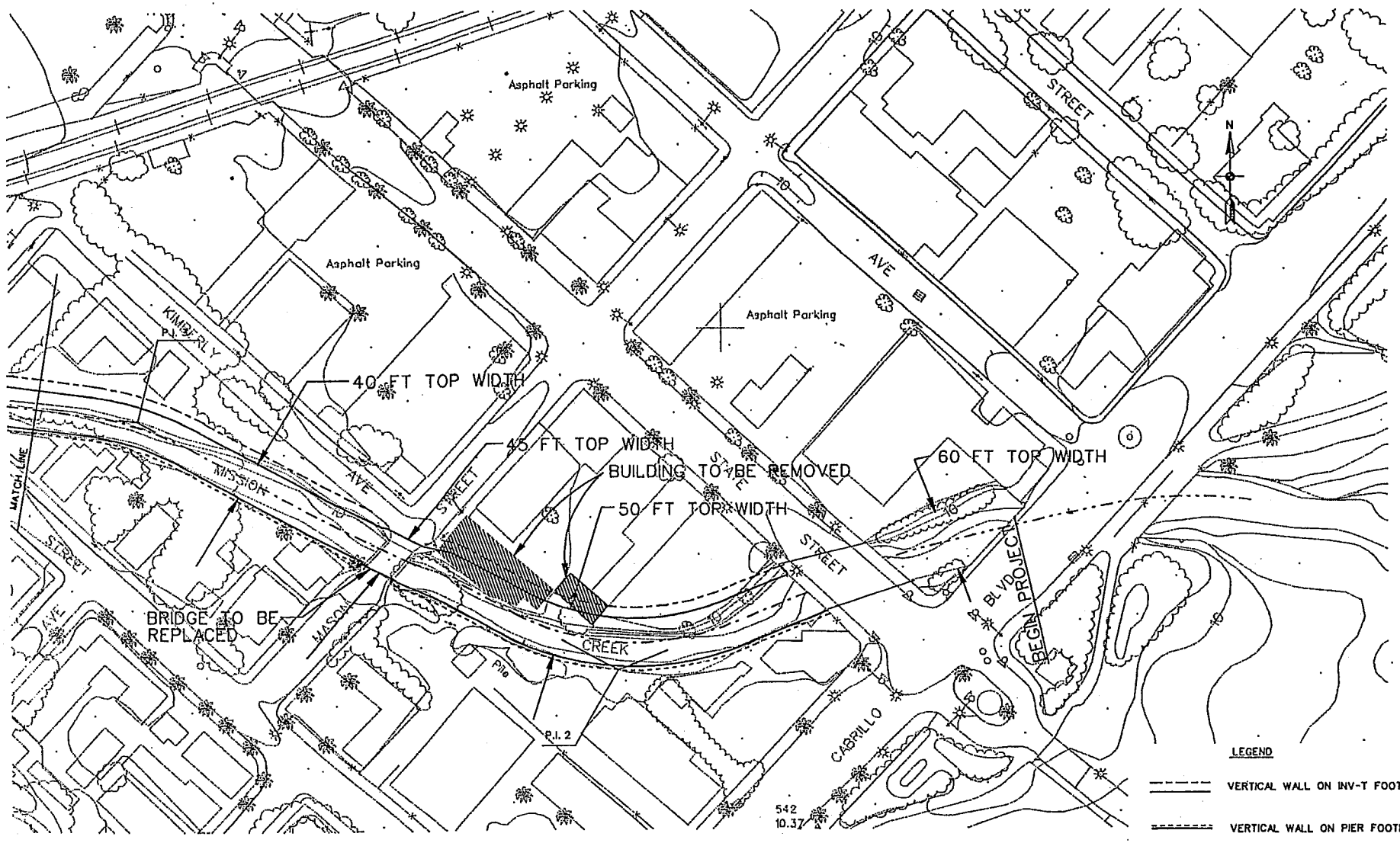
DESIGNED BY: JT
DRAWN BY: JT
CHECKED BY: JT

SUBMITTED BY:
JAMES H. CRUM, P.E.
CHIEF, DESIGN BRANCH

CADD FILE NAME: SHEET 23P2

DISTRICT FILE NO. 2900

SHEET
11



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

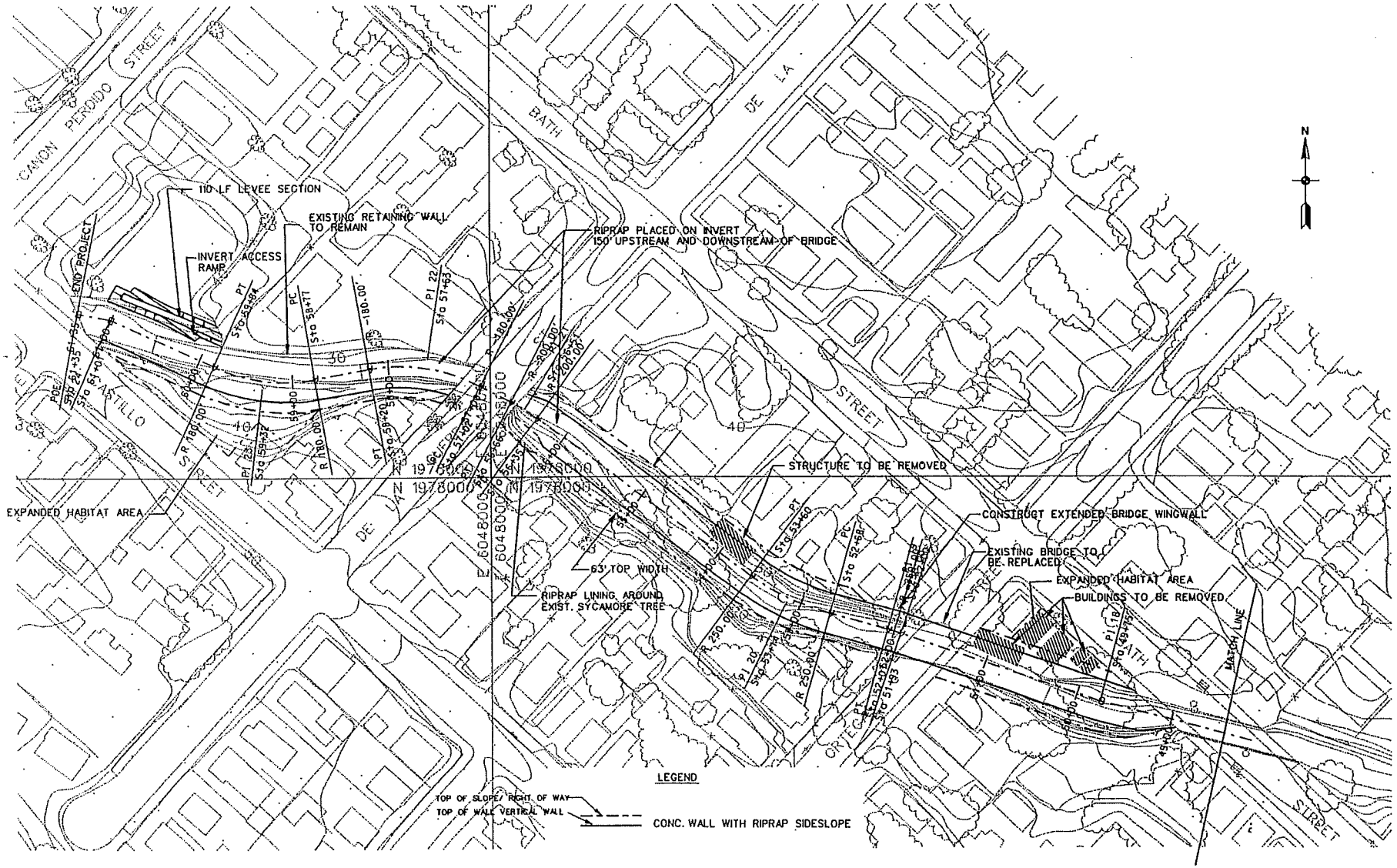
DESIGNED BY:
DRAWN BY:
CHECKED BY:

CAD FILE NAME/SHEET 2SP1

SOLICT FILE NO. 2SP

SHEET 12

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH F5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

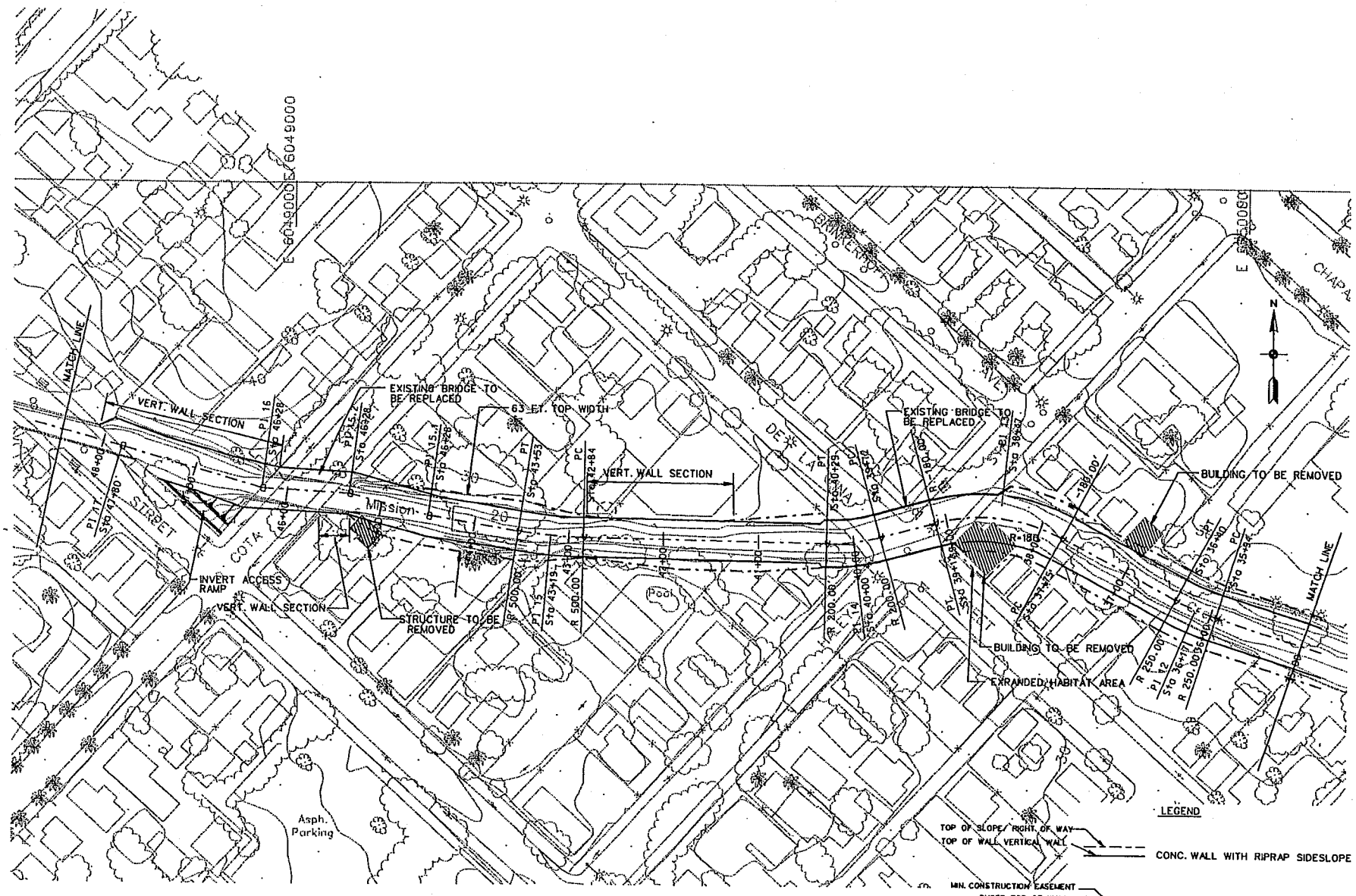
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

DISTRICT FILE NO. 2960

CADD FILE NAME: SHEET 24PA

SHEET 13

SAFETY PAYS



U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME/SHEET 3493

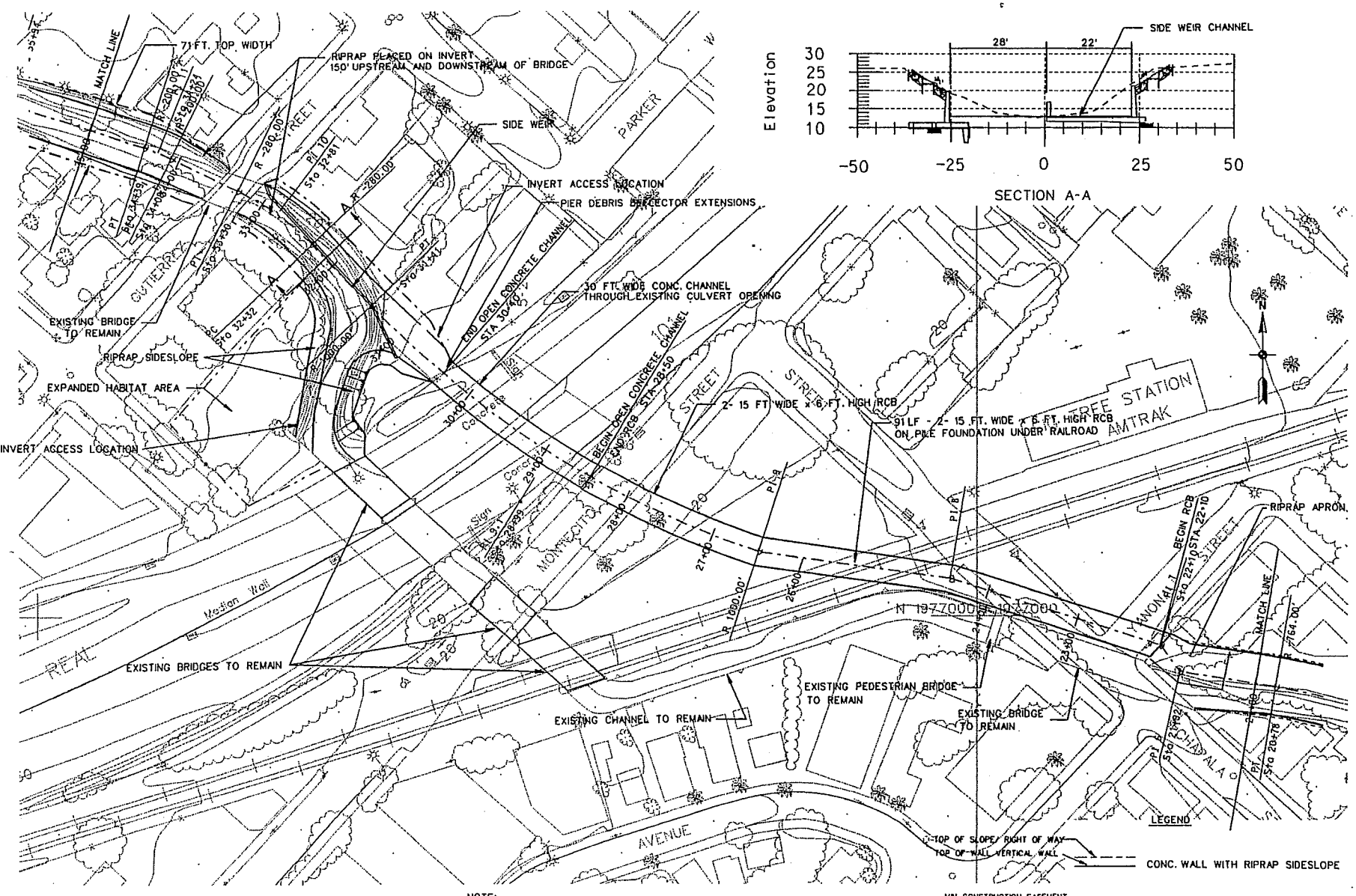
DISTRICT FILE NO. 3807

SHEET
14

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH F5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

VALUE ENGINEERING PAYS



NOTE:
SEE SHEET 7 FOR STAGING AREA LOCATIONS

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH F5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, ECOSYSTEM BRANCH

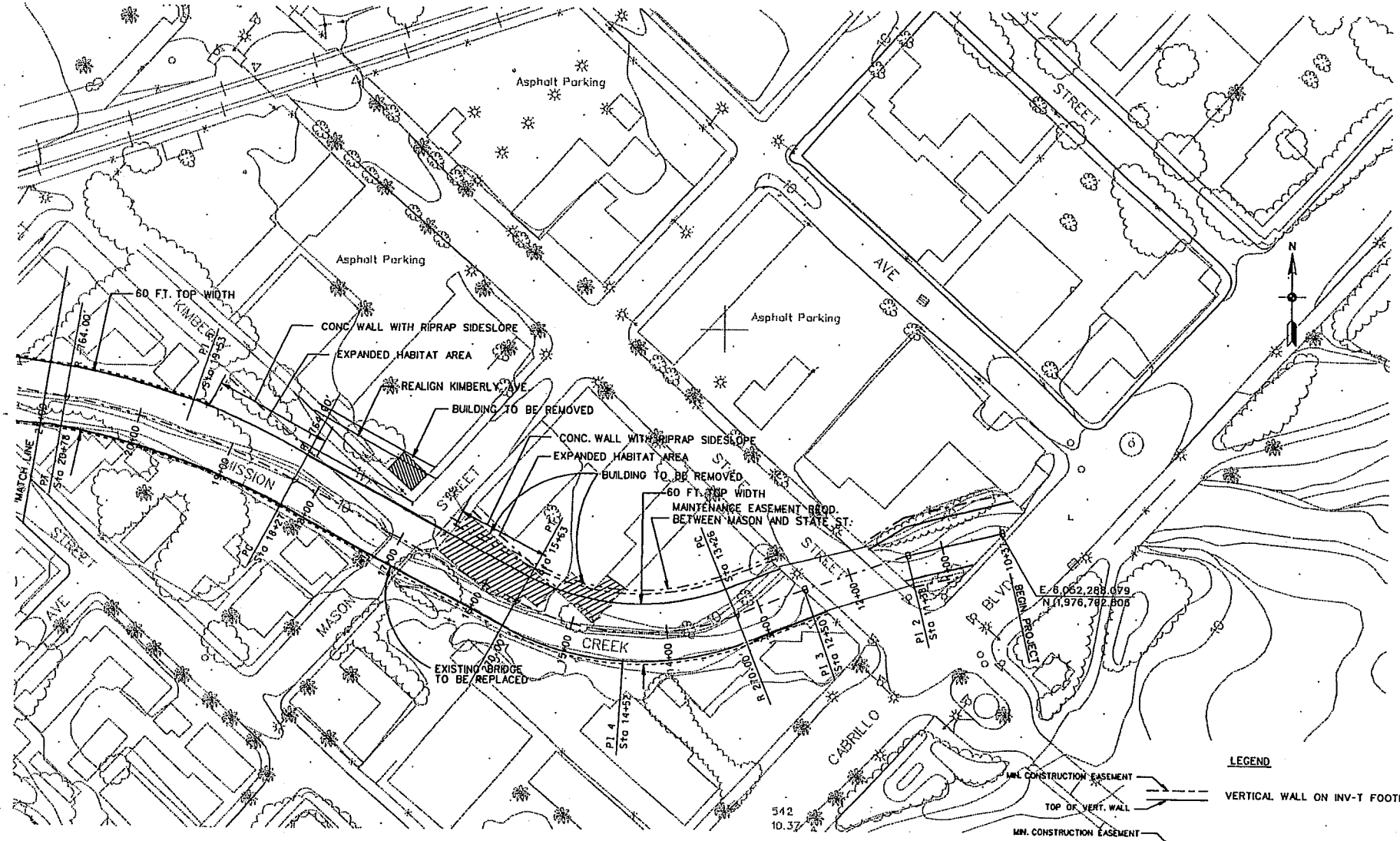
DESIGNED BY:
DRAWN BY:
CHECKED BY:

CADD FILE NAME/SHEET: 34P2

DISTRICT FILE NO. 34AV

SHEET 15

SAFETY PAYS



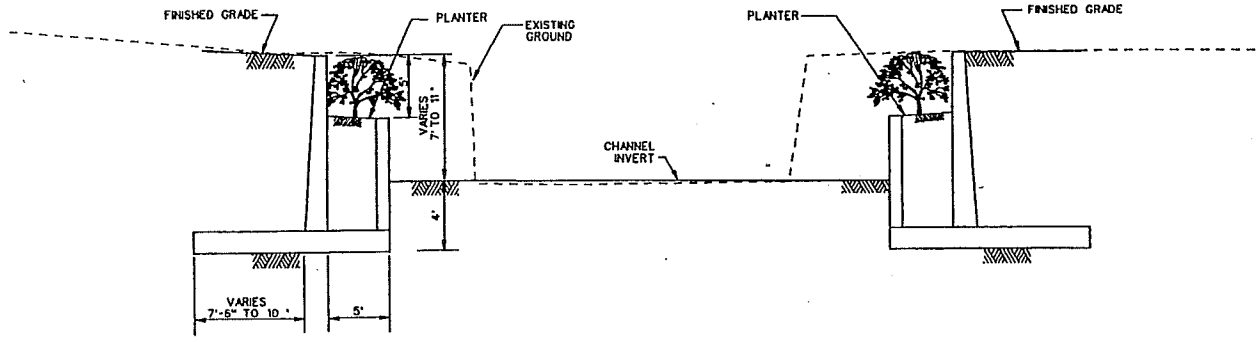
LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS – RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH F5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

REVISIONS

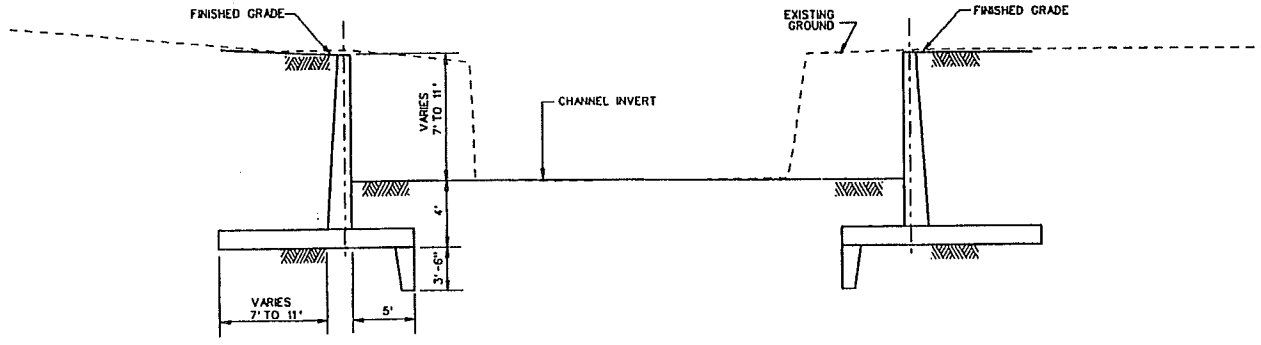
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET 16



TYPICAL CROSS SECTION
STEP WALL ON INVERTED T FOOTING
*NOT TO SCALE



TYPICAL CROSS SECTION
VERTICAL WALL ON INVERTED T FOOTING
*NOT TO SCALE

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
TYPICAL CROSS SECTIONS

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

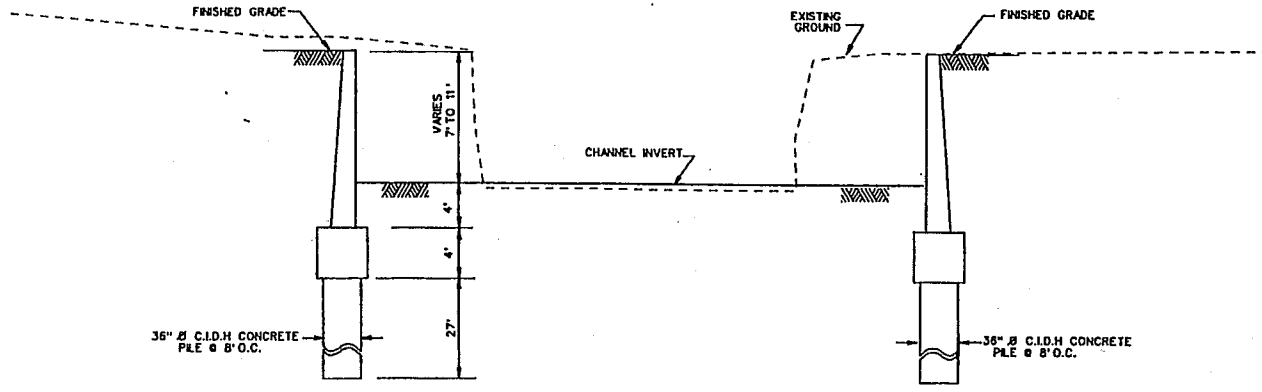
SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY:
DRAWN BY:
CHECKED BY:

CADD FILE NAME:

DISTRICT FILE NO. 26V

SHEET
17



TYPICAL CROSS SECTION
VERTICAL WALL ON PIER FOOTING

*NOT TO SCALE

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
TYPICAL CROSS SECTIONS

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

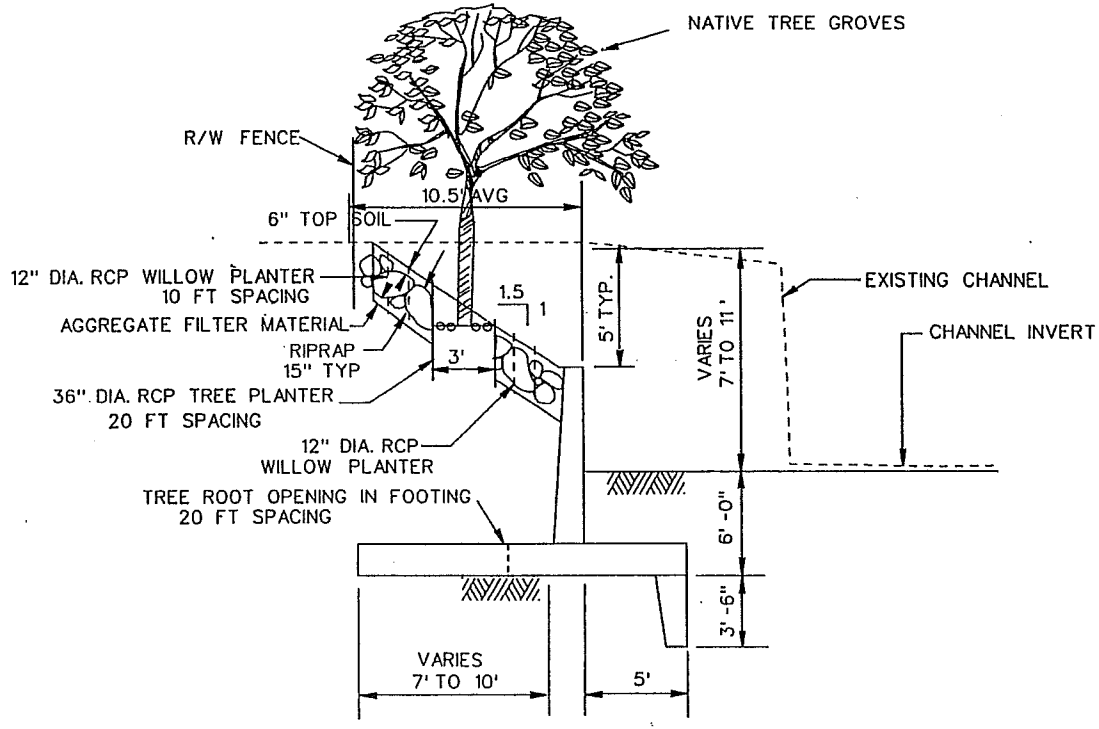
DESIGNED BY:
DRAWN BY:
CHECKED BY:

SUBMITTED BY:
JAMES N. CRUM, P.E.
CHIEF, DESIGN BRANCH

CADD FILE NAME:

DISTRICT FILE NO. 2450

SHEET
18



RIPRAP WALL ALTERNATIVE

SCALE: NOT TO SCALE

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
RIPRAP WALL ALTERNATIVE CROSS SECTION

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

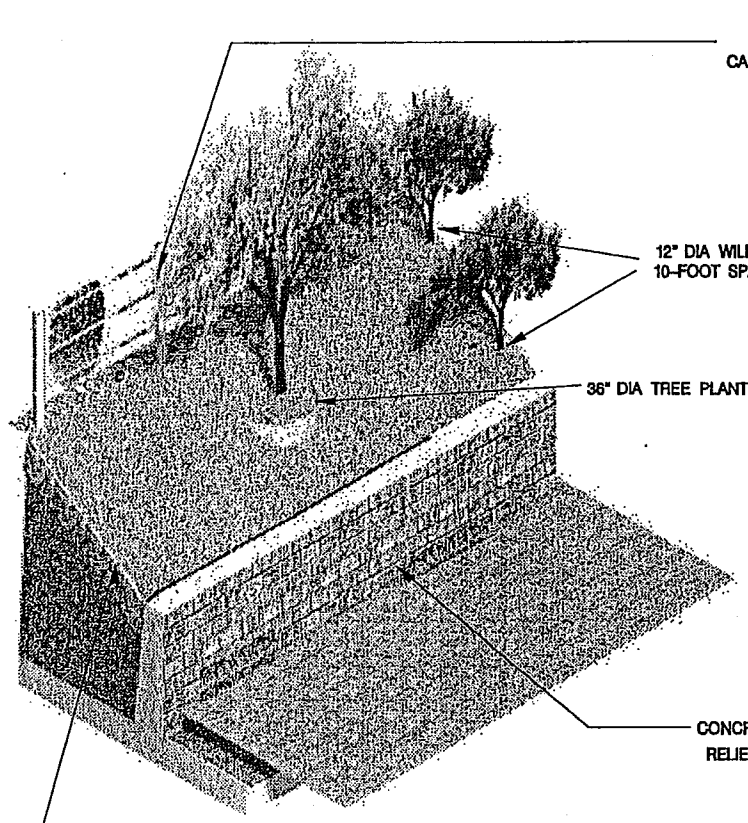
SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME:

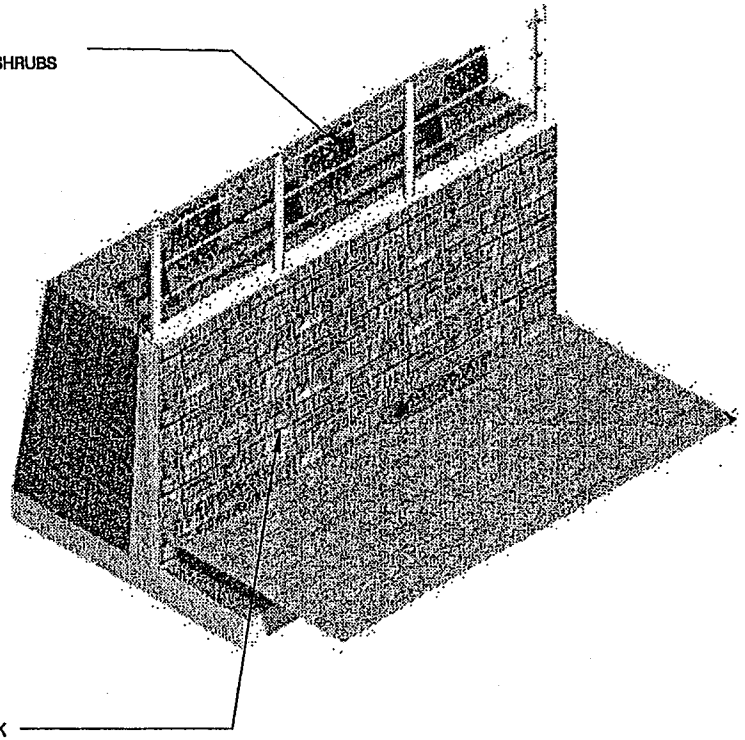
DISTRICT FILE NO. 2667

SHEET 19



WALL WITH RIPRAP SIDESLOPE

NOT TO SCALE



VERTICAL WALL

NOT TO SCALE

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
CHANNEL WALL TYPICAL ESTHETIC FEATURES

REVISIONS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SACE, P.E.
CHIEF, DESIGN BRANCH

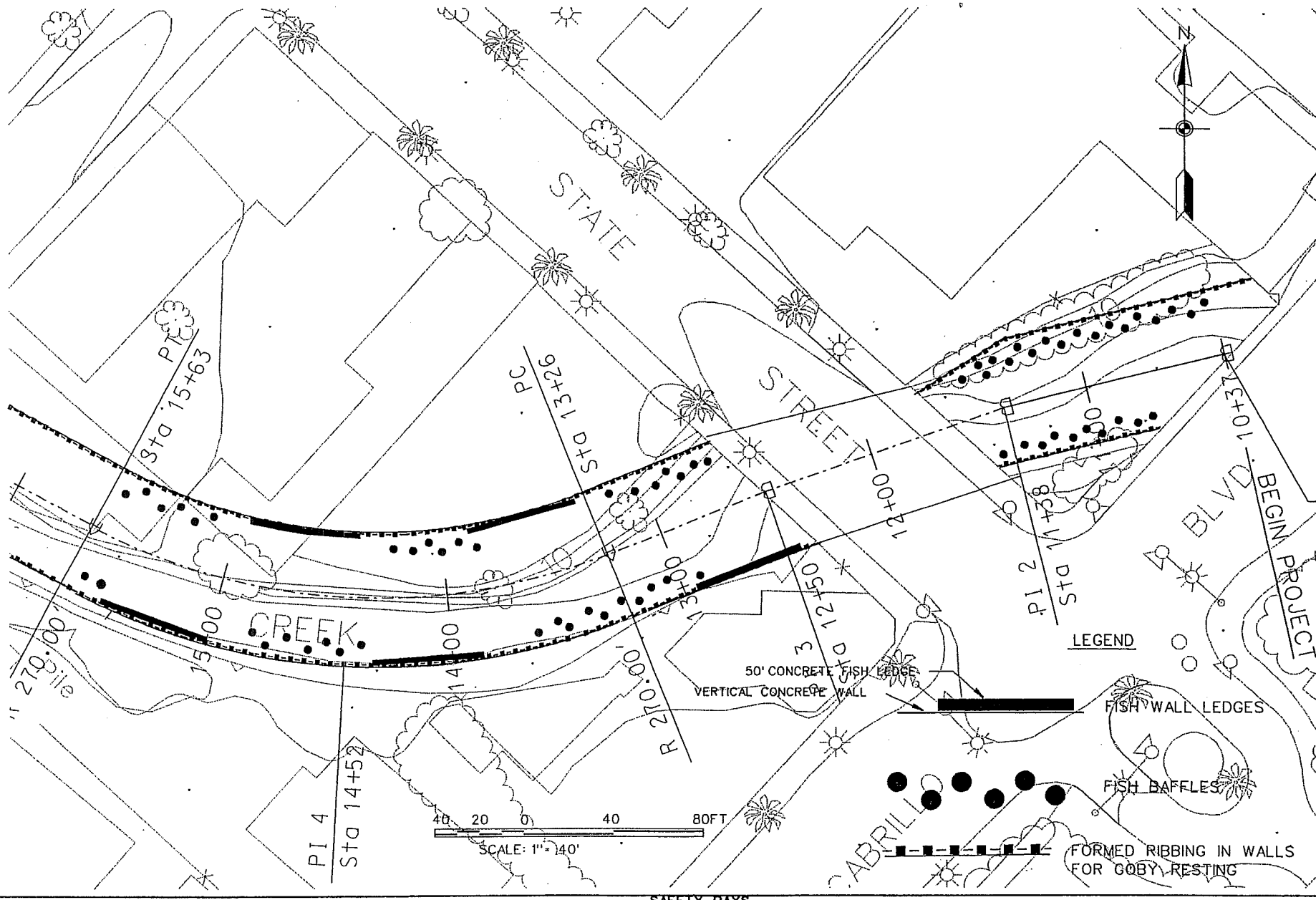
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME:

DISTRICT FILE NO. 2567

SHEET
20

VALUE ENGINEERING PAYS



U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME:

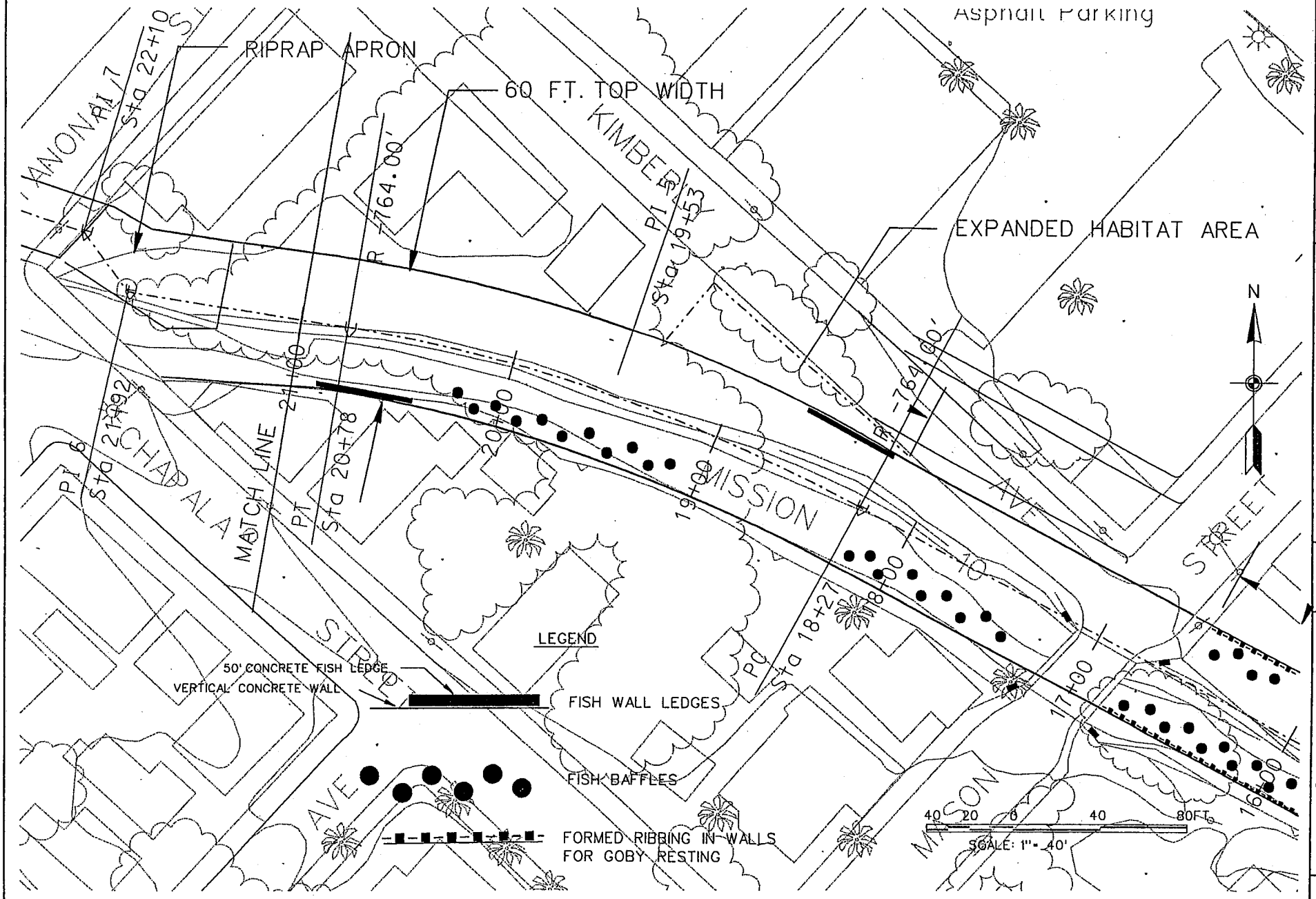
DISTRICT FILE NO. 3660

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

SYMBOL	DESCRIPTION	DATE	APPROVAL
	REVISIONS		

SHEET 21

SAFETY PAYS



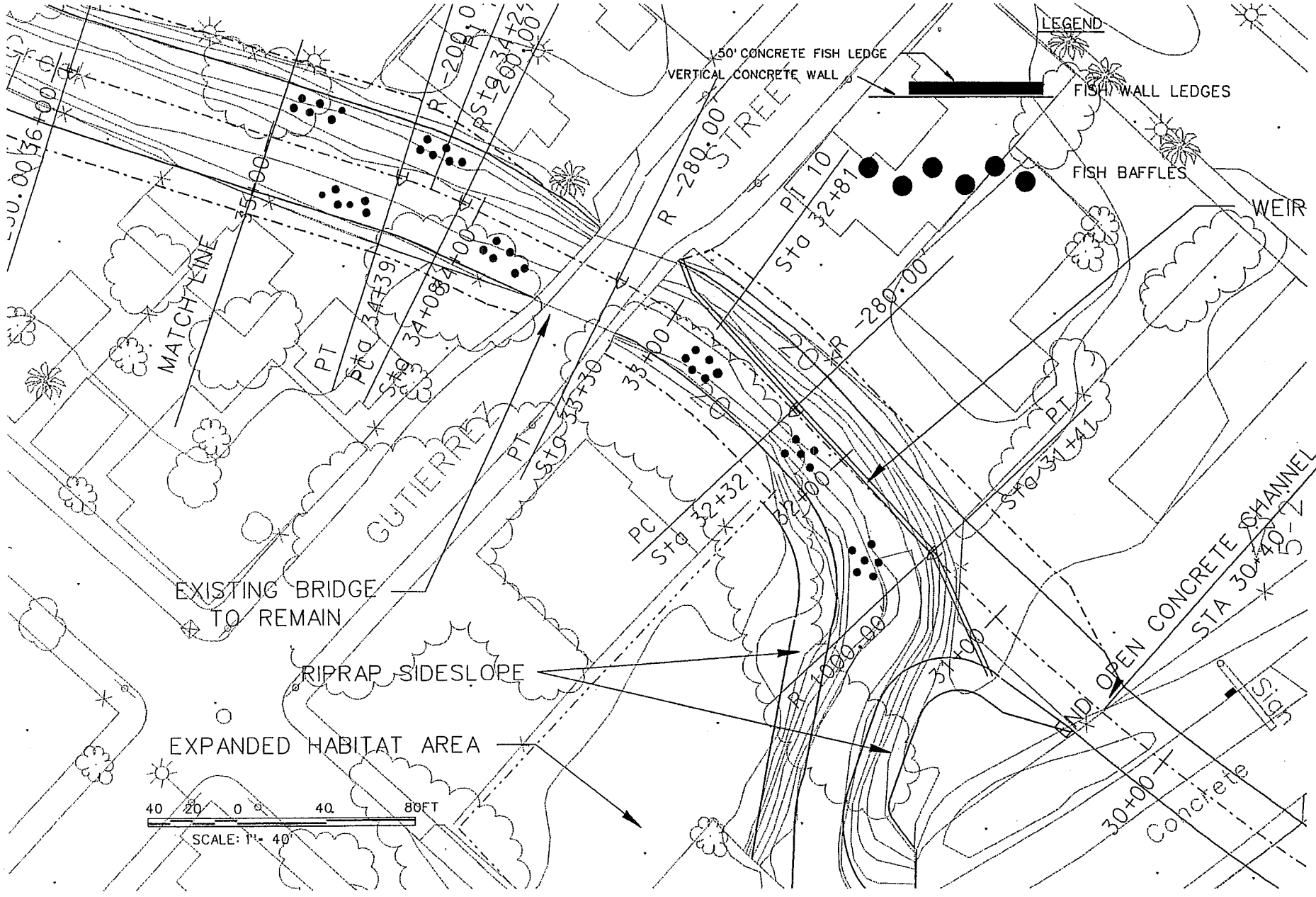
LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET 22

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

REVISIONS | SYMBOL | DESCRIPTIONS | DATE | APPROVAL

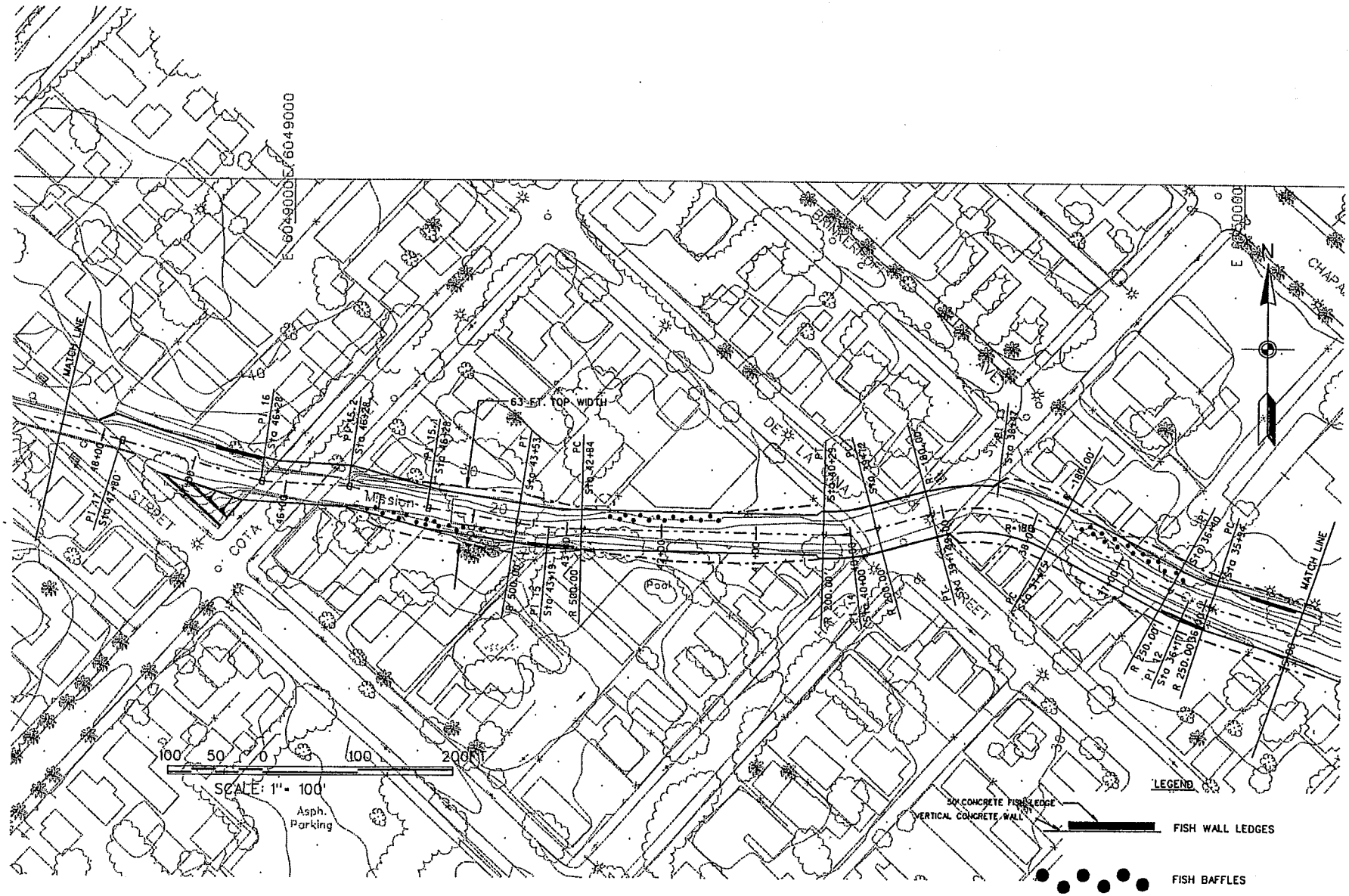
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS
SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SCORED BY: | DRAWN BY: | CHECKED BY:
CADD FILE NAME:
DISTRICT FILE NO. 28SV

SHEET 23

SAFETY PAYS

VALUE ENGINEERING PAYS



U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 24.DGN

DISTRICT FILE NO. 2660

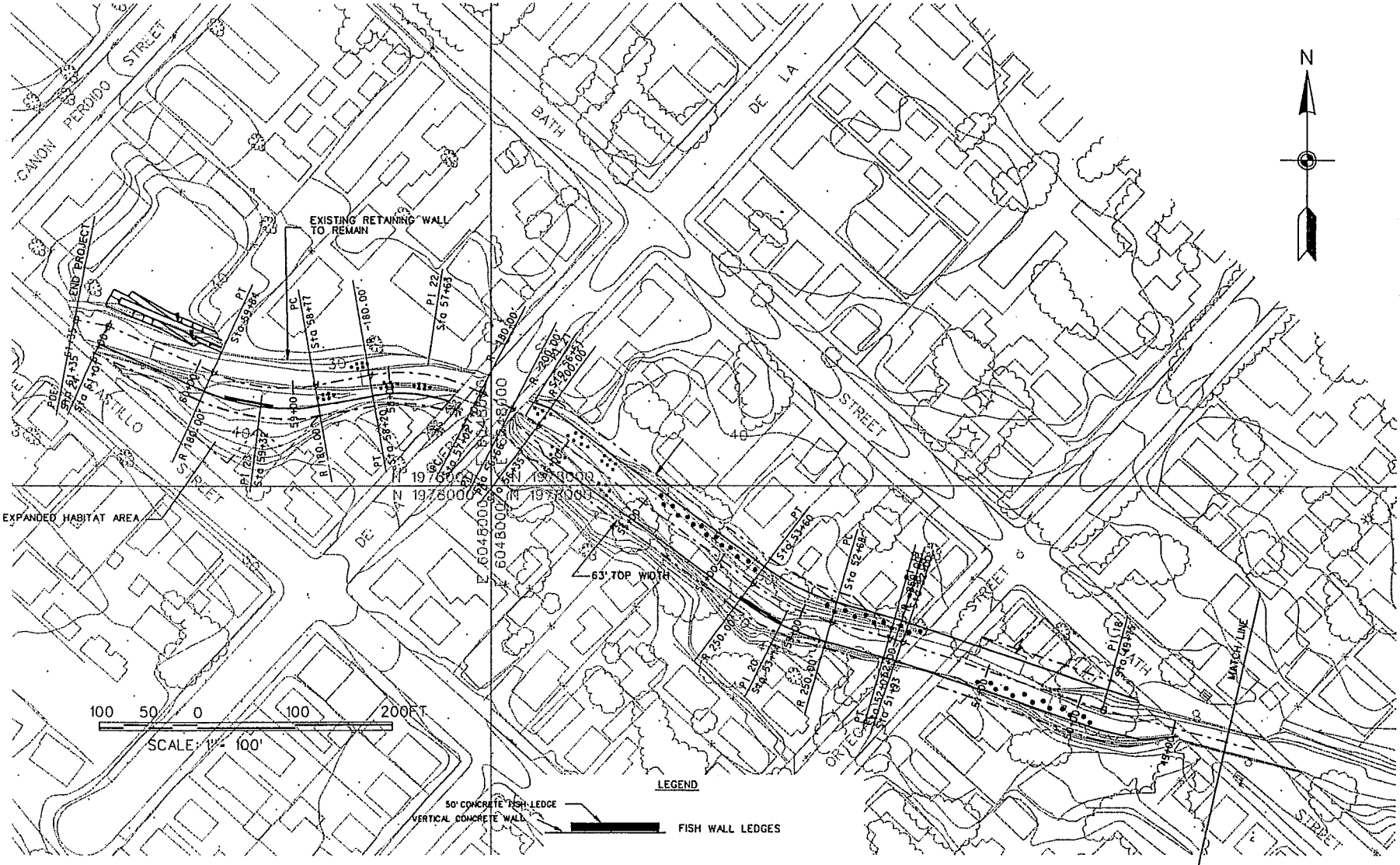
SHEET 24

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

SAFETY PAYS

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS – RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

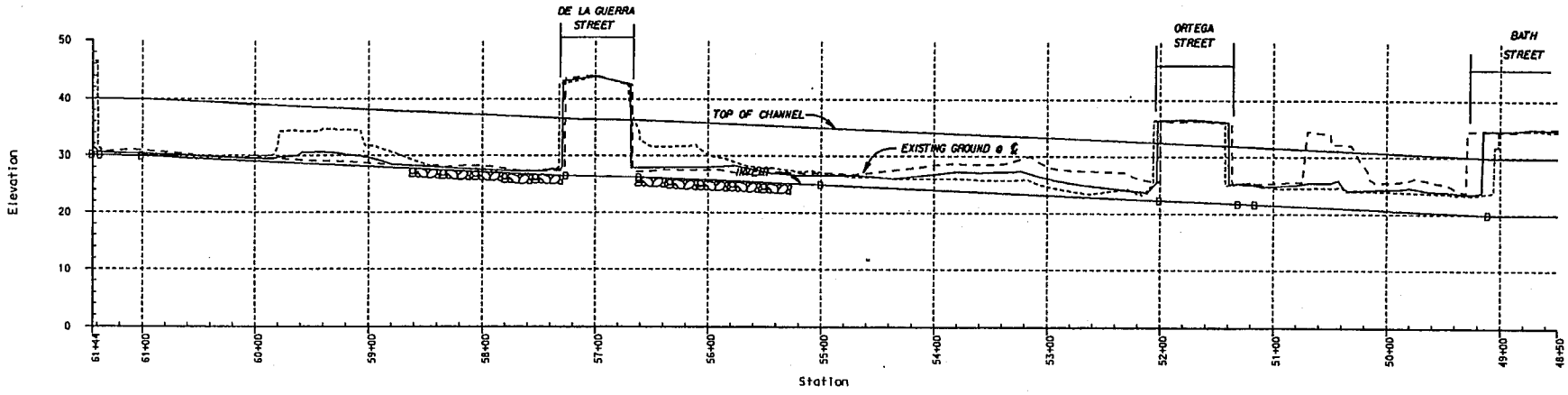
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

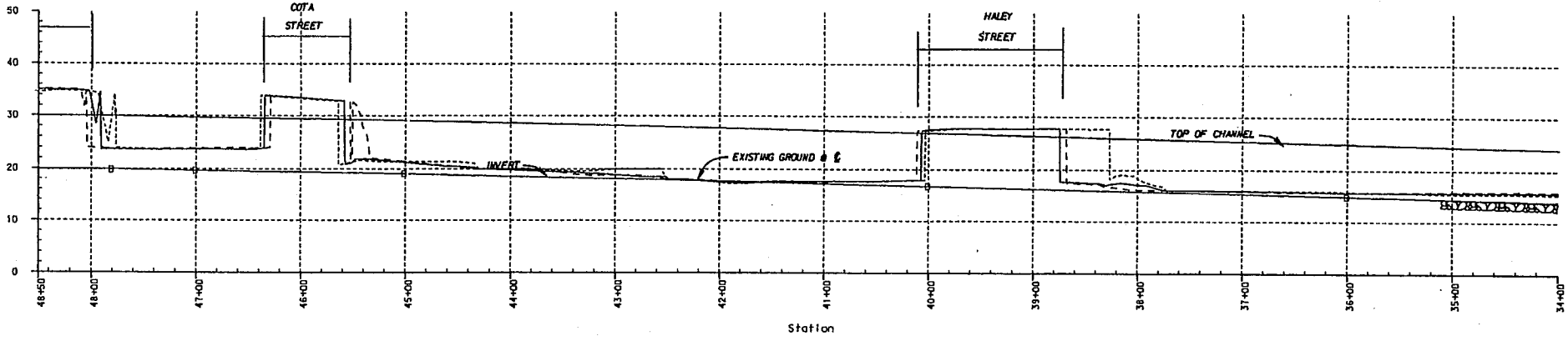
CADD FILE NAME: SHEET 24F4

DISTRICT FILE NO. 28AV

SHEET 25

SAFETY PAYS





LEGEND	
LINE	GROUND OFFSET FROM ℄
———	0.00
-------	-7.00
- - - -	7.00

20 10 0 20 40FT

SCALE: 1"= 20'

100 50 0 100 200FT

SCALE: 1"= 100'

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
PROFILE

REVISIONS | SYMBOL | DESCRIPTIONS | DATE | APPROVAL

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

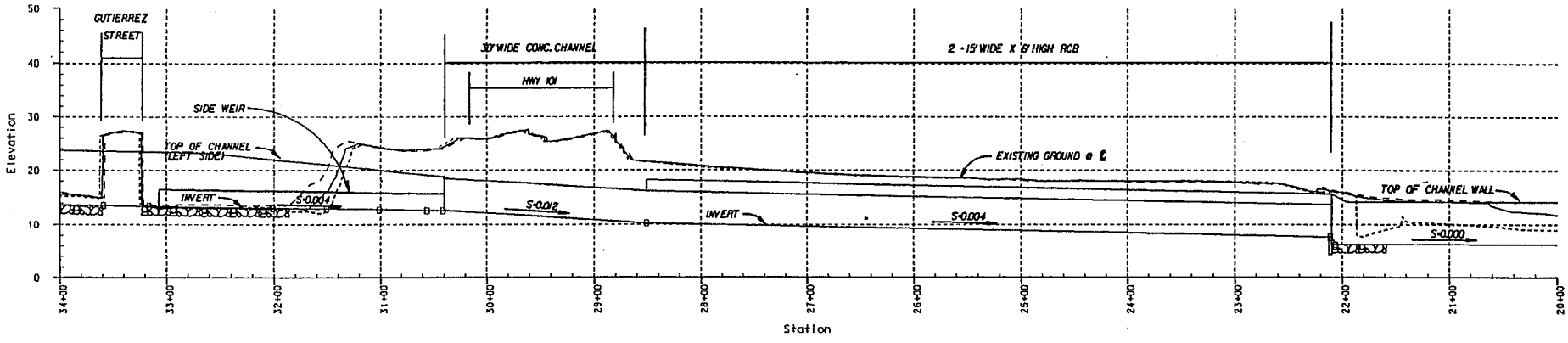
SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

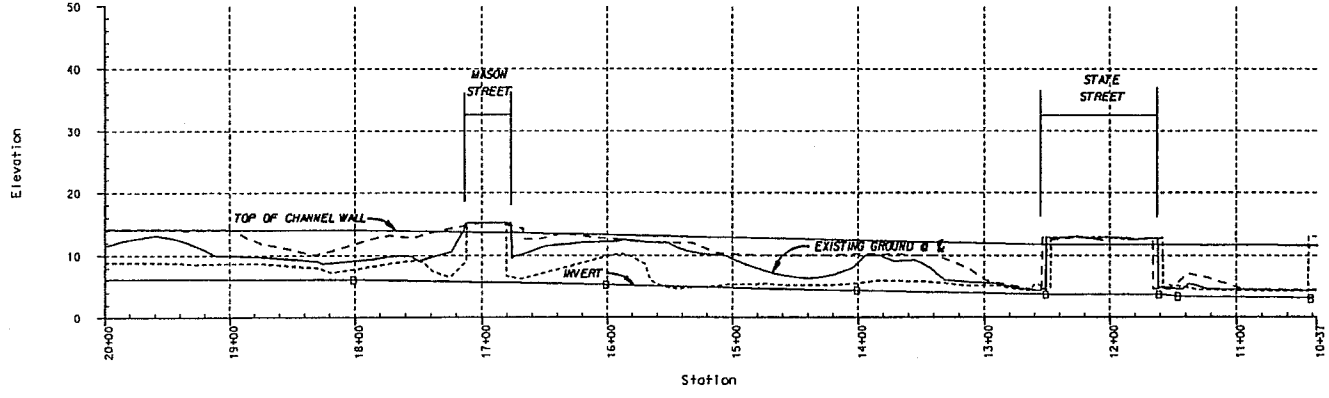
DESIGNED BY:
DRAWN BY:
CHECKED BY:

CADD FILE NAME:

DISTRICT FILE NO. 2867

SHEET 26





LEGEND	
LINE	GROUND OFFSET FROM CL
———	0.00
- - - - - -	-7.00
- - - - - -	7.00

20 10 0 20 40FT

SCALE: 1"= 20'

100 50 0 100 200FT

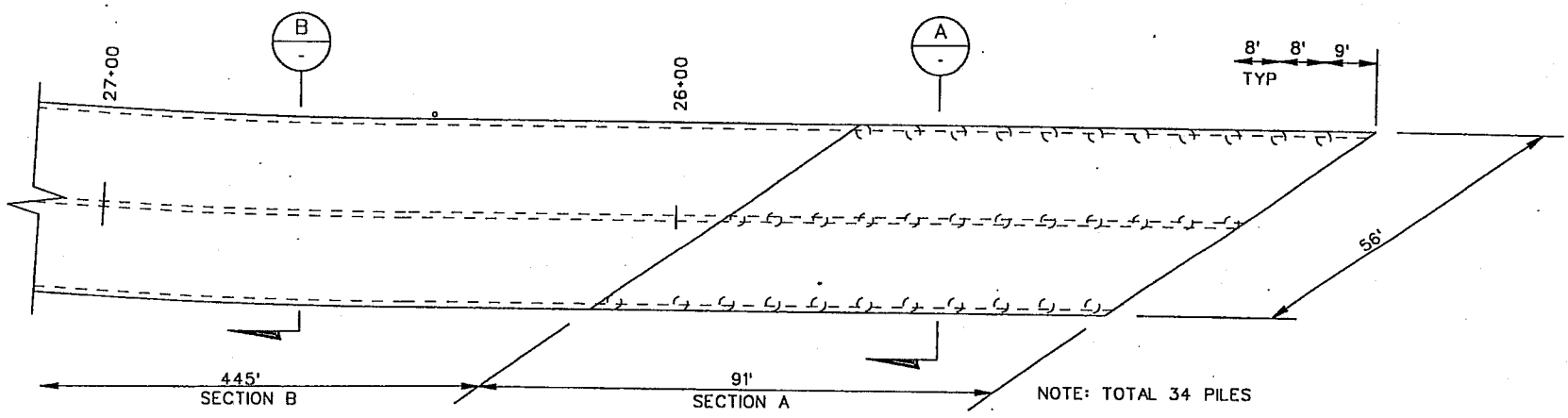
SCALE: 1"= 100'

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
PROFILE

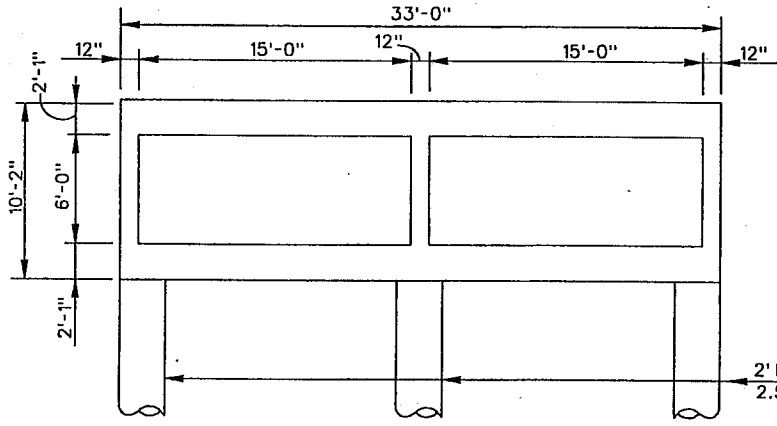
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET 27



BOX CULVERT PLAN
SCALE: N.T.S.



SECTION A
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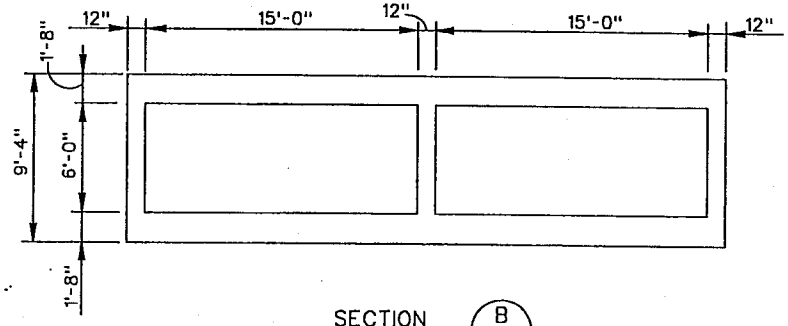


SECTION B
SCALE: N.T.S.

U. S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

LOWER MISSION CREEK FEASIBILITY STUDY

6' HIGH x 15' WIDE TWO-CELL BOX CULVERT

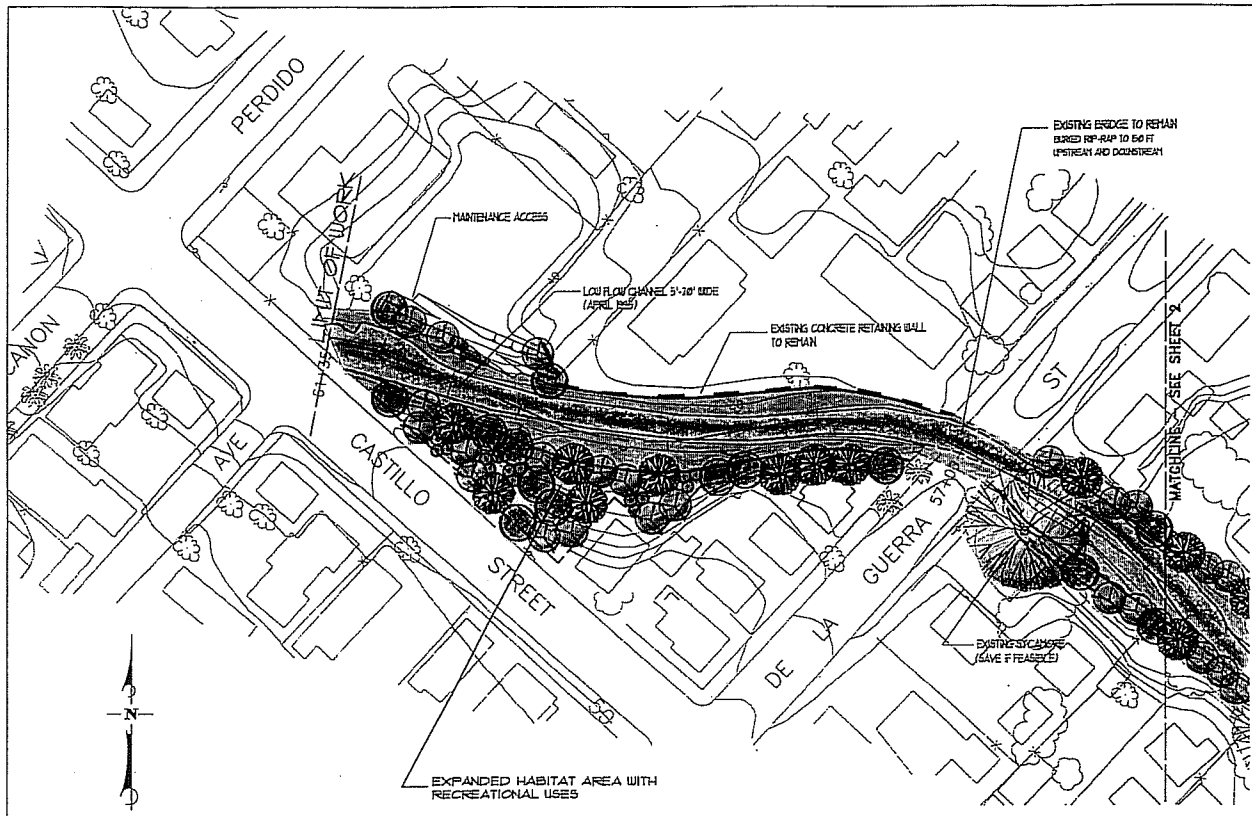
SHEET 28

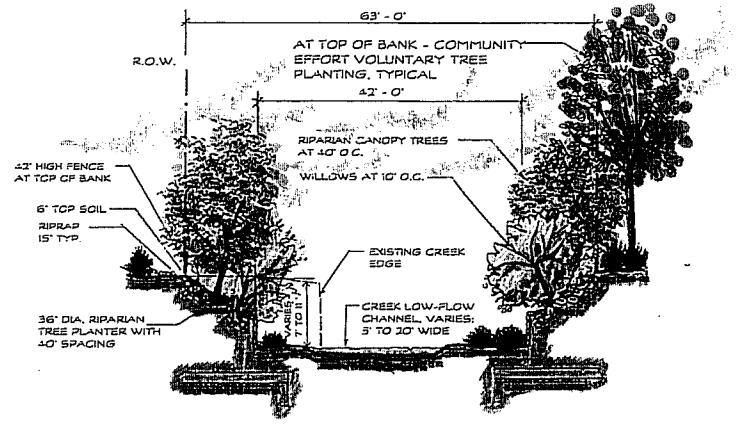
DESIGNED BY	CHECKED BY	DATE	FILE NAME
M. LY	X	FEB 28, 2000	LMC-PLAN2.DGN

Exhibit 8.

ARCHITECTURAL DRAWINGS

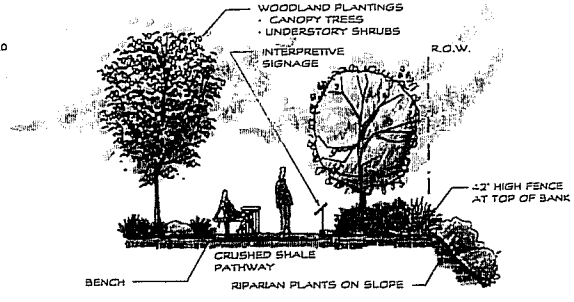
Sheets 1 - 9





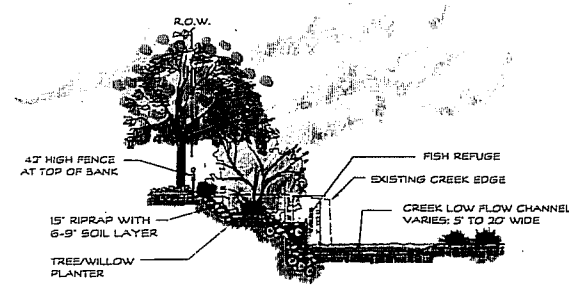
VEGETATED SIDE SLOPE
42' TYPICAL SECTION

NOT TO SCALE



RECREATIONAL USE CONCEPT

NOT TO SCALE



EXPANDED HABITAT AREA

NOT TO SCALE

SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES

DAVID R. BLACK & ASSOCIATES
LANDSCAPE ARCHITECTURE
1109 STATE ST.
SANTA BARBARA, CALIFORNIA 93101
(805) 963-0198
FAX 963-3197

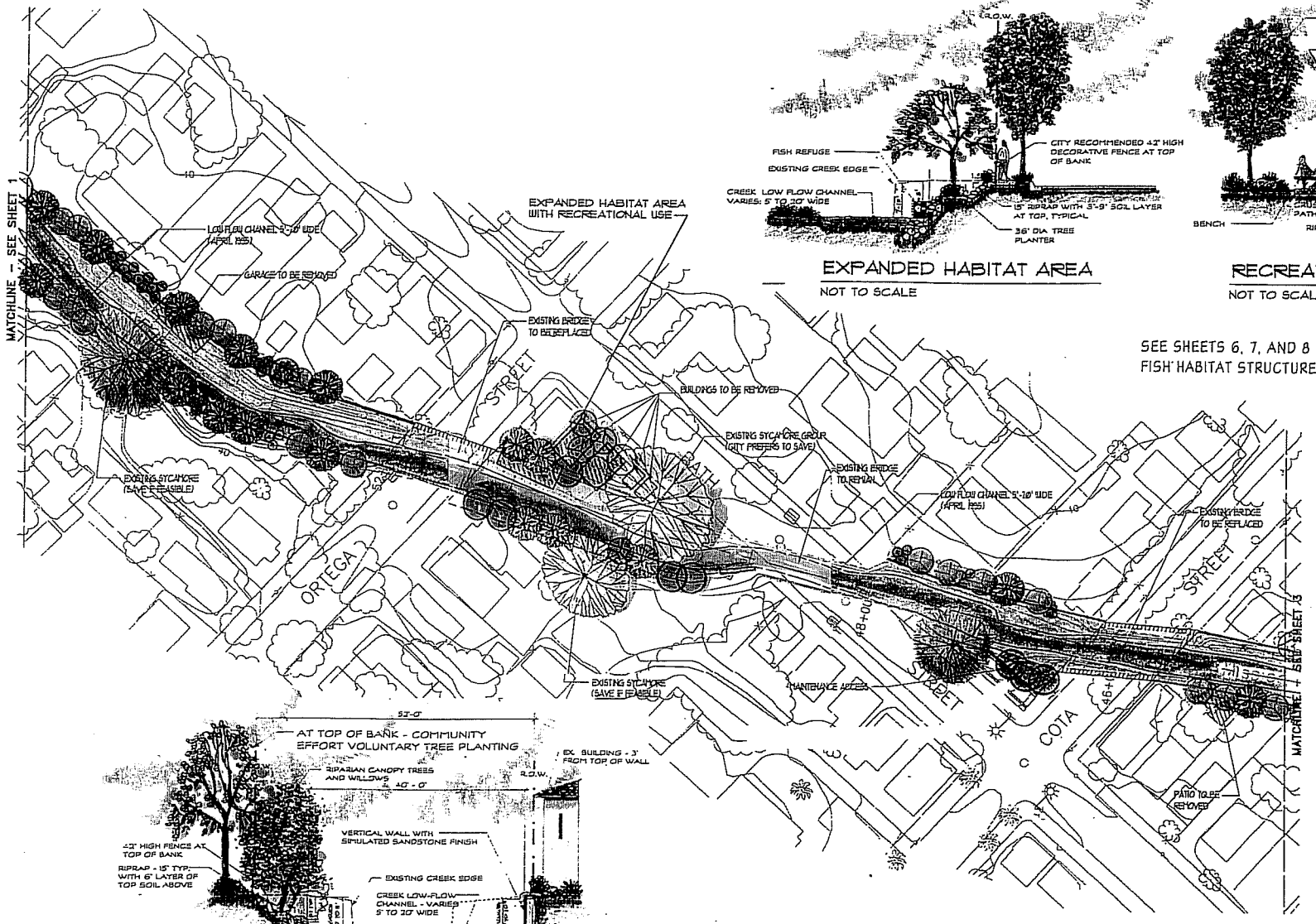
Penfield & Smith
ENGINEERS • SURVEYORS
101 E. VICTORIA ST. SANTA BARBARA
(805) 963-9532 CALIF. 93101
MAILING ADDRESS: P.O. BOX 98 (93102)

NOTE: TREE SIZES INDICATED ARE APPROXIMATELY 5 TO 7 YEARS AFTER INSTALLATION. CITY PREFERS TREES GROUPED AND NATURAL AS SHOWN.

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

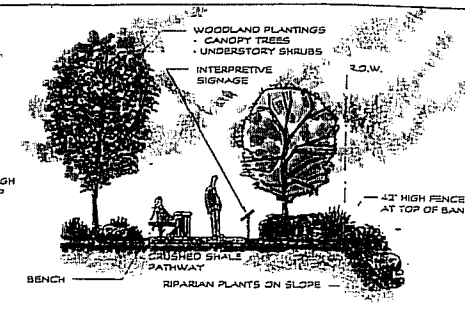
PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES



EXPANDED HABITAT AREA

NOT TO SCALE



RECREATIONAL AREA CONCEPT

NOT TO SCALE

VEGETATED SIDE SLOPE AND VERTICAL WALL SECTION VIEW

NOT TO SCALE

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA

BY PENFIELD AND SMITH AND DAVID R BLACK AND ASSOCIATES

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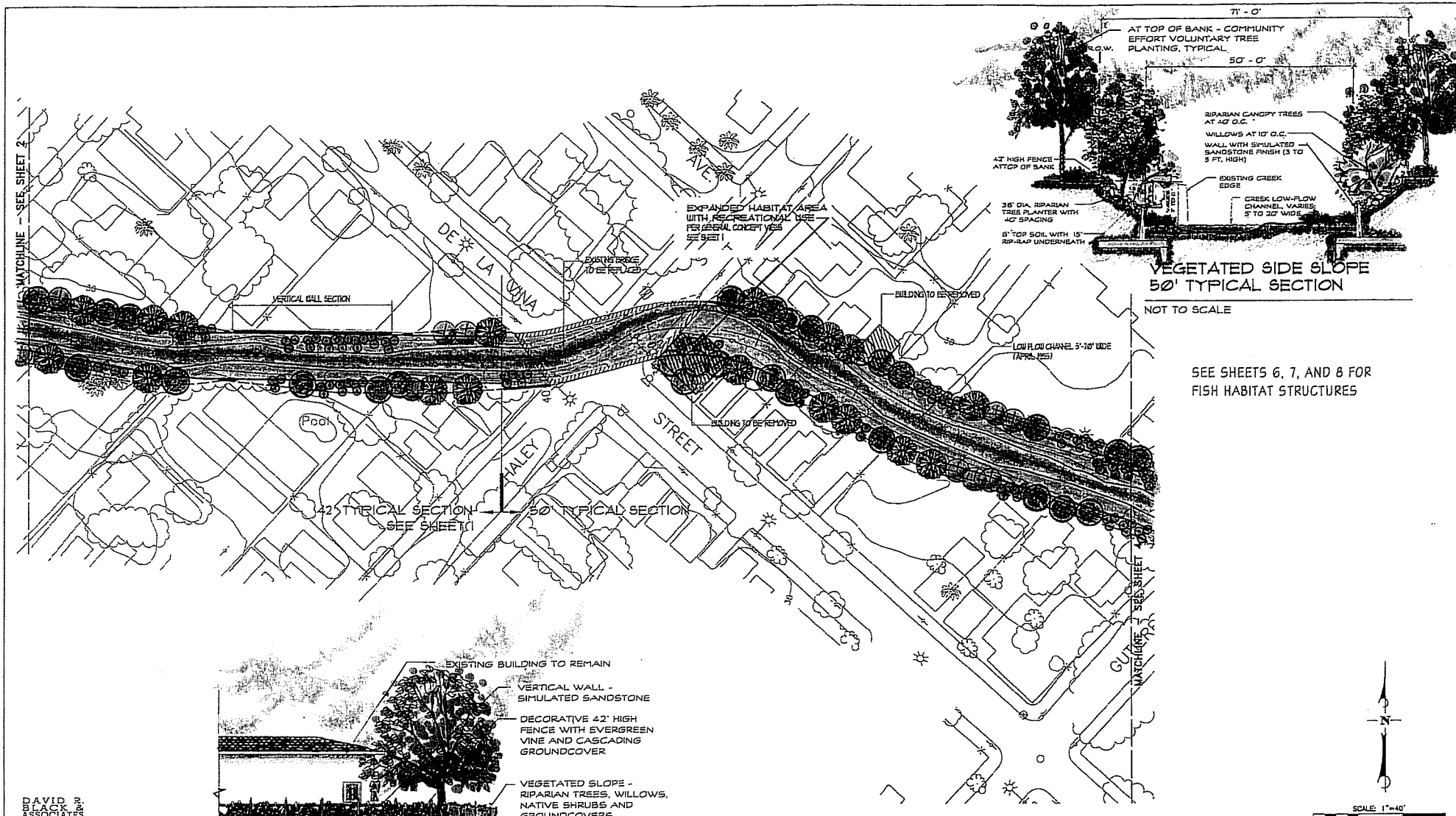

VEGETATED SIDE SLOPE 50' TYPICAL SECTION

NOT TO SCALE

SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES

VERTICAL WALL CONCEPT

NOT TO SCALE

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA

BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES

SHEET 3

DAVID R. BLACK & ASSOCIATES
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FAX 963-3187

Penfield & Smith
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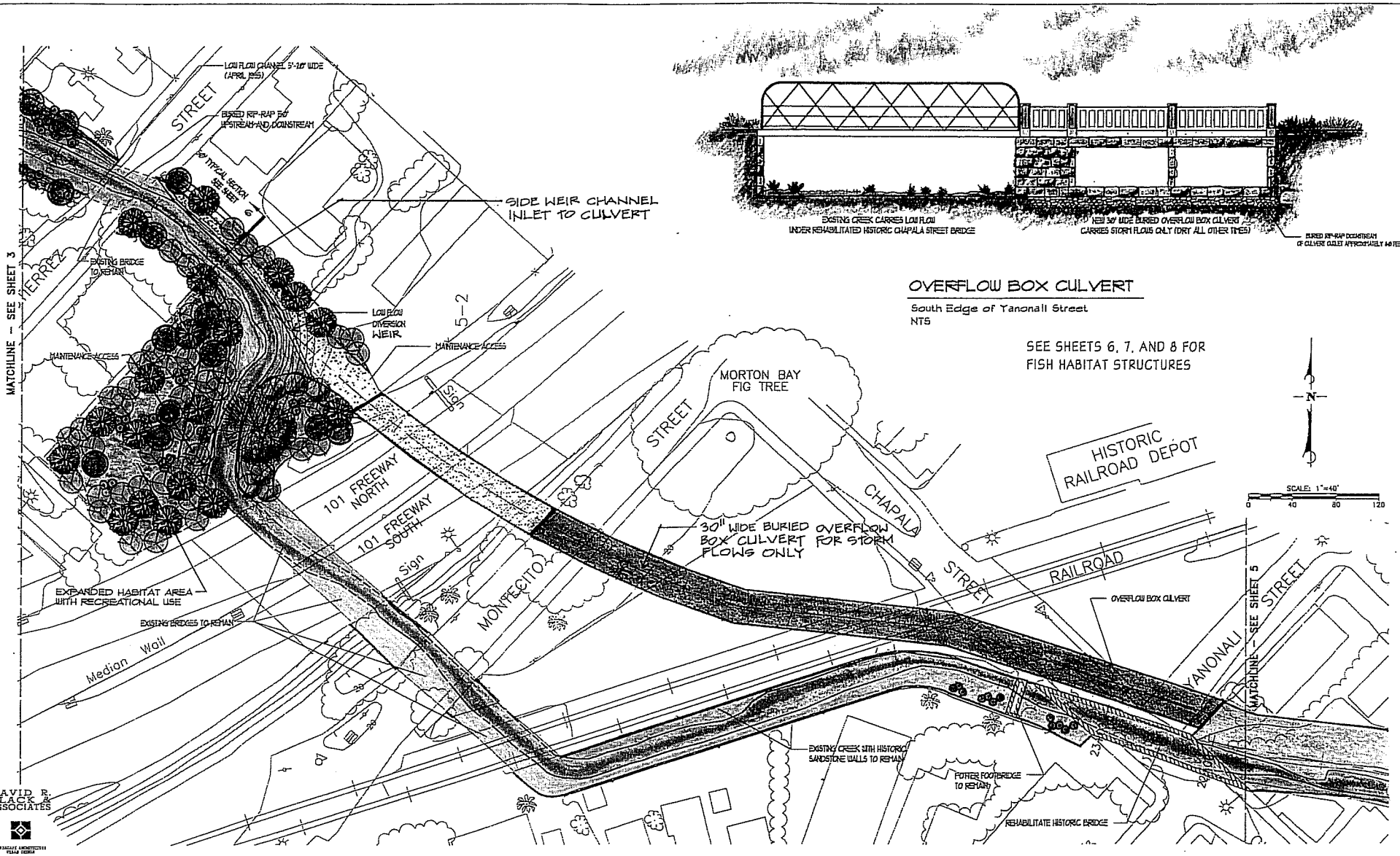
101 E. VICTORIA ST. SANTA BARBARA
(805) 963-9532 CALIF. 93101
MAILING ADDRESS: P.O. BOX 98 (93102)



OVERFLOW BOX CULVERT

South Edge of Yanonali Street
NTS

SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES

DAVID R. BLACK & ASSOCIATES
LANDSCAPE ARCHITECTURE
1108 STATE ST.
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Penfield & Smith
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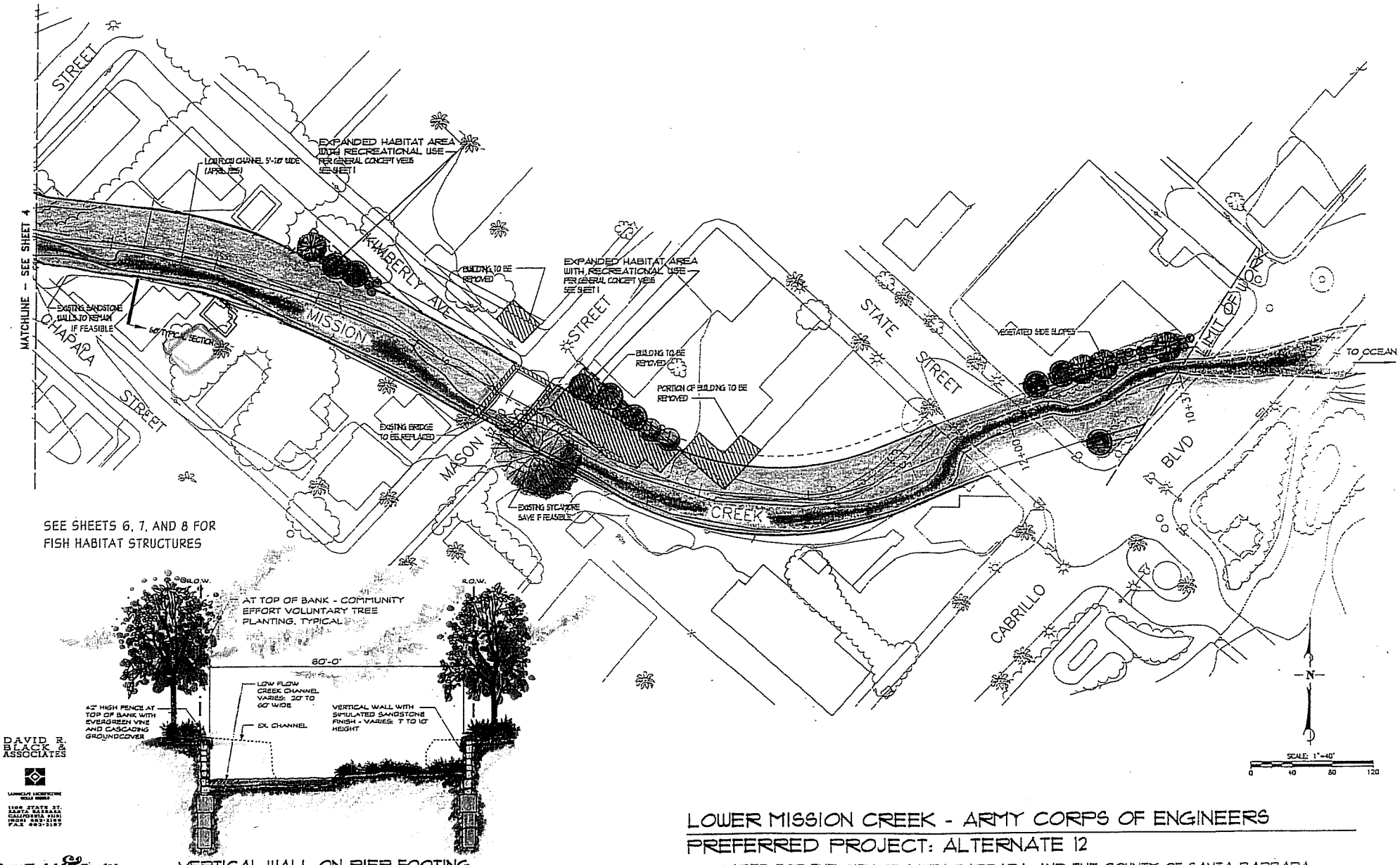
MAILING ADDRESS: P.O. BOX 98 (93102)

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA

BY PENFIELD AND SMITH AND DAVID R BLACK AND ASSOCIATES



SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES

VERTICAL WALL ON PIER FOOTING
TYPICAL SECTION

NOT TO SCALE

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA

BY PENFIELD AND SMITH AND DAVID R BLACK AND ASSOCIATES

SHEET 5

DAVID R. BLACK & ASSOCIATES
LANDSCAPE ARCHITECTURE
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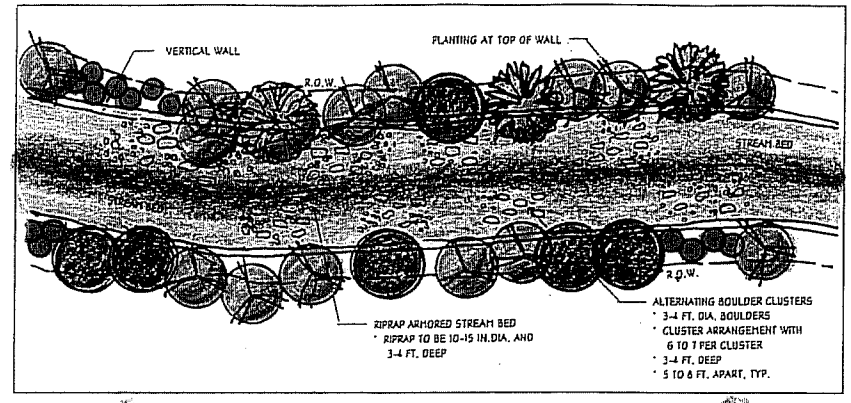
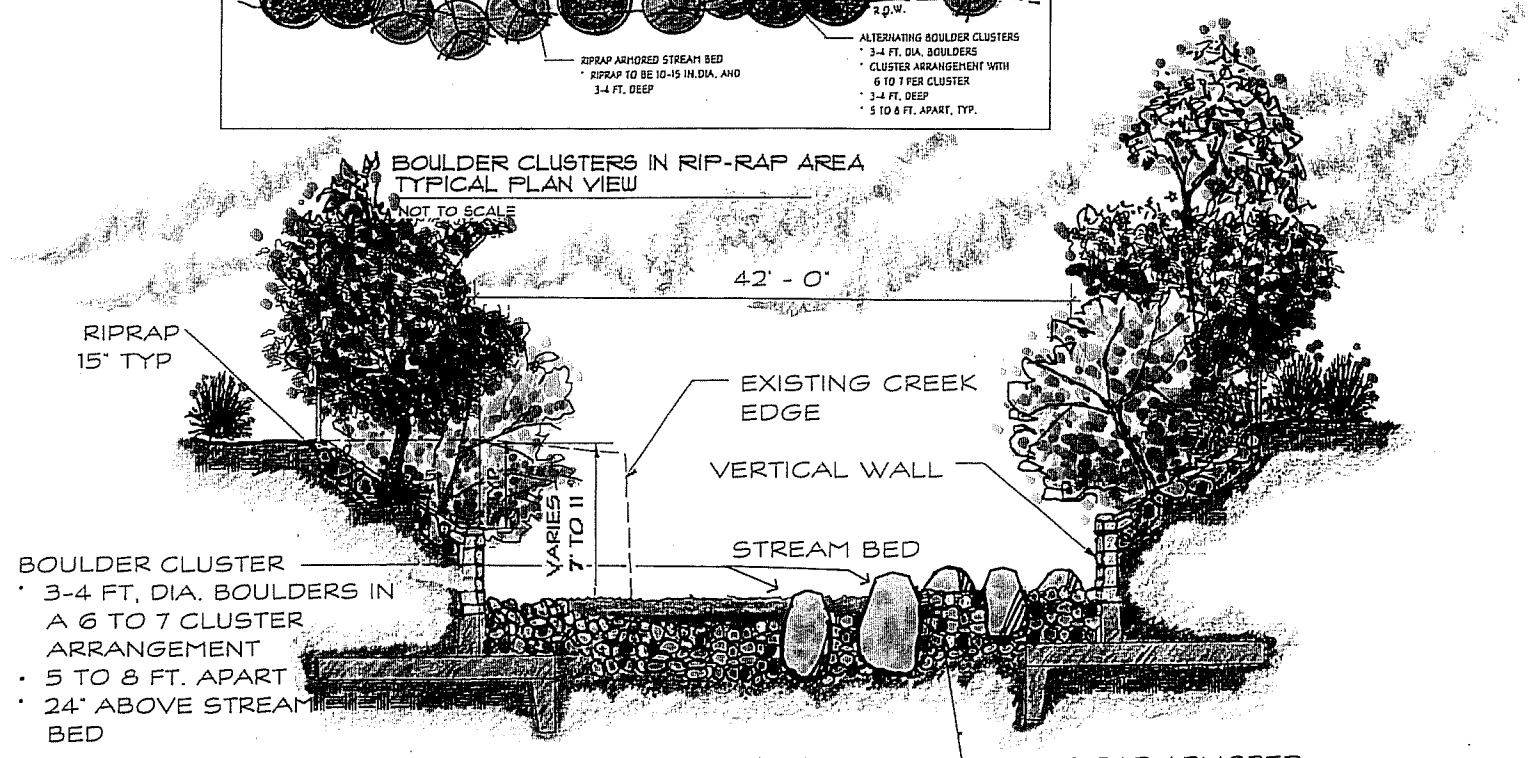
CALIFORNIA 93101
(805) 963-2100
FAX 963-2197

Penfield & Smith
ENGINEERS • SURVEYORS
101 E. VICTORIA ST. SANTA BARBARA
(805) 962-4522 CALIF. 93101
MAILING ADDRESS: P.O. BOX 98 (93102)



BOULDER CLUSTERS IN RIP-RAP AREA
TYPICAL PLAN VIEW
NOT TO SCALE



BOULDER CLUSTERS IN RIP-RAP AREA
TYPICAL SECTION
NOT TO SCALE

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES

DAVID R. BLACK & ASSOCIATES
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101 E. VICTORIA ST. SANTA BARBARA
(805) 963-9532 CALIF. 93101
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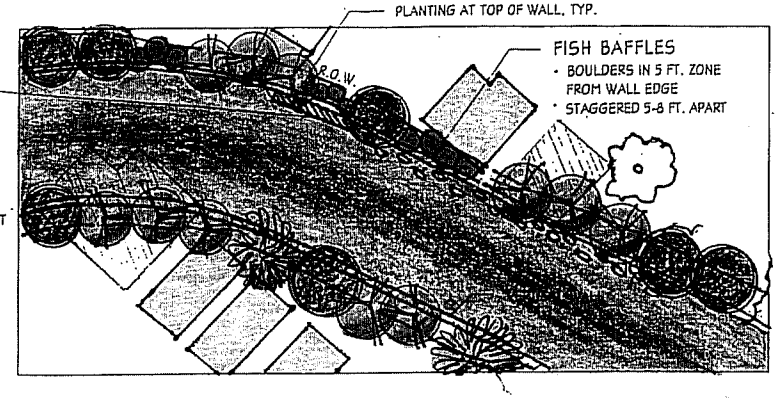
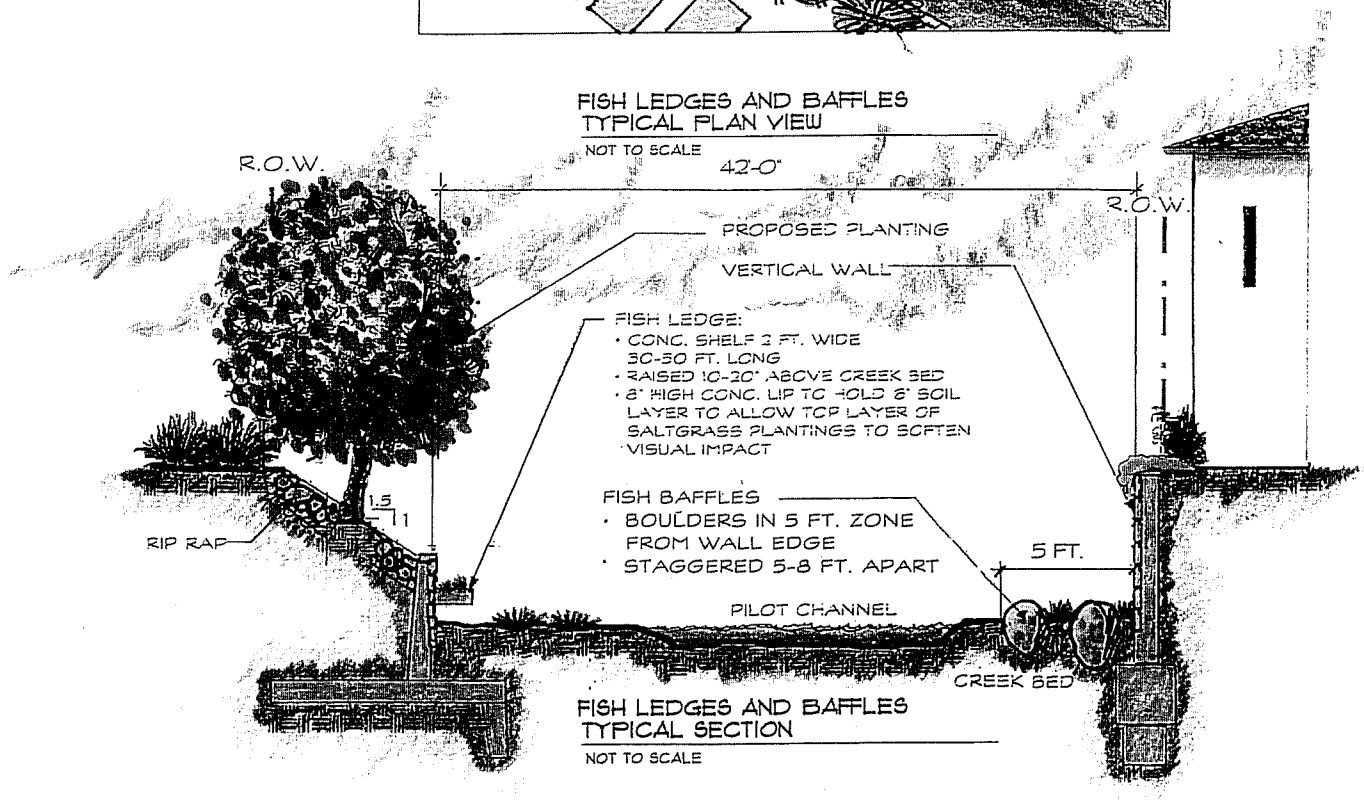


FISH LEDGES
- CONCRETE SHELF 2 FT. WIDE X 30 TO 50 FT. LONG
- RAISED 10 TO 20 IN. ABOVE CREEK-BED
- 6" W. X 8" H CONCRETE LIP TO SURROUND TOP SIDE OF LEDGE TO HOLD 6" SOIL LAYER FOR SALTGRASS PLANTINGS TO SOFTEN VISUAL IMPACT
- CONCRETE LIP TO ALLOW FOR DRAINAGE

FISH LEDGES AND BAFFLES
TYPICAL PLAN VIEW
NOT TO SCALE



FISH LEDGES AND BAFFLES
TYPICAL SECTION
NOT TO SCALE

DAVID R. BLACK & ASSOCIATES
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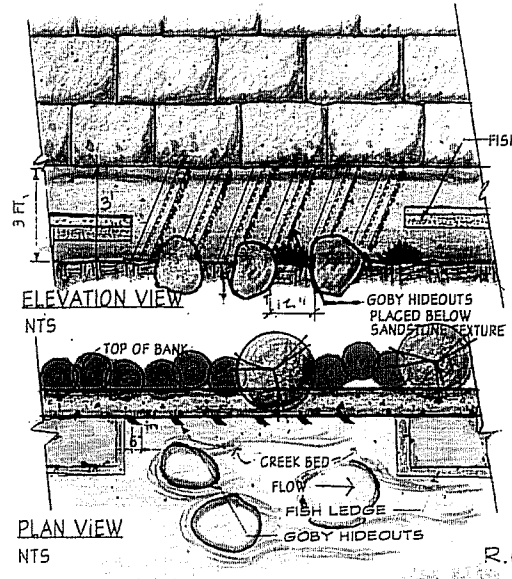
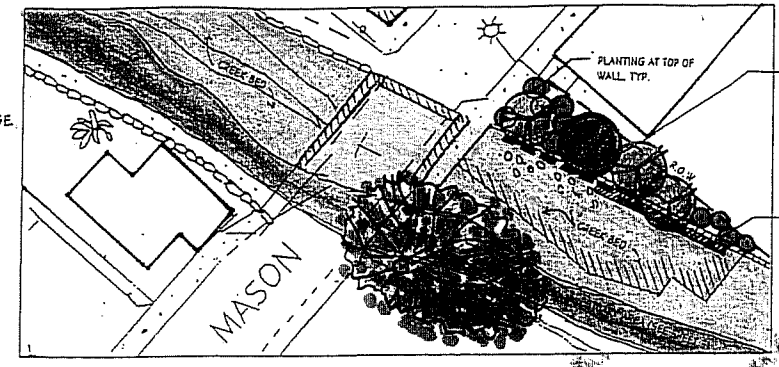
LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS
PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R BLACK AND ASSOCIATES



ELEVATION VIEW
NTS

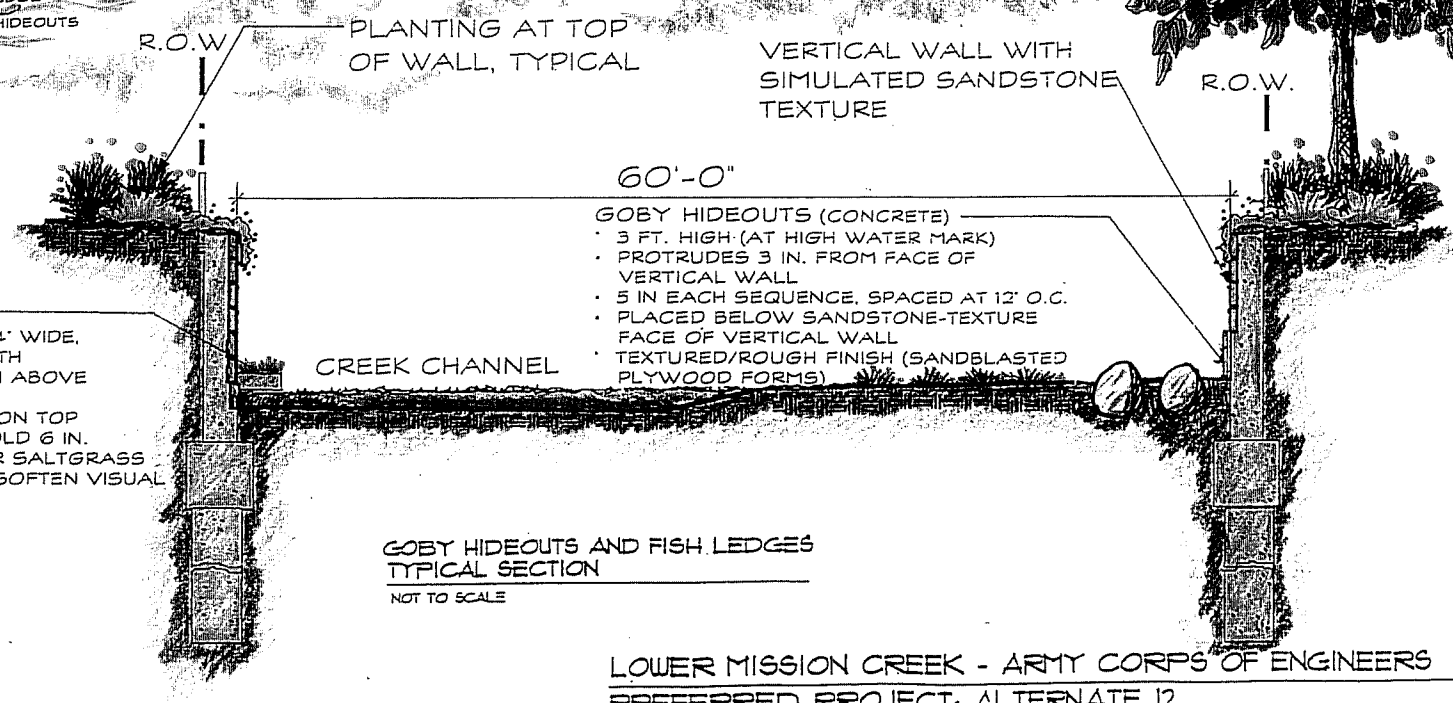
PLAN VIEW
NTS



GOBY HIDEOUTS (CONCRETE)
- 3 FT. HIGH (AT HIGH WATER MARK)
- PROTRUDES 3 IN. FROM FACE OF VERTICAL WALL
- 5 IN EACH SEQUENCE, SPACED AT 12" O.C.
- PLACED BELOW SANDSTONE-TEXTURE FACE OF VERTICAL WALL
- TEXTURED/ROUGH FINISH (SANDBLASTED PLYWOOD FORMS)

FISH LEDGE
- CONC. LEDGE 24" WIDE, 30 TO 50 LENGTH
- RAISED 10-20 IN ABOVE CREEK BED
- 6 IN. CONC. LIP ON TOP SURFACE TO HOLD 6 IN. SOIL LAYER FOR SALTGRASS PLANTINGS TO SOFTEN VISUAL IMPACT

GOBY HIDEOUTS AND FISH LEDGES
TYPICAL PLAN VIEW
NOT TO SCALE



GOBY HIDEOUTS AND FISH LEDGES
TYPICAL SECTION
NOT TO SCALE

DAVID R. BLACK & ASSOCIATES
LANDSCAPE ARCHITECTURE
1130 STATE ST.
SANTA BARBARA
CALIFORNIA 93101
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FAX 963-1167

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(805) 963-4532 CALIF. 93101
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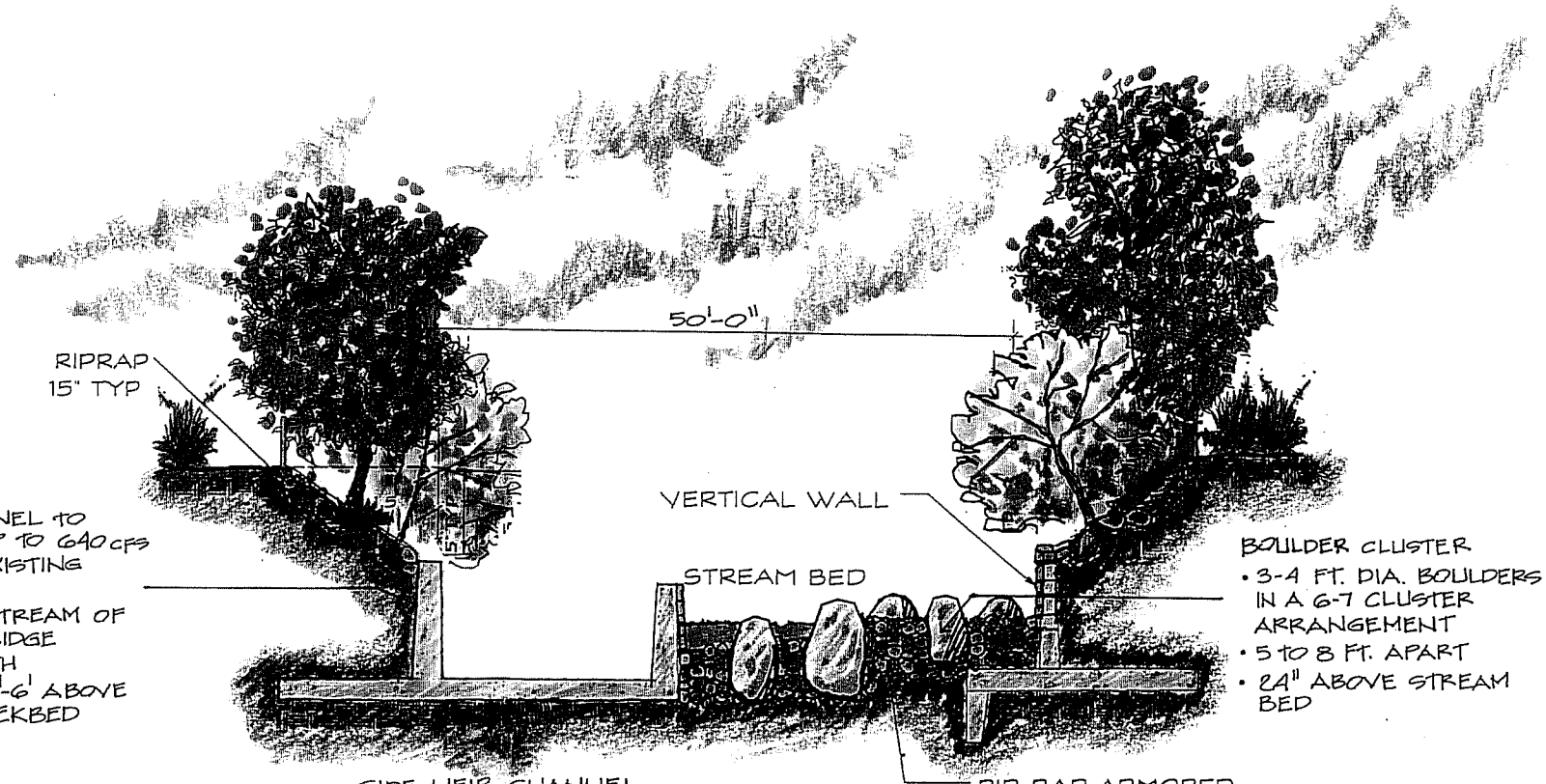
LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES



LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA

BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES

SHEET 9

DAVID R. BLACK & ASSOCIATES

LANDSCAPE ARCHITECTURE
FESLER BARCH

1509 STATE ST.
SANTA BARBARA
CALIFORNIA 93101
(805) 963-3189
FAX 963-3197

Penfield & Smith
ENGINEERS • SURVEYORS
101 E. VICTORIA ST. SANTA BARBARA
(805) 963-4532 CALIF. 93101
MAILING ADDRESS: P.O. BOX 16 (93102)

Exhibit 9

LETTERS OF INTENT
AND
FINANCIAL CAPABILITY

COUNTY OF SANTA BARBARA
PUBLIC WORKS DEPARTMENT
123 East Anapamu Street
Santa Barbara, California 93101
805\568-3000 FAX 805\568-3019

PHILLIP M. DEMERY
Director

September 7, 2000

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
US Army Corps of Engineers, Los Angeles District
PO Box 532711
Los Angeles, CA 90053-2325

RE: Letter of Intent, Lower Mission Creek Project, Santa Barbara, CA

Dear Mr. Koplin:

The Santa Barbara County Flood Control District (District) is the local sponsor for the Lower Mission Creek Project, Santa Barbara, California. Along with our co-sponsor, the City of Santa Barbara (City), and the Corps as the federal lead agency, we are working together on completing the environmental processes (CEQA & NEPA) associated with the Project's Feasibility Report.

As the Corps is well aware, Lower Mission Creek is a serious flooding threat to portions of the City. Most recently, flooding was experienced twice in 1995 and again in 1998, with the January 10, 1995 flood being the most severe flood in recent history. In addition, the creek corridor is degraded and unsightly.

For many years the District and the City have endeavored to complete a project on lower Mission Creek. To date, local agencies have spent well over $1 million working on this flooding problem.

As you know, the maintenance element of this project has yet to be completed. Throughout the Recon and Feasibility process, the District has constantly stated that the project cannot go forward without the assurance of continued long-term maintenance. The community cannot be expected to contribute to the project costs without assurances that the benefits of the project continue into the future. We understand the Corps is in agreement with this point. As you know, the maintenance element has been fully described in the Feasibility Report / EIS/EIR.

As the local sponsor for the Project, along with the City as local co-sponsors, we recognize that the local cost share for the project could be as much as 50% of the Project costs. As the estimate currently sits at about $20 million, the local

share could be as high as $10 million. The District and the City are prepared to meet this obligation through the revenues generated by the City and the District's South Coast Flood Zone. In March of 1996, the voters of the South Coast Flood Zone elected to increase property assessments in the South Coast Flood Zone to fund several Flood Control projects in the area including the Lower Mission Creek Project.

Upon completion of the Environmental Review Process, staff will be in a position to return to the Board of Directors of the Flood Control District for final project approval and direct staff to draft the necessary cost-sharing agreements to implement the project.

The District wishes to also take this opportunity to thank the Corps for their efforts in developing a project on lower Mission Creek. The issues involved in the project are complex and interrelated. We appreciate the willingness of the Corps to work through the many issues that are important to the local community.

Should you have any questions please contact Thomas Fayram, Deputy Public Works Director at 805-568-3436.

Sincerely,

For Phillip M. Demery
Public Works Director
Santa Barbara County

CITY OF SANTA BARBARA

PUBLIC WORKS DEPARTMENT
Telephone: (805) 564-5377
Fax: (805) 564-5467
www.ci.santa-barbara.ca.us

630 Garden Street
P.O. Box 1990
Santa Barbara, CA 93102-1990

September 12, 2000

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
US Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

SUBJECT: LETTER OF INTENT, LOWER MISSION CREEK PROJECT, SANTA BARBARA, CA

Dear Mr. Koplin:

The City of Santa Barbara supports the Santa Barbara County Flood Control District (District) as the local sponsor for the Lower Mission Creek Project, Santa Barbara, California. We have been working together extensively with the District and the U.S. Army Corps of Engineers (Corps) on completing the environmental processes (CEQA & NEPA) associated with the Project's Feasibility Report.

As the Corps is well aware, Lower Mission Creek is a serious flooding threat to portions of the City. Most recently, flooding was experienced twice in 1995 and again in 1998, with the January 10, 1995 flood being the most severe flood in recent history. In addition, the creek corridor is degraded and unsightly.

For many years, the District and the City have endeavored to complete a project on lower Mission Creek. To date, local agencies have spent well over $1 million in support of the Corps working on a solution this flooding problem.

We support the District's statement that the project cannot go forward without the assurance of continued long-term maintenance. The community cannot be expected to contribute to the project costs without assurances that the benefits of the project continue into the future. We understand the Corps is in agreement with this point. As you know, the maintenance element has been fully described in the Feasibility Report/EIS/EIR.

Along with the District, as the local sponsor for the project, we recognize that the local cost share for the project could be as much as 50% of the Project costs. As the proposed cost is currently estimated to be about $20 million, the local share could be as high as $10 million. The District and the City are prepared to meet this obligation through the revenues generated by they City and the District's South Coast Flood Zone. In March of 1996, the voters of the South Coast Flood Zone elected to increase property assessments in the South Coast Flood Zone to fund several Flood Control projects in the area including the Lower Mission Creek Project.

Upon completion of the Environmental Review Process, staff will be in a position to return to the City Council in coordination with the District for final project approval and direct staff to draft the necessary cost-sharing agreements to implement the Project.

The City wishes to also take this opportunity to thank the Corps for their efforts in developing a project on lower Mission Creek.

Should you have any questions, please contact Pat Kelly, Assistant Public Works Director/City Engineer, at (805) 564-5366.

Sincerely,

David H. Johnson
Public Works Director

PK/pav

cc: Phil Demery, Public Works Director, Santa Barbara County, 123 E. Anapamu Street, Santa Barbara, CA 93101