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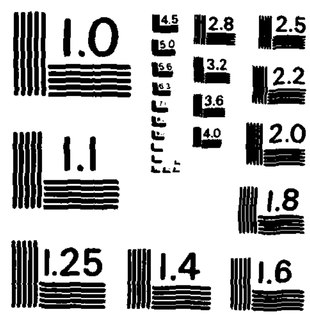

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PAJARO RIVER BASIN
UVAS - CARNADERO CREEK

SANTA CLARA COUNTY, CALIFORNIA

GENERAL DESIGN MEMORANDUM

PHASE I

FINAL

MAIN REPORT AND ENVIRONMENTAL STATEMENT

JULY 1981

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

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PAJARO RIVER BASIN

UVAS-CARNADERO CREEK, CALIFORNIA

GENERAL DESIGN MEMORANDUM

PHASE I REPORT

SYLLABUS

The purpose of this study by the San Francisco District, Corps of Engineers is to evaluate the economic, environmental and social feasibility and impact of various alternative plans for facilities on Uvas-Carnadero Creek to provide flood protection for the City of Gilroy in Santa Clara County, California. The objective of this Phase I Advanced Engineering and Design Study is to bridge the gap between the time when the proposed project was authorized and the initiation of detailed engineering and design of the project.

Numerous alternative plans have been evaluated since this project was first authorized by Congress in 1944. These plans included several for construction of a new, or modification of existing dams, as well as levee systems along Uvas-Carnadero Creek. In 1978 the Corps published the Abridged Review Report, Flood Control and Allied Purposes, Pajaro River, that evaluated and screened these preliminary plans. These prior studies were reviewed and several alternative plans were selected for detailed study.

The study determined that the following planning objectives responded to the problems, needs and opportunities identified during the planning process:

- To provide Standard Project Flood (SPF) damage prevention for the urban areas of Gilroy.

- To preserve the riparian habitat along Uvas-Carnadero Creek.

- To preserve or enhance the visual character and maximize the aesthetic quality along the stream.

- To preserve or enhance the fish and wildlife resources in and along Uvas-Carnadero Creek.

Preliminary studies were made of six levee alternatives and one nonstructural plan for providing flood protection for Gilroy. Detailed studies were made of three of the levee alternatives and the nonstructural alternative. All of the plans were evaluated for both the SPF and 100-year flood events. The levee alternatives consisted of construction or modification of levees on the north side of Uvas Creek from approximately 1,000 feet upstream of Miller Avenue to either 2,000 feet downstream or about 200 feet upstream of Thomas Road. Various levee setbacks up to around 100 feet were investigated. Three of the alternatives would include the raising or relocation of the Thomas Road bridge. The nonstructural alternative consisted of various flood proofing measures for the existing facilities in the urban flood plain area. For SPF protection the total estimated first cost of these alternatives ranged from $958,000 to $5,840,000. The estimated total annual costs ranged between $78,000 and $469,000. The estimated net annual benefits and benefit to cost ratios ranged between $29,000 and $598,000, and 1.1 and 4.0, respectively.

Due to project implementation minor increased flooding depths of between 0.25 and 1.0 foot would be induced in the rural area south of Gilroy. The incremental average annual damage due to this induced flooding under SPF conditions was estimated to be $3,000. The purchase of flowage easements appears to be the most viable method of mitigating these damages. Phase II Advanced Engineering and Design Studies will include more detailed, site specific, assessments of the induced flooding and the flowage mitigation costs for the affected properties.

The San Francisco District recommends that levee Alternative 2, designated for SPF protection be selected as the plan that best meets the project planning objectives. This alternative would consist of a levee on the north side of Uvas Creek from 1,300 feet upstream of Miller Avenue to 2,000 feet downstream of Thomas Road with the levee generally setback to avoid removal of existing riparian vegetation. A recreation plan that would be implemented with this plan consists of about 1.2 miles of paved bikeway on the levee crown, 1.2 miles of hiking trail and a staging and parking area. This plan could be incorporated into the Uvas Creek Linear Park being planned by the City of Gilroy and the County of Santa Clara.

The total estimated first cost of this plan is $3,380,000 of which $1,690,000 would be Federal. The estimated total annual cost is $265,000 of which $125,000 would be Federal. The estimated annual net benefits under future conditions are $575,000 and the benefit to cost ratio is 3.2.

The Corps has determined that this plan most effectively and efficiently satisfies the planning objectives and complies with all applicable planning constraints identified in this study.

PAJARO RIVER BASIN

UVAS-CARNADERO CREEK, CALIFORNIA

GENERAL DESIGN MEMORANDUM

PHASE I REPORT

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MAIN REPORT

PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, CALIFORNIA
GENERAL DESIGN MEMORANDUM
PHASE I REPORT

INTRODUCTION

This report presents the evaluation of various alternative plans for facilities on Uvas-Carnadero Creek to provide flood protection to the City of Gilroy.

AUTHORIZATION

A project to raise and lengthen an existing levee on Uvas-Carnadero Creek to provide flood protection to Gilroy, California was authorized in 1944 (PL 78-534). The Act reads in part:

PAJARO RIVER BASIN

> "The plan of improvement for local flood control protection on the Pajaro River and tributaries, California is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 505 Seventy-eighth Congress, second session, at an estimated cost of $511,160."

The proposed improvements in the Pajaro River Basin, which were contained in House Document No. 505 and authorized by the Flood Control Act of 1944 (Public Law 78-534), consisted of twelve miles of channel improvements on the Lower Pajaro River at Watsonville, and levees on Uvas-Carnadero Creek near Gilroy. The channel improvements at Watsonville were completed in 1949.

The proposed Uvas -Carnadero Creek facilities consisted of the modification of the existing levees along the north bank of the creek from mile 7.25 to mile 9.25 (measured from the Pajaro River) along with a short tie levee to high ground at the upstream end of the project. The levee design was for the 100-year (or one percent probability) flood. The authorized project included the following requirements for local cooperation:

(a) Provide, without cost to the United States, the required lands and easements for construction and maintenance, estimated to cost $125,000 for the Pajaro Valley project and $4,000 for the Carnadero Creek Project.

(b) Provide, at their own expense, flowage rights for flooding adjoining lands on the Carnadero Creek project, estimated to cost $2,000.

(c) Relocate, at their own expense, all existing improvements to lands in the levee right-of-way on the Pajaro Valley project, estimated to cost $63,300.

(d) Agree to accomplish, at their own expense, all required modifications in the Thurwachter bridge and approaches on the Pajaro Valley project, estimated to cost $9,000.

(e) Pay to the United States the sum of $16,000 as the estimated cost of paving special channel transitions and other works required on the Pajaro Valley project to enlarge the inadequate clearance under the present highway bridge at Watsonville, or, as an alternate, adequately increase the channel capacity at their own expense by means of suitable bridge modifications.

(f) Establish satisfactory arrangements for cooperation with the United States and maintenance of the project through city, county, or other suitable authorities.

(g) Give assurances satisfactory to the Secretary of War that they will maintain and operate the project works in accordance with regulations to be prescribed by him and hold and save the United States free from damages due to the construction and operation of all the project works.

Objective and Scope of Study

The objective of the Phase I Advanced Engineering and Design (AE&D) is to bridge the gap between the time a project was authorized and the initiation of detailed engineering and design of a project. During this period of time, changes may have occurred in the study area or in the planning procedures, or previous project reports may be incomplete in certain areas. These changes or deficiencies may have a bearing on the formulation of a project. The Phase I AE&D study seeks to identify, assess, and evaluate these changes or deficiencies in order that a reformulation of alternative plans or affirmation of the authorized plan may be made in light of current conditions and criteria.

The general scope of this study is to investigate the economic feasibility and assess the environmental, cultural and social impacts of various means of providing flood protection to the City of Gilroy and an evaluation of the recreational facilities that could be implemented with the project.

Study Participants and Coordination

This study was prepared with the cooperation and participation of other Federal, State, and local agencies. Public participation in the planning effort has been provided through the involvement of the Uvas Creek Citizens Advisory Committee. Planning efforts for various aspects of the study has been coordinated with interested individuals and agencies. Participating or consulted agencies include the following:

- Santa Clara Valley Water District
- City of Gilroy
  - -- City Manager
  - -- Parks and Recreation Department
  - -- Planning Department
  - -- Public Works Department
- U. S. Fish and Wildlife Service
- U. S. Soil Conservation Service
- U. S. Bureau of Reclamation
- U. S. Environmental Protection Agency
- Central Coast Regional Water Quality Control Board
- State of California Department of Water Resources
- State of California Water Resources Control Board
- State of California Division of Mines and Geology
- State of California Department of Transportation
- State of California Department of Fish and Game
- State of California Department of Parks and Recreation - Office of Historic Preservation
- State of California Department of Finance - Population Research Unit
- Bay Area Air Quality Management Board
- Santa Clara County, Department of Parks and Recreation
- Santa Clara County, Department of Planning
- Santa Clara County, Transportation Department
- Gavilan Water Conservation District

In addition, various private developers, contractors, engineering and architectural firms provided information used in this study. Comments on the draft of this report were received from various entities and individuals and are contain.d in Appendix I of this report.

STUDIES OF OTHERS AND PRIOR CORPS OF ENGINEERS STUDIES

Studies and reports of other entities pertinent to the development of this study include the following:

- City of Gilroy General Plan, November 1979

- Technical Appendix, General Plan Revision Program, City of Gilroy, June 1979

- City of Gilroy Bikeway Plan

- Flood Insurance Study for the City of Gilroy, Federal Insurance Administration, April 1978

- A Plan of Regional Parks for Santa Clara County, Santa Clara County Planning Department, March 1972

- An Urban Development and Open Space Plan for Santa Clara County, Santa Clara County Planning Department, May 1973

- Soil Survey of Eastern Santa Clara Area, California, U. S. Soil Conservation Service and University of California Agricultural Experiment Station, September 1974

- San Felipe Division, Central Valley Project, Environmental Statement, U. S. Department of the Interior, Bureau of Reclamation, March 1976.

- Geology Appendix of the Llagas Creek Watershed Project, U. S. Soil Conservation Service, December 1965

- Llagas Creek Watershed Project, Draft Environmental Impact Statement, U. S. Soil Conservation Service, July 1979

- Report on Potential Disposal Sites for Llagas Creek Watershed Project, Santa Clara Valley Water District, July 1976

- Environmental Geological Analysis of the South County Study Area, Santa Clara County, California, 1973, California Division of Mines and Geology

A complete listing of reference material and other data used in the preparation of this report is contained in Appendix 12.

Prior Corps of Engineers, San Francisco District, reports relevant to this study and their findings include:

o Review Report for Flood Control and Allied Purposes for Pajaro River Basin, April 1965 - This report presented extensive studies of the Uvas-Carnadero Creek and seven alternatives to solve the water resources problems of the basin and found that one alternative, the Gilroy Dam, a multiple-purpose dam and reservoir project on the creek west of Gilroy, was economically justified. However, this plan was not acceptable to local interests who objected to inundation of farm lands and homes in the reservoir area.

o Uvas-Carnadero Creek, Flood Plain Information Report, May 1973 - This report summarized historical flooding along Uvas-Carnadero Creek between the Pajaro River and Uvas Reservoir and presented results of studies defining the flood plain for floods of various frequencies under existing conditions at the time of the study.

o Abridged Review Report, Flood Control and Allied Purposes, Pajaro River Basin, California, July 1978 - This report reviewed the water resource problems in the Pajaro River basin area. The report reviewed and summarized previous Corps studies including the alteration of existing Chesbro Dam to provide flood control storage, the raising of existing Uvas Dam for flood control, and four alternatives for a dam at Hayes Valley of different sites and/or operational plans. The raising of Uvas Dam and the Hayes Valley reservoir plans were found to be economically infeasible. The report concluded the water supply need would be best provided by the San Felipe project of the U. S. Bureau of Reclamation and that flood control problems along Llagas Creek and the proposed raising of Chesbro Dam were being addressed by the U. S. Soil Conservation Service under Public Law 83-566. It concluded that there was no Federal interest in developing any additional multiple-purpose dam and reservoir projects in the basin. The report found that rebuilding the levee along the north side of Uvas-Carnadero Creek between 6th and 10th Streets in Gilroy and extending the levee 2,750 feet downstream from 10th Street to the vicinity of Thomas Road was feasible and in the Federal interest and best mitigated the flood control problems on the creek.

PLANNING, STUDY AND REPORT PROCESS

GENERAL

It is helpful to understand the conceptual framework under which the Corps of Engineers performs its planning activities before discussing specific study details. Briefly, plans to meet study objectives are developed in three stages. During the initial stage (Stage I), the Reconnaissance Report is formulated to guide subsequent planning.

During the intermediate stage (Stage II), a broad range of plans are developed and analyzed. In the final stage (Stage III), plans are screened to identify those which should be developed in detail to furnish a basis for selection and recommendation. During each stage, four functional planning tasks (problem identification, formulation of alternatives, impact assessment, and evaluation) are accomplished.

PLAN DEVELOPMENT STAGES

a. Stage I - Development of the Reconnaissance Report - The initial planning stage defines the scope and character of the study and provides a guide to subsequent planning by carrying out all four planning tasks at a preliminary level. Identification of issues related to resources management in the study area is emphasized. Broad planning objectives are defined, possible alternative measures for achieving the objectives are formulated, and tentative impacts are assessed and evaluated. The level of detail is general and the planning tasks draw upon a broad data base which may be more qualitative than quantitative. The product is the Reconnaissance Report setting forth in general terms the study scope and management actions necessary to perform the study in an orderly, timely manner.

b. Stage II - Development of Intermediate Plans - The intermediate stage is characterized by developing a range of alternatives to achieve the planning objectives without concentrating on detailed engineering or design considerations. Potential impacts of these alternative plans are assessed and evaluated, concentrating on their significant consequences. Data are sufficient to set forth and analyze alternative concepts for resource management and provide initial choices between the different viable resource management options available in the study area.

c. Stage III - Development of Detailed Plans - During the final stage, alternatives are modified and reduced in number to produce an array of feasible plans for potential recommendation. Detailed design, assessment, and evaluation necessitate specific data and well-defined study assumptions. The plans are in sufficient detail to facilitate effective choices and possible plan implementation. Nonstructural and structural measures are described and the means of implementing and managing them are specified. A specific plan satisfying the planning objectives is usually selected as the recommended plan with appropriate technical and institutional measures to accomplish efficient resource management.

FUNCTIONAL PLANNING TASKS

Superimposed on the plan development stages are the four functional planning tasks which are accomplished during each stage. Each task encompasses a number of specific planning activities and requires the full integration of all activities.

Stage I accents the tasks of problem identification, Stage II emphasizes the formulation of alternatives, and Stage III stresses the assessment and evaluation of impacts.

a. Task 1 - Problem Identification - Problem identification describes and analyzes the complete range of water and related land resource problems addressed in the study. This taks involves the establishment of planning objectives which direct the other planning tasks. It is accomplished by identifying and analyzing publicly expressed resource management problems and concerns, determining the extent of the physical areas to be studied, and surveying existing and projected resource conditions within the area.

b. Task 2 - Formulation of Alternatives - Alternative plans are formulated to address the planning objectives. The Principles and Standards for Planning Water and Related Land Resources (P&S) issued by the Water Resources Council require that one of the alternative plans must optimize National Economic Development (NED) and at least one must emphasize Environmental Quality (EQ). In addition to the NED and EQ plans, plan formulation considers other possible alternatives without regard to the implementing authority. Equal consideration is given to non-structural measures in the development of all alternative plans. "No development" plans are considered to delineate the measures necessary to maintain the existing conditions of the study area. The following activities are included in formulation of alternatives: identification of management measures, categorization of application measures, development of plans, and consideration of plans proposed by others.

c. Task 3 - Impact Assessment - Impact assessment identifies and measures the significant economic, social, and environmental effects associated with alternative plans which may influence the decision making process. Impact assessment requires forecasting where and when significant primary, secondary, and other levels of changes are likely to occur, and analyzing and describing expected monetary and non-monetary changes. Impact assessment activities include: categorizing sources of impacts, identifying and tracing impacts, specifying incidence of impacts, and measuring the impacts.

d. Task 4 - Evaluation - Evaluation is a trade-off process resulting in a ranking of the alternative plans and provides a basis for choosing the most desirable one. Impacts are identified in terms of changes from the base condition. Evaluation determines the value of these changes by conducting a "with and without analysis." Evaluation surfaces impacts of alternatives and impacts which are incorporated into succeeding iterations. Subsequent iterations are then directed to more fully achieving beneficial impacts and reducing adverse impacts. Evaluation activities include: categorizing impacts, applying other evaluation criteria, and performing the trade-off analysis for comparison of plans.

ITERATIONS

As the study progresses through the three stages, information concerning the alternatives and their impacts which may not have been foreseen early in the planning process will surface. Therefore, it may be necessary to perform several modified repetitions or "iterations" of the entire set of tasks for each stage. Particular attention is given to more fully defining the planning objectives during each iteration. When an adverse impact cannot be accommodated through reiteration, appropriate mitigation measures are considered. At the completion of the final iteration, the different alternative plans are displayed. Benefits and costs are quantified in comparable terms to the fullest extent possible. The best plan is then selected from among the various alternatives and may be recommended for implementation by appropriate Federal and non-Federal participants.

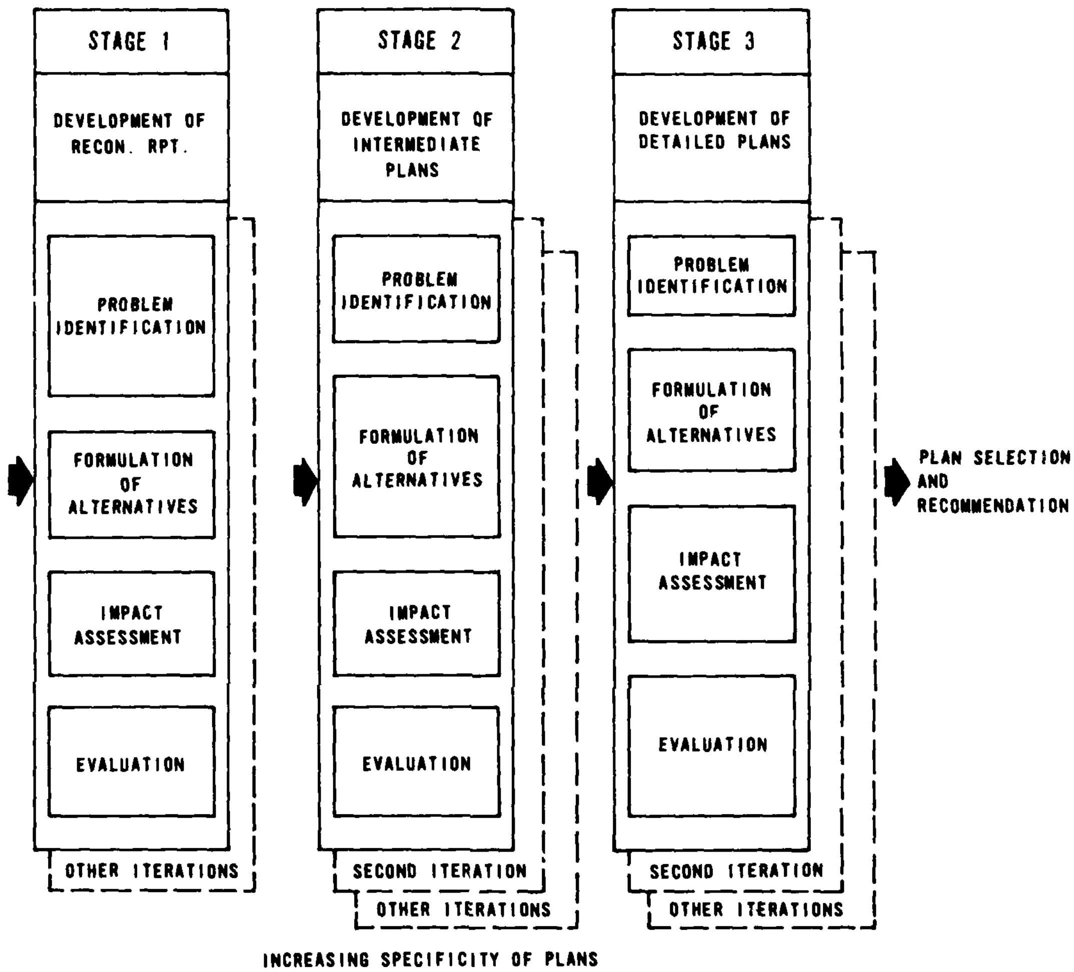
A graphical display of the interrelationship of the three stages, four tasks, and numerous iterations which are involved in arriving at a recommended plan is shown on the following page. This procedure allows for increasing the level of detail of data and analysis while setting forth a fewer number of alternative plans at the completion of each iteration.

PHASE I GENERAL DESIGN MEMORANDUM

Following the completion of the three stage planning process discussed above, the Phase I General Design Memorandum (GDM), as contained in this report, is prepared. The Phase I GDM studies are intended to bridge the gap between the project planning and the initiation of detailed engineering and design of the project. The Phase I GDM studies serve to reaffirm or, if necessary, reformulate the proposed project as formulated during the earlier planning process.

The performance of this study included the following major activities and tasks.

- Problem identification
  - -- Review of previous studies and reports
  - -- Review of current studies or plans of others
  - -- Field reconnaissance investigation to define current conditions
  - -- Hydrologic studies
  - -- Initial damage potential evaluation
- Definition and evaluation of cost and benefits for each alternative
  - -- Review alternatives considered in preliminary planning



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

RELATIONSHIP OF PLANNING STAGES, TASKS AND ITERATIONS

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

-- Definition of alternatives for detailed studies

-- Flood plain hydraulics for existing conditions and project alternatives

-- Determination of flood damages and project benefits, including effects of flooding induced by implementation of the proposed project

-- Soils investigations, testing and report

-- Cultural resources investigation and evaluation

-- Designs and cost estimates for both structural (levee) and nonstructural (flood proofing) alternatives

-- Performance of cost benefits analysis for each alternative

o Preparation of project recreation plan

-- Review of recreation plans and needs of the City of Gilroy and Santa Clara County

-- Development of conceptual plans and review with the City and County

-- Final definition of recreation plan

-- Preliminary facilities design and cost estimates

-- Use and benefit analysis and estimates

o Project analysis

-- Analysis of the impact of project alternatives in accordance with the Water Resources Council's Principles and Standards Accounts for Economic Development, Environmental Quality, Social Well-Being, and Regional Development.

-- Analysis of the environmental impact of all project alternatives, and reformulation and/or mitigation of adverse impacts, in accordance with Corps regulations

o Preparation of Phase I GDM reports in accordance with Corps regulations and the findings of the project studies. The reports are organized into two major parts - a Main Report and Environmental Statement, and the Appendices. The Appendices contain the detailed information developed during the study and include the following:

-- Appendix 1 - Public Views and Responses

-- Appendix 2 - Basis of Design and Cost

-- Appendix 3 - Recreation and Natural Resources

-- Appendix 4 - Social and Cultural Resources

-- Appendix 5 - Economic Considerations

-- Appendix 6 - Hydrology

-- Appendix 7 - Soils and Geology

-- Appendix 8 - Air Quality Analysis

-- Appendix 9 - Land Use Analysis

-- Appendix 10 - Section 404 Evaluation

-- Appendix 11 - Local Cooperation Agreements

-- Appendix 12 - Reference Material and Data

The Main Report and Environmental Statement summarize the detailed data used and results of the study and provides comprehensive evaluation of the project alternatives along with the Corps findings and recommendations with regard to the proposed project.

PROBLEM IDENTIFICATION

The Pajaro River basin is situated in southern Santa Clara County 75 miles south of San Francisco. Uvas-Carnadero Creek is a tributary of the Pajaro River and is located in the northwestern quadrant of the basin. See Plate 1. Between U.S. Highway 101 and the Pajaro River, the creek is called Carnadero Creek; upstream of Highway 101 it is called Uvas Creek.

Uvas-Carnadero Creek drains mountainous terrain of the Santa Cruz Mountains and then enters the Santa Clara Valley, just upstream of the City of Gilroy.

The Santa Cruz Mountains, which form the western boundary of the study area, separate the southern part of the Santa Clara Valley from the coast. These mountains are characterized by narrow canyons with steep side slopes and a rugged appearance. The average elevation of the mountains upstream of the study area is approximately 2,500 feet mean sea level (MSL), but several peaks exceed 3,000 feet msl in height.

The southern part of Santa Clara Valley is a large interior valley that separates the coast range into an eastern and western range. The valley floor is generally flat with an average slope of only 0.5 percent toward the south. Elevations near the City of Gilroy range from about 200 to 250 feet.

The 90 square mile Uvas-Carnadero Creek drainage basin with its major tributaries, Little Uvas, Little Arthur and Bodfish Creeks, is partially controlled by Uvas Reservoir. Downstream of the reservoir, the stream leaves the Santa Cruz Mountains, flows through foothills and enters the Santa Clara Valley. The width of the Uvas-Carnadero Creek channel is quite variable, ranging from 4 to 600 feet. The channel is well-defined, flooding only during significant storms.

The average gradient near Gilroy is six feet per mile, with the channel extending to as much as 600 feet wide near the gravel pits which are located about 1,000 feet upstream of the upstream end of the proposed project. There are minimal flows in the river during the summer season and the available storage at Uvas Reservoir is released during the summer for percolation into the groundwater basins. Uvas Creek is not now planned as a direct water supply source because the water supply needs of the area are being met through the implementation of the San Felipe Division of the Central Valley Project by the U.S. Bureau of Reclamation (USBR).

The major need and problem on Uvas Creek is protection of surrounding lands from major flooding. The study addresses a study area as defined by the existing city limits of the City of Gilroy and Uvas-Carnadero Creek flood plain under existing conditions as shown on Plate 1.

NATIONAL OBJECTIVES

The Water Resource Council's Principles and Standards require that Federal and Federally assisted water and land acti·ities be planned towards achievement of two national objectives, National Economic Development (NED) and Environmental Quality (EQ). Achievement of National Economic Development is made by increasing the value of the Nation's output of good and services, and improving national economic efficiency. The Environmental Quality objective is achieved by management, conservation, preservation, creation and restoration, or improvement of the quality of cultural or natural resources and ecological systems. For the purposes of plan formulation, these national objectives are addressed through planning objectives specific to the study area. The specific planning objectives for the proposed project were based on the original authorizing legislation, previous Corps studies, the recommendations of other interested Federal, state and local agencies, and public desires as expressed during public meetings during earlier stages of the project planning. The degree to which national objectives are addressed is determined by the evaluation of the alternative plans.

EXISTING CONDITIONS

RESOURCE BASE

Climate - The Santa Clara Valley is affected by the North Pacific high, a high pressure weather cell located in the North Pacific. Movement of this high pressure cell towards the north in the summer months and towards the south during the winter is primarily responsible for warm dry summers and mild moist winters. During the winter months cyclonic low pressure cells found over the Aleutians are allowed to move southeastward into California, but during the summer such low pressure cells are blocked by the North Pacific high. While prevailing winds are generally from the northwest the more southerly location of the Pacific high causes airflow from the southeast or south-southwest during the winter that often brings rain into the Santa Clara Valley.

The proximity of San Francisco Bay and the Pacific Ocean has a modifying influence on the temperatures in the study area by allowing colder air from the Pacific to reach the valley. Because of its location with respect to the Santa Cruz Mountains, temperatures in Gilroy are somewhat higher than other stations in the valley. The average annual temperature is about 59°F with a mean high of 86°F for July and a low mean of 37°F for January.

Geology - The intense folding and faulting that has occurred in the coast ranges has so disrupted rock units that normal stratigraphic relations are difficult, if not impossible, to determine. In the project area are folded and faulted Jurassic-Cretaceous shales and metamorphic and volcanic rocks, with conglomerate, chert, serpentine and peridotite. These rocks are often more resistant than the younger less well consolidated sediments and so outcrops are found in hills and on ridges (Plate 2). Structure in the older rocks is complex, consisting of folds and faults striking generally in a northwest direction. The older rocks are overlain by well consolidated to unconsolidated sediments which range from the Santa Clara formation or older alluvium of Plio-Pleistocene stage to Quaternary alluvium of Pleistocene and Holocene age. The latter includes relatively permeable coarse grained water-bearing units and the soft silty clays and organic silts of the baylands. The Santa Clara formation has been faulted, tilted and flexed as a result of the tetonic activity of the area, which has continued through late Pleistocene time. During the same period, changes in the stream gradient caused increased erosion and subsequent increased deposition of thick alluvial sediments in the area.

There are sand and gravel deposits of good quality along Uvas Creek. Two commercial and and gravel plants have an operation extracting these deposits. These operations would not be affected by the proposed project. Small limestone-chert deposits on El Toro Mountain nearby were used by collectors of ornamental stone for several years. What is left of these deposits are on private lands and are generally not available to the public. Other minerals include jasper which can be found west of San Martin and deposits of greenstone, serpentine diabase and limestone-chert.

The Gilroy area is located in the seismically active region of California and is subject to earthquakes. The region is flanked by two major active fault zones, the San Andreas in the Santa Cruz Mountains to the west and the Calaveras-Hayward in the Diablo Range to the east. The study area itself is traversed by a major active fault, the Sargent fault and two smaller faults, Ben Trovato and Berrocal, which are both considered to be inactive since no recognized displacement has occurred along these faults within the last two million years.

However, statistically about six earthquakes per decade have been felt in Gilroy. The most damaging of which was the 1906 earthquake with its estimated magnitude of 8.25 on the Richter magnitude scale. Considerable damage was experienced in the

Gilroy area from this earthquake, which originated in the San Andreas fault zone. According to the State Earthquake Commission Report (Lawson, 1908) ground settlement occurred near Uvas Creek and ground lurching took place on the flood plain in the area of the proposed project. Some liquefaction response to earthquakes can be expected in areas where fine grained cohesionless partially saturated to saturated soils are present near the surface in unconfined conditions. These areas may be subject to lurch cracking, and liquefaction and surface rupture along traces of active faults could also occur. Design of manmade structures will have a major controlling effect on the potential damage from the earthquake.

Some of the foothill areas have experienced landslide problems in the past and even the more stable area in and adjacent to the valley may be subject to landsliding during earthquakes.

The existence of the sand and gravel plant and the continual replacement of gravel deposits shows that mineral being eroded from the foothill and mountain areas are being deposited on the valley floor. Plate 2 shows the general regional geology.

Section A of Appendix 7 of this report evaluates the geotechnical conditions relative to the proposed project facilities. The relatively high earthquake potential of the project area will need to be considered in the design of the facilities. No other significant, geologically related, project design problems have been identified.

Soils - The soils in the southern area of the Santa Clara Valley south of Gilroy are deep, somewhat poorly drained, moderately fine to fine textured. A large portion of this area has been drained. Slopes are generally less than two percent. The major soils of the area are of the Yolo loam, Campbell silty clay loam, and the Pleasanton loam types.

The soils along the outer margins of the valley are on old alluvial fans and stream terraces with slopes less than 15 percent. They are deep, well to moderately well drained soils. The predominant soil series in this area are in the Keefers, Hillgate, San Ysidro, and Positas series. Keefers soils have very gravelly, moderately fine textured subsoils while the other soils are fine textured.

The project site is part of the alluvial plains of the lower Santa Clara Valley and underlain by unconsolidated sand and gravel with some silt and clay. These are undeformed, geologically recent deposits. Table 1 shows the soils types and rating in the Gilroy area.

TABLE 1

SOIL TYPES AND RATINGS

Gilroy Planning Area, California

Grade	Index Rating	Soil Type
Grade 1: Excellent soils, well suited to general intensive agriculture. They are easily worked, productivity is relatively easy to maintain or improve, irrigation can be carried on simply and efficiently, and no special erosion control practices are needed.	100	Yolo loam (YaA), 0-2% slope
	95	Yolo loam (YaB), 2-5% slope
	90	Campbell silty clay loam (Ca)
	90	Yolo silty clay loam (YeA) 0-2% slope
	90	Zamora loam (ZaC), 2-9% slope
	86	Yolo silty clay loam (YeC) 2-9% slope
	85	Pleasanton gravelly loam (PpC) 0-2% slope
	81	Los Robles clay loam (LrA), 0-2% slope
	81	Pleasanton loam (PoC), 209% slope
	80	Zamora clay loam (ZbA), 2-9% slope
Grade 2: Soils are moderately well suited to general intensive agriculture. Irrigation can be carried on simply and efficiently, and no special erosion control practices are required. The ranges for crops and yields are somewhat less than for Grade 1 soils.	77	Garretson loam, gravel substratum (GaA), 0-2% slope
	77	Los Robles clay loam (LrC), 0-9% slope
	72	Arbuckle gravelly loam (ArA), 0-2% slope
	72	Garretson gravelly loam (GbB(, 0-5% slope
	72	Pleasanton gravelly loam (PpA), 0-2% slope
	68	Pleasanton gravelly loam (PpC), 2-9% slope
	63	Campbell silty clay (Cd)

Source: U.S. Department of Agriculture, Soil Survey of Eastern Santa Clara County, California. 1974.

A detailed evaluation of the site soil conditions is included in Section A of Appendix 7 of this report. Section B of Appendix 7 consists of a review of the soils in the Llagas Creek area which is anticipated to be a primary source of borrow material for levee construction.

Topography - General topography in the Gilroy project area is relatively flat being on the Santa Clara Valley floor at an elevation of approximately 250 feet msl. The valley floor has an average slope of only about 0.5 percent, sloping towards the south. Coalescing alluvial fans form the eastern boundary. These alluvial fans form the juncture between the floor of the Santa Clara Valley and the Diablo Range on the east. Along the northern boundary is an alluvial fan that has spread across the valley floor and is serving as a drainage divide between the streams flowing northward to San Francisco Bay or south to the Pajaro River.

Uvas Creek flows southeasterly into the Gilroy area from mountainous terrain with elevations of 2,500 to even 3,000 feet msl through the foothill area onto the valley floor. The area upstream of the project area is sparsely populated and the mountainous canyons are relatively remote.

Demographic Characteristics - The population of Gilroy is estimated to be 22,250 (1981) which shows a significant growth since 1970 when the population was 12,665. The population increased rapidly during the 1960-1970 period with an increase from 7,348 to 12,665 or 72%. Prior to 1960 the population grew slowly.

A comparison of the number of inhabitants measured officially in the 1970 census and estimated for 1981 for Gilroy, the county, the state, and adjacent communities are shown on Table 2.

TABLE 2
NUMBER OF INHABITANTS

AREA	1970 CENSUS 1/	1981 ESTIMATE 2/
California	19,957,304	24,013,200
Santa Clara County	1,064,714	1,309,500
Gilroy	12,665	22,250
Morgan Hill	6,485	17,750
San Martin	1,392	N/A

1/ U. S. Department of Commerce, Bureau of Census, 1970

2/ Population Estimates of California Cities and Counties, Report 81 E-1, California Department of Finance Estimate, January 1981

Population projections were developed consistent with the California Department of Finance projections for Santa Clara County and are shown in Table 3.

TABLE 3
HISTORIC AND PROJECTED POPULATION
CITY OF GILROY 1/

YEAR	POPULATION
1960	7,348 2/
1970	12,665 2/
1981	22,250 3/
1983	23,000
1993	31,000
2003	39,000
2013	46,000
2023	54,000
2033	62,000

1/ Corps of Engineers Projection, except as indicated

2/ U. S. Department of Commerce, Bureau of the Census, 1960, 1970

3/ Population Estimates of California Cities and Counties, Report 81 E-1, California Department of Finance Estimate, January 1, 1981

Based on the 1970 census a composition of population is presented in Table 4. Most of this population is concentrated either in the City of Gilroy or along U.S. Highway 101.

Land Use - Over 60% of the 4,268 acres of the City of Gilroy are involved in urban uses. Of the remainder, a little over half is in vacant land, with the remaining in agricultural production. Within the flood plain study area, almost all urban development is within the City of Gilroy, and the vast majority of lands surrounding the city are in agricultural production.

Within the flood plain to be protected by the proposed project the majority of undeveloped land is targeted for development. Land previously in agriculture uses between Uvas Creek and Monterey Highway (Old U.S. 101) is being developed at a fast rate and probably will be completely filled with new single family home construction prior to the beginning of construction of the proposed project. Land further to the east (east of the highway) is undergoing a transformation into warehouses and manufacturing construction. Several firms have been there for some time and additional construction is underway. Further to the east land is in agricultural production but is targeted for industrial use in the City of Gilroy General Plan as adopted in November 1979. At the southern end of the Standard Project Flood Plain

TABLE 4

COMPOSITION OF 1970 POPULATION
(In Percentages)

PARAMETER	California	Santa Clara County	Gilroy
SEX COMPOSITION			
Male	48	49	49
Female	52	51	51
AGE COMPOSITION			
0-4 years old	8	9	10
5-17 years old	25	27	29
18-44 years old	37	40	35
45-64 years old	20	17	18
65 years and over	9	6	8
Median Age	28	26	25
Children under 5 per 1,000 women, age 15-44	334	397	486
ETHNIC COMPOSITION			
White, total	89	94	94
Non-SSL 1/	73	77	48
SSL 1/	16	18	38
Black	7	2	0.2
Oriental	2	3	3
All Others	2	1	3
POPULATION-TOTAL	19,957,304	1,064,714	12,665

1/ Spanish Language or Spanish surname. Source: U. S. Department of Commerce, Bureau of the Census, 1970.

are agricultural lands of which a maximum of about 20 acres would be protected by the project.

Table 5 includes the existing land uses within the flood plain for the Standard Project Flood in mid-1979

TABLE 5
LAND USE IN STANDARD PROJECT FLOOD PLAIN
1979

LAND USE	ACREAGE
Residential - (Fixed)	210
Mobile Homes	23
Commercial	32
Public	69
Industrial	134
Agricultural	3,325
Roads and Highways	43
Railroad	44
Creek Beds	184
Vacant	189
TOTAL	4,253

The Standard Project Flood (SPF) for Uvas-Carnadero Creek is defined as a hydrograph representing runoff from the Standard Project Storm. The Standard Project Storm represents the most severe flood producing rainfall depth-area-duration relationship and isohyetal pattern of any storm that is considered reasonable for the region in which the drainage basin is located, giving consideration to the runoff characteristics and existence of water regulation structures in the basin. For the Uvas-Carnadero Creek, the SPF has been estimated at 18,800 cubic feet per second at Thomas Road. Details of the estimate for the SPF are contained in Appendix 6 of this report.

Additional discussion of existing land uses is included in Appendices 5 and 8.

Cultural Resources - The most recent listing of the National Register of Historic Places (Federal Register, 6 February 1979, with monthly supplements) and the staff of the State Office of Historic Preservation were consulted with the result that no National Register or eligible properties were found to be within or adjacent to the project area.

California Historical Landmarks 1979 (State Department of Parks and Recreation) and the staff of the State Office of Historic Preservation were consulted with the result that no State Historical

Landmarks or Points of Historic Interest were found to be within or adjacent to the project area. A letter from the State Historic Preservation Officer, dated November 19, 1980, confirming the above determinations is included in Appendix 4 of this report.

In 1974, George V. Shkurkin et. al. conducted a cultural resources survey of that portion of the project area which would be impacted by the placement of levees and riprap along Uvas Creek. That portion of the project area south of Gilroy, which consists of scattered structures to be flood proofed by small, individual ring levees and flood walls has not yet been surveyed for cultural resources. Should this project be implemented, the San Francisco District, Corps of Engineers, will extend its cultural resources investigation to the unsurveyed areas and comply fully with all provisions of the National Historic Preservation Act of 1966 (as amended) and Executive Order 11593. What follows is a description of the cultural resources found within the surveyed area and potential project impacts to them.

Shkurkin et. al. (1974) identified three cultural resources within the impact area of proposed levees and riprap along Uvas Creek:

- Historic structure "H-6", a homestead said to date from the 1850's.

- CA-SCI-85, an archaeological midden.

- CA-SCI-86, an archaeological midden buried under nine to ten feet of alluvial silt.

"H-6", CA-SCI-85, and CA-SCI-86 are not eligible for inclusion in the National Register of Historic Places, and will not be affected by the proposed undertaking. These determinations are documented in Section B of Appendix 4.

A potential exists for the impaction of obscured archaeological resources buried beneath alluvial deposits. This problem and a possible solution are discussed in Section B of Appendix 4.

Transportation Network - U.S. Highway 101, the primary north-south route through the Santa Clara Valley, passes on the east side of Gilroy and the project area. Old Highway 101 passes through Gilroy and continues as the main north-south route through the city. The new freeway is approximately one-half mile east of the old highway.

A portion of the Santa Teresa Expressway has been completed in the area southwest of Gilroy. Upon completion, this expressway will parallel U.S. Highway 101 from San Jose to a point south of Gilroy, joining U.S. 101 and State Highway 25.

Gilroy is served by approximately 45 interstate truck carriers with overnight service to San Francisco and Los Angeles, and bus service is available through Greyhound Lines, stopping in Gilroy.

San Jose Municipal Airport serves both commercial and private aviation. Scheduled passenger and air freight service is provided both intrastate and nationwide. Scheduled carriers serving San Jose and the Santa Clara Valley include American, Continental, Delta, Golden West, Holiday, Pacific Southwest, Trans World, United, Valley, Western, Swift Air, and Hughes Air West. A general aviation airport serving Gilroy is located near San Martin, between the old and new Highway 101.

Railroad service is provided by Southern Pacific including passenger and freight service to Los Angeles, San Francisco, and nationwide points.

The local road network within Gilroy and the project area consists of good quality and well-maintained city streets.

Economic Activity - Manufacturing - Manufacturing within the Gilroy area including Morgan Hill and San Martin consists primarily of flood processing and paper products. The largest industry is Gilroy Foods, Inc., a fruit and vegetable processor. According to the Chamber of Commerce, there are 60 manufacturing plants within the greater Gilroy labor community. Additional information on manufacturing activity in the area is contained in Appendix 5.

Economic Activity - Retail Sales - Table 6 gives a breakdown of sales by product or service for the year 1976. A comparison of the compositions of wholesale and retail sales for Gilroy and Santa Clara County shows that Gilroy has a significantly larger percentage of total retail sales than the county in the building materials and farm implements and auto dealers and supplies categories indicating that the city is agrarian oriented with an automotive retail service of regional importance. On the other hand, the city has a significantly lower percentage of total retail sales in the general merchandise, home furnishing and appliances, and specialty stores categories, along with a larger percentage of total retail sales than the county are reflective of a relatively undiversified economic center on the periphery of the San Jose metropolitan area.

Agriculture - Historically, agriculture has been the major industry in the study area although a rapid increase in urbanization has occurred during the past 25 years, the growing, processing, and marketing of farm products still account for about 85% of the annual income. Based on land use projection contained in the recently adopted Gilroy General Plan, it is expected that agriculture will continue to be the predominant use over the next 20 years. Fruit and vegetable crops predominant in these highly productive agricultural lands. Some pasture and grain are grown along the perimeters of the valley

TABLE 6
TAXABLE WHOLESALE AND RETAIL SALES AS A PROPORTION OF SANTA CLARA COUNTY TOTAL: 1976
CITY OF GILROY, CALIFORNIA

	Santa Clara County			Gilroy		
	Sales ($1,000)	% of Total Retail	% of Total Sales	Sales ($1,000)	% of Total Retail	% of Total Sales
Total Retail	3,272,793	99[a]	69	64,906	101[a]	89
Apparel Stores	167,550	5		2,002	3	
General Merchandise (Department & Variety)	546,378	17		5,673	9	
Drug Stores	80,344	2		2,460	4	
Food Stores	283,732	9		6,386	10	
Packaged Liquor Stores	81,518	2		1,305	2	
Eating and Drinking Places	373,410	11		6,486	10	
Home Furnishing and Appliances	197,565	6		1,739	3	
Building Materials and Farm Implements	252,965	8		8,798	14	
Auto Dealers and Supplies	651,694	20		18,350	28	
Service Stations	327,613	10		8,806	14	
Specialty Stores	310,024	9		2,901	4	
Total Wholesale	1,443,681		31	8,304		11
Total all Sales	4,716,474		100	73,210		100
	Persons			Persons		
12/31/76 Population	4,210,100[b]			17,000[c]		

a/ Total does not add to 100% due to rounding.
b/ From Sales and Marketing Management, April 24, 1978.
c/ From Public Improvement Program 1977-82, City of Gilroy (as of 1/1/77)
Source: Derived from California State Board of Equalization: Taxable Sales in California:1976

TABLE 7

NUMBER OF PEOPLE EMPLOYED BY EMPLOYMENT CATEGORY: 1965, 1975

Gilroy Area [a], California

Employment Category	1965	1975	% Change 1965-75
Agriculture, Forestry and Fish	2,300	3,500	40%
Manufacturing	1,900	2,500	32%
Food Products	(1,300)	N/A	
Other Manufacturing	(600)	N/A	
Construction	200	850	325%
Transportation, Communications, and Utilities	400	500	25%
Wholesale and Retail Trade	1,100	2,100	91%
Finance, Insurance, and Real Estate	200	300	50%
Service	1,000	3,000	200%
Government	1,000	500	50%
Total - All Categories	8,500	13,250	56%

Source: Employment Development Department, State of California

[a] Includes Gilroy, San Martin and Morgan Hill

floor, however, all the land in the study area is classified by the U.S. Soil Conservation Service as prime agricultural land.

The valley land north of Gilroy is predominantly devoted to prune orchards with small areas in strawberrys, grains and hay. South of Gilroy, such crops as beans, tomatoes, and lettuce can be grown only during dry months, while garlic and sugar beets are grown year round. Grapes are grown in vineyards in the hills and nine wineries are located in the study area. Most agricultural land in the study area is irrigated by groundwater.

Labor Force and Employment - Employment in Gilroy is relatively evenly distributed between agriculture, manufacturing, trade, and services. Significant growth has been experienced in the construction and services sectors. Table 7 summarizes employment in Gilroy for 1965 and 1975.

Water Quality - Existing water quality in Uvas Creek is considered to be very good. The observed water quality for Uvas Creek as given in the Water Quality Control Plan Report, Central Coast Basin (3), Regional Water Quality Control Board, May 1974, are shown in Table 8:

TABLE 8
UVAS CREEK WATER QUALITY DATA

Specific conductance (micromhos)	230
TDS	140
Hardness	110
Boron	0.04
pH (units)	7.7
Sodium	7.1
Chloride	5.5
Nitrate	0.8
Sulfate	22
Dissolved oxygen	10.8

Note: Reported in milligrams per liter unles otherwise noted.

Air Quality - The study area occupies the southern-most portion of the San Francisco Bay Air Basin. The topography of the Santa Clara Valley flanked by the Diablo Range and the Santa Cruz Mountains forms a trough oriented roughly northwest-southwest.

The predominantly agricultural area does not generate a heavy load of pollutants, however, pollutant levels become significant when the prevailing northwesterly wind blows pollutants into the area from the City of San Jose and its surrounding urbanized areas where they are trapped by the topography and an inversion layer. The local area does generate significant amounts of particulates during some periods of the year due to agricultural activities.

During the past four years the State or Federal Standards for Oxidants (Ozone) have been exceeded 45 times. However, in the most recent year (1979) the oxidant level standard was not exceeded. The State particulate level standard has been exceeded an average of around 10 percent of the observed days during the last four years.

Additional air quality information is contained in Appendix 8 and the Environmental Statement of this report.

Vegetation - Vegetation in the study area, like that of South Santa Clara County in general, can be divided into the following seven main groups: grassland, grass-oak, brushland, woodland, forest, farm land, and riparian.

The majority of the non-urbanized land in the study area is developed farm land consisting primarily of vegetable fields, vineyards and orchards.

Along Uvas Creek the riparian vegetation consists of a variety of forms including shrubs, vines, willows, oaks, sycamores, cottonwoods and alders. This vegetation along Uvas Creek is shown on Plate 3. Additional discussion of project area vegetation is included in the Environmental Statement accompanying this report.

Fish and Wildlife - The fisheries in Uvas Creek primarily consist of steelhead and trout which are fished in season.

The wildlife in the study area includes wading birds, waterfowl (wood duck), raptors (hawks, owls, and vultures), song birds of a wide variety, game birds (quail and dove), game mammals (cottontail and bush rabbits), furbearers (raccoons, skunk, opossums, coyotes, and foxes) and miscellaneous non-game mammals.

The fish and wildlife in the study area are limited by the lack of natural habitat. Additional evaluations of fish and wildlife are included in Section L of Appendix 3 as well as the Environmental Statement.

Recreation Facilities - Existing recreation facilities serving the Gilroy area consist of two community parks with a total area of around 65 acres, eight neighborhood parks with a total area of around 20 acres, one golf course and several miles of bikeways. A complete listing of existing facilities is included in Section D of Appendix 3 of this report. There are no facilities serving a regional need in the Gilroy area.

Flood History - Damaging floods have occurred on the Uvas-Carnadero Creek in 1937, 1940, 1955, 1958 and 1963. The flood of December 1955, with a flow of 14,000 cubic feet per second at Highway 101, is the flood of record. This flood occurred prior to the completion of Uvas Dam in 1957. Had the dam been in operation in 1955, the flood peak would have been reduced by about 5,000 cfs.

During the general storm period 16-28 December 1955, the heaviest precipitation occurred during the three-day period ending 23 December. The 12.9 inches of rain reported in the vicinity of Gilroy resulted in Uvas-Carnadero Creek overflowing.

According to the local newspapers in Gilroy, the December 1955 flood event was reported to be the greatest event since 1880. At least 82 homes were inundated in 1955 from floodwaters from Uvas-Carnadero Creek and other nearby streams. Flooding was mainly limited to the area south of the proposed project area. In the project area, Uvas Creek was reported to be running nearly bank full at 14,000 cfs. In the opinion of the Corps, the above reports appear realistic.

Most of the problems and damages occurring during this 1955 flood were caused by flooding from Uvas Creek, Llagas Creek, Tequisquita Slough and Pacheco Creek drainage areas and the Hollister Valley, an area of about 500 square miles. The drainage area of Uvas Creek is about 90 square miles and accordingly was responsible for only a relatively small amount of the total flood damages. Most flood damages along Uvas Creek were incurred by agricultural lands and properties in areas adjacent to the creek.

CONDITIONS IF NO FEDERAL ACTION TAKEN

If no Federal actions comprising structural or nonstructural measures are undertaken by the Federal government to control or reduce damages to the City of Gilroy from flooding in Uvas Creek, there will continue to be damage to residential and commercial property, business activity, and transportation and communication facilities from major Uvas Creek floods. The 1955 flood was 14,000 cfs. The existing levee has been found to be of "marginal" stability as is shown in Appendix 7 of this report. The existing levee is assumed to fail which will make the flooding much worse as only 9,000 cfs will be contained in Uvas-Carnadero Creek. Public services including education, health, police and fire will be disturbed. Since this area has been included as a part of the flood insurance program under the National Flood Insurance Act of 1968, flood plain management measures must be implemented for the area to continue to be eligible for Federal flood insurance and Federally assisted financing.

The Gilroy area would continue to grow and urban development is projected to continue within the flood plain with the building elevation above the flood level or other flood proofing measures implemented. The population of the City of Gilroy is projected to continue to increase to an estimated 62,000 by the year 2033. There will be a continued trend towards more urban-industrial socioeconomic conditions. However, most of the land in the study area will remain in agricultural uses. Appendix 5 of this report contains a detailed assessment of the projected socioeconomic conditions in the study area.

With the exception of the conversion of existing agricultural and vacant lands to developed urban uses, no major physical changes are envisioned at this time. It is anticipated that the existing riparian vegetation along Uvas-Carnadero Creek would be preserved by means of local land use controls since the City of Gilroy and the County of Santa Clara plan to maintain the creek as a portion of a regional linear park. However, the continued urbanization will detract somewhat from the aesthetic values of the creek and will result in added adverse pressure on the remaining riparian habitat.

With continued implementation of Federal, state and local pollution control programs, the further degradation of water and air quality should not be substantial.

PROBLEMS, NEEDS AND OPPORTUNITIES

The major remaining water resources related problem in the study area is the long-standing need to protect the urbanized area of the City of Gilroy from floods that occur in the upper Uvas-Carnadero Creek basin. It has been determined in previous Corps studies that a multiple purpose reservoir project on Uvas Creek as well as flood protection works for the agricultural lands along the lower reaches of the creek are not economically feasible.

Flooding of the Gilroy area from the adjacent Llagas Creek, lying to the east of Uvas Creek, will be mitigated by a Llagas Creek project that is being implemented by the U. S. Soil Conservation Service as authorized by Congress under Public Law 83-566 in 1969. This project which is shown on Plate 18 Appendix 2 of this report is scheduled for construction in 1983.

The water supply needs of the area are being provided for by the San Felipe Division of the Central Valley Project which is being implemented by the U. S. Department of the Interior, Bureau of Reclamation.

There is a need for, and an opportunity for the development of, recreational facilities in conjunction with the mitigation of the Uvas Creek flooding problem in Gilroy.

Public Concerns - The people in the Pajaro River Basin have desired flood control for over 30 years. The primary beneficiaries of the project, the people of Gilroy, have publicly supported the project and have formed a Uvas Creek Citizens Advisory Committee to participate with the Corps of Engineers in the design phases.

Key concerns of the local populace include a desire on their part for the Hayes Valley Reservoir and the need to extend any levees along Uvas Creek to at least Thomas Road in order to protect southern areas within the city. The Hayes Valley alternative was screened out in the Review Report because of its low benefit to cost ratio.

The Santa Clara Valley Water District (SCVWD) has a county-wide responsibility for both water supply and flood protection. The SCVWD has supported programs of the Corps of Engineers, and has itself constructed flood protection facilities on county streams. The SCVWD will act as local sponsor for the flood control aspects of the project. The City of Gilroy is participating in the Federal Flood Insurance Program.

As reflected in the City of Gilroy General Plan adopted in November of 1979, the residents of Gilroy have expressed concern over the preservation and enhancement of the Uvas Creek riparian habitat and the enhancement of recreational opportunities along Uvas Creek. The city will act as the local sponsor for the proposed project recreation plan.

Flood Hazard - Gilroy's problem is not one of frequent flooding, but is susceptibility to damage from major floods less frequent than once in 25 years. It is this need that is the primary objective of these design studies.

Flooding now occurs in Gilroy itself and also in much of the relatively undeveloped agricultural lands near the City and southward towards the confluence with the Pajaro River. Significant damage areas are confined to the presently developed sections of Gilroy.

Based on soils investigation and design evaluation, it has been determined that the existing levees located along the creek downstream of Miller Avenue are marginally stable. These levees have sideslopes as steep as three horizontal to four vertical in some areas and at other locations have been stabilized by deteriorated timber bulkheads. In some areas the levee is located immediately adjacent to natural bank channel of marginal stability. It is also apparent that the existing levees were not constructed to the quality control standards for Corps project works. The levees are irregular in sections and show signs of sloughing and settlement. Therefore, as part of the analysis of existing flood plain conditions it has been assumed that these levees would fail. The location of where such a failure would originate cannot be accurately established. Appendix 7 of this report contains additional information regarding the existing levees.

The SPF flood plain under existing conditions along with the estimated depths for the SPF, 100, 50, and 25-year storms are shown on Plate 4. The depths of flooding vary as shown on the above plate and in Table 9.

TABLE 9
FLOODING DEPTH - EXISTING CONDITIONS

FREQUENCY	DEPTHS OF FLOODING
25-Year	0 to 1.5
50-Year	0.5 to 2.25
100-Year	0.75 to 3.00
SPF	1.0 to 3.25

The estimated damages to structures in the flood plain resulting from this flooding have been evaluated in Appendix 5 of this report and are summarized in Table 10.

TABLE 10
FLOOD DAMAGES - EXISTING CONDITIONS

FREQUENCY	SINGLE FLOOD DAMAGE
25-Year	$ 6,180,000
50-Year	$ 7,750,000
100-Year	$19,700,000
SPF	$22,800,000

Due to the type and scheduling of the cropping and the relatively shallow and short duration nature of the flooding, it has been concluded that damages to agricultu al lands and crops would be negligible. The flow velocities over the flood plain for the SPF are estimated at around 2.0 to 2.5 feet per second. The estimated average annual damages are $640,000.

The problems, the potential solutions, and the economics of the authorized project have changed as a result of a levee north of Miller Avenue constructed under the direction of the city. This levee protects the new subdivision as well as other areas within Gilroy and has a significant impact on the scope and economics of the project under study. However, it was found the new levee was too low for about 1300 feet upstream of Miller Avenue and would require raising by up to 2.5 feet to provide Standard Project Flood protection in accordance with Corps criteria. This levee will not provide protection against the 50-year storm.

Recreation - The City of Gilroy and the County of Santa Clara have developed plans for a Uvas Creek Linear Park. The city has constructed Uvas Park Drive which parallels the creek for a distance of about 3,200 feet between Tenth Street and Wren Avenue. The street is intended to provide access to the Linear Park. The city has developed a Master Bikeway Plan of which the Uvas Creek Linear Park will be a key link. They will soon begin construction of a bikeway on the existing levee upstream of the proposed project. The city, in cooperation with the county, also plans to initiate the development of additional linear park facilities in the upstream area as soon as funding is approved for land acquisition.

There are many recreation activities along the creek including hiking, jogging, and during certain periods of the year, fishing. This beautiful, natural recreation resource is of great value to the people in the Gilroy area, and additional recreation needs could be met through supplementary facilities such as a bikeway, trails, and a staging area. The proposed Uvas Creek Linear Park has been designated in the recently approved Gilroy General Plan as the number one priority facility for meeting the city's recreation needs. The city estimates the need for an additional 67.5 acres of parkland by the year 2000. The park is also included in Santa Clara County's "Master Plan for Regional Parks." A detailed evaluation of the recreational need and potential is included in Appendix 3 of this report.

Water Quality - During the winter and spring periods with an adequate supply of flow in the creek, water quality is generally very good. Quality problems may occur as the flow in the creek decreases during the summer and fall seasons. Irrigation return flows can degrade the quality of the summer flows.

There are no water quality problems to be solved by a proposed project as present domestic water supply comes from confined deeper aquifers that are generally good quality and perfectly suitable for domestic uses and as previously discussed, future sources will come from the San Felipe Project.

The creek's water quality should not significantly constrain the anticipated recreational uses associated with the proposed project. The existing water quality will be taken into account in the reconsideration of the proposed project.

Fish and Wildlife - Uvas Creek in the project area receives some angler pressure during steelhead and early trout season, with some light use made of the warm water fishery. Of importance are the two tributaries upstream of Gilroy, Little Arthur Creek and Bodfish Creek, that together supply a significant portion of the steelhead spawning and nursery area in the sub-basin. Insufficient flows for these fisheries below Uvas Reservoir as well as in the tributaries constrain their potential development particularly during water short or drought years. Because of the shortage of recreational fishing opportunities in the area, protection of the fishery resource is important and the California Department of Fish and Game has recommended that during water years when adequate flow is present, Uvas Creek should be protected as a steelhead spawning and nursery area, and that if in the future water is imported from outside the basin, for water supply or groundwater recharge, some arrangements be made to allow more adequate and reliable flow releases downstream of Uvas Reservoir.

The number of wildlife along the creek are small due to the limited habitat. The habitat can accommodate a variety of wildlife such as cottontail and rabbit, small furbearers such as raccoon, opossums and skunk, and birds, primarily song birds and small game birds such as dove and pheasant. There are no known endangered species in the study area.

Nearly all of the land in the project flood plain area has been developed for urban or agricultural uses. There is a critical need to preserve and enhance, where possible, the natural riparian vegetation along Uvas Creek to preserve the aesthetic quality of the area as well as the limited habitat for the small number of remaining wildlife.

PLANNING CONSTRAINTS

Planning for flood protection on Uvas Creek is guided by the following constraints:

o Planning must respond to the requirements of the Water Resources Council's Principles and Standards for Planning Water and Related Land Resources.

o Planning must be in conformance with Executive Order 11988, Flood Plain Management.

o The project must meet various policies that are intended to limit the destruction or degradation of wetlands:

-- Executive Order 11990 on Wetlands, May 25, 1977.

-- Chief of Engineer's Wetland Policy as delineated in the July 14, 1977, Federal Register.

o The project must be in compliance with:

-- Executive Order 11593 - Preservation and Enhancement of Cultural Resources.

-- National Historic Preservation Act of 1966.

-- Clean Air Act of 1976.

-- Fish and Wildlife Coordination Act of 1958.

-- Water Resources Planning Act of 1965.

-- Federal Water Project Recreation Act of 1965.

-- Rare and Endangered Species Act of 1973.

-- Clean Water Act of 1977.

-- National Environmental Policy Act of 1969.

-- Wild and Scenic Rivers Act of 1978.

o Planning must respond to regulations of the U. S. Army Corps of Engineers.

o Planning must be responsive to the needs and desires of the local public and representative governmental agencies.

PLANNING OBJECTIVES

The purposes of preconstruction planning studies are to reassess features of the authorized plan under the conditions now present to insure that the project is an economical and acceptable solution to the identified problems and needs, and to again evaluate alternatives prior to initiating design.

With each phase of the planning process, planning objectives have been revised and focused for the succeeding iteration. For this design memorandum phase, the following revised planning objectives will guide the process:

o To provide SPF flood damage prevention for the urban areas of Gilroy.

o To preserve or enhance the riparian habitat along Uvas-Carnadero Creek.

o To preserve or enhance the visual character and maximize the aesthetic quality along the stream.

o To preserve or enhance the fish and wildlife resource in and along Uvas-Carnadero Creek.

o To provide increased opportunities for stream side recreation along Uvas-Carnadero Creek.

FORMULATION OF PRELIMINARY PLANS

For the Uvas-Carnadero Creek, plan formulation involved analysis of flood control and other purposes. Measures considered in previous studies included multi-purpose dams, levees and channel improvement. After preliminary studies, several solutions to flood control problems were found to be economically justified. Alternatives found to be infeasible were discontinued from further studies. During this process, a number of management measures have been identified, tested, and some discarded during early iterations. Many means exist for managing resources and these measures can be combined in different combinations to form alternative plans that can be evaluated as to the affect upon planning objectives. The concept of a levee on the north side of Uvas Creek protecting the developed area of the City of Gilroy was the only measure found to be economically feasible during formulation of preliminary plans.

REVIEW OF PLANS CONSIDERED IN PRIOR STUDIES

Several alternatives were reviewed during preliminary planning stages that were dropped for a variety of economic and other reasons. These alternatives are discussed in this section to provide a background to the reader so as to better understand some of the early thinking and the reasons why a more extensive project or a storage project were not evaluated in detail as part of the General Design Memorandum studies.

Alternative plans considered during preliminary planning were formulated to meet broader objectives than those guiding the detailed investigations of the General Design Memorandum. Early alternatives were formulated to determine if improvements in the Pajaro River watershed were in the interest of flood control, water conservation and other purposes.

In 1949, 12 miles of channel improvements were constructed by the Corps of Engineers at Watsonville. Plans to construct levees at Gilroy at that time were cancelled when local interests would not meet required non-Federal financial responsibilities.

A study conducted between 1963 and 1965 and presented in the "Review Report for Flood Control and Allied Purposes for Pajaro River Basin," dated April 1965, recommended construction of Gilroy Dam, a multiple purpose dam and reservoir project on Uvas Creek west of Gilroy. This plan, which would inundate productive farm lands, was abandoned because of its unacceptability to the local people.

The Corps of Engineers in 1975 identified and evaluated nine alternatives including seven reservoir-oriented projects, and two levee alternatives along Uvas Creek. One alternative involved releasing water from the existing Chesbro Reservoir to obtain flood storage, and a second consisted of raising Chesbro Dam. A third alternative consisted of the raising of Uvas Dam. Four other alternatives involved construction of a dam in Hayes Valley that would be used to store water diverted from Uvas Reservoir and Chesbro Reservoir and imported water from the San Felipe Project. Levee alternatives involved leveeing both sides of the creek or only the Gilroy side for various lengths, the longest being from upstream of Miller Avenue to U. S. Highway 101.

After evaluation and review of the multitude of alternatives, local interests and the Corps of Engineers determined that flood protection of already developed Gilroy through channel improvements on Uvas Creek is the only economically feasible alternative for further detailed study. These evaluations and recommendations were presented in the "Abridged Review Report, Flood Control and Allied Purposes, Pajaro River Basin," dated July 1978.

PLAN FORMULATION RATIONALE

As described, a number of plans including the authorized plan were given preliminary consideration for solution to the area's flood and related water resources problems and needs. Plan effects are accounted for in terms of their beneficial and adverse impacts on National Economic Development (NED) and Environmental Quality (EQ) accounts. During early phases of the planning process, individual measures were investigated and combined into alternatives for screening and initial evaluation. More detailed evaluation of specific alternatives were conducted as a part of the studies for this General Design Memorandum (GDM). Specific plans were formulated that emphasize the NED and EQ objectives. Evaluation of the no action alternative was also considered.

Consideration of management measures in previous iterations in the planning process combining these features found a levee protecting the urban area of Gilroy to be the only feasible measure from an economic point of view. With the reformulated planning objectives discussed in the previous section, plan formulation in the GDM will be limited to levee protection and levee and flood wall sections directly protecting a structure or a group of structures. The latter type of protection is classified as a nonstructural measure. This GDM can therefore be considered a reaffirmation Phase I GDM since it has been determined that the authorized plan, or variations of this plan, are the only viable alternatives.

A major change in conditions occurred in 1978 when the City of Gilroy directed a residential subdivision developer to construct a levee along the creek adjacent to that development. This levee has been constructed from Miller Avenue upstream for a length of 3,700 feet. The levee protects a significant portion of what was the Gilroy flood damage area, however, up to 1,300 feet of this levee immediately upstream of Miller Avenue is low and will require raising by up to 2.5 feet to provide freeboard for protection against the design floods. The existing levee provides protection against a 50-year (two percent) flood occurrence based on maintaining a minimum of three feet freeboard.

Plan formulation concentrated on the reach of Uvas Creek between Miller Avenue and Thomas Road. In all alternatives the upstream end of the levee is between 800 and 1,300 feet upstream of Miller Avenue. The downstream end of the levee is selected at a point where there remains sufficient flood protection benefits to justify the levee construction cost.

MANAGEMENT MEASURES - PRELIMINARY PLANS

Preliminary design and cost studies have been performed for each of the seven flood protection alternatives. The seven alternatives, including a nonstructural, and a no action alternative are presented here to indicate the range of possible project development of flood protection facilities for the developed area of Gilroy. Each alternative was assessed for both 100-year flood and the Standard Project Flood (SPF). The plans were formulated to cover the full range of possible alternatives that would achieve the previously stated project objectives to various degrees. The formulated plans were predicated on those developed in earlier Corps screening studies. Plates 5 and 6 indicate the flood plains resulting from each alternative while Plates 7, 8, and 9 show detailed plan views of each. Plate 10 shows the levee profiles of each of the alternatives.

PLAN DESCRIPTIONS

LEVEE ALTERNATIVES

a. Alternative 1 - Consists of a new or reconstructed levee along the north side of the creek from a point about 2,000 feet south of Thomas Road to Miller Avenue and the raising of the existing levee upstream of Miller Avenue for a distance of approximately 800 feet for the 100-year flood and 1,300 feet for the SPF. The levee would be setback from the natural creek channel top of bank a minimum of ten feet with the exact location to be based on the stability of the creek. The existing levees would be reconstructed for a distance of approximately 3,500 feet downstream of Miller Avenue. A flood wall of approximately 260 feet in length is required downstream of Thomas Road since there is insufficient space between the natural stream top of bank and the existing home to allow levee construction. It was determined the construction of the flood wall would be less costly than the purchase and relocation of the home. The Thomas Road bridge would be raised at its present location utilizing a temporary detour for local traffic. The purchase and relocation of two farm buildings located south of Thomas Road would be required in lieu of a second flood wall. See Plate 7.

b. Alternative 2 - Is a modification of Alternative 1 with the levees setback to minimize removal of existing riparian habitat. This alternative includes the reconstruction of about 1,100 feet of existing levee downstream of Miller Avenue, the raising of up to 1,300 feet of existing levee upstream of Miller Avenue, the relocation of Thomas Road, and the construction of a new bridge upstream of the existing structure. No flood wall would be required, however, it would be necessary to purchase and relocate one home in addition to the two farm buildings that would be relocated in Alternative 1. See Plate 8.

c. Alternative 3 - Is further modification of Alternative 1 with the levee setback increased to 100 feet or more, depending on property boundaries and existing physical constraints. This alternative included the reconstruction of 1,100 feet of existing levee downstream of Miller Avenue, the raising of up to 1,000 feet of existing levee upstream of Miller Avenue, and the relocation of Thomas Road and bridge. No flood walls would be required; however, the purchase and relocation of five farm buildings and one home would be necessary. See Plate 9.

d. Alternative 4 - Consists of a new or reconstructed levee along the north side of the creek from a point about 200 feet upstream of Thomas Road to Miller Avenue and the raising of the levee upstream of Miller Avenue as required in the above alternatives. The levee location and alignment, and the flood wall required would be the same as in Alternative 1. A flood wall would be required as in Alternative 1. Thomas Road and Thomas Road bridge across Uvas Creek would not be modified. See Plate 7.

e. Alternative 5 - Is a modification of Alternative 4 with the levee setback to the same location and alignment as in Alternative 2 to preserve riparian habitat. No flood walls would be required. There would be no modification to Thomas Road. See Plate 8.

f. Alternative 6 - Is a further modification of Alternative 4 with the levee setback as in Alternative 3. No flood walls would be required; however, the purchase and relocation of one home would be necessary. See Plate 9.

The following design considerations and facility requirements are common to all or nearly all of the levee alternatives.

o Designs are based on a 100-year flood of 17,000 cfs and a SPF of 18,800 cfs. Appendix 6 of this report contains a detailed hydrological evaluation of Uvas Creek.

o Levee sections would be in accordance with typical Corps standards as shown on Plate 11.

o Due to high velocities in the exsiting channel following the confinement of flood flows, slope protection consisting of riprap or gabion mats or walls would be required at critical areas as shown on Plate 12. The locations of the slope protected areas are shown on Plates 7, 8, and 9.

o In order to provide clearance to pass the design flow, the Thomas Road bridge must be raised. Alternative 1 includes the raising of the structure at its present location while Alternatives 2 and 3 include the construction of a new, relocated bridge.

o The adjacent land slopes away from the creek on the leveed side, therefore, local drainage work would consist only of minor ditching and grading to drain the area between the levee and creek.

o Relatively minor relocations of existing facilities including water pipeline, sewer pipelines, and low voltage overhead power lines would be required.

Additional detailed descriptions of alternatives and engineering design criteria is included in Appendix 2, Section C of this report.

NONSTRUCTURAL

Nonstructural measures were investigated and Alternative 7 was formulated and analyzed. The basic criterion was to provide the same level of protection to structures as provided by the levee alternatives.

Nonstructural measures considered include raising, sealing or flood proofing of individual structures, and flood walls and ring levees for individual as well as for small groups of structures.

The removal of existing structures from the flood plain was not considered to be a viable alternative due to the dense development.

Plate 13 indicates the location of each of the nonstructural measures, and Plate 14 illustrates each of the different type facilities.

Additional detailed design information for all nonstructural facilities is included in Section D of Appendix 2.

SCREENING OF PRELIMINARY PLANS

Table 11 summarizes the costs and benefits of the preliminary plans. The costs and benefits are at October 1980 price levels and are based on a discount rate of 7 3/8 percent. All the alternatives have cost to benefit ratios of greater than one to one. However, since the six structural alternatives are similar, it was decided to screen the less desirable alternatives at this point prior to the final assessment and evaluation of detailed plans. Alternatives 4, 5 and 6 were screened from further consideration based on the following rationale:

- Alternatives 1, 2 and 3 protect a larger area than Alternatives 4, 5 and 6, including essentially all of the presently developed area. Alternatives 4, 5 and 6 do not meet the basic planning objective of providing flood protection to the entire existing developed urban area in Gilroy.

- Alternatives 1, 2 and 3 have higher benefit to cost ratios than corresponding Alternatives 4, 5 and 6.

- Alternatives 1, 2 and 3 have larger net benefits than Alternatives 4, 5 and 6.

- Alternatives 1, 2 and 3 preserve larger amounts of riparian habitat, therefore, are preferred over Alternatives 4, 5 and 6 from the Environmental Quality standpoint.

- Therefore, it is concluded that Alternatives 1, 2 and 3 should be selected over Alternatives 4, 5 and 6 and will be included in the alternatives to be assessed in detail.

Alternative 7 (nonstructural) is included in the final array of alternatives in accordance with Corps regulation requirement for a detailed evaluation of nonstructural alternatives.

TABLE 11

PRELIMINARY PLANS - COST AND BENEFITS IN THOUSANDS $ AND BENEFIT-COST RATIOS

(OCTOBER 1980)

ALTERNATIVE	FIRST COST		ANNUAL COST		ANNUAL BENEFITS		NET ANNUAL BENEFIT		BENEFIT TO COST RATIO	
	100-Year	SPF	100-Year	SPF	100-Year	SPF	100-Year	SPF	100-Year	SPF
1	2,300	2,390	182	188	514	777	332	589	2.8	4.1
2	3,010	3,266	234	252	557	819	323	567	2.4	3.3
3	3,360	3,440	259	265	557	819	298	554	2.2	3.1
4 1/	853	958	70	78	136	303	66	225	1.9	3.9
5 1/	1,320	1,360	104	107	136	303	32	196	1.3	2.8
6 1/	1,520	1,550	119	121	136	303	17	192	1.0	2.5
7	5,180	5,840	417	469	449	712	32	243	1.1	1.5

1/ Does not include cost of flowage easement for area of induced flooding

ASSESSMENT AND EVALUATION OF DETAILED PLANS

Detailed design and cost studies have been performed for each of the four flood protection alternatives. In addition, a recreation plan was developed for the project. Five alternatives including a nonstructural and a no action alternative are presented here to indicate the range of possible project development of flood protection facilities for the developed area of Gilroy. In addition, an optional nonstructural alternative was formulated for the purposes of protecting structures on properties in the rural area south of Gilroy where increased flooding depth would be induced by the implementation of the levee project protecting the city. Each alternative was assessed for both 100-year flood and the SPF. The plans were formulated to cover the full range of possible alternatives that would achieve the previously stated project objectives to various degrees. The formulated plans were predicated on those developed in earlier Corps screening studies and in the Screening of Preliminary Plans section of this report.

PLAN DESCRIPTIONS

General descriptions of the project flood protection alternatives were presented in the section Management Measures - Preliminary Plans and are displayed on the previously referenced plates. Supplemental detailed information on each of the plans selected for detailed assessment and evaluation is presented in the following listings and paragraphs. Because of similarity, Alternatives 1, 2 and 3 are presented concurrently with any significant difference noted.

LEVEE ALTERNATIVES 1, 2, AND 3

Location - On north side of Uvas Creek from a point about 2,000 feet south of Thomas Road up to about 1,300 feet upstream of Miller Avenue.

Design Flows - For SPF - 18,800 cubic feet per second (cfs); for 100-year - 17,000 cfs.

Levee Configuration - Twelve foot top width, gravel surfaced, with 3 to 1 waterside and 2 to 1 landside embankment slopes.

Levee Heights - Ten foot maximum for SPF; average about six foot.

Levee Setback -

- Alternative 1 - Ten foot minimum

- Alternative 2 - Behind the existing tree line except adjacent to Uvas Park Drive where there is insufficient space between the trees and the street.

o Alternative 3 - One hundred foot minimum except along Uvas Park Drive.

Slope Protection - Slope protection consisting of riprap or gabion mats or walls would be provided at critical locations on the existing channel and at the end of the levee. The slope protection in the channel would be minimized to limit removal of vegetation.

Flood Wall - Required for Alternative 1 to avoid removal of an existing home. The wall would be about 250 feet in length and would average about six feet in height.

Thomas Road and Bridge -

o Alternative 1 - The Thomas Road bridge would be raised at its present location as necessary to provide three foot freeboard for passage of the SPF. The existing superstructure would be removed, the piers extended, and a new reinforced concrete tee beam superstructure constructed. The approach road would be raised. The existing alignment and widths would not be changed.

o Alternatives 2 and 3 - The approach road would be relocated and a new bridge constructed about 150 feet upstream of the existing crossing. The new bridge would provide two standard traffic lanes and a five foot sidewalk and would be a four span reinforced concrete tee beam with a total length of about 210 feet.

Miller Avenue - Miller Avenue would be raised by about two feet to match the required levee elevation for SPF protection.

Utilities - Utility relocations or modifications would consist of:

o Water main relocation at Thomas Road

o Sewer line relocation and possible pump station modification at Thomas Road.

o Power line relocation near Thomas Road.

o Wastewater reclamation line relocation at about 1,200 feet downstream of Miller Avenue.

Borrow Material - Three potential sites have been identified as sources of borrow material for the levee construction:

o Llagas Creek Flood Control Project located about two miles west of the project area. This project, being implemented by the U. S. Soil Conservation Service, is scheduled for construction in the period from 1984 to 1988 and would have substantial amounts of excess material as a result of channel excavation. The project cost estimates contained in this report are based on using this source of material.

o A commercial borrow pit on Canada Road about five miles west of the project could be used if the above site is not available or feasible.

o The City of Gilroy has proposed the development of a recreation pond in Uvas Creek at about 2,500 feet upstream of Miller Avenue. The viability of the use of this site as a borrow source would require soils investigation and an assessment of the impact on the creek, especially fisheries. Material from this site would be considered for use if the city proceeds with the development of this facility. The recreation pond is not part of the proposed project as formulated by the Corps.

The Llagas Creek Project has been selected as the best potential source of borrow. Use of material from the proposed recreation pond would be considered if this project is implemented by the city. The commercial site could be used if no other sources are available.

The project cost estimate for borrow and haul includes the cost of repairs to existing road that may result from the project construction.

Recreation Facilities - The project recreation plan provides facilities within the project area that would be incorporated into the Uvas Creek Linear Park being planned by the City of Gilroy and the County of Santa Clara. The facilities would include:

o Approximately 1.2 miles of ten foot wide asphalt paved bikeway on top of the project levee from 1,300 feet upstream of Miller Avenue to Thomas Road.

o Approximately 1.2 miles of hiking on the water side of the levee with access ramp to the stream channel at intervals over the project length.

o A staging area at Thomas Road with paved parking for 15 cars.

o Access ramps to the bikeway at Miller Avenue, Tenth Street, and Thomas Road.

The recreation facilities could be incorporated into any of Alternatives 1, 2 or 3, however, they would be best accommodated by Alternative 3 and Alternative 2 would be superior to Alternative 1 because of the larger levee setbacks and small amount of vegetation removal.

Mitigatory vegetative plantings, to offset unavoidable project induced losses of existing vegetation, will be established within the limitations to maintain levee stability and channel capacity.

ALTERNATIVE 7 - NONSTRUCTURAL

Location - The entire developed area within the portion of the existing flood plain protected by Alternatives 1, 2 or 3.

Design Criteria - Flood proofing facilities designs were based on the depth of flooding in the flood plain under existing conditions for the SPF and 100-year floods.

Facilities - Facilities would consist of:

o Flood proofing about 360 permanently foundationed residences with decorative concrete block walls and removable opening barriers.

o Sealing the existing mobile home park fence with a small concrete flood wall.

o Sealing concrete commercial or industrial structures with sealant materials.

o Construction of small ring levees or flood walls at commercial and industrial facilities where space is available.

NO ACTION (WITHOUT CONDITIONS)

No action essentially comprises no structural or nonstructural measures undertaken by the Federal government to control or reduce damages from future flooding in the area. In the future, the population of the area will increase at the same rate and magnitude under the "no action" alternative as under the "with conditions," business will expand and the demand for services will grow; likewise, the flood control mitigation measures will have to be implemented to prevent the flood hazard from also increasing. Through zoning all future construction will require protection from at least the 100-year flood event. For existing structures, flood damages can be partially compensated for through participation in the National Flood Insurance Program. Since the City of Gilroy has been designated as a flood hazard area, it is eligible and is participating in the flood insurance program.

IMPACT ASSESSMENT

In accordance with the Principles and Standards for Planning Water and Related Land Resources, the following impacts of the alternative plans have been identified as making the most significant contribution to the four accounts of the Standards. Because of their similarity, the impacts for Alternatives 1, 2 and 3 are addressed as a group with their differences noted.

ALTERNATIVES 1, 2 AND 3

National Economic Development (NED) -

o Beneficial - All the alternatives have net positive economic benefits due to flood control and recreation as are summarized in Tables 12 and 13. Benefits to cost ratios would be:

With Future Conditions -

Alternative	SPF Protection	100-Year Protecttion
1	4.0	2.8
2	3.2	2.3
3	3.0	2.1

Existing Conditions -

Alternative	SPF Protection	100-Year Protecttion
1	3.7	2.4
2	3.0	2.1
3	2.8	1.9

o Adverse - First and annual costs as shown on Table 12 must be borne by the national economy.

Environmental Quality (EQ) -

o Beneficial - All the alternatives will serve to at least partially protect the natural stream channel vegetation and aesthetic values.

-- Alternative 2 will protect most of the existing riparian vegetation along the channel since the levees are located outside of the tree line wherever possible.

-- Alternative 3, with an added levee setback, provides space for an expansion of the riparian vegetation by about 15 acres and therefore would result in some environmental quality enhancement.

o Adverse - There will be some loss of riparian vegetation for all three alternatives. The levee location immediately downstream of Miller Avenue is constrained by the location of Uvas Park Drive, and it would be necessary to remove some vegetation in this reach as well as for placement of channel bank slope protection at critical erosion-prone areas.

-- Due to the narrow levee setback, there would be an additional loss of vegetation for Alternative 1. The total loss would be about five acres. For Alternative 2 the net loss would be about two acres, while Alternative 3 would result in a net potential gain of about 15 acres.

-- The losses in vegetation would be mitigated by plantings established within the limitations to maintain levee stability and channel capacity.

TABLE 12

SUMMARY OF COST AND BENEFITS AND COST APPORTIONMENT
(Costs in Thousands$) 4/

	STANDARD PROJECT FLOOD DESIGN				100-YEAR FLOOD DESIGN			
	1	2	3	Nonstructural 7	1	2	3	Nonstructural 7
FIRST COST								
Total Construction Federal 1/	$1,153	$1,361	$1,182	$5,624	$1,063	$1,105	$1,096	$4,961
Total Construction NonFederal 2/	$ 359	$ 561	$ 561	--	$ 359	$ 561	$ 561	--
Flowage Easement NonFederal	$ 500	$ 500	$ 500	--	$ 500	$ 500	$ 500	--
Real Estate NonFederal 3/	$ 495	$ 961	$1,315	$ 216	$ 495	$ 961	$1,315	$ 216
Total NonFederal	$1,354	$2,022	$2,376	$ 216	$1,354	$2,022	$2,376	$ 216
TOTAL FIRST COST	$2,510	$3,384	$3,558	$5,840	$2,420	$3,127	$3,472	$5,180
Adjusted Federal and NonFederal 5/	$1,255	$1,692	$1,779	--	$1,210	$1,564	$1,736	--
ANNUAL COST								
Federal								
Interest (7 3/8%) and Amortization	$ 85.0	$ 100.3	$ 87.1	$ 415.5	$ 78.3	$ 81.4	$ 80.8	$ 365.6
NonFederal								
Interest and Amortization	$ 99.8	$ 149.0	$ 175.1	$ 15.9	$ 99.8	$ 149.0	$ 175.1	$ 15.9
Operation and Maintenance	$ 15.5	$ 15.2	$ 15.2	$ 38.0	$ 15.5	$ 15.2	$ 15.2	$ 38.0
Total NonFederal	$ 115.3	$ 164.2	$ 190.3	$ 53.9	$ 115.3	$ 164.2	$ 190.3	$ 53.9
TOTAL ANNUAL COST	$ 200	$ 265	$ 277	$ 469	$ 194	$ 246	$ 271	$ 420
BENEFITS								
Total Annual Benefits	$ 798	$ 840	$ 840	$ 712	$ 535	$ 578	$ 578	$ 449
Net Annual Benefits	$ 598	$ 575	$ 563	$ 243	$ 341	$ 332	$ 307	$ 29
Benefit to Cost Ratio	4.0	3.2	3.0	1.5	2.8	2.3	2.1	1.1
BENEFITS - EXISTING CONDITIONS								
Total Annual Benefits	$ 733	$ 775	$ 775	$ 712	$ 470	$ 513	$ 513	$ 499
Net Annual Benefits	$ 533	$ 510	$ 498	$ 243	$ 274	$ 267	$ 242	$ 29
Benefit to Cost Ratio	3.7	2.9	2.8	1.5	2.4	2.1	1.9	1.1

1/ Includes contingencies, engineering and design, and supervision and administration, construction cost of flood control facilities and 50% of cost of recreation facilities

2/ Includes Thomas Road relocation and new or reconstructed bridge, utility relocation, 50% of cost of recreation facilities and contingencies

3/ Includes cost of lands, improvements, relocations, expenses to residents, mineral rights, severance damage and acquisition cost

4/ All cost and benefits are at October 1980 price levels with discount rate of 7 3/8% and 100-year life

5/ In accordance with section 3 of the Flood Control Act of 1936, the Federal government shall reimburse the local sponsor one-half of the excess costs where the cost of lands, assessments, rights-of-way, and relocations exceed the Federal construction costs.

TABLE 13
SUMMARY AND ALLOCATION OF BENEFITS
(In Thousand $)

	SPF PROTECTION ALTERNATIVE				100-YEAR PROTECTION ALTERNATIVE			
	1	2	3	7	1	2	3	7
FLOOD CONTROL								
Flood Damage Reduction	$640	$640	$640	$640	$406	$406	$406	$406
Affluence Benefits	$ 72	$ 72	$ 72	$ 72	$ 43	$ 43	$ 43	$ 43
Advanced Bridge Replacement	--	$ 43	$ 43	--	--	$ 43	$ 43	--
Saving in Cost to Fill (Future Condition)	$ 65	$ 65	$ 65	--	$ 65	$ 65	$ 65	--
TOTAL FLOOD CONTROL - EXISTING CONDITION	$712	$754	$754	$712	$449	$492	$492	$449
TOTAL FLOOD CONTROL - FUTURE CONDITION	$777	$819	$819	$712	$514	$557	$557	$449
RECREATION	$ 21	$ 21	$ 21	--	$ 21	$ 21	$ 21	--
TOTAL BENEFITS - EXISTING CONDITION	$733	$775	$775	$712	$470	$513	$513	$449
TOTAL BENEFITS - FUTURE CONDITIONS	$798	$840	$840	$712	$535	$578	$578	$449

NOTE: Benefits are based on October 1980 price leves, discount rate of 7 3/8% and 100-year project life

-- There would be minimal air quality impacts due to construction and recreation generated vehicular traffic.

-- There could be minimal short term water quality impacts due to channel excavation required for riprap placement and from the potential rise in temperature caused by vegetation removal.

Social Well-Being (SWB) -

o Beneficial - SPF protection to property would be provided and the need for flood proofing and possible evacuation would be eliminated.

-- Recreational opportunities would be provided by the bicycle and hiking trails included in the project with an estimated usage of 8,500 recreation days initially, increasing to 17,000 by the year 2000. The total first cost of the recreational facilities is estimated to be around $112,000 with an annual cost of $12,000 and a benefit to cost ratio of about 1.7 to 1 when assessed independently. The recreation use and benefits are evaluated in Appendix 3 of this report.

o Adverse - There would be temporary local disruption during construction including the need for temporary detours for construction at Thomas Road and Miller Avenue.

-- Relocation of existing homes or farm buildings and residences would be:

<u>Alternative 1</u> - Two farm buildings would be relocated, no residents would be affected. Flood wall construction provided to avoid the relocation of one home would result in inadequate space for maintenance activities and would be disruptive to the residents of the affected home.

<u>Alternative 2</u> - Two farm buildings and one home would be relocated. One family would be relocated.

<u>Alternative 3</u> - Five farm buildings and one home would be relocated. One family would be relocated.

Regional Development (RD) -

o Beneficial - An estimated 22 short term jobs would be generated during construction and maintenance activities would provide employment averaging about 0.3 manyears annually.

-- Flooding would be eliminated on about 680 acres of mostly urban land in and around Gilroy.

-- Flooding would be eliminated on about 10 miles of local streets and roads under fully developed conditions.

-- For Alternatives 2 and 3, the relocation and construction of a new Thomas Road bridge would improve local transportation.

o Adverse - Land purchased for rights-of-way would be lost from the local tax rolls. The losses would be: Alternative 1 - 50 acres; Alternative 2 - 55 acres; and Alternative 3 - 64 acres.

-- Implementation of Alternatives 1, 2 or 3 would result in an increased depth of flooding on about 2,600 acres of rural land located to the south of the project, as is shown on Plate 15. The flooding depth would be increased by between 0.25 and 1.0 foot. Most of the area is subject to a 0.25 foot increase. The estimated damages to structures in this area are shown on Table 14.

-- Increased depth of flooding would be induced on approximately 7 miles of local roads. The depth increase would be about 0.25 feet in most areas and the duration of the flooding would not be a significant increase. Therefore, this adverse affect is not considered significant.

-- Under existing conditions, Highway 101 would be overtopped at two critical areas up to a depth of about one foot for events between the 25-year frequency flood to the Standard Project Flood. The critical areas are just north of the highway bridge over Uvas Creek and near the junction of Highway 101 and Highway 25. Under project conditions, the highway would be overtopped to a depth of about two feet for six additional hours during the same floods. Therefore, it can be seen that the difference between project and pre-project conditions is small, causing little or no increase in damage effects to the highway.

-- A short term adverse impact would occur as a result of the hauling of earth from the borrow sites to the levee construction. A maximum of about three miles of local roads would be affected. The earth hauling operation would cause some inconvenience to local traffic and could damage the road pavements. These impacts would be mitigated by the inclusion of street traffic control and safety requirements, and provisions for the repair of the roads in the project construction specifications.

ALTERNATIVE 7

National Economic Development -

o Beneficial - As shown on Table 12, this alternative would have positive economic benefits, however the net benefits are much smaller than with Alternatives 1, 2 and 3.

o Adverse - Cost of project must be borne by the national economy.

TABLE 14

AREA OF INDUCED FLOODING
ESTIMATED DAMAGES
(Thousands $, October 1980)

	25-YEAR	50-YEAR	100-YEAR	SPF
Damage for One Event				
Existing Conditions	$339	$422	$523	$603
Project Conditions	$332	$450	$621	$712
Induced Damages	(-7)	28	98	109
Average Annual Damages				
Existing Condition	--	$ 22.8	$ 24.3	$ 25.0
Project Conditions	--	$ 23.4	$ 26.0	$ 26.8
Induced Affluence Damages	--	$ 0.3	$ 0.7	$ 0.8
Total Induced (Rounded)	--	$ 1	$ 2	$ 3

Additional detail concerning the induced damages is contained in Appendix 5

Environmental Quality -

o Beneficial - There would be no direct environmental quality benefit as a result of this plan.

o Adverse - There would be a minimal air quality impact as a result of construction generated traffic.

-- There would be some changes in aesthetic value due to the construction of the flood proofing facilities.

Social Well-Being -

o Beneficial - SPF protection, safeguarding of property would be provided.

o Adverse - There would be inconveniences to residents caused during construction of the flood proofing facilities. There would be the inconvenience of making closures to openings during periods of flooding and the required cleanup of debris and silt following flooding.

Regional Development -

o Beneficial - An estimated 25 jobs would be provided for the nine month construction period. An estimated average of 0.5 manyears annually would be required for maintenance of the facilities.

o Adverse - No impacts have been identified.

NO ACTION

National Economic Development -

o Beneficial - No impacts have been identified.

o Adverse - There would be no direct impact. The cost associated with implementation of the National Flood Insurance Program for Gilroy will be incurred.

Environmental Quality -

o There would be no direct beneficial or adverse impacts.

Social Well-Being -

o Beneficial - The flood insurance would provide for recovery of the cost to repair damages after flooding.

o Adverse - Flooding will continue to cause disruption to the community.

Regional Development -

o Beneficial - No impacts have been identified.

o Adverse - There will be some loss of income due to disruptions caused by flooding.

EVALUATION AND TRADE-OFF ANALYSIS

PLAN EVALUATIONS

An evaluation of the degree to which each of the detailed plans meets the planning objectives as developed in the Problem Identification section of this report is shown on Table 15.

Alternative 1 would effectively provide flood control for the City of Gilroy, however, would not adequately meet the environmental quality objective as identifed in the planning process. This plan would provide recreation opportunities, however, the value would be decreased by the loss of aesthetic quality due to vegetation removal.

Alternative 2 would effectively provide flood control and would partially meet the environmental quality objectives. This plan would serve to preserve the existing environmental quality in the project area but would not provide the desired enhancement. Recreation opportunities would be adequately provided.

Alternative 3 would effectively meet all the flood control, environmental quality, and recreation objectives identified in the planning process.

Alternative 7 would provide protection against damage to structures in the Gilroy urban area, but would not prevent the flooding and resulting disruptions. Alternative 7 would not contribute to the environmental and recreation objectives.

TRADE-OFF ANALYSIS

Each alternative results in trade-offs of the impacts identified in the previous section of this report. The more significant trade-offs are discussed in the following paragraphs.

In providing flood protection for the City of Gilroy, Alternatives 1, 2 and 3 would result in induced damages to the rural area to the south. As was shown in the previous section, the average annual induced damages are small, around $3,000, in comparison to net project benefits, all in excess of $550,000 for the above alternatives for SPF protection. The Corps has further decided that these induced damages should be mitigated.

Alternatives 1, 2 and 3 involve a trade-off of economic versus environmental quality benefits and adverse impacts. Alternative 1 would provide the largest net economic benefits but would result in a significant loss of riparian vegetation. Alternative 3 provides

TABLE 15
PLAN EVALUATION - PLANNING OBJECTIVES

PLANNING OBJECTIVES	LEVEE ALTERNATIVES			NONSTRUCTURAL
	1	2	3	7
Provide SPF Flood Protection for Gilroy	Provides SPF protection - some induced damages	Provides SPF protection - some induced damages	Provides SPF protection - some induced damages	Protects structures only. Does not eliminate flooding.
Preserve or Enhance Riparian Vegetation	Significant Loss	Minor Loss	Significant Enhancement	No Effect
Preserve Aesthetic Quality	Significant Loss	Minor Loss	Significant Enchancement	No Effect
Fish and Wildlife Resource	Significant Loss	Minor Loss	Enhancement	No Effect
Provide Recreation Opportunities	Provides bicycle and hiking trails	Provides bicycle and hiking trails	Provides bicycle and hiking trails. Enhances open space	Not consistent with recreation plans

space for expansion of the riparian vegetation and preserves a larger amount of open space, however, the cost of lands and relocation would be significantly higher. Alternative 2 will preserve most of the existing vegetation and open space with a somewhat lower cost than Alternative 3.

Alternative 7 would provide protection against damages to structures without the necessity of purchasing lands for rights of way, however, would not prevent flooding, would be more costly, and would result in significant inconveniences to affected residents.

MITIGATION REQUIREMENTS

In most instances mitigation measures can be included within the project alternatives as formulated.

The U.S. Fish and Wildlife Service (USFWS) has recommended that the riparian habitat along the creek be preserved and enhanced where possible. The USFWS report prepared in accordance with the Fish and Wildlife Coordination Act of 1958 and other USFWS correspondence regarding this project is contained in Section L of Appendix 3 of this report.

Loss of riparian vegetation resulting from project implementation can be best mitigated by planting native vegetation on presently open areas to compensate for any unavoidable losses in other areas where the levee location is constrained by existing facilities such as Uvas Park Drive or where slope protection is required. Although the existing vegetation is not inhabited by animals to any great extent, it provides significant aesthetic values. Much of the existing vegetation in the reach upstream of Miller Avenue has been removed and a significant amount of mitigatory planting can be accomplished there.

It has been determined that the damages caused by induced flooding in the rural areas south of Gilroy can be best mitigated by the purchase of flowage easements estimated to cost around $500,000 initially, with an amortized annual cost of around $37,000.

Flood proofing measures consisting of ring levees or combination ring levees and flood walls have also been evaluated as a means of mitigating the induced damages. The estimated total first cost of these facilities is $585,000 for SPF protection and $515,000 for 100-year protection. The estimated total annual costs are $58,000 for SPF protection and $53,000 for 100-year protection.

Site specific evaluations of the induced flooding mitigation requirements will be included in the Phase II GDM studies.

Mitigation measures required for the implementation of non-structural Alternative 7 would consist of architectural treatment and landscaping to minimize the impact on the aesthetic character of the affected areas within the city.

IMPLEMENTATION RESPONSIBILITIES

The implementation of the proposed project would be a joint Federal and local responsibility, costs being apportioned between the Federal and local governments and would be allocated among flood control and recreation.

COST ALLOCATION

The criteria used in the allocation of project cost is:

- Flood Control

-- Construction and operation and maintenance cost of all flood control facilities (including relocations) and the cost of all real estate and flowage easements to mitigate induced flooding damages for Alternatives 1, 2 and 3. There will be no real estate or easement costs for Alternative 7.

- Recreation

-- All construction and operation and maintenance costs for the recreation facilities.

-- Recreation lands limited to parking, access, health and safety uses (no additional lands are identified for recreation purposes at this time).

Cost allocations are summarized on Table 16.

COST APPORTIONMENT

Project costs are normally apportioned in accordance with the following criteria.

- Flood Control

-- Federal - First costs of construction of flood control facilities except for required relocation and transportation facilities including Thomas Road Relocation and bridge, Miller Avenue modification, and the utility relocations;

--Non-Federal - All costs of lands, rights-of-way, easements, and damages (per EM 1120-2-101, paragraph 1-84).

- First cost of construction and relocation and transportation facilities including Thomas Road relocation and bridge, Miller Avenue modification and the utility relocations. In accordance with EM 1120-2-101, paragraph 1-84, relocations are considered a portion of land easements and rights-of-way.

- All cost of operation and maintenance.

o Recreation

-- Federal - Fifty percent of project first cost.

-- Non-Federal - Fifty percent of project first cost and all operation and maintenance costs.

In accordance with Section 3 of the Flood Control Act of 1936, the Federal government will reimburse the local sponsor one-half of the excess costs whenever the cost of lands, rights-of-way, easements, and relocations exceed the Federal flood control construction costs.

The previously referenced Table 12 summarized the project costs and their apportionment.

FEDERAL RESPONSIBILITIES

The Corps of Engineers would be responsible for all advanced engineering and design studies, preparation of construction plans and specifications, and supervision and administration of construction of all the project facilities, excluding relocations.

In accordance with Section 3 of the Flood Control Act of 1936, the Federal government will reimburse the local sponsor one-half of the excess costs whenever the cost of lands, rights-of-way, easements, and relocations exceed the Federal flood control construction costs.

NON-FEDERAL RESPONSIBILITIES

Prior to the start of construction, local interests must enter into enforceable agreements as required by Section 221 of the Flood Control Act of 1970 and the Federal Water Project Recreation Act of 1965, drafts of these agreements are included in Appendix 11 of this report, agreeing to provide local cooperation. See page 77 for a listing of the requirements for local cooperation.

COMPARISON OF DETAILED PLANS

Each of the four detailed plans have been assessed for both the SPF and 100-year flood protection levels. Summary comparisons of each of the detailed plans and the "no action" plan are shown on Table 17. The impact on, or contribution to, the four accounts of the Principles and Standards for Planning Water and Related Land Resources (NED, EQ, SWB, and RD) are presented in the above mentioned Table 17.

COMPARISON OF DETAILED PLANS

The more significant points of plan comparison are presented in the following paragraphs.

o Each of the detailed plans was designed and assessed for the SPF (18,800 cfs) and the 100-year flood (17,000 cfs) and were defined in Appendix 6 of this report.

-- For leveed protection of an urban area, the SPF is a more desirable level of protection than the 100-year flood because it represents the most severe flood producing event that can be considered reasonably characteristic of a drainage basin and there is potential risk to life and high property values within such a developed area.

-- The SPF design alternatives have higher benefit to cost ratios than the 100-year design alternatives. All the alternatives have benefit to cost ratios in excess of unity.

-- The SPF protection alternatives have larger net benefits than the 100-year alternatives thereby resulting in a larger contribution to national and regional economic development.

-- The 100-year protection alternatives are not significantly more desirable than the SPF alternatives from the Environmental Quality standpoint.

-- Therefore, it is concluded that the SPF alternatives better serve the project objective than do the 100-year alternatives.

o Alternative 7 (nonstructural) would provide flood damage protection to the same structures as would Alternatives 1, 2 and 3.

-- Alternatives 1, 2 and 3 are preferred over Alternative 7 from a NED standpoint as they would result in substantially higher net economic benefits.

TABLE 17
COMPARISON OF ALTERNATIVES

ALTERNATIVES	PLAN 1 (NED PLAN)		PLAN 2 (SELECTED PLAN)		PLAN 3 (EQ PLAN)		PLAN 7 (NONSTRUCTURAL)		NO ACTION
PLAN DESCRIPTION	Levee along north side of Uvas Creek from 900 feet upstream of Miller Avenue to 2,000 feet south of Thoamas Road. Levee would have minimum setback of approximately 10 feet, plus Recreation Plan 1/.		Similar to Alternative 1 with the levee setback to minimize the removal of existing riparian vegetation and habitat, plus Recreation Plan 1/		Similar to Alternative 1 with the levee setback 100 feet or more, plus Recreation Plan 1/		This alternative consists of a series of protective measures around residential and commercial structures		If no flood protective action is taken the Flood Insurance Program will take effect along with the land use ordinance required by that program
ACCOUNTS									
1. NATIONAL ECONOMIC DEVELOPMENT (Cost and Benefits in $1000)									
a. Beneficial Impacts	SPF	100-Year	SPF	100-Year	SPF	100-Year	SPF	100-Year	
(1) Value of Increased Output of Goods and Services									
(a) Flood Control	$777	$514	$819	$557	$819	$557	$712	$449	NONE
(b) Recreation	$ 21	$ 21	$ 21	$ 21	$ 21	$ 21	$ 0	$ 0	NONE
(2) Total Annual Benefits	$798	$535	$840	$578	$840	$578	$712	$449	NONE
b. Adverse Impacts									
(1) Total Project First Cost	$2,510	$2,420	$3,384	$3,130	$3,560	$3,470	$5,840	$5,180	NONE
(2) Annual Project Cost	$200	$194	$265	$246	$277	$271	$469	$420	NONE
(3) Annual Induced Damages 2/	$ 3	$ 2	$ 3	$ 2	$ 3	$ 2	$ 0	$ 0	NONE
c. Net Benefits	$598	$341	$575	$332	$563	$307	$243	$ 29	NONE
2. ENVIRONMENTAL QUALITY									
a. Environmental Quality Enhanced									
(1) Preservation of Open Space	Will preserve natural channel and 7 acres of over bank land		Will preserve channel and 12 acres of overbank land		Will preserve channel and 22 acres of over-bank land		NONE		NONE
(2) Maintenance or Enhancement of Riparian Habitat	Does not maintain or protect riparian habitat		Maintains most present riparian habitat		Enhancement of riparian habitat areas due to buffer zone		NONE		No damage to riparian habitat

1/ Recreation Plan consists of 1.2 miles of bikeways, 1.3 miles of trail, and one staging area with parking for 15 cars.
2/ Induced damages have not been subtracted in the determination of net benefits since these damages would be mitigated by the purchase of flowage easements.

TABLE 17
COMPARISON OF ALTERNATIVES

ALTERNATIVES	PLAN 1 (NED PLAN)	PLAN 2 (SELECTED PLAN)	PLAN 3 (EQ PLAN)	PLAN 7 (NONSTRUCTURAL)	NO ACTION
ACCOUNTS					
2. ENVIRONMENTAL QUALITY					
b. Environmental Quality Degraded					
(1) Degradation of Riparian Habitat	Destruction of riparian habitat	Minor destruction of habitat	NONE	NONE	NONE
(2) Air Quality	Minor impact during construction and maintenance. Minor (0.03 CO) impact due to recreation	Minor impact during construction and maintenance. Minor (0.03 CO) impact due to recreation	Minor impact during construction and maintenance Minor (0.03 CO) impact due to recreation	Minor impact during construction and maintenance	NONE
(3) Water Quality and Fisheries	Minor temperature increase. No significant effect on fish.	Minor temperature increase. No significant effect on fish	Minor temperature increase. No Significant effect on fish	NONE	NONE
3. SOCIAL WELL BEING					
a. Beneficial Impacts					
(1) Community Well Being	Provides Standard Project Flood protection safeguarding property and residential development	Provides Standard Project Flood protection safeguarding property and residential development	Provides Standard Project Flood protection safeguarding property and residential development	Provides Standard Project Flood protection safeguarding property and residential development	Flood insurance would provide for recovery of costs after flooding
(2) Improvement of Community Cohesion	Flood evacuation and flood proofing measures eliminated	Flood evacuation and flood proofing measures eliminated	Flood evacuation and flood proofing measures eliminated	NO CHANGE	NO CHANGE
(3) Improvement of Leisure Facilities and Public Facilities	Provides recreational opportunities	Provides recreational opportunities	Expanded area for recreation with setback levee. Provides recreational opportunities	NO CHANGE	NO CHANGE
b. Adverse Impacts					
(1) Disruption of Community	Thomas Road bridge must be raised; two farm buildings will be relocated. Temporary detour on Thomas Road	Thomas Road bridge relocated; two farm buildings and one home will be relocated. One family to be moved	Thomas Road bridge relocated; five farm buildings and one home relocated. One family to be moved	Inconvenience of local protective works and flood walls	Flood will continue to cause disruption

TABLE 17
COMPARISON OF ALTERNATIVES

ALTERNATIVES	PLAN 1 (NED)	PLAN 2 (SELECTED PLAN)	PLAN 3 (EQ PLAN)	PLAN 7 (NONSTRUCTURAL)	NO ACTION
ACCOUNTS					
4. REGIONAL DEVELOPMENT					
a. Beneficial Impacts					
(1) Quantity of Increased Employment	Estimated 10 skilled, 12 semi-skilled and 0 unskilled workers during a 6 month construction period	Estimated 10 skilled, 12 semi-skilled and 0 unskilled workers during a 6 month construction period	Estimated 10 skilled, 12 semi-skilled and 0 unskilled workers during a 6 month construction period	Estimated 15 skilled, 10 semi-skilled and 0 unskilled workers during a 9 month construction period	NONE
(2) Land Use	Eliminates flooding on 680 acres	Eliminates flooding on 680 acres	Eliminates flooding on 680 acres	NONE	NONE
(3) Transportation	Flooding eliminated on 10 miles of road	Relocated Thomas Road will improve transportation network. Flooding eliminated on 10 miles of road	Relocated Thomas Road will improve transportation network. Flooding eliminated on 10 miles of road	NONE	NONE
b. Adverse Impacts					
(1) Value of Income Lost	50 acres taken from county tax rolls	56 acres taken from county tax rolls	64 acres taken from county tax rolls	NONE	Loss of income after flooding
(2) Land Use	Purchase of 50 acres of undeveloped land for levee, recreation, and habitat. Increased depth of flooding on 2600 acres of land	Purchase of 55 acres of undeveloped land for levee, recreation, and habitat. Increased depth of flooding on 2600 acres of land	Purchase of 64 acres of undeveloped land for levee, recreation, and habitat. Increased depth of flooding on 2600 acres of land	NONE	NONE
(3) Transportation	Increased depth of flooding of 0.25 to 1.0 feet induced on Highway 101 and 7 miles of local roads for an additional time of up to 7 hours. Temporary effects on traffic and roads due to earth hauling operations.	Increased depth of flooding of 0.25 to 1.0 feet induced on Highway 101 and 7 miles of local roads for an additional time of up to 7 hours. Temporary effects on traffic and roads due to earth hauling operations.	Increased depth of flooding of 0.25 to 1.0 feet induced on Highway 101 and 7 miles of local roads for an additional time of up to 7 hours. Temporary effects on traffic and roads due to earth hauling operations.	NONE	NONE

-- From a Regional Development standpoint the alternatives are nearly equal. Alternatives 1, 2 and 3 would have the adverse impact of the removal of land from the tax rolls. In Alternative 7 the construction of some of the nonstructural facilities could result in some physical constraints on the use of land and improvements. Alternatives 1, 2 and 3 would also prevent the short term disruption of local transportation caused by the flooding of streets and roads.

-- Alternatives 1, 2 and 3 are preferred from a Social Well-Being standpoint since they would enhance the recreation opportunities associated with the project and would exclude flooding from that affected flood plain area while Alternative 7 would not provide for recreational development and would only prevent structural damage and not inconveniences and disruptions of activities caused by the land flooding.

-- Alternatives 1, 2 and 3 are preferred over Alternative 7 from an Environmental Quality standpoint since they would provide positive protection of the riparian vegetation along the creek. Alternative 7 would not, in itself, adversely impact the creek, however, it would not provide the positive protection that is possible through the purchase of lands along the creek.

-- Therefore it is concluded that Alternatives 1, 2 and 3 better meet the project objectives than Alternative 7.

o Alternatives 1, 2 and 3 (SPF) are the same except for the amount of levee setback from the existing natural channel bank and the method of handling the necessary modification to the Thomas Road bridge and approaches.

-- The larger levee setback will preserve and/or enhance riparian habitat, open space and aesthetic value, therefore, from an Environmental Quality standpoint the alternative preference order is 3, 2 and 1 (SPF).

-- Based on net economic benefits, the order of preference from a National Economic Development standpoint is 1, 2 and 3 (SPF)

-- As a result of the preservation and/or enhancement of habitat, the order of preference from a fish and wildlife standpoint is 3, 2 and 1 (SPF)

-- From the standpoint of Social Well-Being (SWB) resulting from the implementation of the recreation plan, order of preference is 3, 2 and 1 (SPF). The larger levee setbacks would provide for greater flexibility in the implementation of potential recreation programs and the added open space would be more compatible with projected recreation uses.

-- From a Regional Development standpoint, the alternatives are nearly equal. The order of preference based on minimizing the amount of land taken from the county tax rolls would be 1, 2 and 3 (SPF).

-- From the standpoint of Executive Order 11988 (Flood Plain Management) the order of preference is 3, 2 and 1 (SPF). The larger levee setback would slightly reduce the amount of land available for development in the existing flood plain.

o Therefore, based on the above factors, it is concluded that Alternative 2 is preferred over Alternative 1 since it better preserves the riparian habitat and open space and aesthetic value of the creek. In the opinion of the Corps, Alternative 1 would not receive local support and would be inconsistent with the expressed views of the Fish and Wildlife Service.

o In the opinion of the Corps, there is not enough environmental enhancement associated with Alternative 3 to justify the cost of the additional lands required for the larger levee setback. The local sponsoring agencies do not support the added expenditures for these additional lands. Therefore, Alternative 2 is preferred over Alternative 3.

RATIONALE FOR SELECTION OF NED PLAN

Alternative 1 has been selected as the NED Plan as it results in the greatest net economic benefits ($598,000 annually) and therefore would make the largest contribution to the National Economic Development. Alternative 2 results in nearly equal net flood control benefits ($575,000 annually). Alternatives 3 and 7 would yield estimated net benefits of $563,000 and $243,000, respectively.

RATIONALE FOR DESIGNATION OF EQ PLAN

Alternative 3 has been designated as the Environmental Quality Plan for the proposed project. This alternative would result in an enhancement of the existing environmental quality conditions. The large levee setback used in this alternative would result in an opportunity for expansion of riparian habitat, thereby enhancement of wildlife values. The plan would provide greater open space, thus enhancing the aesthetic values and recreational opportunities for the project area.

RATIONALE FOR SELECTED PLAN

The San Francisco District recommends that Alternative 2, designated for the Standard Project Flood (SPF) be selected as the plan that is in the best Federal interest and best serves to achieve the planning objectives for this project. The rationale for this recommendation is summarized as follows:

o It has been determined that providing protection for the Standard Project Flood is economically viable for all alternatives considered, and provides greater total and net benefits than 100-year protection.

o Alternative 2, along with Alternatives 1 and 3, provide protection to the developed area in the southern portion of the City of Gilroy.

o Alternative 2 is compatible with the County of Santa Clara and City of Gilroy's plans for the Uvas Creek Linear Park. Open space and aesthetic values are maintained by this alternative.

o Alternative 2 provides for preservation of the existing riparian vegetation and riparian habitat of the creek.

o Alternative 2 is in compliance with Executive Order 11988 - Flood Plain Management, as the flood plain is not changed to encourage development.

COMPLIANCE WITH EXECUTIVE ORDER 11988

In accordance with ER 1165-2-26, paragraph 8, items a through h, the following considerations relate the selected plan for Uvas-Carnadero Creek to the requirements of Executive Order 11988:

o The project does not affect the base flood plain. The main purpose of the project is to reduce flows in the base flood plain in order to provide flood protection for existing development within the flood plain. In this, it complies with the second and third objectives of EO 11988 to reduce the hazard and risk of flood loss and minimize the impact of floods on human safety, health, and welfare.

o The first objective of EO 11988 is to avoid the base flood plain unless it is the only practicable alternative. If the project is to accomplish its purpose, then there is no practicable alternative to the project location and action.

o The public has been advised of the proposed project through a notice of study initiation issued in December 1978 and through the formation of a Citizens Advisory Committee with meetings held in April 1979 and October 1980.

o The draft Phase I GDM was distributed for review by the public and other interested entities on December 29, 1980, and public meeting to review the project was held in Gilroy on February 4, 1981.

o Over 95 percent of the protected flood plain has already been developed for residential, commercial and industrial uses. The protected flood plain represents about 15 percent of the existing flood plain. The unprotected flood plain is nearly all in agricultural and open space uses. Approximately 60 percent of the flood plain area will be subject to a minor degree of induced flooding due to the proposed project.

o Construction of the proposed project would not affect the ongoing economic growth and development within the flood plain areas. The City of Gilroy is participating in the National Flood Insurance Program, and development within the city is continuing in flood hazard areas in compliance with the Flood Insurance Act. This is being accomplished largely by constructing the first floor level above the base flood plain. Future development will take place whether or not the project is built. Location and intensification benefits are, therefore, not expected as a result of the project.

o All alternatives addressing the flood problems would have some impact on the subject flood plains except the no action plan. The consequences of taking no action would include a continuation of flood damages estimated at $640,000 annually, continued flood hazards to life and health, and a continuation of temporary disruptions during periods of high water.

o Others involved in this study include the City of Gilroy, County of Santa Clara, Santa Clara Valley Water District, State of California, and local residents of the flood plains.

o The proposed plan is the plan responsive to and consistent with the objectives of EO 11988. This plan would reduce the hazard and risk of flood loss and minimize the impact of floods on human safety, health, and welfare. In doing so it would not be practicable to avoid the base flood plain. However, that flood plain is already extensively developed and the project would only protect the existing structures and future development that will take place regardless of the project's construction.

COMPLIANCE WITH OTHER PLANNING CONSTRAINTS

The proposed project was determined to be in compliance with Section 404 of the Clean Water Act of 1977 since the project will have minimal water quality impacts. Detailed findings with regard to Section 404 are included in Paragraphs 1.08 through 1.11 of the following project Environmental Statement and in Appendix 11 of this report. Appendix 11 and the Environmental Statement serve to satisfy the requirements of Section 404. The project would result in little or no impact on water quality since all construction would be during periods of low or no flow. A state of California Water Quality Certificate would be obtained for the project.

The degree of compliance of each of the alternative plans with regard to the requirements of the various environmental laws, executive orders and policies and land use plans and controls as included in the planning constraints for the proposed project are summarized on Table I-3 of the Environmental Statement, and are discussed in Paragraph 1.18 through 1.45 of the Statement.

THE SELECTED PLAN

Alternative 2 (SPF) basically consisting of a levee, designed for SPF protection, along the north side of Uvas Creek from approximately 2,000 feet downstream of Thomas Road to approximately 1,300 feet upstream of Miller Avenue has been selected by the San Francisco District, Corps of Engineers, as the plan that best achieves the planning objectives for the Uvas-Carnadero Creek project.

DESCRIPTION OF THE SELECTED PLAN

The selected plan would consist of construction of a new levee from approximately 2,000 feet downstream of Thomas Road to approximately 1,100 feet downstream of Miller Avenue. About 1,100 feet of the existing levee downstream of Miller Avenue would be reconstructed while approximately 1,300 feet of the recently constructed levee upstream of Miller Avenue would be raised. The plan includes the relocation of Thomas Road and the construction of a new bridge approximately 100 feet upstream of the existing crossing. Miller Avenue would be raised to match the project levee and several relatively minor utility relocations would be required. Recreation facilities consisting of an asphalt paved bike trail, graded earth hiking trail, and a parking and staging area are included in the selected plan. Mitigation measures consisting of flowage easements for areas subject to project induced flooding and revegetation measures to mitigate the loss of riparian vegetation resulting from levee construction and riprap installation are included in the selected plan.

The following paragraphs provide more detailed descriptions of the various elements of the selected plan.

Levee Location and Length - On the north side of Uvas Creek from a point about 2,000 feet south of Thomas Road to about 1,300 feet upstream of Miller Avenue. The total length of the levee is approximately 8,200 feet.

Design Flows - 18,800 cubic feet per second for the SPF.

Levee Configuration - Twelve foot top width, asphalt concrete and gravel surfaced, with 3 to 1 waterside and 2 to 1 landside embankment slopes.

Levee Height - Ten foot maximum, average about six foot. The levee height provides a minimum of three foot freeboard under the design flow conditions.

Levee Setback - Behind existing tree line except adjacent to Uvas Park Drive where there is insufficient space between the trees and the street.

Slope Protection - Slope protection consisting of riprap or gabion mats or walls would be provided at critical locations on the existing channel and at the end of the levee. The slope protection in the channel would be minimized to limit removal of vegetation. The riprap would consist of quarry stone with a thickness of around 1 to 1.5 feet as determined by channel velocities and configuration. The gabion would be a minimum of one foot in thickness and would be used as appropriate to minimize vegetation removal and existing bank disturbance.

Thomas Road and Bridge - The approach road would be relocated and a new bridge constructed about 100 feet upstream of the existing crossing. The new bridge would provide two standard traffic lanes and a five foot sidewalk and would be a four span reinforced concrete tee beam with a total length of about 210 feet.

Miller Avenue - Miller Avenue would be raised by about two feet to match the required levee elevation for SPF protection.

Utilities - Utility relocations or modifications would consist of:

o Water main relocation at Thomas Road.

o Sewer line relocation and possible pump station modification at Thomas Road.

o Power line relocation near Thomas Road.

o Wastewater reclamation line relocation at about 1,200 feet downstream of Miller Avenue.

Borrow Material - Three potential sites have been identified as sources of borrow material for the levee construction:

o Llagas Creek Flood Control Project located about two miles west of the project area. This project, being implemented by the U.S. Soil Conservation Service, is scheduled for construction in the period from 1984 to 1988 and would have substantial amounts of excess material as a result of channel excavation. The project cost estimates contained in this report are based on using this source of material.

o A commercial borrow pit on Canada Road about five miles west of the project could be used if the above site is not available or feasible.

o The City of Gilroy has proposed the development of a recreation pond in Uvas Creek at about 2,500 feet upstream of Miller Avenue. The viability of the use of this site as a borrow source would require soils investigation and an assessment of the impact on the creek, especially fisheries.

The Llagas Creek Project has been selected as the best potential source of borrow. The use of material from the proposed recreation pond would be considered if this project is implemented by the City. The recreation pond is not part of the proposed project as formulated. The commercial site could be used if no other sources are available.

The project cost estimate for borrow and haul includes the cost of repairs to existing roads that may result from the project construction.

Recreation Facilities - The project recreation plan provides facilities within the project area that would be incorporated into the Uvas Creek Linear Park being planned by the City of Gilroy and the County of Santa Clara. The facilities would include:

o Approximately 1.2 miles of ten foot wide asphalt paved bikeway on top of the project levee about 1,300 feet upstream of Miller Avenue to Thomas Road.

o Approximately 1.2 miles of hiking on the waterside of the levee with access ramp to the stream channel at intervals over the project length.

o A staging area at Thomas road with paved parking for 15 cars.

o Access ramps to the bikeway at Miller Avenue, Tenth Street, and Thomas Road.

Additional details regarding the flood control and recreation facilities are included in Appendices 2 and 3 of this report. Due to the relatively small scope of the project, a Recreation Master Plan and Feature Design Memoranda for Flood Control and Recreation will not be prepared. All features necessary for the preparation of plans and specifications shall be included in the Phase II General Design Memorandum.

MITIGATION REQUIREMENTS

In most instances mitigation measures can be included within the project alternatives as formulated.

The U. S. Fish and Wildlife Service (USFWS), California Department of Fish and Game, and others, has recommended that the riparian habitat along the creek be preserved and enhanced where possible. The USFWS report regarding this project is contained in Section L of Appendix 3 of this report.

Loss of riparian vegetation resulting from project implementation can be best mitigated by planting native vegetation on presently open areas to compensate for any unavoidable losses in other areas where the levee location is constrained by existing facilities such as Uvas Park Drive or where slope protection is required. Although the existing vegetation is not inhabited by animals to any great extent, it provides significant aesthetic values. Much of the existing vegetation in the reach upstream of Miller Avenue has been removed and a significant amount of mitigatory planting can be accomplished there. Specific measures that would be used to preserve the creek water quality and mitigate the loss of riparian vegetation include the following:

o Slope protection and levee construction will be conducted during period of low flow.

o The landside and waterside levee slopes and berm and streambanks at the bridge crossing and slope protection sites will be hydromulched with grass.

o The vegetation removal to be accomplished in connection with the slope protection work will be coordinated with the State Department of Fish and Game, the National Marine Fisheries Service, and the USFWS.

o Vegetative plantings to offset project-induced losses will be established within the limitations to maintain levee stability and channel capacity. During preparation of the Phase II General Design Memorandum, a conceptual landscape plan will be established through coordination with the State Department of Fish and Game, National Marine Fisheries Service and the USFWS. The plantings shall be in accordance with EM 1110-2-301, "Landscape Planting at Floodwalls, Levees and Embankment Dams," and the State of California Reclamation Board "Guide for Vegetation on Project Levees."

It has been determined that the damages caused by induced flooding in the rural areas south of Gilroy can be best mitigated by the purchase of flowage easements estimated to cost around $500,000 initially, with an amortized annual cost of around $37,000.

Flood proofing measures consisting of ring levees or combination ring levees and flood walls have also been evaluated as a means of mitigating the induced damages. The estimated total first cost of these facilities is $585,000 for SPF protection and $515,000 for 100-year protection. The estimated total annual costs are $58,000 for SPF protection.

Site specific evaluations of the induced flooding and mitigation requirements will be included in the Phase II GDM studies.

COST ESTIMATE FOR THE SELECTED PLAN

FIRST COSTS - CONSTRUCTION

All cost estimates have been determined from preliminary designs, quantity estimates and unit prices developed from the following sources:

- o Dodge Guide to Public Works and Heavy Construction Cost
- o Means Building Construction Cost Data
- o Building Cost File - Western Edition
- o Engineering News Record
- o Bid prices from related or similar projects including City of Gilroy road construction
- o Discussions with local contractors and materials suppliers

All costs were adjusted to October 1980 levels by means of the Engineering News Record cost indices. Costs developed from the national guides listed above were adjusted for geographical differences in accordance with the indices for labor, equipment, and materials as given in the guides. The unit prices used take into consideration the magnitude of the work and set up time. A separate estimate for mobilization was not used.

A contingency factor of 20 percent was added to all costs to provide for costs not fully defined at the current level of study.

FIRST COSTS - ENGINEERING AND DESIGN, SUPERVISION AND ADMINISTRATION

Costs for engineering and design, and construction supervision and project administration were determined from experience on other Corps projects and documented costs to date.

FIRST COSTS - LAND AND RELOCATIONS

Land value trends in the Gilroy vicinity and overall Santa Clara County area have moved upward at a higher rate than nationwide trends and inflation. Land sales in the last two years have increased at an estimated 30 to 40 percent per year.

For purposes of this report, good functional residential property within the city limits has been valued at $20,000 to $30,000 per acre. Lands outside the city limits are at $15,000 per acre or less. Channel lands have been valued at $1,000 per acre. Overbank lands are valued the same as adjacent residential or agricultural lands.

The channel lands owned by the City of Gilroy are used for recreation and open space purposes which will not be altered by the project. No project costs have been included for this land.

Costs for purchase of improvements and relocations are based on preliminary property appraisals.

FIRST COST - FLOWAGE EASEMENTS

Flowage easement costs were based on the number and value of the affected property and the preliminary estimate of induced damages. Detailed, site specific evaluations of induced flooding damages and flowage easement costs will be included in the Phase II Advanced Engineering and Design Studies.

ESTIMATED FIRST COST SUMMARY

The estimated first costs, at October 1980 levels, for the selected plan are summarized as follows:

Construction - Flood control work, levees and slope protection	$772,000
Construction - Thomas Road relocation and bridge, Miller Avenue modification and utility relocations	$537,000
Construction - Recreation facilities	$ 89,000
Engineering and Design	$385,000
Supervision and Administration	$140,000
Real Estate - Lands and Property Relocations	$961,000
Flowage Easements	$500,000
Total	$3,384,000

Detailed breakdowns of estimated flood control facility construction, real estate and relocation costs are included in Appendix 2 of this report. A detailed breakdown of recreation facility costs is included in Appendix 3.

ANNUAL COST

Annual interest and amortization costs have been estimated using a discount of 7 3/8 percent and a 100 year amortization period in accordance with Federal guidelines.

Operation and maintenance activities will consist of weed control, local erosion corrective action, roadway maintenance grading and resurfacing, rodent control, the inspection and repair of structures, and minor replacements. No major replacements are included since all the project facilities are expected to have a useful life equivalent to the project life of 100 years. Cost estimates for operation and maintenance activities are based on guidelines developed from records of similar projects as given in Engineering Division Memorandum Number 198 of the Sacramento District, Corps of Engineers. A detailed breakdown of these costs is included in Appendix 2.

Operation and maintenance cost for recreation facilities were estimated based on data and estimates contained in the "Sacramento Bikeway Master Plan" by the Sacramento City-County Bikeway Task Force dated January 1975. Costs were updated to October 1980 levels. A detailed breakdown of estimated operation and maintenance costs are included in Appendix 2.

ESTIMATED ANNUAL COST SUMMARY

The estimated annual cost, at October 1980 levels, is summarized as follows:

Flood Control and Associated Relocation (including all engineering, design, supervision and administration)

Interest and Amortization	$241,600
Operation and Maintenance	$ 11,400
Total	$253,000

Recreation (including engineering, design, supervision and administration)

Interest and Amortization	$ 8,200
Operation and Maintenance	$ 3,800
Total	$ 12,000

COMPARISON OF COST ESTIMATES

Cost estimates for the project as included in the original authorization of 1944 were:

- o Federal First Cost

Levee Construction

Clearing right-of-way	$ 400
Earthwork	$10,200
Bank Protection	$48,400
Total Federal First Cost	$59,000

- o Non-Federal First Cost

Easement for levee construction and maintenance	$ 4,000
Flowage rights for flooding upstream and downstream lands	$ 2,000
Total Non-Federal First Cost	$ 6,000
Total First Cost	$65,000

Cost estimates as included in the latest approved estimate (PB-3) of October 1, 1980, is:

- o Federal Cost

Channel levees	$ 520,000
Engineering and Design	$ 330,000
Supervision and Administration	$ 90,000
Total Federal	$ 940,000

- o Non-Federal Cost

Land and Damages	$ 310,000
Total Cost	$1,250,000

The difference in costs between those included in the original 1944 authorization and the latest approved estimate (PB-3) is the result of changed price levels for construction and lands, and a more accurate definition of facilities and right-of-way requirements.

The difference between the costs and the estimate for the selected plan and the latest approved estimate (PB-3) as shown above can be primarily attributed to the following factors:

o Authorized plan was based on 100-year (one percent) design flood instead of SPF as used in selected plan.

o Added rights-of-way required to accommodate levee setback as required to preserve the existing riparian vegetation.

o Added cost for the construction of a new Thomas Road bridge and relocation that was not included in previous costs.

o Added costs for the purchase and relocation of one home and two farm buildings that were not included in previous estimates.

o Added costs of relocation of existing utilities and modification of Miller Avenue that were not defined in previous estimates.

o Added costs of recreation facilities.

o Higher costs of flowage easements for the area of induced flooding as defined in the GDM studies.

o Determination of the structural inadequacy of the existing levee located downstream of Miller Avenue.

o Identification of the need to raise the existing levee upstream of Miller Avenue.

o Higher escalation of both construction and land costs in the project area than was used in the cost adjustments for the approved estimate.

o Added costs for engineering, design, supervision and administration due to the added and more complex facilities such as the Thomas Road bridge.

Other than those listed above, the only significant physical difference between the authorized and selected plan is the proposed levee lengths of approximately 2.0 and 1.5 miles respectively.

ACCOMPLISHMENTS AND BENEFITS FOR THE SELECTED PLAN

The selected plan would provide flood protection to the presently urbanized area of the City of Gilroy. It would eliminate the potential for flooding on about 680 acres of urbanized lands and would provide protection for approximately 340 fixed single family homes, 180 mobile homes, 20 multiple family units, and 16 commercial and industrial establishments. There would also be savings in future costs required to floodproof structures that would be constructed on presently vacant land within the urbanized area.

Flooding would be eliminated on approximately 10 miles of local streets and roads. The relocation of Thomas Road and the construction of a new Thomas Road bridge would also improve local transportation.

An estimated 22 short-term jobs would be generated during project construction period of around nine months and operation and maintenance activities would generate employment averaging 0.3 manyears annually.

The selected plan would protect most of the riparian vegetation along the channel since the levee is located outside of the creek's tree line wherever possible. Unavoidable removal of vegetation would be mitigated by planting in presently unvegetated areas.

Recreational opportunities would be provided by the bicycle and hiking trails included in the project with an estimated usage of 8,500 recreation days initially, increasing to 17,000 by the year 2000.

The project economic benefits as based on October 1980 price levels, a discount of 7 3/8% and a 100 year amortization period, are summarized in the following table.

SELECTED PLAN
SUMMARY AND ALLOCATION OF BENEFITS

FLOOD CONTROL	
Flood Damage Reduction	$640,000
Affluence Benefits	$ 72,000
Advanced Bridge Replacement	$ 43,000
Savings in Cost to Fill (Future Condition)	$ 65,000
TOTAL FLOOD CONTROL - EXISTING CONDITION	$754,000
TOTAL FLOOD CONTROL - FUTURE CONDITION	$819,000
RECREATION	$ 21,000
TOTAL BENEFITS - EXISTING CONDITION	$775,000
TOTAL BENEFITS - FUTURE CONDITION	$840,000

SUMMARY OF COSTS AND BENEFITS

A summary of all costs and benefits for the selected plan are summarized in the following table.

SELECTED PLAN
SUMMARY OF COST AND BENEFITS

TOTAL FIRST COST	$3,384,000
TOTAL ANNUAL COST	$ 265,000
TOTAL ANNUAL BENEFITS - EXISTING CONDITION	$ 775,000
TOTAL ANNUAL BENEFITS - FUTURE CONDITION	$ 840,000
TOTAL NET BENEFITS - EXISTING CONDITION	$ 510,000
TOTAL NET BENEFITS - FUTURE CONDITION	$ 575,000
BENEFIT TO COST RATIO - EXISTING CONDITION	2.9
BENEFIT TO COST RATIO - FUTURE CONDITION	3.2

All costs and benefits are at October 1980 price levels and are based on a discount rate of 7 3/8% and a 100 year amortization period.

COST APPORTIONMENT AND REPAYMENT

The apportionment of project costs for the selected plan shall be in accordance with the provisions included in the local sponsor agreements for recreation and flood control contained in Appendix 11 of this report. These provisions are summarized as follows.

FEDERAL COST

o Construction, engineering, design, supervision and administration costs of project flood control facilities.

o Fifty percent of the construction, engineering, design, supervision and administration costs of the project recreation facilities.

o In accordance with Section 3 of the Flood Control Act of 1936, the Federal government shall reimburse the local sponsor one-half of the excess expenditures whenever the costs of lands, easements, right-of-way or relocations exceeds the Federal construction costs of flood control facilities.

LOCAL COSTS

o All lands, easements and rights-of-way.

o All costs of changes in existing improvements including utilities, roads and bridges.

o Fifty percent of all costs of the project recreation facilities.

o All operation and maintenance costs.

o Cost of flowage easement or flood proofing measures for all areas of project induced flooding.

o Wherever the cost of lands, easements, rights-of-way, and changes in existing improvements exceed the Federal cost of construction of flood control facilities, the Federal government will reimburse the local sponsor one-half of such excess costs.

ESTIMATED APPORTIONED COST

Based on the above criteria, the estimated apportioned cost for the selected plan would be:

First Cost	
Federal	$1,690,000
Local	$1,690,000
Annual Cost	
Federal	$124,600
Local	$139,800

REQUIREMENTS FOR LOCAL COOPERATION

Prior to the start of construction, the local sponsors for flood control and recreation must enter into agreements as required by Section 221 of the Flood Control Act of 1970 and the Federal Water Project Act of 1965 that define the requirements for local cooperation for the proposed project. Drafts of these agreements along with letters of acknowledgement from the local sponsors; the Santa Clara Valley Water District, for flood control; and the City of Gilroy, for recreation, are included in Appendix 11 of this report. These agreements include the following provisions.

For flood control:

a. Provide without cost to the United States, all lands, easements, and rights-of-way necessary for construction of the project.

b. Hold and save the United States free from damages resulting from construction of the works.

c. Make at their expense all necessary changes in existing improvements, including utilities and highway bridges.

d. Maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of the Army.

e. Furnish without cost to the United States induced flood damage easements or flood proof structures in the areas of induced flooding as a result of the project as shown on Plate 15 of this report.

f. Prevent encroachment upon the project channels of any works detrimental to the flood control purposes of the project.

g. Provide guidance and leadership in preventing unwise further development of the flood plain by use of appropriate flood plain management techniques to reduce flood losses.

h. At least annually inform affected interests of the degree of protection provided by the project.

i. Maintain and operate after completion the existing project channels and manage the land between the setback levees for wildlife in accordance with regulations prescribed by the Secretary of the Army.

j. Give the government a right to enter upon, at reasonable times and in a reasonable manner, lands which the local sponsor owns or controls for access to the project for purposes of inspection, and for the purpose of operating, repairing and maintaining the project, if such inspection shows that the sponsor for any reason is failing to properly repair and maintain the project facilities.

And provided further, that whenever expenditures for lands, easements, and rights-of-way by the local sponsor for the project shall have exceeded the present estimated construction cost therefore, the sponsor concerned will be reimbursed one-half of its excess expenditures over said estimated construction cost: And provided further, that the Secretary of the Army shall determine the proportion of the present estimated cost of said lands, easements, and rights-of-way that the sponsor should contribute in consideration for the benefits to be received by the sponsor.

For recreation:

k. Provide all lands outside the flood control rights-of-way that are necessary for parking, access, health and safety and other recreational associated uses.

l. Pay, contribute in kind, or repay with interest that portion of the cost of recreation facilities, which when added to the cost of recreation lands, would amount to 50 percent of the total first cost of the recreation lands and facilities.

m. Administer, maintain, operate and replace the recreation facilities provided by the project in accordance with regulations established by the Secretary of the Army.

For both sponsors:

n. Comply with Title VI of the Civil Rights Act of 1964.

o. Comply with the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Items a, b, c, and d of the above responsibilities were included in the requirements for local cooperation as contained in the original project authorization and enumerated under the section on Authorization of this report.

Items f and g, above, were not included in the original authorization as these are more recent requirements developed in accordance with current flood plain management policies.

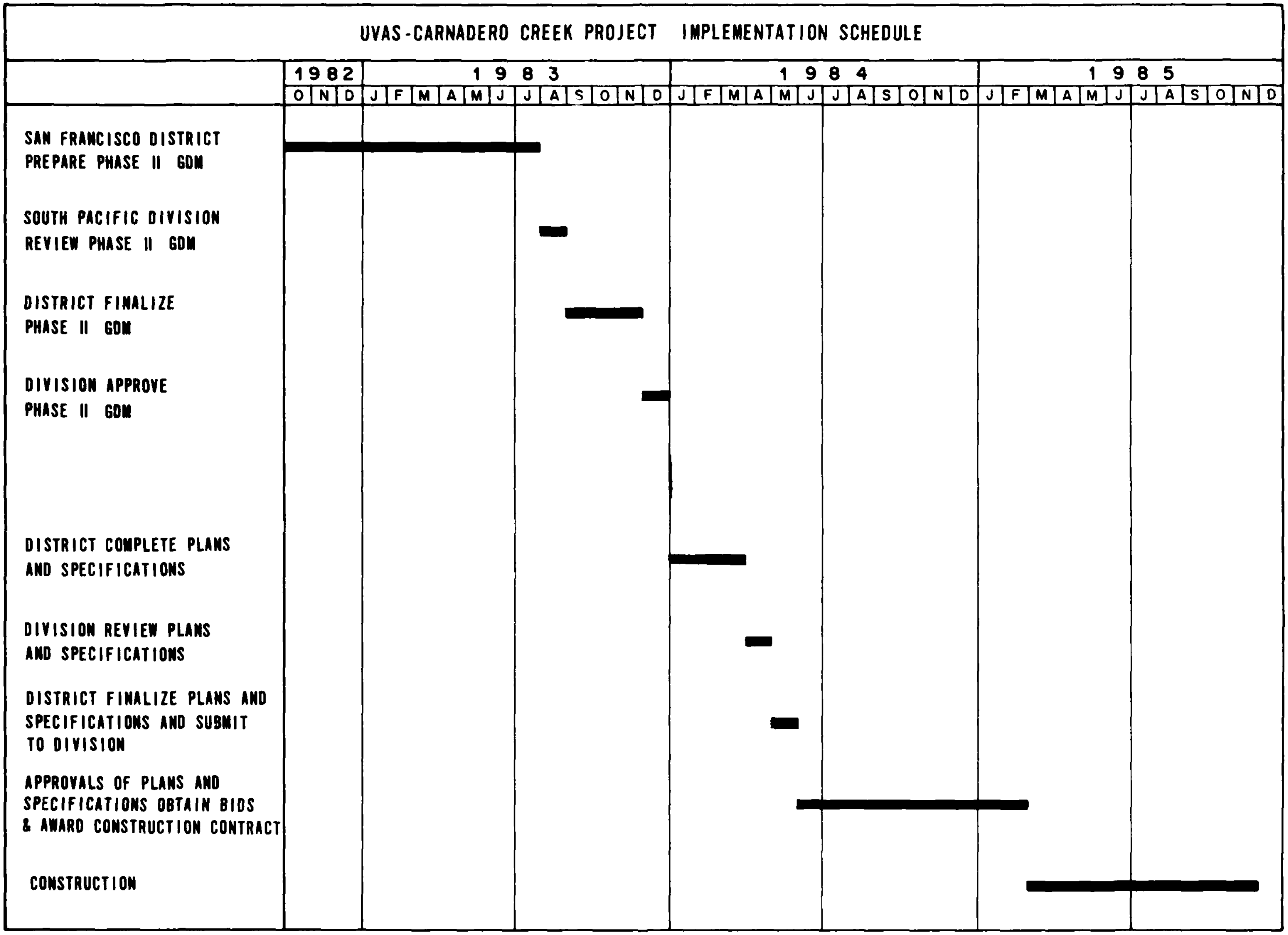
Item h, above, was not included in the authorization since recreation was not included in the project as originally formulated.

Items i through o were not included in the authorization since they result from more recent Federal legislation.

IMPLEMENTATION SCHEDULE

A preliminary schedule for project implementation is shown on the following page. This schedule is predicated on current and projected Congressional funding for the project.

Due to the relatively small scope of the project, a Recreation Master Plan and Feature Design Memoranda for Flood Control and Recreation will not be prepared. All features necessary for the preparation of plans and specifications shall be in the Phase II General Design Memorandum.


UVAS-CARNADERO CREEK PROJECT IMPLEMENTATION SCHEDULE
1982
1 9 8 3
1 9 8 4
1 9 8 5
O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
SAN FRANCISCO DISTRICT PREPARE PHASE II GDM
SOUTH PACIFIC DIVISION REVIEW PHASE II GDM
DISTRICT FINALIZE PHASE II GDM
DIVISION APPROVE PHASE II GDM
DISTRICT COMPLETE PLANS AND SPECIFICATIONS
DIVISION REVIEW PLANS AND SPECIFICATIONS
DISTRICT FINALIZE PLANS AND SPECIFICATIONS AND SUBMIT TO DIVISION
APPROVALS OF PLANS AND SPECIFICATIONS OBTAIN BIDS & AWARD CONSTRUCTION CONTRACT
CONSTRUCTION

PUBLIC INVOLVEMENT AND COORDINATION

This study was prepared with the cooperation and participation of other Federal, State, and local agencies. Public participation in the planning effort has been provided through the involvement of the Uvas Creek Citizens Advisory Committee. Planning efforts for various aspects of the study has been coordinated with interested individuals and agencies. Participating or consulted agencies include the following:

- Santa Clara Valley Water District
- City of Gilroy
  - City Manager
  - Parks and Recreation Department
  - Planning Department
  - Public Works Department
- U.S. Fish and Wildlife Service
- U.S. Soil Conservation Service
- U.S. Bureau of Reclamation
- U.S. Environmental Protection Agency
- State of California Department of Water Resources
- State of California Division of Mines and Geology
- Central Coast Regional Water Quality Control Board
- State of California Department of Fish and Game
- State of California Water Resources Control Board
- State of California Department of Transportation
- State of California Department of Finance
- Bay Area Air Quality Management Board
- Santa Clara County, Department of Parks and Recreation
- Santa Clara County, Department of Planning

- Santa Clara County, Transportation Department

- Gavilan Water Conservation District

In addition, various private developers, contractors, engineering and architectural firms provided information on this study.

The first meeting of the Citizens Committee took place in April 1979 after the approval of the Plan of Study. A second meeting was held on October 2, 1980 to review the findings of the Phase I study and receive input from the Committee.

PUBLIC MEETING

The final public meeting was held in Gilroy, California, on February 4, 1981. The project was presented to the public and the support appeared to be favorable. The City of Gilroy submitted a resolution of support for the project and indicated a willingness to be the local sponsor for the recreation element. The Santa Clara Valley Water District indicated support for the project and a willingness to furnish the requirement for local cooperation. A "petition to build a levee to stop flooding" was submitted at the public meeting, with 192 signatures, in support of the project.

There were also comments at the meeting that expressed dissatisfaction because the project did not provide protection to the lands downstream of Gilroy and would induce flooding on some of these lands. The comments included recommendations for channel cleaning downstream of Gilroy and dam construction. These recommendations have been found not to be feasible. There was also concern expressed about the possible effects of the relocation of Thomas Road and the recreation facilities on the local homeowners. There were also comments recommending the replacement of any riparian vegetation lost due to project construction.

LETTERS OF COMMENT

In addition to the comments given at the public meeting as discussed above, a total of 17 letters were received from various governmental agencies, private organizations, and individuals. The comments contained in these letters included concern over the following issues:

- Induced flooding and erosion on lands and Highway 101.

- Plan selection

- Loss of riparian vegetation and revegetation

- Construction scheduling

- Water quality and fishlife
- Wetlands
- Endangered species
- Cultural resources
- Mosquito control
- Property acquisition and relocation
- Bikeway and hiking trail access
- Mineral resources
- Cost apportionment
- Effect of earth hauling on local roads
- Sources of flooding

A more detailed discussion of the final public meeting as well as point by point responses to the letters of comment on the Draft Phase I GDM report are contained in Appendix 1 of this report.

FISH AND WILDLIFE COORDINATION

The USFWS project report prepared in accordance with the Fish and Wildlife Coordination Act of 1958 is included in Section L of Appendix 3 of this report.

The USFWS recommendation as included on pages 6 and 7 of their report have been assessed and are generally concurred with by the Corps. The following is a point by point response to the USFWS recommendations.

- Slope protection and levee construction would be conducted during periods of low flow. Although July is indicated by USFWS as the beginning of the low flow period, June has also been a month of low flow during dry years.

- The landside, waterside levee slope and berm and streambanks at the bridge crossing and slope protection sites will be hydromulched with grass. The levee crown would be asphalt and gravel surfaced to serve as a recreational bikeway and levee maintenance road and, therefore, cannot be hydromulched.

- The vegetational removal to be accomplished in connection with the slope protection work will be coordinated with the State of California Department of Fish and Game (CDFG), the U.S. National Marine Fisheries Service (USNMFS), and the USFWS.

o Vegetative plantings to offset project-induced losses will be established within the limitations to maintain levee stability and channel capacity. During preparation of the Phase II General Design Memorandum, a conceptual landscape plan will be established through coordination with the CDFG, USNMFS, and USFWS. Costs for such a program have been included in the estimate for construction funds. The revegetation shall also be in accordance with EM 110-2-301, "Landscape Planting at Floodwalls, Levees and Embankment Dams," and the State of California Reclamation Board, "Guide for Vegetation on Project Levees."

CONCLUSIONS

The San Francisco District, Corps of Engineers, has concluded that it is in the Federal interest to proceed with the implementation of the selected plan, Alternative 2. This plan would provide SPF flood protection to the existing developed urban area of Gilroy from the Standard Project Flood of Uvas-Carnadero Creek. This plan would result in some increased depth of flooding on the rural lands south of Gilroy, however, the damages caused by this flooding would be mitigated by the purchase of flooding easements on the affected properties.

The selected plan is economically feasible and would not result in significant adverse environmental or social impacts. The plan includes recreation facilities that may be incorporated into the Uvas Creek Linear Park planning by the City of Gilroy and Santa Clara County.

The selected plan is in compliance with all applicable Federal, state and local environmental laws, and regulations. The plan is also consistent with local regional and state plans.

Local sponsors, the Santa Clara Valley Water District for flood control, and the City of Gilroy for recreation, have been identified for the project.

The District Engineer has determined that the local sponsors have the legal authority and financial capability necessary to fulfill the local responsibility for project implementation.

The District Engineer has reviewed the combined beneficial and adverse EQ and NED effects of the alternatives studied and finds that these combined positive NED and EQ impacts outweigh the negative impacts for the selected plan.

RECOMMENDATIONS

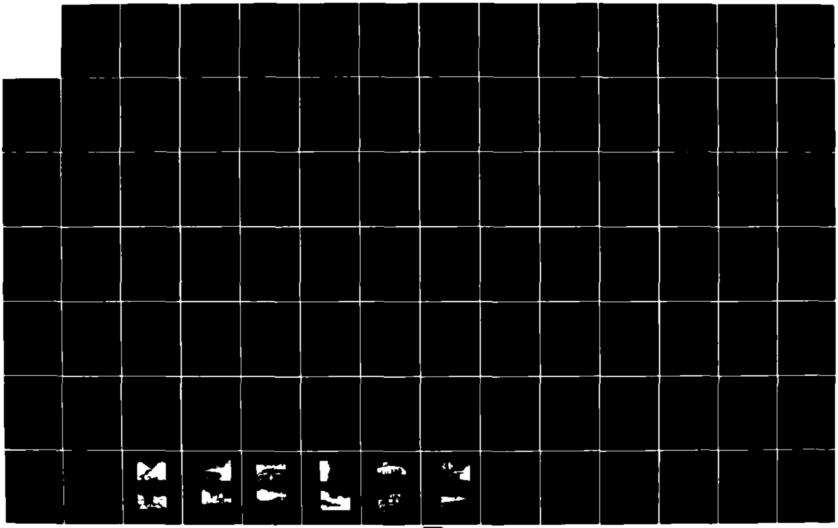
The San Francisco District, Corps of Engineers, recommends that preconstruction planning activities continue for the selected plan, Alternative 2, that would provide Standard Project Flood protection to the City of Gilroy.

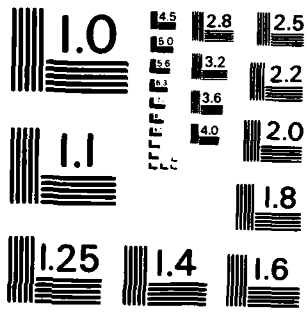
PAUL BAZILWICH, JR.
Colonel, CE
District Engineer

AD-A122 273 PAJARO RIVER BASIN UVAS - CARNADERO CREEK SANTA CLARA COUNTY CALIFORNIA G..(U) CORPS OF ENGINEERS SAN FRANCISCO CA SAN FRANCISCO DISTRICT JUL 81

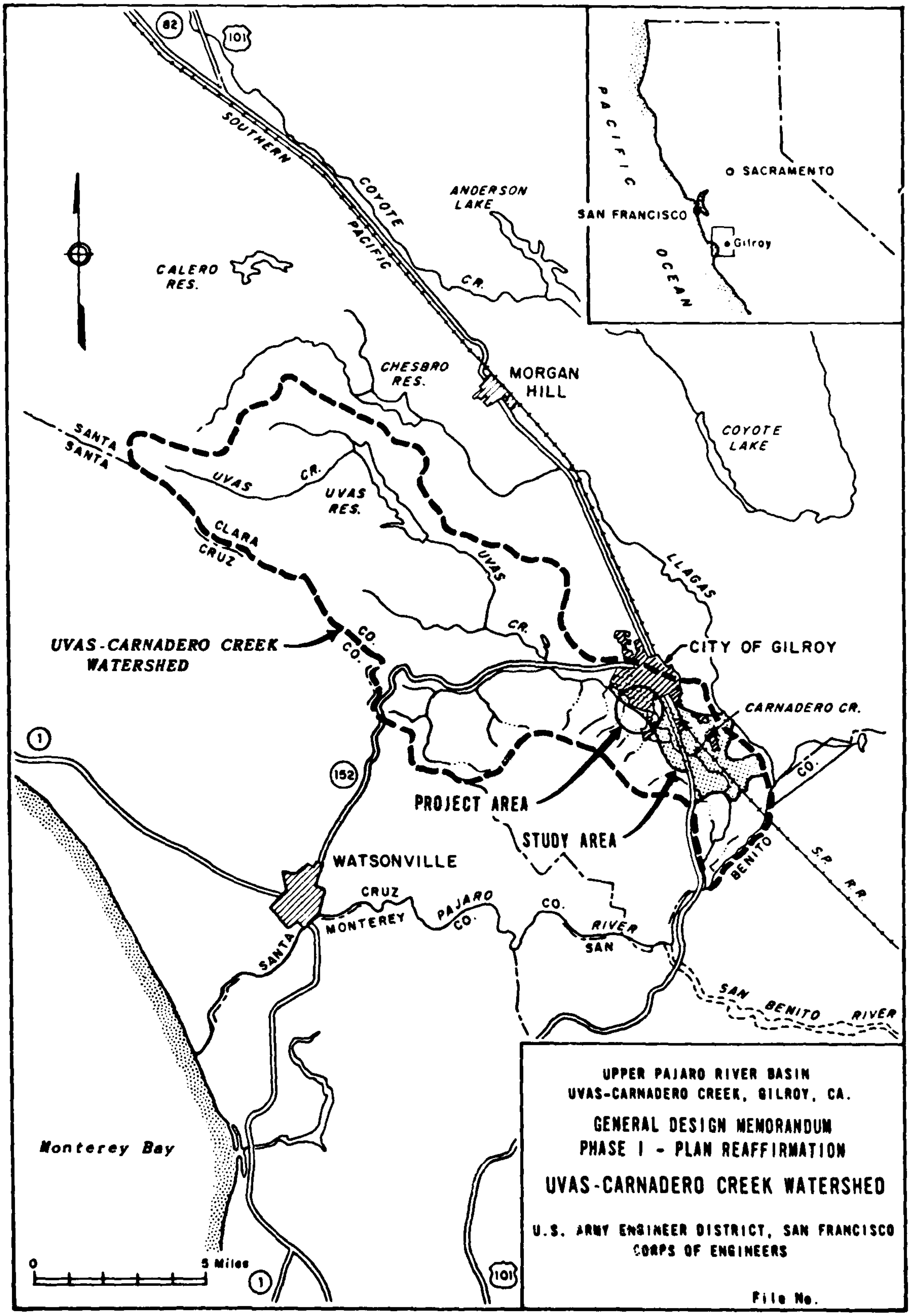
2/7

UNCLASSIFIED F/G 13/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



82
101
SOUTHERN
PACIFIC
COYOTE
CR.
ANDERSON LAKE
CALERO RES.
PACIFIC
OCEAN
O SACRAMENTO
SAN FRANCISCO
Gilroy
CHESBRO RES.
MORGAN HILL
COYOTE LAKE
SANTA
SANTA
CLARA
CRUZ
CO.
CO.
UVAS
CR.
UVAS RES.
UVAS
CR.
LLAGAS
UVAS-CARNADERO CREEK WATERSHED
CITY OF GILROY
CARNADERO CR.
1
152
PROJECT AREA
STUDY AREA
CO.
BENITO
S.P. R.R.
WATSONVILLE
CRUZ
SANTA
MONTEREY
PAJARO
CO.
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SAN BENITO RIVER
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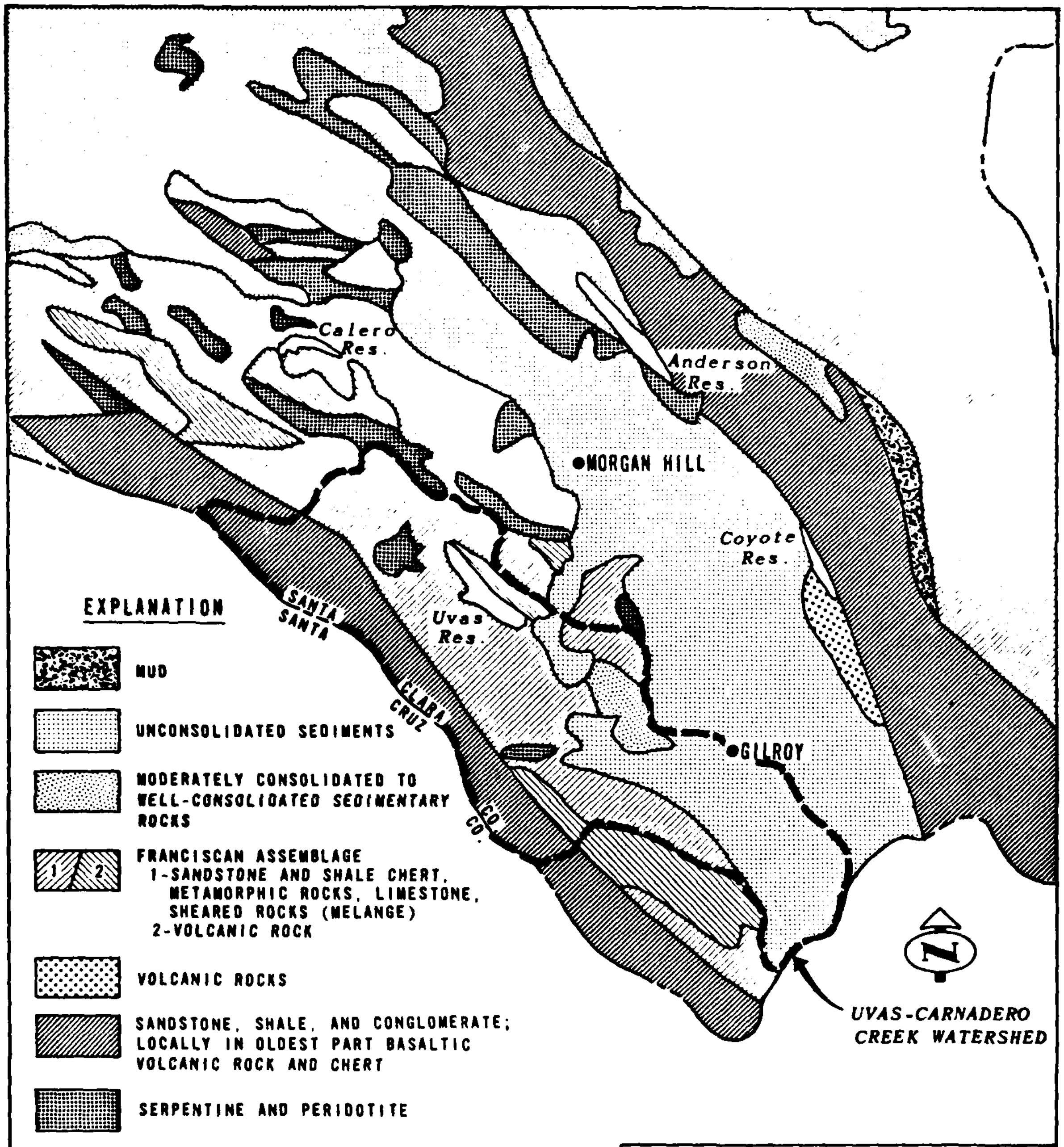
101
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
UVAS-CARNADERO CREEK WATERSHED
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 1



ADAPTED FROM GENERALIZED GEOLOGIC MAP OF THE SAN FRANCISCO BAY REGION, CALIF., U.S. GEOL. SURVEY OPEN FILE MAP, 1971.

0 2 4 6 8 10 Miles

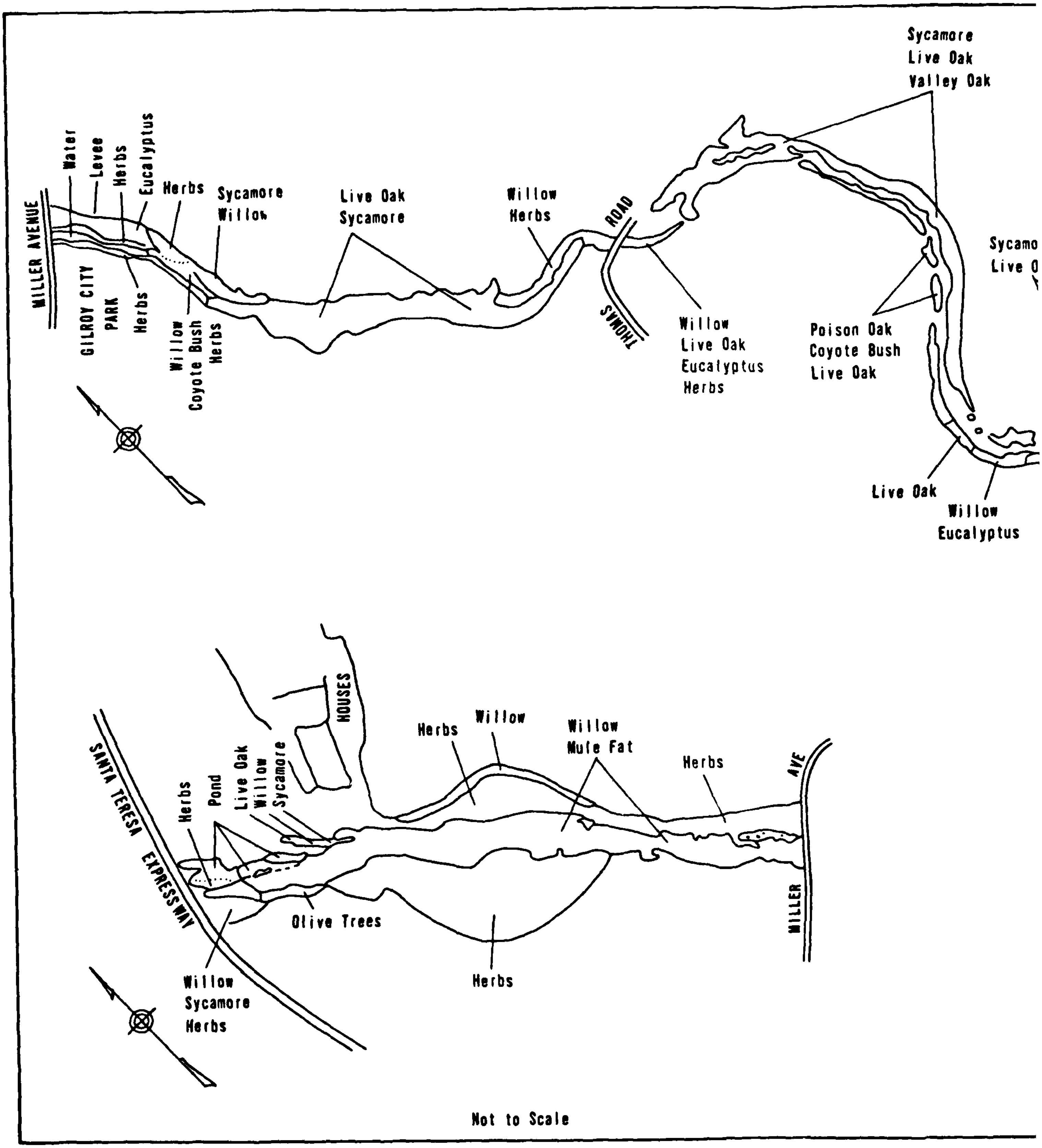
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

REGIONAL GEOLOGY MAP

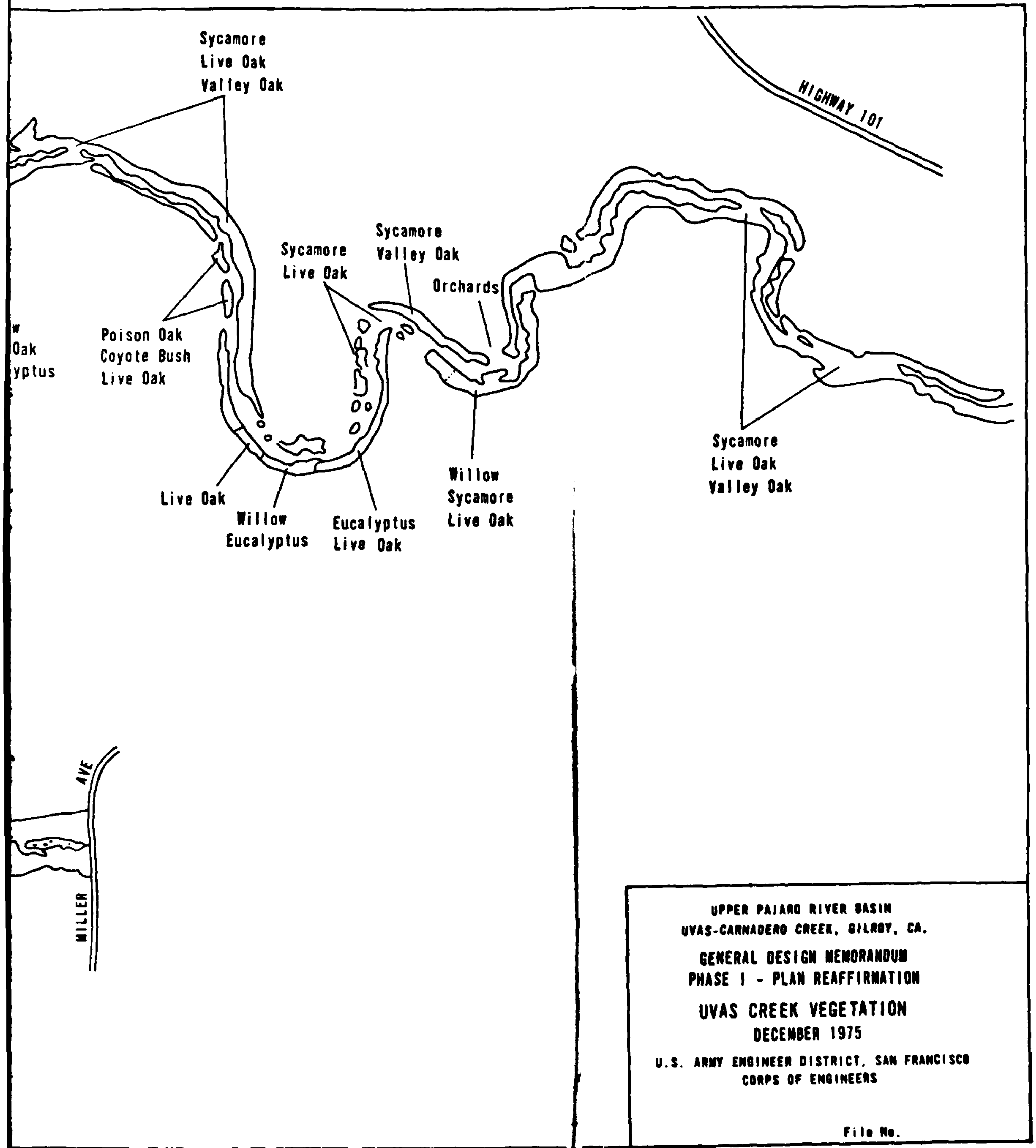
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 2



MILLER AVENUE
Water
Levee
Herbs
Eucalyptus
Herbs
Sycamore
Willow
Live Oak
Sycamore
Willow
Herbs
ROAD
THOMAS
GILROY CITY
PARK
Herbs
Willow
Coyote Bush
Herbs
Willow
Live Oak
Eucalyptus
Herbs
Sycamore
Live Oak
Valley Oak
Poison Oak
Coyote Bush
Live Oak
Live Oak
Willow
Eucalyptus
HOUSES
Herbs
Willow
Willow
Mule Fat
Herbs
AVE
MILLER
SANTA TERESA EXPRESSWAY
Herbs
Pond
Live Oak
Willow
Sycamore
Olive Trees
Herbs
Willow
Sycamore
Herbs
Not to Scale



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

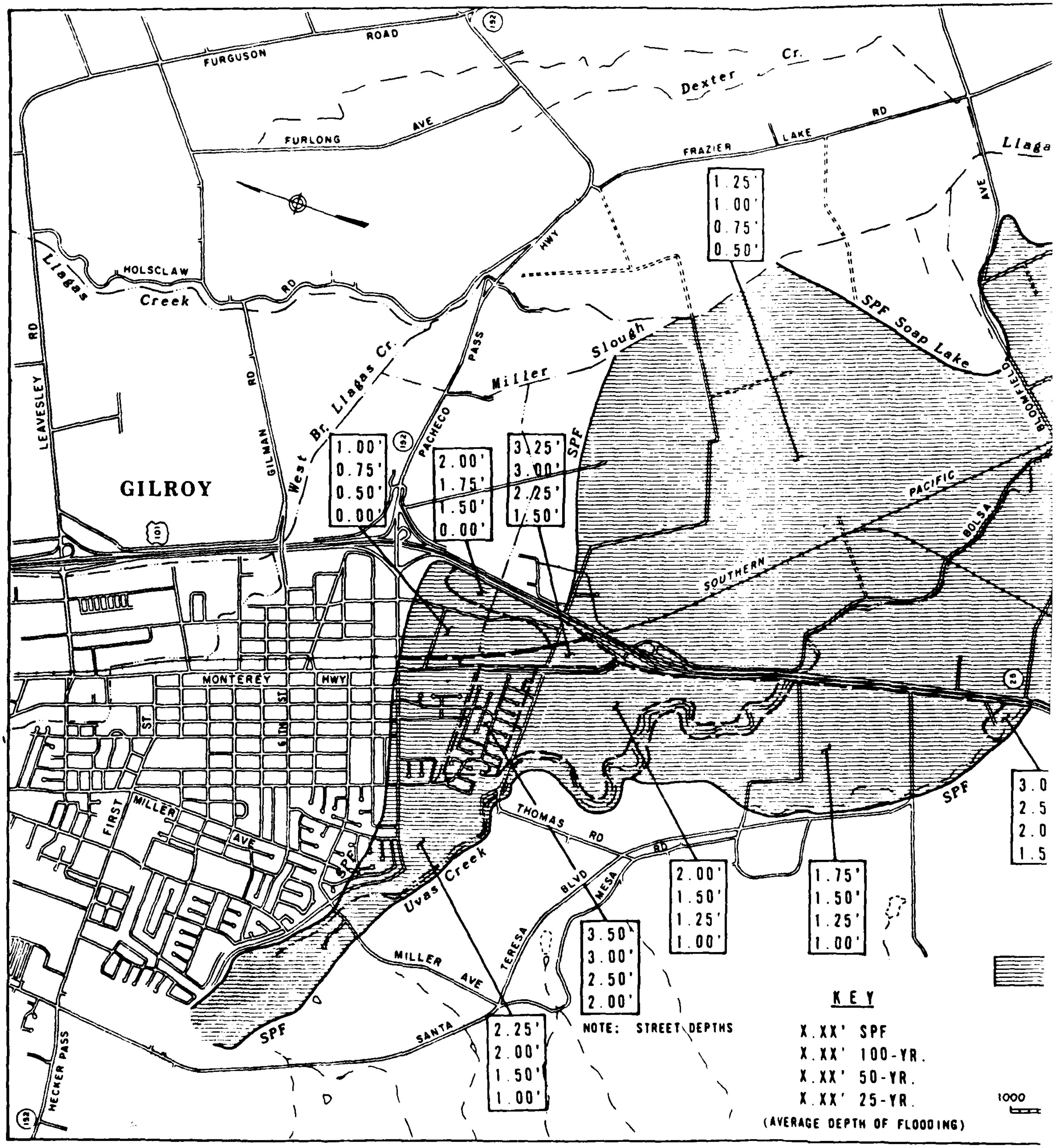
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

UVAS CREEK VEGETATION
DECEMBER 1975

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 3



FURGUSON
ROAD
Dexter Cr.
FURLONG AVE
FRAZIER LAKE RD
Llagas
HOLSCLAW RD
Llagas Creek
LEAVESLEY RD
GILMAN RD
West Br. Llagas Cr.
PACHECO PASS HWY
Miller Slough
SPF Soap Lake
BLOOMFIELD AVE
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SPF
SOUTHERN PACIFIC
BOLSA
MONTEREY HWY
6TH ST.
FIRST ST.
MILLER AVE
THOMAS RD
MESA RD
BLVD
TERESA
Uvas Creek
MILLER AVE
SANTA
SPF
HECKER PASS
2.00'
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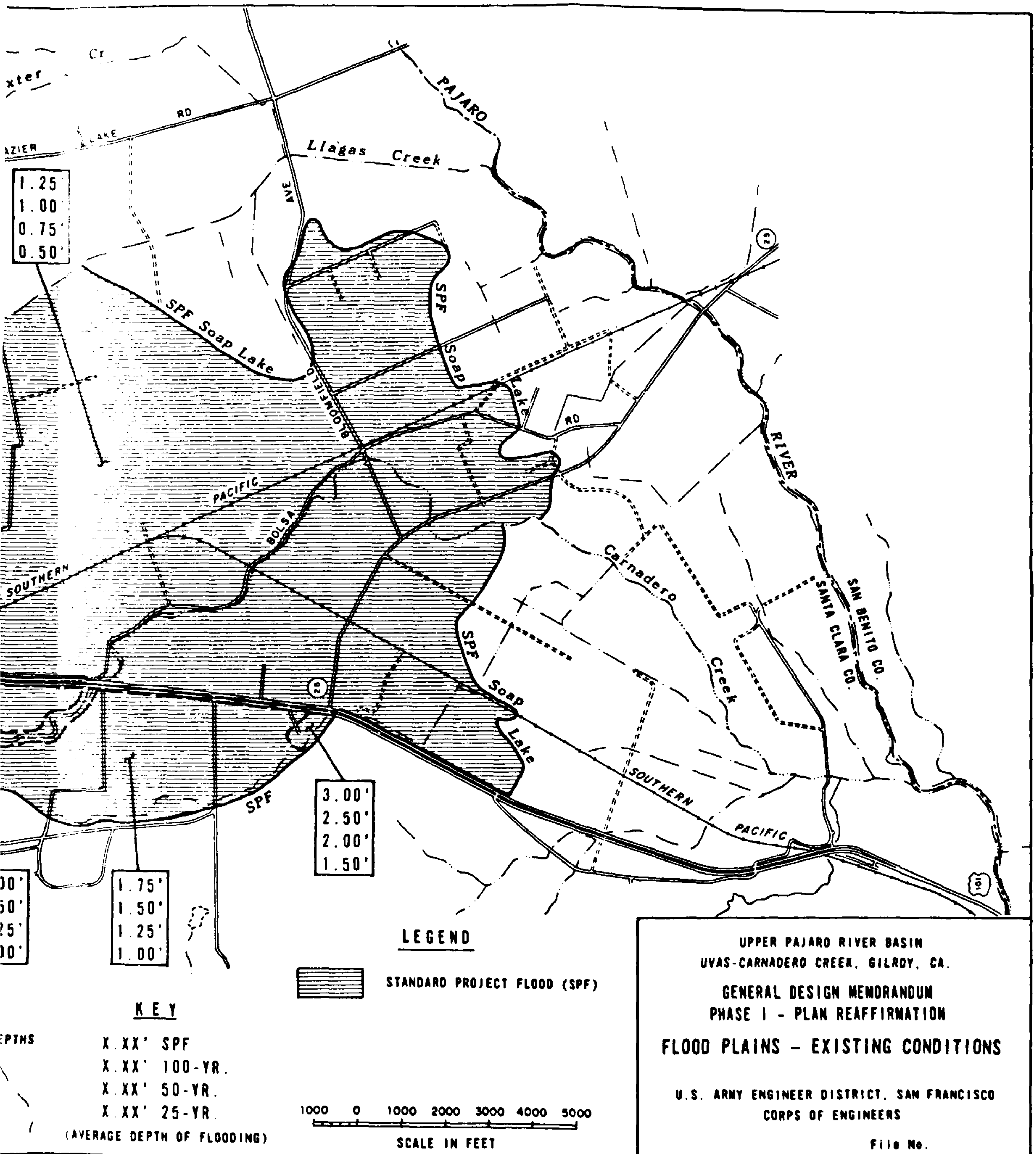
1.00'
NOTE: STREET DEPTHS
KEY
X.XX' SPF
X.XX' 100-YR.
X.XX' 50-YR.
X.XX' 25-YR.
(AVERAGE DEPTH OF FLOODING)
1000


Cr.
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BLOOMFIELD
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SPF Soap Lake
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PACIFIC
BOLSA
SOUTHERN
Carnadero Creek
SAN BENITO CO.
SANTA CLARA CO.
SOUTHERN
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152
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LEGEND
STANDARD PROJECT FLOOD (SPF)
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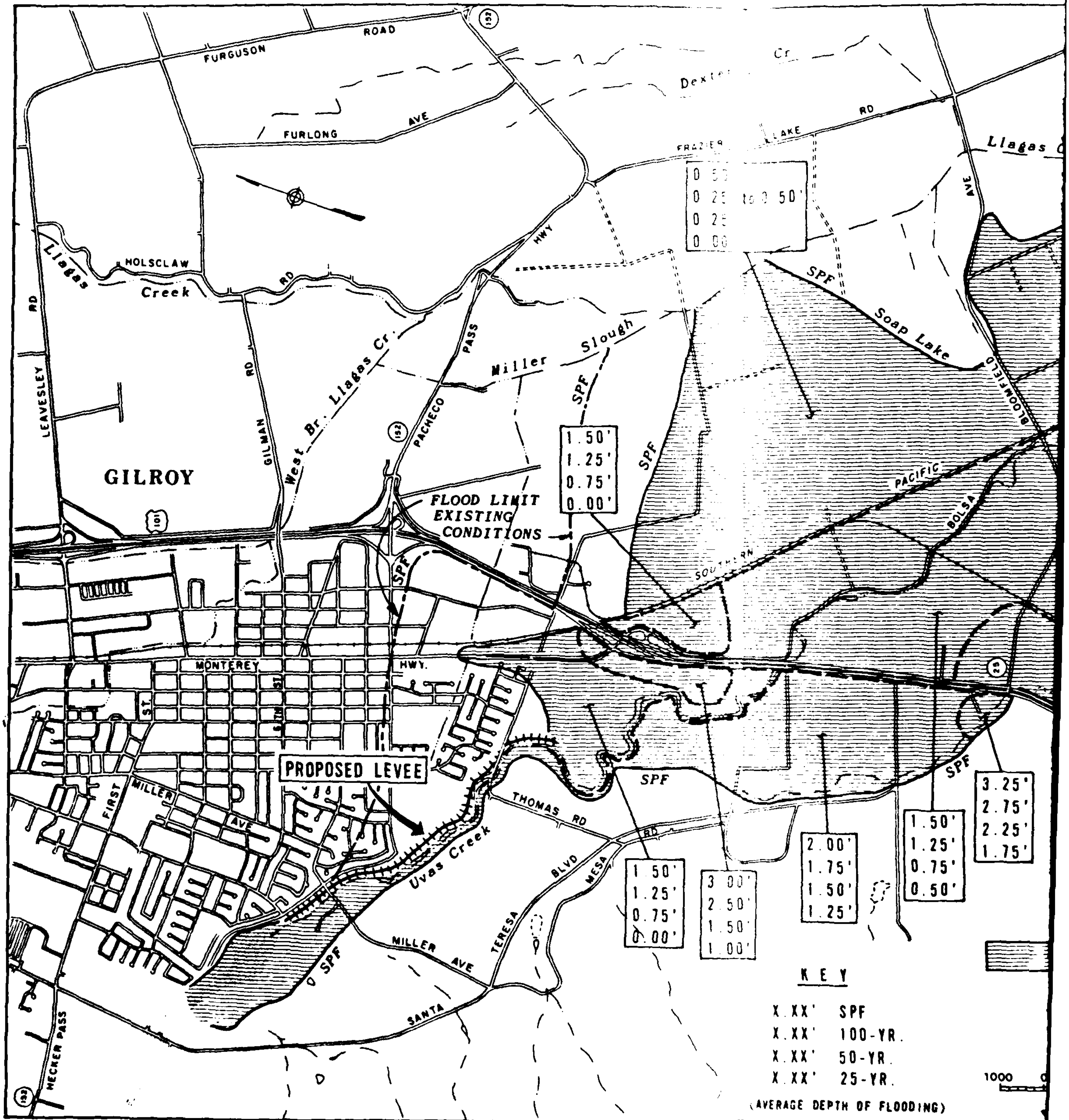
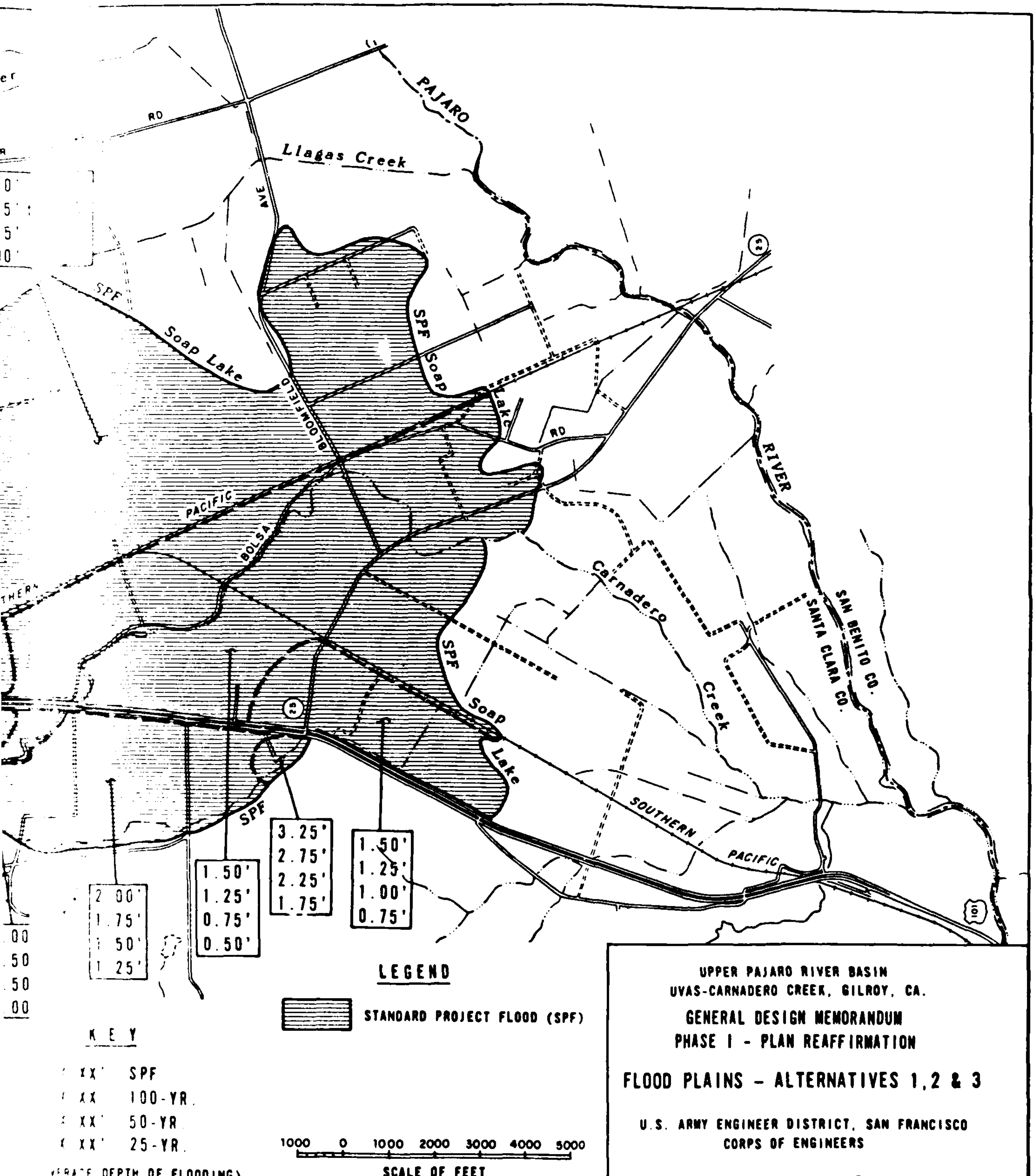
X.XX' SPF
X.XX' 100-YR.
X.XX' 50-YR.
X.XX' 25-YR.
(AVERAGE DEPTH OF FLOODING)
1000 0 1000 2000 3000 4000 5000
SCALE IN FEET
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
FLOOD PLAINS - EXISTING CONDITIONS
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 4



FURGUSON ROAD
FURLONG AVE
FRAZIER LAKE RD
Dexter Cr
Llagas Cr
HOLSCLAW RD
Llagas Creek
LEAVESLEY RD
GILMAN RD
West Br. Llagas Cr.
PACHECO PASS HWY
Miller Slough
SPF
Soap Lake
BLOOMFIELD AVE
GILROY
FLOOD LIMIT EXISTING CONDITIONS
1.50'
1.25'
0.75'
0.00'
SOUTHERN PACIFIC
BOLSA
MONTEREY HWY.
PROPOSED LEVEE
FIRST ST.
MILLER AVE
THOMAS RD
Uvas Creek
MESA RD
TERESA BLVD
SANTA
HECKER PASS
3.25'
2.75'
2.25'
1.75'
1.50'
1.25'
0.75'
0.50'
2.00'
1.75'
1.50'
1.25'
3.00'
2.50'
1.50'
1.00'
1.50'
1.25'
0.75'
0.00'
KEY
X.XX' SPF
X.XX' 100-YR.
X.XX' 50-YR.
X.XX' 25-YR.
(AVERAGE DEPTH OF FLOODING)
1000



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

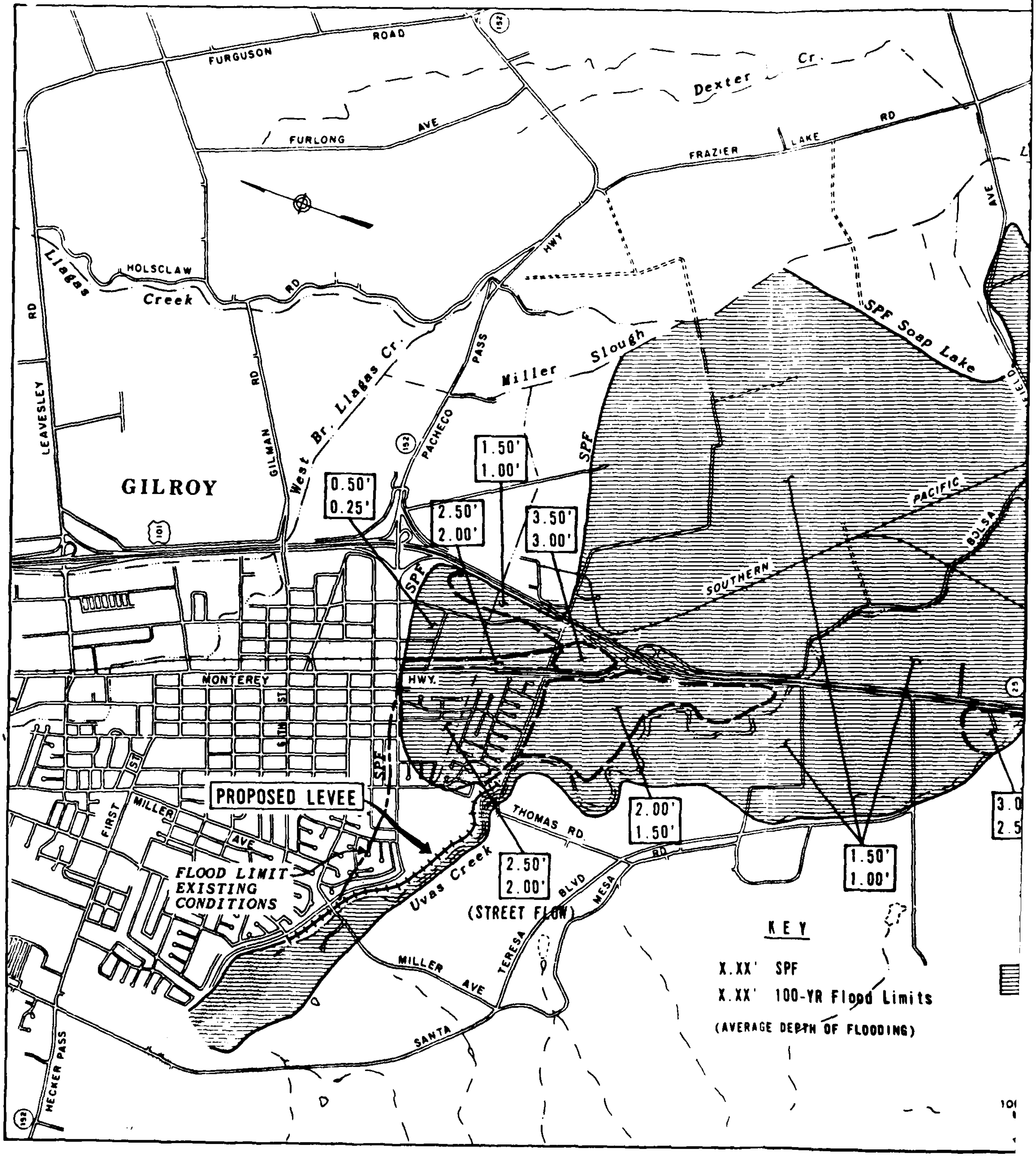
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

FLOOD PLAINS - ALTERNATIVES 1,2 & 3

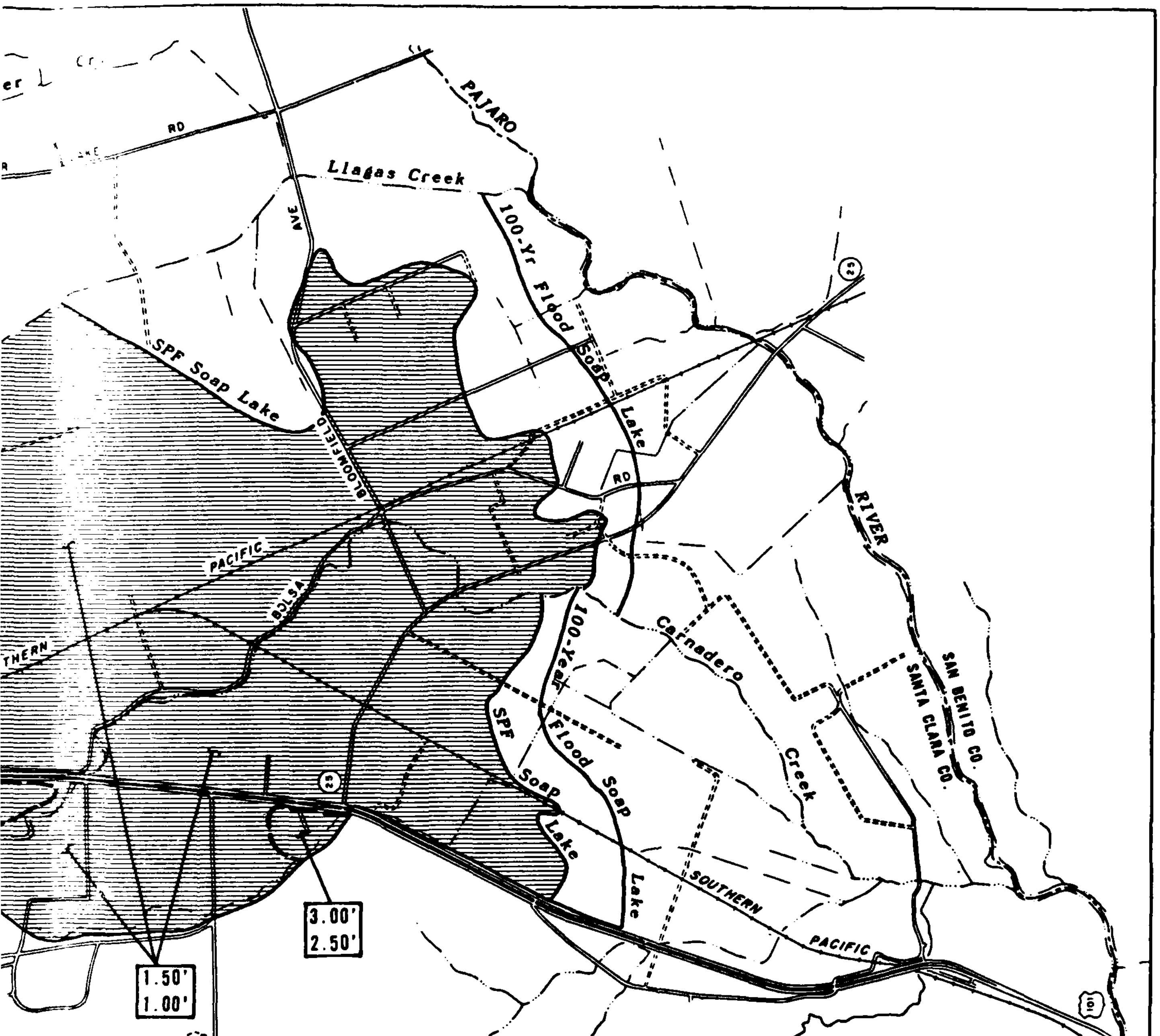
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 5



FURGUSON ROAD
Dexter Cr.
FURLONG AVE
FRAZIER LAKE RD
HOLSCLAW RD
Llagas Creek
HWY
SPF Soap Lake
Miller Slough
West Br. Llagas Cr.
PACHECO PASS
LEAVESLEY RD
GILMAN RD
GILROY
0.50'
0.25'
1.50'
1.00'
2.50'
2.00'
3.50'
3.00'
SPF
SOUTHERN PACIFIC
BOLSA
MONTEREY
HWY.
PROPOSED LEVEE
FIRST ST
MILLER AVE
FLOOD LIMIT EXISTING CONDITIONS
Uvas Creek
THOMAS RD
2.00'
1.50'
2.50'
2.00'
(STREET FLOW)
MESA
BLVD
TERESA
1.50'
1.00'
MILLER AVE
SANTA
HECKER PASS
KEY
X.XX' SPF
X.XX' 100-YR Flood Limits
(AVERAGE DEPTH OF FLOODING)



KEY

.XX' SPF
.XX' 100-YR Flood Limits
AVERAGE DEPTH OF FLOODING)

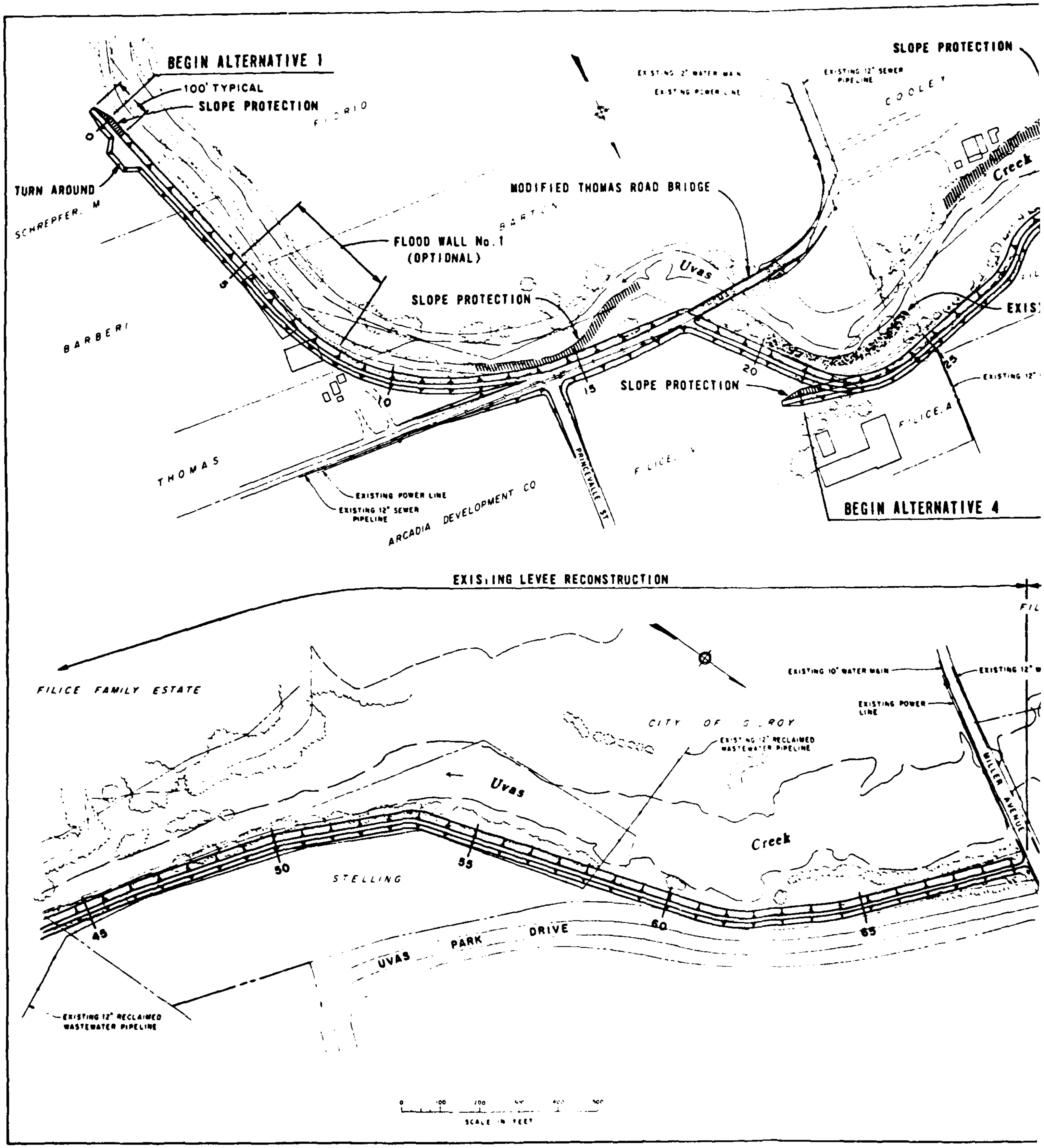
LEGEND

STANDARD PROJECT FLOOD (SPF)

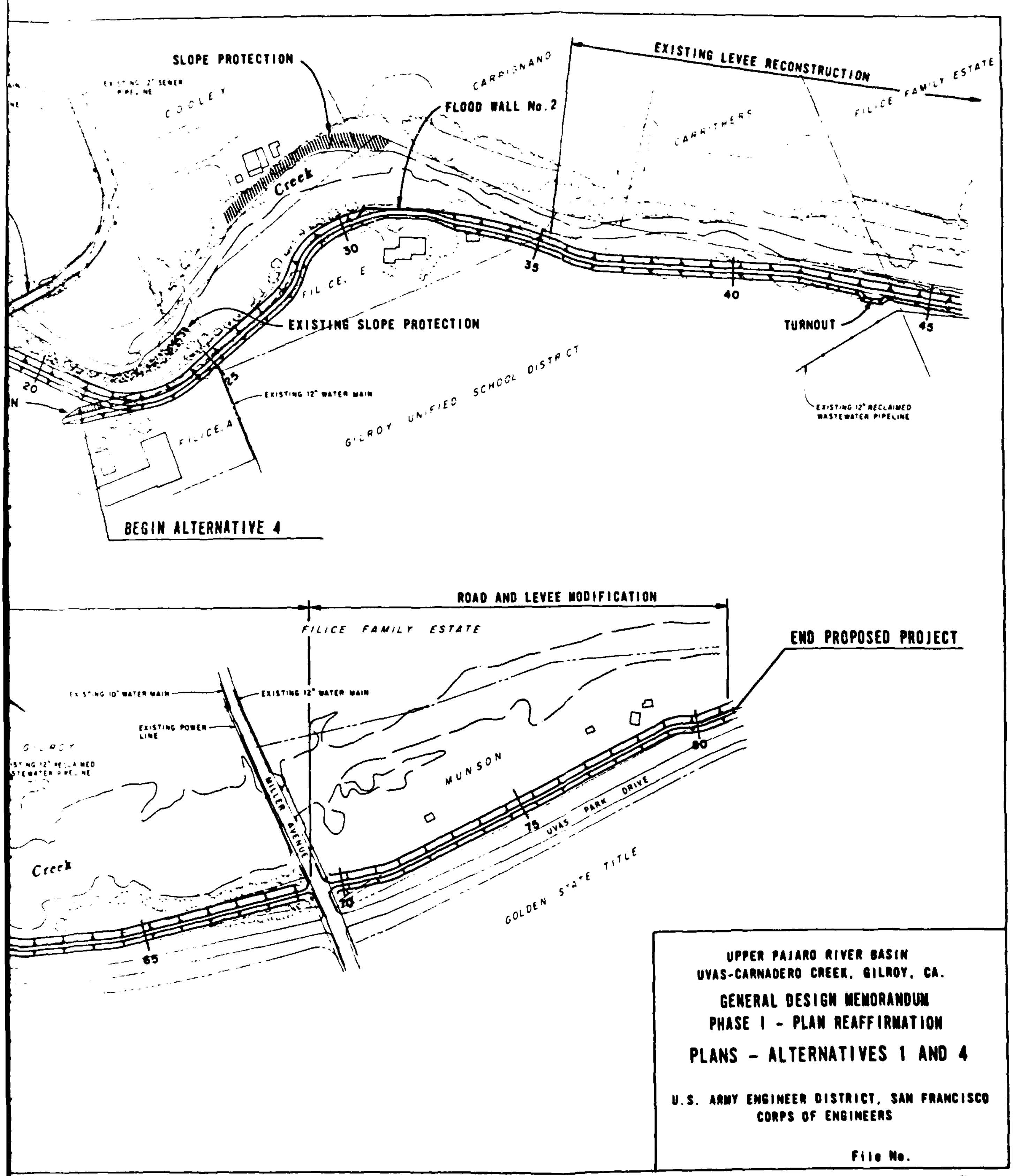
1000 0 1000 2000 3000 4000 5000
SCALE IN FEET

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
FLOOD PLAINS - ALTERNATIVES 4,5 & 6
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 6



BEGIN ALTERNATIVE 1
100' TYPICAL
SLOPE PROTECTION
TURN AROUND
SCHREPFER, M
FLOOD WALL No. 1
(OPTIONAL)
MODIFIED THOMAS ROAD BRIDGE
SLOPE PROTECTION
BARBERI
THOMAS
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
PRINCEVALLE ST
SLOPE PROTECTION
BEGIN ALTERNATIVE 4
COOLEY
Uvas
Creek
EXISTING LEVEE RECONSTRUCTION
FILICE FAMILY ESTATE
CITY OF GILROY
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
EXISTING 10" WATER MAIN
EXISTING POWER LINE
MILLER AVENUE
Uvas
Creek
STELLING
UVAS PARK DRIVE
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
SCALE IN FEET



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

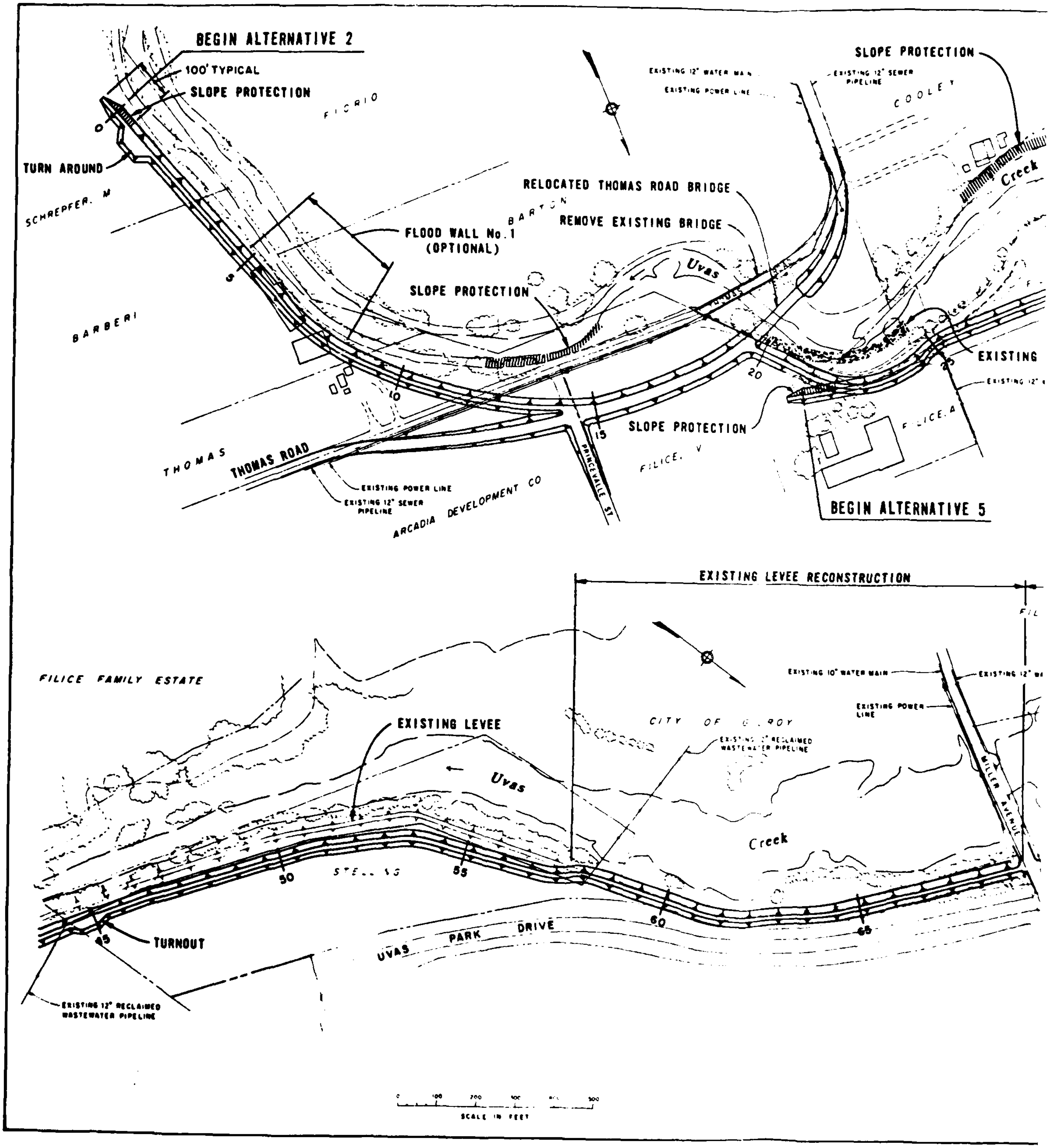
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

PLANS - ALTERNATIVES 1 AND 4

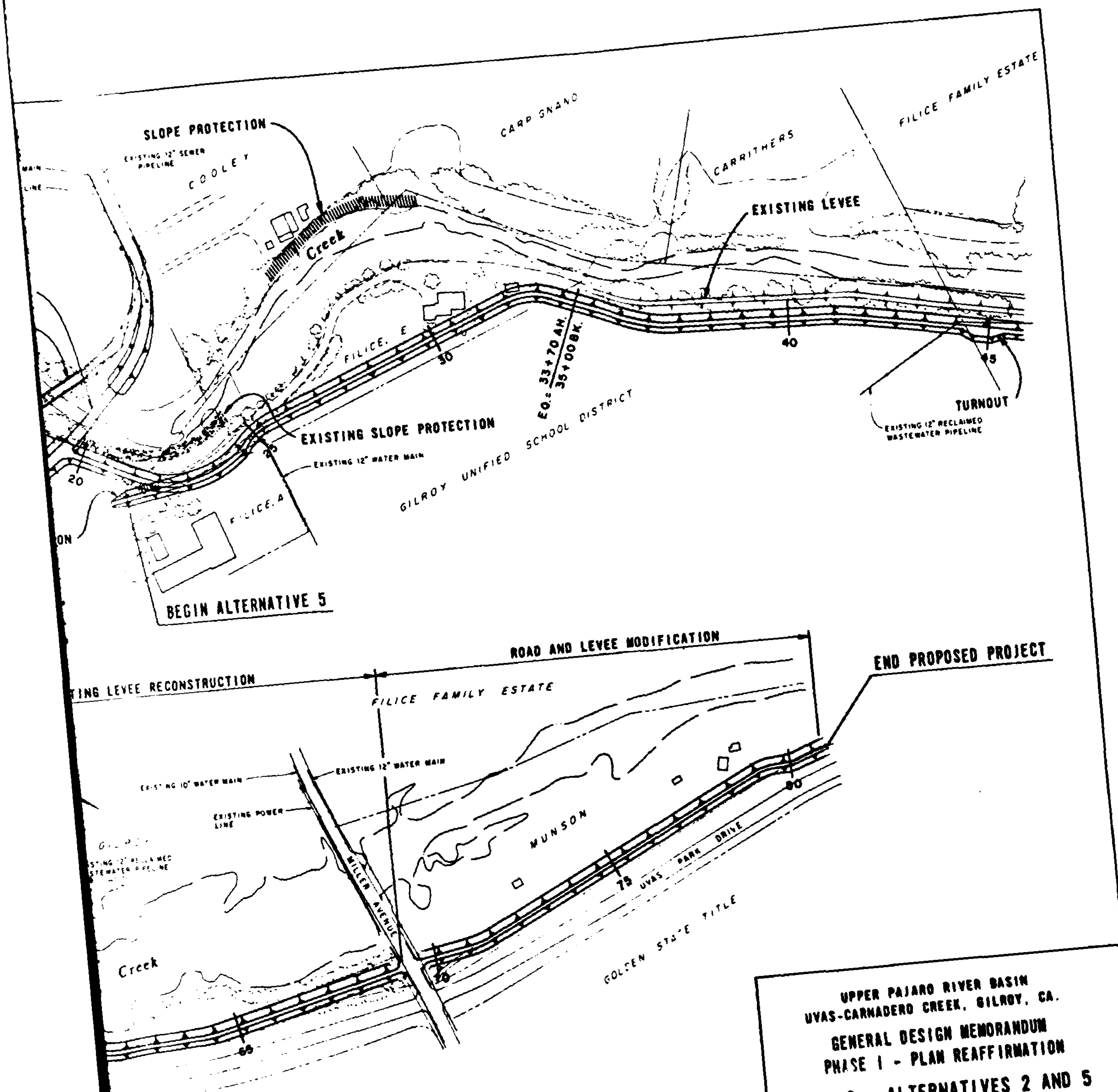
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 7



BEGIN ALTERNATIVE 2
100' TYPICAL
SLOPE PROTECTION
TURN AROUND
FLOOD WALL No. 1
(OPTIONAL)
RELOCATED THOMAS ROAD BRIDGE
REMOVE EXISTING BRIDGE
SLOPE PROTECTION
EXISTING 12" WATER MAIN
EXISTING 12" SEWER PIPELINE
EXISTING POWER LINE
SLOPE PROTECTION
COOLEY
Creek
Uvas
BARTON
SCHREPFER, M
BARBERI
THOMAS
THOMAS ROAD
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
PRINCEVALLE ST
FILICE, V
SLOPE PROTECTION
EXISTING
BEGIN ALTERNATIVE 5
EXISTING LEVEE RECONSTRUCTION
FILICE FAMILY ESTATE
EXISTING LEVEE
Uvas
Creek
EXISTING 10" WATER MAIN
EXISTING POWER LINE
MILLER AVENUE
TURNOUT
UVAS PARK DRIVE
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
SCALE IN FEET



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

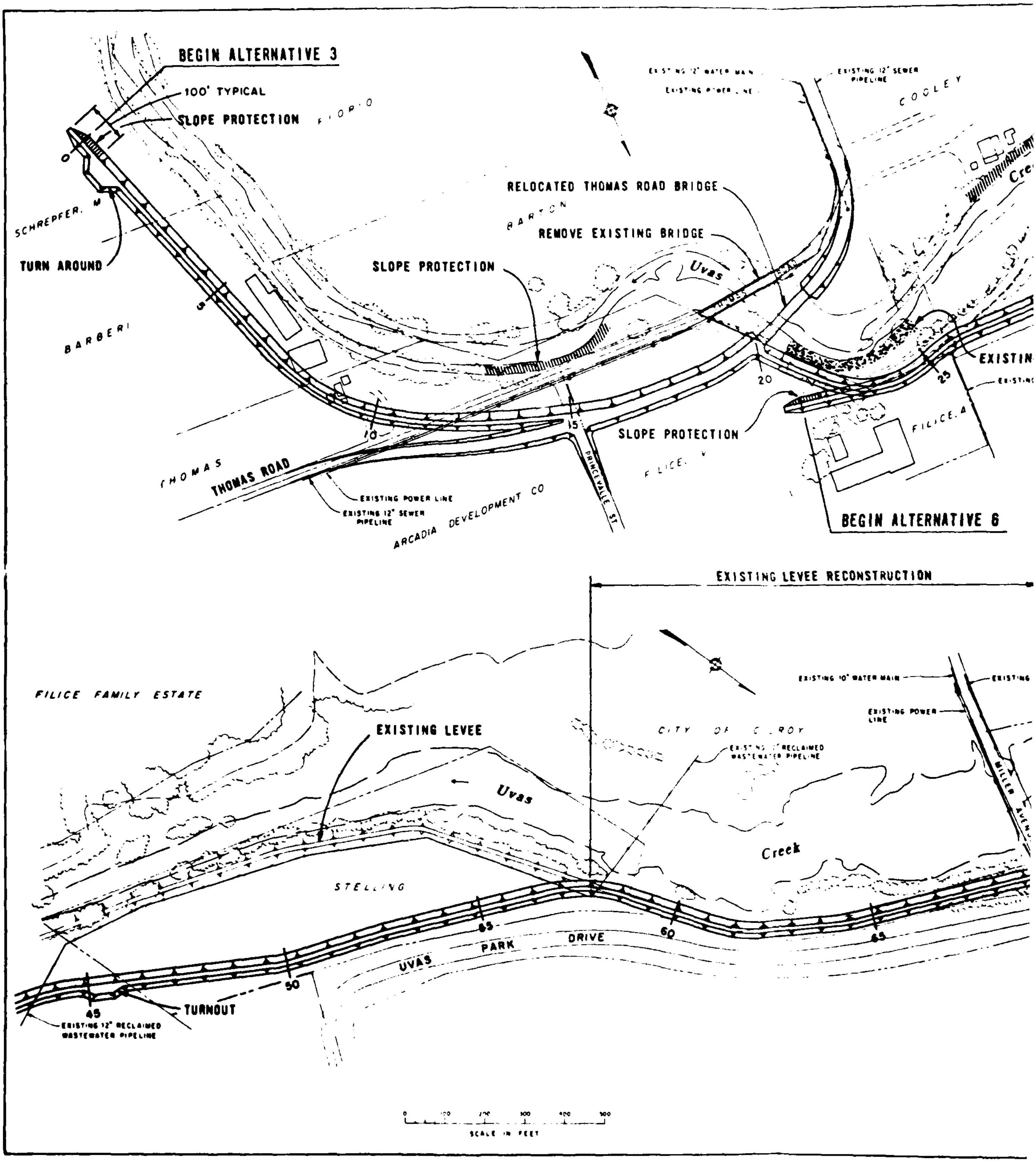
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

PLANS - ALTERNATIVES 2 AND 5

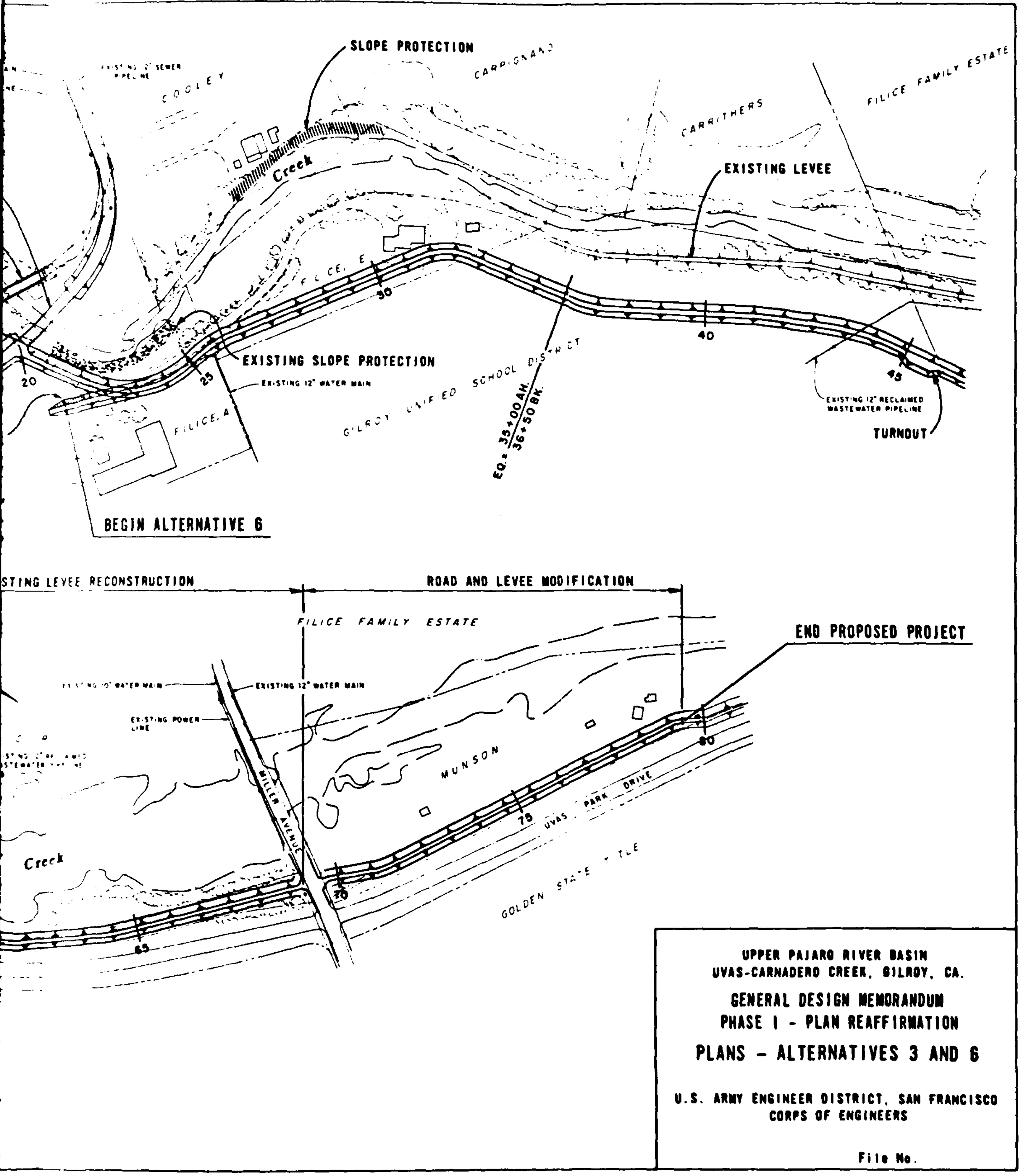
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 8



BEGIN ALTERNATIVE 3
100' TYPICAL
SLOPE PROTECTION
TURN AROUND
SCHREPFER
BARBERI
RELOCATED THOMAS ROAD BRIDGE
REMOVE EXISTING BRIDGE
SLOPE PROTECTION
Uvas
BARTON
COOLEY
THOMAS
THOMAS ROAD
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
PRINCEVALLE ST
SLOPE PROTECTION
FILICE
BEGIN ALTERNATIVE 6
EXISTING LEVEE RECONSTRUCTION
FILICE FAMILY ESTATE
EXISTING LEVEE
Uvas
Creek
STELLING
EXISTING 10" WATER MAIN
EXISTING POWER LINE
MILLER AVENUE
UVAS PARK DRIVE
TURNOUT
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
0
5
10
15
20
25
45
50
55
60
65
SCALE IN FEET



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

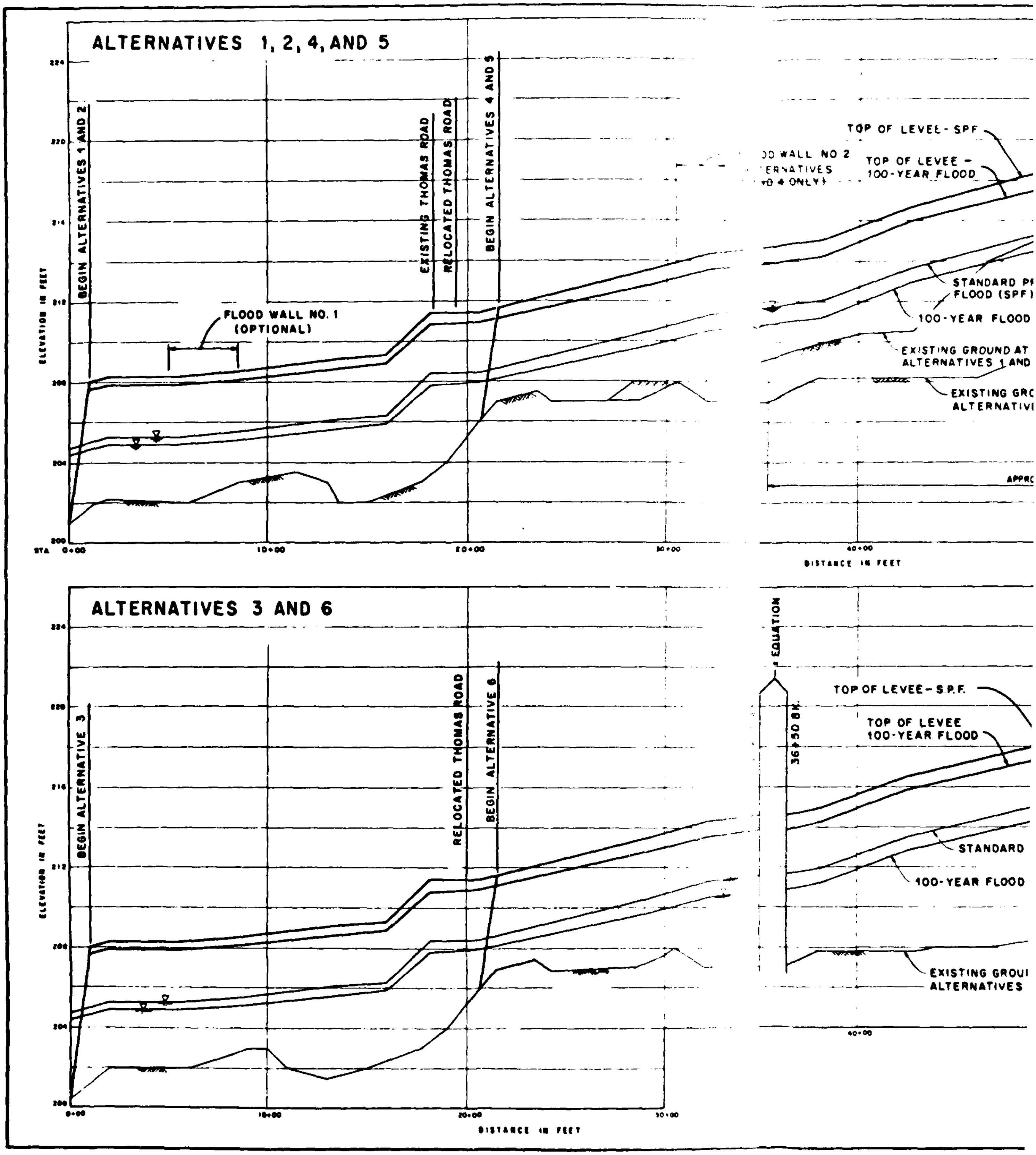
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

PLANS - ALTERNATIVES 3 AND 6

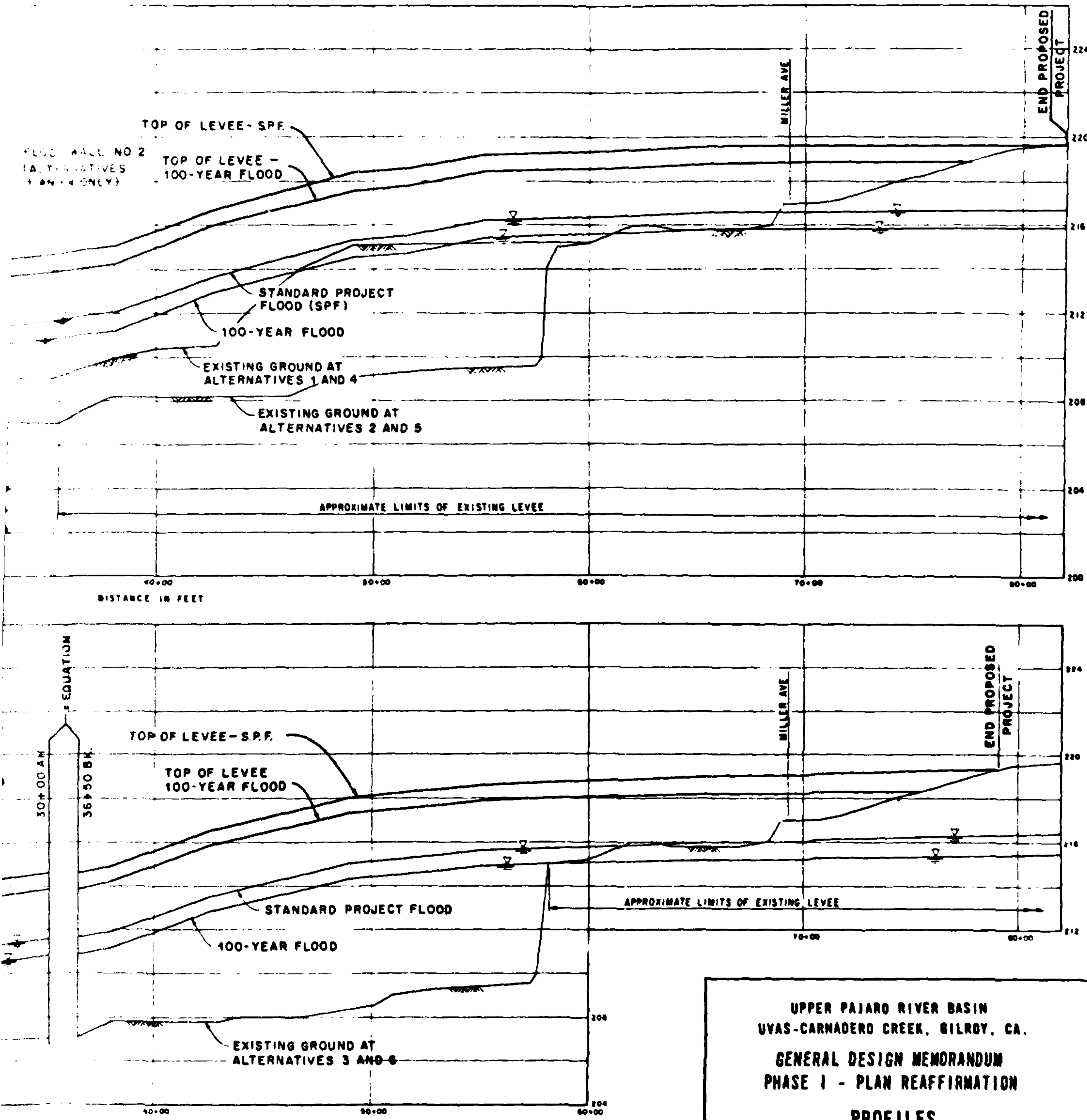
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 9



ALTERNATIVES 1, 2, 4, AND 5
BEGIN ALTERNATIVES 1 AND 2
EXISTING THOMAS ROAD
RELOCATED THOMAS ROAD
BEGIN ALTERNATIVES 4 AND 5
FLOOD WALL NO. 1 (OPTIONAL)
TOP OF LEVEE - SPF
TOP OF LEVEE - 100-YEAR FLOOD
STANDARD PROJECT FLOOD (SPF)
100-YEAR FLOOD
EXISTING GROUND AT ALTERNATIVES 1 AND
ELEVATION IN FEET
DISTANCE IN FEET
ALTERNATIVES 3 AND 6
BEGIN ALTERNATIVE 3
RELOCATED THOMAS ROAD
BEGIN ALTERNATIVE 6
EQUATION
36+50 BK
TOP OF LEVEE - S.P.F.
TOP OF LEVEE 100-YEAR FLOOD
STANDARD
100-YEAR FLOOD
EXISTING GROUND ALTERNATIVES
ELEVATION IN FEET
DISTANCE IN FEET



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

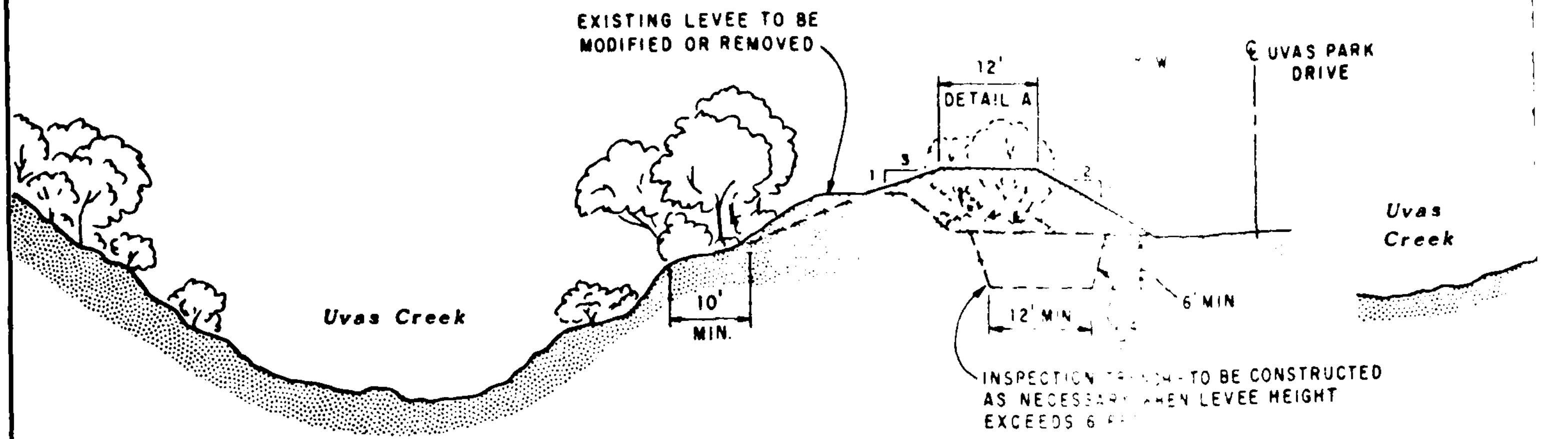
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

PROFILES

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

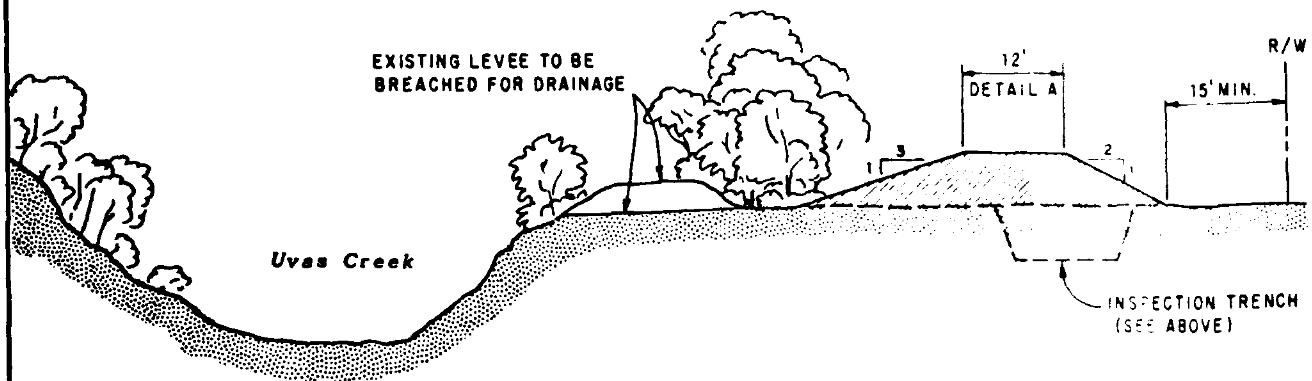
File No.

Plate No. 10

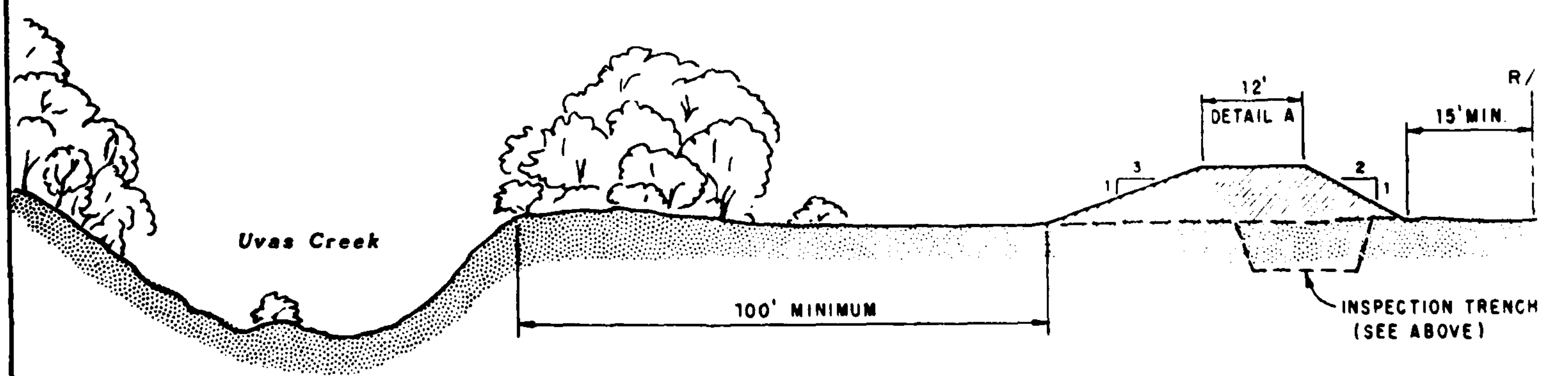


LEVEE RECONSTRUCTION - ALTERNATIVE 1 AND 4

PORTIONS OF ALTERNATIVES 2,3,5 AND 6

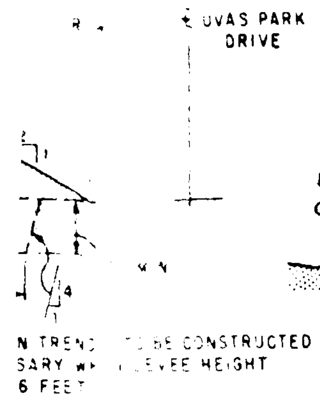


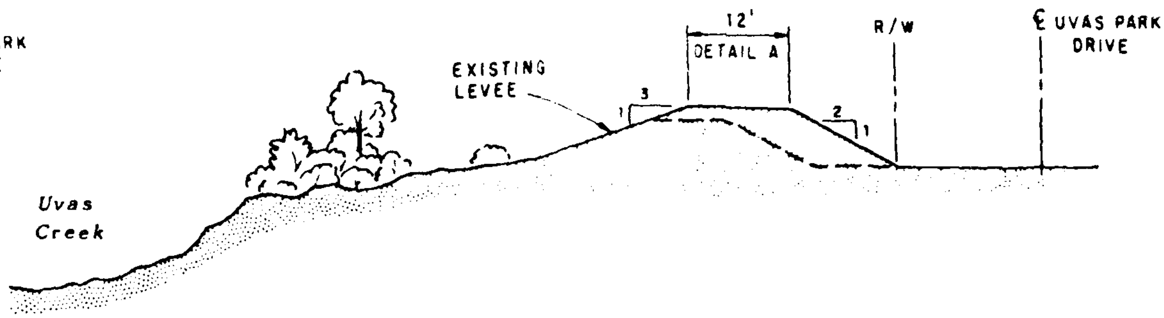
NEW LEVEE SETBACK OUTSIDE TREE LINE - ALTERNATIVES 2 AND 5



NEW LEVEE 100 FT. MINIMUM SETBACK - ALTERNATIVES 3 AND 6

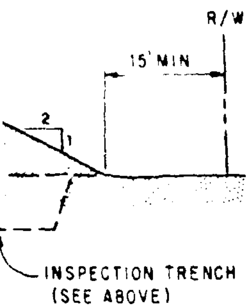
DOWNSTREAM OF MILLER AVENUE

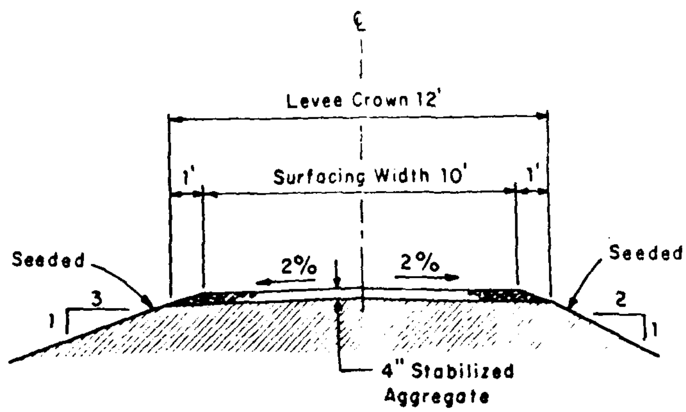




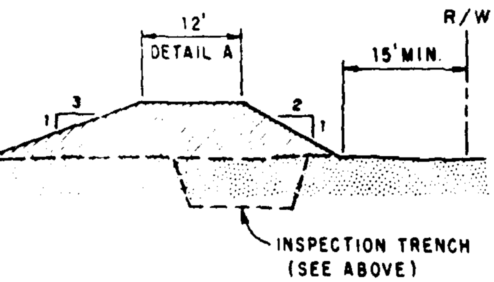
MODIFIED EXISTING LEVEE - ALL ALTERNATIVES

UPSTREAM OF MILLER AVENUE





DETAIL A



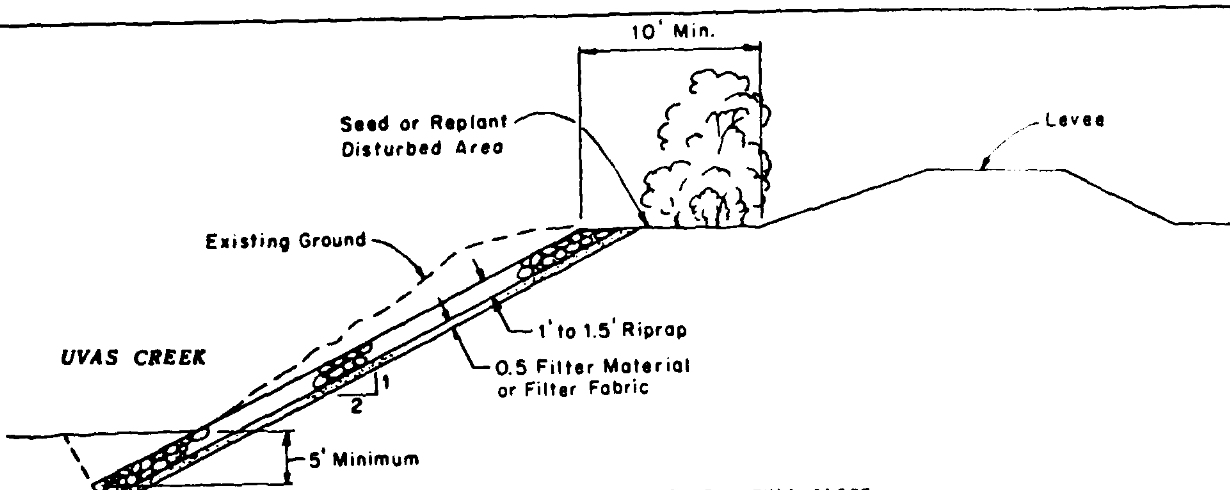
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

TYPICAL LEVEE SECTIONS

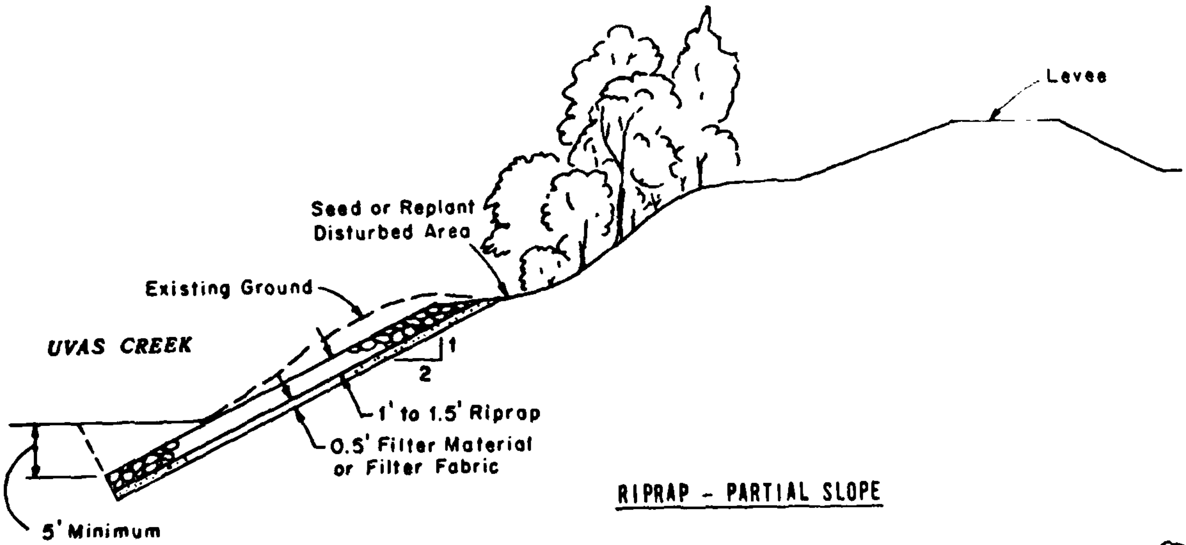
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

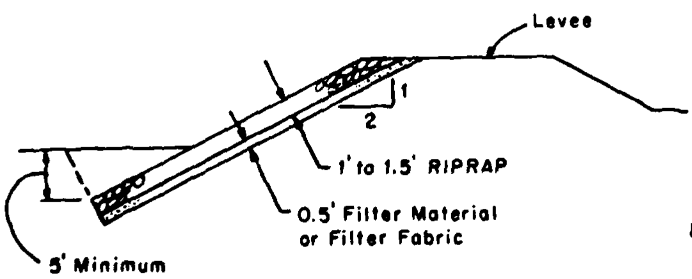
Plate No. 11



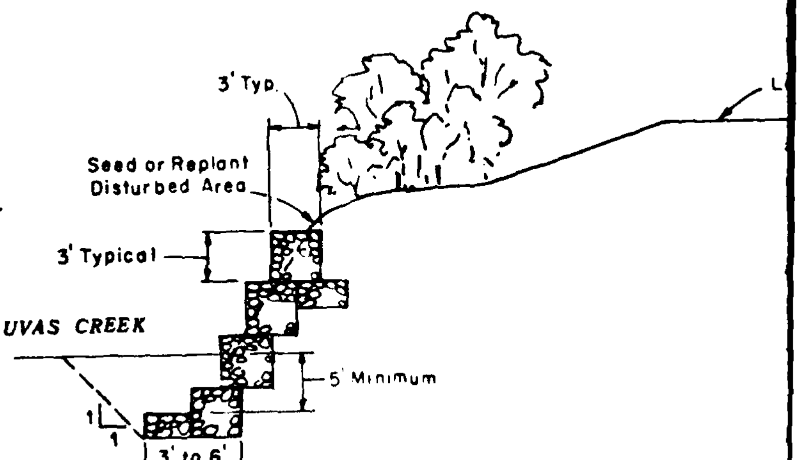
RIPRAP - FULL SLOPE



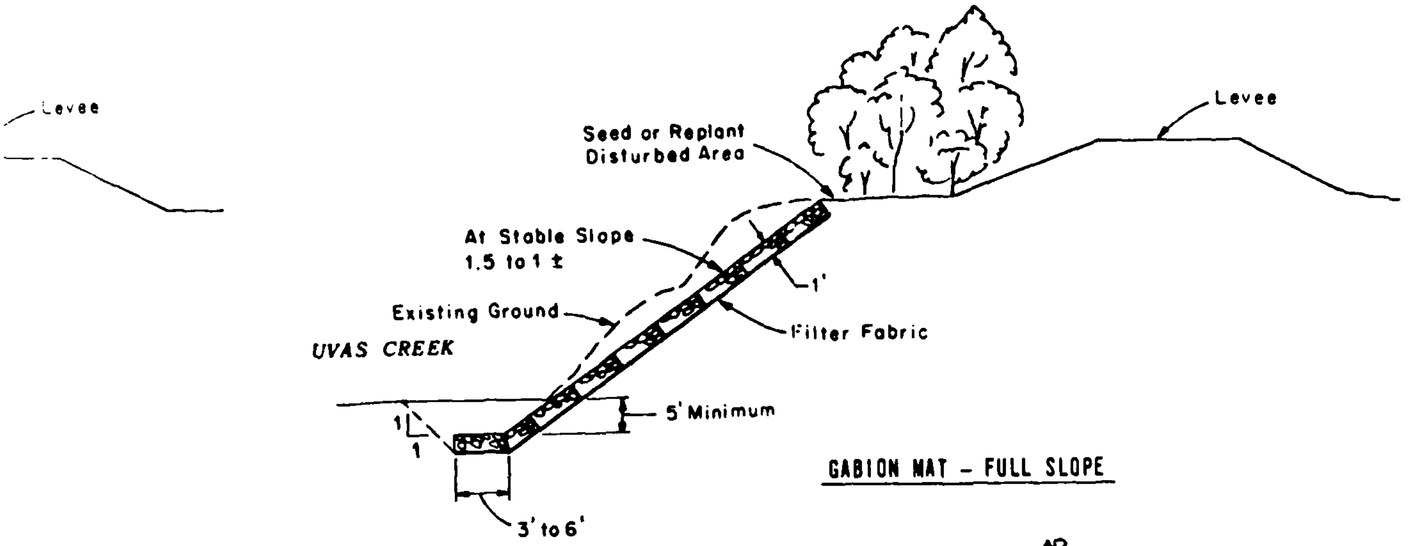
RIPRAP - PARTIAL SLOPE



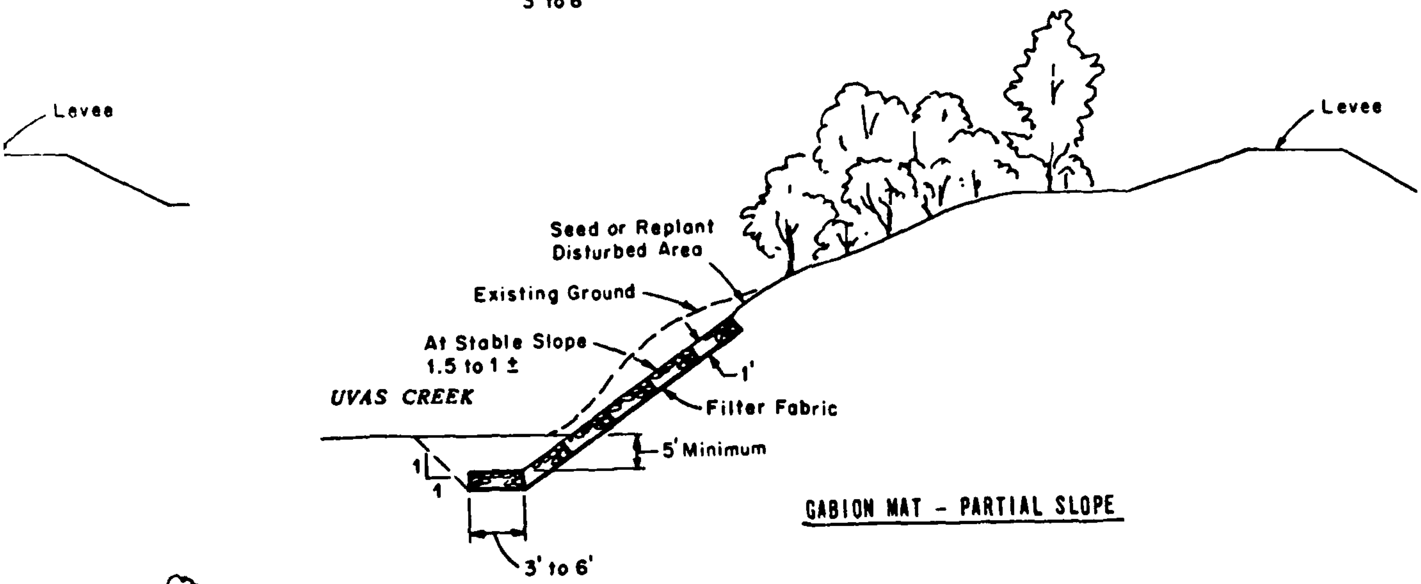
RIPRAP - DOWNSTREAM LEVEE TERMINATION



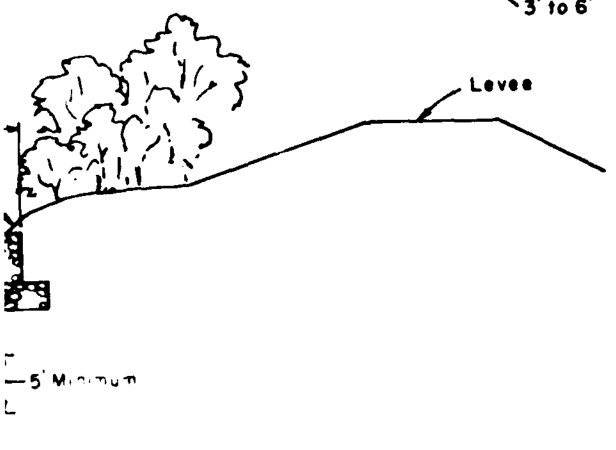
GABION WALL



GABION MAT – FULL SLOPE



GABION MAT – PARTIAL SLOPE



GABION WALL

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

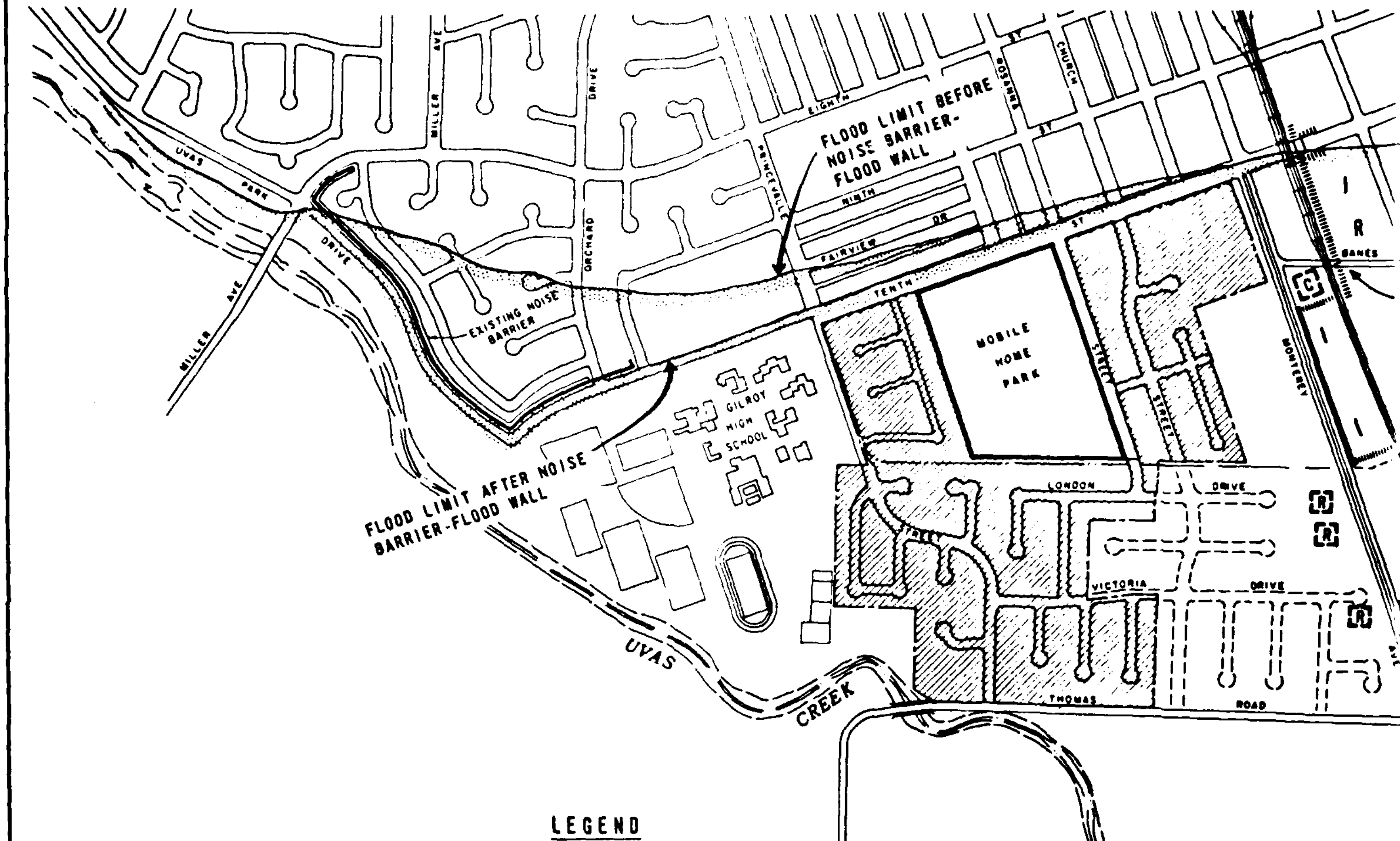
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

TYPICAL SLOPE PROTECTION DETAILS

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 12

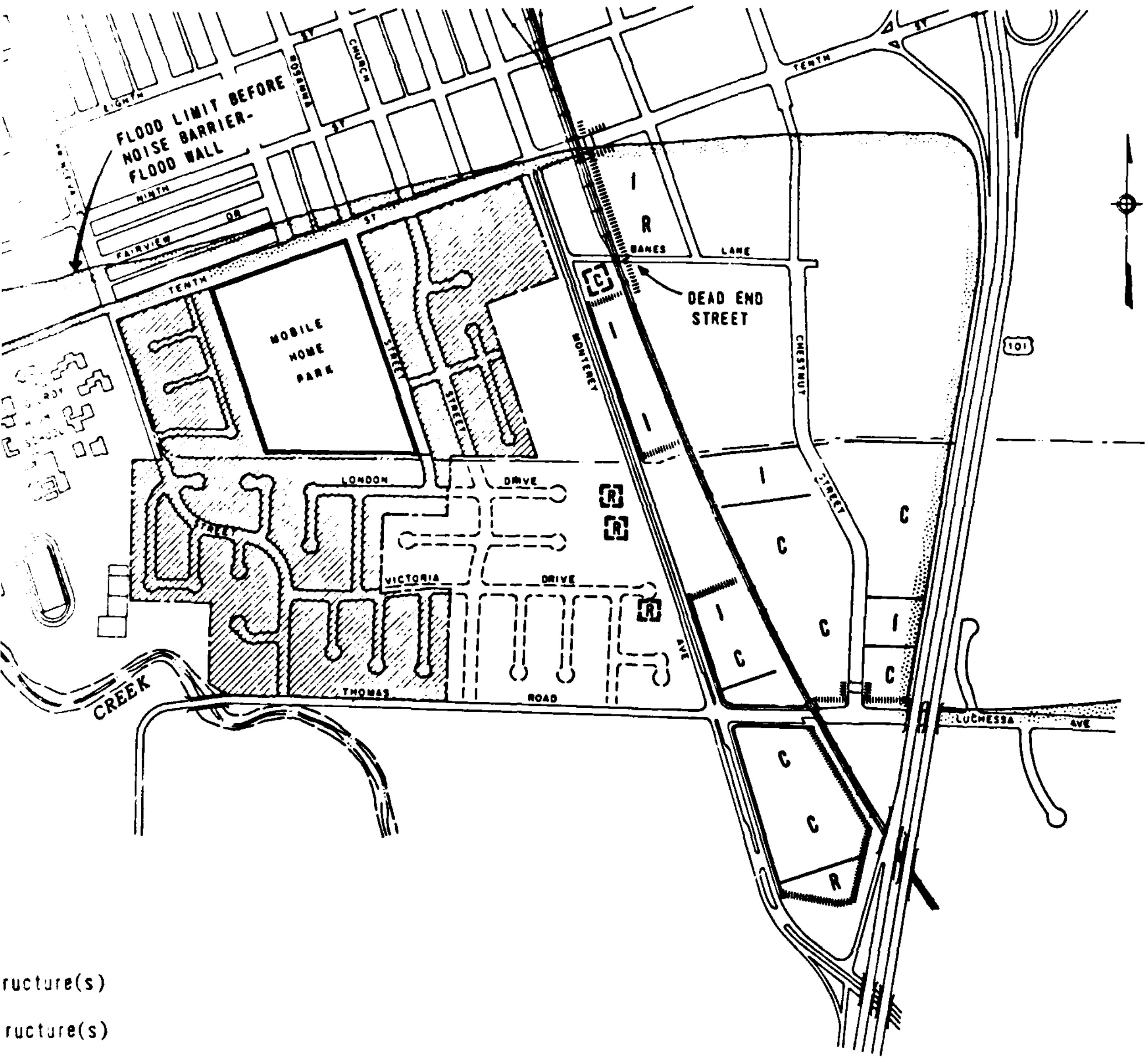


LEGEND

	Levee
	Flood Wall
I	Industrial Structure(s)
C	Commercial Structure(s)
R	Residential Structure
	Flood Proofing Residential and Commerical Structures

0 500 1000 1500 2000

SCALE IN FEET



ructure(s)

ructure(s)

itructure

g Residential
l Structures

500 2000

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA

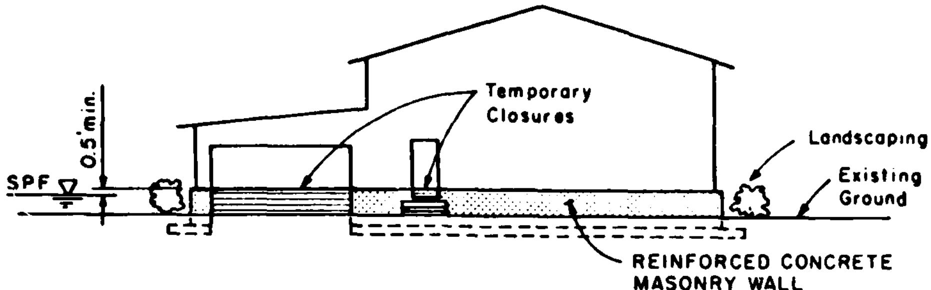
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

ALTERNATIVE 7 - NONSTRUCUTRAL
FLOOD PROTECTION FACILITIES

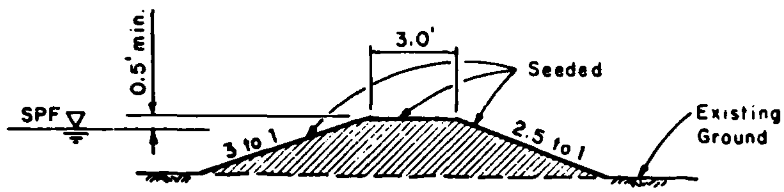
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

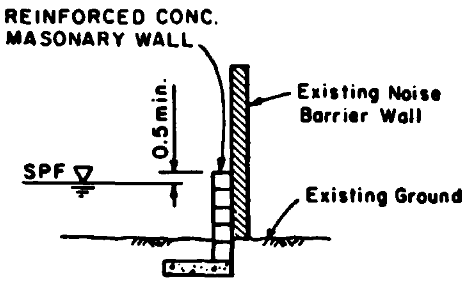
Plate No. 13



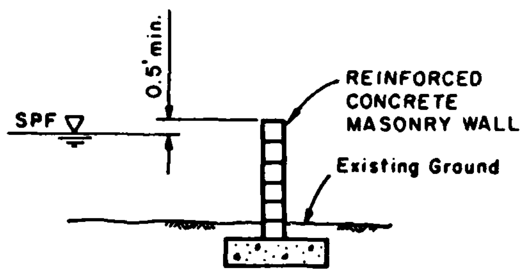
RESIDENTIAL FLOOD PROOFING



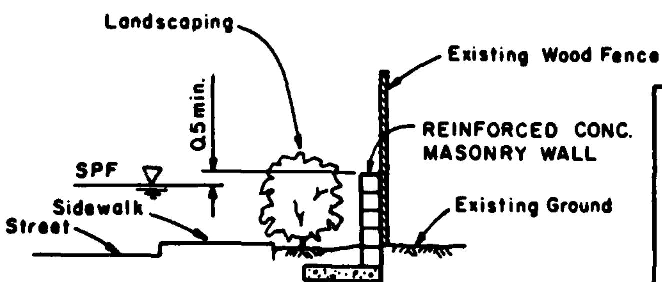
LEVEE



NOISE BARRIER - FLOOD WALL



FLOOD WALL



MOBILE HOME PARK - FLOOD WALL

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

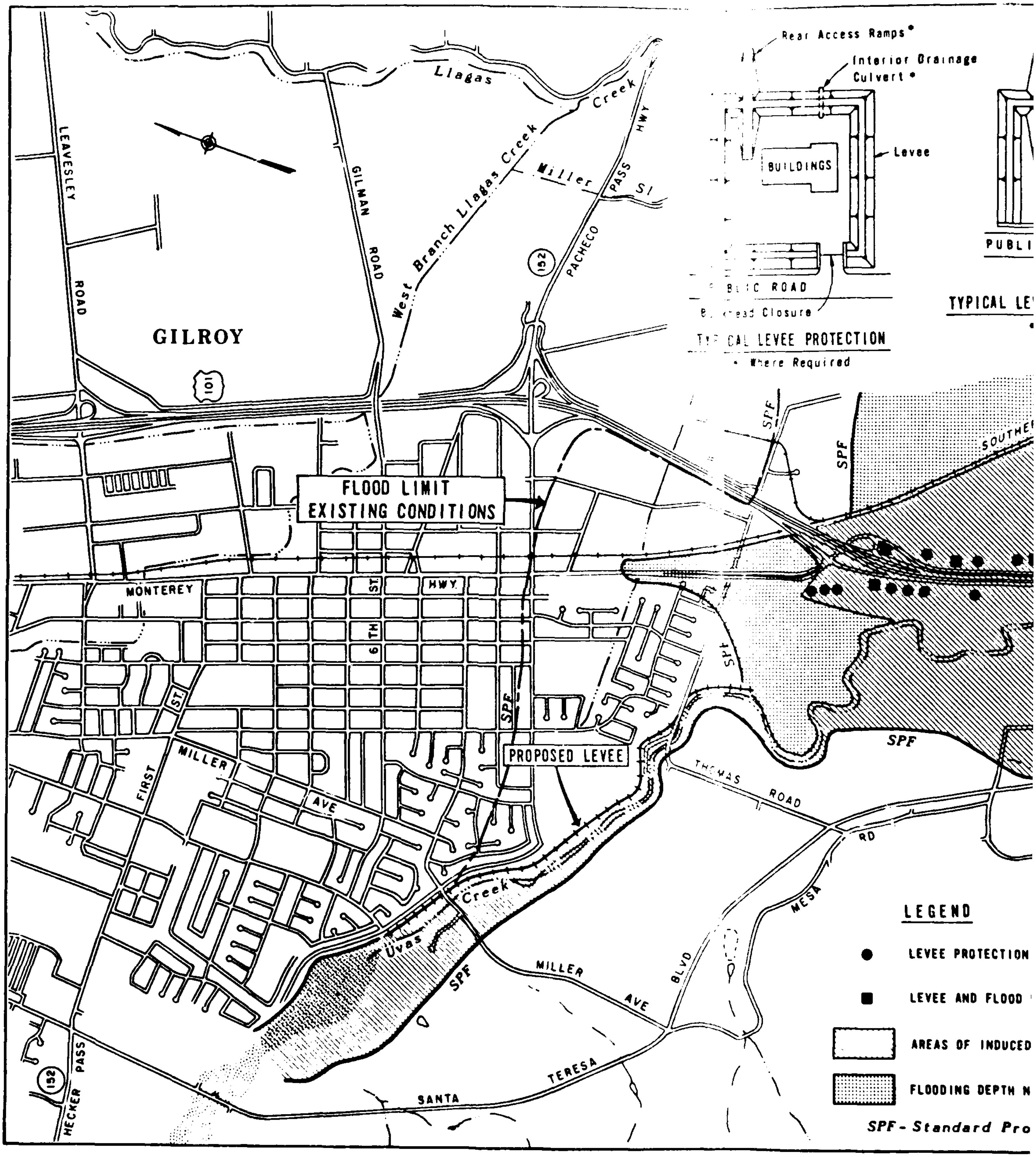
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

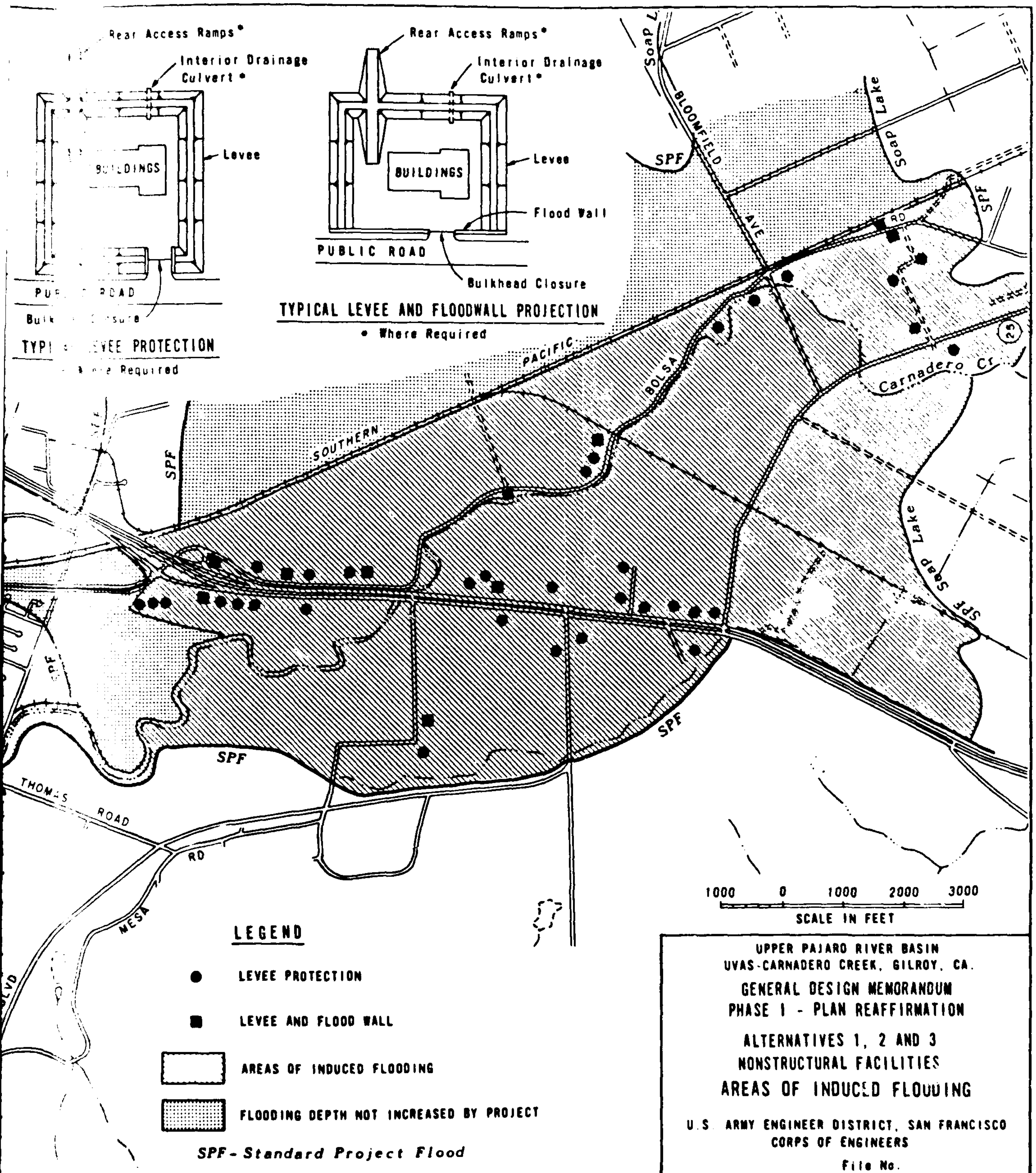
NONSTRUCTURAL ALTERNATIVE
TYPICAL FACILITIES

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

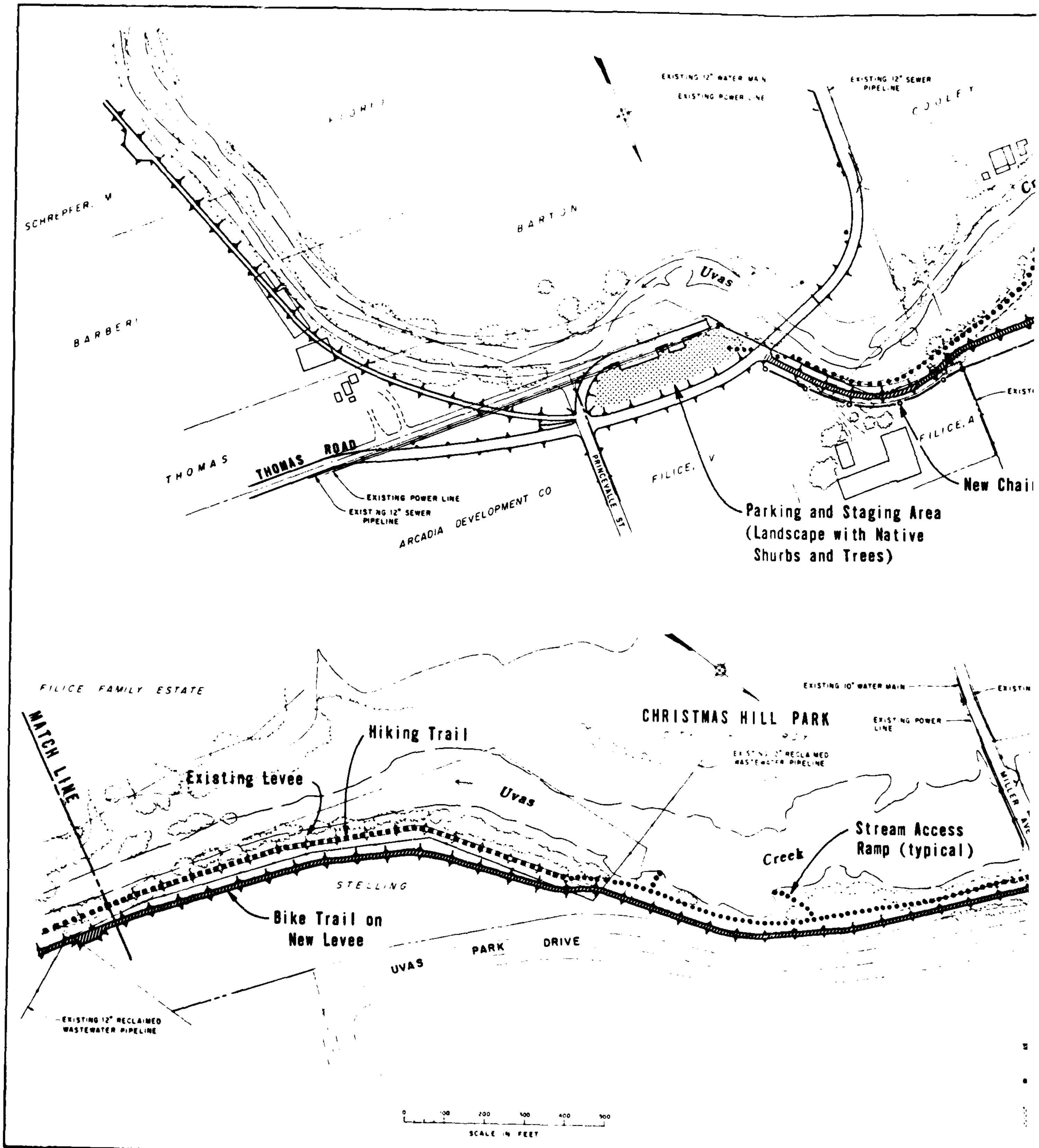
Plate No. 14


GILROY
Llagas Creek
West Branch Llagas Creek
Miller Sl
LEAVESLEY ROAD
GILMAN ROAD
PACHECO PASS HWY
152
101
MONTEREY HWY
6TH ST.
FIRST ST.
MILLER AVE
THOMAS ROAD
MESA RD
MILLER AVE
BLVD
SANTA TERESA
HECKER PASS
Uvas Creek
SPF
FLOOD LIMIT EXISTING CONDITIONS
PROPOSED LEVEE
Rear Access Ramps*
Interior Drainage Culvert*
Levee
BUILDINGS
PUBLIC ROAD
Bulkhead Closure
TYPICAL LEVEE PROTECTION
* Where Required
TYPICAL LE
PUBLI
LEGEND
LEVEE PROTECTION
LEVEE AND FLOOD
AREAS OF INDUCED
FLOODING DEPTH N
SPF - Standard Pro

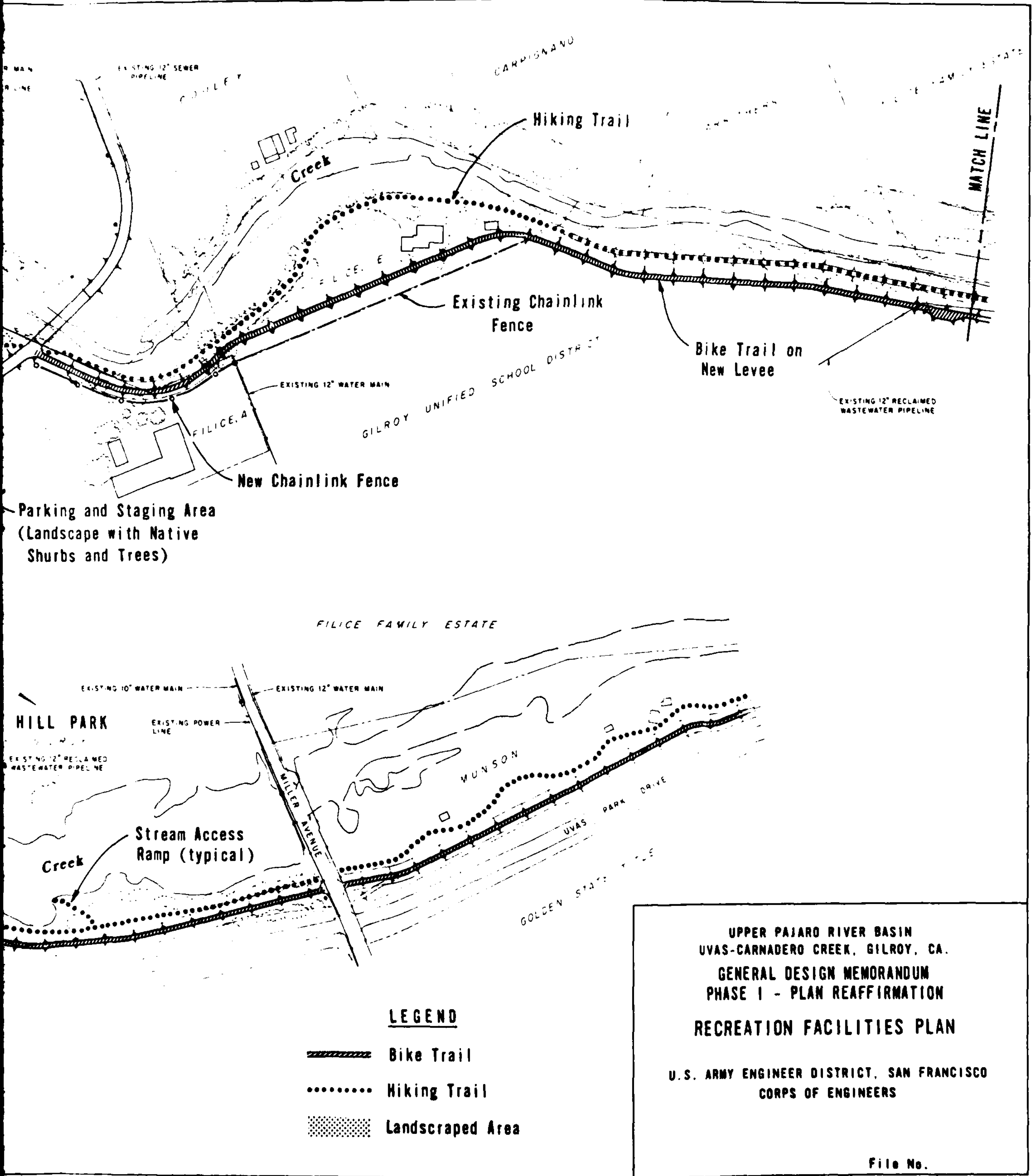


Rear Access Ramps*
Interior Drainage Culvert*
Levee
BUILDINGS
Flood Wall
PUBLIC ROAD
Bulkhead Closure
TYPICAL LEVEE AND FLOODWALL PROJECTION
* Where Required
TYPICAL LEVEE PROTECTION
Soap L
BLOOMFIELD AVE
Soap Lake
SPF
RD
SOUTHERN PACIFIC
BOLSA
Carnadero Cr
25
THOMAS ROAD
RD
MESA
BLVD
1000 0 1000 2000 3000
SCALE IN FEET
LEGEND
LEVEE PROTECTION
LEVEE AND FLOOD WALL
AREAS OF INDUCED FLOODING
FLOODING DEPTH NOT INCREASED BY PROJECT
SPF - Standard Project Flood
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
ALTERNATIVES 1, 2 AND 3
NONSTRUCTURAL FACILITIES
AREAS OF INDUCED FLOODING
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 15



EXISTING 12" WATER MAIN
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
SCHREPFER, M
BARTON
BARBERI
Uvas
THOMAS
THOMAS ROAD
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
PRINCEVALLE ST
FILICE, V
FILICE, A
New Chai
Parking and Staging Area
(Landscape with Native
Shurbs and Trees)
FILICE FAMILY ESTATE
MATCH LINE
Hiking Trail
Existing Levee
Uvas
CHRISTMAS HILL PARK
EXISTING 10" WATER MAIN
EXISTING POWER LINE
MILLER AVE
Stream Access
Ramp (typical)
Creek
STELLING
Bike Trail on
New Levee
UVAS PARK DRIVE
EXISTING 12" RECLAIMED
WASTEWATER PIPELINE
0 100 200 300 400 500
SCALE IN FEET



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

RECREATION FACILITIES PLAN

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 18

ENVIRONMENTAL STATEMENT

PROPOSED PLAN FOR FLOOD PROTECTION

ON UVAS CREEK

GILROY, SANTA CLARA COUNTY, CALIFORNIA

The responsible lead agency is the U. S. Army Corps of Engineers District, San Francisco.

Abstract: Uvas-Carnadero Creek is a tributary to Pajaro River flowing from the Santa Cruz Mountains through the Santa Clara Valley. Gilroy is a city of approximately 22,250 on Uvas-Carnadero Creek and subject to flooding during large events. The San Francisco District has investigated public concerns and has identified and evaluated a number of alternative plans. Plans that consist of levee protection of the developed City of Gilroy were the only alternatives found deserving of detailed study. A project consisting of levee construction or modification on the north side of Uvas Creek between approximately 2,000 feet downstream of Thomas Road and about 1,300 feet upstream of Miller Avenue has been selected as the plan that best serves to achieve the planning objectives for this project. The project would include the relocation of the Thomas Road bridge and other lesser appurtenant features. Mitigation measures would include vegetative plantings to offset losses of riparian vegetation caused by project construction and flowage easements on downstream lands subject to project induced flooding.

TABLE 1
LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Statement.

NAME	EXPERTISE	EXPERIENCE	PROFESSIONAL DISCIPLINE
Corps of Engineers			
Bob Lillie (Study Manager/ Reviewer)	Study Management & Civil Engineer	5 years hydraulic design, 5 years civil engineering & 5 years water resources planning	Civil Engineer
Lars Forsman (EIS Coordinator/ Reviewer)	Environmental Planning & Geoscience	7 years EIS & technical reports, 6 years civil engineering tech, and 12 years photomapping and remote sensing	Geographer
Les Tong (Biological Environment/Reviewer/Section 404 Evaluation)	Environmental Planning & Biology	8 years EIS and technical reports	Zoologist
Frank Andres (Social & Economic Analysis/Reviewer)	Economics	12 years transportation, navigation, flood control & water resources economics	Economist
Alan Mathiesen (Hydrological, Hydraulic Analysis/ Reviewer)	Hydraulics	10 years flood plain analysis and design of hydraulic structures	Civil Engineer
Ed Kandler (Cultural Resources/ Reviewer)	Cultural Resources Management	3 years cultural resources management.	Archaeologist

TABLE 1
LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Statement.

Page 2

NAME	EXPERTISE	EXPERIENCE	PROFESSIONAL DISCIPLINE
Corps of Engineers (Continued)			
Mark Rudo (Cultural Resources/ Reviewer)	Cultural Resources Management	2 years cultural resources management	Archaeologist
Robert White (Real Estate Appraisal)	Real Estate Appraisal	12 years real estate appraisal	Appraiser
Consultants			
Rick Bettis (Study Manager)	Water Resources Engineering	21 years planning and design, 16 years water resources and power, 5 years roads and bridges	Civil Engineer
Terry T. Tice (Environmental Analysis)	Environmental Engineering	18 years engineering including 8 years in water quality and environmental assessment	Sanitary Engineer
William H. Gill (Air Quality/Land Use Appendices)	Environmental Planning	18 years experience in water and environmental planning	Civil Engineer
Michael H. Mosbacher (Nonstructural, Recreation Facility Design)	Civil Engineering	2 years engineering, planning, and design	Civil Engineer

TABLE 1
LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Statement.

Page 3

NAME	EXPERTISE	EXPERIENCE	PROFESSIONAL DISCIPLINE
Consultants (Continued)			
Robert Bow (Hydraulic Analysis Estimating)	Computer Analysis Estimating	18 years varied engineering technical analysis	Engineering Technician
Buster Ide (Graphics)	Drafting/Graphics	19 years drafting experience	Engineering Draftsman
Ann S. Peak (Cultural Resources)	Cultural Resources Investigation	10 years cultural resource investigations	Archaeologist
Melinda A. Peak (Cultural Resources)	Cultural Resources Investigation	7 years cultural resource investigations	Archaeologist
Robert A. Gerry (Cultural Resources)	Archaeology	7 years archaeological studies	Archaeologist
Donald R. Curphy (Geotechnical Appendix)	Soils and Foundation Engineering	14 years soils and foundation engineering	Geotechnical Engineer
Phillip L. Chang (Geotechnical Appendix)	Soils and Foundation Engineering	6 years soils and foundation engineering	Geotechnical Engineer

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CHAPTER 1

SUMMARY

1.01 MAJOR CONCLUSIONS AND FINDINGS. The study found that the only alternatives meriting detailed review were the plans utilizing levees along the left (north) bank of Uvas Creek in the vicinity of Miller Avenue and Thomas Road, and the nonstructural alternatives. Some alternatives result in reduced riparian habitat along the creek while others increase the riparian habitat. Urbanized land area protected from flooding varies from alternative to alternative. The specific findings of this study are presented in the following paragraphs.

1.02 Rationale for Selection of the NED Plan. Alternative 1 has been selected as the NED Plan as it results in the greatest net economic benefits ($598,000 annually) and therefore would make the largest contribution to National Economic Development. Alternative 2 results in nearly equal net flood control benefits ($575,000 annually). Alternatives 3 and 7 would yield estimated net benefits of $563,000 and $243,000, respectively.

1.03 Rationale for Designation of EQ Plan. Alternative 3 has been designated as the Environmental Quality Plan for the proposed project. This alternative would result in an enhancement of the existing environmental quality conditions. The large levee setback used in this alternative would result in an opportunity for expansion of riparian habitat, thereby enhancement of wildlife values. The plan will provide greater open space, thus enhancing the aesthetic values and recreational opportunities for the project area.

1.04 Rationale for Selected Plan. The San Francisco District recommends that Alternative 2, designed for the Standard Project Flood (SPF) be selected as the plan that is in the best Federal interest and best serves to achieve the planning objectives for this project. The rationale for this recommendation is delineated in detail in the Main Report and is summarized as follows:

a. It has been determined that providing protection for the Standard Project Flood is economically viable for all alternatives considered, and provides greater total and net benefits than 100-year protection.

b. Alternative 2, along with Alternatives 1 and 3, provide protection to the developed area in the southern portion of the City of Gilroy.

c. Alternative 2 is compatible with the County of Santa Clara and City of Gilroy's plans for the Uvas Creek Linear Park. Open space and aesthetic values are maintained by this alternative.

d. Alternative 2 provides for preservation of the existing riparian vegetation and riparian habitat of the creek.

e. Alternative 2 is in compliance with Executive Order 11988-Flood Plain Management, as the flood plain is not changed to encourage development.

1.05 Rationale for Most Likely Alternative Future for the Study Area. The future economic and land use conditions for the project area would be those resulting from the "no-action" alternative to this project. The most likely alternative future for the study area will be the continued limited urbanization of the City of Gilroy as defined in the City's General Plan as adopted in November 1979. Projected future land use and economic conditions are defined in detail in Appendix 5 of this report. As a result of the flood plain hydraulic and economic analyses, as presented in Appendix 5, it has been concluded that implementation of the proposed project will not affect future land use in the area. The affected flood plain is nearly completely developed, in accordance with the General Plan. Structures in the undeveloped areas can be flood proofed at relatively low cost. If the proposed project is not implemented, the flood proofing of the structures in the flood plain required in accordance with the Federal Flood Insurance Program will not impact the future land use.

1.06 Findings with Respect to Executive Order 11988 - Flood Plain Management. This policy states that Federal agencies must "avoid long- and short-term adverse impacts associated with the occupancy and modification of flood plains, and ... avoid direct or indirect support of flood plain development whenever there is a practicable alternative ..."

1.07 The project-affected flood plain area is nearly completely developed. It has been determined that, due to the shallow nature of the flooding, the flood proofing required in accordance with the 1973 Flood Disaster Protection Act would have little impact on future development patterns. It is therefore concluded that the project would not induce further flood plain development and the adverse impacts to the flood plain would not be significant. The project is therefore in conformance with E.O. 11988.

1.08 Findings with Respect to Section 404(b), Clean Water Act of 1977. The objective of the Clean Water Act (33 U.S.C. 1344) is to restore and maintain the chemical, physical and biological integrity of the nation's waters. Section 404(b) of this Act, as amended in 1977, requires that the Corps evaluate the impacts of the discharge of dredged or fill material into waters of the United States, according to a set of specified guidelines. A State of California Water Quality Certificate must be issued for all projects authorized under Section 107 of the River and Harbor Act that discharge dredged material into U.S. waters.

1.09 The proposed project would have minimal impact upon the water quality of Uvas Creek. There could be a minor short-term increase in suspended solids as a result of excavation required for the placement of riprap on the channel banks. However, this excavation would be performed during periods when there is little or no flow in the creek, therefore resulting in minimal or no impact. The riprap installation would result in decreased long-term bank erosion with a resulting decrease in sediment and enhancement of water quality.

1.10 There could be a very small short-term increase in water temperature due to the removal of riparian vegetation; however, the resulting water quality impact would be minimal. This temperature increase would be very small since the vegetation to be removed is on the north side of the creek and all losses would be mitigated by revegetation.

1.11 It has been concluded that the project impacts on water quality would be very small and the State Water Quality Certification has been waived; therefore, the project basically conforms to the requirements of Section 404 of the Clean Water Act. A complete Section 404 evaluation and letter waiving the certification are contained in Appendix 10 of this report.

1.12 <u>Findings with Respect to Executive Order 11990 on Wetlands.</u> This order states that each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. It further states that Federal agencies should avoid, to the extent possible, the long- and short-term adverse impacts associated with destruction or modification of wetlands. The agency shall also avoid undertaking and providing support for new construction including draining, dredging, channelizing, filling, diking, impounding and related activities, located in wetlands, uhless the agency head finds: (1) no practicable alternative and (2) all practical measures have been taken to minimize harm to wetlands. In making this finding, the agnecy head may take into account economic, environmental and other pertinent factors.

1.13 Levee construction and slope protection installation would result in small localized losses of riparian wetland vegetation. The elimination of this riparian vegetation would result in small loss in food and shelter for birds and mammals. Due to the physical constraints on the possible levee locations and the need to provide slope protection in critical areas to assure the safety of the project facilities, the Corps has determined that there are no viable alternatives that would serve to better protect the wetland vegetation. All practical measures have been taken to minimize the vegetation removal and mitigratory vegetative plantings would be provided to offset the project caused losses. Therefore, the Corps has concluded that the project conforms with the requirements of E.O. 11990.

1.14 AREAS OF CONTROVERSY. No significant areas of controversy or disagreement developed during the course of the study. Some of the land owners in the rural area south of the project have indicated some opposition to the project since their lands will not be protected. Flowage easements would be purchased on these lands subject to induced flooding.

1.15 The U.S. Fish and Wildlife Service (USFWS) has expressed opposition to any alternative that would result in the loss or degradation of riparian habitat. They have recommended that project levees be set-back to provide for habitat expansion. The selected Alternative 2 would preserve most of the existing riparian vegetation. The Corps has determined that the cost of the lands, as provided for habitat expansion in Alternative 3, cannot be justified on the basis of environmental quality enhancement. The USFWS does not oppose the selection of Alternative 2 provided that the unavoidable vegetation losses are mitigated as recommended in their report of March 5, 1981 included in Section L of Appendix 3 of this report. The Corps has concurred with the recommended mitigating vegetative planting.

1.16 UNRESOLVED ISSUES. There are no unresolved issues within the scope of Federal responsibility.

1.17 RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS. Table I-1 summarizes the degree of compliance of each of the alternative plans to the requirements of the applicable environmental laws, executive orders and policies and land use plans and controls discussed below:

1.18 National Environmental Policy Act. The National Environmental Policy Act of 1969 (NEPA) is a declaration of a national environmental policy. Section 101 of this act includes national goals relating to the preservation and enhancement of environmental quality. Section 102 defines the environmental impact assessment and reporting process required for actions by all Federal agencies that could impact the environment. The plan formulation and evaluation and the environmental assessment for the proposed project have been performed in compliance with this act.

1.19 Executive Order 11988 (Flood Plain Management). This policy states that Federal agencies must "avoid long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct or indirect support of flood plain development wherever there is a practicable alternative ..."

1.20 The Uvas Creek flood plain area that would be affected by the project is nearly completely developed. Due to the relatively shallow nature of the flooding, the flood proofing required in accordance with the 1973 Flood Disaster Protection Act would have little impact on future development patterns if the proposed project was not implemented. Therefore it has been concluded that the project would not induce further flood plain development.

TABLE I-1
RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS

Laws, Policies, Regulations and Plans	PLANS				
	NED Plan 1	Tentatively Selected Plan 2	EQ Plan 3	Nonstructural 7	No Action
FEDERAL					
National Environmental Policy Act	FC	FC	FC	FC	FC
E.O. 11988-Floodplain Management	FC	FC	FC	FC	NA
E.O. 11990-Wetland Protection	FC	FC	FC	NA	NA
Chief of Engineers Wetland Policy	FC	FC	FC	NA	NA
E.O. 11593-Cultural Resources	FC	FC	FC	FC	NA
Endangered Species Act of 1973	FC	FC	FC	FC	NA
National Historic Preservation Act of 1966	FC	FC	FC	FC	NA
Clean Water Act, as Amended in 1977	FC	FC	FC	FC	NA
Clean Air Act of 1970	FC	FC	FC	FC	NA
Fish and Wildlife Coordination Act of 1958	PC	PC	FC	FC	NA
Water Resources Planning Act of 1965	FC	FC	FC	FC	NA
Federal Water Project Recreation Act of 1965	FC	FC	FC	NA	NA
Wild and Scenic Rivers Act of 1978	FC	FC	FC	NA	NA
STATE					
State of California Wetland Policy	FC	FC	FC	NA	NA
LOCAL					
Santa Clara County-Urban Development and Open Space Plan	FC	FC	FC	FC	NA
City of Gilroy General Plan	FC	FC	FC	FC	NA

LEGEND:
FC - Full Compliance (pending review by appropriate agencies)
PC - Partial Compliance
NC - Noncompliance
NA - Not Applicable

1.21 Executive Order 11990 (Wetland Protection). This policy states that Federal agencies should avoid to the extent possible the long- and short-term adverse impacts associated with destruction or modification of wetlands. The agency shall also avoid undertaking and providing support for new construction (draining, dredging, channelizing, filling, diking, impounding, and related activities) located in wetlands, unless the agency head finds: (1) no practicable alternative, and (2) all practical measures have been taken to minimize harm to wetlands. Environmental, economic, and other pertinent factors may be taken into account.

1.22 Levee construction and slope protection installation would result in small localized losses of riparian wetland vegetation. The elimination of this riparian vegetation would result in small loss in food and shelter for birds and mammals. Due to the physical constraints on the possible levee locations and the need to provide slope protection in critical areas to assure the safety of the project facilities, the Corps has determined that there are no viable alternatives that would serve to better protect the wetland vegetation. All practical measures have been taken to minimize the vegetation and removal and mitigatory vegetative plantings would be provided to offset the project caused losses. Therefore the Corps has concluded that the project conforms with the requirements of E.O. 11990.

1.23 Chief of Engineers Wetland Policy. This policy declares wetlands to be vital areas constituting productive and valuable public resources. Alteration or destruction of wetlands is discouraged as contrary to the public interest. Wetland functions considered important to the public interest are delineated in the July 19, 1977 Federal Register. Cumulative effects of small changes in wetlands often result in major wetland impairment. Therefore, Federal projects affecting a particular wetland site will be evaluated with respect to the complete and interrelated wetland area. No construction activity will occur in wetlands delineated as important to the public interest, unless the District Engineer concludes the benefits of the alternative outweigh the damage to the wetlands and the alteration is necessary to realize the benefits. The District Engineer must demonstrate the need to locate the project in the wetland and must evaluate the availability of feasible alternative sites. As indicated for E.O. 11990, the proposed project conforms to this policy.

1.24 State of California Wetland Policy. This policy recognizes the value of marshlands and other wetlands. Basically the Resources Agency and its various departments will not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands. Exceptions may be granted if all the following conditions are met: (1) project is water dependent; (2) no feasible, less environmentally damaging alternative is available;

(3) the public trust is not adversely affected; and (4) adequate compensation is part of the project. Compensation measures must be in writing, and long-term "wetland habitat value" of involved project and mitigation lands must not be less after project completion. As indicated for E.O. 11990, the proposed project conforms with this policy.

1.25 Executive Order 11593 (Preservation and Enhancement of Cultural Resources). This executive order directs Federal agencies to assume leadership in preserving and enhancing the Nation's cultural heritage to survey and nominate to the National Register historic properties under their jurisdiction, to refrain from impairing historic properties under their control and to initiate measures to insure that their programs and policies contribute to the preservation and enhancement of non-Federally owned historic resources.

1.26 One of the two archaeologic sites identified in the study area has been determined to be buried under silt deposits and will not be disturbed by project related activities. A second site has been determined to have been previously destroyed. Therefore, the Corps has concluded that the proposed project conforms with E.O. 11593.

1.27 Endangered Species Act of 1973, As Amended (16 USC SEC 1533). The intent of this law is to protect plant and animal species designated as endangered or threatened by the U. S. Department of the Interior and/or their critical habitat from activities which would further jeopardize such species survival.

1.28 There are no endangered species in the study area. (See Append. 3, Page L-21).

1.29 National Historic Preservation Act of 1966 (80 STAT 915, 16 USC SEC 470). This act created the National Advisory Council to advise the President and Congress on matters involving historic preservation. In performing the above, the Council reviews and comments upon activities licensed by the Federal Government which would have effects upon properties listed in the National Register of Historic Places, or those eligible for listings.

1.30 There are no registered historic sites in the project impact area.

1.31 Clean Water Act, As Amended in 1977. The objective of the 1977 Amendments to the Clean Water Act (P.S. 95-217, 91 Stat 1600, 33 USC 1251 et seq) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Section 404(b) of the Clean Water Act, as amended in 1977, requires that the Corps evaluate the impacts of the discharge of dredged or fill material into the waters of the United States in order to make specified determinations and findings.

1.32 There would be a minimal increase in the Uvas Creek water temperature due to the loss of shade from the removal of riparian vegetation resulting from levee construction and stream bank riprap installation. There would also be a minor short term increase in sediment resulting from stream bank excavation required for riprap installation. The Corps has determined the water impacts to be minimal, therefore, the project is in conformance with this act. A detailed project evaluation with respect to Section 404 of the Clean Water Act is contained in Appendix 10 of this report.

1.33 Water Resources Planning Act of 1965. The act establishes Federal policy and procedures with respect to the planning of water resources development projects. These policies and procedures are contained in the Principles and Standards for Planning Water and Related Land Resources. The planning for this project has been consistent with these policies and procedures as further defined by the Corps of Engineers Regulations under which the proposed project plans were formulated and evaluated.

1.34 Federal Water Project Recreation Act of 1965. This act provides for Federal participation in recreational development and the enhancement of fish and wildlife resources in conjunction with water resource development projects.

1.35 The recreation plan included in the selected plan is consistent with the principles of this act.

1.36 Clean Air Act of 1976. This act established a program for the creation of air quality standards. As a result, National and State Ambient Air Quality Standards have been established. The administration, monitoring and enforcement of these standards is the responsibility of the Federal Environmental Protection Agency, the State of California Air Resources Board, and Bay Area Air Quality Management District.

1.37 The proposed project air quality impact has been determined to be minimal and would not significantly contribute to the degradation of the ambient air quality.

1.38 Fish and Wildlife Coordination Act of 1958. This act establishes requirements for the coordination of the planning for proposed Federal projects with the U.S. Fish and Wildlife Service to assure that adequate consideration is given the potentially affected fish and wildlife resources in the formulation and assessment of project plans.

1.39 The Fish and Wildlife Service has reviewed the environmental data and their report, prepared in accordance with the Coordination Act, is included in Section L of Appendix 3 of this report.

1.40 Wild and Scenic Rivers Act. This act provides that certain selected rivers of the nation, which, with their immediate environments, possess outstanding or remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values; shall be preserved in a free flowing condition and that their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

1.41 Uvas-Carnadero Creek has been significantly altered by the construction of an upstream dam and other activities such as leveeing and sand and gravel removal, therefore, it is not considered to be eligible for inclusion in the Wild and Scenic River System.

1.42 Santa Clara County General Plan. This plan as prepared by the County of Santa Clara Planning Department and adopted by the County Planning Commission and Board of Supervisors in 1980 provides a general land use plan for the entire county. The plan serves to guide specific land use planning and zoning on a county-wide basis.

1.43 The proposed project would not cause or induce any land uses inconsistent with this plan.

1.44 City of Gilroy General Plan. This plan was adopted by the city in November 1979 in accordance with State of California law which requires communities to prepare certain prescribed elements as part of an overall master plan for community development.

1.45 The proposed project is consistent with the related portions of this plan including land use, flood protection, and recreation.

CHAPTER 2

NEED FOR AND OBJECTIVES OF ACTION

2.01 STUDY AUTHORITY. A project to raise and lengthen an existing levee on Uvas-Carnadero Creek to provide flood protection to Gilroy, California, was authorized in 1944 (P.L. 78-534). This act reads in part:

> "The plan of improvement for local flood control protection on the Pajaro River and tributaries, California is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 505 Seventy-eighth Congress, second session, at an estimated cost of $511,160."

The proposed improvements in the Pajaro River Basin, which were contained in House Document No. 505 and authorized by the Flood Control Act of 1944 (Public Law 78-534), consisted of twelve miles of channel improvements on the Lower Pajaro River at Watsonville, and levees on Uvas-Carnadero Creek near Gilroy. The channel improvements at Watsonville were completed in 1949.

2.02 PUBLIC CONCERNS. From the earliest planning for the Pajaro River, the local citizens of Gilroy have expressed strong interest and commitment to solving their long standing flood problem. When the results of planning showed reservoir storage and levees on the south side of Uvas Creek to be uneconomical, local people were disappointed but continued their efforts toward the last remaining feasible options, levee protection of Gilroy.

2.03 A Citizens Advisory Committee was formed under the joint leadership of the Santa Clara Valley Water District (SCVWD), Gavilan Water Conservation District (formerly known as South Santa Clara County Water Conservation District [SSVWCD]), and the City of Gilroy. This committee continues to monitor the planning progress and support construction of a project.

2.04 Key concerns include the need to extend any levee along Uvas Creek to at least Thomas Road in order to protect the high school and southern areas within the city.

2.05 PLANNING OBJECTIVES. With each phase of the planning process, planning objectives have been revised and focused for the succeeding iteration. The final planning objectives are as follows:

a. To provide SPF flood damage prevention for the urban areas of Gilroy.

b. To preserve or enhance the riparian habitat along Uvas-Carnadero Creek.

c. To preserve the visual character and maximize the aesthetic quality along the stream.

d. To preserve or enhance the fish and wildlife resources in and along Uvas-Carnadero Creek.

e. To provide increased opportunities for stream side recreation along Uvas-Carnadero Creek.

CHAPTER 3

ALTERNATIVES

3.01 PLANS ELIMINATED FROM FURTHER STUDY. Plans considered in preliminary planning that were eliminated from further consideration include:

a. Hayes Valley Dams - Four alternatives for dames in Hayes Valley that would provide 5,000 acre feet of flood storage and up to 20,000 acre feet of water yield were evaluated and were eliminated because of unfavorable benefit to cost ratios.

b. Gilroy Dam - A multipurpose dam on Uvas Creek near Gilroy was not acceptable to local interests due to inundation of farm lands.

c. Pescadero Creek Dam - A multipurpose facility was eliminated because of lack of sufficient flood control benefits and less expensive water supply was available from the San Felipe Project.

d. Chesbro Dam Modification - The raising of Chesbro Dam by 11 feet was evaluated and work stopped on the project for environmental studies. The U.S. Soil Conservation Service is continuing project studies.

e. Uvas Dam Modification - The raising of Uvas Dam by 77 feet was studied and eliminated because of unfavorable benefit to cost ratio.

f. Levees - The following levee alternatives were eliminated because of low benefit to cost ratios:

- Alternative 1 - Miller Avenue to U.S. Highway 101 with levees on both sides of Uvas Creek.

- Alternative 2 - Levee on Gilroy side of the creek only, from Miller Avenue to U.S. Highway 101.

- Alternative 4 - Levees on Gilroy side of the creek to 2,000 feet upstream of Thomas Road. Eliminated because it did not provide protection to the newly developed southern portion of the city.

g. Phase I GDM Preliminary Plans - Levee Alternatives 4, 5 and 6 were screened following preliminary evaluation in the Phase I Study since they would not provide flood protection to the entire existing urbanized area of Gilroy.

3.02 WITHOUT CONDITION (NO ACTION). The No Action alternative (the "most likely alternative future") consists of implementation of zoning and county mitigation measures to prevent further damage to existing and future construction. To compensate for structural damages to existing structures participation in the National Flood Insurance Program would be essential.

3.03 PLANS CONSIDERED IN DETAIL. Detailed design and cost studies have been performed for each of the seven flood protection alternatives. In addition, a recreation plan was developed for the project. Four alternatives including a nonstructural and a no action alternative are presented here to indicate the range of possible project development of flood protection facilities for the developed area of Gilroy. In addition, an optional nonstructural plan was formulated for the purposes of protecting structures on properties in the rural area south of Gilroy where increased flooding depth would be induced by the implementation of the levee project protecting the city. Each alternative was assessed for both the 100-year flood and the SPF. The plans were formulated to cover the full range of possible alternatives that would achieve the previously stated project objectives to various degrees. The formulated plans were predicated on those developed in earlier Corps screening studies. Plate 5 (Main Report) indicates the flood plains resulting from the construction of the structural alternatives while Plates 8 and 9 (Main Report) show detailed plan views of each. Plate 13 shows a plan of nonstructural Alternative 7.

3.04 Levee Alternatives - The following alternatives for construction of levees along the north side of Uvas-Carnadero Creek were evaluated in detail:

a. Alternative 1 - Consists of a new or reconstructed levee along the north side of the creek from a point about 2,000 feet south of Thomas Road to Miller Avenue and the raising of the existing levee upstream of Miller Avenue. A flood wall of approximately 260 feet in length is required downstream of Thomas Road since there is insufficient space between the natural stream top of bank and the existing home to allow levee construction. It was determined the construction of the flood wall would be less costly than the purchase and relocation of the home. The Thomas Road bridge would be raised at its present location utilizing a temporary detour for local traffic. The purchase and relocation of two farm buildings located south of Thomas Road would be required in lieu of a second flood wall.

b. Alternative 2 - Is a modification of Alternative 1 with the levees setback wherever possible so that waterside levee toe does not encroach upon the existing riparian vegetation. The removal of some riparian vegetation could not be avoided since the levee location is constrained by the location of the existing Uvas

Park Drive. This alternative includes the reconstruction of about 1,100 feet of existing levee downstream of Miller Avenue, the raising of up to 1,300 feet of existing levee upstream of Miller Avenue, the relocation of Thomas Road, and the construction of a new bridge upstream of the existing structure. The purchase and relocation of one home and two farm buildings would be required.

c. Alternative 3 - Is further modification of Alternative 1 with the levee setback increased to 100 feet or more, depending on property boundaries and existing physical constraints. This alternative included the reconstruction of 1,100 feet of existing levee upstream of Miller Avenue, and the relocation of Thomas Road and bridge. No flood wall would be required, however, the purchase and relocation of five farm buildings and one home would be necessary.

3.05 The following design consideration and facility requirements are common to all or nearly all of the levee alternatives.

a. Designs are based on a 100-year flood of 17,000 cfs and a SPF of 18,800 cfs. Three foot freeboard is provided. Levee profiles are shown on Plate 10 (Main Report).

b. Levee sections would be in accordance with typical Corps standards as shown on Plate 11 (Main Report).

c. Due to high velocities in the existing channel following the confinement of flood flows, slope protection consisting of riprap or gabion mats or walls would be required as shown on Plate 12 (Main Report). Plates 7, 8 and 9 (Main Report) show the location of the slope protection.

d. In order to provide clearance to pass the design flow, the Thomas Road bridge must be raised. Alternative 1 includes the raising of the structure at it present location while Alternatives 2 and 3 include the construction of a new, relocated bridge.

e. The adjacent land slopes away from the creek on the leveed side, therefore, local drainage work would consist only of minor ditching and grading to drain the area between the levee and creek.

f. Relatively minor relocations of existing facilities including water pipeline, sewer pipelines, and low voltage overhead power lines would be required.

3.06 Additional detailed description of alternatives and engineering design criteria is included in Appendix 2, Section C of this report.

3.07 Recreation Plan - The project recreation plan provides facilities within the project area that will be incorporated into the Uvas Creek Linear Park being planned by the City of Gilroy and the County of Santa Clara. The facilities would be incorporated into each of the levee alternatives and would include:

a. Approximately 1.2 miles of ten foot wide asphalt paved bikeway on top of the project levee up to 1,300 feet upstream of Miller Avenue to Thomas Road.

b. Approximately 1.2 miles of hiking trail on the water side of the levee with access ramp to the stream channel at intervals over the project length.

c. A staging area at Thomas Road with paved parking for 15 cars.

d. Access ramps to the bikeway at Miller Avenue, Tenth Street, and Thomas Road.

3.08 Nonstructural - Nonstructural measures were investigated and Alternative 7 was formulated and analyzed. The basic criterion was to provide the same level of protection to the structures as provided by the levee alternatives. Nonstructural alternatives varied depending upon location within the flood plain, depth of flooding, and/or the structures being protected.

3.09 Nonstructural measures considered include raising, sealing or flood proofing of individual structures, and flood walls and ring levees for individual as well as for small groups of structures.

3.10 The removal of existing structures from the flood plain was not considered to be a viable alternative due to the dense development.

3.11 Plate 12 indicates the location of each of the nonstructural measures, and Plate 13 illustrates each of the different type facilities. No recreation facilities would be provided with Alternative 7.

3.12 Induced Flooding - Implementation of Alternative 1, 2 or 3 would result in a redirection of flows and increased flooding depth over approximately 2,600 acres in the rural area south of Gilroy. In most areas the amount of depth increase would be 0.25 feet, however, in some areas the increase in depth would be as much a 1.0 foot.

3.13 Appendix 5 includes estimates of the induced damages to the structures in the affected area while Appendix 2 includes an estimate of the flood proofing measures necessary to prevent these damages.

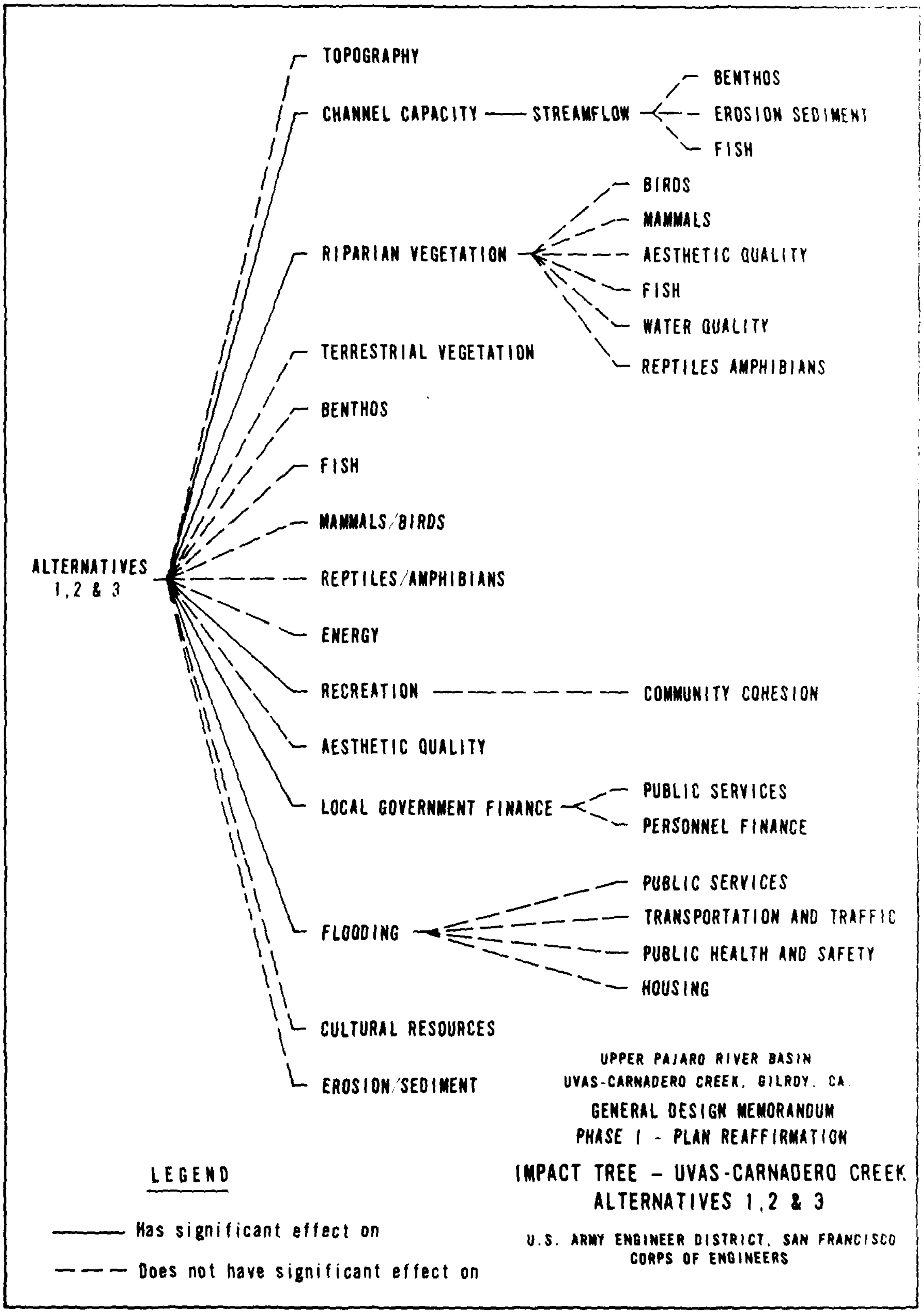
3.14 It has been concluded that the purchase of flowage easements is the most viable method of mitigating these damages.

3.15 Seismic Considerations - The Gilroy area is located in the seismically active region of California and is subject to earthquakes. The region is flanked by two major active fault zones, the San Andreas in the Santa Curz Mountains to the west and the Calaveras-Hayward in the Diablo Range to the east. The study area itself is traversed by a major active fault, the Sargent fault and two smaller faults, Ben Trovato and Berrocal, which are both considered to be inactive since no recognized displacement has occurred along these faults within the last two million years.

3.16 However, statistically about six earthquakes per decade have been felt in Gilroy, the most damaging of which was the 1906 earthquake with its estimated magnitude of 8.25 on the Richter magnitude scale. Considerable damage was experienced in the Gilroy area from this earthquake, which originated in the San Andreas fault zone.

3.17 Section A of Appendix 7 of this report evaluates the geotechnical conditions relative to the proposed project facilities. The relatively high earthquake potential of the project area will be considered in establishing the design loading for the facilities.

3.18 COMPARATIVE IMPACT OF ALTERNATIVES. Impact Tree for the project alternatives are shown on the following two pages. The comparative impact of the plans considered in detail is shown on Table III-1.



TOPOGRAPHY
CHANNEL CAPACITY
STREAMFLOW
BENTHOS
EROSION SEDIMENT
FISH
BIRDS
MAMMALS
AESTHETIC QUALITY
FISH
WATER QUALITY
REPTILES AMPHIBIANS
RIPARIAN VEGETATION
TERRESTRIAL VEGETATION
BENTHOS
FISH
MAMMALS/BIRDS
ALTERNATIVES 1,2 & 3
REPTILES/AMPHIBIANS
ENERGY
RECREATION
COMMUNITY COHESION
AESTHETIC QUALITY
LOCAL GOVERNMENT FINANCE
PUBLIC SERVICES
PERSONNEL FINANCE
FLOODING
PUBLIC SERVICES
TRANSPORTATION AND TRAFFIC
PUBLIC HEALTH AND SAFETY
HOUSING
CULTURAL RESOURCES
EROSION/SEDIMENT
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
IMPACT TREE – UVAS-CARNADERO CREEK
ALTERNATIVES 1,2 & 3
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
LEGEND
Has significant effect on
Does not have significant effect on

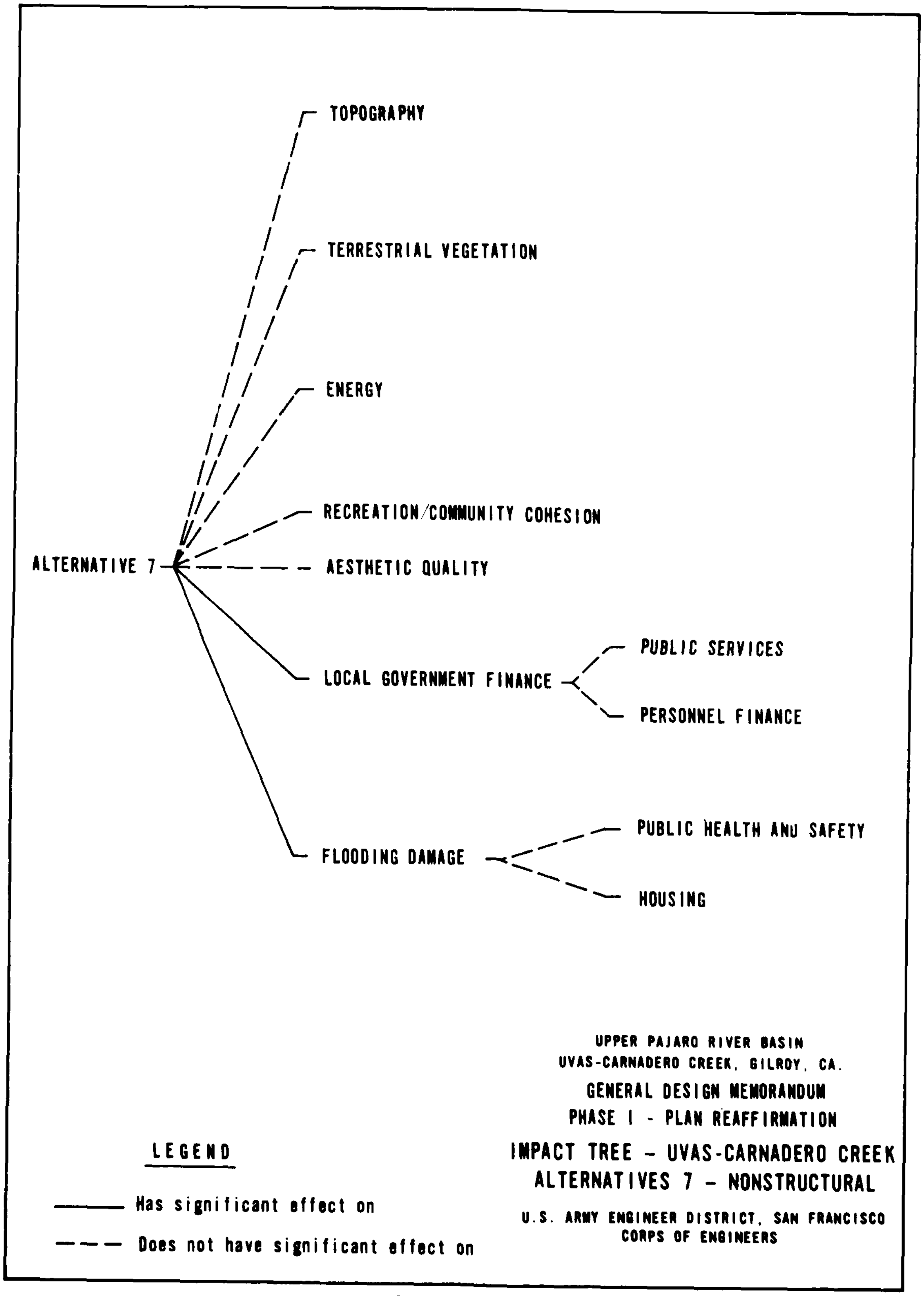

TOPOGRAPHY
TERRESTRIAL VEGETATION
ENERGY
RECREATION/COMMUNITY COHESION
ALTERNATIVE 7
AESTHETIC QUALITY
LOCAL GOVERNMENT FINANCE
PUBLIC SERVICES
PERSONNEL FINANCE
FLOODING DAMAGE
PUBLIC HEALTH ANU SAFETY
HOUSING
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
IMPACT TREE - UVAS-CARNADERO CREEK
ALTERNATIVES 7 - NONSTRUCTURAL
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
LEGEND
Has significant effect on
Does not have significant effect on

TABLE III-1
COMPARATIVE IMPACTS OF ALTERNATIVES

BASE CONDITIONS & ALTERNATIVES	FLOODPLAIN 1/	POPULATION	WATER QUALITY	AIR QUALITY	FISH RESOURCE	RIPARIAN VEGETATION 5/	TERRESTRIAL VEGETATION 6/	RECREATION RESOURCE 7/	ECONOMIC RESOURCE	
Base Condition	Floodplain 4250 acres	Population: 22,250 2/	Adequate for fish life	Standards exceeded 8 days/year 4/	Available: 200-500 Steelhead Trout	Available: 45 acres (210 acres)	Available: 3700 acres	Available 77 acres parkland 5/	Existing economic Base-$85,179,000 8/ taxable sales	
No Action	Floodplain 4250 acres Change: 0 acres	Population: 62,000 3/ Changes: 42,100	Adequate for fish life Impact: 0	Projected to meet all standards Change: Continued improvement	Available 200-500 Steelhead Trout Impact: 0	Available: 45 acres (210 acres) Impact: 0	Available: 2000 acres Change: 1700 acres	Available: 193 acres parkland Change: +116 acres	Economic base 9/ $302,000,000 taxable sales	
Alternative 1	Floodplain 3570 acres Impact: 680 acres	Population: 62,000 Impact: 0	Adequate for fish life Impact: Small temperature increase	Projected to meet all standards Impact: +0.03 ppm CO	Available: 200-500 Steelhead Trout Impact: Minimal due to tempera-ture increase	Available: 40 acres (205 acres) Impact: -5 acres	Available: 2006 acres Impact: +6 acres	Available: 193 acres + 6440' bike trail & 7000' hiking trail Impact: + biking&hiking trail	Economic base and $798,000 Impact: $798,000 flood protection & recreation	Cost: 2.5 million B/C Ratio: 4.1 Net Benefits: $598,000
Alternative 2	Floodplain 3570 acres Impact: 680 acres	Population 62,000 Impact: 1 family relocated	Adequate for fish life Impact: Minor temperature increase	Projected to meet all standards Impact: +0.03 ppm CO	Available: 200-500 Steelhead Trout Impact: Minimal due to tempera-ture increase	Available: 43 acres (208 acres) Impact -2 acres	Available: 2006 acres Impact: +6 acres	Available: 193 acres + biking&hiking trail Impact: + biking&hiking trail	Economic base and $840,000 Impact: $840,000 flood protection and recreation benefits	Cost: 3.3 million B/C Ratio: 3.2 Net Benefits: $575,000
Alternative 3	Floodplain 3570 acres Impact: 680 acres	Population: 62,000 Impact: 1 family relocated	Adequate for fish life Impact: Minimal temperature increase	Projected to meet all standards Impact: +0.03 ppm CO	Available: 200-500 Steelhead Trout Impact: Minimal due to tempera-ture increase	Available: 60 acres (225 acres) Impact +15 acres	Available: 2006 acres Impact: +6 acres	Available: 193 acres + biking&hiking trail Impact: + biking&hiking trail	Economic base and $840,000 Impact: $840,000 flood protection and recreation benefits	Cost: 3.6 million B/C Ratio: 3.1 Net Benefits: $563,000
Alternative 7 Nonstructural	Floodplain 9a/ 4250 acres Impact: Protection for structures on 680 acres	Population: 62,000 Impact: 0	Adequate for fish life Impact: 0	Projected to meet all standards Impact: 0	Available: 200-500 Steelhead Trout Impact: 0	Available: 45 acres (210 acres) Impact: 0	Available: 2000 acres Impact: 0	Available: 193 acres + parkland Impact: 0	Economic base and $712,000 Impact: $712,000 flood protection benefits	Cost: 5.8 million 6/ B/C Ratio: 1.5 Net Benefits: $243,000

1/Standard Project Floodplain
2/Estimated 1981 - City of Gilroy
3/Projected to year 2083
4/1979 Data
5/Along Uvas Creek from 1300 feet upstream of Miller Avenue to 2000 feet south of Thomas Road (in study area, Hecker Pass Road to Soap Lake).
6/Agriculture and open space lands in study area
7/Gilroy Urban Area
8/City of Gilroy, 1977
9/Assumed to increase in proportion to population - projected to 2083
9a/Minor change in floodplain due to protection of structures

TABLE III-1
COMPARATIVE IMPACTS OF ALTERNATIVES

BASE CONDITIONS & ALTERNATIVES	LOCAL GOVERNMENT FINANCE 10/	EMPLOYMENT AND LABOR FORCE	CULTURAL RESOURCES	LAND USE 10/	WILDLIFE RESOURCE	TRANSPORTATION 10/	ENERGY 13/
Base Condition	Taxable land 3500 acres	Total Employed 11/ 4800	3 known sites	Urban - 550 Agriculture and open space - 3700 acres	Existing wildlife	15 miles of street and road	Annual Use Gasoline - 8 million gallons Diesel - 0.7 million gallons
No action	Taxable Land 3500 acres Change: 0	Total Employed 17,800 12/ Change: 13,000	3 known sites Change: 0	Urban - 2250 acres Agriculture and open space - 2000 acres Change: 1700 acres urbanized	Decrease with loss of habitat Change: Small decrease	Estimated 20 miles of street and road Change +5 miles	Annual Use 12/ Gas - 25 million gallons Diesel - 2.3 million gallons Change: Gas - +17 million gallons Diesel - +1.6 million gallons
Alternative 1	Taxable Land 3450 acres Impact: -50 acres	Total Employed 17,800 Impact - 22 jobs during 6 months construction; 0.3 jobs, operation and maintenance	3 known sites Impact: 0	Urban - 2240 acres Agriculture and open space - 2007 acres Impact: 7 acres added open space	Decrease with loss of habitat Impact: Small decrease	10 miles street and road Impact: Flooding prevented on 10 miles	Annual Use Gasoline - 8 million gallons Diesel - 0.7 million gallons Impact: Gasoline & Diesel, 3000 gallons construction 200 gallons annual O&M
Alternative 2	Taxable land 3445 acres Impact: -55 acres	Total Employed 17,800 Impact: 22 jobs during 6 months construction; 0.3 jobs, operation and maintenance	3 known sites Impact: 0	Urban - 2240 acres Agriculture and open space - 2012 acres Impact: 12 acres added open space	Decrease with loss of habitat Impact: Minor decrease	10 miles street and road Impact: Flooding prevented on 12 miles	Annual Use Gasoline - 8 million gallons Diesel - 0.7 million gallons Impact: Gasoline & Diesel, 3000 gallons construction 200 gallons annual O&M
Alternative 3	Taxable land 3436 acres Impact: - 64 acres	Total Employed 17,800 Impact: 22 jobs during 6 months construction; 0.3 jobs, operation and maintenance	3 known sites Impact: 0	Urban - 2230 acres Agriculture and open space - 2022 acres Impact: 22 acres added open space	Decrease with loss of habitat Impact: Small Enhancement	13 miles street and road Impact: Flooding prevented on 12 miles	Annual Use Gasoline - 8 million gallons Diesel - 0.7 million gallons Impact: Gasoline & Diesel, 3000 gallons construction 200 gallons annual O&M
Alternative 7 Nonstructural	Taxable Land 3500 Impact: 0	Total Employed 17,800 Impact: 25 jobs during 9 months construction; 0.5 jobs, operation and maintenance	3 known sites Impact: 0 on known sites	Urban - 2250 acres Agriculture and open space - 2000 acres Impact: 0	Decrease with loss of habitat Impact: None	20 miles of street and road Impact: 0	Annual Use Gasoline - 8 million gallons Diesel - 0.7 million gallons Impact: Gasoline & Diesel, 500 gallons construction 200 gallons annual O&M

10/ In Standard Project Floodplain

11/ City of Gilroy, 1975

12/ Assumed to increase in proportion to population - Projected to 2083

13/ Study area

CHAPTER 4

AFFECTED ENVIRONMENT

4.01 ENVIRONMENTAL CONDITIONS. The study area, located in southern Santa Clara County in Central California, is situated in the northwesternmost portion of the Pajaro River Basin as shown in Plate 1. It forms a 200 square mile sub-basin that occupies the land area drained by Uvas-Carnadero Creek and Llagas Creek.

4.02 The topography of the area consists of mountainous terrain surrounding a level valley floor with some isolated hills on the valley floor. The area is characterized by active faults, alluvial fans and plains, and deep, fine grained soils. Vegetation includes grassland, grass-oak, brushland, woodland, fruitland, farm land and riparian habitat. Streams in this area contain an assemblage of warm and cold water game fishes, forage fishes, rough fishes, and supporting flood-web organisms. The climate in the study area is characterized by warm, dry summers while winters are mild and moderately moist.

4.03 An excellent network of all-weather roads serves both agricultural and urban areas. The principal metropolitan region within the study area is the City of Gilroy and its surrounding unincorporated suburbs, which have about half of the study area's population. In 1981, the estimated population of Gilroy was approximately 22,250. The median annual family income was $11,355 in 1975, and about 39% of the City's households were considered "low-income households." In 1975, 52% of the population were Caucasian, 33% Mexican/Chicano, 3% Spanish/Latino, 2% Japanese and 10% were other non-white races.

4.04 Thirty-five percent of the Gilroy area's adult population was employed full-time and 9% was employed part-time in 1975. Of the employed population, approximately 26% worked in agriculturally related fields, 23% in services, 19% in manufacturing, 16% in wholesale and retail trade, and 6% in construction. The remainder worked in a variety of other fields.

4.05 Historically, agriculture has been the major industry in the study area. Although some increase in urbanization has occurred during the past 25 years, the growing, processing and marketing of farm products account for about 85% of the annual income.

4.06 The valley land north of Gilroy is predominantly devoted to prune orchards with smaller areas in strawberries, grains and hay. South of Gilroy, such crops as beans, tomatoes and lettuce can be grown during dry months while garlic and sugar beets are grown year around. Some pasture and grain are grown around the fringes of the valley floor. Vineyards in the hills supply nine wineries located in the study area. Most of the agricultural land in the study area is irrigated by pumped ground water.

4.07 SIGNIFICANT RESOURCES.

4.08 Flood Plains - The Uvas-Carnadero Creek flood plain under existing conditions is shown on Plate 4. There are approximately 4,250 acres of land in SPF flood plain of which over 75 percent is in agricultural use. A complete breakdown of the lands within the flood plain is shown on Table 4 of the Main Report.

4.09 Population - The latest official population figures for the study area are from the 1970 Census which enumerated a total of 29,777 persons for the Pajaro Basin area and 12,665 for the City of Gilroy. The estimated population for Gilroy in 1981 was 22,250. Tables 2, 3, and 4 of the Main Report include historic and projected population, population composition, and distribution for Gilroy and the regional area.

4.10 Based on 1970 census data, a larger percentage of the population in the study area, 66% male and 65% female, are married than statewide, 65% male and 59% female. Also, the average household size is somewhat larger with 3.56 persons per household in the study area compared with 2.95 persons per household statewide.

4.11 The data also show that the residents of the study area and Gilroy, as a group, were at a lower educational level than county and state averages. Fifty-one percent of the population are high school graduates in the study area and 48% in Gilroy as compared with 70% for the county and 62% for the state as a whole. Median school years completed are 10.9 years in the study area compared to 12.4 years statewide. Eight percent of the school enrolled population in the study area up to age 34 is attending college while statewide 15% attend college.

4.12 In 1970, farm related employment was 12% as compared with 3% for the state as a whole.

4.13 Generally speaking, family income in 1975 was at a lower level in the study area than in the county and the state. While approximately 50% of the families in the study area earned $11,355 or more, 65% in the county and 55% in the state had achieved the same income level. Median for income for Santa Clara County for 1975 was $16,500.

4.14 Water Quality - The quality of the ground water in the study area varies greatly from place to place, but in the confined deeper aquifer the water is generally of good quality and suitable for domestic uses. However, a study by the U.S. Geological Survey, (Webster 1972) points out that, in an area between Gilroy and Pajaro River, high concentrations of total dissolved solids (TDS) as well as high concentration of nitrate were high enough (greater than 45 milligrams per liter) to be considered injurious to infants.

4.15 The quality of the surface waters in the study area is quite variable in both time and location because it is dependent on the lithology, soils, vegetation, rainfall, time of year and human activity within the watershed. In the winter, when stream flow is relatively high, the water quality is fairly good, while in the summer when low flow conditions exist, the quality of the surface waters is poor due to the lack of flushing action. As one goes downstream, the water quality degrades due mainly to increased human activity (mainly irrigation return flows). Specific surface water quality data are provided in Appendix 3 of this report.

4.16 Air Quality - The study area occupies the southernmost portion of the San Francisco Bay Area Air Basin.

4.17 The topography of the air basin, which basically consists of Santa Clara Valley flanked by the Diablo Range and the Santa Cruz Mountains, forms a trough oriented roughly northwest-southeast.

4.18 Land use in the study area is predominantly agriculture and open space, neither of which is a major producer of pollutants. However, the City of San Jose and the urbanized area surrounding the city are located within the air basin upwind of the study area. San Jose is a major producer of pollutants, mainly due to automobile emissions. Although the study area does not generate a heavy load of pollutants, pollutant levels become significant when the prevailing northwesterly wind blows pollutants into the study area where they are trapped by the topography and an inversion layer.

4.19 An air quality monitoring station has been maintained at Gilroy since 1974 by the Bay Area Air Quality Management District. Data from this station for the years 1976-1979 is summarized on Table IV-1. This data indicates that Federal and State standards have been exceeded for oxidants (Ozone) and suspended particulates. However, there has been some decrease in oxidant levels and in 1979 the Federal standard on 12 parts per 100 million was not exceeded. There has been a slight decrease in particulate levels that is expected to continue as the area becomes more urbanized and farming operations are reduced.

4.20 Fish Resource - The study area contains an assemblage of warm and cold water game fishes, forage fishes, rough fishes as well as supporting food-web organisms.

4.21 The most important game fish species is the steelhead rainbow trout (Salmo gairdnerii gairdnerii). Approximately 200 to 500 adult pairs migrate into the Pajaro River system from the sea annually to spawn. Actual numbers vary from year to year probably because of variations in annual runoff of surface water. The number entering Uvas-Carnadero and Llagas Creeks is not known.

TABLE IV-1

AIR POLLUTION LEVELS AND STANDARDS

City of Gilroy, California

Substance	Federal Standard[1/]		State	Level Recorded in Gilroy				No. of Days Gilroy exceeded the Standard[2/]			
	Primary	Secondary	Standard	1976	1977	1978	1979	1976	1977	1978	1979
Oxidant (Ozone) - 1 hour average (parts per 100 million)	8 12	8 12	10	21	12	15	12	30	11	4	0
Carbon Monoxide - 8 hours average (parts per million)	9	9	40ppm (during peak hr)	6.80	7.20	6.6	6.2	0	0	0	0
Nitrogen Dioxide - max hr average (parts per 100 million)	5 (annual average)	5 (annual average)	25 (during peak hr)	23	21	18	17	0	0	0	0
Sulfur Dioxide - 24 hour average (parts per million)	0.14		0.04	0.001	0.007	.004	.002	0	0	0	0
Particulates-annual mean - 24 hour average (micrograms/cubic meter)	75	60	60	62	62	57	55	11.7[3/]	10.2%[3/]	13.1[3/]	8

1/ Federal Air Quality Standards are divided into two categories, primary standards designed to protect human health and more stringent secondary standards to protect property and aesthetics. Federal standard for oxidents changed from 8 to 12 parts per 100 million in January 1978.

2/ Number of days the strictest, whether Federal or State Ambient Air Quality Standard was exceeded, except for oxidents where the Federal standard is used.

3/ Percent of observed days when State Air Quality Standard was exceeded.

SOURCES: California Air Resources Board, "Air Pollution Control in California," 1976
Bay Area Air Quality Management District, Air Polution in the Bay Area By Station and Contaminant, 1976, 1977, 1978, and 1979

4.22 Historical records, distribution of sensitive fish species and other habitat factors investigated by Lollock in 1968 did not indicate that water quality was a limiting factor for fishlife in the basin at that time ("An Evaluation of the Fishery Resources of the Upper Pajaro River Basin," Lollack, Donald C., California Department of Fish and Game 1968, page 29).

4.23 Riparian Vegetation - Riparian vegetation is a striking feature of the landscape in South Santa Clara County, appearing as a green belt along permanent and intermittent streams and lakes. Riparian vegetation occupies less than one percent of the total land area in the state but its importance to wildlife far transcends this small figure. Riparian vegetation is composed of woody trees, shrubs, and herbaceous plants found along streams in the transition zone between water and drier terrestrial vegetation. Because of its relative importance to the alternatives of this study, it is addressed more extensively than preceding groups.

4.24 The riparian veg tation forms a pleasing relief through the cultivated landscape which reflects the original natural conditions. Willows, valley and live oaks, sycamores, cottonwoods, and alders are frequently found in the riparian habitat. Shrubs and vines are also common, as are thickets of wild rose and blackberry. In some areas there is a dense cover of grasses and herbs. The overall aspect is one of lush growth resulting from the supply of moisture from the nearby stream. In this area of farming and dry foothills, often the only high quality wildlife habitat available is the riparian vegetation. The vegetation adjacent to Uvas-Carnadero Creek in the project area is shown on Plate 3. There are approximately 45 acres of riparian vegetation in and along the creek over the length of the project and approximately 210 acres in the study area.

4.25 Terrestrial Vegetation - Terrestrial vegetation in the study area consists of conventional landscaping associated with normal urban uses such as schools and residences, and agricultural land consisting of orchards, pasture and annual cropped lands. Vacant lands are generally fallow with some natural grasses and brush. There are approximately 3,325 acres of agricultural lands in the study area at this time.

4.26 Wildlife Resource - Riparian habitats near streams and reservoirs in the study area presently provide living conditions for a greater variety of wildlife than any other habitat type. Some examples follow:

a. Large wading birds (herons, egrets, etc.). Large riparian trees are necessary for rookery sites.

b. Waterfowl. The wood duck needs tree hole nesting sites.

c. Raptors (hawks, eagles, owls, vultures, and kites). Many species concentrate in riparian areas for nesting sites, feeding areas and roosting sites. The red-shouldered hawk is virtually confined to riparian areas.

d. Song birds. Many species occur in riparian areas in great variety and abundance. Some species are water-associated and many others of more general habits rely on riparian vegetation as a haven in an otherwise sparse habitat.

e. Game birds. Quail are often numerous in riparian environments. Doves and pheasants are also attracted to such areas.

f. Game mammals - Cottontail and brush rabbits reach great densities in riparian areas.

g. Furbearers. In farming areas the riparian habitat is the concentration point for such species as raccoons, skunks, opossums, foxes and coyotes. Mature riparian trees are valid to species like the raccoon, which establishes dens there.

4.27 Birds are prominent wildlife feature, and like other fauna they have specific sub-habitat preferences. For example, California (scrub) jays preferred oak trees, whil mourning doves were commonly associated with willows. Habitat for raptorial birds is provided by tall Western sycamore trees throughout much of the Uvas Creek riparian habitat. A red-tailed hawk, a barn owl, and a great horned owl were also seen in association with these trees, some of which reach 120 feet in height.

4.28 There are no known endangered species in the study area.

4.29 Recreation Resource - The recreational resources in an area fall into one of two categories: (1) Open space in general, which is valuable as a recreational resource because of the tranquility, wildlife habitat, and scenery that it provides, and (2) Open space that has been set aside as parks, playgrounds and other formal recreational activities.

4.30 Existing recreation facilities serving the study area consist of two community parks with a total area of around 65 acres, eight neighborhood parks with a total area of around 20 acres, one golf course and several miles of bikeways. A complete listing of existing facilities is included in Section D of Appendix 3 of this report. There are no facilities serving a regional need in the study area.

4.31 Cultural Resources - The most recent listing of the National Register of Historic Places (Federal Register, 6 February 1979, with monthly supplements) and the staff of the State Office of Historic Preservation were consulted with the result that no National Register or eligible properties were found to be within or adjacent to the project area.

4.32 California Historical Landmarks 1979 (State Department of Parks and Recreation) and the staff of the State Office of Historic Preservation were consulted with the result that no State Historical Landmarks or Points of Historic Interest were found to be within or adjacent to the project area.

4.33 In 1974, George V. Shkurkin et. al. conducted a cultural resources survey of that portion of the project area which would be impacted by the placement of levees and riprap along Uvas Creek. That portion of the project area south of Gilroy, which consists of scattered structures to be flood proofed by small, individual ring levees and flood walls has not yet been the subject of a cultural resources investigation. Likewise, the project area of the non-structural, Alternative 7, has not been surveyed for cultural resources. Should this project be implemented, the San Francisco District, Corps of Engineers, will extend its cultural resources investigation to the unsurveyed areas and comply fully with all provisions of the National Historic Preservation Act of 1966 (as amended) and Executive Order 11593. What follows is a description of the cultural resources found within the surveyed area and potential project impacts to them.

4.34 Shkurkin et. al. (1974) identified three cultural resources within the impact area of proposed levees and riprap along Uvas Creek:

a. Historic structure "H-6", a homestead said to date from the 1850's.

b. CA-SCL-85, an archaeological midden.

c. CA-SCL-86, an archaeological midden buried under nine to ten feet of alluvial silt.

4.35 "H-6", CA-SCL-85, and CA-SCL-86 are not eligible for inclusion in the National Register of Historic Places, and will not be affected by the proposed undertaking. These determinations are documented in Section B of Appendix 4.

4.36 A potential exists for the impact on obscured archaeological resources buried beneath alluvial deposits. This problem and a possible solution are discussed in Section B of Appendix 4.

4.37 Economic Resource - Historically, agriculture has been the major industry in the study area. Although some increase in urbanization has occurred during the past 25 years, the growing, processing and marketing of farm products account for about 85% of the annual income, and economists expect that agriculture will continue to be the predominant land use during the next 20 years as indicated by the Gilroy General Plan adopted in November 1979.

4.38 The valley land north of Gilroy is predominantly devoted to prune orchards with small areas in strawberries, grains and hay. South of Gilroy, such crops as beans, tomatoes, and lettuce can be grown during dry months while garlic and sugar beets are grown year around. Grapes are grown in vineyards in the hills which supply nine wineries located in the study area. Some pasture and grain are grown around the fringes of the valley floor.

4.39 There are 60 manufacturing plants in the Gilroy community which includes Gilroy, San Martin and Morgan Hill, according to the Chamber of Commerce. Food processing is by far the most important industry in the study area, but other manufacturer's of items such as paper products and modular structures are also present. A listing of the largest firms in the area and their employment is included in Appendix 5 of this report.

4.40 There are two active sand and gravel pits in Uvas Creek located approximately 2,000 feet and 8,000 feet respectively upstream of Miller Avenue. According to the 1973 study of the California Division of Mines and Geology, "Environmental Geological Analysis of the South County Study Area, Santa Clara County, California," the pits have a combined yearly production of about 250,000 short tons. Most of this material is used for road aggregate, fill and concrete aggregate. The reserves have been estimated as sufficient for 50-100 years of production at present rates.

4.41 Local Government Finance - Taxable wholesale and retail sales for Santa Clara County and the City of Gilroy are summarized in Table 6 of the Main Report. They totaled over $4,700,000,000 for the county and $73,000,000 for the city in 1976.

4.42 There are approximately 3,500 acres of taxable land within the City of Gilroy and its urban service area. The distribution of this land is summarized on Table 1 of Appendix 9 to this report.

4.43 Labor Force and Employment - Employment in Gilroy is relatively evenly distributed between agriculture, manufacturing, trade, and services. Significant growth has been experienced in the construction and services sections. Table 7 of the Main Report summarizes employment in Gilroy for 1965 and 1975.

4.44 Land Use - Over 60% of the 4,268 acres of the City of Gilroy are involved in urban uses. Of the remainder, a little over half is in vacant land, with the remaining in agricultural production. Within the flood plain study area, almost all urban development is within the City of Gilroy, and the vast majority of lands surrounding the city are in agricultural production. Of the 4,250 acres in the SPF flood plain, 3,325 acres are in agricultural uses. All of the agricultural lands in the study area have been classified as prime farmlands by the U.S. Soil Conservation Service (SCS) and are not considered unique according to the SCS data and classification criteria.

4.45 Within the flood plain to be protected by the proposed project, the majority of undeveloped land is targeted for development. Land previously in agriculture uses between Uvas Creek and Monterey Highway (Old U.S. 101) is being developed at a fast rate and probably will be completely filled with new single family home construction prior to the beginning of construction of the proposed project. Land further to the east (east of the highway) is undergoing a transformation into warehouse and manufacturing construction. Several firms have been there for some time and additional construction is underway. Further to the east land is in agricultural production but is targeted for industrial use in the City of Gilroy General Plan as adopted in November 1979. At the southern end of the SPF flood plain are agricultural lands of which a maximum of about 20 acres would be protected by the project.

4.46 Table 5 of the Main Report includes the existing land uses within the flood plain for the SPF in mid-1979. Appendices 5 and 9 provide additional detail regarding both existing and projected land use in the study area.

4.47 Transportation - U. S. Highway 101, the primary north-south route through the Santa Clara Valley, passes on the east side of Gilroy and the project area. Old Highway 101 (Monterey Street and Road) passes through Gilroy and continues as the main north-south route through the city. The new freeway is approximately one-half mile east of the old highway.

4.48 A portion of the Santa Teresa Expressway has been completed in the area southwest of Gilroy. Upon completion, this expressway will parallel U.S. Highway 101 from San Jose to a point south of Gilroy, joining U.S. 101 and State Highway 25.

4.49 Gilroy is served by approximately 45 interstate truck carriers with overnight service to San Francisco and Los Angeles, and bus service is available through Greyhound lines, stopping in Gilroy.

4.50 Railroad service is provided by Southern Pacific including passenger and freight service to Los Angeles, San Francisco, and nationwide points.

4.51 The local road network within Gilroy and the study area consists of good quality and well-maintained city streets. The project recreation facilities would generate minor increases in traffic on Miller Avenue and Thomas Road which currently have average volumes in excess of 3,300 vehicles per day according to the Gilroy General Plan Revision Program, Technical Appendix, dated June 25, 1979.

4.52 Energy - The energy impact of the project would be minimal. The average daily energy consumption for Santa Clara County is summarized on Table IV-2. This use pattern is considered representative of the Gilroy area. The project affects only gasoline and diesel fuel use. The current use of these fuels based on the estimated population in the study area in 1979 is: gasoline - 7,990,000 gallons, and diesel fuels - 726,000 gallons.

TABLE IV-2

AVERAGE DAILY ENERGY CONSUMPTION: 1976

Santa Clara County, California

Fuel	User	Daily Consumption
Natural Gas	Residential, per customer	310.0 cubic feet/day[a/]
	Residential, per capita	88.4 cubic feet/day[b/]
	All uses, per capita	158.0 cubic feet/day[b/]
Electricity	Residential, per capita	5,851.0 watt hours/day[c/]
	All uses, per capita	19,690.0 watt hours/day[c/]
Gasoline	Per capita	1.1 gallons/day[d/]
Diesel Fuel	Per capita	0.1 gallons/day[d/]

Source: Santa Clara County Planning Department, Energy Resources, March 1, 1979.

[a/] Santa Clara County Energey Task Force, Energy Use and Supply in Santa Clara County, Mark Northcross, author, December 4, 1978, Table 65.

[b/] Ibid, Table 15.

[c/] Ibid, Table 7.

[d/] Santa Clara County Energy Task Force, Future Energy Needs of Santa Clara County, Mark Northcross, author, January 18, 1979, Table 66.

CHAPTER 5

ENVIRONMENTAL EFFECTS

5.01 FLOOD PLAINS. Alternatives 1, 2 and 3 will provide protection for approximately 680 acres, mostly located in the developed urban areas of Gilroy. An adverse impact will result from an increase in flooding depth on approximately 2,600 acres of rural flood plain lands located in the residual flood plain downstream of the project. The increase in depth will range between 0.25 foot and 1.0 feet with most of the area subject to an induced depth of 0.25 foot. Due to the topography and features such as railroads and roads that confine and direct the flow, there will be no significant increase in the amount of land flooding in the area of induced flooding. The post project flood plain area and depths of flooding are shown on Plate 15.

5.02 The damages resulting from the induced flooding would be mitigated by the purchase of flood easements on this land. Consideration will also be given flood proofing of the structures in the area of induced flooding.

5.03 Alternative 7 (nonstructural) will not significantly affect the existing flood plain.

5.04 POPULATION. Population would not be significantly impacted by any of the project alternatives. There will also be some additional short-term employment opportunities during construction, however, all the necessary work force to construct the project is available in the region. The large metropolitan area of San Jose is located within a 30 minute drive of the project area.

5.05 In Alternative 1, two farm buildings would require relocation, while in Alternative 2 one home and two farm buildings would be relocated, and in Alternative 3, five farm buildings and one home would be relocated. The home relocation will involve the displacement of one family unit. To avoid this relocation, a flood wall could be constructed in front of the home, however, due to the limited distance from the home to the channel, this construction and subsequent maintenance activities would be disruptive to the residents of this home. The relocation of the farm buildings would not affect any residents. For Alternative 7 there would be some inconveniences caused to residents and businesses during construction of the flood proofing facilities.

5.06 It has been determined the project would not have any growth inducing impact. The protected area is nearly completely developed and the project will only serve to reduce the flood proofing cost on the relatively small remaining area of undeveloped land. The population growth and land use changes will be the same with or without the proposed project. For a detailed evaluation of projected population growth, see Appendix 5 of this report.

5.07 WATER QUALITY. There would be a minimal short-term increase in water temperature due to the loss of shade as the result of vegetation removal for construction of the project levees and installation of slope protection on the natural channel. It is estimated that for the worst case (Alternative 1) less than 10% of the shade on the northwest side of the creek would be lost.

5.08 The effect on water temperature would be very minimal since the small amount of lost shade is on the north side of the stream. There would be no significant effect on the uses of the stream. This impact would be mitigated by the planting of native trees in all available vacant areas along the creek that can support growth.

5.09 There could be a minor short term increase in suspended sediment and turbidity during construction as a result of excavation required for installation of riprap on the natural channel banks.

5.10 To mitigate this impact, the riprap installation would be performed during periods of low or no flow and the construction specifications would require the contractor to use measures such as temporary dikes to direct the stream from the area disturbed during construction. The riprap installation would result in a decrease in long-term erosion with a resulting decrease in sediment and enhancement in water quality.

5.11 The nonstructural Alternative 7 would not impact the water quality of the creek.

5.12 It has been determined that since the water quality impact of the project will be minor, the project is in compliance with Section 404 of the Clean Water Act. Section 404 is also addressed in paragraphs 1.08 and 1.31 of this Statement and a complete Section 404 evaluation is contained in Appendix 10 of this report.

5.13 AIR QUALITY. The proposed project has been determined not to have any significant effect on development within the study area. Therefore, it has been determined that a regional air quality impact analysis is not required. There would be minimal local impacts during construction, operation and maintenance from local traffic generated by the project recreation facilities.

5.14 There would be a minor air quality impact during construction. Earth moving operations would result in some additional particulate matter, however, strict dust control requirements would be included in the construction specifications to mitigate this impact.

5.15 The air quality impact due to occasional passage of operation and maintenance vehicles would be minimal.

5.16 The estimated local air quality impact from traffic generated by the project recreation facilities would also be small (0.03 parts per million during the peak hour of carbon dioxide) as is shown by the analysis presented in Appendix 7. By providing recreational opportunities conveniently located within the City of Gilroy, the project recreation facilities could result in a slight improvement of regional air quality by reducing out of town recreational travel, thereby mitigating the small local adverse impact.

5.17 FISH RESOURCE. The fish resource would not be significantly impacted by any of the project alternatives. The minimal rise in water temperature would have little or no impact on the fish resource. The project does not affect the flows in the creek.

5.18 RIPARIAN VEGETATION. Forty-five acres of riparian vegetation currently exists along the north bank of Uvas Creek between Miller Avenue and 2,000 feet south of Thomas Road. This vegetation would be impacted by levee construction and riprap installation in Alternatives 1, 2, and 3 as shown in the following table:

Alternative	Loss of Vegetation Due to Riprap	Change in Riparian Vegetation
1	0.5 acre	5 acres lost
2	0.5 acre	2 acres lost
3	0.5 acre	15 acres added

5.19 The lost vegetation would be located along the existing levee for about 1,100 feet downstream of Miller Avenue and at areas where slope protection would be placed as shown on Plates 7, 8 and 9 (Main Report) and depends on levee setback distance. Lost vegetation would include willow, live oak, sycamore and herbs. The added vegetation under Alternative 3 assumes that the vegetation would spread into the protected adjacent areas.

5.20 The loss in vegetation would have minor adverse impact on the aesthetic values of the area and would slightly decrease available habitat.

5.21 The loss of riparian vegetation would be mitigated in accordance with the measures recommended by the Fish and Wildlife Service in their report contained in Section L of Appendix 3 of this report.

- The landside, waterside levee slope and berm and streambanks at the bridge crossing and slope protection sites will be hydromulched with grass.

o Vegetative plantings to offset project-induced losses will be established within the limitation to maintain levee stability and channel capacity. During preparation of the Phase II General Design Memorandum, a conceptual landscape plan will be established through coordination with the California Department of Fish and Game, National Marine Fisheries Service and the USFWS. Costs for such a program have been included in the estimate for construction funds. The revegetation shall also be in accordance with EM 1110-2-301, "Landscape Planting at Floodwalls, Levees and Embankment Dams," and the State of California Reclamation Board, "Guide for Vegetation on Project Levees."

5.22 Nonstructural Alternative 7 would not affect the riparian vegetation.

5.23 TERRESTRIAL VEGETATION. The project would have minimal impact on the terrestrial vegetation in the study area. Since the levee is located in an area that is either presently urbanized or is projected to be urbanized, Alternatives 1, 2 and 3 would have a minor beneficial impact as a result of making available about six acres of land in the strip area on the landside of the levee for the establishment of native grasses or for landscaping. Without the project this land could be converted to non-vegetative urban uses.

5.24 There will also be a minor adverse impact as the result of the loss of about two acres of playing field turf grass on the Gilroy High School property and about two acres of cultivated land south of Thomas Road.

5.25 The loss of terrestrial vegetation would be mitigated by the planting of native grasses or landscaping in all available landside areas.

5.26 Alternative 7 would result in some minor modification of residential landscaping as a result of the construction of the flood proofing facilities. Landscaping would be provided to mitigate this affect.

5.27 WILDLIFE RESOURCE. Although not quantifiable, wildlife along Uvas Creek would be adversely impacted by the significant loss of riparian habitat associated with Alternative 1. There would be a minor loss with Alternative 2 and there would be a benefit from the increase in riparian habitat accompanying Alternative 3.

5.28 The CDFG and the USFWS have reviewed the draft GDM and Environmental Statement for the project. Appendix 3 includes the Fish and Wildlife Coordination Report for the project, and Appendix 1 includes the CDFG comments regarding this project. Both agencies are primarily concerned with minimizing and mitigating the project caused losses of riparian vegetation.

5.29 RECREATION RESOURCE. All project alternatives would add about 1.2 miles of bikeway, 1.3 miles of nature and hiking trail and a 15 car parking lot to the existing 77 acre park system serving the Gilroy area.

5.30 The City of Gilroy General Plan requires five acres of developed parkland per 1,000 residents. Based on an estimated 1981 population of 22,500, over 110 acres of developed parkland is necessary to meet city standards. Project bike trails and hiking trails help make up the shortfall in available developed parkland. It is estimated that project facilities would generate 8,500 recreation days initially and 17,000 recreation days by the year 2000.

5.31 The nonstructural alternative has no impact on the existing recreation resource.

5.32 CULTURAL RESOURCE. No cultural resource within the surveyed portions of the project area will be affected by the proposed undertaking (see Section B of Appendix 4). Unknown cultural resources may be affected by the undertaking within the unsurveyed portions of the project area (see "Affected Environment").

5.33 ECONOMIC RESOURCE. Impacts on the economic resource include flood damage reduction and affluence benefits and a benefit resulting from the advanced replacement of the Thomas Road bridge, and recreation usage. The estimated annual values for these impacts are summarized in Table III-1 and are shown in detail in Appendix 5 and in Section K of Appendix 3. The active sand and gravel pits are located upstream of the project area and would not be impacted by the project.

5.34 LOCAL GOVERNMENT FINANCE. The short-term affect of the project on local government finance would be the required cost for project implementation. The local responsibility includes the following cost of:

a. All lands and easements.

b. Cost of construction for transportation facilities such as the new Thomas Road bridge.

c. Cost of all required relocations of existing facilities.

d. Fifty percent of the cost of the project recreation facilities.

e. Cost of project operation and maintenance.

5.35 These costs are summarized on Table 12 of the Main Report.

5.36 An additional long-term adverse impact would be the removal of the following amount of land from the local tax rolls.

a. Alternative 1 - 50 acres.

b. Alternative 2 - 55 acres.

c. Alternative 3 - 64 acres.

5.37 Alternative 7 would not include the purchase of permanent right-of-ways, therefore, would not remove any lands from the tax rolls.

5.38 A more detailed evaluation of the financial aspects of the study area is included in Appendix 5 of this report.

5.39 EMPLOYMENT AND LABOR FORCE. Alternatives 1, 2 and 3 would have a short-term beneficial impact of providing an estimated 22 jobs during a six month construction period, while Alternative 7 would provide an estimated 25 jobs during a nine month construction period.

5.40 Operation and maintenance of the project facilities would provide an estimated average of 0.3 and 0.5 manyears of employment annually for Alternatives 1, 2 and 3, and Alternative 7, respectively.

5.41 LAND USE. It has been determined that the project would not affect the local land use or growth patterns in the study area. Nearly all of the protected flood plain area is already developed for urban uses. Without a project, development on the remaining land would be flood proofed in accordance with the requirements of the 1973 Flood Disaster Protection Act. Implementation of Alternatives 1, 2 and 3 would result in some savings in flood proofing cost as is evaluated in Appendix 5, but would not affect projected changes to land use.

5.42 Alternatives 1, 2 and 3 will preserve the following amounts for land as open space that could be lost to developed urban uses:

a. Alternative 1 - 7 acres.

b. Alternative 2 - 12 acres.

c. Alternative 3 - 22 acres.

5.43 Alternatives 1, 2 and 3 would result in induced flooding on approximately 2,600 acres of primarily agriculture lands, however, this flooding would not affect the use of these lands. The Corps has determined that, due to the scheduling and type of the cropping and the shallow and short duration nature of the flooding, the agricultural land and crop damages would be insignificant. Levee construction would result in the loss of approximately 1, 2, and 5 acres of prime agricultural land for Alternatives 1, 2 and 3, respectively.

5.44 Alternative 7 would not significantly impact land use in the study area.

5.45 TRANSPORTATION. Alternatives 2 and 3 would include the construction of a new and relocated Thomas Road bridge that would improve the traffic carrying capacity and safety of Thomas Road.

5.46 Alternatives 1, 2 and 3 would eliminate flooding from approximately 5 miles of local streets and roads, under existing conditions, and as much as 10 miles under projected fully developed conditions. In addition, the depth of flooding would be reduced on approximately 3 miles of existing road. However, these alternatives would induce increased depth of flooding on approximately 7 miles of local roads. The depth increase would be about 0.25 feet in most areas and the duration of the flooding would not be a significant increase. Therefore, this adverse affect is not considered significant. Under existing conditions Highway 101 would be overtopped at two critical areas up to a depth of about one foot for events between the 25-year frequency flood to the Standard Project Flood. The critical areas are just north of the highway bridge over Uvas Creek and near the junction of Highway 101 and Highway 25. Under project conditions, the highway would be overtopped to a depth of about two feet for six additional hours during the same floods. Therefore, it can be seen that the difference between project and pre-project conditions is small, causing little or no increase in damage effects to the highway.

5.47 A short-term adverse impact would occur as a result of the hauling of earth from the borrow sites to the levee construction. A maximum of about three miles of local roads would be affected. The earth hauling operation would cause some inconvenience to local traffic and could damage the road pavements. These impacts would be mitigated by the inclusion of street traffic control and safety requirements, and provisions for the repair of the roads in the project construction specifications.

5.48 There would be a minimal local increase in traffic generated by the recreation facilities. This traffic would be distributed between Miller Avenue and Thomas Road and has been estimated at a maximum daily peak of 120 vehicles with a maximum hourly peak of 15 vehicles. This local traffic increase would be less than 4% of current volumes.

5.49 Alternative 7 would not significantly affect transportation in the study area. There could be some minor inconvenience to traffic as a result of flood wall and ring levee construction adjacent to local streets.

5.50 ENERGY. The project will have minor affects on energy use in the study area. It is estimated that construction activities for Alternatives 1, 2 and 3 would use a maximum of 2,500 gallons of diesel fuel and less than 500 gallons of gasoline. It is estimated that Alternative 7 would require no more than 500 gallons of diesel fuel and gasoline. Operation and maintenance activities would required 200 gallons of fuel or less annually.

CHAPTER 6

PUBLIC INVOLVEMENT

6.01 PUBLIC INVOLVEMENT PROGRAM. The San Francisco District has worked with Santa Clara Valley Water District, Santa Clara County and City of Gilroy staffs in the past and since inception of the Phase I AE&D Study, and a Citizens Committee has been formed. The committee is comprised of members of the community interested in the project. A meeting of the Citizens Committee was held on 3 May 1979, after the approval of the Plan of Study. Another meeting of the committee was held on 2 October 1980, to review the preliminary findings of the study. A draft GDM and Environmental Statement was distributed for public review on 29 December 1980 and a public meeting to review the report and project was held on 4 February 1981.

6.02 In addition, close contact and coordination has been maintained with the County of Santa Clara, City of Gilroy, and Santa Clara Valley Water District, to insure their participation in the conclusions and recommendations of the Phase I GDM and to insure that local interests will carry out the commitments contemplated.

6.03 A Notice of Study Initiation of Phase I, AE&D was mailed to interested parties on 20 December 1978. The notice of the 4 February 1981 Public Meeting was distributed on 29 December 1980.

6.04 REQUIRED COORDINATION. Meetings have been held with representatives of the City of Gilroy, Santa Clara Valley Water District, County of Santa Clara, and the Uvas Creek Citizens Advisory Committee to review the contents and conclusions of the draft report. A Public Meeting was held on 4 February 1981 regarding the project.

6.05 STATEMENT RECIPIENTS. This statement will be furnished to all those on the project mailing list as well as other interested groups and individuals.

6.06 PUBLIC VIEWS AND RESPONSES. The following comments generated during early public review of the project had the following major impacts on the Phase I GDM Study:

a. Alternatives 1, 2 and 3, which would extend the levee to a point approximately 2,000 feet south of Thomas Road and which would replace the existing Thomas Road bridge was considered in detail in response to a request by the Santa Clara Valley Water District.

b. Several alternatives utilizing a levee setback of up to 100 feet were evaluated in detail as a result of requests from the Santa Clara County Environmental Management Agency and the U. S.

Fish and Wildlife Service. The area between the creek and levee would be used as a recreational hiking trail as provided in the County's Recreation Plan.

c. Following completion of the Phase I GDM Study and the draft report, the primary public concerns as expressed at the Public Meeting of 4 February 1981 and in the letter of comments on the draft report, related to the unprotected agricultural lands located downstream of the project and the project induced flooding on these lands. Comments received from the general public and various interested entities along with the Corps of Engineers detailed responses are contained in Appendix 1 of this report.

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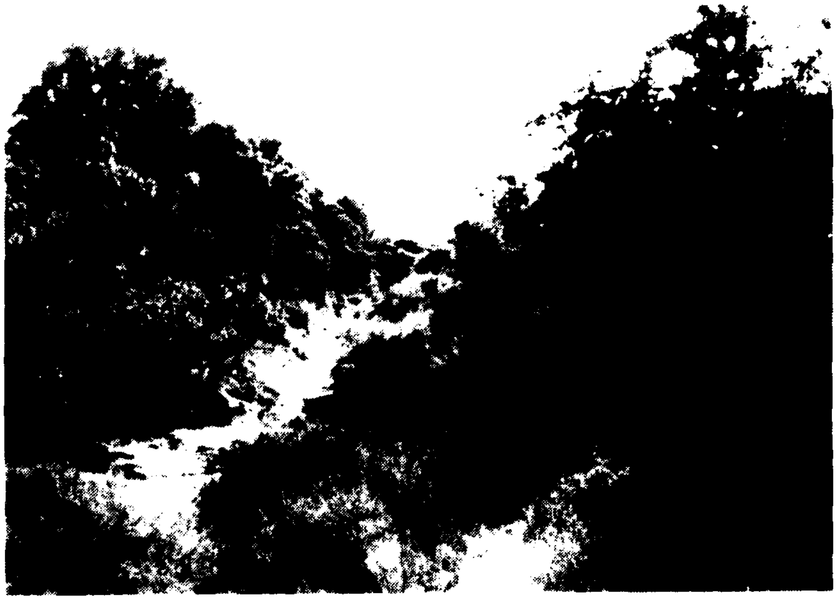
PHOTOGRAPHS



A) Uvas Creek Near Thomas Road
Looking Upstream.

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PAJARO RIVER BASIN
UVAS - CARNADERO CREEK

SANTA CLARA COUNTY, CALIFORNIA

GENERAL DESIGN MEMORANDUM

PHASE I

APPENDICES

JULY 1981

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

APPENDIX 1

PUBLIC VIEW AND RESPONSES

SECTION A

PUBLIC INVOLVEMENT PROGRAM

PUBLIC INVOLVEMENT PROGRAM

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APPENDIX 1

PUBLIC INVOLVEMENT PROGRAM

GENERAL

1. Citizen interest in water and land resource planning and the desire to take part in the planning process has resulted in public involvement becoming an integral part of the planning process. This increased interest on the part of the citizen requires a commitment of both the citizens and the planners to communicate with each other. Once effective communication is established, common goals can be defined, conflicts resolved, and agreement reached on proposed solutions to the problems. This section discusses the various elements of the Public Involvement Program for the study. The program is designed:

a. To open and maintain channels of communication with the public.

b. To build public confidence and trust in the planning process, procedures, and the individuals conducting the study.

c. To solicit the public's comments, views, and perceptions of problems, needs, alternative solutions, and related impacts, and any recommendation for Federal action.

d. To provide channels through which the study participants can obtain information on public goals and priorities regarding planning alternatives.

e. To coordinate the study with water and related land resource planning of all Federal, State, and local agencies.

f. To encourage public understanding of Federal, State, regional and local responsibilities, authorities, procedures, and constraints in conducting water resources planning studies and implementing water resources programs.

PROGRAM ACTIVITIES

2. There was a meeting with representatives of the Santa Clara Valley Water District to discuss the beginning of a Phase I AE&D study. San Francisco District representatives have worked with the District, City of Gilroy, Santa Clara County, and a Citizens Committee has been formed. The committee is comprised of members of the community interested in the study. The first meeting of the Citizens Committee took place in April 1979 after the approval of the Plan of Study. A second meeting was held on October 2, 1980 to review the findings of the Phase I study and receive input from the Committee.

3. In addition, close contact and cooperation has been maintained with the local sponsors, The Santa Clara Valley Water District and the City of Gilroy, to insure their participation in the conclusions and recommendations of the Phase I GDM as there should be a reasonable degree of assurance that local interests will carry out the commitments contemplated.

4. A Notice of Study Initiation of Phase I, AE&D, was issued (20 December 1978).

5. The Santa Clara Valley Water District has surveyed all of the landowners in the area south of the project that will be subject to induced flooding. The District has assessed these landowners responses to the project and has determined that the majority would prefer compensation in the form of flowage easements to local flood proofing measures.

6. The draft Phase I General Design Memorandum and Environmental Impact Statement was distributed for review and comment on December 29, 1980. Approximately 250 copies were distributed to interested Federal, state, and local government agencies as well as the general public.

7. The final public meeting was held in Gilroy, California, on February 4, 1981. The project was presented to the public and the support appeared to be favorable. The City of Gilroy submitted a resolution of support for the project and indicated a willingness to be the local sponsor for the recreation element. The Santa Clara Valley Water District indicated support for the project and a willingness to furnish the requirement for local cooperation. A "petition to build a levee to stop flooding" was submitted at the public meeting, with 192 signatures, in support of the project.

8. One homeowner was unhappy with the Thomas Road bridge alignment and the parking area for recreation as they were near his property. The City of Gilroy Director of Public Works responded to this comment by stating that the relocated alignment for Thomas Road has been established prior to the development of the property in question and the fact that this homeowner had not been properly informed was a matter to be resolved between him and the developer, real estate broker or agent.

9. Four property owners and a representative of the Loma Prieta Resource Conservation District were concerned with the induced flooding downstream of the project and two were concerned with additional erosion which would occur downstream. These concerns were responded to by pointing out that the magnitude of the induced flooding was relatively small and that the proposed project included provisions for flowage easements that would compensate landowners for any project induced flooding and damages. The Loma Prieta Resource Conservation District representative as well as two of the landowners recommended that the Uvas Creek channel downstream of the project be cleared to increase the channel capacity. This proposal has been subsequently investigated

AD-A122 273 PAJARO RIVER BASIN UVAS - CARNADERO CREEK SANTA CLARA COUNTY CALIFORNIA G..(U) CORPS OF ENGINEERS SAN FRANCISCO CA SAN FRANCISCO DISTRICT JUL 81

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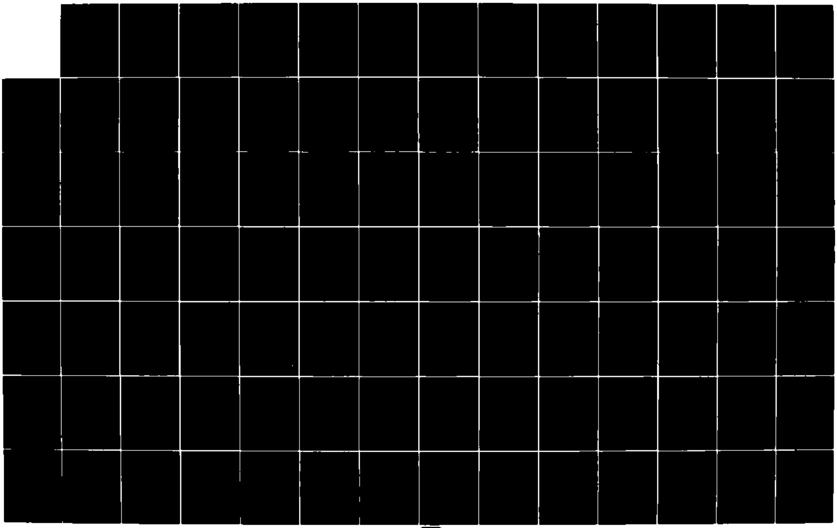

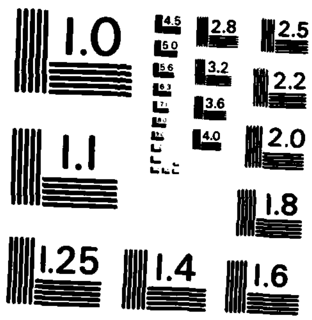

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

by the Corps of Engineers. Representatives of the Santa Clara Valley Water District, California Department of Fish and Game and the Corps of Engineers made a field investigation to identify those areas where clearing would be performed as well as access requirements. It has been concluded that the cost of rights-of-way and easements required to perform this work would not be economically justified by the benefits derived.

10. One citizen wanted the Corps of Engineers to build a dam upstream to prevent flooding and conserve water. In response to this comment, it was pointed out that the Corps of Engineers had previously studied several alternatives for dam construction or modifications and had determined none of the proposed projects were both economically justified and supported by the public.

11. A representative of the State Fish and Wildlife Office preferred Alternative 3 (100 foot levee setback) but supported Alternative 2 if vegetation were planted to replace any lost due to construction and if the maintenance of the creek was done with care.

12. In addition to the comments given at the public meeting as discussed above, a total of 17 letters were received from various governmental agencies, private organizations, and individuals regarding the draft Phase I General Design Memorandum and Environmental Impact Statement. These letters and the responses to the issues raised are included in the following section of this Appendix.

REVIEW COMMENTS AND CORPS RESPONSES

Letter No.	Date	Issue No.	Commentor/Issue	Page No.
8	2/17/81		California Department of Transportation	18
		8-1	Induced Flooding of Highway 101	18
9	2/17/81		Resources Agency of California	19
		9-1	Induced Flooding of Highway 101	19-20
		9-2	Cost Apportionment	19-20
		9-3	Flowage Easement	19-20
		9-4	Wildlife/Riparian Vegetation	19-20
			LOCAL GOVERNMENT AGENCIES, NONGOVERNMENTAL ORGANIZATIONS AND INDIVIDUALS	
10	1/14/81		Santa Clara County Parks and Recreation Department	21
11	1/16/81		Santa Clara County Transportation Agency	22
		11-1	Advanced Micro Devices Project	22-23
		11-2	City of Gilroy/County Boundary Lines	22-23
		11-3	Haul Routes	22-23
		11-4	Earth Hauling Information	22-23
		11-5	Thomas Road and Miller Avenue Traffic Maintenance	22-23
		11-6	Funding for Thomas Road Bridge Construction	22-23
12	1/19/81		Jerry J. Smith, Ph.D., Department of Natural Science, San Jose State University	24
		12-1	Streamflow	24-25
		12-2	Water Temperature Changes	24-25
		12-3	Fishlife-Water Quality Affects	24-25
		12-4	Nursery Habitat	24-25
13	2/6/81		Citizens to Preserve Llagas/Chesbro	26
		13-1	Sources of Flooding	26
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14	2/25/81		Masoni Brothers	27
		14-1	Induced Flooding and Erosion	27
15	2/26/81		Fiorio Family	28
		15-1	Induced Flooding	28

COMMENT LETTER 1

United States Department of Agriculture

Soil Conservation Service

2828 Chiles Road
Davis, CA 95616
(916) 758-2200

February 18, 1981

Colonel Paul Bazilwich, Jr.
District Engineer
U.S. Army, Corps of Engineers
211 Main Street
San Francisco, California 94105

Dear Colonel Bazilwich:

The Soil Conservation Service has reviewed the Draft General Design Memorandum Phase I, Main Report and Environmental Statement for Pajaro River Basin, Uvas-Carnadero Creek, Santa Clara County. We offer the following comments.

1-1 This project will not use prime farmland for construction since it will take place in an urbanized area. However, the statement does not appear to consider the effects of induced flooding on prime lands and crops further downstream.

1-2 The statement does not appear to specify the construction period or the number of construction seasons needed to complete the project. Erosion control measures during construction are covered by a reference that riprap installation will be done during periods of low flow. The SCS recommends that the statement be amended to specify that construction activities be confined to a period between April 1 to October 1, and that permanent or temporary erosion control measures will be in place by November 1.

1-3 This project is designed for a levee along one side of Uvas Creek. It appears that flooding will be increased along the opposite side in a narrow strip. The consequences of this flooding are not discussed. The SCS recommends that the statement discuss this increased flooding along the bank opposite the levee, and point out what could be done to mitigate any adverse effect.

1-1 The project will include flooding on agricultural land. The statement says induced flood damages will be compensated by purchasing flood easements and by flood proofing structures. We would suggest including in the statement a discussion of the types of damages expected from the induced flooding.

1-3 The establishment of vegetation and landscaping can be enhanced in the construction areas by using topsoil carefully. The SCS recommends that the project plan and environmental statement specify stockpiling and reusing topsoil for revegetation and landscaping.

COMMENT LETTER 1

We appreciate the opportunity to review and comment on this report and environmental statement.

Sincerely,

FRANCIS C. H. LUM
State Conservationist

cc: Norman A. Berg, Chief, SCS, Washington, D.C.
Monte J. Collins, Area Conservationist, SCS, Salinas, CA

RESPONSE LETTER 1

COMMENT LETTER 1. U.S. Soil Conservation Service

1-1 Issue: Induced Flooding

Due to the type of scheduling of the cropping, and the short term, shallow and low velocity of the flooding, the Corps of Engineers has concluded that the damage to land and crops in the floodplain would be insignificant.

1-2 Issue. Construction Scheduling

The estimated construction period is shown on the implementation schedule included in the Selected Plan section of the report. It is anticipated that construction would be completed during a single season. Erosion control measures shall be specified to be installed during period of no or low flow.

1-3 Issue: Revegetation

Stockpiling and reuse of topsoil for purposes of revegetation shall be specified as recommended.

COMMENT LETTER 2

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
630 Sansome Street
San Francisco, California 94111

1950
March 9, 1981

Colonel Paul Bazilwich, Jr.
District Engineer
Department of the Army
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, CA 94105

Dear Colonel Bazilwich:

Thank you for the opportunity to review the Pajaro River Basin, Uvas-Carnadero Creek General Design Memorandum and Draft Environmental Impact Statement. Since National Forest System lands and resources are not involved, we have no comment. Additionally, it will not be necessary to send us a copy of the final EIS.

Sincerely,

for Robert W. Cermak
ZANE G. SMITH, JR.
Regional Forester

COMMENT LETTER 3

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333

(404) 262-6649

March 18, 1981

Colonel Paul Bazilwich, Jr.
District Engineer
Department of the Army
San Francisco District
Corps of Engineers
211 Main Street
San Francisco, California 94105

Dear Colonel Bazilwich:

We have reviewed the General Design Memorandum, Phase I, Draft Main Report and Environmental Statement for Pajaro River Basin Uvas - Carnadero Creek, Santa Clara County, California. We are responding on behalf of the Public Health Service.

3-1 Neither beneficial nor adverse impacts of the proposed project upon local mosquito production were addressed. The land improvement actions planned will likely benefit mosquito control through better drainage. The final statement should address the potential for mosquito problems and mitigation measures planned.

3-2 It is noted that one family will be displaced by the proposed action. The final statement should indicate if relocations and acquisitions will be conducted under the provisions of the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970."

We appreciate the opportunity of reviewing this document. Please send us a copy of the final statement when it becomes available.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

RESPONSE LETTER 3

COMMENT LETTER 3. U. S. Department of Health & Human Services

3-1 Issue: Mosquito Problems

Potential mosquito problems in the immediate project area would not be worsened by the project implementation. The land adjacent to the north side of Uvas Creek slopes away from the creek, therefore, the levee construction would not interfere with external cross drainage. Potential trapping of water between the creek and the offset levee would be mitigated by construction of small drainage ditches that would drain the water back to the creek. The potential for mosquito problems in the Gilroy urban area as a result of flooding would be eliminated. The minor increase in the length of time of flooding in the areas of induced flooding should not have a significant affect on mosquito problems.

3-2 Issue: Relocation

A statement to the effect that all relocations and acquisitions will be in accordance with the "*Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*," has been incorporated into the report.

COMMENT LETTER 4

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
PACIFIC SOUTHWEST REGION
BOX 36098 • 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102
(415) 556-8200

March 27, 1981

ER81/161

Colonel Paul Bazilwich, Jr.
District Engineer, San Francisco District
Corps of Engineers
211 Main Street
San Francisco, California 94105

Dear Colonel Bazilwich:

The Department of the Interior has reviewed the Draft Phase I, General Design Memorandum for Pajaro River Basin, Uvas-Carnadero Creek, Santa Clara County, California, and offer the following comments.

General Comments

4-1 To date, the project has not satisfied the requirements of the Fish and Wildlife Coordination Act. The Fish and Wildlife Service is preparing a detailed project report to you, pursuant to Section 2B of the Act on the selected alternative. In that report, the Service plans to recommend that riparian habitat losses due to levee placement and slope protection be offset by establishing vegetative plantings on the new and reconstructed levees. Until such time as the final Coordination Act report is completed and disposition of the report's recommendations resolved, the final general design memorandum (GDM) should not be submitted to higher authority. According to the Service, ample time is available to complete this coordination within the existing time frame. However, should additional time be necessary, they believe the present schedule must be adjusted to insure that equal consideration is given to fish and wildlife resources as required by provisions of the Act.

Specific Comments

4-2 Potential questions on mineral resources that may be affected should be more fully answered. For example, the first sentence, last paragraph of page 21, indicates sand and gravel deposits along Uvas Creek are of good quality. The second and third sentences indicate the two operating sand and gravel plants will not be affected. Will future recovery of the other sand and gravel deposits not currently being mined be affected?

Also, sand and gravel and other mineral resources should be addressed under "Chapter 4, Affected Environment," either as a separate discussion on Mineral Resource or as part of "4-36 Economic Resource" on pages 155 and 156. Will any mineral resource, including sand and gravel, be impacted under the various alternatives? The answer should be given in Chapter 5 on "Environmental Effects."

COMMENT LETTER 4

4-3 Bike trail access to Miller Avenue and Christmas Hill Park is identified in the Recreation Facilities Plan. Access from the hiking trail to Miller Avenue, to promote use of Christmas Hill Park, should also be included in the Recreation Plan provided that adequate side walk width is available on Miller Avenue.

4-4 Appendix 3, Plate 2, Recreation and Natural Resources, identifies a proposed bikeway on Tenth Street. Access from the Tenth Street bikeway and Gilroy High School is not evident in the proposed Recreation Facilities Plan. Coordination with the Gilroy Unified School District, to provide a bikeway access ramp from Tenth Street and Gilroy High School, should be initiated during the Public Involvement Program (Section 6.01, page 173). Mr. Rodney Kelley, Superintendent - Gilroy Unified School District (or his representative), should be consulted during final planning for project recreational facilities.

4-5 Appendix 4, page B-7. We note that the State Historic Preservation Officer has recommended consultation with the Regional Archeological Site Survey Office for additional information on archeological sites in the project area. The subject document does not record consultation with this office. The Regional Officer for Santa Clara County is Mr. Rob Edwards at Cabrillo College.

4-6 Appendix 2, Plate 18. The draft statement does not confirm archeological surveys of the proposed borrow sites identified therein. Pursuant to the Corps' regulations for identification and administration of cultural resources, a cultural resource reconnaissance should have been conducted prior to the current stage of the planning process.

4-7 Relocation or reconstruction of the Thomas Road bridge is also proposed. Potential historical significance of the bridge should be addressed in the final envitomental statement.

4-8 Page 116, par. 1.08. The final GDM should indicate that the Corps of Engineers will obtain a permit for the proposed work pursuant to Section 404 of the Clean Water Act. In the Service's review of the application, it will be recommended that the following condition be met: (1) that slope protection and levee construction be implemented only during periods of low stream flow; (2) that vegetation removal done in connection with the slope protection work be coordinated with the Fish and Wildlife Service (FWS) and the California Department of Fish and Game (CDF&G); (3) that vegetative plantings be established to offset project-induced losses of riparian vegetation, and (4) that specific plans and operation schedules for the proposed recreation pond be provided to the FWS and CDF&G for review and comment, if that alternative is given further consideration as a source for borrow material.

4-9 Page 117, par. 1.12. The project area supports wetland vegetation. Cattails can be found in the vicinity of Miller road. Additionally, the Corps of Engineers' technical bulletin entitled "Preliminary Guide to Wetlands of the West Coast States" identifies riparian vegetation as a freshwater wetland.

COMMENT LETTER 4

4-10 Page 123, par. 1.27. Pursuant to Section 7(c) of the Endangered Species Act, the preparation of a biological assessment is required for construction projects undertaken, funded, or authorized by Federal agencies. The biological assessment process begins when a Federal agency submits a request to the FWS or National Marine Fisheries Service for information on whether endangered or threatened species may be present in the area affected by the proposed action. The biological assessment should be undertaken and, if a listed species will be affected, the agency should initiate and complete the formal consultation process before the final GDM is prepared.

4-1 Page 167, par. 5.27. To date, FWS comments have been provided in the form of technical assistan[illegible] they do not constitute the detailed report as specified in Section 2 of t[illegible] [illegible]sh and Wildlife Coordination Act and do not satisfy the provisions of [illegible] [illegible]t.

We appreciate [illegible] opportunity to review and comment on this general design memorandum. If you have any questions, please contact my office directly.

Sincerely,

Patricia S Port

Patricia Sanderson Port
Regional Environmental Officer

cc: Director, OEPR (w/copy incoming)
Director, Fish and Wildlife Service
Director, Heritage Conservation & Recreation Service
Director, National Park Service
Director, Geological Survey
Director, Bureau of Mines
Director, Bureau of Land Management (202-B)
Commissioner, Water & Power Resources Service
Commissioner, Bureau of Indian Affairs
Reg. Dir., FWS
Reg. Dir., HCRS
Reg. Dir., NPS
Reg. Dir., GS
Reg. Dir., BM
Reg. Dir., BLM
Reg. Dir., WPRS
Reg. Dir., BIA

Mr. Rodney Kelley, Superintendent
Gilroy Unified School District
7663 Church Street
Gilroy, California 95020

RESPONSE LETTER 4

COMMENT LETTER 4. *U. S. Department of the Interior*

4-1 Issue: Fish and Wildlife Coordination

A detailed report has been completed by the Fish and Wildlife Service and is included in Appendix 3 of this report.

4-2 Issue: Mineral Resources

Additional discussion of mineral resources has been added as recommended. The mineral resources are located upstream of Miller Avenue where the project consists of only a minor modification of the existing levee, therefore, there would be no project related effects on future recovery of sand and gravel.

4-3 Issue: Hiking Trail Access

The proposed hiking trail would directly connect to Miller Avenue which is already in use by pedestrians and bicyclists for access to Christmas Hill Park.

4-4 Issue: Bikeway Access

The bikeway as shown on the "Recreation Facilities Plan" is in accordance with the Bikeway Master Plan of the City of Gilroy. Since the project levee is not adjacent to 10th Street, the recommended bikeway connection would be the responsibility of the City. Ramps would be provided where necessary to connect to the City Bikeway System.

4-5 Issue: Regional Archaeological Site Survey Office Coordination

The Regional Officer has been consulted during the project study, will be provided a copy of the final report and will be consulted as necessary during future phases of project implementation.

4-6 Issue: Archaeological Survey of Borrow Site

Archaeological studies have been completed for the selected borrow source, the Llagas Creek Project, by the U.S. Soil Conservation Service. These studies are contained in "A Cultural Resources Evaluation of the Llagas Creek Watershed" by Archaeological Resource Management, Inc., dated March 1981 and in the "Uvas Creek Watershed Project Draft Environmental Impact Statement" by the U.S. Soil Conservation Service dated July 1979. Should it be necessary to obtain from either of the alternative borrow sites, archaeological surveys will be performed prior to construction.

RESPONSE LETTER 4

4-7 Issue: Thomas Road Bridge

The existing Thomas Road bridge was constructed in 1947 and is not considered to be of historical significance. In their letter of November 19, 1980, as contained in Appendix 4 of the draft report, the State of California Office of Historic Preservation confirmed that there were no points of historical interest located within or adjacent to the project area.

4-8 Issue: Section 404, Clean Water Act Permit

The Corps of Engineers will obtain a permit for the proposed work pursuant to Section 404 of the Clean Water Act. The stated conditions would be met as recommended. With regard to condition (4), it should be noted that the proposed recreation pond is not part of the project as formulated and would be considered as a potential source of borrow material only if the facility is implemented by the City of Gilroy.

4-9 Issue: Wetlands

It agreed that the project area supports wetland vegetation and the report has been modified accordingly.

4-10 Issue: Endangered Species

The recommended assessment has been requested of and completed by the Fish and Wildlife Service. In their letter of April 23, 1981, as contained in Appendix 3 of this report, the FWS confirmed that there are no threatened or endangered species in the area of the project.

COMMENT LETTER 5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca 94105

Project # D-COE-K36048-CA 27 MAR 1981

Colonel Paul Bazilwich, Jr., District Engineer
U.S. Army Corps of Engineers, San Francisco District
211 Main Street
San Francisco, CA 94105

Dear Colonel Bazilwich:

The Environmental Protection Agency (EPA) has received and reviewed the Draft Environmental Impact Statement (DEIS) titled PAJARO RIVER BASIN, UVAS-CARNADERO CREEK, SANTA CLARA COUNTY, CALIFORNIA.

The EPA's comments on the DEIS have been classified as Category LO-2. Definitions of the categories are provided by the enclosure. The classification and the date of the EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal Actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

The EPA appreciates the opportunity to comment on this DEIS and requests five copies of the Final Environmental Impact Statement when available.

If you have any questions regarding our comments, please contact Susan Sakaki, EIS Review Coordinator, at (415) 556-7858.

Sincerely yours,

Sheila M. Prindiville
Acting Regional Administrator

Enclosure

COMMENT LETTER 5

General Comments

5-1 Material presented in the DEIS in Tables 12, 13, 16, and 17 would suggest that the analysis of costs for Alternatives 2 and 3 appears to have been an overriding factor in the tentative selection of the preferred alternative. Alternatives 2 and 3 appear to differ minimally when considering the project's cost as a whole. Additionally, the analysis of environmental impacts and benefits expected to result from either of these alternatives has clearly demonstrated that Alternative 3 is the more desirable alternative in terms of meeting the planning objectives as outlined on page 52 of the DEIS. This alternative provides significant enhancement of two planning objectives (Preserve or Enhance Riparian Vegetation and Preserve Aesthetic Quality) and enhancement of two other objectives (Fish and Wildlife Reserves and Recreation).

Page 96 of the DEIS states that Alternative 2 should be "selected as the plan that is in the best Federal interest and best serves to achieve the planning objectives for this project." For three of the planning objectives, it should be noted that alternative 2 would incur minor losses of riparian habitat. Thus, the EPA finds an inadequate correlation between the information *provided in the DEIS which* would lead to the selection of preferred alternative and the conclusions reached by the Corps of Engineers.

The Final Environmental Impact Statement (FEIS) should, as a public disclosure document, clarify the selection criteria, discuss the weighing of such criteria, and clearly justify the selection of an alternative based on the criteria identified. Additionally, the assumptions used by the Corps of Engineers and the trade-offs between economic and environmental considerations should be fully explained.

404(b) Permit Comments

5-2 While the DEIS appears to address the impacts of the proposed project on the riparian vegetation of the study area, the evaluation was not conducted based on the guidelines contained in 40 CFR 230 promulgated pursuant to Section 404 of the Clean Water Act, Executive Order 11990 titled "Protection of Wetlands," nor was the evaluation in conformance with the State of California Wetland Policy. This oversight in evaluation may have resulted from misapplication of the term "wetland."

The riparian environment described in Chapter 4 of the DEIS fits the criteria for classification as a riparian swamp as listed on pages 56-61 of the U.S. Army Corps of Engineers Technical Report Y-78-4, Preliminary Guide to Wetlands of the West Coast States - specifically, the presence of *Alnus oregana* (Red Alder), *Platanus racemosa* (Sycamore), *Populus fremontii* (Cottonwood), *Salix* spp. (Willow), and thickets of

COMMENT LETTER 5

blackberries as described in the DEIS would be characteristic of a riparian swamp. This wetland area is a transition zone; the distinction between riparian swamp and upland forest is based on species composition.

Since wetlands do in fact exist in the study area, impacts on these wetlands should be based on the statutes and policy statements cited above. More precisely:

> "Consideration shall be given to.... the availability of alternate sites and methods of disposal that are less damaging to the environment..."
>
> 40 CFR 230.5(a)

> "Each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such a construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use."
>
> Section 2(a), Executive Order 11990

The EPA has concluded that Alternative 1 does not meet these criteria. Alternative 2, while allowing for less wetland area loss, also falls short of meeting these criteria since a practicable alternative (Alternative 3) does exist. This alternative would not result in loss of wetland habitat.

The EPA requests that the Final Environmental Impact Statement address the following issues:

1. Re-evaluation of impacts of the proposed project with respect to wetlands, based on guidelines contained in 40 CFR 230 promulgated pursuant to Section 404, Executive Order 11990, and the State Wetland Policy;
2. Measures to limit impacts to wetlands under the provisions of the regulations and policy documents cited above;
3. Re-evaluation of the justification for the tentative selection of Alternative 2, as outlined on pages 95-97 of the DEIS, taking into consideration application of the provisions of Section 404, E.O. 11990, and the State Wetland Policy.

RESPONSE LETTER 5

COMMENT LETTER 5. U. S. Environmental Protection Agency

5-1 Issue: Alternative Selection

The Corps of Engineers finds that the implementation of Alternative 3 would not provide sufficient environmental quality benefits to justify the added costs of lands as compared to the Selected Plan, Alternative 2. The local sponsoring agency does not support the added land costs required for Alternative 3. All losses of riparian vegetation associated with Alternative 2 would be mitigated by plantings in existing unvegetated areas.

5-2 Issue: Section 404, Clean Water Act and Wetland Policies

It is agreed that the project area supports wetland vegetation and the report has been modified accordingly. Appendix 10 has been added to the report to supplement the Section 404 evaluations as contained in the Main Report and Environmental Statement. These evaluations sufficiently serve to meet the requirements of Section 404, Executive Order 11990, and the State of California Wetland Policy. We do not expect the wetland habitat value will be less after project completion than exists under pre-project conditions.

Appendix 1
16

COMMENT LETTER 6

STATE OF CALIFORNIA—RESOURCES AGENCY — EDMUND G. BROWN JR., Governor

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-[illegible]

RECEIVED FEB 1 7 1981

February 3, 1981

Colonel Paul Bazilwich, Jr.
District Engineer
Corps of Engineers
San Francisco District
211 Main Street
San Francisco, California 94105

Dear Colonel Bazilwich:

Subject: Pajaro River Basin, Uvas-Carnadero Creek General Plan Design Memorandum, Santa Clara County

Thank you for the opportunity to review and comment on the subject document.

6-1 We are primarily concerned with the potential loss of riparian vegetation and note that your preferred Alternative 2 will result in a net loss of about two acres of this habitat. We recommend that any loss of habitat resulting from implementation of Alternative 2 that would have been preserved under Alternative 3 be mitigated by replacement, as well as any other vegetation lost due to slope protection and levee placement or relocation.

6-2 Flood control projects such as this involve recurring maintenance of the channel capacity. The agreement required by section 221 of the Flood Control Act of 1970 should include a provision for the preservation of riparian vegetation.

Department of Fish and Game personnel are available to discuss our concerns with the applicant or project sponsor. To arrange a meeting, the applicant or sponsor should contact Mr. Walt Smith or Mr. Gil Thompson at our Region 3 Office, Post Office Box 47, Yountville, California 94599; telephone (707) 944-2443.

Sincerely,

E C Fullerton

Director

RESPONSE LETTER 6

COMMENT LETTER 6. California Department of Fish and Game

6-1 Issue: Riparian Vegetation

Removal and replacement of all lost riparian vegetation will be mitigated by replacement in accordance with the Fish and Wildlife Coordination Report as contained in Appendix 3 of this report; EM 1110-2-301, "Landscape Planting at Floodwalls, Levees and Embankment Dams", and State of California Reclamation Board, "Guide for Vegetation on Project Levees."

6-2 Issue: Channel Maintenance-Vegetation Preservation

Provisions for preservation of riparian vegetation are contained in Item J of the proposed agreement with the Santa Clara Valley Water District as contained in Appendix 11 of this report.

COMMENT LETTER 7

STATE OF CALIFORNIA—THE RESOURCES AGENCY — EDMUND G. BROWN JR., Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
POST OFFICE BOX 2390
SACRAMENTO, CALIFORNIA 95811

February 10, 1981

Colonel Paul Bazilwich, Jr.
District Engineer, Corps of Engineers
San Francisco District
211 Main Street
San Francisco, CA 94105

RE: Pajaro River Basin, UVAS-Carnadero Creek

Dear Colonel Bazilwich:

We are in receipt of the above referenced undertaking(s). Thank you for the opportunity to comment pursuant to 36 CFR 800.

Based on the information provided in the report(s) noted above I have determined that no properties included in or eligible for inclusion in the National Register of Historic Places should be affected by the proposed undertaking(s).

7-1 It should be remembered that compliance with 36 CFR 800.7 is required if previously unknown cultural resources should be discovered during subsequent work.

If there are any questions, please feel free to contact Michael Ranson, Staff Archeologist, at (916) 445-[illegible].

Sincerely,

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation

RESPONSE LETTER 7

COMMENT LETTER 7. State of California Office of Historic Preservation

7-1 Issue: Subsequent Discovery of Cultural Resources

Provisions will be made for reporting and preservation of any cultural resources discovered during subsequent work in accordance with 36 CFR 800.7.

COMMENT LETTER 8

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — EDMUND G. BROWN JR., Governor

DEPARTMENT OF TRANSPORTATION
1120 N STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-4400

February 17, 1981

Col. Paul Bazilwich, Jr.
District Engineer
U.S. Corps of Engineers
211 Main Street
San Francisco, CA 94105

Dear Sir:

In reply to your letter of December 29, 1980 requesting comments on your Draft Phase I, General Design Memorandum on the Pajaro River Basin, Caltrans has the following comment:

8-1 It is believed that the document should address or discuss the possibility that the project may induce flooding on Route 101 if the levees are extended to the highway. The effects to our facilities are not apparently clear.

Please send your response to Caltrans District CEQA Coordinator, P. O. Box 3366 Rincon Annex, San Francisco, CA 94119.

Sincerely,

J. T. KASSEL
Chief, Office of Planning and Design

RESPONSE LETTER 8

COMMENT LETTER 8. California Department of Transportation

8-1 Issue: Induced Flooding of Highway 101

The levee proposed does not extend to Highway 101. The project ends approximately 2,000 feet below the Thomas Road bridge which is about one mile *upstream of the highway. Under existing conditions, Highway 101 would be* overtopped at two critical areas up to a depth of about one foot for events between the 25-year frequency flood to the Standard Project Flood. The critical areas are just north of the highway bridge over Llas Creek and near the junction of Highway 101 and Highway 25.

Under project conditions, the highway would be overtopped to a depth of about two feet for six additional hours during the same floods. Therefore, it can be seen that the difference between project and pre-project conditions is small, causing little or no increase in damage effects to the highway.

COMMENT LETTER 9

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95814
(916) 445-5656

Department of Conservation
Department of Fish and Game
Department of Navigation and Ocean Development
Department of Parks and Recreation
Department of Water Resources

EDMUND G. BROWN JR
GOVERNOR OF
CALIFORNIA

Air Resources Board
Colorado River Board
San Francisco Bay Conservation and Development Commission
Solid Waste Management Board
State Lands Commission
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Boards
Energy Resources Conservation and Development Commission

THE RESOURCES AGENCY OF CALIFORNIA

SACRAMENTO, CALIFORNIA

MAR 17 1981

Colonel Paul Bazilwich, Jr.
District Engineer
San Francisco District
U. S. Army Corps of Engineers
211 Main Street
San Francisco, CA 94105

Dear Colonel Bazilwich:

The State of California has reviewed your "Pajaro River Basin, Uvas-Carnadero Creek, Santa Clara County, California, General Design Memorandum, Phase I, Draft - Main Report and Environmental Statement" transmitted by Notice of Intent (SCH 81012719) and submitted to the Office of Planning and Research (State Clearinghouse) in the Governor's Office. This review fulfills the requirements under Part II of the U. S. Office of Management and Budget Circular A-95 and the National Environmental Policy Act of 1969.

The State's review has been coordinated with the Departments of Forestry, Conservation, Fish and Game, Parks and Recreation, Water Resources, and Transportation; the Air Resources Board, the State Water Resources Control Board, the California Coastal Zone Conservation Commission, and the State Lands Division of the State Lands Commission.

Flood Threat

9-1 It is believed that the document should address the possibility that the project may induce flooding on Route 101 if the levees are extended to the highway. The effect on the highway is not clear.

COMMENT LETTER 9

Rights of Way

9-2 Section 3 of the Flood Control Act of 1936 provides for federal payment of one-half of the rights of way and relocation costs in excess of the construction costs. The distribution of costs to federal and nonfederal interests on page 100 of the General Design Memorandum (GDM) does not provide for this payment. The distribution should be revised to reflect this.

9-3 The proposal to mitigate "project-induced damages" by purchasing flowage easements on 2,600 acres of land south of Gilroy should be removed from the GDM. Incurring an average annual cost of $37,000 to mitigate average annual damages of $2,600 is not justified. We believe this is particularly true when the average increased depth is 0.25 feet-3 inches. The purpose of acquiring the easements appears to be to prevent future damage claims. Acquisition of easements for this purpose would not be eligible for State financial assistance.

Wildlife

9-4 We are primarily concerned with the potential loss of riparian vegetation and note that your preferred Alternative 2 will result in a net loss of about two acres of this habitat. We recommend that any loss of habitat resulting from implementation of Alternative 2 that would have been preserved under Alternative 3 be mitigated by replacement, as well as any other vegetation lost due to slope protection and levee placement or relocation.

9-4 Flood control projects such as this involve recurring maintenance of the channel capacity. The agreement required by Section 221 of the Flood Control Act of 1970 should include a provision for the preservation of riparian vegetation.

Thank you for the opportunity to review and comment.

Sincerely,

James W Burns

James W. Burns
Assistant Secretary
for Resources

cc: Director of Management Systems
State Clearinghouse
Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

Mr. John T. O'Halloran
General Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

RESPONSE LETTER 9

COMMENT LETTER 9. *Resources Agency of California*

9-1 Issue: Induced Flooding of Highway 101

See response to Issue 8-1.

9-2 Issue: Cost Apportionment

The project cost apportionment has been revised in the report to reflect the requirements of Section 3 of the Flood Control Act of 1936. The Federal government will be responsible for payment of one-half of the rights-of-way and relocation costs in excess of the construction costs.

9-3 Issue: Flowage Easements

The Corps of Engineers has determined that it is necessary to mitigate damages resulting from project induced flooding. The local sponsor, the Santa Clara Valley Water District, has concurred with this finding, and has surveyed the affected landowners and has found that the majority would prefer flowage easements to local floodproofing measures. Except for the limitations of Section 3 of the Flood Control Act of 1936, the cost of all required easements is the responsibility of the local sponsoring agency. The question of eligibility of such costs for state financial assistance should be resolved as a result of on-going discussions between the Santa Clara Valley Water District and the State of California Resources Agency and Department of Water Resources.

9-4 Issue: Wildlife-Riparian Vegetation

See response to Issues 6-1 and 6-2.

COMMENT LETTER 10

County of Santa Clara
California

EMA/GSA
Environmental Management/
General Services Agency

Parks and Recreation Department
1555 Berger Drive
Building # 2 Rm 209
San Jose California 95112
(408) 299-4337 Administration
(408) 299-2912 Reservations

January 14, 1981

Department of the Army
San Francisco District
Corps of Engineers
211 Main Street
San Francisco, CA 94105

Dear Colonel Bazilwich,

The Santa Clara County Parks and Recreation Department has reviewed the Pajaro River Basin, Uvas-Carnadero Creek, Draft Phase I, General Design Memorandum and supports the Corps selection of alternate #2.

Alternate number 2 provides benefits not only for the Corps and water district containment of flood waters but also the expansion of the wildlife habitats and recreation needs of the community.

Very truly yours,

Felice Errico

FELICE ERRICO
Park Planner

FE:sp

COMMENT LETTER 11

County of Santa Clara
California

Transportation Agency
1555 Berger Drive
San Jose California 95112

January 16, 1981

Colonel Paul Bazilwich, Jr.
Department of The Army
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, CA 94405

Subject: Pajaro River Basin, Uvas-Carnadero Creek
Draft Phase I, General Design Memorandum
and EIS (12-80)

Dear Colonel Bazilwich:

Our Transportation Agency Staff has reviewed the above referenced document and we have the following comments:

11-1 I. This project may impact the proposed Advanced Micro Devices Project Site in Gilroy. (See their DEIR dated November 1980).

11-2 II. City of Gilroy/County boundary lines should be shown on a project location map.

11-3 III. All County - maintained roadways that may be used as haul routes should be identified and listed. The level of improvement of the County roadways within the haul routes should be submitted to this Agency for review and comment.

11-4 IV. The following information regarding the trucks to be used in the hauling operation should be submitted to this Agency for review and comment.

A. Number of one-way trips per day
B. Weight of loaded hauling trucks
C. Length of time hauling operation is planned.

11-5 V. On page C-12 (Appendix 2), the report states that access to the levees will be provided at Thomas Road and Miller Avenue. What are the provisions for maintaining Thomas and Miller during the construction operation?

11-6 VI. On page 168 the report discusses local government finance. We are specifically concerned with the Section which talks of the construction of the new Thomas Road bridge. Who will be paying for this? We feel that the County Transportation Agency should not bear these costs.

COMMENT LETTER 11

Colonel Paul Bazilwich, Jr.
(Page 2)

January 16, 1981

If you have any questions on the above comments, please contact Bob Van Etten or Ted Cicoletti of our Transportation Agency Staff at (408) 299-2362. Thank you for the opportunity to comment on this report.

Sincerely,

Harold R. Bell

Harold R. Bell
Agency Environmental Specialist

HRB/JMI/mk

cc: Dick Hall, County Planning
LM
RMS
SAB
TAC
RVE

RESPONSE LETTER 11

COMMENT LETTER 11. County of Santa Clara Transportation Agency

11-1 Issue: Impact on Advanced Micro Devices Project

The draft Environmental Impact Report has been reviewed and it has been determined that the Advanced Micro Devices Project is not within the impact area of the proposed flood control project.

11-2 Issue: *City/County Boundary Lines*

The City of Gilroy and County boundary lines have been added to the project location map as suggested.

11-3 Issue: Haul Routes

The potential routes are shown on Plate 18 of Appendix 2. There are two potential borrow areas and the routes are shown for both sites on the plate; as our studies progress, we will be more specific. The following is included in all Corps of Engineers contracts:

"... d. Federal, State and County Highways and Roads and City Streets: It shall be the responsibility of the Contractor to obtain permits as necessary for use of highways, roads, streets and any additional access rights-of-way to the construction areas, from the agency having jurisdiction over such facilities. The Contractor will be required to maintain all such highways, roads and streets in their existing state of repair throughout the life of the contract and upon completion of the contract work the facilities shall be left in condition equal to that existing at the time of commencement of work ..."

11-4 Issue: Earth Hauling Information

The information requested may be obtained directly from the construction contractor (after award of contract) when a permit is filed with the responsible agency in accordance with the above contract provision. Should specific limitations need to be placed on certain county roads, they will be included in the construction contract.

11-5 Issue: Thomas Road and Miller Avenue Traffic Maintenance

The existing Thomas Road and bridge would remain in use during construction of the proposed road relocation and new bridge. There would be only minor interference with traffic when the tie-ins to the existing road are made at each end of the relocation.

RESPONSE LETTER 11

It will be necessary to raise the grade of Miller Avenue to match the proposed levee. Temporary detours and/or traffic controls would be provided in accordance with the County or City of Gilroy requirements.

11-6 Issue: Thomas Road Bridge Costs

The cost of the Thomas Road Bridge, subject to the limitations of Section 3 of the Flood Control Act of 1936, would be the responsibility of the local sponsoring agency, the Santa Clara Valley Water District.

COMMENT LETTER 12

19 January 1981
Dept. Natural Science
San Jose State Univ.
San Jose, CA 95192

Department of the Army
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, CA 94105

Dear Mr. Brasilwich:

This letter is in response to the document, "Pajaro River Basin, Uvas-Carnadero Creek, Draft Phase I, General Design Memorandum. I have been carrying on fisheries research in the Pajaro River system, including the Uvas Creek watershed since 1972 and completed a dissertation on the ecology of the system in 1977 (Univ. Calif., Davis) and have the following comments:

12-1
1. The section of stream in the proposed project zone includes several quarry pits, and otherwise consists primarily of large, slow, deep pools. I generally agree that the proposed levees will have relatively small impacts upon the stream fishes, as long as riparian vegetation is not disturbed. This vegetation provides shade, and also the overhanging branches provide substantial cover for the stream fishes. Under present flow releases the section does not contribute significantly to juvenile steelhead nursery habitat; however, if additional flow releases were made available, due to San Felipe water or changes in interbasin juggling between Uvas and Llagas creeks, as a mitigation for channelization of Llagas Creek, then the section could be suitable steelhead nursery habitat.

12-2
2. On page 117 (1.10) and on page 163 (5.08) you refer to the small anticipated temperature changes and suggest the impacts would be minimal. At the present time, temperature, along with the low velocity conditions, is one of the primary factors limiting juvenile steelhead use of the area. If flows were increased, the water in the area would be reduced in temperature and might be marginally acceptable for juvenile steelhead. At that time small temperature changes might be significant. For this reason, any shade removal should be avoided.

12-3
3. On page 150 you refer to Leilack's survey which suggested that water quality was not a limiting factor for fishlife in the basin. This is not so (at the present time). Warm water temperatures limit steelhead distribution downstream in Uvas Creek and other creeks in the basin. Although the Pajaro River is not directly affected by the project, poor water quality (turbidity, temperature, and oxygen) directly limits fishlife there. The continued use of this erroneous or out of date statement should be avoided lest it become a generally accepted comment of other EIR and EIS.

12-4
4. Another erroneous idea perpetuated in the report is the statement on page 49 (and in Appendix 3, I-1) that insufficient flows in Uvas Creek below the dam are constraining steelhead nursery habitat and that most ("almost all") of the nursery habitat is supplied by the two tributaries, Redfish and Little Arthur creeks. Releases do constrain the quality of nursery habitat below Uvas Reservoir, but the main creek is a significant producer of smolt-sized steelhead in most years. In 1972, 1976, 1977, three recent drought years, the creek did fail to produce steelhead, but the tributaries did also. In 1973, 1974, 1975, 1978, and 1980 the creek produced considerable steelhead of smolt size. In 1973 and 1978 (higher flow years) the main creek probably out-produced the tributaries. Again, these facts do not directly affect the

COMMENT LETTER 12

project in question, but the statements should be avoided before their perpetuation becomes the common wisdom. The ideas also reduce the likelyhood that enhancement will be considered feasible in the creek; substantial opportunities for enhancement still exist if flows are increased.

Sincerely,

Jerry J. Smith

Jerry J. Smith, Ph.D.

RESPONSE LETTER 12

COMMENT LETTER 12. Jerry J. Smith, Ph.D., Department of Natural Science, San Jose State University

12-1 Issue: Streamflow

The Corps of Engineers concurs with the stated comments, however, provisions for additional flows from San Felipe Reservoir or flow exchanges between Uvas and Llagas Creeks are not within the Corps jurisdiction or authority.

12-2 Issue: Water Temperature

The Corps of Engineers concurs with this comment. Shade removal shall be avoided or mitigated, as appropriate.

12-3 Issue: Fishlife-Water Quality Effects

Comment has been noted and the report text has been modified to reflect the concern regarding the use of past data.

12-4 Issue: Nursery Habitat

This report has been modified to avoid the potential of misleading statements.

COMMENT LETTER 13

CITIZENS TO PRESERVE LLAGAS/CHESBRO

P.O. BOX 1004, MORGAN HILL, CA. 95037

February 6, 1981

U.S. Army Corps of Engineers
ATTN: SPNED-PW
211 Main Street
San Francisco, CA 94105

Re: Pajaro River Basin
Uvas - Carnadero Creek
General Design Memorandum,
Ph I, Draft, Dec. 1980

Gentlemen:

In general the CPL/C is in favor of the Uvas - Carnadero Creek Project and the recommended alternative. However, we do have some comments regarding the referenced General Design Memorandum.

13-1 First, on page 41 it is stated "most of the problems and damages during this 1955 flood were caused by flooding from Llagas Creek or Miller Slough and not Uvas Creek." The basic problem was the overfilling and expansion of Soap Lake, which was contributed to by the Uvas as well as other streams. Of interest to CPL/C is the fact that the "Review Report for Flood Control and Allied Purposes for Pajaro River Basin, April (May?) 1965" does not even mention the Llagas as contributing to the problems anywhere in the Pajaro River Basin. How is it, then, that the Llagas is a primary culprit in 1980?

13-2 Second, induced flooding downstream of the project is indicated as only 2600 acres ending in a line designated as Standard Project Flood Soap Lake. Where is the SPF Soap Lake described? Is the induced flooding from this project already included in the SPF Soap Lake?

13-3 Third, although a minor point, quite a few of our membership had difficulty with the plates which show North toward the bottom. While not incorrect, this is not customary in our society.

Very truly yours,

Robert A. Moulthrop
ROBERT A. MOULTHROP
President of Citizens to Preserve Llagas/Chesbro

cc: John L. Richardson
Head, Project Development Branch
Design and Construction
Santa Clara Valley Water District

RESPONSE LETTER 13

COMMENT LETTER 13. Citizens to Preserve Llagas/Chesbro

13-1 Issue: Source of Flooding

Page 41 of the December 1980 report has been changed to read as follows:

"Most of the problems and damages occurring during the 1955 flood were caused by flooding from Uvas Creek, Llagas Creek, Tequisquita Slough and Pacheco Creek drainage areas and the Hollister Valley, an area of about 500 square miles. The drainage area of Uvas Creek is about 90 square miles and accordingly was responsible for only a relatively small amount of the total flood damages. Most flood damages along Uvas Creek were incurred by agricultural lands and properties in areas adjacent to the creek."

13-2 Issue: Soap Lake Flooding

In the "Review Report for Flood Control and Allied Purposes for Pajaro River Basin, April 1965," Llagas Creek is mentioned as contributing to the problems in the Pajaro River Basin (see paragraph 44, page 34; paragraph 49, page 37; Plate D-1). Specific studies of Llagas Creek were excluded from the report "inasmuch as a flood control project is under preparation by the U.S. Soil Conservation Service under Public Law 566" (paragraph 48, page 36).

Soap Lake flood elevations were presented, in part, in *Flood Plain Information* (FPI) Reports for Uvas-Carnadero Creek and San Felipe Lake, Unit 2. The data developed for the 1965 report, referenced above, was used in the FPI studies and has also been used to respond to requests for flood hazard information. Soap Lake elevations incorporate all runoff into 'the lake.' The induced flood elevations which will be attributable to the Uvas-Carnadero Creek Levee Project will not have an impact on flood levels in Soap Lake.

13-3 Issue: Drawing Orientation

The plan and profile drawings have been oriented with the downstream end of the project at the left of the sheet in accordance with the conventional practice for engineering drawings for flood control projects.

COMMENT LETTER 14

Feb. 25, 1981

U.S. Army Corps of Engineers
San Francisco District
District Engineer:

Dear Sir:

We would like the following to become a part of the official record of the public meeting held in Gilroy, Santa Clara County California in regards to the proposed plan for flood protection on the Uvas creek.

14-1 We are property owners in the immediate vicinity of said project and are greatly concerned about the induced bank erosion and induced flooding that will be caused by the higher and greater volume of water that will be forced down the main channel, due to the construction of a levee.

We have enclosed a map clearly showing our cause for concern.

We feel we must have bank and flood protection before this project can be acceptable to us,

Very truly yours
Masoni Brothers
Louis Masoni

RESPONSE LETTER 14

COMMENT LETTER 14. Masoni Brothers

14-1 Issue: *Induced Flooding and Erosion*

Preliminary studies indicated there would be a limited amount of induced flooding on this property. The potential for induced erosion would not be significant since the increased in-channel velocities due to project implementation would be quite small.

The project as formulated includes provisions for flowage easements to compensate for any increased damages on lands subject to induced flooding. Site specific studies of areas subject to induced flooding will be included in the Corps of Engineers Phase II Advanced Engineering and Design Studies.

COMMENT LETTER 15

U. S. Army Corps of Engineers
San Francisco District
District Engineer:

Dear Sir:

We would like our opinion to become a part of the minutes of the Public Meeting held in Gilroy, Calif., [illegible], concerning Uvas Creek levee project.

We are property owners that will be greatly affected by the flood water forced down the channel. The water that normally would spill on the Gilroy or East side will be induced to spill on the west bank.

15-1 The construction of this project will cause a problem we never had anticipated having, and are therefore opposed to the project unless this problem can be resolved.

Enclosed is a map illustrating our concern.

Sincerely
Fiorio Family

RESPONSE LETTER 15

COMMENT LETTER 15. Fiorio Family

15-1 Issue: Induced Flooding

Preliminary assessment indicates that there will be some induced flooding over a portion of the subject property. The proposed project as formulated includes provisions for flowage easements to compensate for any increased damages due to induced flooding. Site specific studies of areas subject to induced flooding will be included in the Corps of Engineers Phase II Advanced Engineering and Design Studies.

COMMENT LETTER 16

BLOOMFIELD FARMS

SANTA CLARA VALLEY SINCE 1851

March 9, 1981

Colonel Paul Batilwich, Jr.
Corps of Engineers
San Francisco District
Department of the Army
211 Main Street
San Francisco, CA 94105

Dear Colonel Batilwich:

Thank you for your letter of February 11. We are sorry that we are unable to concur with the construction of a levee on a portion of Uvas Creek. For the reasons previously stated, the Santa Clara Valley Water District and the City of Gilroy must accept responsibility for the unlawful dumping of runoff water from the Gavilan College and the Mesa Ranch subdivision before we could concur with this project.
16-1 Santa Clara Valley Water District and the City of Gilroy have known for years that lands lying eastward of the two developments were the recipients of the unlawful dumping of water, creating floods of valuable farm land, and failed and refused to take any productive action to correct the situation. It is clear to me therefore that any additional dumping of water by the project that you are currently undertaking will only add to the unlawful conduct of the City of Gilroy and the Santa Clara Valley Water District. Any reasonable investigation will show that atethe time of these two developments a plan for disposition

Business Offices 175 S SAN ANTONIO ROAD · LOS ALTOS CALIFORNIA 94022 · (415) 941-0413

COMMENT LETTER 16

BLOOMFIELD FARMS

Page Two

of the runoff water was developed but the district entities have failed and refused to implement the project as it was originally conceived, the result of which is to flood properties owned by me and other farmers in the area, doing dangerous and irreparable injury to the topsoil and farming potential of the subject lands. May I suggest that your intervention by reason of your current project might help focus attention on the need for proper drainage on my lands and the lands of my contiguous neighbors. Thank you in advance for your cooperation.

Very truly yours,

Morton P. MacLeod

Morton P. MacLeod

MPM:tm

cc: Santa Clara Valley Water District Board of Directors
City of Gilroy

RESPONSE LETTER 16

COMMENT LETTER 16. Morton P. MacLeod, Bloomfield Farms

Issue: Induced Flooding

In 1978 the Corps of Engineers evaluated the possibility of extending levees on both sides of Uvas Creek from Miller Avenue to U.S. Highway 101. This was the most expensive alternative investigated due to the need to raise and widen the bridge at Uvas Creek and the highway. This alternative was found not to be in the Federal interest to build as there were not enough benefits to offset the construction costs. The alternative recommended to best solve the flood problem is the construction of a levee on the Gilroy side of Uvas Creek beginning approximately 1,000 feet upstream of Miller Avenue and extending 2,000 feet below the Thomas Road Bridge.

Under current or pre-project conditions, prior to construction of the above described levee, this property is subject to flooding from a 25-year frequency flood (a flood which has a 4 percent chance of occurrence in any one year). Construction of the levee will not perceptibly change this condition. The Corps preliminary calculations indicate that should a 100-year flood occur (a flood which has a one percent chance of occurrence in any one year), the subject property would be flooded about three inches deeper than it would have been prior to construction of the proposed levee. It is the Corps opinion that this slight increase in water depth for such a rare storm will not appreciably increase flood damages to the property. The local sponsoring agency, Santa Clara Valley Water District, is responsible for furnishing the lands, easements, and rights-of-way for the project. The flood easements they propose are to recognize the small increase in flood depths for the 100-year flood and will not take any rights for development away from the property owner.

Regarding the interior drainage problems of this property and others in the area and as mentioned previously, the Corps of Engineers did investigate construction of levees on both sides of Uvas Creek to Highway 101. In December we sent to all property owners in the area the Draft Phase I, General Design Memorandum for review and comment. As stated in the Environmental Statement (page 120) the Soil Conservation Service (SCS) has designated the land in the area as prime agricultural lands. It is suggested that the owner contact the Soil Conservation Service and inquire of the possibility of that agency doing some work to properly drain the property from waters put on the property due to developments such as Gavilan College and Mesa Ranch subdivision.

COMMENT LETTER 17

SANTA CLARA VALLEY
DISTRICT COUNCIL OF CARPENTERS
OF THE
UNITED BROTHERHOOD OF CARPENTERS
AND JOINERS OF AMERICA
Affiliated with AFL-CIO

AFFILIATED
LOCAL UNIONS
Piledrivers Local 34
Oakland
Millwrights Local 102
Oakland
Lathers Local 144L
San Jose
Millmen's and Industrial
Carpenters Local 262
San Jose
Carpenters Local 316
San Jose

HARVEY H. "SKIP" LANDRY, JR.
Executive Secretary
Phone 265-1855
P.O. Box 8111
SAN JOSE, CALIFORNIA 95155

AFFILIATED
LOCAL UNIONS
Carpenters Local 354
Gilroy-Hollister
Carpenters Local 668
Palo Alto
Carpenters Local 1280
Mountain View
Floor Layers Local 1861
Milpitas
Carpenters Local 2006
Los Gatos

April 1, 1981

Col. Paul Bazilwich
Corps of Army Engineers
211 Main Street
San Francisco, CA 94105

Dear Sir:

Please accept these late comments of your flood control proposals for the City of Gilroy. We attended the meeting you held in the Gilroy City Council Chambers and concur with your recommendations for levee Alternative 2.

We agree that plan has the greatest benefit for the city. We are willing to assist the Corps of Engineers and the city in any way we can.

Sincerely,

Harvey H. Landry Jr.

Harvey S. Landry
Executive Secretary

HL/ts
cc: Fred Wood

APPENDIX 2

BASIS OF DESIGN AND COST

APPENDIX 2

BASIS OF DESIGN AND COST

C

SECTION A

GENERAL

GENERAL

TABLE OF CONTENTS

SECTION A

GENERAL

Scope

1. This appendix describes the basic data and criteria used, the alternatives investigated, the preliminary design studies performed, and the cost estimates for the various alternatives for providing flood protection to the lands along Uvas Creek in and around the City of Gilroy. Existing conditions are described and evaluated, the design floods are evaluated, criteria is defined, and preliminary designs and cost estimates are presented.

Existing Conditions

2. Hydrologic conditions of the Uvas-Carnadero Creek Basin are defined in Appendix 6. Potential flooding along the creek is essentially uncontrolled from its confluence with the Pajaro River to Miller Avenue located in the southwest section the the City of Gilroy. The extent of the flood plains estimated to occur under existing conditions assuming the failure of the existing levee downstream of Miller Avenue for Standard Project Flood (SPF) and a 100-year flood are shown on Plate 1. The depth of flooding relative to street grades is estimated to vary up to a maximum of 3.0 feet for the 100-year event and 3.5 feet for the SPF. Flooding depth, relative to street grades, in most of the developed areas of Gilroy will vary between 1.0 and 2.0 feet for the 100-year event and 1.5 and 2.5 feet for the SPF. The area designated as Soap Lake on the flood plain maps results from Pajaro River backwater that will occur concurrently with the flooding along the creek. The eastern limits of the flood plains are defined by Miller Slough and Llagas Creek which will also be subject to concurrent flooding.

3. The land adjacent to the creek slopes from northwest to southeast, resulting in a limited flood plain of the northwest (uphill) side of the creek and shallow overland flow on the southeast side.

4. Nearly all the estimated damages resulting from Uvas Creek would be in the developed areas bounded by the creek on the west, State Highway 101 on the east, Miller Avenue on the north, and Thomas Road on the south. Outside of these limits the lands are primarily in agricultural uses and will not be subject to significant damages as a result of the anticipated flooding.

5. The natural stream channel upstream of Thomas Road has a capacity of about 9,000 cubic feet per second which is approximately equal to the estimated 15-year exceedence interval flows. The

channel is characterized by a relatively heavy growth of trees and brush along the banks which encroach upon the streambed in several areas. The existing levees located on the left (east) side of the creek from about 1,500 feet upstream of Thomas Road to Miller Avenue are in generally poor condition and will require reconstruction where they are to be incorporated into the proposed project levee alternatives. In accordance with the assessment and recommendations on pages 10 and 11 of the "Preliminary Geotechnical Investigation," contained in Appendix 7, the stability of these levees and the natural stream bank varies from fair to marginal. Erosion and slouthing are eveident at several locations. The levee is also supported at a few locations by timber retaining walls. These walls are in generally deteriorated condition and cannot be relied upon to ensure the levee stability. The existing levee section varies substantially with a maximum top width of approximately 30 feet and a minimum of around five feet. The levee sideslopes range from about two horizontal to one vertical, to as steep as about three horizontal and four vertical. The levee location relative to the top of the natural bank also varies and at some points provides no setback from banks of marginal stability. It also appears that these levees were not constructed to quality control standards required for Corps project works. To assure the stability of these levees their cross-sections will need to be adjusted. The determination of the 100-year and SPF floodplains under existing conditions as shown on Plate 1 are based on failure of these levees to natural ground. Complete reconstruction of these levees to project standards is required to insure their integrity.

6. The levee upstream of Miller Avenue has been reconstructed within the last two years for a distance of about 3,700 feet in conjunction with the development of the adjacent lands. This levee is well constructed with three horizontal and one vertical water sideslopes, a ten foot top width and flat landside slope varying from about two to one to ten to one to conform with existing conditions prior to construction. However, this levee does not provide three foot freeboard in accordance with project standards for a distance of about 1,000 feet upstream of Miller Avenue. The levee height will need to be increased by a miximum of approximately 2.5 feet for the Standard Project Flood design.

ALTERNATIVE PLANS

7. Detailed evaluations and updates of the two levee alternatives determined to be the most economically viable in previous studies were prepared. Each alternative was re-examined based on current conditions with a more detailed investigation of project physical requirements. Alternatives 1, 2, and 3 basically consist of a levee along the left side of Uvas Creek from approximately 2,000

feet downstream of Thomas Road to about 1,000 feet upstream of Miller Avenue. Alternatives 4, 5, and 6 will basically consist of a levee from approximately 200 feet upstream of Thomas Road to about 1,000 feet upstream of Miller Avenue. Varying levee setbacks from a minimum of 10 feet to a maximum of 100 feet were evaluated. Each of the levee alternatives are described in detail in Section C of this appendix. Floods resulting from the implementation of each of these alternatives are shown on Plates 2 and 3.

8. A nonstructural alternative consisting of various flood proofing measures such as sealing of existing structures, flood walls, raising of existing structures, and ring levees were also investigated and are discussed in detail in Section D of this appendix.

SECTION B

BASIC DATA

BASIC DATA

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SECTION B

BASIC DATA

GENERAL

1. Basic data acquired for use in this study included aerial photographs, topographic mapping, as-built drawings of existing facilities, hydrologic data, soils exploration data, land ownership plats, property assessment data, drawings of facilities currently under construction or proposed and site data noted during field reconnaissance investigations. On-site inspections were made to confirm or modify data as necessary to reflect existing conditions.

MAPPING AND SURVEYS

2. Flood plain analyses were based on U. S. Geological Survey Topographic Mapping, Santa Clara County cadastral mapping, City of Gilroy street maps, engineering drawings of recently constructed or proposed land developments and recent (1977) aerial photographs provided by the City of Gilroy of the city and adjoining areas.

3. Hydraulic studies and preliminary levee design were based on detailed topographic mapping obtained from the Santa Clara County Water District, cross-section data obtained from field surveys performed in connection with preparation of the survey report and the Federal Emergency Management Agency (formerly Federal Insurance Administration, Department of Housing and Urban Development) Flood Insurance Study for the City of Gilroy.

4. Right of way requirements were based on the County of Santa Clara Assessors maps and data.

5. Existing utilities were identified from the City of Gilroy's Sewer, Water, and Drainage System Maps, and from as-build drawings obtained from the city and the Santa Clara Valley Water District, as well as field investigations.

6. Nonstructural alternatives were based on City of Gilroy and Santa Clara County aerial photographs, city street maps, USGS topographic maps, and engineering drawings of existing and currently under construction developments and facilities such as Gilroy High School.

7. Basin hydrologic studies used the data as described in Appendix 6, Hydrology.

Geology and Soils

8. The site geologic and soils conditions were assessed by means of review of the available data and a preliminary exploration program consisting of a field inspection by an engineering geologist, six field test borings and laboratory testing. The laboratory testing included moisture content and dry density, Atterberg limits, sieve analysis, unconfined compressive strength and direct shear tests.

9. Soils data for the Llagas Creek Project, which has been identified as the primary source of borrow for the project levee construction, was obtained from previous investigations and reports by the Soil Conservation Service.

10. Geologic and soils data are included in Appendix 7 of this report.

SECTION C

STRUCTURAL ALTERNATIVES

STRUCTURAL ALTERNATIVES

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TABLES

SECTION C

STRUCTURAL ALTERNATIVES

GENERAL

1. Detailed design and cost studies have been performed for each of the alternatives discussed in Section A. Six basic alternatives are presented herein to indicate the range of possible project development. Each alternative was assessed for both the 100-year flood and the Standard Project Flood (SPF).

ALTERNATIVES

2. Detailed design and costs estimated are presented for the following alternatives:

a. Alternative 1 - Consists of a new or reconstructed levee along the left side of the creek from a point about 2,000 feet south of Thomas Road to Miller Avenue and the raising of the existing levee upstream of Miller Avenue for a distance of approximately 800 feet for the 100-year flood and 1,300 feet for the SPF. The levee would be setback from the natural creek channel top of bank a minimum of 10 feet with the exact location to be based on the stability of the creek. The existing levees would be reconstructed for a distance of approximately 3,500 feet downstream of Miller Avenue. A flood wall of approximately 260 feet in length is required upstream of Thomas Road since there is insufficient space between the natural stream top of bank and the existing home to allow levee construction. It was determined the construction of the flood wall would be less costly than the purchase and relocation of the home. The Thomas Road bridge would be raised at its present location utilizing a temporary detour for local traffic. The purchase and relocation of two farm buildings located south of Thomas Road would be required in lieu of a second flood wall.

b. Alternative 2 - Is a modification of Alternative 1 with the levees setback to minimize removal of existing riparian habitat. This alternative includes the reconstruction of about 1,100 feet of existing levee downstream of Miller Avenue, the raising of up to 1,000 feet of existing levee upstream of Miller Avenue, the relocation of Thomas Road, and the construction of a new bridge upstream of the existing structure. The floodwall upstream of Thomas Road would not be provided and the relocation of one home along with two farm buildings would be necessary.

c. Alternative 3 - Is further modification of Alternative 1 with the levee setback increased to 100 feet or more, depending on property boundaries and existing physical constraints. This alternative included the reconstruction of 1,100 feet of existing levee downstream of Miller Avenue, the raising of up to 1,100 feet of Thomas Road and bridge. No flood walls would be required, and the purchase and relocation of five farm buildings and one home would be necessary.

d. Alternative 4 - Consists of a new or reconstructed levee along the left side of the creek from a point about 200 feet upstream of Thomas Road to Miller Avenue and the raising of the levee upstream of Miller Avenue as required in the above alternatives. The levee location and alignment, and flood wall required would be the same as in Alternative 1. A flood wall would be required as in Alternative 1. Thomas Road and Thomas Road bridge across Uvas Creek would not be modified.

e. Alternative 5 - Is a modification of Alternative 4 with the levee setback to the same location and alignment as in Alternative 2 to preserve riparian habitat. No flood walls would be provided and the purchase and relocation of one home would be necessary. There would be no modification to Thomas Road.

f. Alternative 6 - Is a further modification of Alternative 4 with the levee setback as in Alternative 3. No flood walls would be required; however, the purchase and relocation of one home would be necessary.

3. Plan views of each alternative are displayed on Plates 4, 5, and 6.

HYDRAULIC DESIGN

4. The hydraulic design of the various levee alternatives utilized in the computer program HEC-2, "Water Surface Profiles." The most current available cross-section data for the existing channel was obtained from the Federal Emergency Management Agency (formerly the Federal Insurance Administration) Flood Insurance Study completed in 1979. An average Manning channel roughness coefficient of between 0.040 and 0.050, as determined by channel conditions, was used for the hydraulic analysis. Hydraulic analyses were performed for the following flows:

Exceedence Interval	Flow-Cfs
10	7,650
25	12,500
50	14,100
100	17,000
500	22,200
SPF	18,800

5. Water surface and design levee profiles for the Intermediate Regional Flood and the Standard Project Flood are shown on Plate 7. A single profile has been included for Alternatives 1, 2, 4, and 5 since the computed difference in water surface elevation between these alternatives is approximately 0.2 feet.

LEVEE LOCATION AND ALIGNMENT

6. Levee locations and alignment are based on economics, design, integrity, fish and wildlife, aesthetic, recreational and property boundary considerations.

7. Two areas have a common alignment for all alternatives. For approximately 700 feet upstream of Thomas Road, the levee has been located to avoid costly property acquisiton and relocation cost and minmize the disruption of the riparian vegetation. The levee alignment for about 1,000 feet downstream of Miller Avenue follows the existing levees. Larger setbacks for the levee in this reach was not possible since there is inadequate space between the channel and the recently constructed Uvas Park Drive.

8. The alignment for Alternatives 1 and 4 is essentially the same as used in the project plan recommended in previous studies. The waterside levee toe of slope would be located a minimum of 10 feet back from the top of the natural channel bank. Larger setbacks of up to 30 feet are required in some areas due to the potential instability of the natural channel banks. A particularly critical area is the channel reach extending about 700 feet downstream from Thomas Road. The channel banks are quite steep and show evidence of erosion, and the estimated channel velocities range from around seven feet per second for a ten year storm to around 11 feet per second for the SPF. A second area of locally high velocities is located approximately 2,000 feet upstream of Thomas Road. The velocities at this location range from around six feet per second for the ten year storm and ten feet per second for the SPF.

The use of localized slope protection appears necessary in these areas. The levee would be setback 20 to 30 feet to allow for bank grading and slope protection installation if needed. It should be noted that larger setbacks would not significantly affect the channel velocities. The larger levee setbacks would result in somewhat larger overbank flows and reduced main channel flows. The difference in velocity between the minimum setback and a 100-foot setback is less than five percent. The estimated channel velocities in other channel reaches range from three to eight feet per second for the SPF and two to seven feet per second for a 10-year flood. The overbank velocities range up to a maximum of around five feet per second.

9. The alignment of Alternatives 2 and 5 is predicated on minimizing the removal of riparian habitat. The levee would be setback to land side of the existing tree line due to the bank stability and erosion factors discussed above, and real estate considerations. Alternatives 1, 2, 4, and 5 alignments would be the same from Station 0 to Station 10. From Station 10 to about Station 58, Alternatives 2 and 5 would be located further from the channel. From Station 58 to Miller Avenue, the alignments would again be identical.

10. The alignment of Alternatives 3 and 6 is based on providing a setback of about 100 feet from the channel bank to the levee toe, where possible. This alternative will allow the reestablishment of riparian habitat in the setback area, provide open space, and would provide added opportunities for the future development of additional recreation facilities. Levee alignments are shown on Plates 5, 6, and 7.

Levee Sections

11. The levee cross sections as shown on Plate 8 are in accordance with minimum Corps' standards. The top width shall be 12 feet to provide for a 10 foot gravel surfaced maintenance roadway. Land-side slopes of two horizontal to one vertical will be used so that native grasses can be established and maintained Three foot of freeboard will be provided in accordance with Corps' standards for urban area levees.

12. The stability of the proposed section is ample. A preliminary stability assessment of two loading conditions was made.

- Design flood with rapid drawdown
- Seismic (0.2g) without flooding

13. The resulting factors of safety ranged from 2.0 to 3.5 depending on soils strengths and levee heights.

14. With the generally fine grained cohesion foundation soils and available embankment materials, along with the short duration nature of the flooding, seepage will be minimal.

15. Inspection trenches may be required in areas where the levee heights exceed six feet and final soils investigations indicate that the foundation condition is questionable.

16. The levee slopes and adjacent disturbed soil will be seeded with native grass, fertilized and mulched, as needed.

SLOPE PROTECTION

17. With confinement of the flood flows, high velocities would be experienced in localized reaches of the natural channel. Between approximate levee Stations 6 and 17 the estimated average channel velocities range from around seven feet per second for a 10-year storm and 11 feet per second for the SPF. Between approximate levee Stations 39 and 45, the estimated channel velocities range from approximately six feet per second for the 10-year event and ten feet per second for the SPF. Slope protection is included at critical areas based on the above velocities and field inspections of the creek. The use of slope protection has been minimized in an effort to preserve the existing vegetation and aesthetic value of the creek. The velocities in the overbank area will generally be less than five feet per second and no slope protection other than seeding of the levee and adjacent area with native grasses is considered necessary, except at the downstream end of the levees where high velocities would be experienced as the water surface draws down to the level of the floodplain.

18. The most critical of the above areas is between approximate levee Stations 10 and 13. At this location the levee would be located relatively close to the outside of the channel bend in a zone of high velocity. This reach will be most critical for project Alternative 1, where Thomas Road would not be relocated and the modified road and levee would be adjacent to the creek channel, and slope protection is provided to insure that the levee would not be endangered by migration of the natural channel. In Alternatives 2 and 3 there would not be immediate danger to the proposed levee, however, protection of the channel bank is recommended to prevent loss of land inside the levee and relocated Thomas Road where recreational uses are contemplated.

19. In the reach between Stations 39 and 45, the channel alignment is relatively straight and will not be subject to the same erosion potential as the above reach. The channels show some evidence of minor local erosion, however, they are well vegetated. There are large old growth trees on the banks giving evidence to essentially stable conditions. It has been concluded that slope protection is not essential in this reach and it has been omitted to preserve the existing vegetation and aesthetic value of the creek.

20. The slope protection for the east abutment of the relocated Thomas Road bridge will abut the existing sacked concrete slope protection that extends around the channel bend between approximate levee Stations 21 and 25. The main channel velocities through the bridge opening will be between eight and nine feet per second for the SPF, and slope protection has been included for the east bridge abutment. The west bridge abutment is located above a flat, approximately seven horizontal to one vertical, stable bank and no slope protection will be needed.

21. Slope protection on the south bank of the creek is considered necessary at only one location, opposite approximate levee Stations 29 to 31. At this location farm buildings are located adjacent to a steep and partially eroded slope on the other side of a channel bend subject to relatively high velocities. In other areas of high velocity there are structures and the adjacent farm land slopes upward from the creek. Bank erosion in these areas would not result in significant damages to adjacent properties and slope protection is not considered economically justified at this time.

22. For Alternatives 1 and 4 the proposed slope protection would primarily consist of graded stone riprap backed by a graded reverse filter material. In localized areas of steep slopes, gabion blankets or stepped gabion walls both backed by a filter would be used. The riprap slope should be two to one or flatter and its placement would require some grading of the channel slopes and, in certain areas, removal of a significant amount of riparian vegetation.

23. For Alternatives 2, 3, 5, and 6, the design of slope protection facilities should be predicated on preservation of the creek's natural and aesthetic values. The removal of riparian vegetation should be minimized by limiting the grading of the channel slopes. Gabion mat and stepped gabion walls would be used to a greater extent in areas of steep slopes. Construction methods would also be more rigidly specified to prevent unnecessary damage to vegetation. These factors would result in somewhat higher construction costs.

24. Based on the channel flow velocities, slope and configuration design boundary shear values are estimated to range between two and four pounds per square foot. Nominal riprap size (D_{50}) of six to twelve inches will be required with total layer thickness of nine to eighteen inches. The reverse filter blanket thickness would be six inches. The gabion mat thickness would be one foot thick and the gabion wall would consist of three foot thick segments. It is not proposed to protect the channel invert. The bank slope protection should be extended below the invert for vertical distance of around four to six feet to provide for degradation of the invert.

25. The slope protection locations are shown on Plates 4, 5 and 6 and the details on Plate 9.

ACCESS

26. Access to the levees will be provided at Thomas Road and Miller Avenue. A turnout to provide for passing vehicles will be provided midway between the access points and turnaround will be provided at the levee terminous south of Thomas Road for Alternative 3.

FLOOD WALLS

27. A flood wall as shown on Plate 10 will be required for Alternatives 1 and 5 beginning at approximate levee Station 31. At this location there is inadequate space for safe levee construction without relocation of the existing home. The wall would be a conventional reinforced concrete, spread footing Canti-lever type. It will be necessary to replace and add some local landscaping to mitigate aesthetic damages to the adjacent property. The added cost of this wall is estimated to be approximately $90,000, including engineering, administration and contingencies, while the estimated added cost of purchasing the property and relocating the home is around $260,000 including damages and contigencies.

28. An optional flood wall as shown on Plate 11 beginning at approximately levee Station 5 could be provided to avoid purchase and/or relocation of the existing farm buildings in Alternatives 1 and 2. Current cost estimates indicate purchase of the building would be less costly, however, this may not be the case depending on final real estate acquisition negotiations. This wall would require shoring during construction to assure the stability of the existing buildings and would result in some channel constriciton under flood conditions. The construction of this wall is not recommended unless the actual real estate cost significantly exceeds the cost of the wall. For the purposes of this report, this wall is not included in the project alternatives.

29. The preliminary wall designs were based on minimum factors of 1.5 for overturning, sliding and uplift; and maximum bearing of one ton per square foot.

LOCAL DRAINAGE

30. The lands along the creek slope away from the creek. Minor grading and ditching would be required to direct local drainage to the channel in some areas. This will be particularly necessary at the wider levee setbacks.

Thomas Road - Bridge and Road Modifications

31. The existing Thomas Road bridge does not provide the necessary vertical clearance for passage of the design flood flows. The existing structure is a continuous four span monolithic reinforced concrete tee-beam on solid piers. The bridge cannot be readily raised. The existing 18 foot roadway width is not in accordance with current standards for public roadways.

32. Alternative 1 includes the recontruction of the bridge at its present location at a higher elevation to provide three foot freeboard between the lower chord and the design water surface. The existing superstructure would be removed and reconstructed with a simalar cast-in-place tee beam. The existing piers, abutments and wingwalls would be extended. The bridge approaches would be reconstructed and the eastern approach would be combined with the project levee and would be relocated by a maximum of 20 feet to provide adequate setback from the natural channel. A detour would be required and would include a temporary culvert designed to pass a five year exceedence frequency storm. Plate 12 displays the bridge modification and detour facilities.

33. Alternatives 2 and 3 include the relocation of Thomas Road and the construction of a new bridge as shown on Plate 13. The road relocation would be designed for a speed of 35 miles per hour and would be constructed in accordance with the City of Gilroy standards as shown on Plate 14. The bridge would provide two lanes with twelve foot travelled ways and a five foot pedestrian sidewalk in accordance with current standards. Provisions for future widening to four lanes would be included. The bridge would be cast-in-place tee-beam with continious piers and open abutments founded on piles. The requirement for piles will be reassessed following the completion of final detailed soils explorations.

Water Line Relocation

34. In conjunction with the Thomas Road modification, the existing City of Gilroy 12-inch water main that crosses the creek on the bridge would require relocation. The line will be routed across the new or modified bridge and be relocated between levee Station 20 and 25 to clear the levee.

Sewer Line Relocation and Pump Station Modification

35. The City of Gilroy 12-inch sewer pipeline crossing the existing Thomas Road bridge would be relocated in conjunction with modifying or reconstructing the bridge. Due to the increase in head caused by raising the bridge, the sewer station located south of the creek along Thomas Road will require modifications including pump impellor replacement or modification, motor replacement and adjustments in controls.

Wastewater Reclamation Relocation

36. Local relocation will be required for the existing Santa Clara Valley Water District 12-inch wastewater reclamation pipeline that crosses the levee at approximate levee Station 58.

Powerline Relocation

37. Relocation of one or two of the Pacific Gas & Electric Company power poles adjacent to Thomas Road will be required in conjunction with the road modification.

Cost Estimates

BASIS OF CONSTRUCTION COST ESTIMATES

38. All cost estimates have been determined from preliminary designs, quantity estimates and unit prices developed from the following sources:

- Dodge Guide to Public Works and Heavy Construction Cost
- Means Building Construction Cost Data
- Building Cost File - Western Edition
- Engineering News Record
- Bid prices from related or similar projects including City of Gilroy road construction
- Discussions with local contractors and materials suppliers

39. All costs were adjusted to October 1980 levels by means of the Engineering News Record costs indices. Costs developed from the national guides listed above were adjusted for geographical differences in accordance with the indices for labor, equipment, and materials as given in the guides. The unit prices used take into consideration the magnitude of the work and set up time. A separate estimate for mobilization was not used.

CONTINGENCIES

40. A contingency factor of 20 percent was added to all costs to provide for costs not fully defined at the current level of study.

ENGINEERING AND DESIGN, SUPERVISION AND ADMINISTRATION

41. Costs for engineering and design, and construction supervision and project administration, were taken to be 15 percent and 10 percent of the total construction costs, respectively, as determined from experience on other Corps projects.

COMPARISON OF COSTS FROM PREVIOUS STUDIES

42. The total costs for levee Alternatives 3 or 4 are not directly comparable to those included in survey report. Subsequent to the previous estimates, the portion of levee upstream of Miller Avenue has been reconstructed. Other differences are due to site conditions either changed or not fully defined such as the construction of new farm buildings near the creek south of Thomas Road, the identification of utilities that require relocation due to the project, and the identified lack of borrow material immediately at the site.

COST SUMMARIES

43. Project costs as summarized on Table 1 have been adjusted to October, 1980 levels. The detailed cost summaries as shown on Tables 2 through 17 are at February, 1980 levels.

TABLE 1

STRUCTURAL ALTERNATIVES COST SUMMARY 3/

(Costs in thousands $)

(October, 1980)

	STANDARD PROJECT FLOOD DESIGN						100-YEAR FLOOD DESIGN					
	1	2	3	4	5	6	1	2	3	4	5	6
Levee and Flood Walls 1/	$1,083.2	$1,115.0	$1,112.8	$725.0	$ 660.6	$ 664.3	$ 995.6	$1,036.2	$1,027.2	$618.9	$ 614.8	$ 632.5
Thomas Road Bridge and Relocations - Non-Federal	$ 314.5	$ 516.2	$ 600.4	$ 18.7	$ 18.7	$ 18.7	$ 314.5	$ 516.2	$ 516.2	$ 18.7	$ 18.7	$ 18.7
Total Construction	$1,399.7	$1,631.2	$1,629.0	$743.7	$ 679.3	$ 683.0	$1,310.1	$1,552.4	$1,543.4	$637.6	$ 633.5	$ 651.2
Flowage Easement - Non-Federal	$ 500.0	$ 500.0	$ 500.0	$ -	$ -	$ -	$ 500.0	$ 500.0	$ 500.0	$ -	$ -	$ -
Real Estate-Non-Federal 2/	$ 494.5	$ 961.3	$1,314.6	$215.1	$ 683.4	$ 871.2	$ 494.5	$ 961.3	$1,314.6	$215.1	$ 683.4	$ 871.2
Total Non-Federal	$1,309.0	$1,977.5	$2,330.8	$233.8	$ 702.1	$ 889.9	$1,309.0	$1,977.5	$2,330.8	$233.8	$ 702.1	$ 889.9
TOTAL FIRST COST	$2,394.2	$3,092.5	$3,443.6	$958.8	$1,362.7	$1,554.2	$2,304.6	$3,013.7	$3,358.0	$852.7	$1,316.7	$1,322.4
ANNUAL COSTS												
Federal												
Interest (7 3/8%) and Amortization	$ 80.0	$ 82.2	$ 82.0	$ 53.4	$ 48.7	$ 49.0	$ 73.4	$ 76.4	$ 75.7	$ 45.6	$ 45.3	$ 46.6
Non-Federal												
Interest and Amortization	$ 96.5	$ 145.7	$ 171.8	$ 17.2	$ 51.7	$ 65.6	$ 96.5	$ 145.7	$ 171.8	$ 17.2	$ 51.7	$ 65.6
Operation and Maintenance	$ 11.7	$ 11.4	$ 11.4	$ 7.2	$ 6.9	$ 6.9	$ 11.7	$ 11.4	$ 11.4	$ 7.2	$ 6.9	$ 6.9
Total Non Federal	$ 108.2	$ 157.1	$ 183.2	$ 24.4	$ 58.6	$ 72.5	$ 108.2	$ 157.1	$ 183.2	$ 24.4	$ 58.6	$ 72.5
TOTAL ANNUAL COSTS	$ 188.2	$ 239.3	$ 265.2	$ 77.8	$ 107.3	$ 121.5	$ 181.6	$ 233.5	$ 258.9	$ 70.0	$ 103.9	$ 119.1

1/ Includes contingencies, engineering and design, and supervision and administration

2/ Includes cost of lands, improvements, relocations, mineral rights, severence damage and acquisition costs

3/ Does not include recent E&D or recreation costs.

SPF DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Clearing and Grubbing	AC		7.0	1600	00	11	200
Embankment	CY	71	050	0	70	49	740
Borrow, Haul and Road Repair	CY	81	710	3	75	306	410
Strip and Prepare Foundation	SY	40	140	0	37	14	850
Common Excavation	CY	15	000	2	00	30	000
Stone Slope Protection	CY	1	250	26	00	32	500
Filter Material	CY		400	14	00	5	600
Gabion Mats and Walls	CY		660	75	00	49	500
Gravel Surfacing	CY	1	100	16	00	17	600
Seeding	AC		6	2000	00	12	000
Road Gates	EA		4	320	00	1	280
FLOOD WALL							
Structure Excavation	CY		490	9	50	4	660
Concrete - Wall	CY		104	300	00	31	200
Concrete - Footing	CY		135	110	00	14	850
Reinforcing Steel	LB	20	200	0	45	9	090
Structure Backfill	CY		370	12	50	4	630
ACCESS ROAD RELOCATION	LF	1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF		300	22	00	6	600
Subtotal						609	510
Contingencies 20%						121	900
Total Construction						731	410
Engineering and Design 15%						109	710
Supervision and Administration 10%						73	140
GRAND TOTAL						914	260

LEVEE ALTERNATIVE NO. 2
SPF DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
LEVEE									
Clearing and Grubbing	AC			3.6	2000	00		7	200
Embankment	CY		77	760	0	70		54	430
Borrow, Haul and Road Repair	CY		89	420	3	75		335	330
Strip and Prepare Foundation	SY		43	930	0	37		16	250
Common Excavation	CY		14	500	2	00		29	000
Stone Slope Protection	CY		1	100	30	00		33	000
Filter Material	CY			350	16	00		5	600
Gabion Mats and Walls	CY			950	75	00		71	250
Gravel Surfacing	CY		1	100	16	00		17	600
Seeding	AC			5.7	2000	00		11	400
Road Gates	EA			4	320	00		1	280
FLOOD WALL									
Structure Excavation	CY								
Concrete - Wall	CY								
Concrete - Footing	CY								
Reinforcing Steel	LB								
Structure Backfill	CY								
ACCESS ROAD RELOCATION	LF		1	200	6	50		7	800
WASTEWATER PIPE RELOCATION	LF			300	22	00		6	600
Subtotal								596	740
Contingencies 20%								119	350
Total Construction								716	090
Engineering and Design 15%								107	410
Supervision and Administration 10%								71	610
GRAND TOTAL								895	110

LEVEE ALTERNATIVE NO. 3
SPF DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Clearing and Grubbing	AC		3.6	2000	00	7	200
Embankment	CY	77	170	0	70	54	020
Borrow, Haul and Road Repair	CY	88	750	3	75	332	800
Strip and Prepare Foundation	SY	43	600	0	37	16	130
Common Excavation	CY	15	000	2	00	30	000
Stone Slope Protection	CY	1	100	30	00	33	000
Filter Material	CY		330	16	00	5	600
Gabion Mats and Walls	CY		950	75	00	71	250
Gravel Surfacing	CY	1	070	16	00	17	120
Seeding	AC		6.3	2000	00	12	600
Road Gates	EA		4	320	00	1	280
FLOOD WALL							
Structure Excavation	CY						
Concrete - Wall	CY						
Concrete - Footing	CY						
Reinforcing Steel	LB						
Structure Backfill	CY						
ACCESS ROAD RELOCATION	LF	1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF		150	22	00	6	600
Subtotal						595	400
Contingencies 20%						119	080
Total Construction						714	480
Engineering and Design 15%						107	170
Supervision and Administration 10%						71	450
GRAND TOTAL						893	100

TABLE 5
LEVEE ALTERNATIVE NO. 4
TO MILLER AVENUE, SPF DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Clearing and Grubbing	AC		4.5	1600	00	7	200
Embankment	CY	50	090	0	70	35	060
Borrow, Haul and Road Repair	CY	59	740	3	75	224	030
Strip and Prepare Foundation	SY	25	960	0	37	9	610
Common Excavation	CY	7	100	2	00	14	200
Stone Slope Protection	CY	1	500	26	00	13	000
Filter Material	CY		300	14	00	2	800
Gabion Mats and Walls	CY		350	75	00	26	250
Gravel Surfacing	CY		760	16	00	12	160
Seeding	AC		4.2	2000	00	8	400
Road Gates	EA		4	320	00	1	280
FLOOD WALL							
Structure Excavation	CY		490	9	50	4	660
Concrete - Wall	CY		104	300	00	31	200
Concrete - Footing	CY		135	110	00	14	850
Reinforcing Steel	LB	20	200	0	45	9	090
Structure Backfill	CY		370	12	50	4	630
ACCESS ROAD RELOCATION	LF	1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF		300	22	00	6	600
Subtotal						432	820
Contingencies 20%						86	560
Total Construction						519	380
Engineering and Design 15%						77	910
Supervision and Administration 10%						51	940
GRAND TOTAL						649	230

TABLE 6
LEVEE ALTERNATIVE NO. 5
TO MILLER AVENUE, SPF DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Clearing and Grubbing	AC		1.5	2000	00	3	000
Embankment	CY	57	270	0	70	40	090
Borrow, Haul and Road Repair	CY	65	860	3	75	246	980
Strip and Prepare Foundation	SY	32	360	0	37	11	970
Common Excavation	CY	6	600	2	00	13	200
Stone Slope Protection	CY		450	30	00	13	500
Filter Material	CY		175	16	00	2	800
Gabion Mats and Walls	CY		350	75	00	26	250
Gravel Surfacing	CY		760	16	00	12	160
Seeding	AC		4.2	2000	00	8	400
Road Gates	EA		2	320	00	1	280
FLOOD WALL							
Structure Excavation	CY						
Concrete - Wall	CY						
Concrete - Footing	CY						
Reinforcing Steel	LB						
Structure Backfill	CY						
ACCESS ROAD RELOCATION	LF	1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF		300	22	00	6	600
Subtotal						394	030
Contingencies 20%						78	810
Total Construction						472	840
Engineering and Design 15%						70	930
Supervision and Administration 10%						47	280
GRAND TOTAL						591	050

TABLE 7

LEVEE ALTERNATIVE NO. 6
TO MILLER AVENUE, SPF DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Clearing and Grubbing	AC		1.5	2000	00	3	000
Embankment	CY	57	650	0	70	40	360
Borrow, Haul and Road Repair	CY	66	300	3	75	248	620
Strip and Prepare Foundation	SY	32	570	0	37	12	050
Common Excavation	CY	6	100	2	00	13	200
Stone Slope Protection	CY		450	30	00	13	500
Filter Material	CY		175	16	00	2	800
Gabion Mats and Walls	CY		350	75	00	25	250
Gravel Surfacing	CY		740	16	00	11	840
Seeding	AC		4.5	2000	00	9	000
Road Gates	EA		2	320	00	1	280
FLOOD WALL							
Structure Excavation	CY						
Concrete - Wall	CY						
Concrete - Footing	CY						
Reinforcing Steel	LB						
Structure Backfill	CY						
ACCESS ROAD RELOCATION	LF	1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF		150	22	00	6	600
Subtotal						395	300
Contingencies 20%						79	060
Total Construction						474	360
Engineering and Design 15%						71	150
Supervision and Administration 10%						47	440
GRAND TOTAL						592	950

LEVEE ALTERNATIVE NO. 1
TO MILLER AVENUE, 100-YEAR DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Clearing and Grubbing	AC		7.0	1600	00	11	200
Embankment	CY	61	070	0	70	42	750
Borrow, Haul and Road Repair	CY	70	230	3	75	263	360
Strip and Prepare Foundation	SY	34	500	0	37	12	770
Common Excavation	CY	15	500	2	00	31	000
Stone Slope Protection	CY	1	250	26	00	32	500
Filter Material	CY		400	14	00	5	600
Gabion Mats and Walls	CY		660	75	00	49	500
Gravel Surfacing	CY	1	100	16	00	17	600
Seeding	AC		5.6	2000	00	11	200
Road Gates	EA		4	320	00	1	280
FLOOD WALL							
Structure Excavation	CY		460	9	50	4	370
Concrete - Wall	CY		100	300	00	30	000
Concrete - Footing	CY		128	110	00	14	080
Reinforcing Steel	LB	18	200	0	45	8	190
Structure Backfill	CY		350	12	50	4	380
ACCESS ROAD RELOCATION	LF	1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF		300	22	00	6	600
Subtotal						554	180
Contingencies 20%						110	840
Total Construction						665	020
Engineering and Design 15%						99	750
Supervision and Administration 10%						66	500
GRAND TOTAL						831	270

LEVEE ALTERNATIVE NO. 2
MILLER AVENUE, 100-YEAR DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Clearing and Grubbing	AC		3.6	2000	00	7	200
Embankment	CY	67	730	0	70	47	410
Borrow, Haul and Road Repair	CY	78	890	3	75	295	840
Strip and Prepare Foundation	SY	38	270	0	37	14	160
Common Excavation	CY	14	500	2	00	29	000
Stone Slope Protection	CY	1	100	30	00	33	000
Filter Material	CY		350	16	00	5	600
Gabion Mats and Walls	CY		950	75	00	71	250
Gravel Surfacing	CY	1	100	16	00	17	600
Seeding	AC		5.7	2000	00	11	400
Road Gates	EA		4	320	00	1	280
FLOOD WALL							
Structure Excavation	CY						
Concrete - Wall	CY						
Concrete - Footing	CY						
Reinforcing Steel	LB						
Structure Backfill	CY						
ACCESS ROAD RELOCATION	LF	1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF		300	22	00	6	600
Subtotal						548	140
Contingencies 20%						109	630
Total Construction						657	770
Engineering and Design 15%						98	670
Supervision and Administration 10%						65	780
GRAND TOTAL						822	210

TABLE 10
LEVEE ALTERNATIVE NO. 3
TO MILLER AVENUE, 100-YEAR DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST	
LEVEE								
Clearing and Grubbing	AC			3.7	2000	00	7	400
Embankment	CY		68	970	0	70	48	280
Borrow, Haul and Road Repair	CY		79	320	3	75	297	430
Strip and Prepare Foundation	SY		38	970	0	37	14	420
Common Excavation	CY		14	000	2	00	28	000
Stone Slope Protection	CY		1	100	30	00	33	000
Filter Material	CY			550	16	00	8	800
Gabion Mats and Walls	CY			950	75	00	71	250
Gravel Surfacing	CY		1	070	16	00	17	120
Seeding	AC			6.0	2000	00	12	000
Road Gates	EA			4	320	00	1	280
FLOOD WALL								
Structure Excavation	CY							
Concrete - Wall	CY							
Concrete - Footing	CY							
Reinforcing Steel	LB							
Structure Backfill	CY							
ACCESS ROAD RELOCATION	LF		1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF			150	22	00	6	600
Subtotal							542	580
Contingencies 20%							108	520
Total Construction							651	100
Engineering and Design 15%							97	660
Supervision and Administration 10%							65	110
GRAND TOTAL							813	870

LEVEE ALTERNATIVE NO. 4
TO MILLER AVENUE, 100-YEAR DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST	
LEVEE								
Clearing and Grubbing	AC			4.5	1600	00	7	200
Embankment	CY		42	160	0	70	29	510
Borrow, Haul and Road Repair	CY		48	480	3	75	181	820
Strip and Prepare Foundation	SY		23	820	0	37	8	810
Common Excavation	CY		7	100	2	00	14	200
Stone Slope Protection	CY			500	26	00	13	000
Filter Material	CY			200	14	00	2	800
Gabion Mats and Walls	CY			350	75	00	26	250
Gravel Surfacing	CY			740	16	00	11	840
Seeding	AC			4.2	2000	00	8	400
Road Gates	EA			2	320	00	1	280
FLOOD WALL								
Structure Excavation	CY			460	9	50	4	370
Concrete - Wall	CY			100	300	00	30	000
Concrete - Footing	CY			128	110	00	14	080
Reinforcing Steel	LB		18	200	0	45	8	190
Structure Backfill	CY			350	12	50	4	380
ACCESS ROAD RELOCATION	LF		1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF			300	22	00	6	600
Subtotal							367	330
Contingencies 20%							73	470
Total Construction							440	800
Engineering and Design 15%							66	120
Supervision and Administration 10%							44	080
GRAND TOTAL							551	000

LEVEE ALTERNATIVE NO. 5
TO MILLER AVENUE, 100-YEAR DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST	
LEVEE								
Clearing and Grubbing	AC			1.5	2000	00	3	000
Embankment	CY		48	870	0	70	34	210
Borrow, Haul and Road Repair	CY		56	200	3	75	210	750
Strip and Prepare Foundation	SY		27	610	0	37	10	220
Common Excavation	CY		6	600	2	00	13	200
Stone Slope Protection	CY			450	30	00	13	500
Filter Material	CY			150	16	00	2	400
Gabion Mats and Walls	CY			550	75	00	41	250
Gravel Surfacing	CY			760	16	00	12	160
Seeding	AC			4.2	2000	00	8	400
Road Gates	EA			2	320	00	1	280
FLOOD WALL								
Structure Excavation	CY							
Concrete - Wall	CY							
Concrete - Footing	CY							
Reinforcing Steel	LB							
Structure Backfill	CY							
ACCESS ROAD RELOCATION	LF		1	200	6	50	7	800
WASTEWATER PIPE RELOCATION	LF			300	22	00	6	600
Subtotal							364	770
Contingencies 20%							72	950
Total Construction							437	720
Engineering and Design 15%							65	660
Supervision and Administration 10%							43	770
GRAND TOTAL							547	160

Appendix 2

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TABLE 13
LEVEE ALTERNATIVE NO. 6
TO MILLER AVENUE, 100-YEAR DESIGN
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
LEVEE				
Clearing and Grubbing	AC	1.5	2000.00	3,000
Embankment	CY	50,910	0.70	35,640
Borrow, Haul and Road Repair	CY	58,550	3.75	219,550
Strip and Prepare Foundation	SY	28,760	0.37	10,640
Common Excavation	CY	6,100	2.00	13,200
Stone Slope Protection	CY	450	30.00	13,500
Filter Material	CY	150	16.00	2,400
Gabion Mat and Walls	CY	550	75.00	41,250
Gravel Surfacing	CY	740	16.00	11,840
Seeding	AC	4.5	2000.00	9,000
Road Gates	EA	2	320.00	1,280
ACCESS ROAD RELOCATION	LF	1,200	6.50	7,800
WASTEWATER PIPE RELOCATION	LF	150	22.00	6,600
Subtotal				375,700
Contingencies 20%				75,140
Total Construction				450,840
Engineering and Design 15%				67,630
Supervision and Administration 10%				45,080
GRAND TOTAL				563,550

TABLE 14

ALTERNATIVES 2 AND 3
THOMAS ROAD NEW BRIDGE
CONSTRUCTION COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
BRIDGE							
Concrete Abutments	CY		53	160	00	8	480
Concrete Superstructure	CY		284	320	00	90	880
Concrete Wingwalls	CY		13	290	00	3	770
Concrete Piers	CY		143	200	00	30	030
Concrete Pier Footings	CY		52	110	00	5	720
Concrete Railing and Sidewalk	CY		29	120	00	3	480
Concrete Approach Slabs	CY		29	110	00	3	190
Steel Reinforcement	LBS	93	670	0	45	42	150
Stone Slope Protection	CY		327	27	00	8	830
Filter Material	CY		105	14	00	1	470
Structure Excavation	CY	1	823	9	50	17	320
Structure Backfill	CY		734	12	50	9	180
Bridge Railing	LF		420	45	00	18	900
Piles	LF	1	200	35	00	42	000
Bridge Removal	CY		215	35	00	7	530
Water Line Relocation	LF		830	22	00	18	260
Sewer Line Relocation	LF		350	22	00	7	700
Pump Station Modification	LS					4	000
Power Line Relocation	LS					1	000
Subtotal						383	920
Contingencies 20%						76	780
Total Construction						460	700
Engineering and Design 15%						69	110
Supervision and Administration 10%						46	070
GRAND TOTAL						575	880

TABLE 15
THOMAS ROAD BRIDGE MODIFICATION AND DETOUR
ALTERNATIVE 1
(SPF DESIGN)

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
DETOUR									
Grading	SY		8	867	0	45		3	990
Compacted Embankment	CY		4	790	0	70		3	350
Aggregate Base	SF		29	400	0	22		6	470
Asphalt Seal Coat	SF		8	400	0	55		4	620
54" Diameter CMP	LF			200	55	00		11	000
Embankment Removal	CY		4	790	0	55		2	630
THOMAS ROAD BRIDGE APPROACH MODIFICATION									
Remove Existing Pavement	SY			980	0	50			490
Embankment	CY		2	050	0	70		1	440
Borrow and Haul	CY		2	360	2	50		5	900
12" Aggregate Base	SF		14	400	0	55		7	920
6" Aggregate Base	SF		2	400	0	35			840
3" Asphalt Concrete	SF		14	400	0	45		6	480
UTILITIES RELOCATION									
Water Line Relocation	LF			830	22	00		18	260
Sewer Line Relocation	LF			900	22	00		19	800
Pump Station Modification	LS							4	000
Power Line Relocation	LS							1	500
BRIDGE MODIFICATION									
Concrete Removal	CY			185	35	00		6	480
Concrete Superstructure	CY			207	320	00		66	240
Concrete Piers, Abuts, Wingwalls	CY			45	210	00		9	450
Reinforcing Steel	LBS		64	300	0	45		28	948
Railing	LF			410	45	00		18	450
Subtotal								228	250
Contingencies								45	650
Total Construction								273	900
Engineering and Design 15%								41	090
Supervision and Administration 10%								27	390
Grand Total								342	380

TABLE 16
ALTERNATIVES 1 THROUGH 6
MODIFICATION - EXISTING LEVEE, MILLER ROAD AND UVAS PARK DRIVE
CONSTRUCTION COSTS
(SPF DESIGN)

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
ROAD MODIFICATION				
Embankment	CY	2,050	0.70	1,440
3 Inch Asphalt Concrete Surfacing	SF	5,600	0.45	2,520
Aggregate Base 12 Inch	SF	5,600	0.55	3,080
Aggregate Base 6 Inch	SF	1,200	0.35	420
Borrow	CY	2,360	2.50	5,900
Pavement Removal	SF	5,600	0.50	2,800
LEVEE MODIFICATION				
Embankment	CY	1,200	0.70	840
Borrow	CY	1,380	2.50	3,450
Foundation Preparation	SY	7,670	0.37	2,840
Gravel Surfacing	CY	135	16.00	2,160
Seeding	AC	0.4	3005.00	800
Subtotal				26,250
Contingencies 20%				5,250
Total Construction				31,500
Engineering and Design 15%				4,730
Supervision and Administration 10%				3,150
GRAND TOTAL				39,380

TABLE 17
OPTIONAL FLOOD WALL NO. 1
ALTERNATIVES 1 AND 2

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
Structure Excavation	CY		940	9	50	8	930
Structure Backfill	CY		490	13	00	6	370
Concrete - Wall	CY		165	300	00	49	500
Concrete - Footing	CY		215	110	00	23	659
Reinforcing Steel	LB	38	250		45	17	210
Shoring	SF		840	3	80	3	190
Subtotal						108	850
Contingencies 20%						21	770
Total Construction Cost						130	620
Engineering and Design 15%						29	590
Supervision and Administration 10%						13	060
GRAND TOTAL						163	270

SECTION D

NONSTRUCTURAL ALTERNATIVES

NONSTRUCTURAL ALTERNATIVES

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SECTION D

NONSTRUCTURAL ALTERNATIVES

General

1. The basic criteria used in evaluation of nonstructural measures was to provide essentially the same degree of flood protection as the structural alternatives; Levee Alternatives 1, 2, and 3. The nonstructural alternatives varied depending upon location within the flood plain, depth of flooding, and/or the structure being protected. The nonstructural measures considered in this study included raising, sealing or flood proofing of individual structures, and flood walls and ring levees for individual as well as for groups of structures.

2. The removal of existing structures from the flood plain was not considered to be a viable alternative due to the dense development.

3. To provide alternatives comparable to the structural facilities, nonstructural estimates and evaluations were based on both the 100-year and the Standard Project Flood events. For both storm events, the total construction costs were found to be more than three times the most costly structural alternative and more than twice the annual cost of the same. It was therefore concluded that the nonstructural alternatives were not economically competitive and the evaluation of additional options was unnecessary.

4. South of the project area, induced flooding will result through the implementation of the levee alternatives. The analysis of these areas was based on Levee Alternative 1, 2 and 3 which would induce greater added flooding depths than Levee Alternatives 4, 5 and 6. The design of the flood proofing facilities for this area was based on the depths obtained with the 100-year and the Standard Project Flood flows.

5. Plate 15 indicates the location of each of the selected non-structural measures, and Plate 16 illustrates each of the selected facilities.

Permanent Residential Structures

6. Permanent residential structures included all permanently foundationed single family homes and apartments. Mobile homes were considered separately. All single family homes were assumed to be built on a raised type foundation which put the first floor 18 inches above the pad elevation and 2.0 feet above the street. The structures were assumed to be wood framed with stucco siding. For calculation purposes, the average square footage per house was assumed at 2,100 square feet including the garage with an outside perimeter of 200 feet.

7. Two protective methods were selected for the residential structures. The first method would consist of constructing a flood profing reinforced concrete masonry wall directly against the outside wall of the home or apartment being protected. The wall height would provide protection from the 100-year or SPF events plus one half foot of freeboard, and would be designed to resist floodwater loadings in excess of the existing structures lateral loading resistance capacity. It would be constructed so that it encircled both the living quarters and the garage. The wall would consist of decorative block or would be painted to match or be compatible with the appearance of the existing structure. Temporary wooden or aluminum closures would be provided at the garage door and other openings. The second protection method selected would utilize the existing noise barrier wall along Miller Avenue and Uvas Park Drive to protect those encompassed by it. The noise barrier would be flood proofed by sealing it with a short reinforced concrete wall. The wall could be approximately 2.75 feet high for the SPF storm and 2.50 feet high for the 100-year storm. The wall would close the opening beneath the existing precast panels and would accommodate all of the hydrostatic and flood flow deflection loading. Sealing of the noise barrier would divert flood flows around residential areas as indicated on Plate 15.

8. Estimated average cost per home for the flood proofing walls was $10,900 for the 100-year event and $12,900 for the SPF. The cost of flood proofing 3,200 feet of noise barrier wall is estimated to be $11,500 and $129,300 for the 100-year and SPF events respectively. All apartment facilities within the flood plain are located within the zone which is susceptible to 2.0 feet of flooding for the 100-year event and 2.25 feet of flooding during the SPF. Apartment protection costs for the 100-year and SPF are estimated at $218,600 and $245,900 respectively. Total first cost for all residential protection (homes and apartments) would be around $4,150.000 for the 100-year event and $4,620,000 for the SPF.

9. The advantages associated with the residential flood proofing walls include the following:

a. Occupants of the structures not required to vacate premises during construction.

b. No significant aesthetic effects.

c. Not dependent upon the size nor type of structure or foundation type.

10. The disadvantages associated with the residential flood proofing walls include the following:

a. The reduced likelihood of effective closures at night or during vacations for those openings **requireing** temporay closures.

b. Ineffectiveness of flood proofing wall for any storm greater than the design level of protection.

11. Two other nonstructural alternatives were considered in the protection of the residential structures. Ring levees were evaluated but could not be used due to the space requirements between the homes or between the homes and the street. Raising of the individual homes was also investigated. It has the advantages of not requiring temporary closures and the ability of providing some degree of protection even if the design level of protection is exceeded. The average cost for raising each individual home is estimated at approximately $12,090 as compared to an average cost of $12,300 per home for the flood proofing wall. When comparing the cost of raising and for the flood proofing wall they were treated as essentially equal since the unit cost values used for the development of each alternative's cost may vary plus or minus 25 percent.

12. For purposes of this report the economic evaluation of the nonstructural facilities has been based on construction of the flood proofing wall for each structure. It is believed that this alternative would more likely receive public acceptance than the raising of individual homes.

Mobile Home Court

13. The Mobile Home Court protection would be provided by a 2.5 foot reinforced masonry flood wall around the court perimeter for 100-year protection and a 2.75 foot reinforced masonry wall for SPF protection. Openings would have temporary aluminum and timber closures for the development of a completely flood proofed structure. Cost for this wall would be $440,900 for the 100-year and $495,600 for the SPF storm.

14. The advantages and disadvantages of this flood wall are similar to those of the permanent residential flood proofing wall except that the disadvantage associated with ineffective closure at night or while on vacation would be minimized since maintenance personnel will be available to make all closures necessary.

15. The alternative of raising each individual mobile home was considered as another possibility which offered some protection even if the level of protection were surpassed. However, this method was found to be more costly with a total estimated cost of $1,690.000 for the 100-year and $1,816,000 for the SPF storm.

16. In both the mobile home and the permanent residential structure raisings, the costs to protect the garages or the carports nearly equalled the cost to protect the homes.

INDUSTRIAL AND COMMERCIAL

17. Industrial or commercial structures would be protected by various methods depending upon structure type, i.e., tilt-up concrete walls, raised foundations, and/or woodframe or metal buildings.

18. For the tilt-up concrete buildings which were susceptible to damaging flood waters, sealing was determined to be the least costly. Sealing would consist of sandblasting the outside walls to clean and prepare for the water proofing sealant, and temporary aluminum and timber closures installed at all door openings. There were only two commercial structures subject to flood damage which could be sealed effectively.

19. The remainder of the commercial and industrial structures would utilize both a flood wall and a levee combination for their flood protection. During a field visit, it was determined that a large percentage of the property value was located in the yards surrounding these structures and would also require protection from damaging flood waters. Therefore, for those properties south of Thomas Road and adjacent to Business 101, a flood wall would be constructed as shown on Plate 15. The back sides of the above properties would be protected by the use of a small ring type levee as shown on Plate 15.

20. For those properties north of Thomas Road and south of Tenth Street, two separate areas of flood protection will be developed, thus providing both structures and yard contents protection. It was determined since the existing space between the two areas was not presently developed, it was unnecessary to protect this property. Future development of this undeveloped area as well as all other undeveloped properties within the flood plain will require flood protection to be incorporated in all designs prior to develoment of these properties.

21. For the commercial and industrial structures along Chestnut Street, protection will be provided by constructing a levee along Luchessa Avenue between the railroad tracks and Highway 101 at the south end and a levee along the east side of the railroad tracks at Tenth Street in the north. The levee will run 100 feet north of Tenth and 1,100 feet south of Tenth tying both ends of the levee into the railroad where sufficient height and freeboard exists. Tenth Street and Chestnut Street will be permanently ramped to the levee grade. The costs associated with the Chestnut Street area protection are $35,600 and $41,900 for the 100-year and SPF storms respectively.

22. First cost associated with the commercial and industrial properties total $471,000 for the 100-year protection and $510,000 for the SPF protection level.

Gilroy High School

23. The high school structures when constructed were built such that each building was placed upon a raised earth pad of 3 to 3.5 feet above street grade so as to provide adequate drainage away from the structures. In doing this, it also provided adequate elevation to protect all buildings from any damaging flood waters which are estimated at a maximum depth of 2.25 feet in the street. The grounds of the school would be subject to nominal damage, insufficient to warrant the construction of flood proofing facilities.

Induced Flooding Area

24. The structures which are subject to induced flooding include 11 commercial-industrial structures and approximately 47 residential properties. Each of the residential properties contained at least one living quarters and garage. Several of the properties also contained various barns and other out buildings. Due to the proximity of the structures, certain residential properties were combined for purposes of the design of the protection facilities, resulting in 35 residential groups for the 47 properties.

25. The methods of protection selected for the commercial-industrial as well as the residential groups were a levee around the entire group or a wall-levee combination when insufficient space was available between the structures and the adjacent public road for levee construction. All protection methods were provided a removable wood or aluminum bulkhead closure at the vehicle entrances. Where required, a flap gated drainage pipe would be provided through the levees for internal drainage. Where necessary, a rear access ramp would be provided over the levee for farm equipment crossing.

26. The estimated first costs associated with the above induced flooding protection was determined to be $475,000 for the 100-year event and $545,300 for the SPF event.

27. The construction of a flood proofing wall for each structure similar to that described in paragraph 7 of this section, was also evaluated and found to be more costly. The estimated total first cost of protection of the commercial, industrial and residential buildings would be $537,000 for the 100-year event and $598,000 for the SPF event. This cost does not include protection for barns, sheds or other out buildings on agricultural properties.

Cost Estimates

28. The estimates obtained were determined through preliminary designs for a typical structure and a given flood water depth. All designs were such to provide a minimum factor of safety of 1.5 against overturning in all wall or levee designs and a freeboard of at least 0.5 foot in all flood proofing walls, levees or sealed structures. Structural designs were based on Uniform Building Code requirements.

29. All unit construction costs were determined from the Dodge Guide, the Western Edition of the Building Cost File, and the Means Building Construction Cost Data. The costs associated with the loading and bracing of the homes and mobile homes were determined through telephone conversations with home moving contractors.

30. Basic operation and maintenance costs for the flood proofing facilities were based on the factors as discussed in paragraph 2, section G in this appendix. Additional annual operation and maintenance costs of $15,000 for Alternative 7 and $5,000 for the area of induced flooding (Alternatives 1, 2, and 3) have been included to provide for funding of general clean-up operations within the flood plain following periods of overflows.

31. Since protection is being provided to individual properties it has been assumed that the owners would donate all lands and easements required for the construction of the facilities and no land or property damage costs have been included in the project cost estimates. A cost of $500 per parcel has been included to cover the cost of consummating an agreement with the landowners.

32. Cost for the nonstructural facilities for Alternative 7 are summarized on Table 18 and the cost of the flood proofing facilities for the area of induced flooding are summarized on Table 19. These costs have been adjusted to October 1980 price levels by means of the Engineering News Record Cost Indices. Detailed construction cost breakdowns for all nonstructural flood proofing facilities are shown on Tables 20 through 41. These costs were estimated at February 1980 levels.

TABl .6

NONSTRUCTURAL ALTERNATIVE NO. 7

COST SUMMARY - SPF DESIGN

(October 1980)(Discount Rate - 7 3/8%)

Type of Facility Protected	First Cost	Annual Operation and Maintenance	Annual Cost Interest and Amortization	Total Annual Cost
I. Residential				
a. Flood proofing homes	$4,243,000	$16,980	$312,710	$329,690
b. Flood proofing Apartments and Commercial Buildings	$ 246,000	$ 980	$ 18,130	$ 19,110
c. Sealing Noise Barrier	$ 129,000	$ 520	$ 9,510	$ 10,030
II. Mobile Home Park	$ 496,000	$ 1,990	$ 36,560	$ 38,550
I. Commercial and Industrial				
a. Between 10th Street and Thomas Road	$ 273,000	$ 1,250	$ 20,120	$ 21,370
b. South of Thomas Road	$ 195,000	$ 1,040	$ 14,370	$ 15,410
c. Chestnut Road	$ 42,000	$ 240	$ 3,100	$ 3,324
Right of Way Acquisition (Non-Federal)	$ 216,000	--	$ 15,920	$ 15,920
Maintenance - Flood Clean-up	$ --	$15,000	$ --	$ 15,000
TOTAL COSTS	$5,840,000	$38,000	$430,920	$468,920
COST APPORTIONMENT				
Federal	$5,624,000	$ --	$415,500	$415,000
Non-Federal	$ 216,000	$ 38,000	$ 15,920	$ 53,920

TABLE 18 - CONTINUED

NONSTRUCTURAL ALTERNATIVE NO. 7

COST SUMMARY - 100 YEAR DESIGN

(October 1980)(Discount Rate - 7 3/8%)

Type of Facility Protected	First Cost	Annual Operation and Maintenance	Annual Cost Interest and Amortization	Total Annual Cost
I. Residential				
a. Flood proofing Homes	$3,715,000	$14,860	$273,800	$288,660
b. Flood proofing Apartments and Commercial Buildings	$ 219,000	$ 870	$ 16,140	$ 17,010
c. Sealing Noise Barrier	$ 115,000	$ 460	$ 8,480	$ 8,940
II. Mobile Home Park	$ 441,000	$ 1,770	$ 32,500	$ 34,270
I. Commercial and Industrial				
a. Between 10th Street and Thomas Road	$ 252,000	$ 1,160	$ 18,570	$ 19,730
b. South of Thomas Road	$ 180,000	$ 960	$ 13,270	$ 14,230
c. Chestnut Road	$ 39,000	$ 210	$ 2,870	$ 3,080
Right of Way Acquisition (Non-Federal	$ 216,000	$ --	$ 15,920	$ 15,920
Maintenance - Flood Clean-up	$ --	$15,000	$ --	$ 15,000
TOTAL COSTS	$4,961,000	$35,290	$381,550	$416,840
COST APPORTIONMENT				
Federal	$4,961,000	$ --	$365,630	$365,000
Non-Federal	$ 216,000	$35,290	$ 15,920	$ 51,840

TABLE 19

ALTERNATIVES 1, 2 AND 3

AREA OF INDUCED FLOODING

COST SUMMARY

(October 1980, Discount Rate 7 3/8%)

	SPF	100-YEAR
FIRST COSTS		
Construction	$545,000	$475,000
Right of Way Acquisition	$ 40,000	$ 40,000
TOTAL	$585,000	$515,000
ANNUAL COSTS		
Federal		
Interest & Amortization	$ 40,170	$ 35,000
Non-Federal		
Interest & Amortization	$ 2,950	$ 2,950
Operation & Maintenance	$ 15,200	$ 14,900
TOTAL NON-FEDERAL	$ 18,150	$ 17,850
TOTAL ANNUAL	$ 58,320	$ 52,850

TABLE 20
UVAS CREEK NONSTRUCTURAL
FLOOD PROOFING PERMANENT INDIVIDUAL HOMES - SPF

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Concrete Block and Grout	SF		205	500	4	70		965	850
Concrete Footing	CY		5	292	150	00		793	800
Reinforced Steel	LB		101	253	0	45		45	564
Footing Excavation	CY		8	362	12	00		100	344
Relandscaping	SF		182	000		90		163	800
Duct Relocation	LB		20	000	3	00		60	000
Decorative Stucco	SY		24	231	17	00		411	927
Concrete Sealant	SF		205	500	0	38		78	090
Subtotal							2	619	375
Contingencies 20%								523	875
Total Construction							3	143	250
Engineering and Design 15%								471	490
Administration and Supervision 10%								314	330
GRAND TOTAL							3	929	070

Appendix 2

TABLE 21
UVAS CREEK NONSTRUCTURAL
RAISING INDIVIDUAL PERMANENT HOMES - SPF

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST		
Load, brace and reset structure	EA		337	1600	00		539	200
Lumber	MBF		281	1500	00		421	500
Stucco Siding	SY	14	963	20	00		299	266
Concrete Block and grout	SF	50	375	4	70		236	763
Reinforcing Steel	LB	114	810	0	45		51	665
Drilling and Placing Rebar	Home		337	320	00		107	840
Footing Excavation	CY	2	093	12	00		25	116
Footing Concrete	CY	1	325	150	00		198	750
Relandscaping	SF	45	500	0	90		40	950
Chimney Replacement	EA		337	1000	00		337	000
Disconnect and Reconnect Utilities	Home		337	935	00		315	095
Subtotal						2	573	145
Contingencies 20%							514	629
Total Construction						3	087	770
Engineering and Design 15%							463	170
Supervision and Administration 10%							308	780
GRAND TOTAL						3	859	720

TABLE 22
UVAS CREEK NONSTRUCTURAL
MOBILE HOME FLOOD WALL - SPF

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Footing Excavation	CY			519	12	00		6	228
Footing Concrete	CY			778	150	00		116	700
Concrete Block and Grout	SF		28	020	4	70		131	694
Reinforcing Steel	LB		23	397	0	45		10	529
Relandscaping	SF		42	030	0	90		37	827
Backfill	CY			130	15	00		1	950
Temporary Access Closure	EA			1	1000	00		1	000
Subtotal								305	928
Contingencies 20%								61	186
Total Construction								367	110
Engineering and Design 15%								55	070
Administration and Supervision 10%								36	710
GRAND TOTAL								458	890

TABLE 23
UVAS CREEK NONSTRUCTURAL
MOBILE HOME PARK
RAISING EACH INDIVIDUAL HOME - SPF

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Raise Trailer, Disconnect and Reconnect Utilities	EA			180	850	00		153	000
Replace or Lengthen Skirting	EA			180	1500	00		270	000
Blocks for Foundation	EA			180	210	00		37	800
Concrete Block and Grouting	SF		36	000	4	70		169	200
Footing Excavation	CY		5	333	12	00		63	996
Footing Concrete	CY		2	667	150	00		400	050
Reinforcing Steel	LB		48	096	0	45		21	643
Subtotal							1	115	689
Contingencies 20%								223	138
Total Construction							1	338	830
Engineering and Design 15%								200	820
Administration and Supervision 10%								133	880
GRAND TOTAL							1	673	530

UVAS CREEK NONSTRUCTURAL
SEALING NOISE BARRIER WALL
ALONG UVAS PARKWAY AND MILLER AVENUE - SPF

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST	
Concrete Block and Grout	SF		8	025	4	70	37	718
Concrete Footing	CY			178	150	00	26	700
Reinforcing Steel	LB		3	752	0	45	1	688
Footing Excavation	CY			238	12	00	2	856
Concrete Sealant	SF		8	025	0	38	3	050
Relandscaping	SF		6	420	0	90	5	778
Temporary Closure				2	1000	00	2	000
Subtotal							79	790
Contingencies 20%							15	958
Total Construction							95	750
Engineering and Design 15%							14	360
Administration and Supervision 10%							9	580
GRAND TOTAL							119	690

Appendix 2

TABLE 25
UVAS CREEK NONSTRUCTURAL
APARTMENTS AND COMMERCIAL STRUCTURES
AT CORNERS OF TENTH AND CHURCH AND TENTH AND BUSINESS 101 - SPF

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
Block and Grout	SF	12	600	4	70	59	220
Footing Excavation	CY		176	12	00	2	112
Footing Concrete	CY		350	150	00	52	500
Reinforcing Steel	LB	17	750	0	45	7	988
Relandscaping	SF	24	500		90	22	050
Decorative Stucco or Vernier	SY		467	17	00	7	939
Subtotal						151	809
Contingencies 20%						30	362
Total Construction						182	170
Engineering and Design 15%						27	330
Administration and Supervision 10%						18	220
GRAND TOTAL						227	720

TABLE 2[illegible]

UVAS CREEK NONSTRUCTURAL

LEVEE FOR CHESTNUT ROAD AND TENTH STREET - SPF

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Removal of Asphalt Pavement	SY		1	866	0	60		1	120
Foundation Preparation	SY		3	780	0	30		1	134
Embankment Borrow and Haul	CY		3	559	2	50		8	898
Replacement Asphalt Pavement	SF		16	800	0	50		8	400
Seeding of Levee	AC			0.83	2000	00		1	659
Embankment Placement	CY		3	095	1	50		4	643
Subtotal								25	854
Contingencies 20%								5	171
Total Construction								31	020
Engineering and Design 15%								4	650
Administration and Supervision 10%								3	100
GRAND TOTAL								38	770

TABLE 27
UVAS CREEK NONSTRUCTURAL
COMMERCIAL AND INDUSTRIAL
BETWEEN TENTH STREET AND THOMAS ROAD - SPF

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEES							
Levee Preparation	SY	2	010	0	30		603
Embankment Borrow and Haul	CY		771	1	50	1	928
Embankment Placement	CY		670	2	50	1	005
Levee Seeding	AC		0.34	2000	00		680
WALL QUANTITIES							
Earth Excavation	CY	1	172	12	00	14	064
Concrete Block and Grout	SF	10	547	4	70	49	571
Reinforcing Steel	LB	18	557	0	45	8	351
Earth Backfill	CY		214	15	00	3	210
Closure Costs	EA		4	300	00	1	200
Footing Concrete	CY		558	150	00	83	700
STRUCTURE SEALING							
Sandblasting Wall	SF	1	500	1	75	2	625
Caulking and Sealant	SF	1	500	0	50		750
Closures	EA		4	200	00		800
Subtotal						168	487
Contingencies 20%						33	697
Total Construction						202	180
Engineering and Design 15%						30	330
Administration and Supervision 10%						20	220
GRAND TOTAL						252	730

TABLE 28
UVAS CREEK NONSTRUCTURAL
COMMERCIAL AND INDUSTRIAL
SOUTH OF THOMAS ROAD - SPF

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Foundation Preparation	SY	5	445	0	30	1	634
Embankment Borrow and Haul	CY	4	638	2	50	11	595
Embankment Placement	CY	4	033	1	50	6	050
Levee Seeding	AC		1.25	2000	00	2	500
WALL QUANTITIES							
Earth Excavation	CY		711	12	00	8	532
Footing Concrete	CY		339	150	00	50	850
Concrete Block and Grout	SF	6	403	4	70	30	094
Reinforcing Steel	LB	11	900	0	45	5	355
Earth Backfill	CY		147	15	00	2	205
Temporary Access Closure	EA		5	300	00	1	500
Subtotal						120	315
Contingencies 20%						24	063
Total Construction						144	380
Engineering and Design 15%						21	660
Administratio: and Supervision 10%						14	440
GRAND TOTAL						180	480

Appendix 2

TABLE 29

NONSTRUCTURAL ALTERNATIVE - SPF
PROPERTIES SUBJECT TO INDUCED FLOODING
LEVEE AND WALL COMBINATION COST

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE QUANTITY							
Levee Preparation	SY	34	987	0	30	10	496
Embankment Borrow and Haul	CY	23	068	2	50	57	670
Embankment Placement	CY	19	913	1	50	29	870
Seeding	AC		7.3	2000	00	14	600
Drain Pipes	FT		398	16	00	6	368
Flap Gates	EA		20	500	00	10	000
Closure Costs	LS					23	640
Large Culvert	FT		300	60	00	18	000
WALL QUANTITIES							
Concrete Block and Grout	SF	1	957	4	70	9	198
Concrete Footing	CY		43.6	150	00	6	540
Reinforcing Steel	LB		915	0	45		412
Footing Excavation	CY		58	12	00		696
Concrete Sealant	SF	1	957	0	38		744
Relandscaping	SF	1	566	0	90	1	409
Subtotal						208	100
Contingency 20%						41	620
Total Construction						249	720
Engineering and Design 15%						37	460
Administration and Supervision 10%						24	970
GRAND TOTAL						312	150

TABLE 30
NONSTRUCTURAL ALTERNATIVE
PROPERTIES SUBJECT TO INDUCED FLOODING
PROTECTION WALL COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
Concrete Block and Grout	SF	21	533	4	70	101	205
Concrete Footing	CY		495	150	00	74	250
Reinforcing Steel	LB	10	160	0	45	4	572
Footing Excavation	CY		692	12	00	8	304
Concrete Sealant	SF	21	533	0	38	8	183
Relandscaping	SF	17	634	0	90	15	871
Duct Relocation	LB	2	140	3	00	6	420
Decorative Stucco	SY	2	772	17	00	47	124
Subtotal						265	928
Contingencies 20%						53	186
Total Construction						319	110
Engineering and Design 15%						47	870
Administration and Supervision 10%						31	910
GRAND TOTAL						398	890

Appendix 2

TABLE 31

UVAS CREEK NONSTRUCTURAL
FLOOD PROOFING PERMANENT INDIVIDUAL HOMES - 100 YR

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Concrete Block and Grout	SF		179	918	4	70		845	614
Concrete Footing	CY		4	633	150	00		694	982
Reinforced Steel	LB		88	648	0	45		39	892
Footing Excavation	CY		7	321	12	00		87	852
Relandscaping	SF		159	343		90		143	409
Duct Relocation	LB		17	510	3	00		52	531
Decorative Stucco	SY		21	215	17	00		360	647
Concrete Sealant	SF		179	918	0	38		68	369
Subtotal							2	293	300
Contingencies 20%								458	660
Total Construction							2	751	960
Engineering and Design 15%								412	790
Administration & Supervision- 10%								275	200
GRAND TOTAL							3	439	950

TABLE 32

UVAS CREEK NONSTRUCTURAL
RAISING INDIVIDUAL PERMANENT HOMES - 100 YR

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Load, brace & reset structure	EA			337	1600	00		539	200
Lumber	MBF			246	1500	00		369	000
Stucco Siding	SY		13	100	20	00		262	000
Concrete Block & Grout	SF		44	104	4	70		207	289
Reinforcing Steel	LB		100	518	0	45		45	233
Drilling & Placing Rebar	Home			337	320	00		107	840
Footing Excavation	CY		1	832	12	00		21	984
Footing Concrete	CY		1	160	150	00		174	000
Relandscaping	SF		39	836	0	90		35	852
Chimney Replacement	EA			337	1000	00		337	000
Disconnect & Reconnect Utilities	Home			337	935	00		315	095
Subtotal							2	414	490
Contingencies 20%								482	900
Total Construction							2	897	390
Engineering & Design 15%								434	610
Supervision & Administration-10%								289	740
GRAND TOTAL							3	621	740

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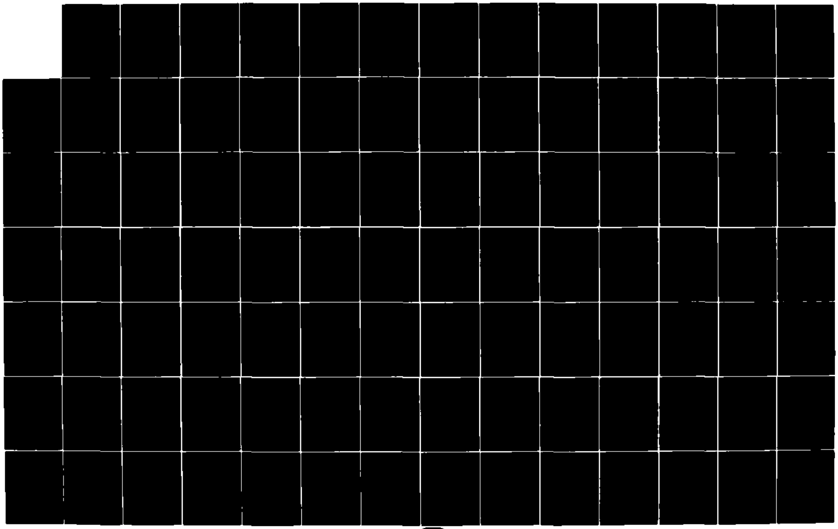

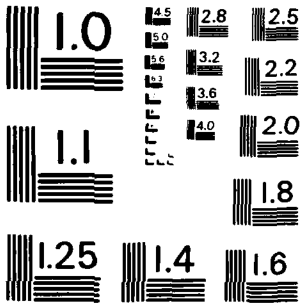

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TABLE 33

UVAS CREEK NONSTRUCTURAL
MOBILE HOME FLOOD WALL - 100 YR

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
Footing Excavation	CY	461	12.00	5 532
Footing Concrete	CY	692	150.00	103 800
Concrete Block & Grout	SF	24 907	4.70	117 063
Reinforcing Steel	LB	20 797	0.45	9 359
Relandscaping	SF	37 360	0.90	33 624
Backfill	CY	116	15.00	1 740
Temporary Access Closure	EA	1	1000.00	1 000
Subtotal				272 120
Contingencies 20%				54 420
Total Construction				326 540
Engineering & Design 15%				48 980
Administration & Supervision-10%				32 650
GRAND TOTAL				408 170

TABLE 34

UVAS CREEK NONSTRUCTURAL
MOBILE HOME PARK
RAISING EACH INDIVIDUAL HOME - 100 YR

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Raise Trailer, Disconnect &									
Reconnect Utilities	EA			180	850	00		153	000
Replace or Lengthen Skirting	EA			180	1500	00		270	000
Blocks for Foundation	EA			180	210	00		37	800
Concrete Block & Grouting	SF		32	000	4	70		150	400
Footing Excavation	CY		4	740	12	00		56	880
Footing Concrete	CY		2	371	150	00		335	650
Reinforcing Steel	LB		42	752	0	45		19	238
Subtotal							1	042	970
Contingencies 20%								208	590
Total Construction							1	251	560
Engineering & Design 15%								187	730
Administration & Supervision-10%								125	160
GRAND TOTAL							1	564	450

TABLE 35

UVAS CREEK NONSTRUCTURAL
SEALING NOISE BARRIER WALL
ALONG UVAS PARKWAY AND MILLER AVENUE - 100 YR

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
Concrete Block & Grout	SF	7 133	4 70	33 525
Concrete Footing	CY	158	150 00	23 700
Reinforcing Steel	LB	3 335	0 45	1 501
Footing Excavation	CY	212	12 00	2 544
Concrete Sealant	SF	7 133	0 38	2 711
Relandscaping	SF	5 707	0 90	5 136
Temporary Closure		2	1000 00	2 000
Subtotal				71 120
Contingencies 20%				14 220
Total Construction				85 340
Engineering & Design 15%				12 800
Administration & Supervision-10%				8 530
GRAND TOTAL				106 670

TABLE 30

UVAS CREEK NONSTRUCTURAL
APARTMENTS AND COMMERCIAL STRUCTURES
AT CORNERS OF TENTH AND CHURCH AND TENTH AND BUSINESS 101 - 100 YR

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
Block & Grout	SF	11	200	4	70	52	640
Footing Excavation	CY		156	12	00	1	872
Footing Concrete	CY		311	150	00	46	650
Reinforcing Steel	LB	15	778	0	45	7	100
Relandscaping	SF	21	778		90	19	600
Decorative Stucco or Vernier	SY		415	17	00	7	055
Subtotal						134	920
Contingencies 20%						26	980
Total Construction						161	900
Engineering & Design 15%						24	280
Administration & Supervision- 10%						16	190
GRAND TOTAL						202	370

Appendix 2

TABLE 37

UVAS CREEK NONSTRUCTURAL
LEVEE FOR CHESTNUT ROAD AND TENTH STREET - 100 YR

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
Removal of Asphalt Pavement	SY	1 866	0 60	1 120
Foundation Preparation	SY	3 307	0 30	992
Embankment Borrow & Haul	CY	3 114	2 50	7 785
Replacement Asphalt Pavement	SF	16 800	0 50	8 400
Seeding of Levee	AC	0.73	2000 00	1 460
Embankment Placement	CY	2 708	1 50	4 062
Subtotal				23 820
Contingencies 20%				4 760
Total Construction				28 580
Engineering & Design 15%				4 290
Administration & Supervision- 10%				2 860
GRAND TOTAL				35 730

Appendix 2

TABLE 38

UVAS CREEK NONSTRUCTURAL
COMMERCIAL AND INDUSTRUAL
BETWEEN TENTH STREET AND THOMAS ROAD - 100 YR

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST	
LEVEES								
Levee Preparation	SY		1	855	0	30		557
Embankment Borrow & Haul	CY			711	1	50	1	067
Embankment Placement	CY			618	2	50	1	545
Levee Seeding	AC			0.31	2000	00		620
WALL QUANTITIES								
Earth Excavation	CY		1	082	12	00	12	984
Concrete Block & Grout	SF		9	736	4	70	45	759
Reinforcing Steel	LB		17	130	0	45	7	709
Earth Backfill	CY			198	15	00	2	970
Closure Costs	EA			4	300	00	1	200
Footing Concrete	CY			515	150	00	77	250
STRUCTURE SEALING								
Sandblasting Wall	SF		1	385	1	75	2	424
Caulking & Sealant	SF		1	385	0	50		693
Closures	EA			4	200	00		800
Subtotal							155	580
Contingencies 20%							31	120
Total Construction							186	700
Engineering & Design 15%							28	000
Administration & Supervision- 10%							18	670
GRAND TOTAL							233	370

TABLE 59

UVAS CREEK NONSTRUCTURAL
COMMERCIAL AND INDUSTRIAL
SOUTH OF THOMAS ROAD - 100 YR

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE							
Foundation Preparation	SY	5	026	0	30	1	508
Embankment Borrow and Haul	CY	4	281	2	50	10	703
Embankment Placement	CY	3	723	1	50	5	585
Levee Seeding	AC		1.15	2000	00	2	300
WALL QUANTITIES							
Earth Excavation	CY		656	12	00	7	872
Footing Concrete	CY		313	150	00	46	950
Concrete Block and Grout	SF	5	910	4	70	27	777
Reinforcing Steel	LB	10	985	0	45	4	943
Earth Backfill	CY		136	15	00	2	040
Temporary Access Closure	EA		5	300	00	1	500
Subtotal						111	180
Contingencies 20%						22	240
Total Construction						133	420
Engineering and Design 15%						20	010
Administration & Supervision-10%						13	340
GRAND TOTAL						166	770

TABLE 40
NONSTRUCTURAL ALTERNATIVE - 100 YEAR FLOOD
PROPERTIES SUBJECT TO INDUCED FLOODING
LEVEE AND WALL COMBINATION COST

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
LEVEE QUANTITY							
Levee Preparation	SY	54	123	0	30	16	237
Embankment Borrow and Haul	CY	28	620	2	50	71	550
Embankment Placement	CY	24	885	1	50	37	328
Seeding	AC		11.8	2000	00	23	600
Drain Pipes	FT		733	16	00	11	728
Flap Gates	EA		49	500	00	24	500
Closure Gates	LS					47	000
Large Culvert	FT		300	60	00	18	000
WALL QUANTIEIES							
Concrete Block and Grout	SF	4	475	4	70	21	033
Concrete Footing	CY		98.5	150	00	14	775
Reinforcing Steel	Lb	2	092	0	45		941
Footing Excavation	CY		131	12	00	1	572
Concrete Sealant	SF	4	475	0	38	1	701
Relandscaping	SF	3	577	0	90	3	219
Subtotal						293	180
Contingency 20%						58	640
Total Construction						351	820
Engineering and Design 15%						52	770
Administration and Supervision 10%						35	180
Grand Total						439	770

TABLE 41
NONSTRUCTURAL ALTERNATIVE - 100 YEAR FLOOD
PROPERTIES SUBJECT TO INDUCED FLOODING
PROTECTION WALL COSTS

ITEM	UNIT	QUANTITY		UNIT COST		ITEM COST	
Concrete Block and Grout	SF	26	270	4	70	123	469
Concrete Footing	CY		661	150	00	99	150
Reinforcing Steel	LB	12	878	0	45	5	795
Footing Excavation	CY	1	028	12	00	12	336
Concrete Sealant	SF	26	274	0	38	9	984
Relandscaping	SF	23	030	0	90	20	727
Duct Relocation	LB	2	570	3	00	7	710
Decorative Stucco	SY	3	082	17	00	52	394
Subtotal						331	570
Contingencies 20%						66	310
Total Construction						397	880
Engineering and Design 15%						59	680
Administration and Supervision 10%						39	790
GRAND TOTAL						497	350

SECTION E

CONSTRUCTION MATERIALS

CONSTRUCTION MATERIALS

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SECTION E

CONSTRUCTION MATERIALS

EMBANKMENT

1. A maximum of around 85,000 cubic yards of imported borrow will be required. The project design and cost estimates are predicted on the use of excess materials from the proposed U. S. Soil Conservation Service, Llagas Creek Watershed Project. Significant portions of this project consists of excavated channel modifications, resulting in a substantial amount of excess material. A July 1976 report, "Report on Potential Disposal Site for Llagas Creek Watershed Project," by the Santa Clara Valley Water District, designates the Uvas Creek Project as one of the primary potential disposal sites for this excess material. Construction on this project is scheduled to begin within about two to three years. The project location and layout and proposed haul routes to Uvas Creek are shown on Plate 18. Reach 1 on this project has been completed and the excess used successfully in the construction of the Highway 101 freeway. Preliminary soils data for the project, as obtained from the U. S. Soil Conservation Service, is summarized in Appendix 7 of this report. The excess material, as estimated by the U. S. Soil Conservation Service, and year during which construction is scheduled to start, follows:

Reach No.	Excess Material Cubic Yards	Year
2	1,000,000	1984
10	140,000	1986
11a	100,000	1986
12	180,000	1986
13 North	10,000	1986
13 North	40,000	1986

2. The project cost estimate for borrow includes the excavation, loading, haul and spreading of this material, and the repair of the existing public streets and roads that will be used as haul routes. If construction operation on the two projects can be properly coordinated, savings can be realized by elimination of the duplication of excavation operations.

3. At the site of an abandoned gravel quarry, approximately 3,000 feet upstream on Uvas Creek from Miller Avenu, the City of Gilroy has proposed the development of a recreation pond in the creek channel.

Substantial amounts of borrow material could be obtained from this site resulting in significant project cost savings since the haul distance will be minimal as compared to obtaining the material from Llagas Creek. An estimated savings of around $2.00 to $2.50 per cubic yard could be realized. In addition, the use of this source would facilitate the recreation pond construction. Soils investigations to insure that the materials at this site are appropriate for use as embankment will be required. In addition, an evaluation of the fisheries implications will be required to establish the feasibility of this site as a borrow source. These evaluations should be included in the project advanced engineering and design studies.

4. If the construction on the Llagas Creek Project does not proceed as scheduled and the proposed recreation pond source is not feasible, borrow material can be obtained from a commercial pit being developed on Canada Road on off Leavsely Road about four miles west of the project area. Use of this pit will result in some added costs. The owner has tentatively quoted a current price of $0.75 per ton for the material loaded at the pit. This will result in an added project cost of $0.60 to $0.70 per cubic yard.

Slope Protection

5. Slope protection (riprap) and filler materials are available at the Aromas Quarry located about 15 miles southwest of Gilroy. Gabion wire is available from a Reno, Nevada distributor and has been used in nearby projects in Santa Clara Valley.

Other Materials

6. All other materials such as concrete, reinforcing steel, asphalt, and gravels are available locally in the Gilroy/San Jose area.

SECTION F

REAL ESTATE REQUIREMENTS

REAL ESTATE REQUIREMENTS

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SECTION F

REAL ESTATE REQUIREMENTS

LAND REQUIREMENTS

1. Right of way requirements for the levee alternatives are based on providing a 10 foot minimum maintenance strip outside the landside levee toe and purchasing the entire waterway area to the top of the bank or limit of riparian habitat on unleveed side of channel. The maintenance strip is required for maintenance and repair of the landside levee slopes and works required for the control of potential seepage.

2. It has been assumed that no right of way would need to be purchased for the nonstructural alternative.

PRESENT LAND USES

3. The subject property is situated in a transition area along the Uvas-Carnadero Creek. It fronts both sides of the creek, and is mostly within the city limits of Gilroy. Current use of the land within the city limits is for public purposes, for example, a high school, a public park, or residential use. Zoning is residential (R-1) and interim use (IZ). The lands outside the city limits are used agriculturally, and have agriculture zoning.

4. Highest and best use of the Gilroy city limits land is for residential development. Project lands outside of Gilroy have a residential highest and best use, but interim use for agriculture purposes.

LAND COSTS

5. Land value trends in the Gilroy vicinity and overall Santa Clara County area have moved upward at a "higher" rate than nationwide trends and inflation. Land sales in the last two years have increased at an estimated 30 to 40 percent per year.

6. For purposes of this report, good functional residential property within the city limits has been valued at $20,000 to $30,000 per acre. Lands outside the city limits are at $15,000 per acre or less. Channel lands have been valued at $1,000 per acre. Overbank lands are valued the same as adjacent residential or agricultural lands.

7. The channel lands owned by the City of Gilroy are used for recreation and open space purposes which will not be altered by the project. No project costs have been included for this land.

Improvements and Relocations

8. Costs for purchase of improvements and relocations are based on preliminary property appraisals.

Land and Cost Summaries and Responsibilities

9. All land requirements and costs are summarized on Table 42. Purchase of lands, improvements will be local responsibility with no cost to the Federal government. The responsible local agency will be Santa Clara Valley Water District.

TABLE 42

REAL ESTATE LANDS AND COSTS
LEVEE ALTERNATIVES

ITEM	ALTERNATIVES					
	1	2	3	4	5	6
Lands Required						
Channel - Acres	42	42	42	37	37	37
Overbank - Acres	7.5	13.0	21.5	4.5	8.5	14.0
Costs - R						
Total Lands	$189,000	$367,000	$549,000	$117,000	$296,000	$416,500
Improvements	$ 90,000	$220,000	$275,000	$ 0	$130,000	$135,000
Total Lands and Improvements	$279,000	$587,000	$824,000	$117,000	$426,000	$551,500
Mineral Rights	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Severance Damages - 10%	$ 28,900	$ 58,700	$ 83,400	$ 12,700	$ 42,600	$ 56,150
Contingencies - 25%	$ 79,480	$163,930	$229,350	$ 34,930	$119,650	$154,410
Relocation Costs	$ 15,000	$ 25,000	$ 25,000	$ 0	$ 10,000	$ 10,000
Acquisiton Costs	$ 45,500	$ 45,500	$ 45,500	$ 24,500	$ 24,500	$ 24,500
TOTAL (February, 1980)	$457,880	$890,130	$1,217,250	$199,130	$632,750	$806,660
ADJUSTED TOTAL OCTOBER 1980	$494,500	$961,300	$1,314,600	$215,100	$683,400	$871,200

SECTION G

OPERATION AND MAINTENANCE

OPERATION AND MAINTENANCE

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SECTION G

OPERATION AND MAINTENANCE

RESPONSIBILITIES

1. Project operation and maintenance will be a local responsibility handled by the Santa Clara Valley Water District in accordance with the regulations prescribed by the Secretary of the Army as set fourth in Section 208.10, Title 33 of the Code of Regulations. The City of Gilroy will be responsible for the maintenance of the recreation facilities.

ACTIVITIES AND COSTS

2. Operation and maintenance activities will consist of weed control, local erosion correction action, maintenance roadway grading and resurfacing, rodent control, the inspection and repair of structures, and minor replacements. No major replacements are included since all the project facilities are expected to have a useful life equivalent to the project life of 100 years. Cost estimates for operation and maintenance activities are based on guidelines developed from records of similar projects as given in Engineering Division Memorandum Number 198 of the Sacramento District, Corps of Engineers. Based on this guideline, the values used in the project cost estimates as updated to October 1980 levels were as follows:

Levees	$1,700 per mile
Riprap Slopes	$900 per mile
Stream Channel and Vegetation	$3,500 per mile
Structure	0.3 percent of first cost

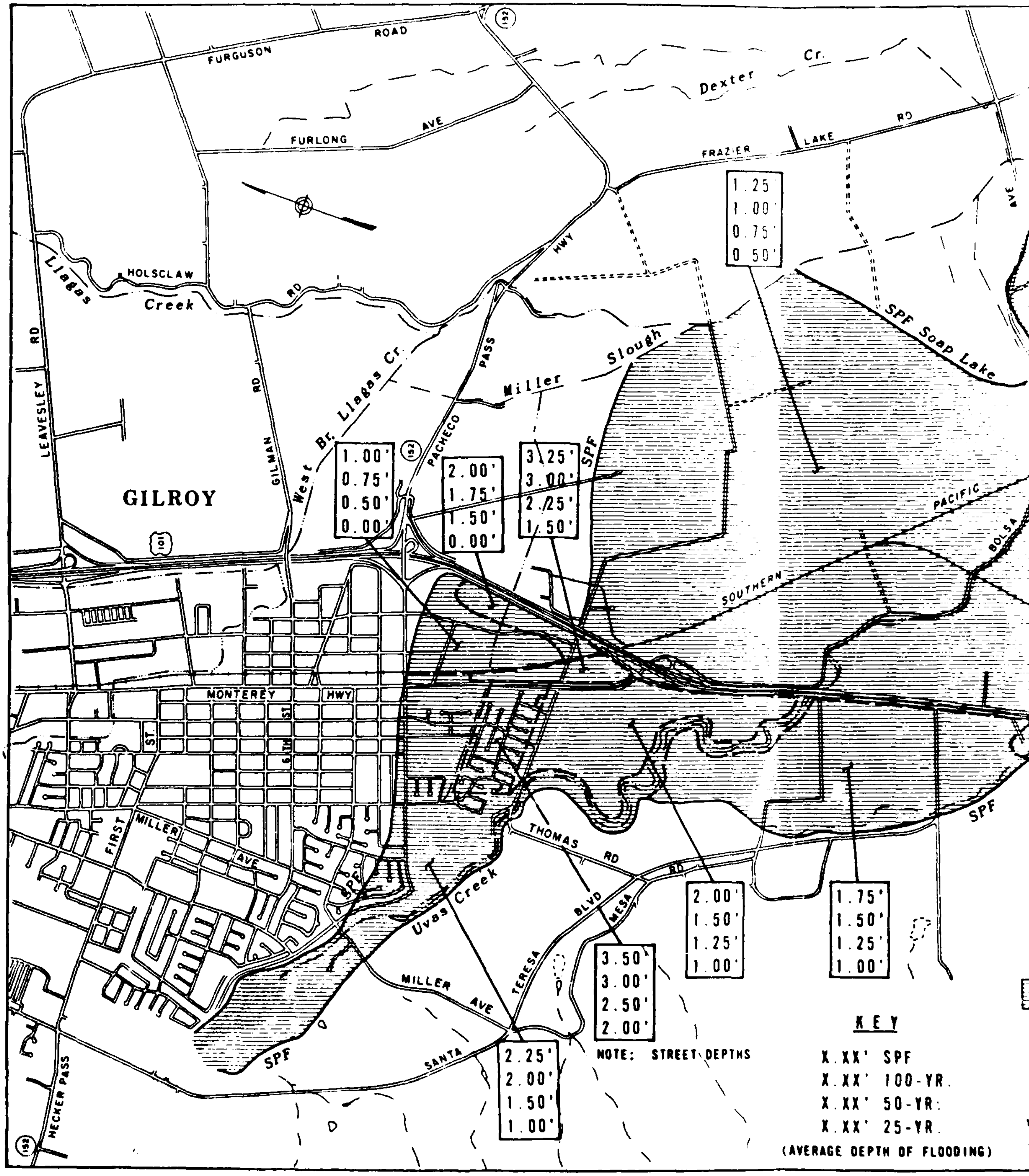
The above value for stream channel and vegetation has been adjusted to include the cost of maintenance of vegetation along the creek that will be provided along the creek to mitigate the loss of existing riparian vegetation due to levee construction and slope protection installation. Operation and maintenance costs for project flood control facilities are summarized on Table 43. Operation and maintenance requirements and cost for the recreation facilities are included in Appendix 3 of this report.

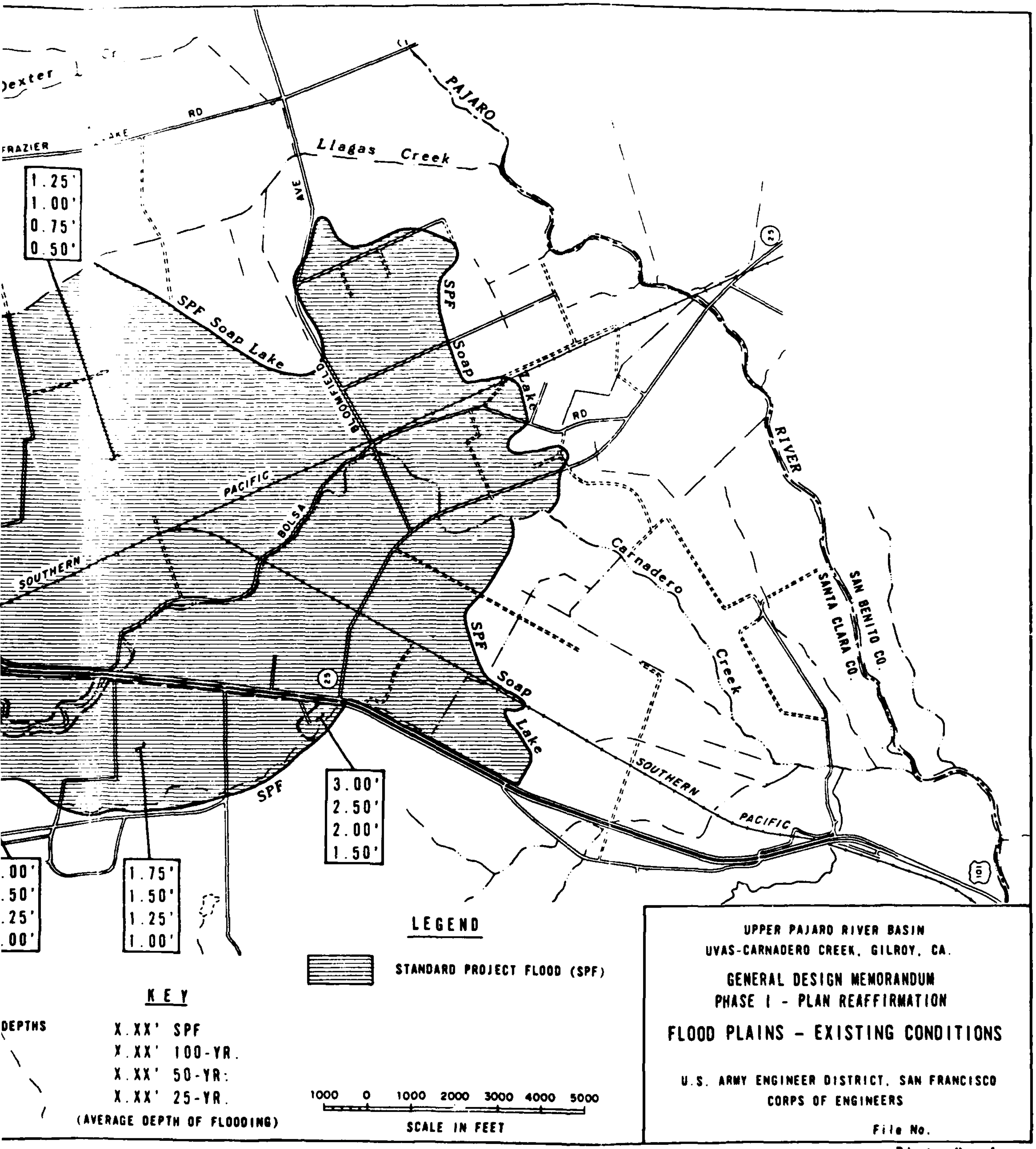
TABLE 43

UVAS-CARNADERO CREEK LEVEE ALTERNATIVES
OPERATION AND MAINTENANCE COST

Alternative No.	COST 1/				
	Levee	Structures	Riprap Slopes	Channel & Vegetation	Total
1	$3,100	$2,100	$200	$6,300	$11,700
2	$3,100	$1,800	$200	$6,300	$11,400
3	$3,100	$1,800	$200	$6,300	$11,400
4	$2,200	$ --	$100	$4,600	$ 7,200
5	$2,200	$ --	$100	$4,600	$ 6,900
6	$2,200	$ --	$100	$4,600	$ 6,900

1/ Cost includes 20% contingency


FURGUSON ROAD
Dexter Cr.
FURLONG AVE
FRAZIER LAKE RD
AVE
1.25'
1.00'
0.75'
0.50'
Llagas Creek
HOLSCLAW RD
HWY
SPF Soap Lake
PACHECO PASS
Miller Slough
West Br. Llagas Cr.
LEAVESLEY RD
GILMAN RD
GILROY
1.00'
0.75'
0.50'
0.00'
2.00'
1.75'
1.50'
0.00'
3.25'
3.00'
2.25'
1.50'
SPF
PACIFIC
BOLSA
SOUTHERN
MONTEREY HWY
ST.
6TH ST
FIRST
MILLER AVE
THOMAS RD
SPF
Uvas Creek
BLVD
MESA
TERESA
MILLER AVE
2.00'
1.50'
1.25'
1.00'
1.75'
1.50'
1.25'
1.00'
3.50'
3.00'
2.50'
2.00'
SANTA
SPF
2.25'
2.00'
1.50'
1.00'
NOTE: STREET DEPTHS
HECKER PASS
KEY
X.XX' SPF
X.XX' 100-YR.
X.XX' 50-YR.
X.XX' 25-YR.
(AVERAGE DEPTH OF FLOODING)



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

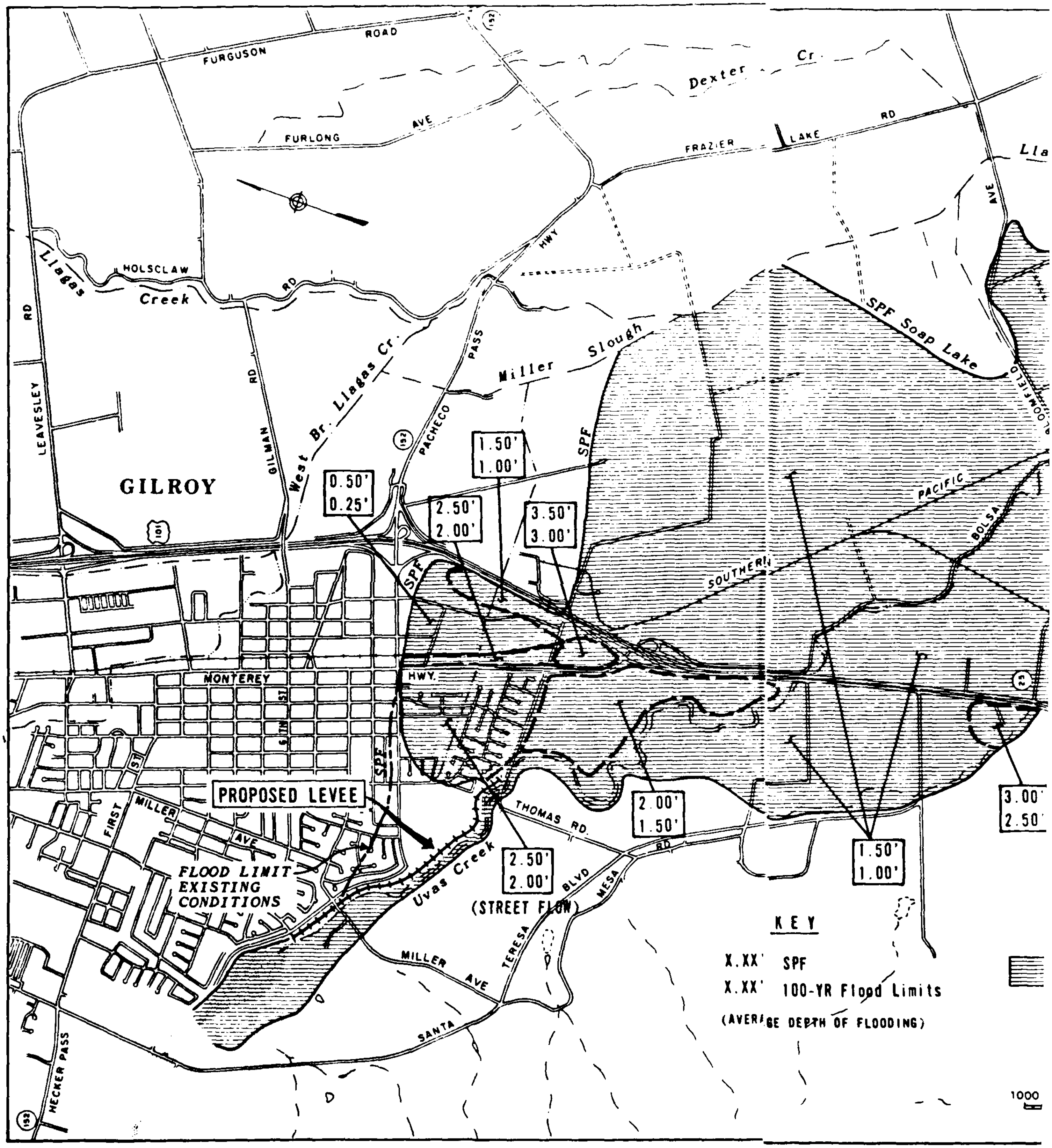
FLOOD PLAINS - EXISTING CONDITIONS

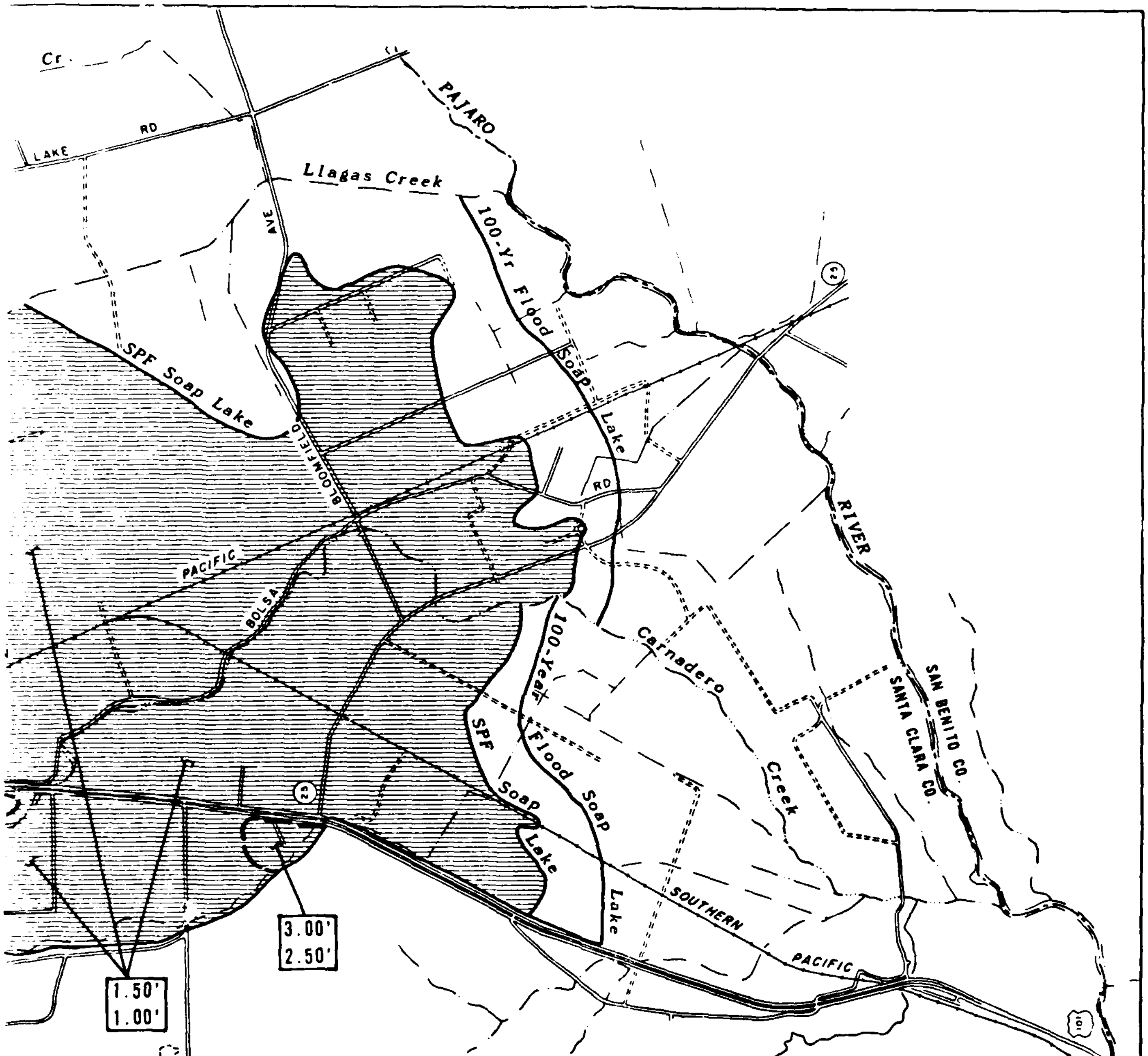
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 1

2


FURGUSON
ROAD
Dexter
Cr.
FURLONG
AVE
FRAZIER
LAKE
RD
Llagas
Creek
HOLSCLAW
RD
LEAVESLEY
RD
GILMAN
RD
West Br. Llagas Cr.
PACHECO
PASS
HWY
Miller
Slough
SPF
SPF Soap Lake
GILROY
0.50'
0.25'
1.50'
1.00'
2.50'
2.00'
3.50'
3.00'
PACIFIC
SOUTHERN
BOLSA
MONTEREY
HWY.
6TH
ST
FIRST
ST
MILLER
AVE
PROPOSED LEVEE
FLOOD LIMIT
EXISTING
CONDITIONS
Uvas Creek
THOMAS RD.
2.00'
1.50'
2.50'
2.00'
(STREET FLOW)
1.50'
1.00'
3.00'
2.50'
MESA
RD
TERESA
BLVD
MILLER
AVE
SANTA
HECKER PASS
KEY
X.XX' SPF
X.XX' 100-YR Flood Limits
(AVERAGE DEPTH OF FLOODING)
1000



KEY

SPF

100-YR Flood Limits

GE DEPTH OF FLOODING)

LEGEND

STANDARD PROJECT FLOOD (SPF)

1000 0 1000 2000 3000 4000 5000

SCALE IN FEET

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

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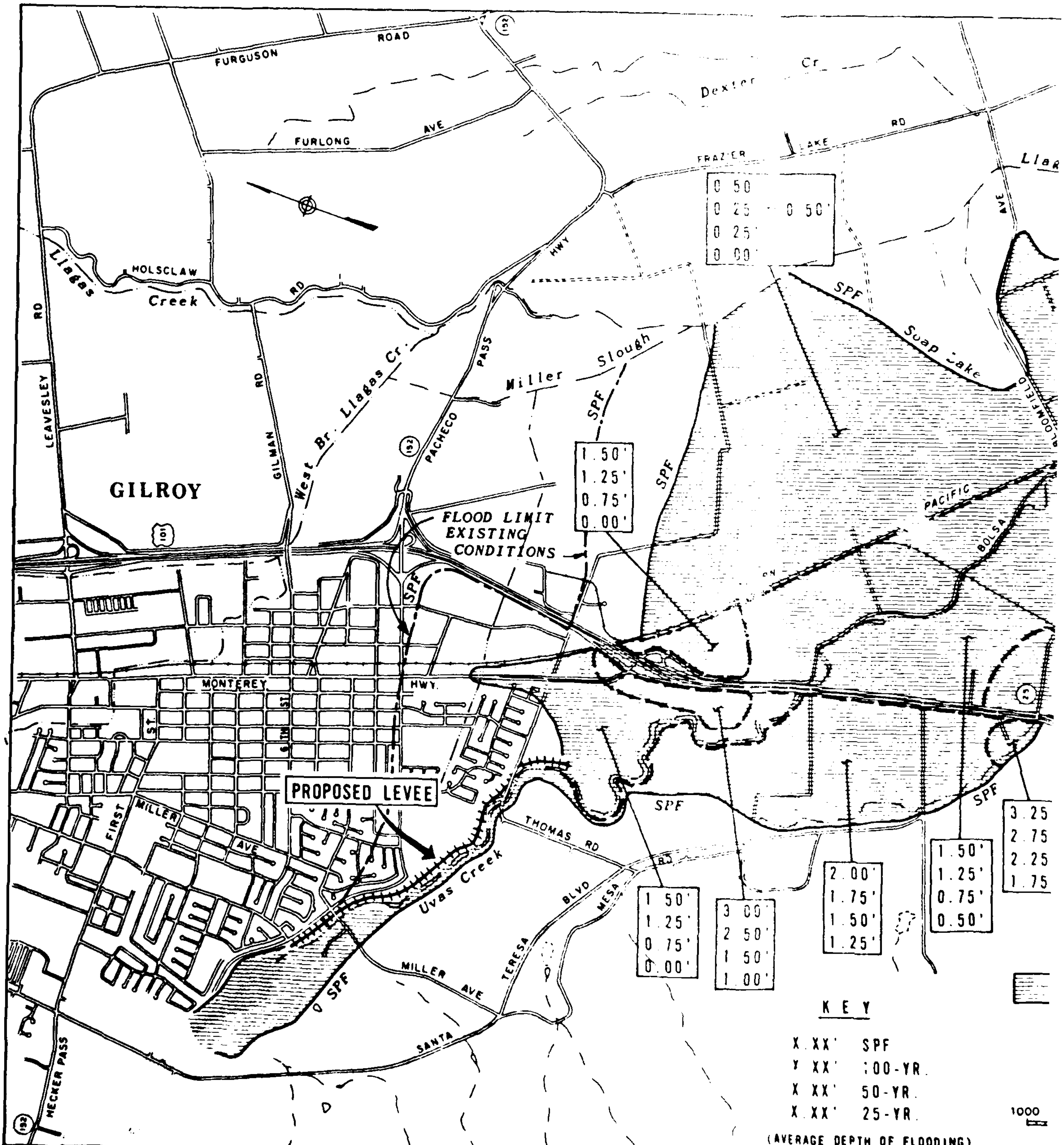
FLOOD PLAINS - ALTERNATIVES 4,5 & 6

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

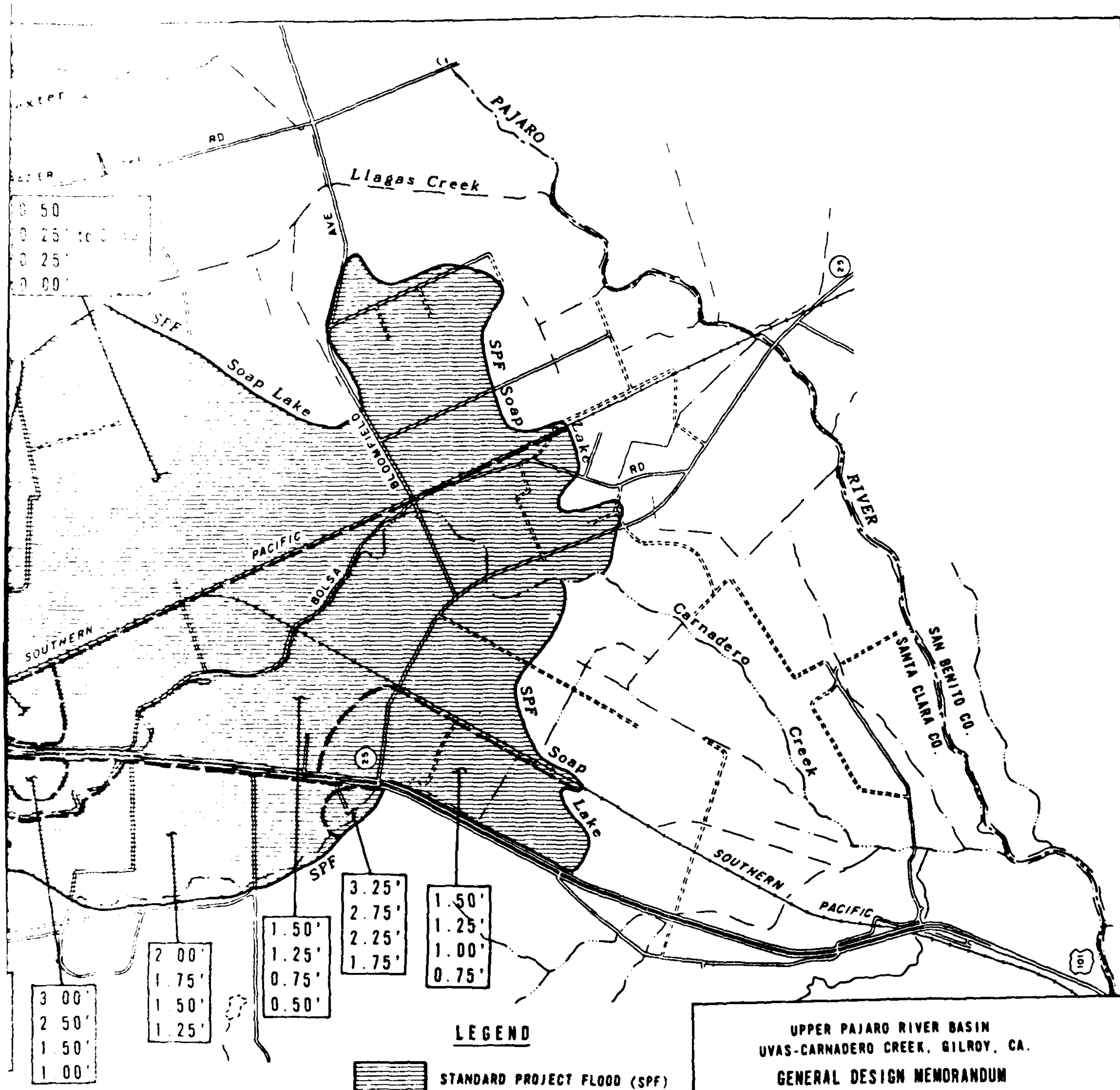
File No.

Plate No. 2

2



FURGUSON
ROAD
Dexter Cr
FURLONG
AVE
RD
FRAZIER
LAKE
Llagas Creek
HOLSCLAW
RD
HWY
SPF
Soap Lake
Miller Slough
PASS
PACHECO
West Br. Llagas Cr.
LEAVESLEY
RD
GILMAN
RD
GILROY
FLOOD LIMIT EXISTING CONDITIONS
PACIFIC
BOLSA
BLOOMFIELD
AVE
MONTEREY
HWY.
ST.
6TH ST
PROPOSED LEVEE
FIRST
MILLER
AVE
THOMAS RD
Uvas Creek
BLVD
MESA
TERESA
MILLER AVE
SANTA
HECKER PASS
0 SPF
1.50' 1.25' 0.75' 0.00'
0.50 0.25 0.25' 0.00' 0.50'
3.00' 2.50' 1.50' 1.00'
2.00' 1.75' 1.50' 1.25'
1.50' 1.25' 0.75' 0.50'
3.25 2.75 2.25 1.75
KEY
X.XX' SPF
Y.XX' 100-YR.
X.XX' 50-YR.
X.XX' 25-YR.
(AVERAGE DEPTH OF FLOODING)
1000



LEGEND

STANDARD PROJECT FLOOD (SPF)

KEY

X XX' SPF
X XX' 100-YR.
X XX' 50-YR.
X XX' 25-YR.

(AVERAGE DEPTH OF FLOODING)

1000 0 1000 2000 3000 4000 5000
SCALE OF FEET

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

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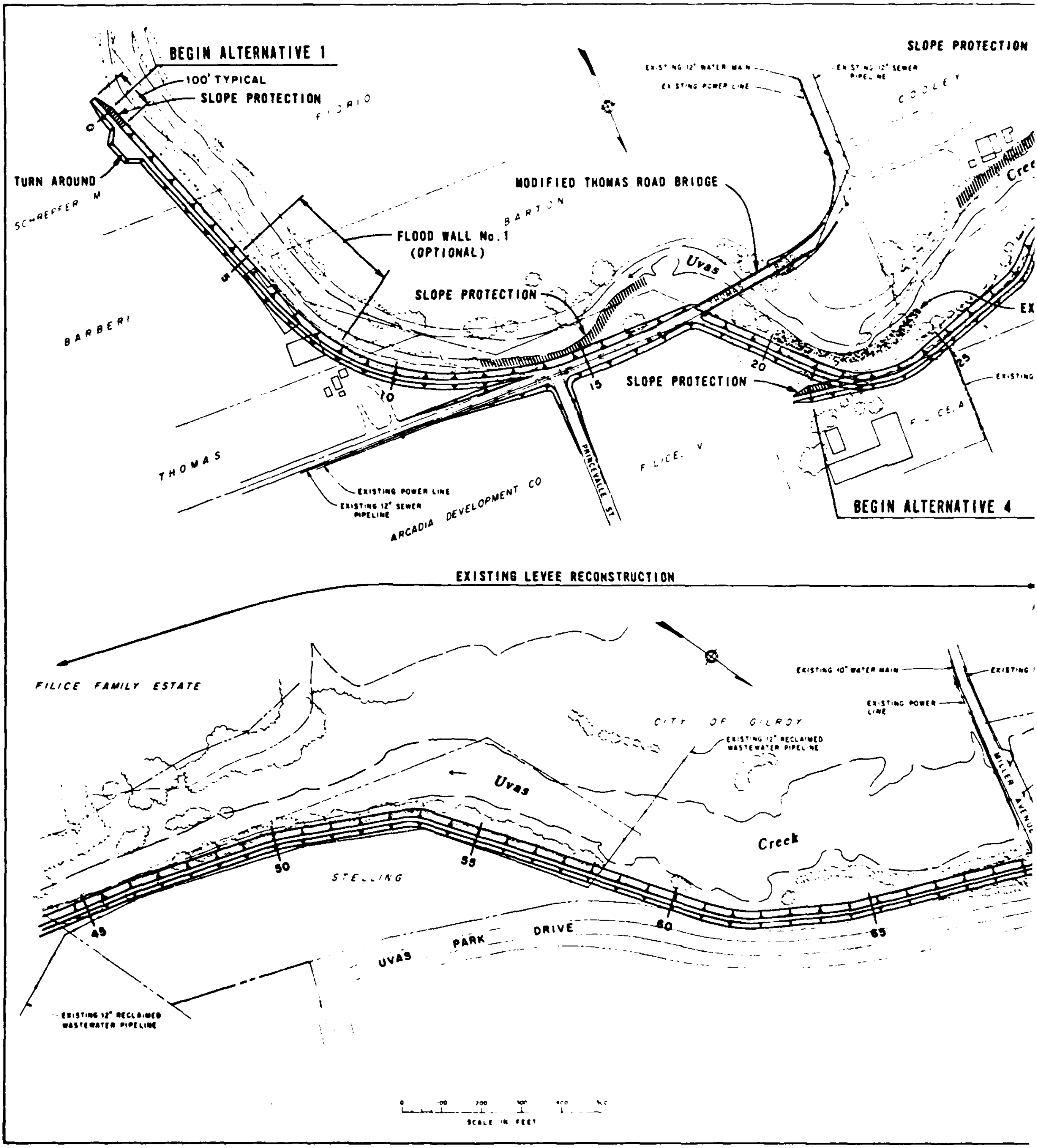
FLOOD PLAINS - ALTERNATIVES 1,2 & 3

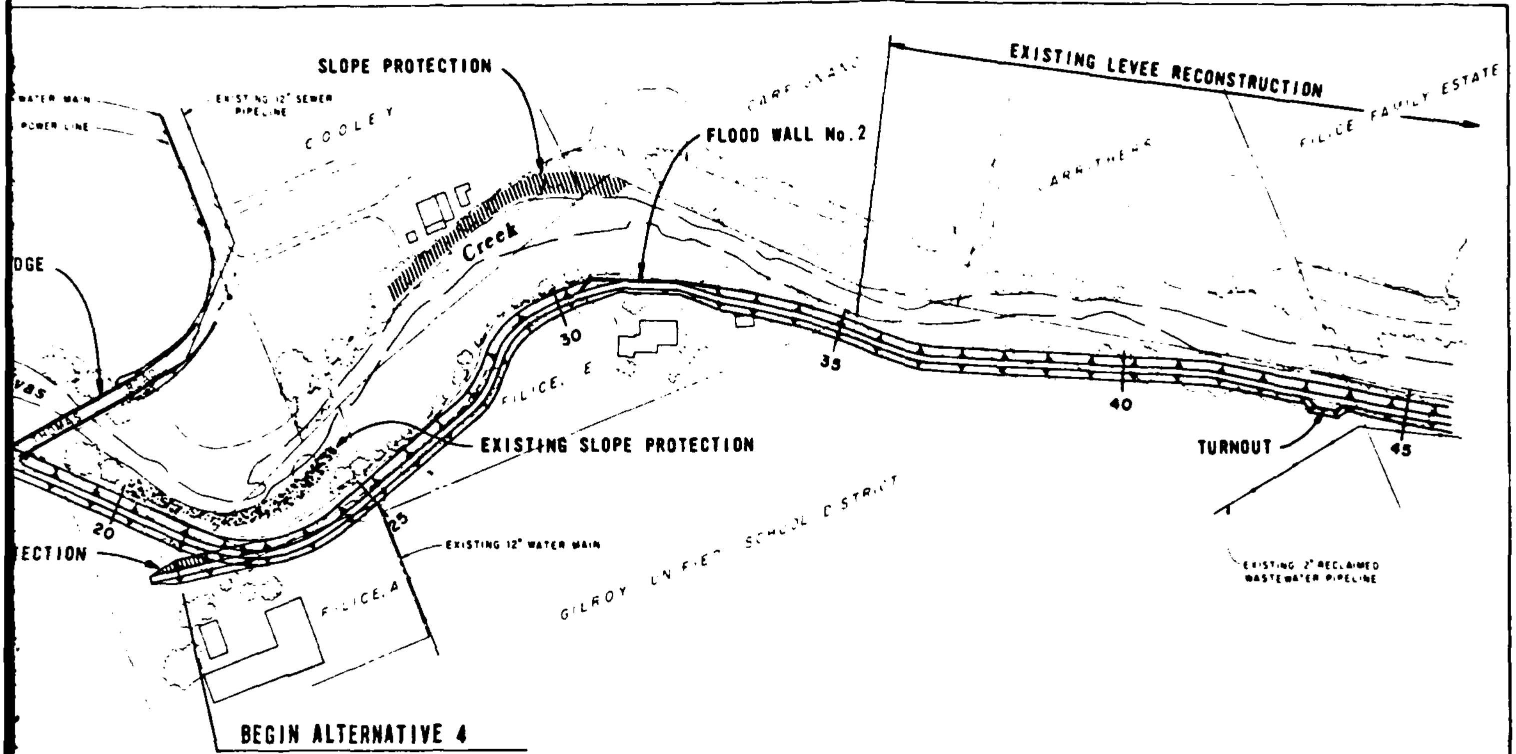
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

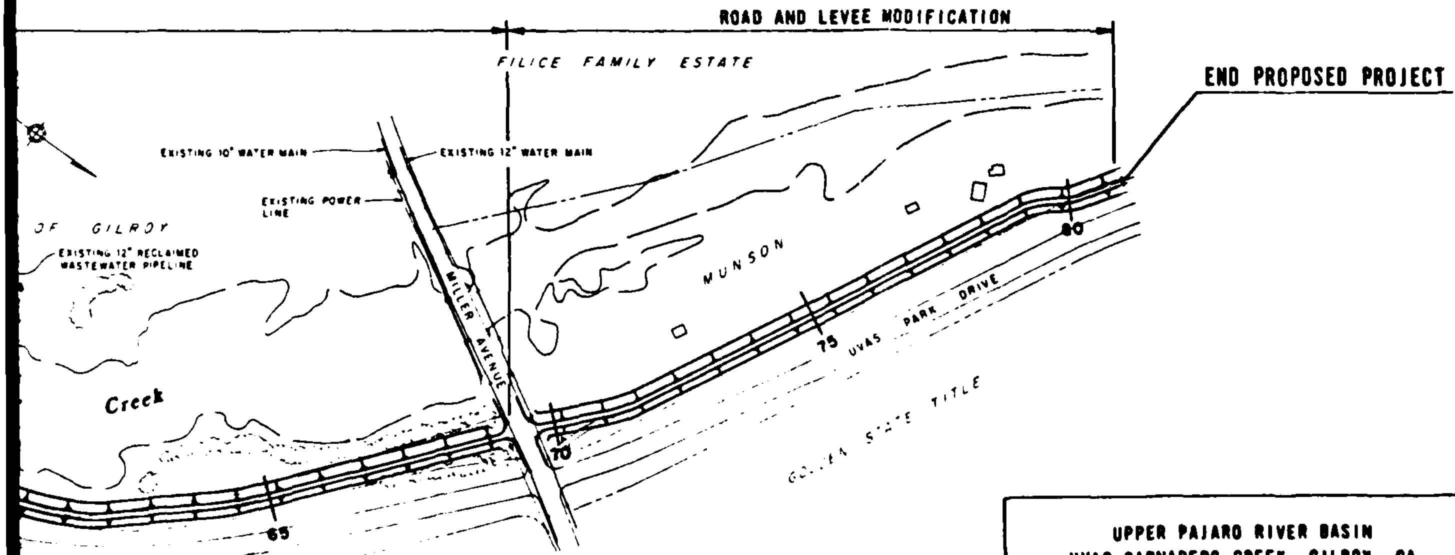
File No.

Plate No. 3



BEGIN ALTERNATIVE 1
100' TYPICAL
SLOPE PROTECTION
TURN AROUND
SCHREFFER M
FLOOD WALL No. 1
(OPTIONAL)
BARTON
BARBERI
MODIFIED THOMAS ROAD BRIDGE
SLOPE PROTECTION
SLOPE PROTECTION
Uvas
THOMAS
PRINCEVALLE ST
FILICE, V
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
BEGIN ALTERNATIVE 4
SLOPE PROTECTION
EXISTING 12" WATER MAIN
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
COOLEY
Creek
EXISTING LEVEE RECONSTRUCTION
FILICE FAMILY ESTATE
CITY OF GILROY
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
EXISTING 10" WATER MAIN
EXISTING POWER LINE
MILLER AVENUE
Uvas
Creek
STELLING
UVAS PARK DRIVE
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
SCALE IN FEET





UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

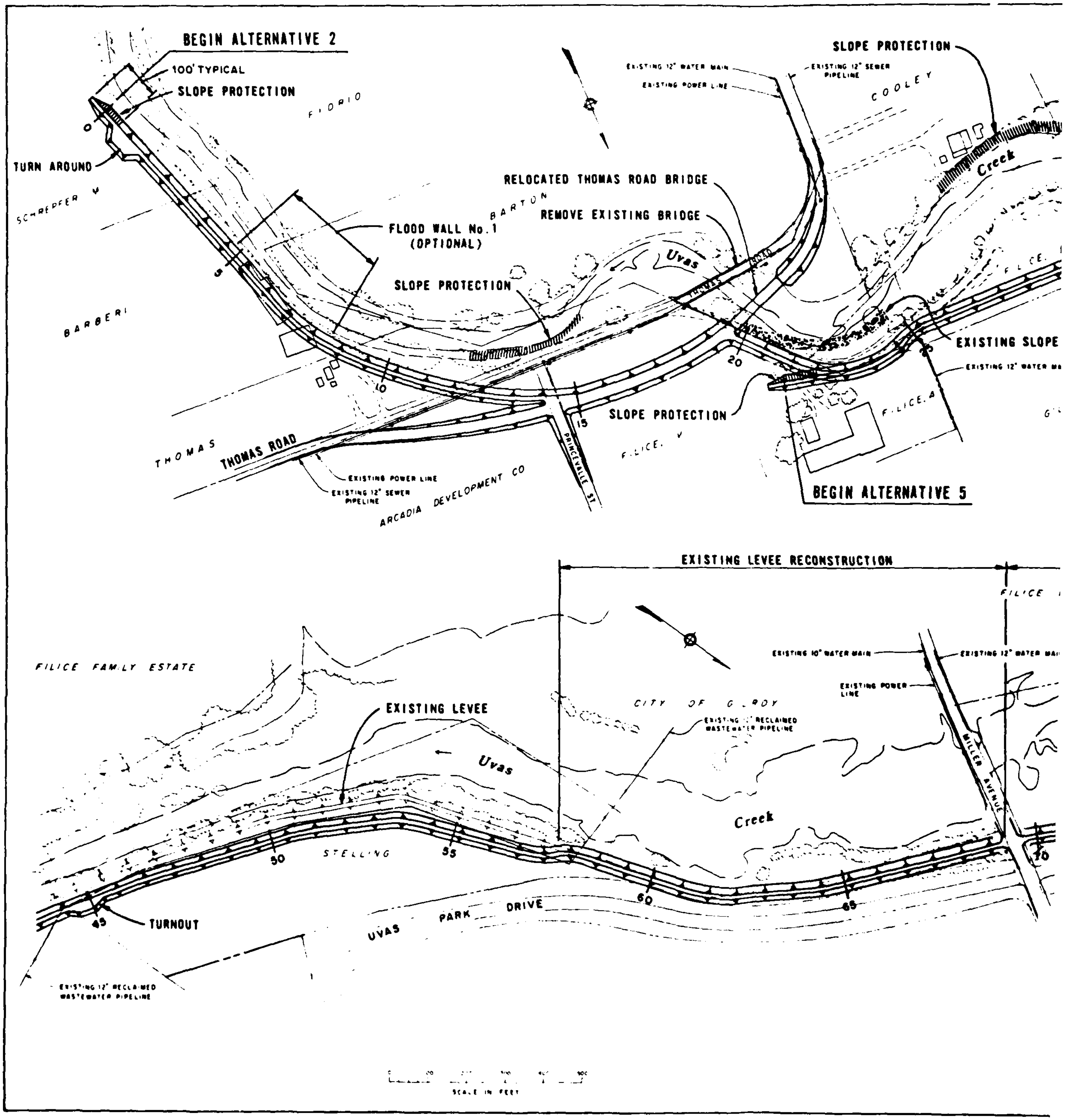
PLANS - ALTERNATIVES 1 AND 4

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

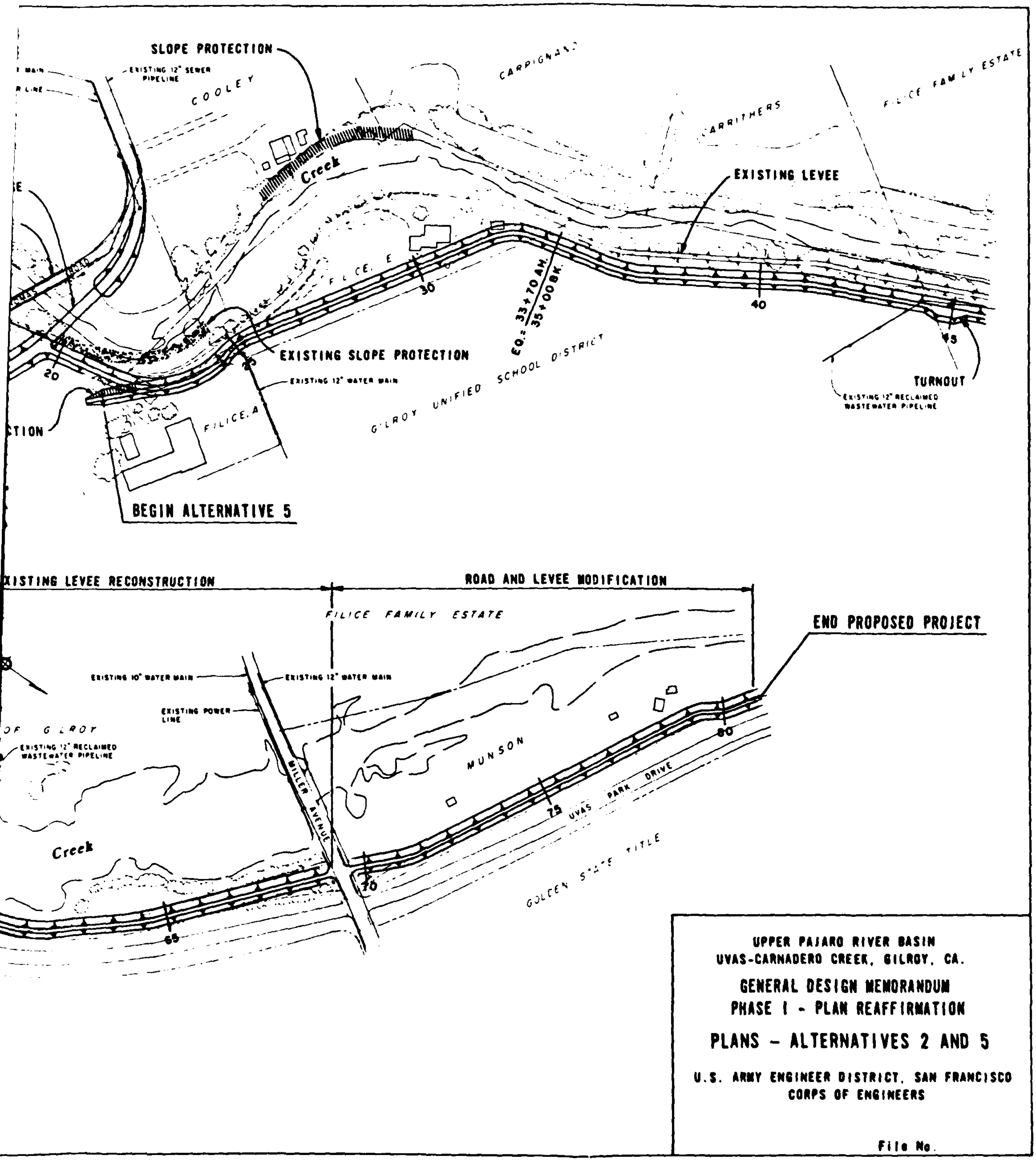
File No.

Plate No. 4

2



BEGIN ALTERNATIVE 2
100' TYPICAL
SLOPE PROTECTION
TURN AROUND
FLOOD WALL No. 1 (OPTIONAL)
SLOPE PROTECTION
RELOCATED THOMAS ROAD BRIDGE
REMOVE EXISTING BRIDGE
SLOPE PROTECTION
EXISTING 12" WATER MAIN
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
COOLEY
Creek
Uvas
EXISTING SLOPE
SLOPE PROTECTION
BEGIN ALTERNATIVE 5
THOMAS ROAD
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
PRINCEVILLE ST
BARBERI
BARTON
THOMAS
EXISTING LEVEE RECONSTRUCTION
FILICE FAMILY ESTATE
EXISTING LEVEE
Uvas
Creek
EXISTING 10" WATER MAIN
EXISTING 12" WATER MAIN
EXISTING POWER LINE
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
MILLER AVENUE
STELLING
UVAS PARK DRIVE
TURNOUT
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
SCALE IN FEET



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

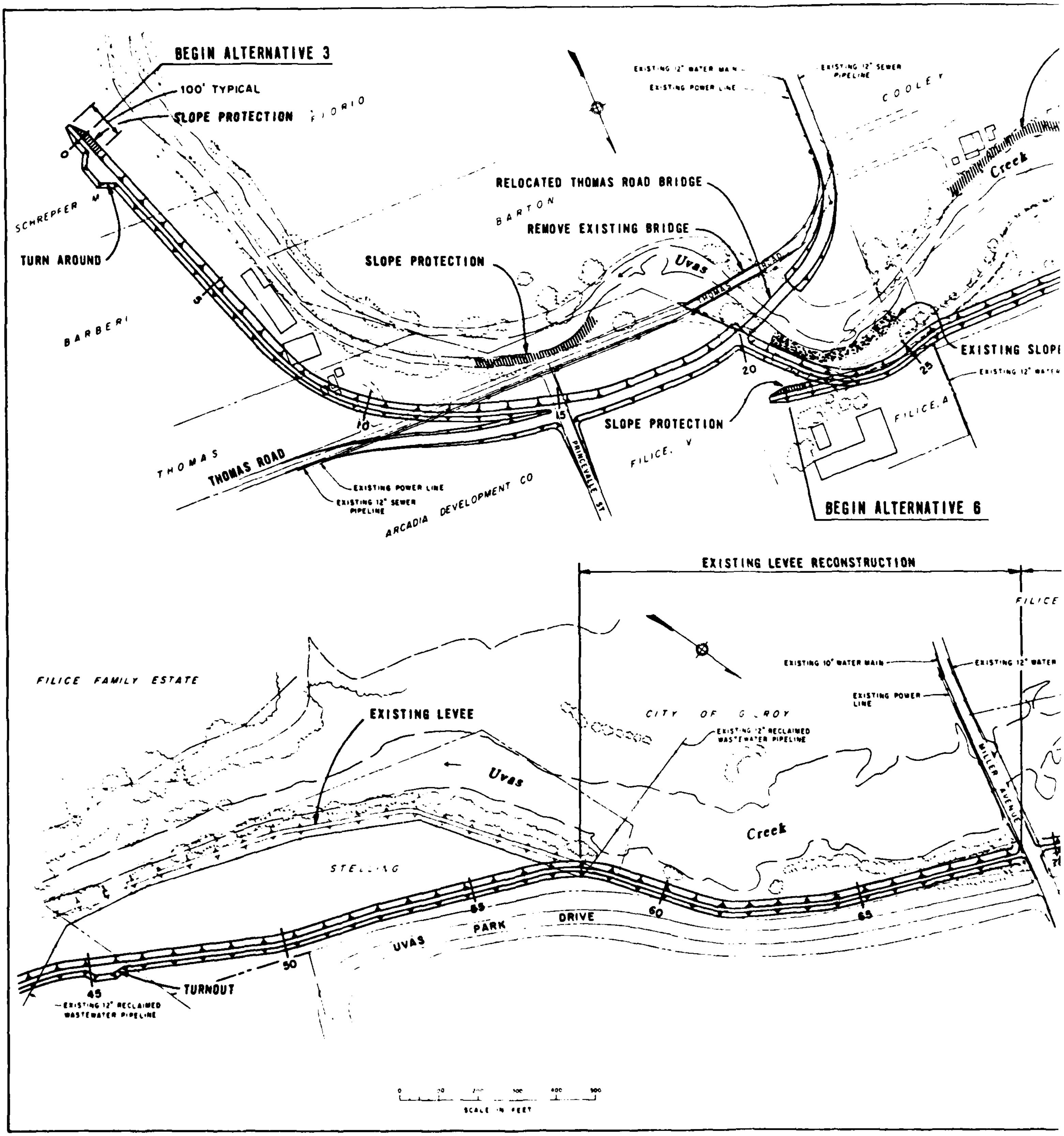
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

PLANS - ALTERNATIVES 2 AND 5

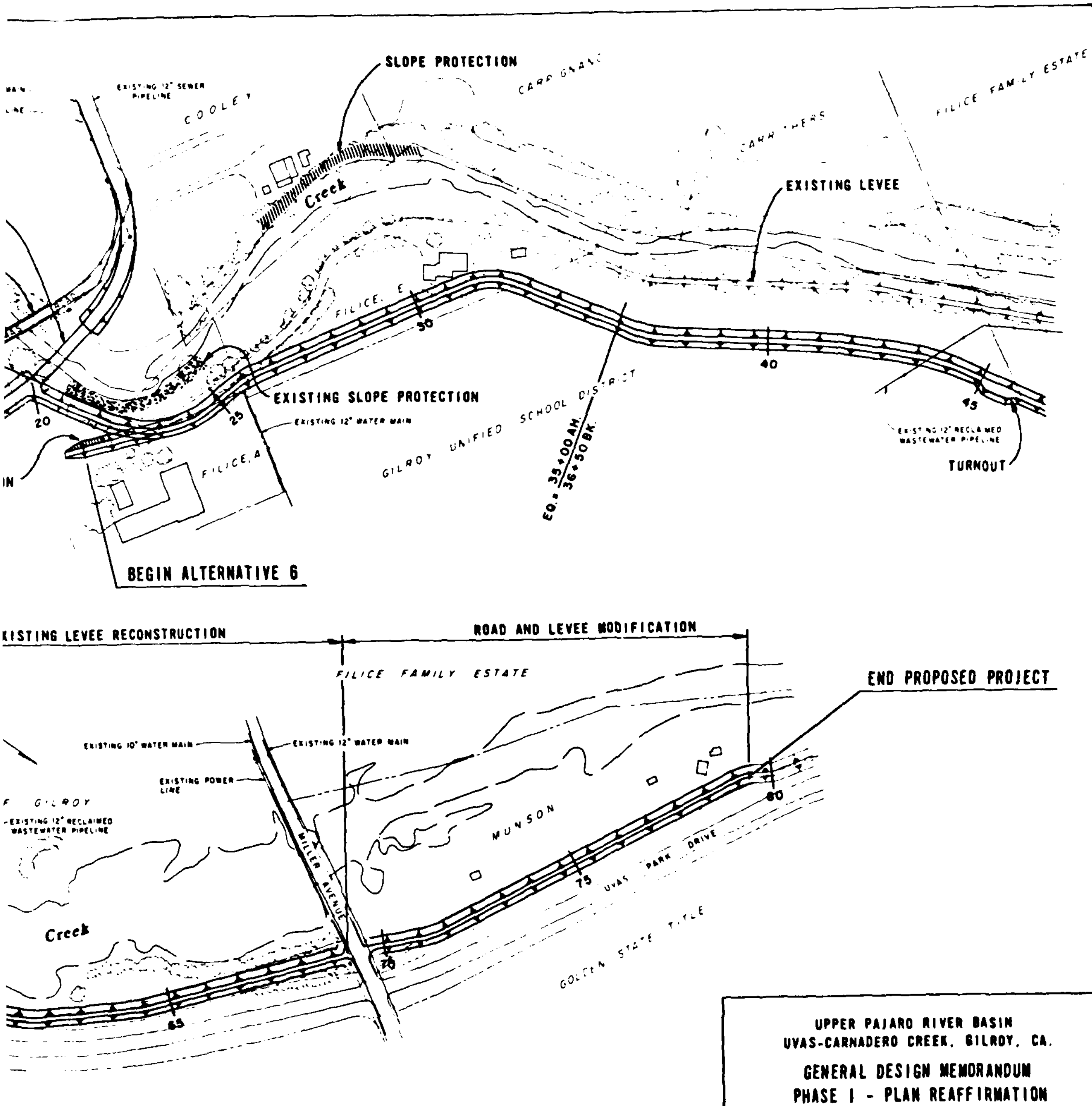
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 5



BEGIN ALTERNATIVE 3
100' TYPICAL
SLOPE PROTECTION
FIORIO
SCHREPFER
TURN AROUND
BARBERI
EXISTING 12" WATER MAIN
EXISTING 12" SEWER PIPELINE
EXISTING POWER LINE
COOLEY
Creek
RELOCATED THOMAS ROAD BRIDGE
BARTON
REMOVE EXISTING BRIDGE
SLOPE PROTECTION
Uvas
THOMAS ROAD
EXISTING SLOPE
20
25
15
10
5
0
SLOPE PROTECTION
FILICE, A
THOMAS
THOMAS ROAD
FILICE, V
PRINCEVALLE ST
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
BEGIN ALTERNATIVE 6
EXISTING LEVEE RECONSTRUCTION
FILICE
FILICE FAMILY ESTATE
EXISTING 10" WATER MAIN
EXISTING 12" WATER
EXISTING POWER LINE
EXISTING LEVEE
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
MILLER AVENUE
Uvas
Creek
STELLING
55
60
65
UVAS
PARK
DRIVE
50
45
TURNOUT
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
SCALE IN FEET



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

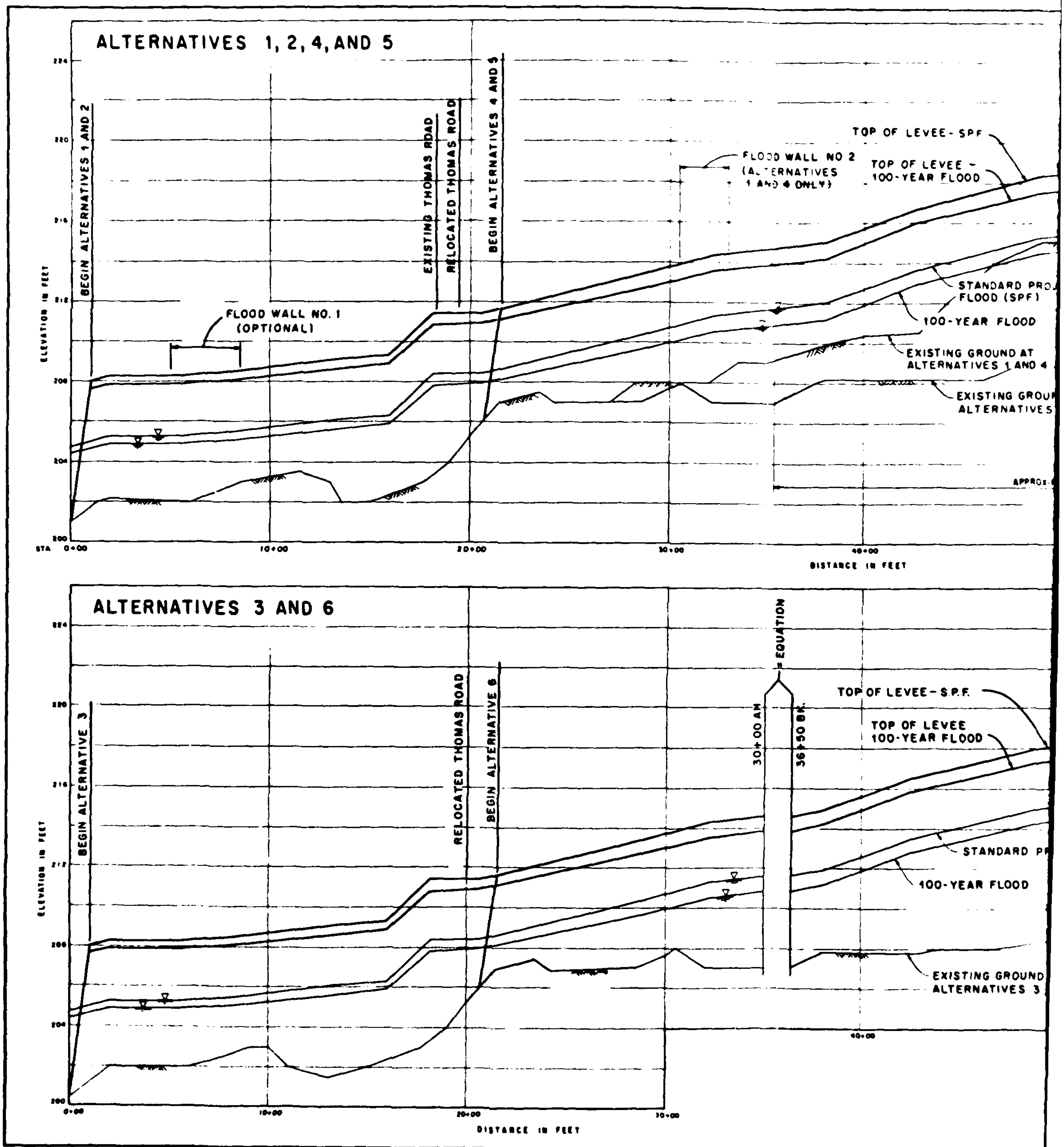
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

PLANS - ALTERNATIVES 3 AND 6

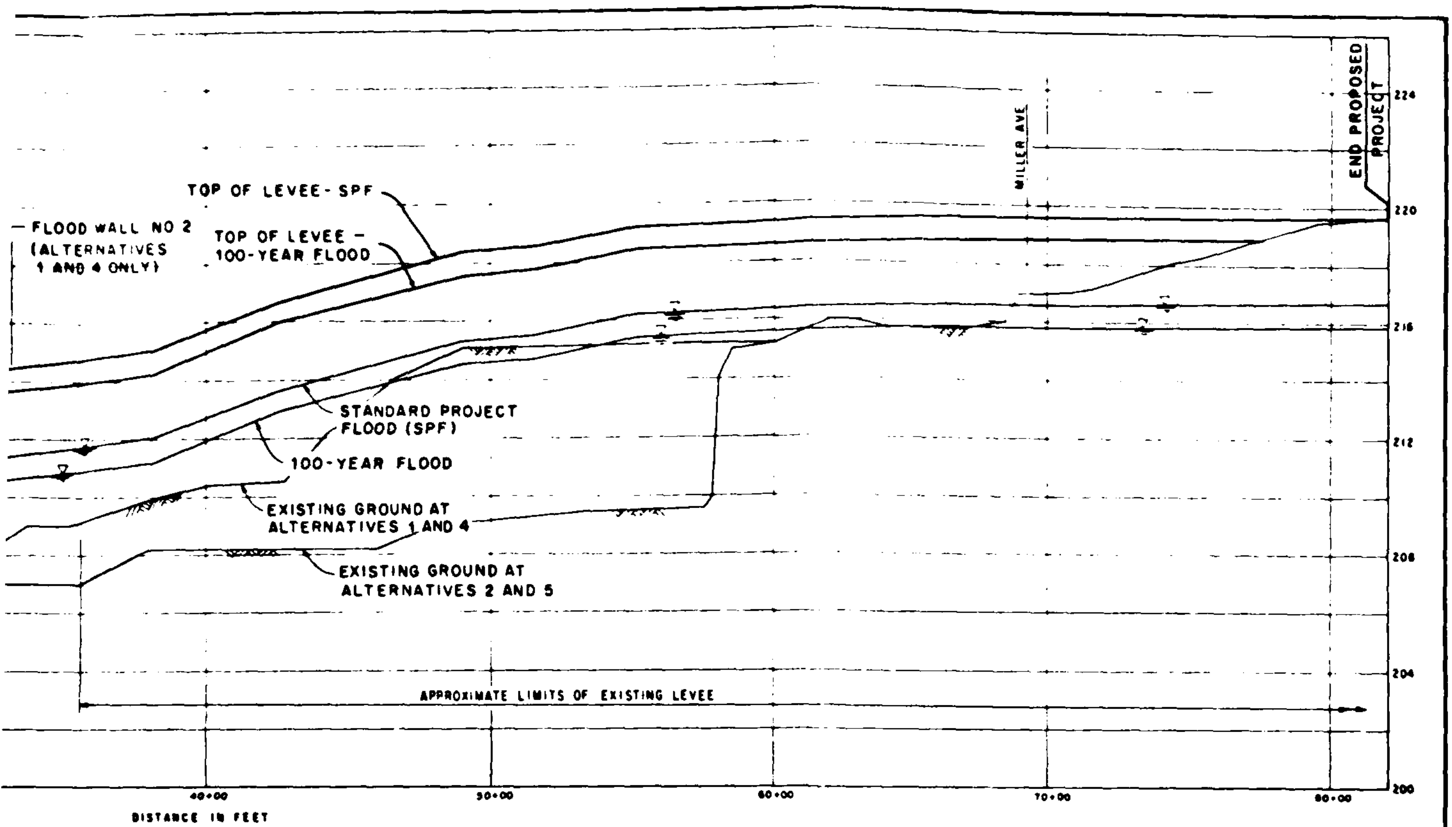
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

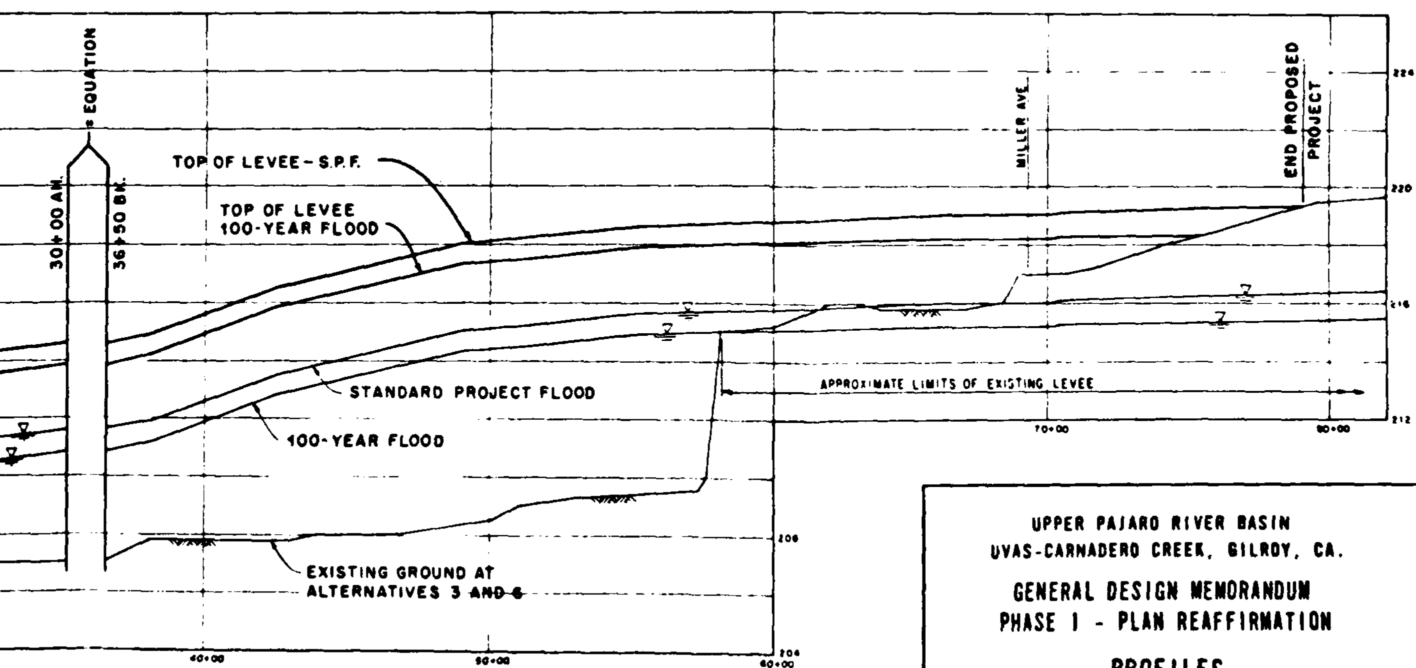
File No.

Plate No. 6



ALTERNATIVES 1, 2, 4, AND 5
BEGIN ALTERNATIVES 1 AND 2
EXISTING THOMAS ROAD
RELOCATED THOMAS ROAD
BEGIN ALTERNATIVES 4 AND 5
FLOOD WALL NO. 1
(OPTIONAL)
FLOOD WALL NO 2
(ALTERNATIVES
1 AND 4 ONLY)
TOP OF LEVEE - SPF
TOP OF LEVEE -
100-YEAR FLOOD
STANDARD PROJ
FLOOD (SPF)
100-YEAR FLOOD
EXISTING GROUND AT
ALTERNATIVES 1 AND 4
EXISTING GROUN
ALTERNATIVES
ELEVATION IN FEET
DISTANCE IN FEET
STA 0+00
10+00
20+00
30+00
40+00
ALTERNATIVES 3 AND 6
BEGIN ALTERNATIVE 3
RELOCATED THOMAS ROAD
BEGIN ALTERNATIVE 6
EQUATION
30+00 AH
36+50 BK
TOP OF LEVEE - S.P.F.
TOP OF LEVEE
100-YEAR FLOOD
STANDARD PR
100-YEAR FLOOD
EXISTING GROUND
ALTERNATIVES 3
ELEVATION IN FEET
DISTANCE IN FEET
0+00
10+00
20+00
30+00
40+00





UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

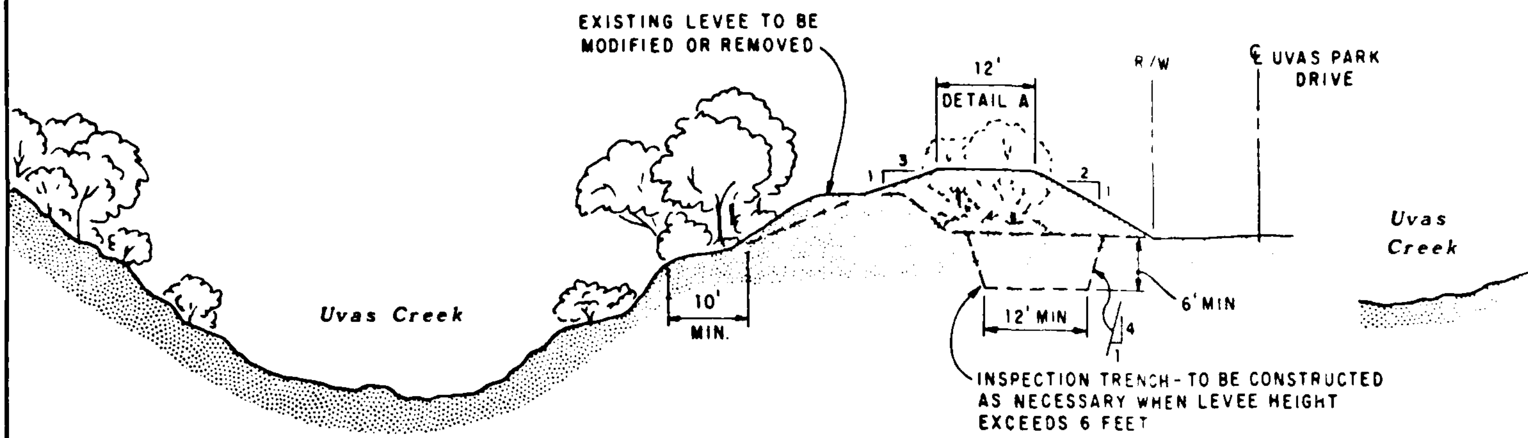
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

PROFILES

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

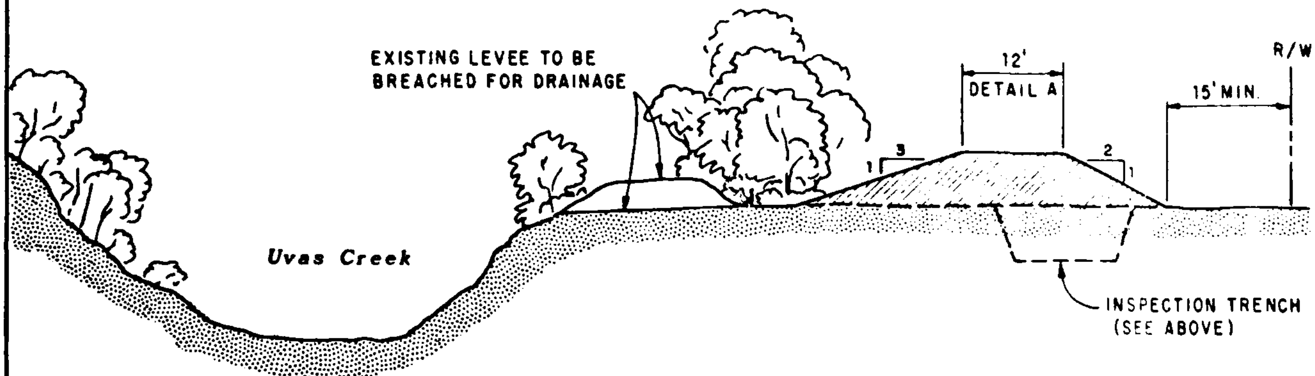
File No.

Plate No. 7

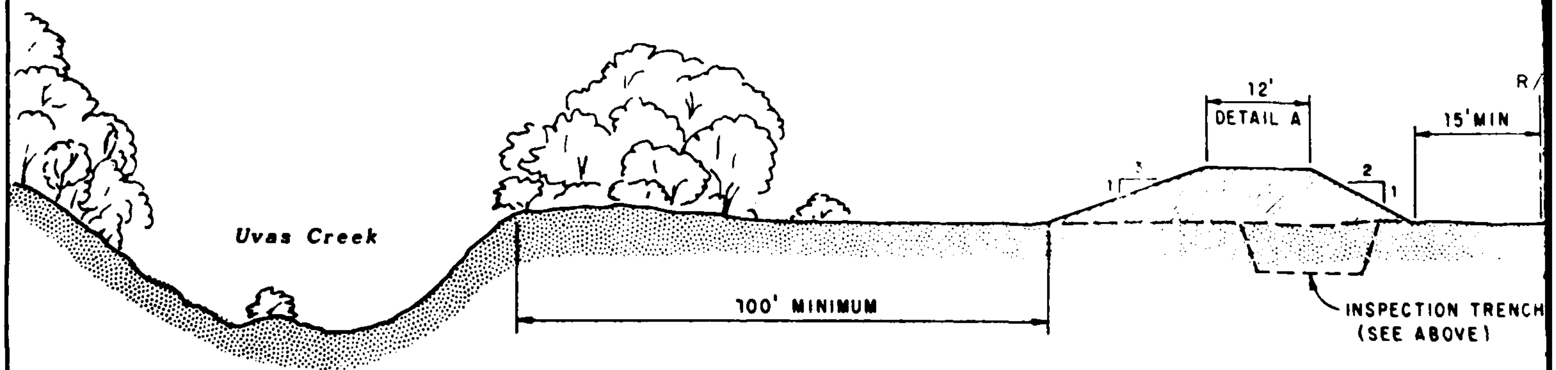


LEVEE RECONSTRUCTION - ALTERNATIVE 1 AND 4

PORTIONS OF ALTERNATIVES 2,3,5 AND 6

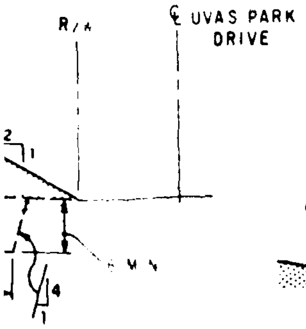


NEW LEVEE SETBACK OUTSIDE TREE LINE - ALTERNATIVES 2 AND 5

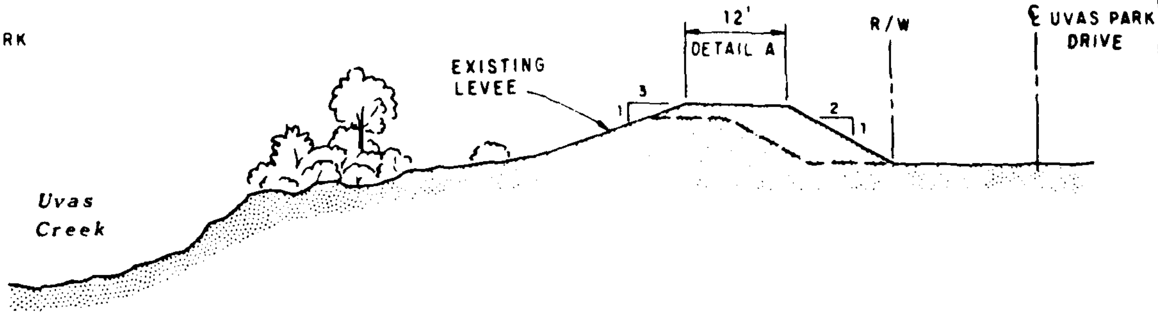


NEW LEVEE 100 FT. MINIMUM SETBACK - ALTERNATIVES 3 AND 6

DOWNSTREAM OF MILLER AVENUE

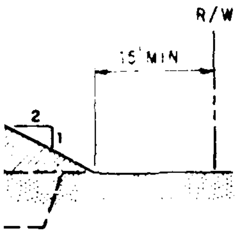


N TRENCH TO BE CONSTRUCTED
SARY WHEN LEVEE HEIGHT
6 FEET

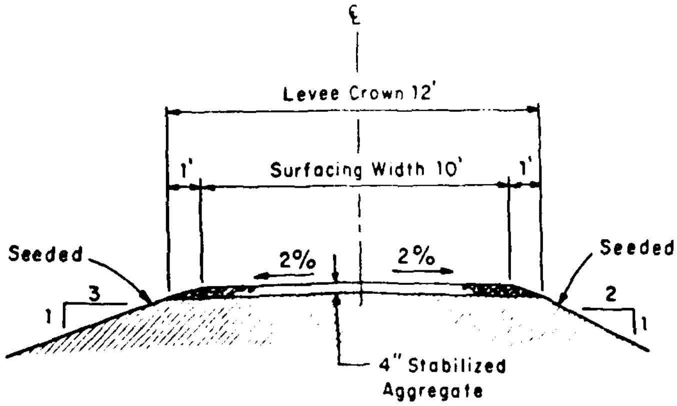


MODIFIED EXISTING LEVEE - ALL ALTERNATIVES

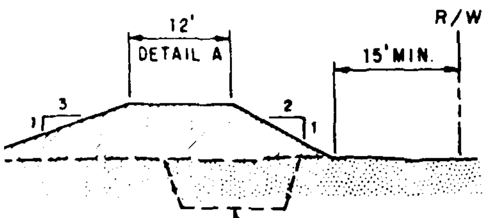
UPSTREAM OF MILLER AVENUE



INSPECTION TRENCH
(SEE ABOVE)



DETAIL A



INSPECTION TRENCH
(SEE ABOVE)

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

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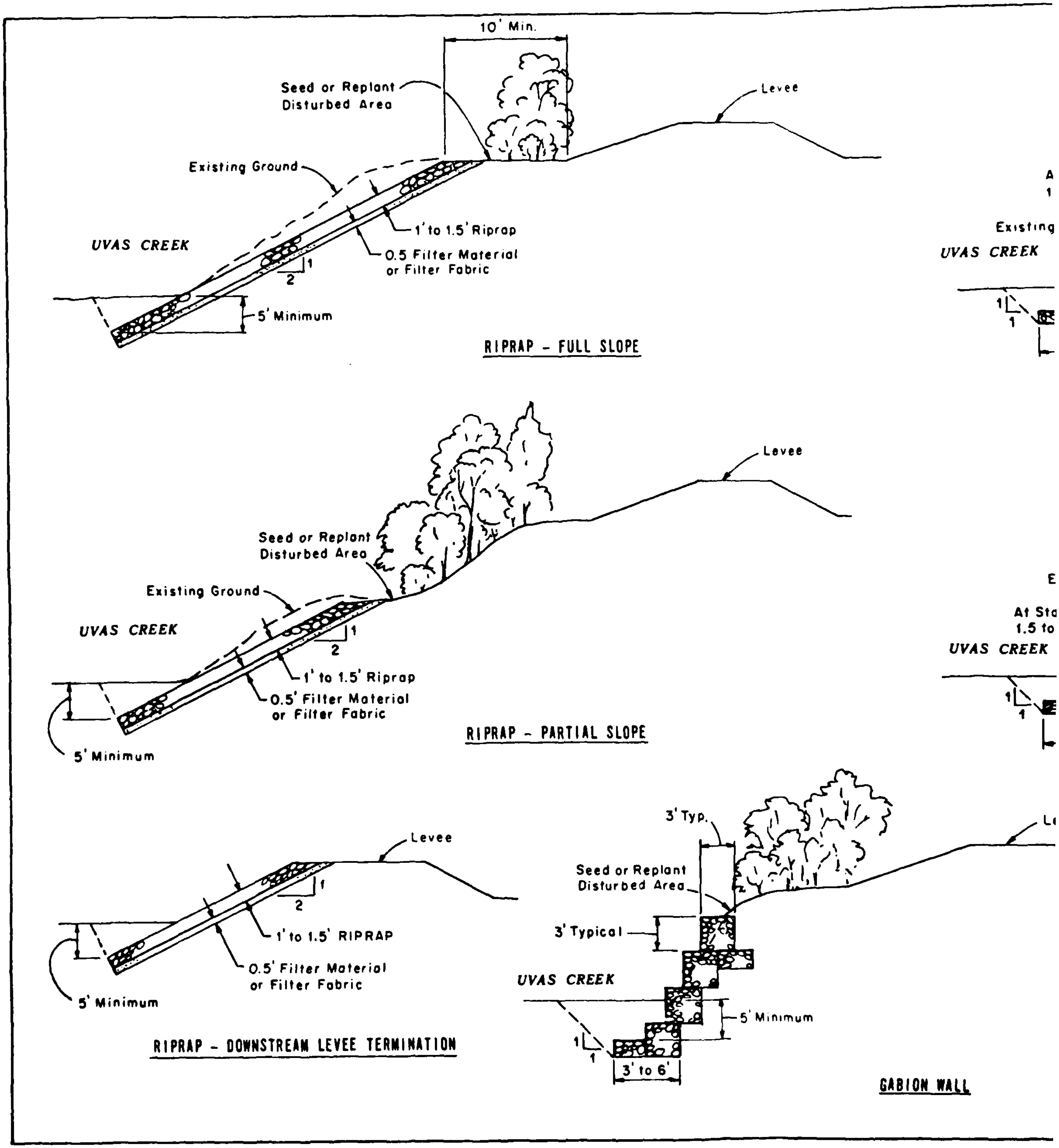
PHASE I - PLAN REAFFIRMATION

TYPICAL LEVEE SECTIONS

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 8

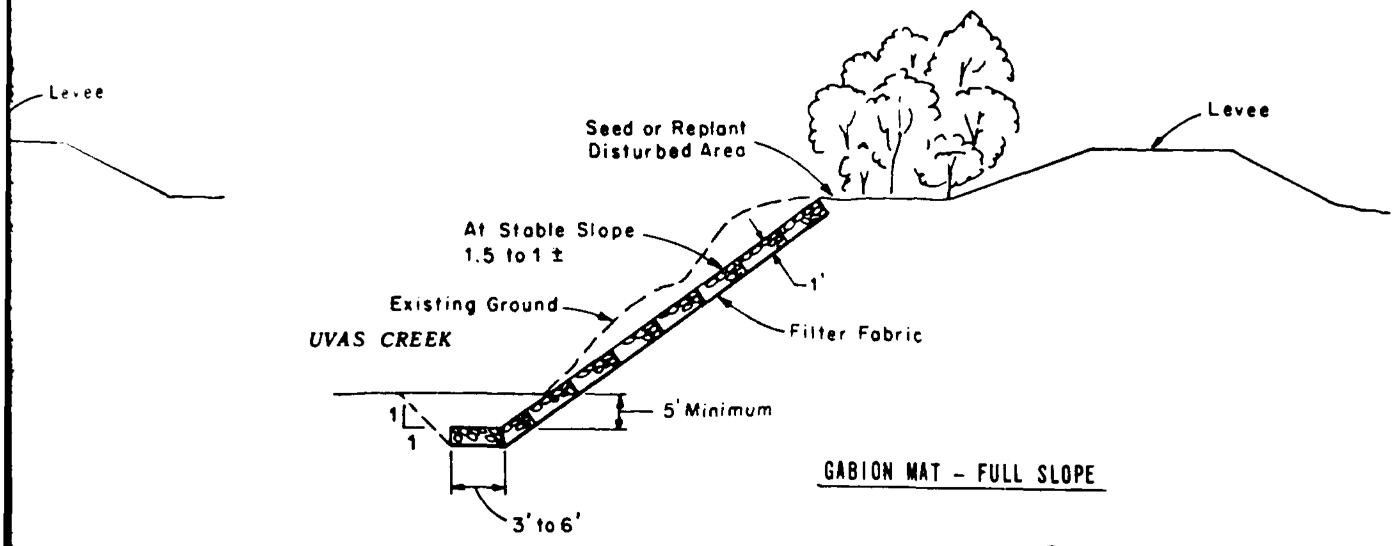


RIPRAP - FULL SLOPE

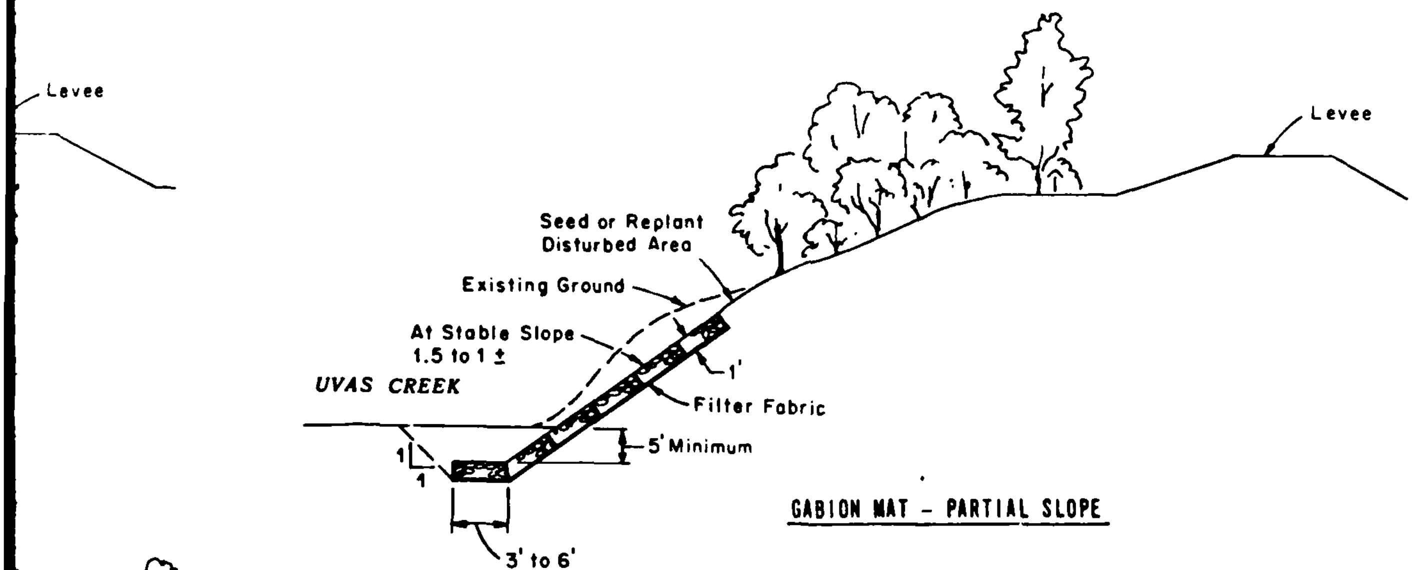
RIPRAP - PARTIAL SLOPE

RIPRAP - DOWNSTREAM LEVEE TERMINATION

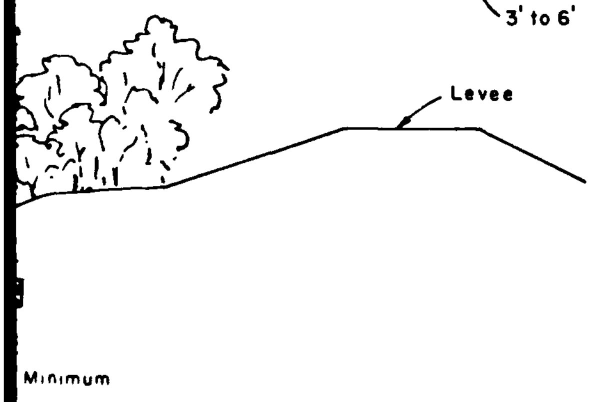
GABION WALL



GABION MAT - FULL SLOPE



GABION MAT - PARTIAL SLOPE



GABION WALL

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

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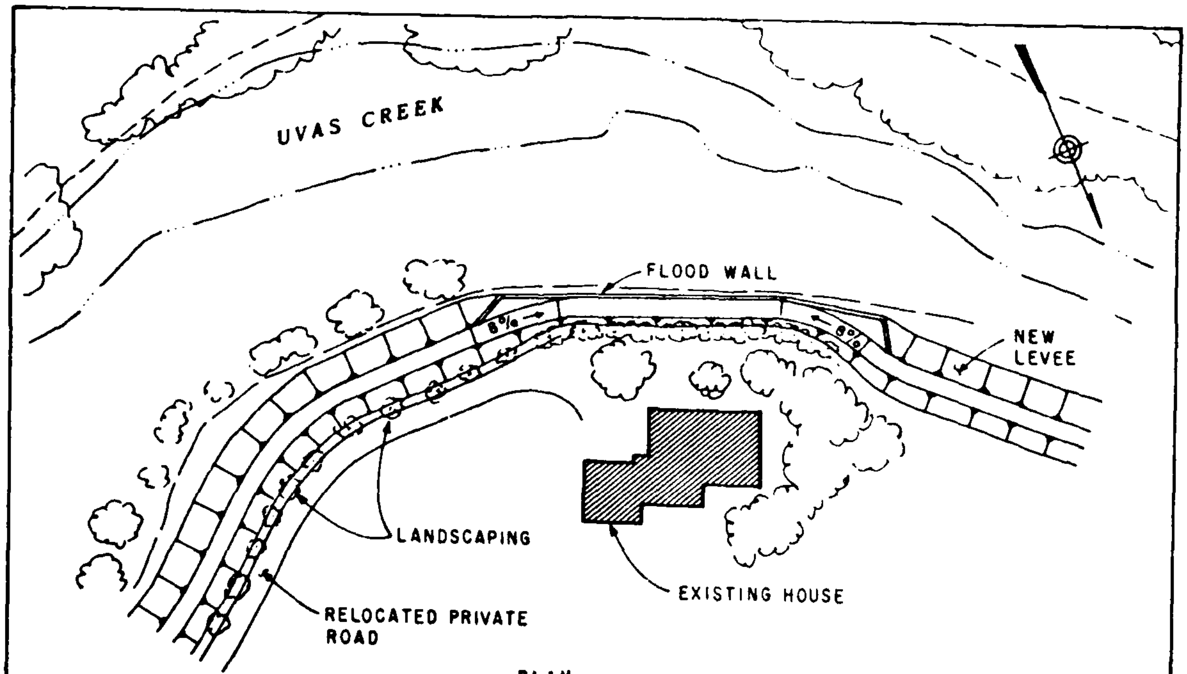
PHASE I - PLAN REAFFIRMATION

TYPICAL SLOPE PROTECTION DETAILS

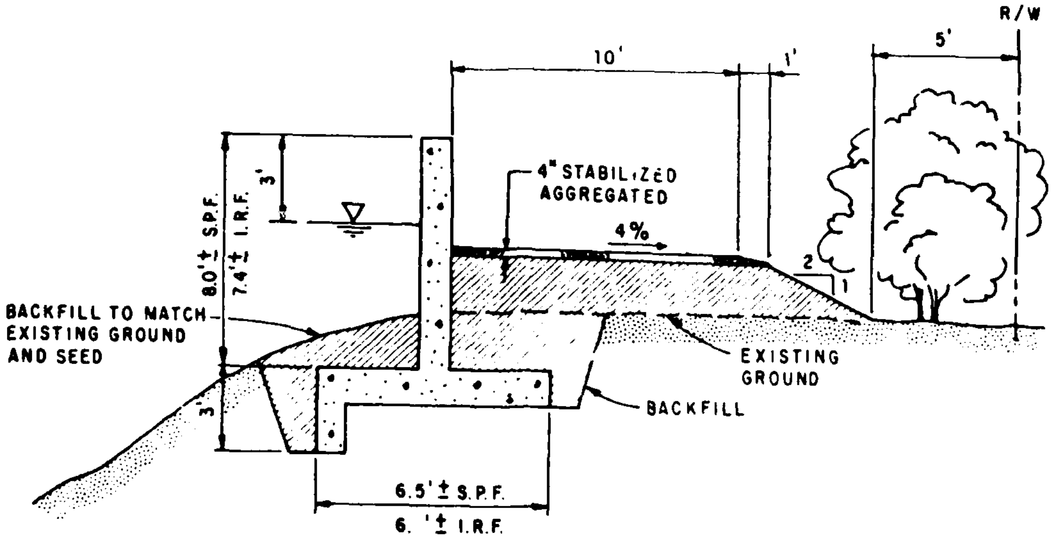
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 9



PLAN



TYPICAL SECTION

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

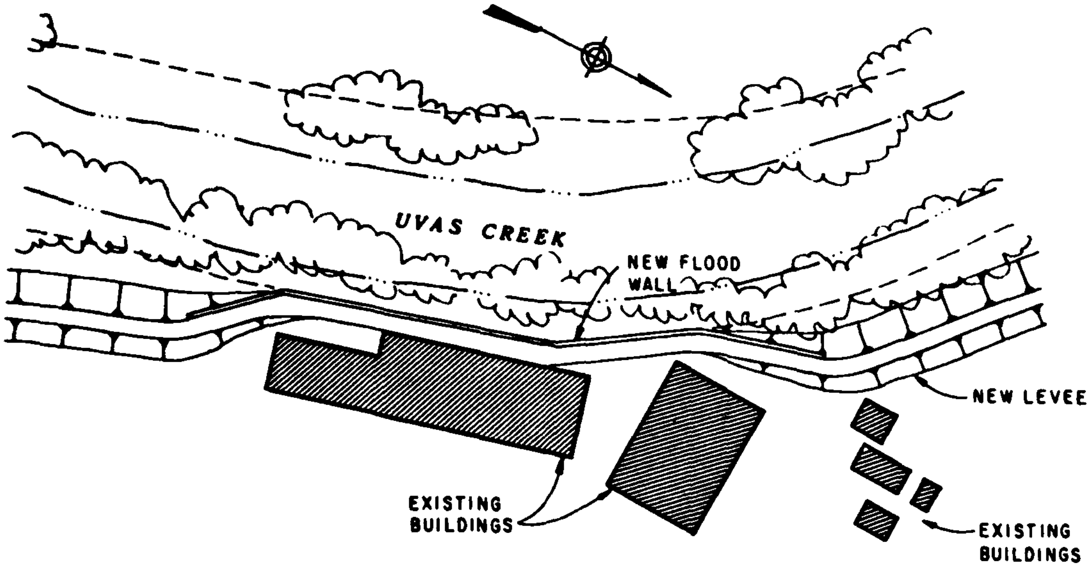
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

FLOOD WALL NO. 2
ALTERNATIVES 1 AND 4

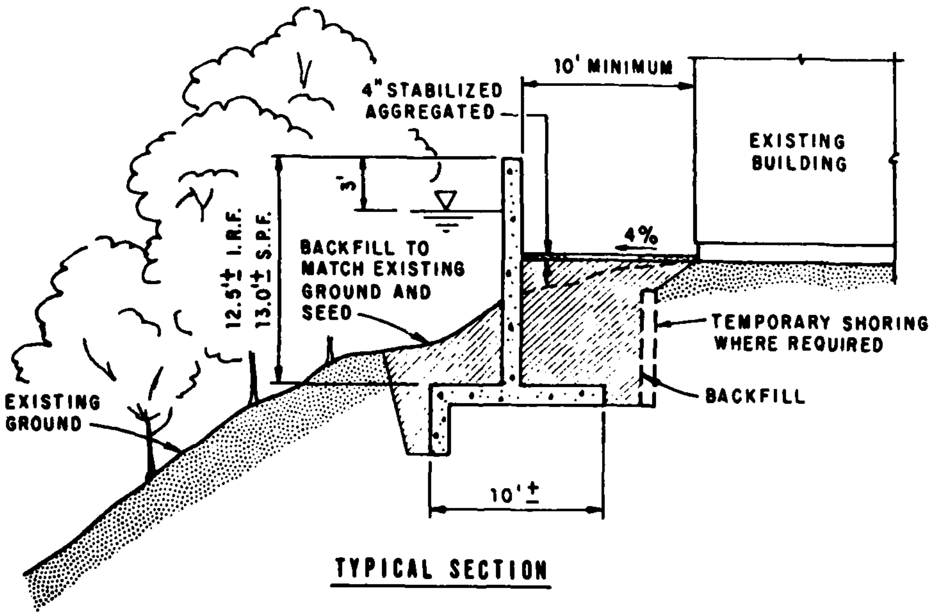
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 10



PLAN



TYPICAL SECTION

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

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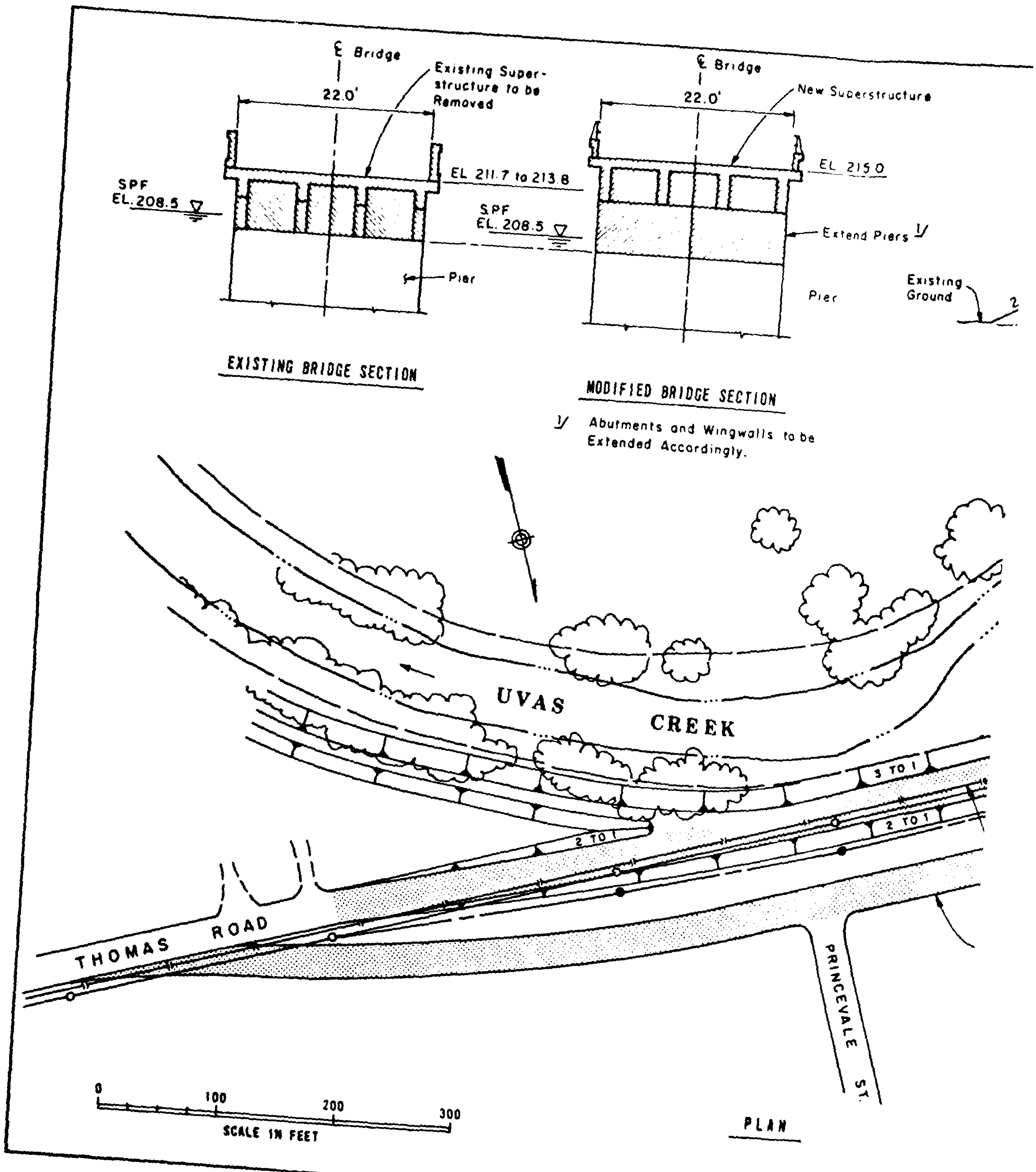
PHASE I - PLAN REAFFIRMATION

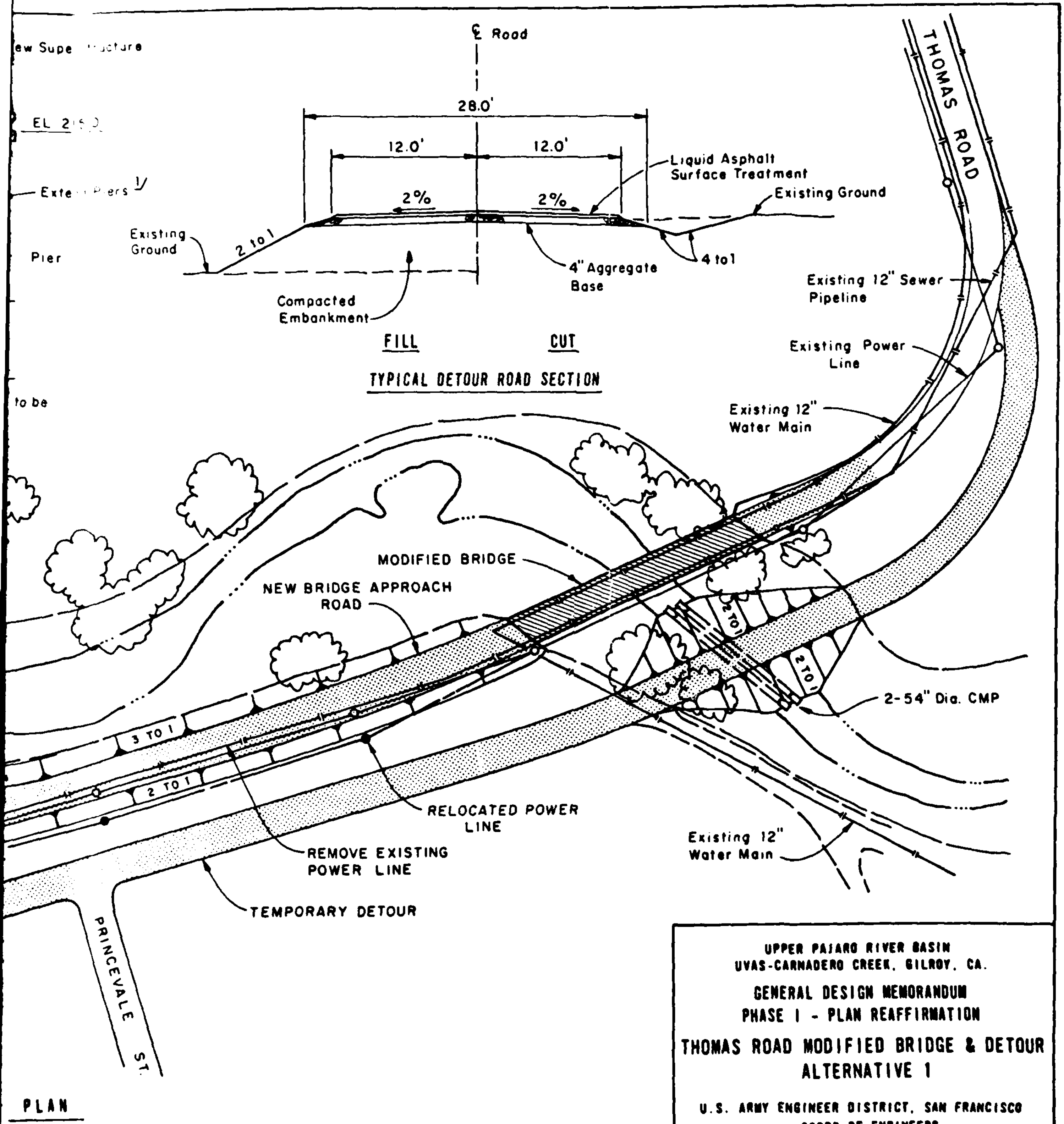
FLOOD WALL NO. 1 - OPTIONAL ALTERNATIVES 1 AND 2

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.



℄ Bridge
22.0'
Existing Super-structure to be Removed
SPF
EL. 208.5
EL 211.7 to 213.8
Pier
EXISTING BRIDGE SECTION
℄ Bridge
22.0'
New Superstructure
EL 215.0
SPF
EL. 208.5
Extend Piers 1/
Pier
Existing Ground
MODIFIED BRIDGE SECTION
1/ Abutments and Wingwalls to be Extended Accordingly.
UVAS
CREEK
3 TO 1
2 TO 1
2 TO 1
THOMAS ROAD
PRINCEVALE ST.
0
100
200
300
SCALE IN FEET
PLAN



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

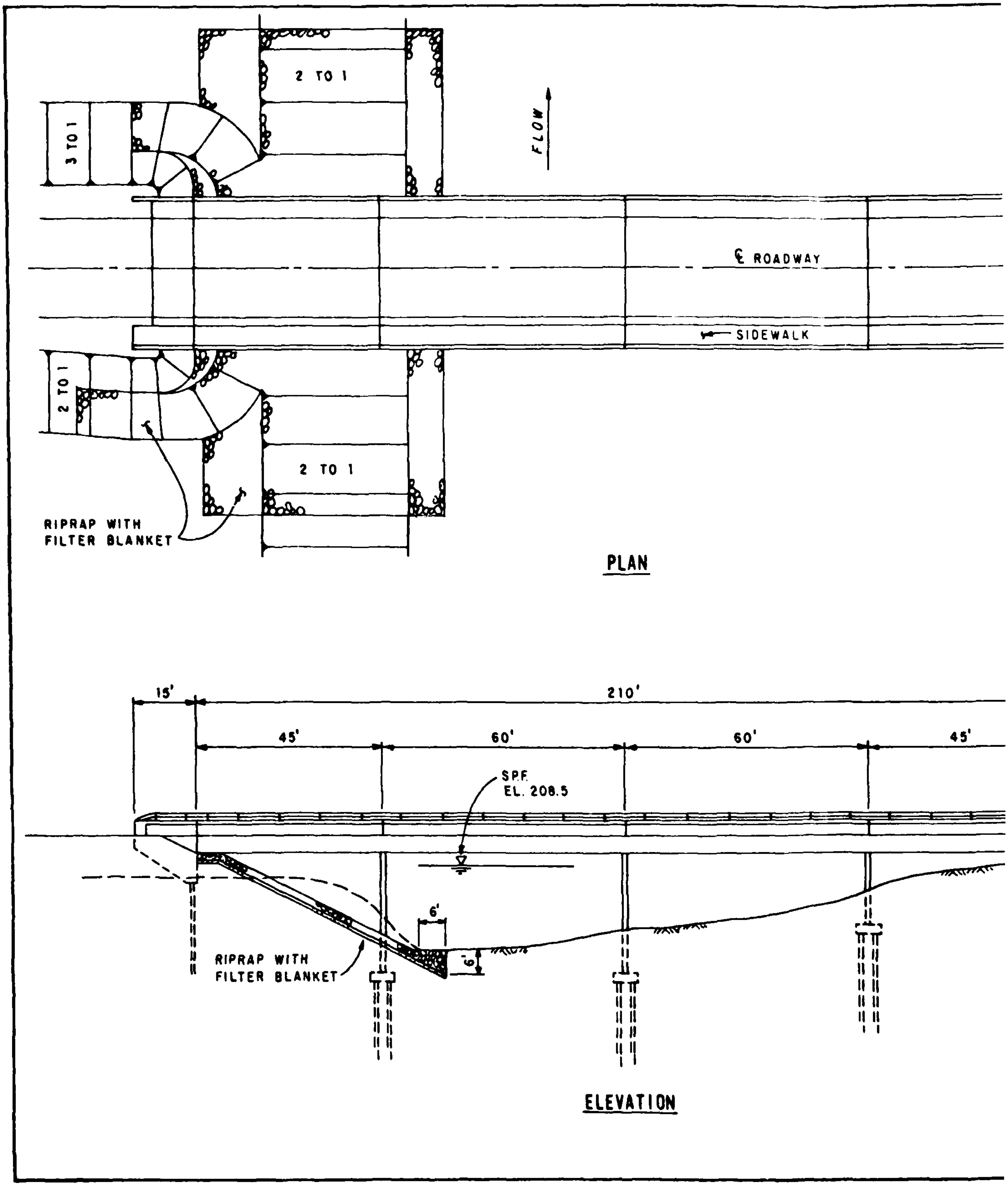
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

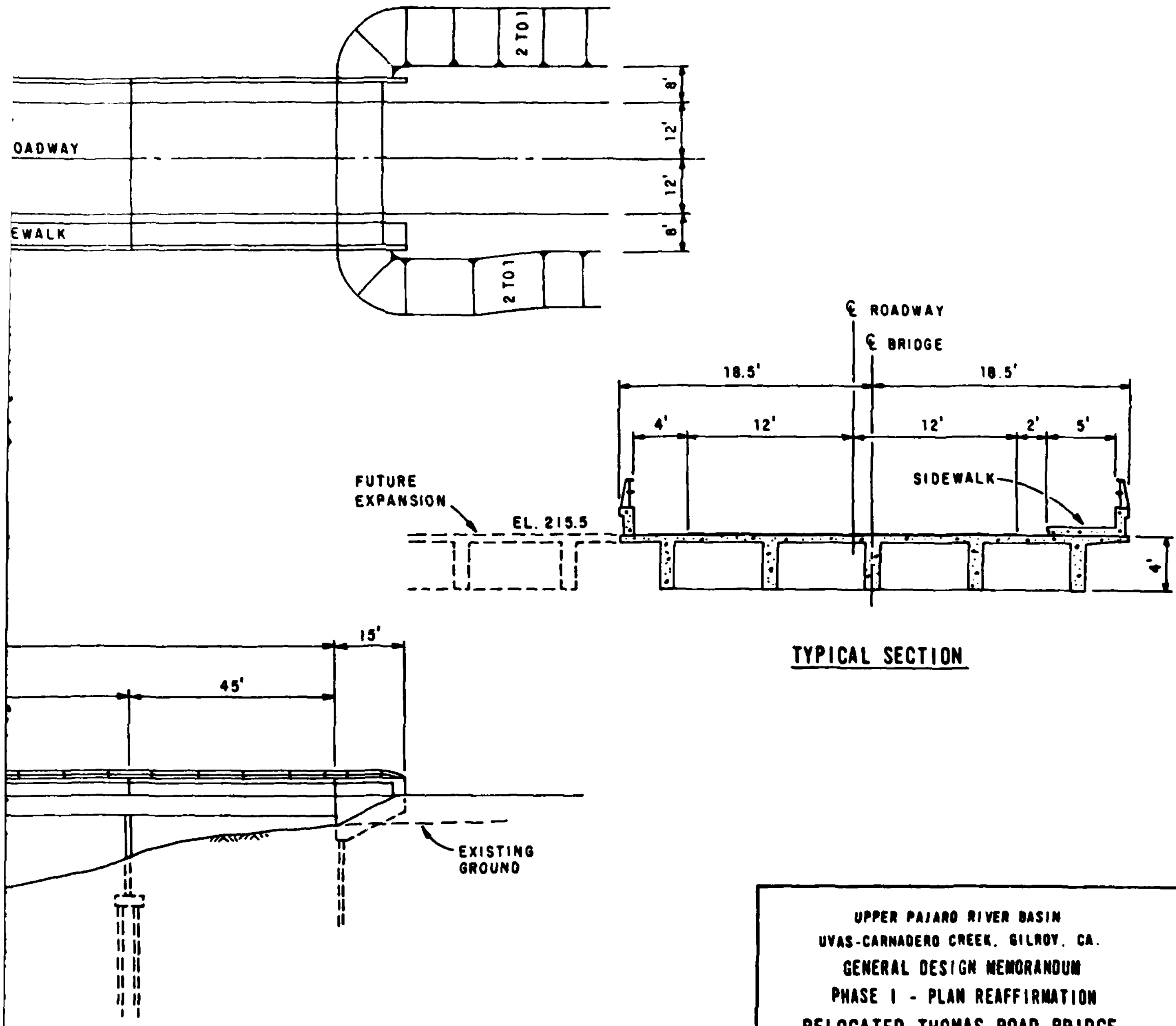
THOMAS ROAD MODIFIED BRIDGE & DETOUR
ALTERNATIVE 1

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 12

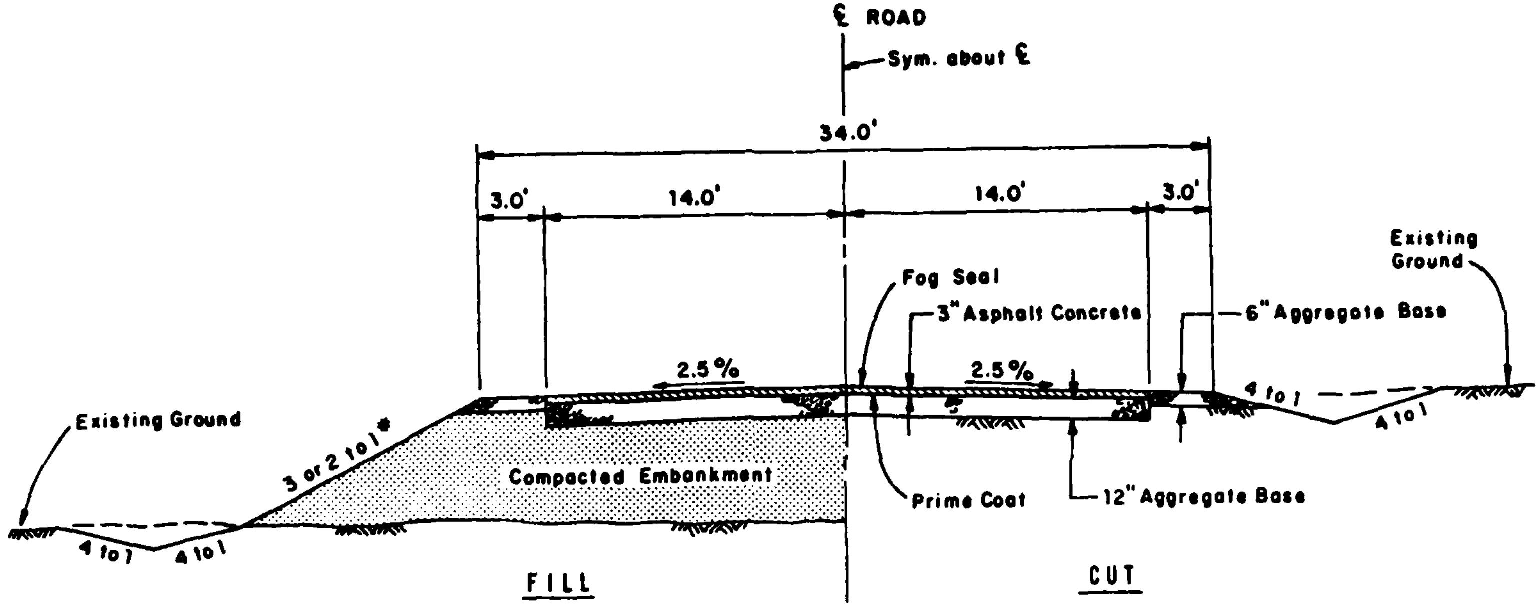

2 TO 1
3 TO 1
FLOW
℄ ROADWAY
SIDEWALK
2 TO 1
2 TO 1
RIPRAP WITH
FILTER BLANKET
PLAN
15'
210'
45'
60'
60'
45'
S.P.F.
EL. 208.5
6'
6'
RIPRAP WITH
FILTER BLANKET
ELEVATION



TYPICAL SECTION

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
RELOCATED THOMAS ROAD BRIDGE
ALTERNATIVES 2 AND 3
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.



TYPICAL ROAD SECTION

THOMAS ROAD BRIDGE APPROACHES

MILLER AVENUE AND UVAS PARK DRIVE MODIFICATIONS

- To be 3 to 1 and seeded with natural grasses where Thomas Road Bridge approach is part of the Project Levee.

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

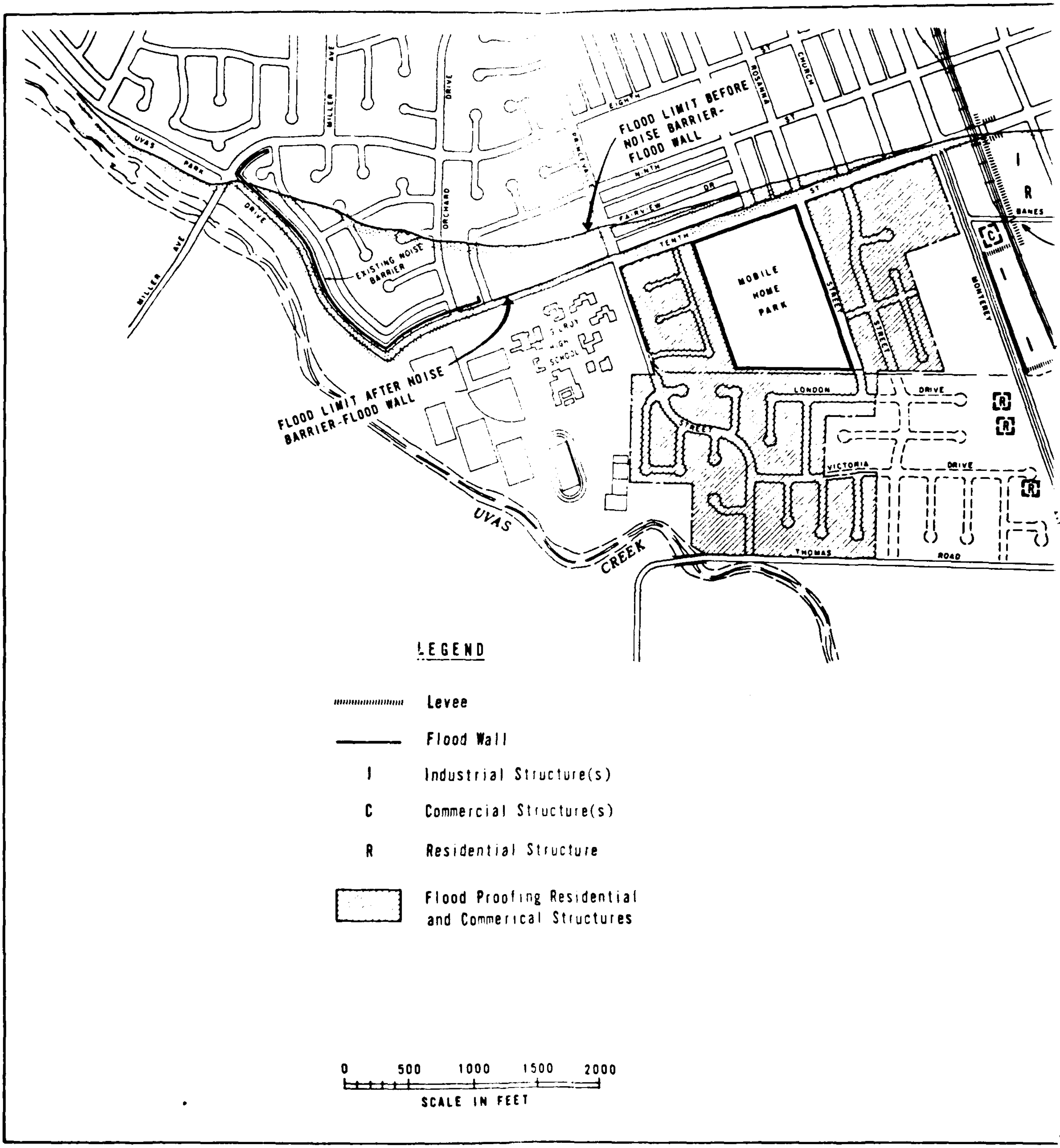
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

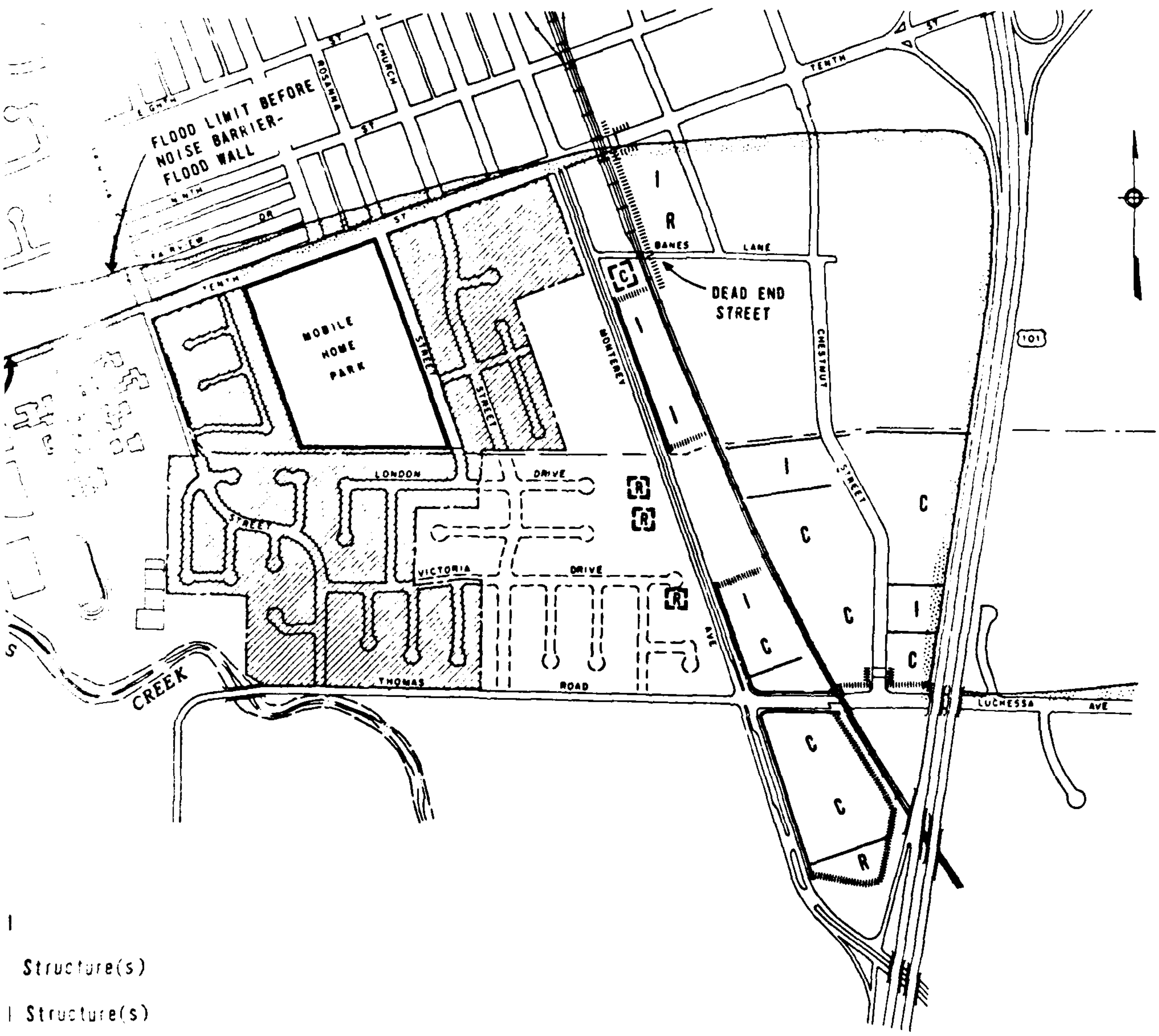
TYPICAL ROAD SECTION

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 14


FLOOD LIMIT BEFORE NOISE BARRIER-FLOOD WALL
FLOOD LIMIT AFTER NOISE BARRIER-FLOOD WALL
EXISTING NOISE BARRIER
MOBILE HOME PARK
UVAS CREEK
MILLER AVE
UVAS PARK DRIVE
ORCHARD DRIVE
TENTH ST
FAIRVIEW DR
NINTH
EIGHTH
ROSANNA ST
CHURCH
MONTEREY
LONDON DRIVE
VICTORIA DRIVE
THOMAS ROAD
BANES
LEGEND
Levee
Flood Wall
I Industrial Structure(s)
C Commercial Structure(s)
R Residential Structure
Flood Proofing Residential and Commerical Structures
0 500 1000 1500 2000
SCALE IN FEET



I

Structure(s)

l Structure(s)

al Structure

ofing Residential
rical Structures

1500 2000

EET

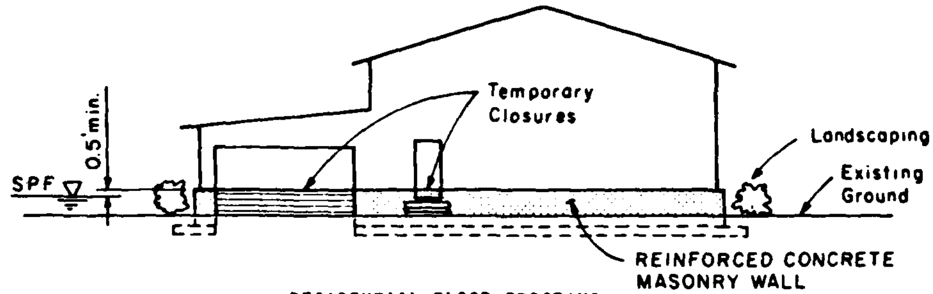
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

ALTERNATIVE 7 - NONSTRUCUTRAL FLOOD PROTECTION FACILITIES

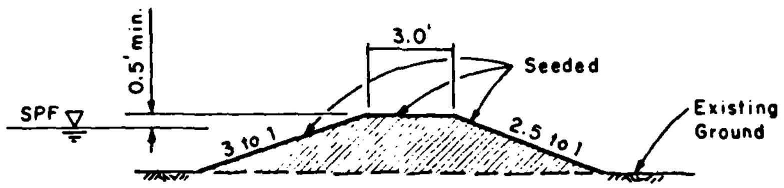
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

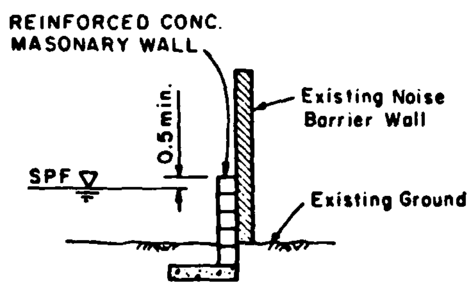
Plate No. 15



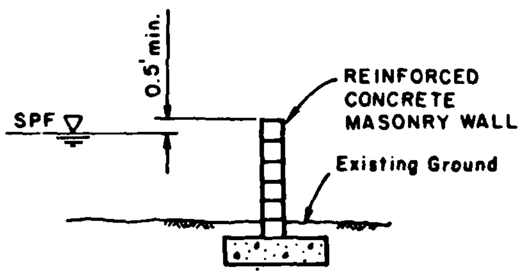
RESIDENTIAL FLOOD PROOFING



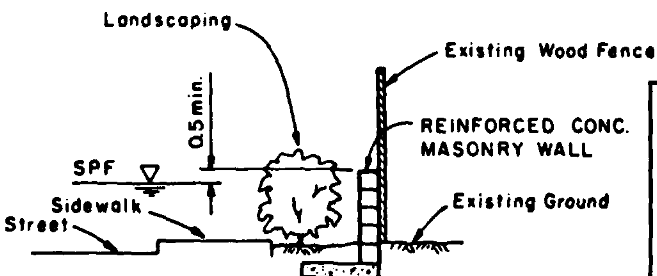
LEVEE



NOISE BARRIER - FLOOD WALL



FLOOD WALL



MOBILE HOME PARK - FLOOD WALL

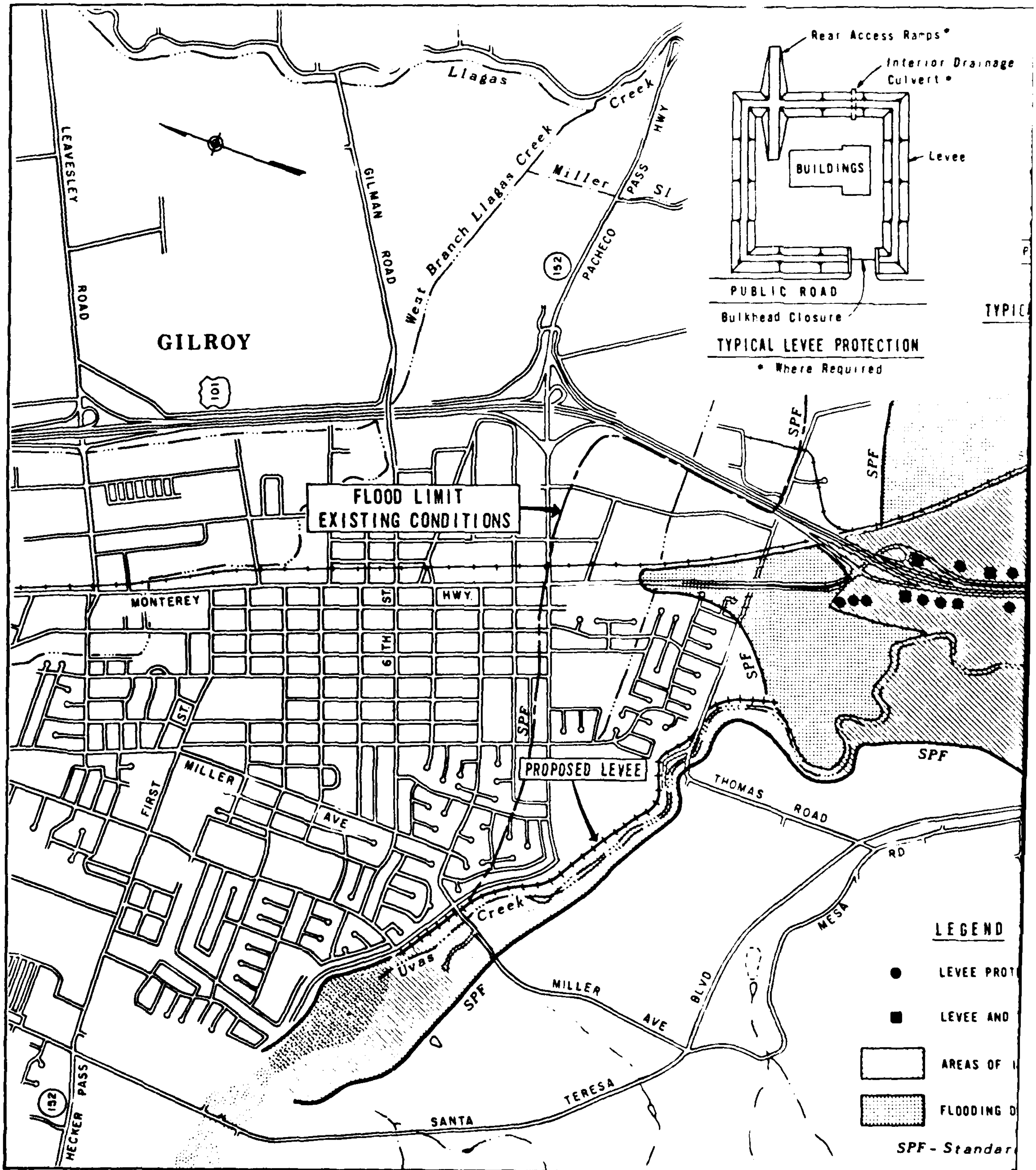
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

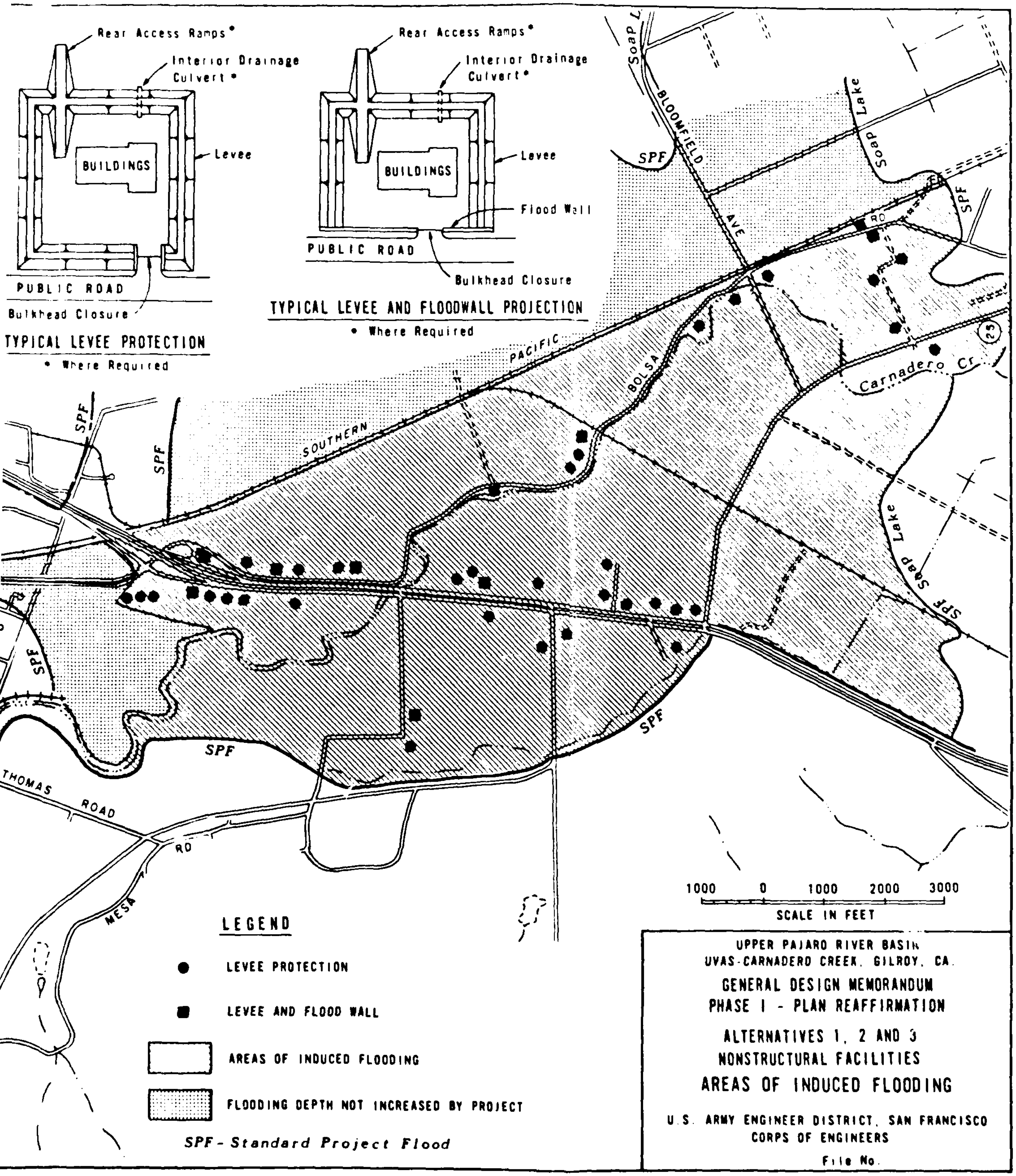
NONSTRUCTURAL ALTERNATIVE
TYPICAL FACILITIES

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

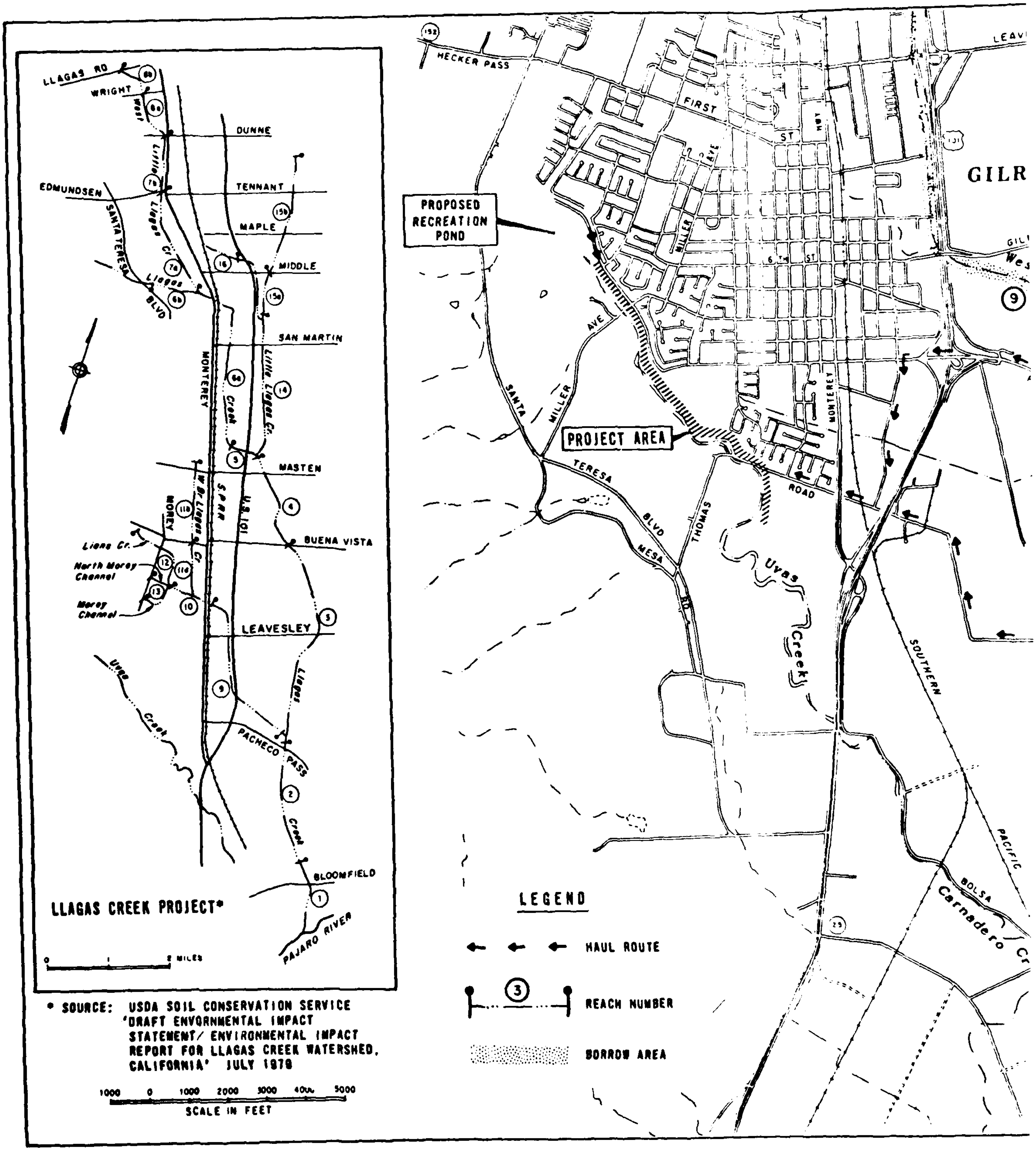


GILROY
Llagas Creek
West Branch Llagas Creek
Miller Sl
PACHECO PASS HWY
152
101
LEAVESLEY ROAD
GILMAN ROAD
Rear Access Ramps*
Interior Drainage Culvert*
Levee
BUILDINGS
PUBLIC ROAD
Bulkhead Closure
TYPICAL LEVEE PROTECTION
* Where Required
FLOOD LIMIT EXISTING CONDITIONS
MONTEREY HWY
6 TH ST
FIRST ST
MILLER AVE
SPF
PROPOSED LEVEE
THOMAS ROAD
Uvas Creek
MILLER AVE
SANTA TERESA
MESA RD
BLVD
HECKER PASS
LEGEND
LEVEE PROT
LEVEE AND
AREAS OF
FLOODING D
SPF - Standar



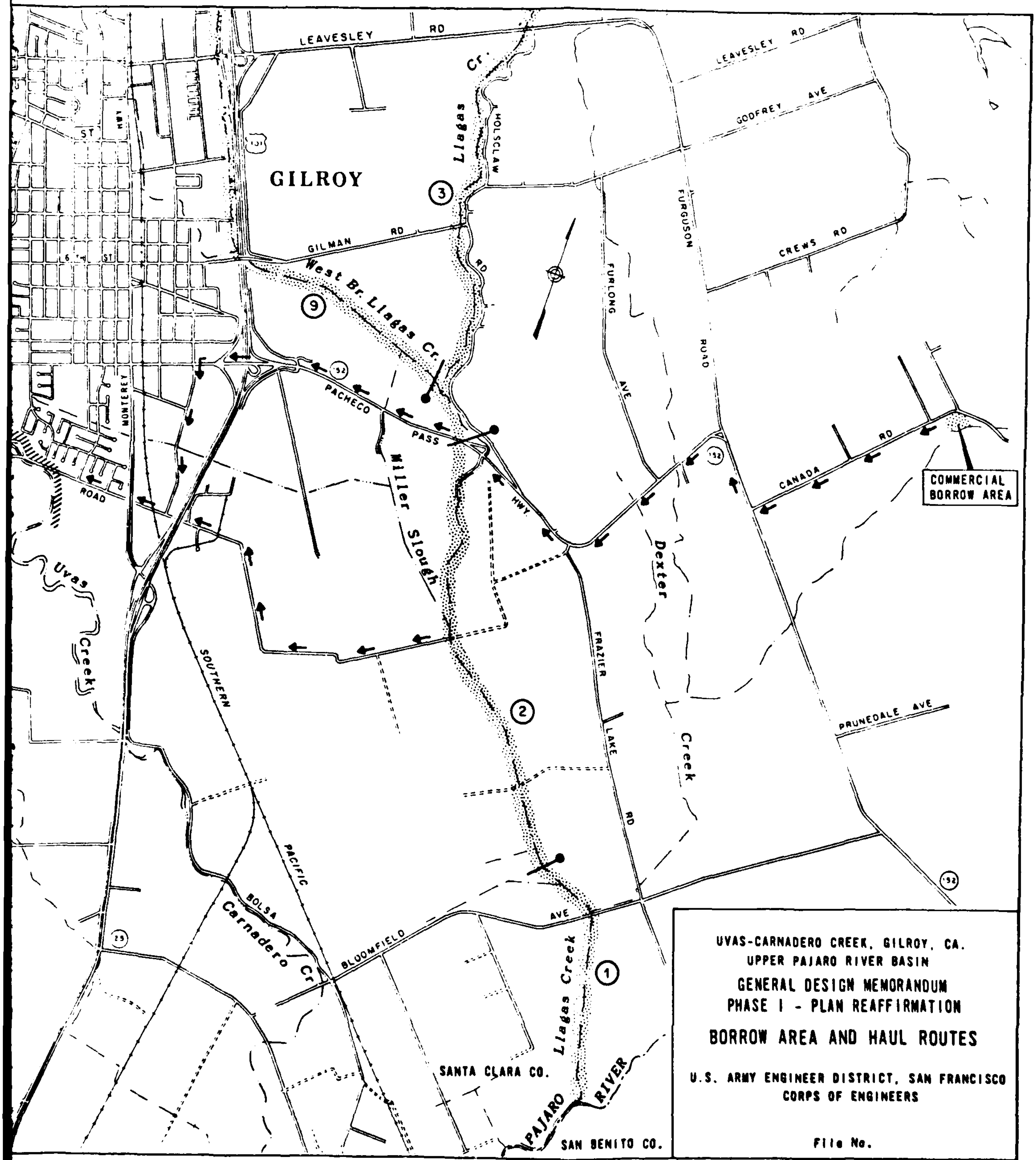
Rear Access Ramps*
Interior Drainage Culvert*
BUILDINGS
Levee
PUBLIC ROAD
Bulkhead Closure
TYPICAL LEVEE PROTECTION
* Where Required
Rear Access Ramps*
Interior Drainage Culvert*
BUILDINGS
Levee
Flood Wall
PUBLIC ROAD
Bulkhead Closure
TYPICAL LEVEE AND FLOODWALL PROJECTION
* Where Required
Soap L
BLOOMFIELD
AVE
Soap Lake
SPF
RD
SOUTHERN
PACIFIC
BOLSA
Carnadero Cr
25
Soap Lake
SPF
THOMAS
ROAD
RD
MESA
1000 0 1000 2000 3000
SCALE IN FEET
LEGEND
LEVEE PROTECTION
LEVEE AND FLOOD WALL
AREAS OF INDUCED FLOODING
FLOODING DEPTH NOT INCREASED BY PROJECT
SPF - Standard Project Flood
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
ALTERNATIVES 1, 2 AND 3
NONSTRUCTURAL FACILITIES
AREAS OF INDUCED FLOODING
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 17



* SOURCE: USDA SOIL CONSERVATION SERVICE 'DRAFT ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT FOR LLAGAS CREEK WATERSHED, CALIFORNIA' JULY 1979

1000 0 1000 2000 3000 4000 5000
SCALE IN FEET


LEAVESLEY RD
GILROY
GILMAN RD
West Br. Llagas Cr.
Llagas Cr.
HOLSCLAW RD
GODFREY AVE
FURGUSON ROAD
CREWS RD
FURLONG AVE
PACHECO PASS HWY
Miller Slough
Dexter Creek
CANADA RD
COMMERCIAL BORROW AREA
MONTEREY
Uvas Creek
SOUTHERN PACIFIC
FRAZIER LAKE RD
PRUNEDALE AVE
BOLSA
Carnadero Cr
BLOOMFIELD AVE
Llagas Creek
PAJARO RIVER
SANTA CLARA CO.
SAN BENITO CO.
UVAS-CARNADERO CREEK, GILROY, CA.
UPPER PAJARO RIVER BASIN
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PHASE I - PLAN REAFFIRMATION
BORROW AREA AND HAUL ROUTES
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 18

APPENDIX 3

RECREATIONAL AND NATURAL RESOURCES

APPENDIX 3

RECREATIONAL AND NATURAL RESOURCES

SECTION A - INTRODUCTION

SECTION B - DESCRIPTION OF PROJECT AREA

SECTION C - RECREATION MARKET AREA

SECTION D - EXISTING AND PROPOSED RECREATION FACILITIES

SECTION E - PROJECTED RECREATION ATTENDANCE

SECTION F - RECOMMENDED PLAN OF DEVELOPMENT

SECTION G - COORDINATION

SECTION H - MANAGEMENT AND COST SHARING

SECTION I - ENVIRONMENTAL QUALITY

SECTION J - COST

SECTION K - BENEFITS

SECTION L - FISH AND WILDLIFE

SECTION A

INTRODUCTION

INTRODUCTION

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RECREATION AND NATURAL RESOURCES

LIST OF PLATES

SECTION A

INTRODUCTION

PURPOSE AND SCOPE

1. This appendix presents the plans for project related recreation development for which the City of Gilroy's, the local sponsor, requirements and desires are reflected. Estimates of use, benefits, and costs for the proposed recreation development are presented. Existing outdoor recreation opportunities in the project area are also briefly discussed. Also included in this appendix are pertinent fish and wildlife data and information and correspondence from the U. S. Fish and Wildlife Service.

BACKGROUND

2. Construction of levees on Uvas-Carnadero Creek was authorized in 1944. In 1963 the Upper Pajaro Sub-basin was studied more comprehensively and an array of alternatives considered. Special emphasis was placed on the flood plain south and west of Gilroy which had experienced substantial damages during the floods of 1955 and 1958. It was determined that, of the alternatives investigated, a multiple purpose flood control and recreational reservoir on Uvas Creek just west of Gilroy was the only project which at the time was economically feasible. The plan for the Gilroy Reservoir was presented at a public meeting in Gilroy in 1965, but the plan was rejected by local interests who objected to the inundation of farmlands and homes in the reservoir area.

3. In 1967, Santa Clara and Santa Cruz Counties requested that the basin study be reactivated to reevaluate the alternatives and to develop new alternatives to the Gilroy Reservoir. In 1968, after funds were made available, the study was resumed. Fourteen different alternatives were considered for solving the existing and future water resources needs and problems of the region. Preliminary benefit analysis and cost estimates were made of the fourteen alternatives considered, only two were to be feasible for further study: a water supply reservoir on Pescadero Creek, and seven miles of channel improvements along Uvas-Carnadero Creek. The reservoir on Pescadero Creek was eliminated from further studies since it would not provide any flood control benefits. It was at this time that Santa Clara County proceeded on a Recreational General Plan which included the Uvas-Carnadero Creek within its Park System. In 1972, the proposed parkway along Uvas Creek was approved by the Santa Clara County Board of Supervisors, thus, being the basis of this recreational planning objective.

SECTION B

DESCRIPTION OF PROJECT AREA

DESCRIPTION OF PROJECT AREA

TABLE OF CONTENTS

SECTION B

DESCRIPTION OF PROJECT AREA

GEOGRAPHIC BOUNDARY

1. The boundary of the proposed recreation development coincides with levee Alternative 2 and is shown on Plate 1.

ACCESS

2. Access to the levee trail system would be available at both Miller Avenue to the north and Thomas Road to the south.

CLIMATE

3. The climate for the proposed project area is characterized by warm and dry summers with winters that are mild and moderately moist. The average annual temperature for Gilroy is about 59°F, with a high mean of 86°F for July and a low mean of 37°F for January. Ninety percent of the 20 inches of rain received falls within the months of November through April.

TOPOGRAPHY AND SOILS

4. The topography of the proposed trail area is level with no marked discontinuities. The soils are characterized very deep, level, somewhat poor to poorly drained soils which are well suited to various types of stream foliage.

LAND USE

5. The current land use within the proposed project area is in partial fulfillment of the Plan of Regional Parks for Santa Clara County. Along the west side of the Uvas-Carnadero Creek the 36 acre Christmas Hill Park is located which extends from Miller Avenue south to the Filice family estate. Along the east side of the creek the property is in agricultural and residential uses until it adjoins Gilroy High School. North of the high school the adjacent property is vacant for a short reach until the beginning of Uvas Park Drive at Tenth Street. Uvas Park Drive parallels the creek to Wren Avenue upstream of the end of the proposed project. Immediately east of Uvas Park Drive the land is being used for residential purposes.

BIOLOGICAL AND ECOLOGICAL RESOURCES

6. Some riparian trees and shrubs occur along various segments of Uvas Creek. These areas provide habitat for a variety of small animals. Stream fisheries are marginal to non-existent due to the

seasonally intermittent nature of the streams; however, some non-game fish and amphibians may be found at times. Further discussion of the fish and wildlife resources of the project area is included in Section L of this appendix.

Recreation Features

7. The Plan of Regional Parks for Santa Clara County proposes the development of a trail and bike system which would be a continuous linear park adjacent to Uvas Creek extending from Uvas Reservoir to the Pajaro River. Existing and proposed recreation are further discussed in Section D of this appendix.

Socioeconomic Features

8. The area surrounding the City of Gilroy is predominately agricultural. Some industry, primarily oriented toward processing agricultural products is also located here. The city and the areas surrounding Gilroy are becoming urban centers due to their proximity to San Jose, thus reflecting the impact of growth and the need for recreation centers.

Scenic Features

9. The proposed project site is presently supporting riparian vegetation which includes thick underbrush as well as several mature stands of sycamore and alder trees.

Cultural Resources

10. See Section B of Appendix 4.

Hydrology

11. The flow in Uvas Creek varies considerable depending upon the year and the time of the year flow is observed. It is generally observed that Uvas Creek is dryed up during the summer months but sustains enough moisture to maintain the riparian vegetation.

Water Quality

12. The water quality of the proposed project area is such that it will present no problem to the recreational plan. Fishing will be constrained by the lack of flow but not by the quality of the waters. The observed water quality for Uvas Creek as given in the Water Quality Control Plan Report, Central Coast Basin (3), Regional Water Quality Control Board, May 1974, are as follows:

Specific conductance (micromhos)	230
TDS	140
Hardness	110
Boron	0.04
pH (units)	7.7
Sodium	7.1
Chloride	5.5
Nitrate	0.8
Sulfate	22
Dissolved oxygen	10.8

Reported in milligrams per liter unless otherwise noted.

SECTION C

RECREATIONAL MARKET AREA

RECREATION MARKET AREA

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SECTION C

RECREATIONAL MARKET AREA

USER ORIGIN

1. The proposed recreation development is limited to a relatively short trail system located generally within the Gilroy city limits. Empirical studies of facilities similar to those proposed for the City of Gilroy indicate that users originate from areas very near such facilities. Based on this knowledge, the City of Gilroy and surrounding areas are considered to be the appropriate market area.

SOCIOECONOMIC CHARACTERISTICS

2. Population Trends - The population growth of the study area was considerably below the statewide average until the 1960's. With the rapid growth of the San Jose metropolitan area, the population in and around Gilroy has been growing at an equally proportional rate. Approximately 50 percent of the working population in the City of Gilroy commutes to employment areas in metropolitan San Jose. Therefore, unless the advent of the energy situation tends towards slowing the growth of the study area substantially, the proposed project and future planned recreation areas are very much in need.

3. Projected Population - The projected population for the City of Gilroy in the year 2,000 is 38,500 persons. Based on the standard of five acres of developed parkland per 1,000 residents (as obtained from the City of Gilroy General Plan), a total of 193 acres of parkland would be required. The 1978 population was estimated at 18,000 persons and requires an approximate 90 acres of developed park. Presently there are 77 acres of developed parkland. Table 1 summarizes the existing and projected parkland requirements for the City of Gilroy.

TABLE 1

PARKLAND REQUIREMENT: 1978-2000

CITY OF GILROY, CALIFORNIA

Date	Total Population	Additional Population[a/]	Additional Parkland Acreage Required[b/]	Total Acreage Developed Parkland
1978	18,000	--	--	77.0
1985	25,000	7,000	48.0	125.0
2000	38,000	13,500	67.5	192.5

Source: General Plan Revision Program, Technical Appendix, City of Gilroy, California, June 1979

a/ Additional population from preceding line

b/ Based on the standard of 5 acres of developed parkland per 1,000 residents

SECTION D

EXISTING AND PROPOSED RECREATION FACILITIES

EXISTING AND PROPOSED RECREATION FACILITIES

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SECTION D

EXISTING AND PROPOSED RECREATION FACILITIES

EXISTING FACILITIES

1. Existing parks in the Gilroy community are shown on Table 2. Some of these parks as well as the existing bikeways are shown on Plate 2. Christmas Hill Park located on the west side of Uvas Creek at Miller Avenue is a fully developed community park of 36 acres which serve as a major recreational focal point for the City. The existing bikeways along Miller Avenue and Santa Teresa Avenue that will connect to the proposed Uvas Creek Linear Park provide direct routes to Gavilan College located south of the city and to the Los Animas Park in northern Gilroy.

PROPOSED RECREATION DEVELOPMENT

2. In a Plan of Regional Parks for Santa Clara County, (Santa Clara County Planning Department, 1972), a Uvas Creek Park Chain is shown stretching along Uvas Creek from Uvas Canyon County Park in the upper reach all the way to Pajaro River. The Parks Technical Advisory Committee of the Planning Policy Committee of Santa Clara County, which was formed to evaluate the 63 selected park sites meeting the minimum requirements for regional parks, rated Uvas Creek Park Chain second highest in the linear park type category.

3. In the City of Gilroy General Plan adopted by the city in November 1979, the following proposed facilities are included:

- Uvas Creek Linear Park
- Ronan Channel Linear Park
- Hillside Community Park
- Day Road Community Park
- Other neighborhood parks to be dedicated (or accquired from fees in lieu of dedication) as part of future development proposals.

The plan further states:

> "Of the proposed recreational facilities on the Modified Draft Central Plan map, give first priority to the development of the Uvas Creek Linear Park because of its integral and strategic location within the urbanized area. Develop Uvas Park Drive as a two-lane recreational road which will accent the Uvas natural area. Provide pedestrian and bicycle trails within the linear park and parking turn-out areas along the Uvas Park Drive right-of-way."

TABLE 2

RECREATIONAL RESOURCES: 1978[a]

CITY OF GILROY, CALIFORNIA

Neighborhood Parks	
Atkinson	0.25 acres
Butcher	0.13 acres
El Roble	3.50 acres[b]
Forest Street	0.50 acres
Miller	5.00 acres
Oak	0.50 acres
San Ysidro	9.25 acres
Southern Pacific (leased)	1.50 acres
Community Parks	
Las Animas	28.50 acres[c]
Christmas Hill	36.00 acres
Golf Course	
Gilroy Golf and Country Club/ Ousley Park	90.00 acres[d]

a/ From General Plan Revision Program, Technical Appendix, City of Gilroy, California

b/ Presently undeveloped.

c/ 5.50 acres of this are undeveloped.

d/ The Golf Course is not operated by the City of Gilroy. Ousley Park is undeveloped.

And that the City of Gilroy will:

> "Work closely with Santa Clara County, Santa Clara Valley Water District, the utility companies and other agencies in developing a recreational trail system. Recreational trails furnish an excellent opportunity for linking facilities, open space and park activity areas in the Gilroy Planning Area. The Ronan Channel easement and creekside easements along the Uvas and Llagas Creeks offer potential routes for recreational (hiking and cycling) trails."

4. The City of Gilroy, and the Santa Clara County Parks and Recreation Department and Parks Commission have approved the purchase of lands along Uvas Creek from the upstream end of the project to Santa Teresa Boulevard. The County will provide funds for these lands following approval by the Board of Supervisors. The facilities contemplated includes a recreational pond, natural and picnic area, hiking trails, and a parkway.

5. The city has recently completed a comprehensive bikeway plan for the city. The plan provides for linkage of the city's major recreational areas along with Gilroy High School and Gavilan College. The city has obtained State of California transportation grant funding for a bikeway on the existing levee from Santa Teresa Boulevard to the upstream end of the bikeway proposed as part of the project recreational facilities.

SECTION E

PROJECTED RECREATION ATTENDANCE

PROJECTED RECREATION ATTENDANCE

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SECTION E

PROJECTED RECREATION ATTENDANCE

1. There are numerous factors that affect trail usage including:

   Trail type and amenities.
   Character of the surrounding area.
   Proximity and number of potential users.
   Trail length and access facilities.
   Socioeconomic makeup of the adjacent area.
   Trail location relative to other recreation centers, schools and features that may affect trail usage.

2. Planning for the proposed Uvas Creek Chain Park has progressed to the conceptual stage and, at this time, there have been estimations of usage by local recreation planning organizations. In developing a preliminary estimate of the Uvas Creek trail attendance, usages of three other trails were assessed. These were the Lafayette-Moraga Trail, the Alameda Creek Trail and the American River Bikeway.

3. A report by the East Bay Regional Parks District, "A Trails Study," dated October 1979 evaluates the useage of the 4.5 mile long Lafayette-Moraga Trail (LMT) in Contra Costa County and the 11.5 mile long Alameda Creek Trail (ACT) in Alameda County near Fremont, Newark and Union City. The estimated annual visits to these trails are 116,000 for the LMT and 26,000 for the ACT.

4. The LMT is located in a foothill area of considerable scenic value, traverses mostly upper middle class residential areas, and St. Mary's College is located at its southern terminous. The trail has no official designated staging areas, however, access is available at numerous (at least 20) points along its length.

5. The ACT trail passes through primarily commercial and industrial areas and follows a manmade relocation of Alameda Creek which has not developed a riparian habitat and normally contains water of poor quality. The trail has six staging or parking areas for users.

6. Even though there was a large difference in total usage of the above trails they shared several common usage characteristics. The users were from the local communities; for the LMT, 56% of users were from Lafayette, 19% from Moraga, and 10% from Walnut Creek. For the ACT, 71% were from Fremont, 11% from Union City, and 5% each from Newark and Hayward. The user travel distance to the trails were found to be:

Distance	Lafayette-Moraga	Alameda Creek
Less than one half mile	37%	31%
One half to three miles	47%	42%
Four miles to ten miles	12%	21%
Over ten miles	4%	6%

7. The user activity and age distribution for each trail was found to be similar, with average values of:

User Activity	Percentage
Bicyclists	58
Joggers	22
Walkers	18
Horse Riders	2

User Age	Percentage
Adults	69
Teenagers	13
Children	18

8. The proposed Uvas Creek Trail when connected to the reach to be constructed by the City of Gilroy will be about two miles in length and will attract users from the residential areas along its north side. One staging is to be provided at Thomas Road, near Gilroy High School, and access and parking at the upstream end will be from Miller Avenue and Christmas Hill Park. Access will also be available at Tenth Street near Gilroy High School and at Wren Avenue and Santa Teresa Boulevard in the trail to be constructed by the City. Assuming usage to be in proportion to trail length and number of sides of the trail from which users will come, results in annual usage estimates of:

Based on Lafayette-Moraga - 13,000 visits
Based on Alameda Creek - 1,100 visits

9. The usage of the Uvas Creek trail will initially represent nearly a median of these two values under present conditions with usage to increase as the entire Uvas Park Chain proposal is implemented.

10. Another estimate of the trails system usage can be based on recent (1975) research by the Corps of Engineers of the American River Parkway in Sacramento, California. In the report, "Analysis of Supply and Demand of Urban Oriented Non-Reservoir Recreation," by the Institute of Water Resources (Report 76-R2) dated November 1976, the Woodlake Reach of the American River Parkway provides a 1.2 mile reach of a regional parkway system with characteristics and length similar to the Uvas Creek linear park when it reaches ultimate development and full capacity usage. This reach has an annual usage of about 21,500 recreation days. Swimming, rafting and fishing represent about 20% of this usage and are deducted for our purposes of correlation with the Uvas Trail. This results in a maximum usage of about 17,200 annual recreation days which is judged to be a realistic maximum capacity for the proposed project trail.

11. For purposes of preliminary assessment, a base year annual use of around 8,500 visitor days is judged to be reasonable for the Uvas Trail. This represents a factor of around 0.4 visitor days per capita when correlated to the Gilroy population projected for the base year of 1982. This usage will increase with continued population growth, development of the Uvas Park Chain, and the completion of the City of Gilroy's bikeway system. The per capita use factor is also expected to increase as the character of the Gilroy community becomes more urban and the increased cost and lessened availability of gasoline result in greater emphasis on local and non-vehicle oriented forms of recreation. Based on the population growth projections as shown in Table 1, the following recreation uses are projected.

Year	Recreation Days
1984	8,500
1987	10,000
1992	12,500
2000 and beyond	17,000

SECTION F

RECOMMENDED PLAN OF DEVELOPMENT

RECOMMENDED PLAN OF DEVELOPMENT

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SECTION F

RECOMMENDED PLAN OF DEVELOPMENT

Basis of Recommended Plan

1. The Recommended Plan was developed through coordination between the City and County's desires and is consistent with the policies of the Corps of Engineers.

Recreation Facilities

2. The proposed trails within the project area will consist of one mile long by ten foot wide paved bikeway. The bikeway will run on top of the levee and be accessed at Miller Avenue on the north end and Thomas Road staging area on the south end. Between the levee and Uvas Creek, 1.3 miles of hiking trail will meander through the existing vegetation. Erosion control measures will be taken and creek bed access points will be provided at three different locations along the creek. All erosion control and steam bed access points will be constructed with a material such as to blend with the natural environmental setting. The bikeway and staging area will be landscaped with appropriate plant materials. A boundary type fence will be provided along the base of the levee to separate trail users from adjacent property owners; in this case it will key into the existing high school fence and run 1,350 feet to Thomas Road. A general map of the recreation development is shown on Plate 1, and a concept sketch of the trail and staging area are shown on Plate 2. The staging area will be located within the triangle developed by the relocated Thomas Road and Uvas Creek. It will provide parking for 15 cars and will not provide any picnicing or sanitary facilities. The staging area parking lot will be paved enabling all year access. The trail system will offer opportunities for recreational bicycling and other compatible activities such as walking, jogging and nature hiking. In addition, the bicycling and hiking trail may serve as an alternate transportation route and/or be incorporated into the adjacent high school's environmental studies or cross country running curriculums.

SECTION G

COORDINATION

COORDINATION

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SECTION G

COORDINATION

The proposed recreation facilities plan was developed in coorperation with the City of Gilroy, Department of Recreation, and the Santa Clara County Department of Parks and Recreation. The City Departments of Planning and Public Works also were consulted during the project planning as was the Santa Clara Valley Water District.

SECTION H

MANAGEMENT AND COST SHARING

MANAGEMENT AND COST SHARING

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SECTION H

MANAGEMENT AND COST SHARING

FEDERAL RESPONSIBILITY

1. Federal (Corps of Engineers) responsibility for the recreation feature of the project includes the preparation of preliminary plans as described herein, preparation of a master plan for the recreation development including guidelines for administration, operation, and maintenance and preparation of plans and specifications and supervision of construction. The Corps of Engineers will budget funds for 50% of the separable first cost of recreation development and construct the recreation facilities.

NON-FEDERAL RESPONSIBILITY

2. Non-Federal responsibility for the development of recreation facilities associated with the project includes provision of 50% of the separable costs for recreation facilities and assumption of all administration, operation, and maintenance of the completed recreation facilities. The non-Federal cost and responsibilities will be assumed by the City of Gilroy.

SECTION I

ENVIRONMENTAL QUALITY

ENVIRONMENTAL QUALITY

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SECTION I

ENVIRONMENTAL QUALITY

VEGETATIVE PROGRAM

1. Vegetation of native and other compatible species will be planted and maintained in the staging area and, where possible, along the levee berms to provide shade and an aesthetically pleasing environment. Species of vegetation will be selected to also provide habitat for indigenous wildlife.

ARCHITECTURAL TREATMENT

2. No buildings are planned for the proposed recreation area. Directional and informational signs will be of a "natural" wood appearance as is used in other City of Gilroy facilities.

SOLID WASTE DISPOSAL

3. Trash receptacles will be provided and maintained at the recreation area. The collection and disposal of solid waste will be handled by the City of Gilroy along with waste from other city facilities.

SECTION J

COST

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COST

Costs

1. The initial and annual interest and amortization costs based on current, October 1980, price levels and 7 3/8 percent discount rate are $111,900 and $8,240, respectively. Bikeway costs are based upon paving what would otherwise be a gravel patrol road. A detailed construction cost breakdown is shown on Table 3. (February 1980 levels).

2. Operation and maintenance were estimated to be $3,800 per year based on data and estimates contained in the "Sacramento Bikeway Master Plan" by the Sacramento City-County Bikeway Task Force dated January 1975. Costs were updated to October 1980 levels. A detailed breakdown of estimated operation and maintenance cost is shown in Table 4. (February 1980 price levels).

3. Total annual cost for the project recreation facilities are estimated to be $12,040.

TABLE 3
UVAS CREEK RECREATIONAL FACILITIES
(February 1980)

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST		
Ramp Earth Borrow and Haul	CY			730	2	50		1	830
Ramp Embankment	CY			630	1	50		1	080
Aggregate Base	SF		15	140	0	40		6	060
Asphalt Concrete	SF		82	500	0	45		37	130
Hiking Trail Clearing	SY		3	330	0	60		2	010
Timber Erosion Control and Steps	MBF			0.40	1500	00			600
Seeding-Landscaping	AC			2.5	2500	00		6	250
Chainlink Fencing	LF		1	350	10	00		13	500
Subtotal								68	450
Contingencies 20%								13	690
Total Construction								82	140
Engineering and Design 15%								13	320
Administration and Supervision 10%								8	210
GRAND TOTAL								103	580

TABLE 4

RECREATION FACILITIES

ANNUAL OPERATION AND MAINTENANCE COSTS

(February 1980 Cost Levels)

Item	Annual Cost
Bike Trail	
Barrier	$ 350
Signs	$ 320
Sweeping	$ 330
Litter Cleanup	$ 200
Drainage and Landscaping	$ 270
AC Pavement	$ 380
Hiking Trail	
Brushing and Grading	$ 500
Subtotal	$2,350
Contingencies 20%	$ 470
Total Direct Cost	$2,820
Administration 25%	$ 700
TOTAL	$3,520

AD-A122 273 PAJARO RIVER BASIN UVAS - CARNADERO CREEK SANTA CLARA COUNTY CALIFORNIA G..(U) CORPS OF ENGINEERS SAN FRANCISCO CA SAN FRANCISCO DISTRICT JUL 81

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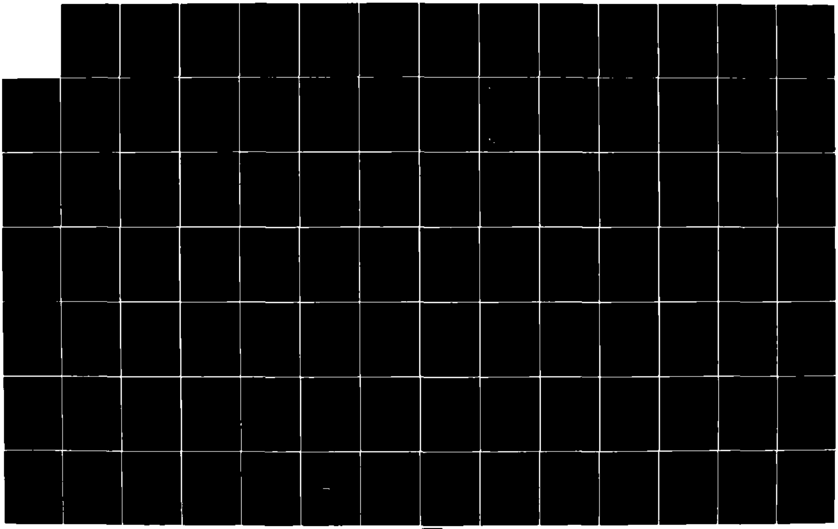

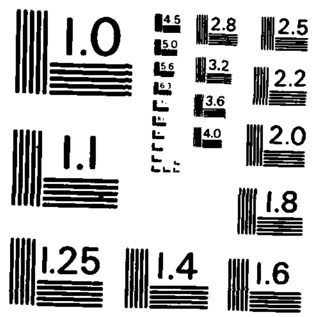

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SECTION K

BENEFITS

BENEFITS

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SECTION K

BENEFITS

1. Economic benefits from recreation usage associated with Federal projects have been prescribed to fall in the range $0.75 to $2.25 per recreation day in accordance with the "Principles and Standards" of the Water Resources Council. To determine where within this range of values the proposed project falls, the "Unit Value Approach" as presented in the report, "Analysis of Supply and Demand of Urban Oriented Non-Reservoir Recreation," published by the Institute for Water Resources in November 1976 as prepared by the Sacramento District of the Corps of Engineers, was used. The following description of the unit value approach has been excerpted from pages 36 and 37 of the above report.

"The unit value approach estimates the recreation benefit as the product of a unit day value multiplied by the estimated total number of recreation days to occur at a site. This approach can be used with any use estimating procedure. Currently the prescribed bounds on the unit value are $.75 and $2.25 (10). Given this range, a systematic scaling of the following criteria should be evaluated to determine the appropriate unit value within the specified range of values:

a. Quality of project access and recreation facilities provided.
b. Diversity of recreation activities available.
c. Extent of overcapacity expected or the existence of underutilized competitive alternatives.
d. Aesthetic conditions and planners' "feel" for possible uniqueness.

"A project's access quality refers to the project's location and the nonproject roads and highways linking the project and the using population. Recreational facilities' quality refers to capital improvements. These may vary from the mere meeting of public health and safety requirements to substantial development. Project quality also relates to the setting and location with respect to resources and population centers, and to the desires of local sponsors under applicable cost-sharing and other local cooperation criteria.

"The diversity of available recreational activities refers to the number of activities which various members of a party may engage during a single outing.

"Because capacity utilization and competitive alternatives are related, they are measured on the same scale. If it is expected that crowding will rarely occur and there are no underutilized alternatives, then the measurement would be the maximum allowable. However, if crowding does not occur because there are existing underutilized competitive alternatives, then the measurement would be lower value because the willingness to pay would be less, given the alternatives. Similarly, if there are few alternatives and this results in expected crowding, the value of the measurment should reflect the willingness to pay despite the crowded conditions. It should be understood that while it is possible to have average crowding and average competing alternatives, it is logically inconsistent to have both excessive crowding or overcapacity and extensive underutilized competitive alternatives, i.e., if the project is expected to be crowded and if crowding is accepted as an adverse condition, then if some other facility remains underutilized, it is judged to be not a competing alternative.

"Aesthetic conditions will, in general, be judged relative to what prevails in similar recreational environments. This scale, more than the others, will reflect the planner's personal values. For this reason and because the rest of the scales cannot accommodate all of the project's distinctiveness, the planners' feel for any uniqueness is explicitly coupled with the aesthetic conditions.

"The measurement of the preceding four criteria are necessarily judgemental. It is recommended that each criterion be given equal weight on a linear scale of 0-14. Hence, composite scores will range from 0 to 56 and translate into unit values as follows:

0-8	9-16	17-24	25-32	33-40	41-48	49-56
$.75	$1.00	$1.25	$1.50	$1.75	$2.00	$2.25

"The resulting unit value can be used for evaluating initial recreation benefits and for projecting benefits over the project's life. With this procedure, changes in annual benefits over time will usually result from just expected changes in annual use estimates and will be a function of the use-estimating procedure employed. However, if significant changes in one or more of the above criteria are expected to result over time, a new scaling of those criteria would be appropriate with the reevaluation of the unit value used where applicable."

2. Using the above system, the following values have been selected for the Uvas Creek Trail:

	Unit Point Value
Quality of access: Above average access at Thomas Road, Tenth Street, Miller Avenue and Wren Avenue -	8
Development and quality of facilities: Minimum development proposed except for hiking and bicycle trails and one staging area -	2

	Unit Point Value
Diversity and value of activities: Primarily bicycling, hiking, relaxing and some seasonal fishing. Potential for nature interpretive areas -	3
Overuse or oversupply: Full utilization of the trails is anticipated -	7
Aesthetics: General pleasing natural environment on the creek of the levee between Thomas Road and Miller Avenue. Upstream of Miller Avenue much of the vegetation has been removed	6
Total	26
Unit Value	$1.50

3. Based on the above unit value, the use projections contained in Sections of this appendix, a discount value of 7 3/8%, and a project economic life of 100 years, the equivalent annual benefit will be $21,000.

4. The benefit cost ratio for the proposed recreation development is estimated to be 1.75 to 1.

SECTION L

FISH AND WILDLIFE

FISH AND WILDLIFE

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SECTION L

FISH AND WILDLIFE

FISH

1. In the main Uvas-Carnadero Creek and in its tributaries below the Uvas Reservoir, steelhead spawning and nursery areas are constrained by the available quantity of water during water short and drought years. During normal or high runoff years when water releases from Uvas Reservoir are more reliable, steelhead spawning may occur throughout the entire stream with the best areas being located above the Adams School bridge. The main creek is a significant producer of smolt sized steelhead in most years. However, during dryer years, the spawning is limited in Uvas Creek. The operation of the reservoir as well as numerous minor diversions collectively use the water supply down to critical levels during the early summer. The severity of the problem fluctuates directly with wet and dry years. Throughout this main lower area, concentrations of garbage and trash have been seen often in the stream further impairing the fishery.

2. In 1972, 1976, and 1977, three recent drought years, Uvas Creek and its tributaries failed to produce steelhead. In 1973, 1974, 1975, 1978 and 1980, the creek produced considerable steelhead of smolt size. In 1971 and 1978 (higher flow years) the main creek probably out-produced the tributaries.

3. The main Uvas-Carnadero Creek area below Uvas Reservoir receives heavy angler pressure during steelhead and early trout season. Some light use is also made of the warmwater fishery.

4. The California Department of Fish and Game has recommended the following with regard to the management of the fishery resources in the Uvas Creek drainage basin.

WILDLIFE

5. Riparian habitats in the stream area presently provides living conditions for a greater variety of wildlife than any other habitat type. Some examples follow:

a. Large wading birds (herons, egrets, etc.). Large riparian trees are necessary for rookery sites.

b. Waterflow. The wood duck needs tree hole nesting areas.

c. Raptors (hawks, eagles, owls, vultures, and kites). Many species concentrate in riparian areas for nesting sites, feeding areas and roosting sites. The red-shouldered hawk is virtually confined to riparian areas.

d. Song Birds. They occur here in great variety and abundance. Some species are water-associated and many others of more general habits rely on riparian vegetation as a haven in an otherwise sparse habitat.

e. Game Birds. Quail are often numerous in riparian environments. Doves and pheasants are attracted to such areas.

f. Game Mammals. Cottentail and brush rabbits reach greatest densities in riparian areas. Deer are able to maintain small populations along rivers and sloughs.

g. Furbearers. In farming areas the riparian habitat is the concentration point for such species as raccoons, skunks, oppossums, foxes and coyotes. Mature riparian trees are vital to species like the raccoon, which establishes dens there.

h. Miscellaneous Non-game Mammals. These are found in abundance and variety.

6. Birds are a prominent wildlife feature, and like other fauna they have specific sub-habitat preferences. For example, California (scrub) jays preferred oak trees, while mourning doves were commonly associated with willows. Habitat for valuable raptorial birds is provided by tall Western sycamore trees throughout much of the Uvas Creek riparian habitat. A red-tailed hawk, a barn owl, and a great horned owl were also seen in association with these trees, some of which reach 120 feet in height.

7. The heavily developed land of the valley floor offers little cover or food supply for any but a limited variety of wildlife animals. Those observed on the site include ground and gray squirrels, field mice and jack rabbits. Hawks circle over the grassy slopes at times looking for rodents. Quail are seen around the springs on the site. An occasional black-tailed deer finds cover in the groves of oak trees.

ENDANGERED FLORA

8. Although no endangered plant species have been reported in the study area, one is reported in an area on the other side of the valley east of Anderson Reservoir. It is Parvisedum pentandrum (five stamened parvisedum) (Santa Clara County Planning Department, 1973).

ENDANGERED FAUNA

9. There are no known endangered fauna in the project area. The endangered California condor has been sighted overflying the area west of Chesbro Reservoir, but it is not reported to nest in the area (Santa Clara County, 1973). The southern bald eagle may also hunt over the area. No other endangered or rare species have been reported to inhabit the study area covered by this environmental statement. Two species of endangered wildlife inhabit the watersheds to the east, associated with the Anderson and Coyote Reservoirs. They are the southern bald eagle which nests there, and the San Joaquin kit fox reported there in 1970-1973 (California Department of Fish and Game, 1974, and U.S. Department of the Interior, 1974).

U. S. FISH AND WILDLIFE SERVICE REPORT

10. The United States Fish and Wildlife Service has reviewed the preliminary planning for the project and has recommended that, as a minimum, all existing riparian habitat be preserved and that, if possible, the project levee be setback further to provide for habitat enhancement. These recommendations are contained in the attached Fish and Wildlife Service letters dated March 16, 1978, May 21, 1979, and April 7, 1980. In accordance with these recommendations, the Corps evaluated alternatives that have preserved as well as provided for enhancement of the existing riparian vegetation. The Corps has selected project Alternative 2 that would preserve most of the existing riparian habitat as suggested by the Fish & Wildlife Service correspondence of April 7, 1980. The habitat would be removed in the reach between levee Station 58 and 69 where the alignment is constrained by the location of the existing city street, Uvas Park Drive. Riparian habitat enhancement was included in Alternative 3, however, the Corps has determined that cost of the lands required for a larger levee setback cannot be justified on the basis of Environmental Quality benefits.

11. The Fish and Wildlife Service project report prepared in accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) is contained in their letter dated May 5, 1981. This report supersedes the planning letter discussed in the above paragraphs. The report is concurred with by the California Department of Fish and Game and has been reviewed by the National Marine F sheries Service.

1 . e Fish and Wildlife Service recommendations as included on ages 6 and 7 of their report have been assessed and are generally concurred with by the Corps. The following is a point by point response to the Fish and Wildlife Service recommendations.

o Slope protection and levee construction would be conducted during periods of low flow. Although July is indicated by the Fish and Wildlife Service as the beginning of the low flow period, June has also been a month of low flow during dry years.

o The landside, waterside levee slope and berm and streambanks at the bridge crossing and slope protection sites will be hydromulched with grass. The levee crown would be asphalt and gravel surfaced to serve as a recreational bikeway and levee maintenance road, and, therefore, cannot be hydromulched.

o The vegetational removal to be accomplished in connection with the slope protection work will be coordinated with the State Department of Fish and Game, the National Marine Fisheries Service, and the Fish and Wildlife Service.

o Vegetative plantings to offset project-induced losses will be established within the limitation to maintain levee stability and channel capacity. During preparation of the Phase II General Design Memorandum, a conceptual landscape plan will be established through coordination with the State Department of Fish and Game, National Marine Fisheries Service and Fish and Wildlife Service. Costs for such a program have been included in the estimate for construction funds. The revegetation shall also be in accordance with EM 1110-2-301, "Landscape Planting at Floodwalls, Levees and Embankment Dams," and the State of California Reclamation Board, "Guide for Vegetation on Project Levees."

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Area Office
2800 Cottage Way, Room E-2740
Sacramento, California 95825

MAY 05 1981

In reply refer to: ES-S

District Engineer
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, California 94105

Dear Sir:

This letter constitutes the Fish and Wildlife Service's report on the Corps of Engineers' plannned flood control work in the Pajaro River Basin on Uvas-Carnadero Creek at Gilroy, California. The project to raise and lengthen an existing levee to provide flood protection for Gilroy was authorized by the Flood Control Act of 1944. This report was prepared under the authority, and in accordance with the provisions, of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.); it supersedes our planning aid letters of March 16, 1978, May 31, 1979, April 7, 1980, and December 11, 1980. The report is concurred in by the California Department of Fish and Game as indicated by the attached letter of April 10, 1981. The report has been reviewed by the National Marine Fisheries Service.

Our analysis of project impacts is based on a consideration of project data furnished by the Corps of Engineers prior to January 1981 and of biological data obtained in cooperation with the California Department of Fish and Game.

Description of the Planning Area

The Pajaro River Basin is situated in southern Santa Clara County approximately 75 miles south of San Francisco. Uvas-Carnadero Creek is a tributary of the Pajaro River and is located in the northwestern portion of the basin. Between the Highway 101 bridge and the Pajaro River, the creek is called Carnadero Creek; upstream from the bridge it is called Uvas Creek. Uvas-Carnadero Creek flows are partially controlled by Uvas Reservoir. The stream's major tributaries are Little Uvas Creek, located upstream of the dam, and Little Arthur and Bodfish Creeks, which enter the creek below the dam. Downstream of Bodfish Creek the stream enters the project area at the city of Gilroy (Plate 1).

Over 60 percent of the area within the city limits of Gilroy is in urban uses. Of the remainder, a little over half is in vacant land, with the balance in agricultural production. Within the floodplain, agricultural land is being converted at a fast rate to residential and commercial uses. Land use downstream of the project area is primarily rural-residential and agricultural.

Water quality in Uvas Creek is generally considered to be very good; however, quality problems, as a result of irrigation return flows, can occur as natural flow in the creek decreases during the summer and fall. The creek's riparian vegetation dominates the landscape and provides habitat for a variety of terrestrial organisms. As a result of past development, surrounding wildlife habitat has nearly been eliminated, thus the value of the riparian vegetation to terrestrial resources is accentuated.

Project Description

The project will protect the urbanized area of of Gilroy from the Uvas-Carnadero Creek standard project flood. The selected plan consists of constructing a new levee (4,000 feet), reconstructing an existing levee (3,500 feet), and raising an existing levee (1,000 feet). The planned work is on the north side of the creek, begins about 2,000 feet downstream of Thomas Road crossing, and ends approximately 1,000 feet upstream of Miller Road crossing. Slope protection is planned at three locations on the creek: (1) at the downstream terminus of the project; (2) at Princevale Street; and (3) on the creek's south bank about 750 feet upstream of Thomas Road crossing (Plate 2). Thomas Road and Bridge will be relocated 150 feet immediately upstream of the existing structures. Two farm buildings and one residence will be relocated.

The levees will be set back behind the existing tree line, except for the first 1,000-foot reach downstream of Miller Avenue where there is insufficient space between the trees and Uvas Park Drive. The levees will have a maximum height of 10 feet and top width of 12 feet. Slopes will be 3 feet to 1 foot on the waterside and 2 feet to 1 foot on the landside. Three potential borrow sources have been identified for levee construction material: (1) the U.S. Soil Conservation Service's Llagas Creek Flood Control Project; (2) Uvas Creek upstream of the Miller Road crossing; and (3) a commercial borrow pit. Slope protection will consist of riprap or gabion mats or walls. The slope protection work is to be completed in a manner which minimizes impacts on riparian vegetation.

Project implementation will result in a redirection of flows and increased flooding depth over 2,600 acres in the rural area south of Gilroy. In most areas the increase in flood water depth will be 0.25 feet; however, in some areas the increase in depth will be as much as 1.0 foot.

Existing Fish and Wildlife Resources

Aquatic Resources

It is estimated that the Pajaro River system supports an annual steelhead run of 500 to 1000 fish. The percentage of these steelhead entering the Uvas-Carnadero Creek system in the late fall and early winter seeking spawning sites has not been determined. The fish utilize spawning gravels in all accessible sections of the drainage. A substantial portion of the system's spawning gravel is located upstream of the project area, particularly in Bodfish and Little Arthur Creeks. In the late spring-summer period, when flows are low, the steelhead smolt must move out of the Uvas-Carnadero Creek system and into the Pajaro River.

Warmwater species occurring in the stream include squawfish, hitch, California roach, Sacramento sucker and riffle sculpin. During the low flow periods these species also move from tributaries into the Pajaro River.

Terrestrial Resources

In general, there are two habitat types in the project area: urban and riparian. The developed urban areas afford wildlife little cover or food for wildlife species other than songbirds and small mammals. There are 45 acres of riparian vegetation in and along the creek over the length of the project. Sycamore, willow, oak and eucalyptus are the dominant species. Additionally, shrubs, blackberry vines, grasses and herbs are common in the riparian habitat.

The importance of riparian areas to wildlife is related primarily to its structure. Diversity in bird species is related to foliage height and volume, percent cover, and plant species complexity. The availability of perch sites and presence of various food types also influences avian use. In addition, riparian zones are primarily linear in nature, which serves to maximize the edge-effect phenomenon in relation to adjacent areas. The presence of basic wildlife habitat elements and favorable juxtaposition of those elements also contributes to an abundance of wildlife. Further, a microclimate characterized by higher transpiration rates, increased humidity and air movement, and decreased temperatures is responsible for greater wildlife use compared to upland areas. The greater availability of moisture and organic debris promotes growth of plants and insects, both of which are basic components of the complex food webs existing in riparian zones that foster community stability.

The relatively small area representative of riparian systems provides a seemingly disproportionate amount of habitat for wildlife. Some of the highest breeding bird densitites in the continental United States have been reported for riparian zones. In many areas nearly 50 percent of the avifauna is associated with riparian systems, or reaches its greatest concentration therein. Even higher percentages are typcial of the more arid portions of the western United States. Riparian zones also provide food and cover to species utilizing adjacent upland areas, and they provide migration corridors as well. For example, nearly 80 percent of the terrestrial species known to occur in the Great Basin of southeastern Oregon are dependent on riparian areas or utilize them more than any other habitat. Of all mammal species in North America, 42 percent are associated with the riparian communities of the western United States.

The project area is within the range of the federally endangered California condor and San Joaquin kit fox. The San Joaquin kit fox inhabits the semi-desert area of the southern San Joaquin Valley and surrounding foothills. In general, the kit fox utilizes scattered native brushland on the valley floor and open annual grasslands, on gentle slopes, in the foothills. In addition, they seem to prefer the lighter well-drained, loam and sandy soils. The California condor inhabits the mountains of central California from Santa Clara and Fresno Counties south to Ventura and Los Angeles Counties. Nesting sites are usually located in caves, crevices and potholes in isolated areas of the coast and transverse mountain ranges. Typical roost sites are rock cliffs and dead conifer snags located in isolated or semi-secluded areas. Condors require open grassland for feeding to assure easy takeoff and approach.

Upstream from and adjacent to the project area, the stream and its floodplain have been modified significantly by sand and gravel operations. However, vegetation has begun to re-establish in this area and provide habitat for wildlife. Lands downstream of the project area are in agricultural use, mostly field crops and orchards. Wildlife use of this area is minimal.

Future Without the Project

With the exception of the conversion of agricultural and vacant lands to urban uses, no major physical changes affecting the creek are envisioned under without-the-project conditions. It is anticipated that the riparian vegetation along Uvas-Carnadero Creek would be preserved by means of land use controls since the city of Gilroy and the county of Santa Cruz plan to protect the creek in a regional linear park. However, continued urbanization will work to the disadvantage of the remaining habitat.

Future With the Project

Aquatic Resources

Levee construction and slope protection would eliminate 2.5 acres of riparian vegetation. The resultant reduction in stream shade would increase water temperatures. Further, the availability of fish food items, such as insects and organic debris, necessary for primary production would decline.

During construction, sediment inflow would increase stream turbidity and siltation, and aquatic organisms dependent upon sight for obtaining their food would be affected. Additionally, the sediments could clog respiratory systems of nektonic species and smother benthic species.

Removal of borrow from the creek would temporarily increase stream turbidity and siltation. Depending upon the instream borrow site location and design, migrating steelhead may be affected.

Terrestrial Resources

As noted above, project construction would result in a loss of 2.5 acres of riparian vegetation. Two acres of the affected vegetation adjacent to and downstream of the Miller Road crossing is dominated by eucalyptus; affected vegetation on the remaining 0.5 acre includes willow, sycamore and live oak. The loss of vegetation would eliminate those terrestrial organisms dependent upon the habitat.

The project would increase flooding depth over approximately 2,600 acres of agricultural land south of Gilroy. This would have only a minor effect on fish and wildlife.

Removal of borrow from the creek would affect areas previously disturbed by sand and gravel operations. However, without a specific project description and location, potential impacts cannot be determined.

Discussion

Sediment inflow associated with levee construction and slope protection work would temporarily impact aquatic resources. Limiting project construction activities to periods of normal low flow and hydromulching all affected areas would minimize these impacts. Estimated cost for hydromulching the bridge crossing site, levee work and slope protection areas is $8,500.

The permanent removal of 2.5 acres of riparian vegetation would result in a reduction in both aquatic and terrestrial resources. While specific animal numbers are undetermined, the riparian vegetation provides the only quality wildlife habitat in the immediate area and any loss therefore would be significant. Removal of vegetation at the slope protection sites should be limited through careful placement of materials and selective plant removal. To compensate for habitat value lost it would be necessary to increase the carrying capacity of adjacent habitat.

A planting program along the creek and on the levees would offset project-induced losses. Plantings should be made on the waterside levee slope and the levee berm and overflow areas upstream to the project terminus and downstream, for approximately 1,200 feet, of the Miller Road crossing. Removal of rubbish and debris would have to precede any planting upstream of Miller Road. Plantings should include native tree species such as sycamore, live oak and willow. Additionally, shrubs of value to wildlife such as elderberry, toyon and blackberry should be interspersed among the trees. The trees and shrubs should be planted as close to the creek and groundwater table as possible in order to provide maximum shading of the water surface and encourage plant survival. Irrigation of all plants would be necessary during the first year following planting.

An acceptable planting scheme for the waterside slope and the levee berm and overflow areas could include: (1) staggered rows of trees (1-gallon size) planted 15-25 feet apart; and (2) shrubs planted 5-10 feet apart and interspersed between the trees, creek and levee crown. Estimated planting and irrigation costs are $10,000.

Based on information currently available, there are no proposed or listed threatened or endangered species in the project area, or candidates for listing or designated critical habitats.

Specific information with regard to the proposed instream borrow site is not available. A study of alternative locations and designs should be completed prior to obtaining borrow to avoid adverse impacts on migrating steelhead.

Recommendations

We recommend:

1. That slope protection and levee construction be conducted during periods of low flow (July 1 to October 30).

2. That the levee crown, waterside levee slope and berm and streambanks at the bridge crossing and slope protection sites be hydromulched with grass. Estimated cost is $8,500.

3. That vegetation removal done in connection with the slope protection work be coordinated with the California Department of Fish and Game, National Marine Fisheries Service, and the U.S Fish and Wildlife Service.

4. That vegetative plantings be established to offset project-induced losses of riparian vegetation. A conceptual landscape plan approved by the California Department of Fish and Game, National Marine Fisheries Service, and the U.S. Fish and Wildlife Service should be included in the Phase 1 General Design memorandum for this project. It is estimated that this effort would cost $10,000.

5. That alternative plans be provided to the California Department of Fish and Game, National Marine Fisheries Service, and the U.S. Fish and Wildlife Service for review and comment if the stream is to be used as a source for borrow material.

We appreciate the cooperation of your staff during the preparation of this report. Please notify us of your proposed actions regarding our recommendations. We would appreciate notification of any changes in project plans so that we may revise this report as necessary.

Sincerely,

William W. Sweeney

Area Manager

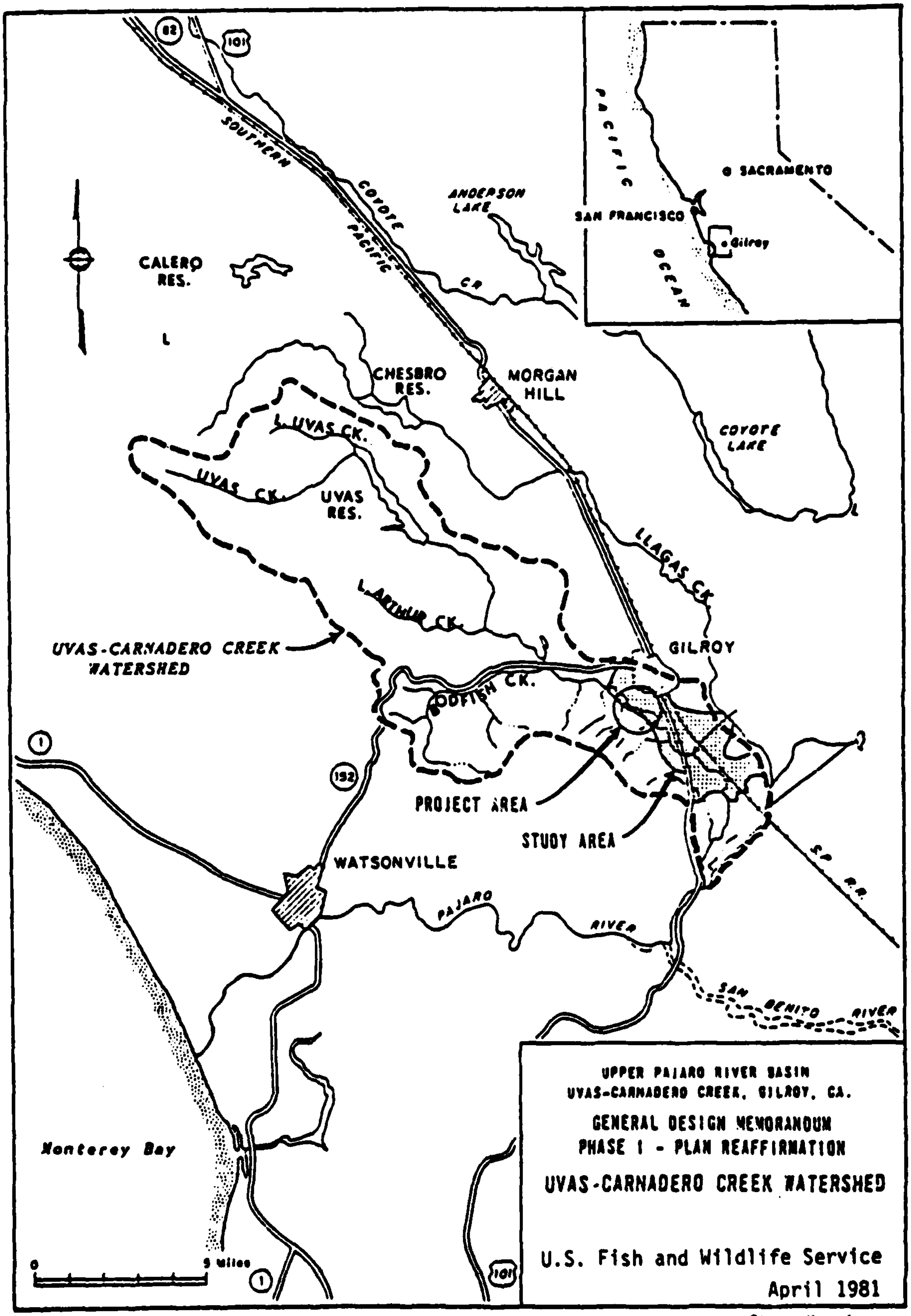
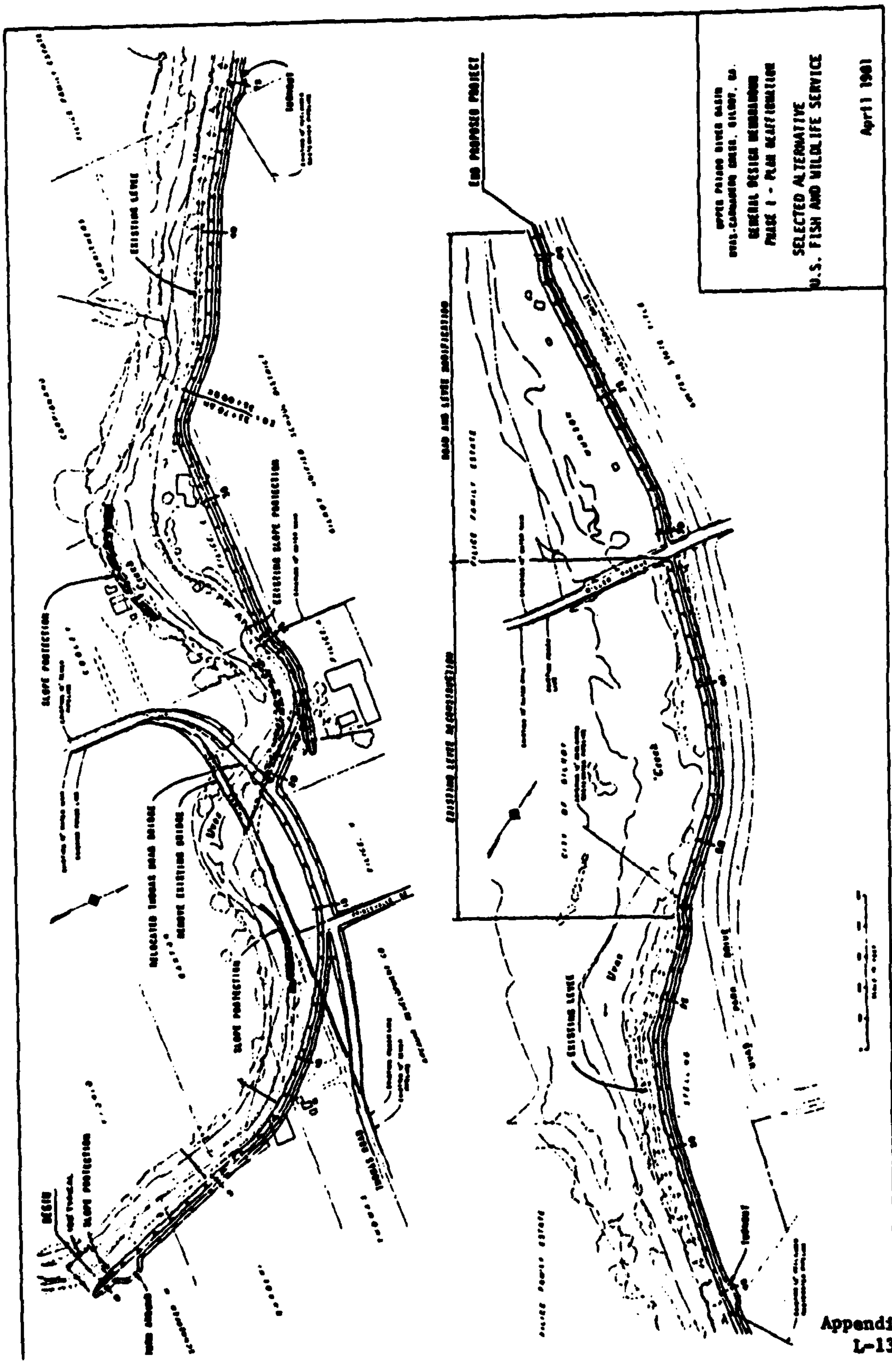

SOUTHERN
PACIFIC
COYOTE
ANDERSON LAKE
CALERO RES.
CHESBRO RES.
MORGAN HILL
L. UVAS CK.
UVAS CK.
UVAS RES.
COYOTE LAKE
LLAGAS CK.
GILROY
UVAS-CARNADERO CREEK WATERSHED
PROJECT AREA
STUDY AREA
WATSONVILLE
PAJARO RIVER
SAN BENITO RIVER
S.P. R.R.
Monterey Bay
SACRAMENTO
SAN FRANCISCO
PACIFIC OCEAN
Gilroy
0 5 Miles
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
UVAS-CARNADERO CREEK WATERSHED
U.S. Fish and Wildlife Service
April 1981

Plate No. 1


GENERAL DESIGN MEMORANDUM
SELECTED ALTERNATIVE
U.S. FISH AND WILDLIFE SERVICE
April 1981
END PROPOSED PROJECT
EXISTING LEVEE
SLOPE PROTECTION
EXISTING SLOPE PROTECTION
RELOCATED THOMAS ROAD BRIDGE
REMOVE EXISTING BRIDGE
ROAD AND LEVEE MODIFICATION
EXISTING LEVEE RECONSTRUCTION
BEGIN

United States Department of the Interior

FISH AND WILDLIFE SERVICE
DIVISION OF ECOLOGICAL SERVICES
2800 Cottage Way, Room E-2727
Sacramento, California 95825

March 16, 1978

Colonel John M. Adsit
District Engineer
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, California 94105

Dear Colonel Adsit:

This responds to Mr. H.E. Pape, Jr.'s letter of March 1, 1978, requesting comments on the Review Report, Pajaro River Basin, California. That report recommends that engineering and design studies for 7,850 feet of new levees on Uvas Creek, near Gilroy, California, be undertaken as authorized by the December 1944 Flood Control Act.

The report is accurate with respect to matters of fish and wildlife. There are only negligible impacts on wildlife habitat associated with Plan 4A, the locally preferred plan. We believe that during construction every effort should be taken to protect the existing riparian habitat.

The proposed project has potential wildlife enhancement capabilities if a levee setback greater than 10 feet is provided. About 1 acre of land would be required for each additional 5-foot setback. A 15-, 20-, or 25-foot levee setback would provide for a larger berm area which would, even without plantings, eventually support riparian habitat and the wildlife populations associated with it. Esthetic values would also measurably increase. A 15- to 20-foot levee setback could perhaps double the wildlife habitat and esthetic values that would exist with the proposed 10-foot levee setback. In our opinion this would be in important contribution to the social well-being of the Gilroy area residents. We cannot urge the project sponsors too strongly in this endeavor, for once the levees are placed this option is irretrievably lost.

ATTACHMENT 5

Thank you for the opportunity to comment on the Review Report.

Sincerely yours,

Felix E. Smith

Felix E. Smith
Field Supervisor

cc: Area Mgr., FWS, Sacramento
Dir., CDF&G, Sacramento
Mr. Frank Wood, City Adm.,
Gilroy City Hall, 7390 Rosanna St.,
Gilroy, California 95020

United States Department of the Interior
FISH AND WILDLIFE SERVICE
DIVISION OF ECOLOGICAL SERVICES
2300 Cottage Way, Room E-2727
Sacramento, California 95825

MAY 1979

Colonel John M. Adsit
District Engineer
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, California 94105

Subject: Pajaro River Basin, California

Dear Colonel Adsit:

I would like to supplement the Service's March 16, 1978 letter on the subject investigation, regarding levees on Uvas Creek near Gilroy, California.

When we wrote the above-referenced letter we believed that all existing riparian vegetation along Uvas Creek occurred no further than 10-feet landward of the top of bank. We also assumed that with a 10-foot levee setback there would be no construction impacts on existing riparian habitat. At this time we wish to expand upon our earlier letter by saying that the levees, if constructed, should not directly impact any of the existing riparian habitat. Perhaps a larger setback would be required in some reaches to accomplish this objective. As before, a levee setback greater than the minimum required to preserve all existing riparian habitat would provide incidental enhancement to the environment as riparian habitat would then probably encroach towards the levee on what is now cleared land.

As your staff finalizes advanced designs, please have them submit alignment drawnings to us so that we may check to see that, at a minimum, all existing riparian habitat is preserved.

Sincerely,

James J. McKevitt

James J. McKevitt
Field Supervisor

cc: CDF&G, Menlo Park

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Division of Ecological Services
2800 Cottage Way, Room E-2727
Sacramento, California 95825

April 7, 1980

District Engineer
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, California 94105

Subject: Pajaro River Basin

Dear Colonel Adsit:

This planning aid letter is provided pursuant to our work scope agreement. The comments contained herein are based on your General Design Memorandum (preliminary draft) for the Pajaro River Basin, Uvas-Carnadero Creek, Santa Clara County, California (February, 1980).

We are pleased that the Corps has tentatively selected alternative 3 as the recommended plan. This alternative includes: (1) the reconstruction of approximately 2,100 linear feet of an existing levee, (2) the construction of about 5,500 linear feet of new levee, (3) the purchase and relocation of five farm buildings and one residential building, and (4) the relocation of [illegible] Road and bridge. The new levee would generally be setback at least 100 feet from the stream channel. Of the plans evaluated, alternative 3 provides for the greatest amount of protection for riparian habitat and allows for the greatest expansion of the riparian corridor. The development of new sources of water is not a feature of this alternative, nor of any of the seven other alternatives under consideration. Therefore, the flow regime in Uvas-Carnadero Creek is not expected to be altered by the project.

The Service is satisfied that implementation of the recommended plan described in the referenced report would not adversely impact the fish and wildlife resources in the project area. In fact, the levee setbacks (100+ feet) should result in the expansion of the riparian zone which would be of benefit to many wildlife species.

It is understood that the selection of alternative 3 as the recommended plan is only tentative. We therefore request the opportunity to review and comment on the plan ultimately selected.

Sincerely,

James D. Carson

for James J. McKevitt
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
2800 Cottage Way, Room E-2727
Sacramento, California 95825

Colonel Paul Bazilwich, Jr.
District Engineer
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, California 94105

Subject: Planning Aid Letter - Pajaro River Basin, Uvas-Carnadero Creek Project

Dear Colonel Bazilwich:

This planning aid letter is provided pursuant to our work scope agreement. The comments contained herein address your Draft General Design Memorandum for the Pajaro River Basin, Uvas-Carnadero Creek, Santa Clara County, California (October 1980). This information is provided as technical assistance; it does not constitute our detailed report as specified in Section 2 of the Fish and Wildlife Coordination Act.

The selected alternative (Alternative 2) includes: (1) construction of 4,000 feet of new levee, (2) reconstruction and setback of 2,400 feet of existing levee, (3) reconstruction of 1,100 feet of existing levee, (4) raising 1,000 feet of existing levee, (5) construction of approximately 600 feet of bank protection, (6) relocation of Thomas Road and Bridge, and (7) purchase and relocation of two farm buildings and one residence.

The Service provided comments on April 7, 1980, which supported the selected plan identified in the Preliminary Draft GDM (Alternative 3). Under that alternative, levees would generally be set back 100 feet from the stream channel. Under the plan now proposed, levees would generally be set back behind existing vegetation. While both plans provide equal protection for existing riparian vegetation, the opportunity for riparian enhancement associated with Alternative 3 would be foregone.

It is anticipated that habitat losses due to levee placement and slope protection could be offset by establishing vegetative plantings on the new and reconstructed levees and disturbed river bottom areas. Also, during construction efforts should be made to minimize the removal of existing vegetation. Providing these measures are included, the Service believes that implementation of the recommended plan would not adversely impact the fish and wildlife resources of the project area.

We appreciate the opportunity to provide these comments. If you should have any questions please contact Mr. Rick Breitenbach (FTS 468-4731).

Sincerely yours,

James J. McKevitt
Field Supervisor

cc: Dir., CDF&G, Sacramento, CA
Reg. Mgr., Reg. III. CDF&G, Yountville, CA
NMFS, Tiburon, CA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
AREA OFFICE
2800 Cottage Way, Room E-2740
Sacramento, California 95825

APR 23 1981

In reply refer to: SESO
#1-1-81-SP-159

Mr. Jay Soper
Chief, Engineering Division
Corps of Engineers
San Francisco District
211 Main Street
San Francisco, California 94105

Subject: Request for List of Endangered and Threatened Species in the Area of the Proposed Flood Control on Uvas - Carnadero Creek, Pajaro River Basin, Santa Clara County, California

Dear Mr. Soper:

This is in reply to your letter of March 23, 1981, requesting a list of listed and proposed endangered and threatened species that may occur within the area of the subject project. Your request and this response are made pursuant to Section 7(c) of the Endangered Species Act of 1973 as amended (PL 95-632).

We have reviewed the most recent information and to the best of our knowledge there are no listed or proposed species within the area of the project. We appreciate your concern for endangered species and look forward to continued coordination. If you have further questions, please contact Mr. Swanson of our Endangered Species Field Office at (FTS) 448-2791 or (916) 440-2791.

Sincerely,

Area Manager

United States Department of the Interior

FISH AND WILDLIFE SERVICE
AREA OFFICE
2800 Cottage Way, Room E-2740
Sacramento, California 95825

APR 23 1981

In reply refer to: SESO
#1-1-81-SP-159

Mr. Jay Soper
Chief, Engineering Division
Corps of Engineers
San Francisco District
211 Main Street
San Francisco, California 94105

Subject: Request for List of Endangered and Threatened Species in the Area of the Proposed Flood Control on Uvas - Carnadero Creek, Pajaro River Basin, Santa Clara County, California

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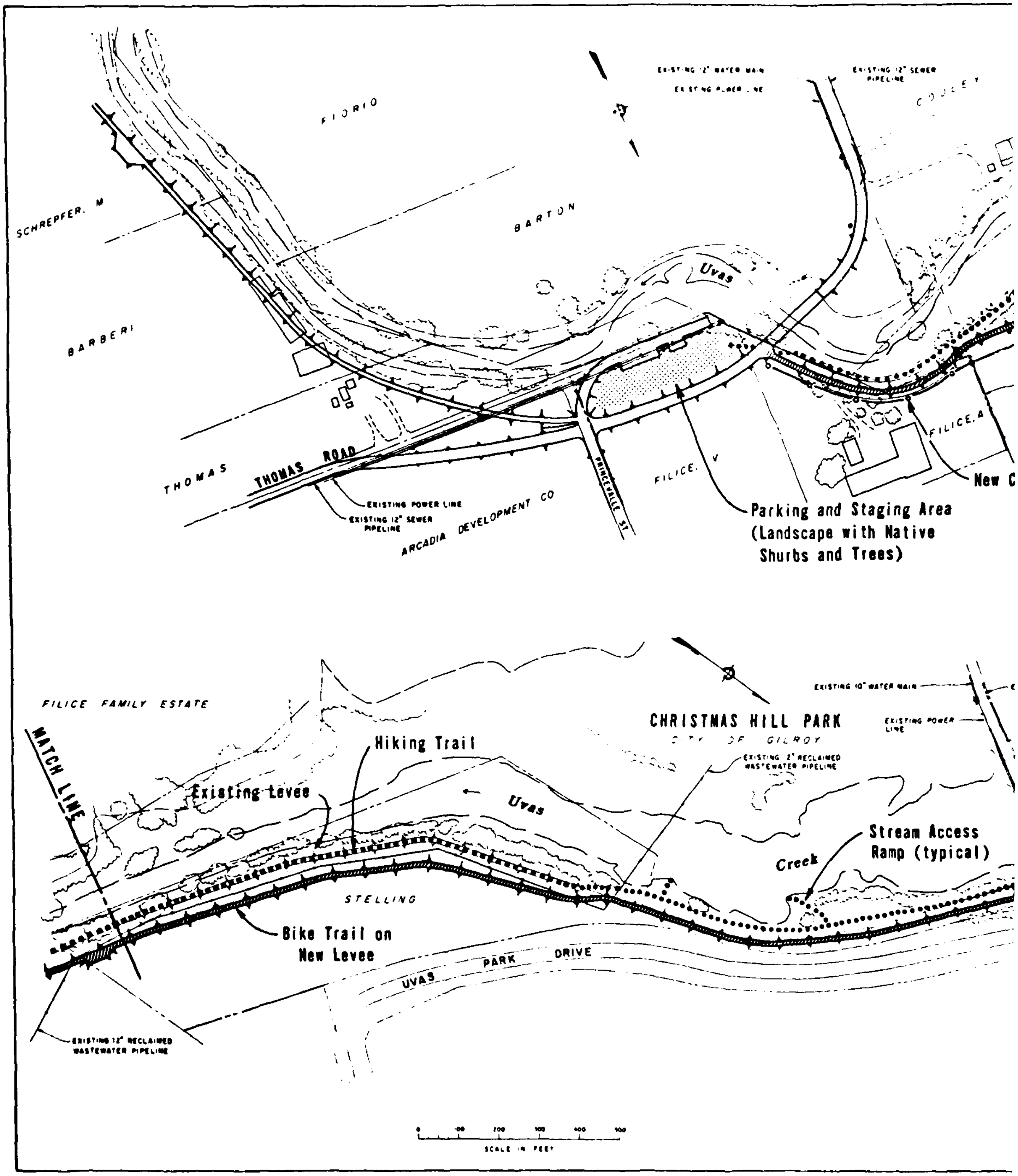
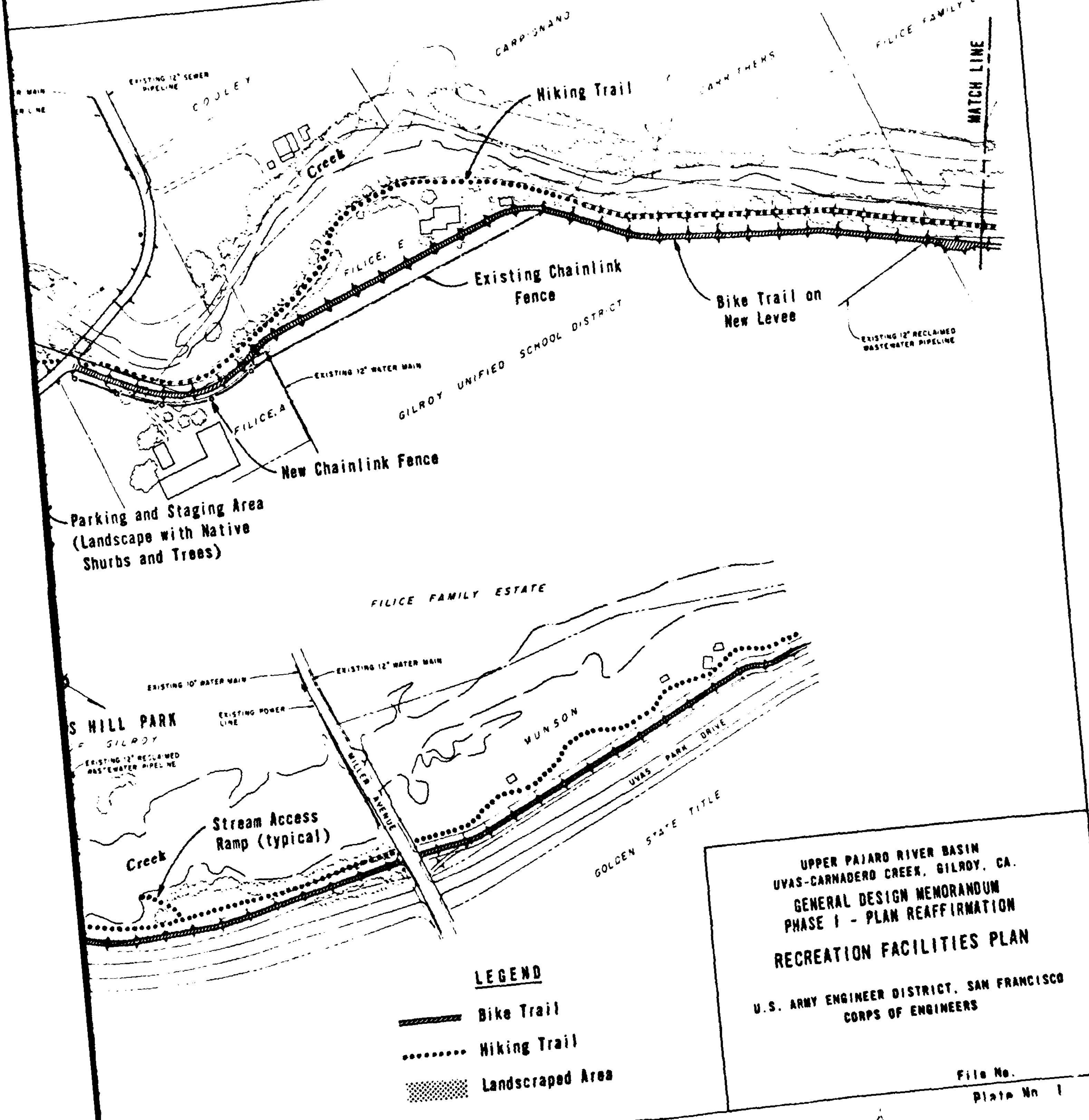
Sincerely,

Area Manager



EXISTING 12" WATER MAIN
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
FIORIO
SCHREPFER, M
BARTON
Uvas
BARBERI
THOMAS
THOMAS ROAD
EXISTING POWER LINE
EXISTING 12" SEWER PIPELINE
ARCADIA DEVELOPMENT CO
PRINCEVALLE ST.
FILICE, V
FILICE, A
New C
Parking and Staging Area
(Landscape with Native
Shurbs and Trees)
FILICE FAMILY ESTATE
MATCH LINE
Hiking Trail
Existing Levee
CHRISTMAS HILL PARK
CITY OF GILROY
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
EXISTING 10" WATER MAIN
EXISTING POWER LINE
Uvas
Creek
Stream Access
Ramp (typical)
STELLING
Bike Trail on
New Levee
UVAS PARK DRIVE
EXISTING 12" RECLAIMED WASTEWATER PIPELINE
SCALE IN FEET

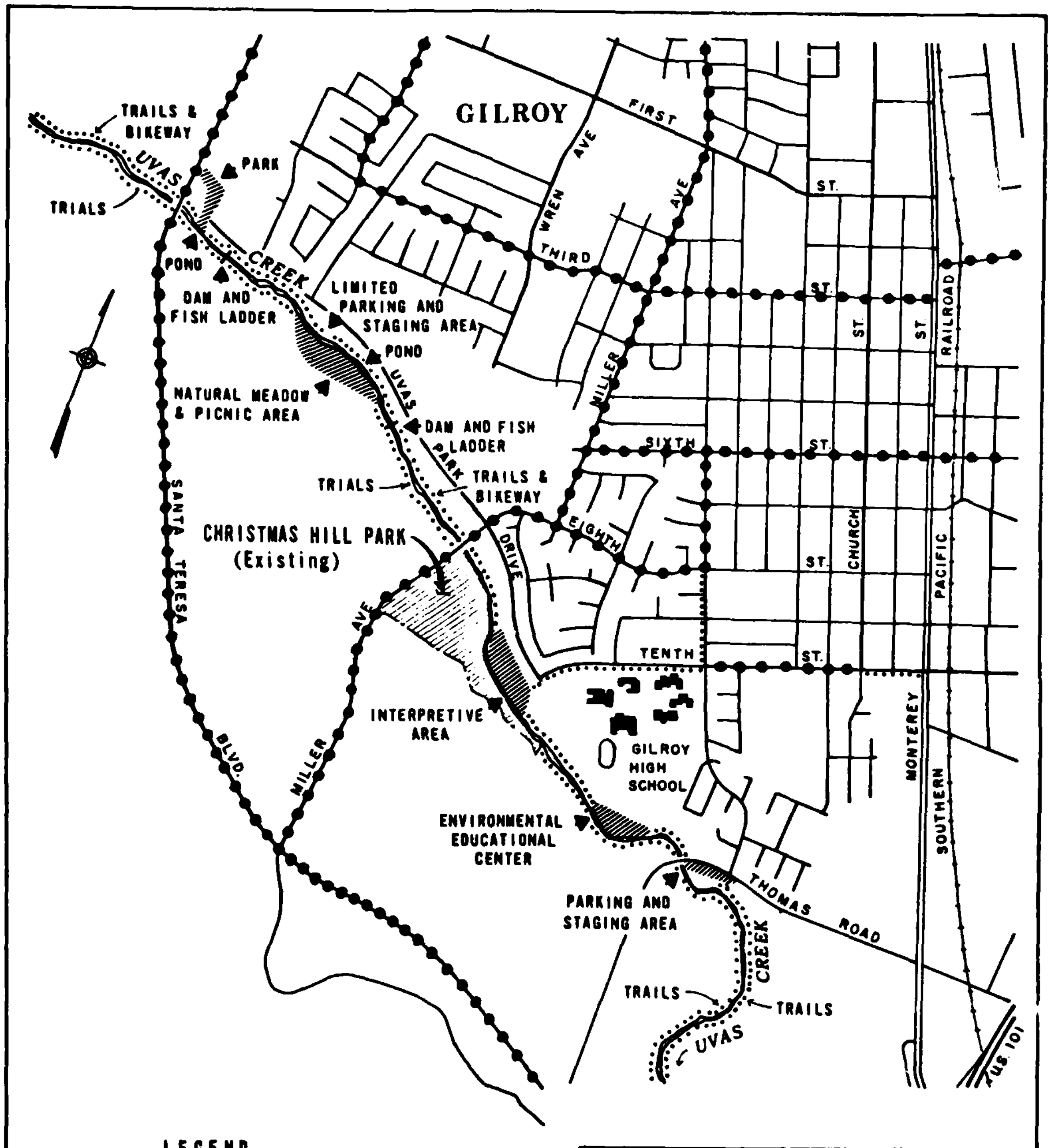


UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

RECREATION FACILITIES PLAN

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.
Plate No. 1



LEGEND

·············· Proposed Bikeway

●●●●●● Existing Bikeway

0 1000 2000 3000 4000

SCALE IN FEET

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

UVAS CREEK RECREATION RESOURCES
POTENTIAL FACILITIES

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 2

APPENDIX 4

SOCIAL AND CULTURAL RESOURCES

SECTION A - SOCIAL WELL-BEING

SECTION B - CULTURAL RESOURCES

SECTION A

SOCIAL WELL-BEING

SECTION A

SOCIAL WELL-BEING

1. A project designed to protect people from damages and the nuisance of storm flooding impacts social well-being in addition to economic development and environmental quality objectives.

2. Social well-being impacts are measured as:

- Effects on real income
- Effects on security of life, health, and safety
- Education, cultural, and recreational opportunities
- Effects on emergency preparedness

3. The project will not significantly affect current or future land use because a majority of the land in the flood plain protected by the project has already been developed. The project would displace no more than one family and relocation assistance would be provided in accordance with the law.

4. There will be a small loss in local tax revenues as a result of the project because of the removal of no more than one home, or two farm buildings, and 63 acres of privately owned land from the tax roll. Of this land, 42 acres are located in the stream channel while a maximum of only 21 acres are in usable overbank land of significant value.

5. Construction of the Uvas Creek levee would significantly reduce flood damages and prevent disruption in day to day living and in earnings for residents in the Gilroy area. Some potential losses to agricultural lands would also be reduced with the exception of some areas that would be the recipient of some induced damages.

6. Because of the relatively small magnitude and short term of the project construction, there would be a minimal influx of construction worker, and it is not anticipated that community services would be significantly affected. Local hiring of construction workers would slightly reduce local unemployment and provide additional revenues for local economy for a brief period of time.

7. The project increases recreation opportunities in the area by providing picnic, hiking, and bicycling areas.

8. The project would enhance educational opportunities by placing into public ownership a natural area within the City adjacent to Gilroy High School and about three miles from Gavilan College. No impact on cultural opportunities is anticipated.

9. By providing flood protection, the project would lessen the need for emergency procedures.

SECTION B

CULTURAL RESOURCES

SECTION B

CULTURAL RESOURCES

1. Shkurkin et. al. (1974) [1] discovered three cultural resources within the potential impact area of the levees and riprap proposed for Uvas Creek. These consisted of historic structure "H-6", and archaeological sites CA-SCl-85 and CA-SCl-86. On 11 September 1980, Mark O. Rudo, staff archaeologist with the San Francisco District, Corpos of Engineers, inspected "H-6" and CA-SCl-85 to determine their current disposition. CA-SCl-86, buried beneath nine to ten feet of silt, could not be inspected. The results of the inspection are as follows:

"H-6": This historic homestead, dated to the 1850's, has been completely destroyed, and removed from the property. The remains of the homestead consist of several trees in the former garden, and a mailbox.

CA-SCl-85: This site, "80% destroyed" (Shkurkin et. al. 1974) at the time of initial survey, is now completely destroyed. An intensive examination of the site location yielded only two possible chert waste flakes, and a small non-artifactual Haliotis fragment. The soil consisted of a light colored sandy alluviam, which had been recently disked. An examination of the adjacent creek bank (Uvas Creek) revealed no buried archaeological deposits. The site appears to have been completely removed by grading.

2. "H-6" and CA-SCl-85 have been destroyed and therefore cannont meet any of the National Register criteria. CA-SCl-86 was heavily impacted by the excavation of a swimming pool (cause of its discovery). After consulting with Mr. Shkurkin, the San Francisco District, Corps of Engineers determined that CA-SCl-86 lacked sufficient integrity for National Register elegibility.

3. "H-6" and CA-SCl-85 no longer exist and will therefore not be affected by the proposed project. CA-SCl-86 will not be affected by the proposed project due to its protective cover of alluvial deposition.

4. No subsurface excavation is proposed wi in several hundred feet of CA-SCl-86.

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[1] Shkurkin, George V., William A. MacDonald, Daniel E. Seachord, Steven Brown, "Site Survey for Archaeological/Historical Environmental Impace Report Concerned with the Proposed U. S. Army Corps of Engineers Project on Hayes Valley Reservoir and the Uvas (Carnadero) Creek Levee Scheme, December, 1974

5. Buried Archaeological Sites - Sections (totalling approximately 3,100 feet in length) of the proposed levee system will require the excavation of inspection trenches at least six feet in depth, and twelve feetn in width (see Plate No. 11 in EIS). Shkurkin et. al. (1974) note a distinct potential for the existence of buried archaeological sites along the course of Uvas Creek. Such sites (e.g. CA-SCl-86) cannot normally be identified in the course of a surface reconnassance, as was conducted for this project. In order to protect potentially buried archaeological sites from adverse project impacts resulting from excavation of the inspection trenches, the Corps proposes to field a qualified archaeological monitor during trench excavation. Should significant archaeological resources be discovered under construction, all subsurface excavation within 50 feet of the discovery would cease pending evaluation of the resource and consultation with the State Historic Preservation Officer (SHPO) and the Heritage Conservation and Recreation Service. The Corps would comply fully with 36 CFR 800.7 and the Archaeological and Historic Preservation Act of 1974 (16 USC 469 (a)).

6. A Cultural Resource Survey Information Request was submitted to the SHPO with the attached Corps letter dated 16 October 1980. The SHPO conducted a cultural resources record search and concluded that there were no California Historical Landmarks, Points of Historical Interest, or sites included in or eligible for inclusion in the National Register of Historic Places, located within the proposed project impact area. A copy of the SHPO letter dated November 19, 1980 is attached to this appendix.

STATE OF CALIFORNIA—THE RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 2390
SACRAMENTO 95811
(916) 445-8006

NOV 19 1980

Department of the Army
San Francisco District
Corps of Engineers
211 Main Street
San Francisco, CA 94105

Proposed Floodproofing Project South of Gilroy, California

My staff has conducted a search of our cultural resource records for the project area referenced above.

According to these records, the following resources are located within or adjacent to the project's impact area:

1. California Historical Landmarks ___ Yes _x_ No
2. Points of Historical Interest ___ Yes _x_ No
3. Sites included in or eligible for inclusion in the National Register of Historic Places ___ Yes _x_ No

Since the Archeological Regional Officer for your area has the most current records, he should be contacted for an archeological site records search.

As you are probably aware, Federal projects or those assisted by Federal funding or licensed by Federal permits must comply with Section 106 of the National Historic Preservation Act of 1966. Any properties possessing archeological, historical, architectural, or cultural value within the project's area of potential environmental impact must be identified and assessed in terms of the National Register of Historic Places criteria. Structures scheduled for demolition, sale, or alteration must be assessed for their architectural, historical, or engineering significance.

In furtherance of compliance with the National Historic Preservation Act, all cultural resource survey documentation should be forwarded to this Office for review and comments.

APPENDIX 5

ECONOMIC CONSIDERATIONS

ECONOMIC SETTING AND BASE AND FLOOD CONTROL BENEFITS

ECONOMIC CONSIDERATIONS

ECONOMIC SETTING AND BASE AND FLOOD CONTROL BENEFITS

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ECONOMIC CONSIDERATIONS

ECONOMIC SETTING AND BASE AND FLOOD CONTROL BENEFITS

HISTORICAL BACKGROUND

1. In prehistoric times, lands in the vicinity of the study area were occupied by Indians of the Costanoan linguistic group. The first Spanish explorers to enter the study area was the Gasper Portola expedition, which in 1769 traversed the western side of the Santa Clara Valley on its way to San Francisco Bay.

2. The explorers were followed by soldiers, missionaries, and settlers. To provide economic self-sufficiency for the presidios and missions in the San Francisco and Monterey areas, a pueblo (a civilian agricultural settlement) was established in 1777 on the Guadalupe River. As a result of the establishment of the pueblo, agriculture was introduced in the Santa Clara Valley and in the study area. Agricultural crop production and cattle raising becoming prominent during the first half of the Nineteenth Century.

3. The discovery of gold in California caused a tremendous influx of settlers, which created a demand for agricultural products in the San Francisco Bay Area. The result was a rapid conversion of large acreages of land in the study area from cattle raising to wheat farming. By 1870, California was second in wheat production to the United States, with large surplus tonnages being exported to England. During the latter part of the Nineteenth Century, production in the valley turned away from wheat to fruits and vegetables, primarily prunes and apricots. Agriculture and agriculturally-oriented manufacturing industry remain the dominant factors in the economy of the Santa Clara Valley at the present time. However, the rapid urbanization which has occurred in the northern parts of the valley has influenced the economic activity in the vicinity of the City of Gilroy.

POPULATION

4. The population in the City of Gilroy grew slowly before 1960. The rate of population growth in the city increased sharply during 1960-1970 with an increase from 7,348 to 12,665, or 72 percent. The city has continued to grow at this increased rate during the period 1970-1979 with an increase from 12,665 to 19,990, or 57 percent.

5. This increase in the rate of population growth has been related to increases in employment in the city and to large increases in economic activity which have occurred in the San Jose metropolitan area. It is

expected that the City of Gilroy will continue to be a separate community through the 50-year projection period 1983-2033, and will not be engulfed by the expanding San Jose area during this time period. Future projections for the city, shown on Table 1, were made by extrapolating historical trends. These projections are consistent with the California Department of Finance E-150 projections for Santa Clara County.

TABLE 1

HISTORIC AND PROJECTED POPULATION

CITY OF GILROY[1/]

1960	7,348[2/]
1970	12,665[2/]
1981	22,000[3/]
1983	24,000
1993	31,000
2003	39,000
2013	46,000
2023	54,000
2033	62,000
2083	62,000

1/ Corps of Engineers projections, except as indicated
2/ U. S. Department of Commerce, Bureau of the Census, 1960, 1970
3/ California Department of Finance Estimate, May 1, 1981, based on the 1980 census.

EMPLOYMENT

6. The largest industrial sector in the City of Gilroy in 1970 for which the most recent detailed information is available was manufacturing comprising 26 percent of the working population, this percentage was slightly higher than the corresponding percentage for the State (22 Percent). This high percentage is due to the food processing plants located in the vicinity of the city whose operations are labor intensive and employ a large number of people per plant. The second largest industrial category was wholsale and retail trade (19 percent), which is approximately the same as the State (21 percent). This high level of trade is due primarily to the location of Gilroy along the major highway, U. S. 101. The third largest category was agriculture, forestry, and fisheries (14 percent) compared to 3 percent for the State, which reflects the agricultural orientation of the City of Gilroy. The fourth largest category was service (14 percent) compared to 23 percent for the State, which reflects

the fact that the economy of Gilroy is primarily rural in nature and lacks the variety of services larger metropolitan areas provide. Employment by industry for 1970 for the City of Gilroy and the State of California is shown on Table 2.

AGRICULTURE

7. Historically, agriculture has been the major industry in the vicinity of the City of Gilroy. Although urbanization has occurred in the area during the past 25 years, the growing, processing and marketing of farm products account for about 85 percent of the annual income, and given its location and the rural nature of the area, it is expected that agriculture will continue to be the predominant economic force over the next 50 years. Fruit and vegetable crops predominate in these highly productive agricultural lands. Some pasture and grain are grown around the fringes of the valley floor.

8. The valley land north of Gilroy is devoted mainly to prune orchards with smaller areas in strawberries, grains, and hay. South of Gilroy, such crops as beans, tomatoes and lettuce can be grown only during dry months while garlic and sugar beets are grown all year round. Grapes are grown in vineyards in the hills and nine wineries are located in the vicinity of Gilroy. In addition, there are three cattle ranches, two dairies, and two chicken ranches. Most of the agricultural land in the study area is irrigated by pumped groundwater.

9. The agricultural land in the Uvas-Carnadero floodplain to the south of the City of Gilroy possess a clay soil which limits production during the rain season to small acreages of garlic and sugar beets.

MANUFACTURING

10. There are 60 industrial firms in the vicinity of Gilroy. Leading classes of products are: food processing, paper products, seed production and research animals. The largest firms in the area and their approximate number of employees are shown on Table 3.

TRANSPORTATION

11. The City of Gilroy is located on U. S. 101, which is the major route along the California coast between San Francisco and the Los Angeles area. U. S. 152 also runs through the city with connections to Watsonville, Santa Cruz, and the Monterey Penisula to the west

TABLE 2

DEVELOPMENT BY INDUSTRY, 1970

CITY OF GILROY AND THE STATE OF CALIFORNIA [1/]

	Gilroy		California	
Category	Employees	Percent of Total	Employees	Percent of Total
Agriculture, Forestry, and Fisheries	950	14.3	233,850	3.1
Mining	32	.5	34,379	.5
Construction	444	6.7	404,350	5.4
Manufacturing	1,715	25.9	1,614,687	21.6
(Durable Goods)	(789)	(46.0)	(1,105,242)	(68.4)
(Non-durable Goods)	(926)	(54.0)	(509,445)	(31.6)
Transportation	221	3.3	272,957	3.6
Communications and Public Utilities	169	2.5	260,162	3.5
Wholesale and Retail Trade	1,281	19.3	1,575,721	21.0
Financial, Insurance, and Real Estate	162	2.5	443,165	5.9
Services	924	13.9	1,697,681	22.7
Government	738	11.1	947,738	12.7
TOTAL	6,636	100.0	7,484,690	100.00

1/ U.S. Department of Commerce, Bureau of the Census, 1970

TABLE 3

INDUSTRIAL EMPLOYMENT

NAME OF COMPANY	EMPLOYMENT	PRODUCTS
Air-O-Fan Corporation	25*	Agricultural Machinery
California Canners & Growers	525*	Fruits/Vegetables
Crown-Zellerbach Corporation	70	Paper Products
Gentry, Inc.	700*	Food Processing
Gilroy Foods, Inc.	850*	Food Processing
Gilroy Produce	200*	Fruits/Vegetables
Goldsmith Seeds	50*	Seeds
National Fiberglass Company	35*	Shower Doors
Pacific Central Company	55	Paper Products
Pieters-Wheeler Seeds	63*	Seeds
Simonsen Laboratories	85	Research Animals
Sunsweet, Inc.	30*	Fruit

*Seasonal Peak Employment

and the San Joaquin Valley to the east.

12. The city is on the main line of the Southern Pacific Transportation Company between San Francisco and Los Angeles. Forty-five trucking firms operate in Gilroy with overnight delivery to San Francisco, Los Angeles, and intermediate points.

13. The South County Airport located near San Martin has a single runway and serves general non-commercial aviation. San Jose Municipal Airport, 28 miles to the north, provides scheduled commercial passenger and air freight service.

FLOODPLAIN CHARACTERISTICS

FLOOD HAZARD

14. The project area is the Uvas-Carnadero floodplain from Miller Avenue downstream to Soap Lake. The study area is a larger area of potential impact which includes the floodplain, the City of Gilroy, and areas immediately surrounding the city.

15. The Standard Project and 100-year floodplains are shown on Plates 1, 2 and 3 of Appendix 2. High hazard areas are located primarily in the developed portions of the floodplain within the Gilroy city limits. Reaches located upstream of Miller Avenue are relatively undeveloped at this time, and none of the proposed plans are expected to have significant economic impacts in these areas. Damaging floods have occurred on the Uvas-Carnadero Creek in 1937, 1940, 1955, 1958, 1963, and 1967; however, little data is available except for the flood of 1955. The flood of December 1955, with a flow of 14,000 cfs at Highway 101, is the flood of record. Although there was damage to urban properties during the flood, analyses indicate that these damages were caused by flooding along Llagas Creek and Miller Slough. It appears that flood damages along Uvas Creek at that time were incurred mainly by agricultural lands and properties in areas immediately along the creek. This flood occurred prior to the completion of Uvas Dam in 1957. Had the dam been in operation in 1955, the flood peak would have been reduced by about 5,000 cfs and would have probably been confined to the creek channel. Under existing conditions the Standard Project Flood would have depths ranging up to 3.5 feet of water. Due to the nature of the flooding, it was estimated that the velocities in the floodplain would be about two to three feet per second.

16. An existing levee is located along the creek from Miller Avenue downstream to 2,750 feet upstream from the Thomas Road Bridge. The levee has been examined by means of soil borings and has been judged to be "marginal" in stability. Therefore, it was assumed to fail to the natural ground for events larger than the 20 year flood.

17. The existing floodplain and the various depth areas are shown on Plate 1 of Appendix 2.

18. Damages which occurred during the 1955 storm were collected by the San Francisco District. However, these damages were caused by commingled flows from Uvas-Carnadero Creek, Llagas Creek, and Miller Slough and cannot be disaggregated. These damages were sustained prior to the construction of Uvas Dam and other flood works in the area. Also, agricultural land use has changed drastically in the area. Therefore, historical data collected for Uvas-Carnadero Creek were not used in the benefit analysis.

HISTORICAL AND PROJECTED LAND USE IN FLOODPLAIN

GENERAL

19. Development in the vicinity of the City of Gilroy has expanded outward during the past 25 years. The development was shaped by transportation routes with a north and south orientation around the old Highway 101. The new freeway to the east is not stimulating expansion into this area. Historically, development has been constrained on the south and east by the Uvas-Carnadero and Llagas Creek floodplains. The existing land use within the Standard Project Floodplain is as shown on Table 4.

COMMUNITY AND FLOODPLAIN PROJECTIONS

20. General - The land uses forecast for the floodplain are consistent with the Gilroy General Plan, adopted November 1979. (See Plate 1). However, although the land use plan indicates what uses may develop in the future, a projection methodology is needed to forecast when various areas will be needed in the future. Also in conformance with Executive Order 11988, this analysis is conducted to show that there exists no lands which are economically practicable alternatives for project floodplain development.

21. Demand for Land - Future demand for land was based on population projections presented in the Economic Base Study. Future population was converted into spatial demand on the basis of relationships between population increases and spatial demand found historically in the Gilroy area of 10 people per gross acre which agrees with relationships found in developing portions of the San Francisco Bay area and the Los Angeles Metropolitan area.

22. Supply of Land - Determinants used for the supply of land were transportation costs with respect to the center of the City of Gilroy, site development costs (including flood-related costs), productivity costs (including the cost of displaced agricultural activities), and costs of providing utilities and services. These determinants have been found to be important in detailed analysis of metropolitan areas (see Sespe Creek, Santa Clara River, U.S. Army Corps of Engineers, Los Angeles District, 1970) and in many research studies made in the field of economic geography. The determinants transportation costs, costs of utilities and services, and productivity of land are generally related to compact development as their costs are generally minimal when urban development is concentrically outward and contiguous to an urban center. Site development costs are related to geographical market for and the spatial projection without a project.

TABLE 4

EXISTING LAND USE IN STANDARD PROJECT FLOODPLAIN

LAND USE	ACREAGES
Residential	233
Commercial	32
Industrial	134
Agricultural	3,325
Vacant	189
Roads and Highways	43
Railroads	44
Creek Bed	184
Total	4,184

23. Determinants of the demand for and the supply of land were combined utilizing an isochronic map (see Plate 2). This map indicates increasing transportation costs as a function of driving seconds from the center of the city. The supply determinants of costs of utilities and services and productivity of land are generally related to this same pattern. Site development costs were accounted for by delineating areas of high slope. After the spatial projection was made the need for developing floodplain land was made by comparing flood hazard costs with the costs associated with developing alternate sites (in every case the cost of developing an alternative site was higher than developing on the floodplain; e.g. in residential areas of the floodplain near the city center where the 100-year flood line is one foot above the ground it would cost $34 (average annual) per acre to enter the floodplain now compared to $3,393 per acre in net location costs to locate on flood-free land available one half mile to the west of the city center. Net location costs were calculated as follows:

($76,000/acre, urban value of floodplain with a project - $4,000, agricultural non-speculative value of floodplain without a project) - ($33,000/acre, urban value of alternative site without a project - $7,000, agricultural non-speculative value of alternative site with a project) = $46,000; x .07375 (capital recovery factor used as return on land) = $3,393 (average annual).

Therefore, development of the floodplain is expected without a project as there are no alternative lands which are economically practi·able to develop which is in conformance to E.O. 11988. The differential between costs is so great, primarily because the cost of flood proofing floodplain land is small, that this condition is deemed to be applicable to the entire floodplain.

24. The population was then allocated outward contiguously from the center of the city with a density of 10 people per acre in accordance with the ischronic map, yielding a spatial projection without a project (See Plate 3).

25. Site development in the floodplain is under the influence of the Flood Disaster Protection Act of 1973. This requires that all development be flood protected to the 100-year flood level. In addition, development is allowed to encroach onto the floodplain only until it raises the flood level by one foot. A floodway must then be designated to allow this height of water to pass. The Uvas-Carnadero floodplain is characterized by overland flow and the Corps of Engineers and the Federal Insurance Administration have determined that a floodway is not applicable in this instance.

26. Future Land Use with a Project - The land use projection for the floodplain would be the same with the project as without because the elimination or reduction of flood-related costs would not be sufficient to make a substantial alteration in the sequence of development. See Table 5.

BENEFIT EVALUATION

EXISTING FLOOD CONTROL BENEFITS

27. General - The recommended project is a levee from Miller Avenue to a point approximately 2,000 feet downstream from Thomas Road. The residual floodplain which would exist with the existing plan and the various depth areas are shown on Plate 2 of Appendix 2.

28. Damage Reduction for Existing Urban Properties - The evaluation of average annual flood damages to urban property and flood control benefits for present conditions of development was based on a current estimate of flood damages that would be caused by the 25-year, 50-year, 100-year, and Standard Project Floods along Uvas-Carnadero Creek, with and without the recommended plan. The damages which would be caused by these floods were calculated utilizing (1) hydrologically estimated flood discharges which would be produced by the various size floods, (2) the value of structural improvements within the floodplain based upon assessor's information, detailed U. S. Geological Survey maps denoting land elevations, and visual inspection of type and specific location of structures, and (3) hydraulically estimated depths of flooding for various areas in the floodplain for the various size floods. The depth-damage curves utilized were derived from regression analyses using data from the Federal Emergency Management Agency (formerly Federal Insurance Administration) and depth-damage relationships developed by the Stanford Research Institute. The depth-damage curves which were used are shown on Table 6. The first floor of residential structures are approximately 1½ feet above the ground and industrial-commercial structures are generally flat on the ground. The present and future number of damageable units and unit damages by land use expected on the floodplain are shown on Table 7 and 8. The damages to properties along Uvas-Carnadero Creek under existing conditions from the 25-year, 50-year, 100-year and Standard Project Floods are shown on Table 9.

29. Estimates of flood damages to various categories of land uses that would be caused by the Standard Project Flood, under current conditions (October 1980) of development, are presented on Table 10.

30. Utilizing the estimates of damage for each reach for the various floods and a hydrological determined channel capacity for each reach, a discharge-damage relationship was derived. This relationship

TABLE 5

UVAS-CARNADERO CREEK

FUTURE LAND USE WITH AND WITHOUT A PROJECT
(Acreages)

PROPERTY TYPE	1980	1983	1993	2003	2013	2023	2033	2083
Residential	233	233	426	867	1,139	1,512	1,512	1,512
Commercial	32	32	32	32	32	32	32	32
Industrial	134	159	250	350	382	396	396	396
Highways and Streets	43	47	78	137	171	213	213	213
Railroad	44	44	44	44	44	44	44	44
Agricultural	3,325	3,321	3,170	2,570	2,232	1,803	1,803	1,803
Vacant	189	164	0	0	0	0	0	0
Creek Channel	184	184	184	184	184	184	184	184
Total	4,184	4,184	4,184	4,184	4,184	4,184	4,184	4,184

TABLE 6

PERCENT DAMAGES TO STRUCTURES AND CONTENTS BY TYPE OF STRUCTURE

Depth Above 1st Floor (Feet)	Residential [1]		Mobile Homes [1]		Commercial & Industrial [2]	
	Structure	Contents	Structure	Contents	Structure	Contents
-3	1.0	0.0	1.0	0.0	0.0	0.0
-2	1.3	0.0	5.0	0.0	0.7	0.0
-1	1.3	0.0	10.0	0.0	1.0	0.0
0	7.4	11.0	23.0	10.0	2.0	2.6
1	14.2	15.9	35.0	22.0	4.0	8.0
2	20.3	20.2	44.0	34.0	7.0	13.0
3	25.5	24.8	51.0	40.0	12.0	18.0
4	29.9	29.7	51.0	45.0	15.0	23.0
5	33.3	34.7	52.0	47.0	17.0	25.0
6	36.0	40.4	53.0	48.0	17.0	25.0
7	37.7	46.2	55.0	49.0	17.0	25.0
8	38.6	47.0	55.0	50.0	17.0	25.0

1/ Derived from regression analyses using FIA data

2/ Obtained from study by Stanford Research Institute (1958)

TABLE 7

PRESENT AND FUTURE NUMBER OF DAMAGEABLE UNITS

	1980	1983	1993	2003	2013	2023	2033	2083
Residential	1,170	1,170	2,130	4,340	5,700	7,560	7,560	7,560
Commercial	7	7	7	7	7	7	7	7
Industrial	10	12	21	29	32	33	33	33

TABLE 8

UNIT DAMAGES OF LAND USE, 1980

Residential - Str	$ 400
Residential - Con	$ 60
Commercial - Str	$ 760
Commercial - Con	$1,420
Industrial - Str	$ 110
Industrial - Con	$ 330

TABLE 9

DAMAGES TO PROPERTY ALONG UVAS-CARNADERO CREEK

UNDER EXISTING CONDITIONS FOR

VARIOUS SIZE FLOODS

SPF	$22,772,000
100-Year	$19,653,000
50-Year	$ 7,748,000
25-Year	$ 6,176,000

was intergrated with a discharge-frequency relationship by means of a program developed to derive average annual damages; the same procedure was followed for the proposed project condition with the differences between the two conditions representing the project benefit. In the calculations, it was assumed that the project would be in place and start accruing economic benefits in 1983. It was also assumed that the SPF levee would not fail. The discharge-damage, discharge-frequency, and frequency-damage curves utilized in the calculations are shown for Alternatives 1, 2, 3, and 7 on Plate 4, attached at the end of this appendix.

31. Average annual damages to urban structures under existing conditions, under project conditions, and damages prevented for alternatives are shown on Table 11. Probable annual damages under existing conditions, residuals with the various plans in, and damages prevented are shown over the life of the project on Table 12-18.

32. Although there are many areas of agricultural land in the Uvas-Carnadero floodplain in the vicinity of the City of Gilroy, this land possesses a clay soil which limits production during the rain season to small acreages of garlic and sugar beets. Benefits were calculated and were found to be negligible.

33. During a 100-year or Standard Project Flood, most of the businesses in the floodplain would be closed one week or less. Emirical data gathered from other river basins in the Bay Area show that emergency expenses are usually incurred when flood waters reach two foot or more on the ground. These depths are usually experienced in the residential areas along Uvas-Carnadero Creek only during the Standard Project Flood. Benefits in this category were calculated and found to be negligible.

BENEFITS FROM ADVANCE REPLACEMENT OF BRIDGE

34. Construction of Alternative 2 and 3 would result in the advance replacement of the bridge at Thomas Road. The cost of replacing this bridge has been fully accounted for in the first costs for this plan. However, an adjustment must be made on the benefit side of the benefit-cost ratio to account for the fact that this bridge would have to be replaced anyway in the future without a project. It has been determined that a new bridge will be required in the year 1985 because of recent rapid urbanization in the Gilroy area. The cost of replacement has been estimated to $673,300. The estimated life of the replacement bridge is 100 years.

35. The benefit was calculated by taking the present worth of the cost of the bridge for the second year and converting this figure into an average value by multiplying by the capital recovery factor (7 3/8% 100 years).

$673,300 (estimated replacement cost) x .86937 (PWF, 7 3/8%, second year) = $585,590 x .07381 = $43,220 say $43,000.

TABLE 10

DAMAGES CAUSED TO VARIOUS LAND USES

BY THE STANDARD PROJECT FLOOD ALONG UVAS-CARNADERO CREEK

Land Use Category	Damages
Residential	$21,188,000
Mobile Homes	$ 938,000
Commercial	$ 491,000
Industrial	$ 156,000
All Uses	$22,773,000

TABLE 11

AVERAGE ANNUAL DAMAGES TO URBAN STRUCTURES
EXISTING CONDITIONS, UNDER 50-YEAR, 100-YEAR AND SPF PROJECT
CONDITIONS, AND DAMAGES PREVENTED FOR ALTERNATIVES 1, 2, 3, AND 7

(October 1980 Price Level and Economic Conditions)

	Alternatives 1, 2, 3, and 7		
	Existing Conditions	Project Conditions	Damages Prevented (Benefits)
50-Year	$640,000	$376,000	$264,000
100-Year	$640,000	$234,000	$406,000
SFP	$640,000	$ 0	$640,000

TABLE 12

PROBABLE ANNUAL DAMAGES, EXISTING CONDITIONS

	1980	1983	1993	2003	2013	2023	2033	2083
Residential - Str	468	468	468	468	468	468	468	468
Residential - Con	135	143	183	237	305	335	335	335
Mobile Homes - Str	13	13	13	13	13	13	13	13
Mobile Homes - Con	1	1	1	1	1	1	1	1
Industrial - Str	1	1	1	1	1	1	1	1
Industrial - Con	3	3	3	3	3	3	3	3
Commercial - Str	5	5	5	5	5	5	5	5
Commercial - Con	10	10	10	10	10	10	10	10
Public - Str	0	0	0	0	0	0	0	0
Public - Con	0	0	0	0	0	0	0	0
Total	636	644	684	738	806	836	836	836

TABLE 13

PROBABLE ANNUAL DAMAGES, RESIDUAL

50-YEAR PROTECTION

	1980	1983	1993	2003	2013	2023	2033	2083
Residential - Str	269	269	269	269	269	269	269	269
Residential - Con	83	88	112	145	187	205	205	205
Mobile Homes - Str	13	13	13	13	13	13	13	13
Mobile Homes - Con	1	1	1	1	1	1	1	1
Industrial - Str	0	0	0	0	0	0	0	0
Industrial - Con	0	0	0	0	0	0	0	0
Commercial - Str	2	2	2	2	2	2	2	2
Commercial - Con	4	4	4	4	4	4	4	4
Public - Str	0	0	0	0	0	0	0	0
Public - Con	0	0	0	0	0	0	0	0
Total	372	377	401	434	476	494	494	494

TABLE 14

PROBABLE ANNUAL DAMAGES, RESIDUAL

100-YEAR PROTECTION

	1980	1983	1993	2003	2013	2023	2033	2083
Residential - Str	170	170	170	170	170	170	170	170
Residential - Con	50	55	70	92	118	130	130	130
Mobile Homes - Str	10	10	10	10	10	10	10	10
Mobile Homes - Con	1	1	1	1	1	1	1	1
Industrial - Str	0	0	0	0	0	0	0	0
Industrial - Con	0	0	0	0	0	0	0	0
Commercial - Str	1	1	1	1	1	1	1	1
Commercial - Con	1	1	1	1	1	1	1	1
Public - Str	0	0	0	0	0	0	0	0
Public - Con	0	0	0	0	0	0	0	0
TOTAL	233	238	253	275	301	313	313	313

TABLE 15

PROBABLE ANNUAL DAMAGES, RESIDUAL

STANDARD PROJECT PROTECTION

	1980	1983	1993	2003	2013	2023	2033	2083
Residential - Str	0	0	0	0	0	0	0	0
Residential - Con	0	0	0	0	0	0	0	0
Mobile Homes - Str	0	0	0	0	0	0	0	0
Mobile Homes - Con	0	0	0	0	0	0	0	0
Industrial - Str	0	0	0	0	0	0	0	0
Industrial - Con	0	0	0	0	0	0	0	0
Commercial - Str	0	0	0	0	0	0	0	0
Commercial - Con	0	0	0	0	0	0	0	0
Public - Str	0	0	0	0	0	0	0	0
Public - Con	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0

TABLE 16

PROBABLE ANNUAL DAMAGES PREVENTED

50-YEAR PROTECTION

	1980	1983	1993	2003	2013	2023	2033	2083
Residential - Str	198	198	198	198	198	198	198	198
Residential - Con	52	55	71	92	118	130	130	130
Mobile Homes - Str	0	0	0	0	0	0	0	0
Mobile Homes - Con	0	0	0	0	0	0	0	0
Industrial - Str	1	1	1	1	1	1	1	1
Industrial - Con	3	3	3	3	3	3	3	3
Commercial - Str	3	3	3	3	3	3	3	3
Commercial - Con	5	5	5	5	5	5	5	5
Public - Str	0	0	0	0	0	0	0	0
Public - Con	0	0	0	0	0	0	0	0
Total	262	265	281	302	328	340	340	340

TABLE 17

PROBABLE ANNUAL DAMAGES PREVENTED

100-YEAR PROTECTION

	1980	1983	1993	2003	2013	2023	2033	2083
Residential - Str	298	298	298	298	298	298	298	298
Residential - Con	85	86	111	143	185	203	203	203
Mobile Homes - Str	3	3	3	3	3	3	3	3
Mobile Homes - Con	0	0	0	0	0	0	0	0
Industrial - Str	1	1	1	1	1	1	1	1
Industrial - Con	3	3	3	3	3	3	3	3
Commercial - Str	4	4	4	4	4	4	4	4
Commercial - Con	9	9	9	9	9	9	9	9
Public - Str	0	0	0	0	0	0	0	0
Public - Con	0	0	0	0	0	0	0	0
Total	403	404	429	461	503	521	521	521

TABLE 18

PROBABLE ANNUAL DAMAGES PREVENTED

STANDARD PROJECT PROTECTION

	1980	1983	1993	1003	2013	2023	2033	2083
Residential - Str	468	468	468	468	468	468	468	468
Residential - Con	135	143	183	237	305	335	335	335
Mobile Homes - Str	13	13	13	13	13	13	13	13
Mobile Homes - Con	1	1	1	1	1	1	1	1
Industrial - Str	1	1	1	1	1	1	1	1
Industrial - Con	3	3	3	3	3	3	3	3
Commercial - Str	5	5	5	5	5	5	5	5
Commercial - Con	10	10	10	10	10	10	10	10
Public - Str	0	0	0	0	0	0	0	0
Public - Con	0	0	0	0	0	0	0	0
Total	636	644	684	738	806	836	836	836

FUTURE FLOOD CONTROL BENEFITS

36. Benefits related to future urban development were calculated based on a 100-year life and on the changes in land use on the floodplain which are consistent, with and without a project, with the requirements of the National Flood Insurance Program. Normally, it is assumed that future development in the floodplain would be controlled by zoning so that encroachment by urban development into the floodplain would not increase the elevation of the 100-year flood surface by more than one foot. On the basis of these assumptions, future development is usually expected to be located on a flood fringe on the edge of the floodplain without a project and that future development would not be allowed within a designated floodway.

37. However, the floodplain in the vicinity of Gilroy is characterized by overland flow and does not have a normal "v" cross-sectional shape. Therefore, it was determined that the delineation of a floodway, which is usually required in flood hazard areas, is not appropriate in this case. Therefore, no project alternatives would have an impact upon future land use in the floodplain and as a result, no location benefits would be generated by the project.

38. The Gilroy Land Use Plan authorized in 1979 is shown on Plate 1. Although portions of the floodplain are shown in agricultural uses, the plan intends to show the extent of development expected to the year 2000, and is to be considered to be conceptual in nature only, and should not be considered a depiction of the exact, detailed use expected at that time. Also, the depiction of agricultural areas on the plan in no way indicate an official desire to preserve these areas for this use.

39. It was assumed that growth in the Gilroy areas would follow historical trends with a modification upward to reflect anticipated increases in traffic along Highway 101 and induced growth caused by the approach of the expanding San Jose metropolitan areas. However, it was assumed that the San Jose metropolitan area would not expand into the immediate vicinity of the City of Gilroy during the next 50 years. The timing of future development was estimated by the use of gravity mode, using an isochronic map with time-distances from the center of the city.

AFFLUENCE BENEFITS

40. A historical relationship between household income and values of household content stock was found in a Corps of Engineers research study (ER 1105-2-351, Appendix A). On this basis and according to the procedures outlined in the above ER, the OBERS regional growth rate for per capita income (2.5 percent per year for the Gilroy area) could be used as a basis to increase the real value of residential contents in the future to account for the observed relationship between household income and household content stock. See Table 19.

TABLE 19

AFFLUENCE BENEFITS

ALTERNATIVES 1, 2, 3, AND 7

	Without Project Conditions	With Project Conditions	Damages Prevented (Benefits)
100-Year	$72,000	$29,000	$43,000
SPF	$72,000	$ 0	$72,000

BENEFITS FROM SAVINGS IN FLOOD PROOFING COSTS

41. In accordance with the 1973 Flood Disaster Protection Act, future land uses locating within the floodplain would be required to be flood proofed. There are approximately 605 acres of agricultural and vacant land on the floodplain which are expected to be developed by the year 2029 (see paragraph 23) and for which flood proofing would be required without a project. With a project, flood proofing requirements for these acreages would be changed; therefore, the impact of the recommended plan upon flood proofing costs must be calculated.

42. Estimates of the costs of flood proofing by means of fill and stilts were calculated for the areas which would be affected by the recommended plan. The cost was approximately $15,000/acre for elevating two houses two feet or less off the ground by means of stilts. The cost of fill was approximately $11,000 and less for less depth. Because of this, the cost of filling areas on the flood fringe were used in calculating savings in flood proofing costs.

43. The depths of fill were estimated by calculating the average depths of the 100-year flood which would be experienced in areas of future development and by adding one foot to allow for the impact of future encroachment of development into the floodplain. An estimate of approximately $4.35 a cubic yard of fill (Oct 80) was made which included the costs of transporting the fill from source to site, of placement and compaction, and of royalties, lands, easements, and rights-of-way at the borrow sites. It is customary development practice in the area to fill a net three-quarters of every acre of future residential, commercial, and public properties and half of every acre of future industrial property. It has been calculated that a maximum of one-half of each acre could be filled and be able to pass the 100-year flows without raising the 100-year flood level by more than one foot. On the basis of this, a net one-half of each acre was expected to be filled.

44. The land use projection used in the savings in flood proofing costs calculations are consistent with the Gilroy General Plan. The plan calls for approximately 550 acres of industrial property to be located within the floodplain by the year 2000. This is consistent with the present city policy of encouraging industrial development. The plan calls for 1,814 acres of industrial development in the city in 2000. It should be noted that the City of San Jose which is a highly industrial area only had 3,593 acres of industrial property in July, 1977. Thus, it appears more reasonable to expect less industrial development than was forecast by the city and more residential and residential related uses.

TABLE 20
CALCULATION OF NET SAVINGS IN COSTS TO FILL

Development Period	Land Use	Acreages	Calculation of Per Acre Cost	Average Annual Costs Saved (+) Induced (-)
1983-1993	Residential	110	1' fill x 1/3 yard/ft x 4840 sq yd/ac x $4.35/cu yd ($7,018) x .75 (net acre filled) = $5,264/per acre	$3,755
		23	.25' x $7,018 x .75 = $1,316	1,542
		9	-1' x $7,018 x .75 = -$5,264	-2,414
		18	-.25' x $7,018 x .75 = -$1,316	-1,207
		129	.5' x $7,018 x .75 = $2,632	17,300
	Industrial	50	1.75' x $7,018 x .5 = $6,141	15,645
		41	2.75' x $7,018 x .5 = $9,650	20,160
1993-2003	Residential	18	-.25' x $7,018 x .75 = $1,316	- 592
		110	-.25' x $7,018 x .75 = -$1,316	-3,621
		64	.25' x $7,018 x .75 = $1,316	2,107
		9	.25' x $7,018 x .75 = $1,316	296
		55	-1' x $7,018 x .75 = -$5,264	-7,241
		185	.5' x $7,018 x .75 = $2,632	12,179
	Industrial	100	.625' x $7,018 x .5 = $2,193	5,485

TABLE 20
CALCULATION OF NET SAVINGS IN COSTS TO FILL

Development Period	Land Use	Acreages	Calculation of Per Acre Cost	Average Annual Costs Saved (+) Induced (-)
2003-2013	Residential	32	.5' x $7,018 x .75 = $2,632	1,034
		51	-.25' x $7,018 x .75 = -$1,316	- 824
		60	-.25' x $7,018 x .75 = -$1,316	- 969
		129	-.25' x $7,018 x .75 = -$1,316	-2,084
	Industrial	32	.625' x $7,018 x .5 = $2,193	862
2013-2023	Residential	64	.5' x $7,018 x .75 = $2,632	1,016
		5	.5' x $7,018 x .75 = $2,632	79
		37	-.25' x $7,018 x .75 = -$1,316	- 293
		28	-.25' x $7,018 x .75 = -$1,316	- 222
		14	-.25' x $7,018 x .75 = -$1,316	- 111
		225	-.25' x $7,018 x .75 = -$1,316	-1,785
	Industrial	14	.625' x $7,018 x .5 = $2,193	185
Total (Net)				$65,110
			Rounded	$65,000

45. The recommended plan will eliminate costs of flood proofing in some areas of the floodplain; however, it would increase the costs in other areas. The depths of fill which would be required with and wighout the project for various areas and a net flood proofing depth representing a savings (+) or induced additional cost (-) produced by the project were determined (see Table 20). Then calculations of net savings in cost of flood proofing were made, which are shown on Table 21. Benefits from net savings in flood proofing costs are $65,000. If the projection of industrial property called for in the General Plan had been used, benefits would have been more than that taken because the first floors of industrial properties are usually located on the ground, thus requiring more flood proofing than residential properties and more costs would be eliminated by the project. Calculation of residual damages in flood proofing areas were made and these damages were negligible.

46. Portions of the overflow area is designated as Open-Space Flooding. This designation means that the only reason for restricting development in these areas is because of the flooding hazard. If developers can show that they will eliminate that hazard for parcels to be developed, then development will be allowed in these restricted areas. This consistent with the assumptions used in this report based on the Flood Disaster Protection Act. In addition, the agricultural lands in the floodplain are not uniquely valuable lands as they are comparable in value ($4,000/acre) to agricultural areas outside of the floodplain and are limited in their growing potential by clay soils which are extremely difficult to utilize during the rain season.

SAVINGS FROM FUTURE INUNDATION REDUCTION

47. Although it is expected that future land use will be flood proofed to the 100-year flood line, these uses would still be vulnerable to floods greater than the 100-year flood. In these areas, the difference between the 100-year flood and the Standard Project Flood is between ¼ foot and ½ foot. Benefits were calculated for future inundation reduction and found to be negligible.

PROJECT INDUCED DAMAGES

48. Project implementation will result in a redirection of flows and increased flooding depth in the rural area south of Gilroy. As a result additional flood damages will be induced. This area is shown on Plate 17 of Appendix 2.

49. Existing Land Uses - The area subject to induced damages is primarily in rural residential and agricultural uses, mostly annual crops with some orchards. Approximately 2,600 acres of land will be affected. Nearly all this land is in agricultural or rural residential uses. Around 100 acres of land are in commercial and industrial use, including commercial nursery and greenhouse facilities, a motel, restaurant, wine tasting rooms, fruit and vegetable sale stands, automobile service station, and lodge hall, and a large fruit, nut and vegetable packing facility.

50. Future Land Uses - Approximately 170 acres of land within the area of induced flooding are designated south of the creek and north of Mesa Road in the City of Gilroy General Plan for future low density residential development. It is expected that this land would be developed between 1985 and 2000 and would be flood proofed against the 100-year storm in accordance with floodplain management policies.

51. Flood Damages - Flood damages to structures located within the area of induced flooding were determined based on the depth damage curves as tabulated in Table 6. The structure values were estimated from assessors data and information on recent property sales. The flood depths for the 25-year, 50-year, 100-year and Standard Project Flood were estimated using available topographic mapping. Estimates were made for existing conditions and for conditions resulting from the implementation of Alternatives 1, 2, or 3. Each of the structures was visually inspected to determine its type, condition, and floor elevation relative to the floodplain.

52. The flooding depths within this range are as shown in Table 21.

TABLE 21

AREA OF INDUCED FLOODING
FLOOD DEPTHS
(Feet)

	Existing Conditions	Project Conditions
25-Year	0.5 to 1.5	0 to 1.75
50-Year	0.75 to 2.0	0.75 to 2.25
100-Year	1.00 to 2.5	1.25 to 2.75
SPF	1.25 to 3.0	1.5 to 3.25

53. The total estimated damages for the existing and project conditions are shown in Table 22.

TABLE 22

INDUCED FLOODING AREA
Damages - Thousands of $
(October 1980)

	25-Year	50-Year	100-Year	SPF
Existing Conditions				
Residential-Agricultural	170	211	269	312
Commercial-Industrial	169	211	254	291
Totals	332	422	523	603
Project Conditions				
Residential-Agricultural	165	234	327	378
Commercial-Industrial	167	216	294	334
Totals	332	450	621	712
Induced Damages				
Residential-Agricultural	(-5)	23	58	66
Commercial-Industrial	(-2)	5	40	43
Totals	(-7)	28	98	109

54. Average annual damages were computed for the SPF for existing and post project conditions and are shown on Plates 5 and 6. Net affluence damages were also computed based on the criteria discussed in Paragraph 55. Average annual damages are summarized on Table 23.

TABLE 23

Average Annual Induced Damages - Thousands of $
Alternatives 1, 2, and 3
50-Year, 100-Year, and SPF Designs
(October 1980)

	50 Year	100-Year	SPF
Existing Conditions	22.8	24.3	25.0
Post Project Conditions	23.4	26.0	26.8
Induced Damage	0.6	1.7	1.8
Induced Affuence Damages	0.3	0.7	0.8
Total Induced Damage	0.9	2.4	2.6
SAY	1.0	2.0	3.0

Summary of Project Flood Control Benefits

A summary of benefits attributable to Alternatives 1, 2, 3 and 7 based on October 1980 price levels and a discount rate of 7 3/8 percent is presented in Table 24. Benefits are summarized for both current conditions and including future flood control benefits from savings in flood proofing cost and affluence benefits. The benefits also summarized both including and excluding the project induced damages.

TABLE 24

SUMMARY OF AVERAGE ANNUAL BENEFITS IN $1000

ALTERNATIVES 1, 2, 3 and 7
for 50-Year, 100-Year and SPF Protection
(October 1980)

ALTERNATIVE 1

Current Conditions	50-Year	100-Year	SPF
Flood Damage Reduction	264	406	640
Affluence Benefits	32	43	72
Induced Flooding Damages	(-1)	(-2)	(-3)
Subtotal Benefits for Current Conditions			
-With Induced Damages	295	447	709
-Without Induced Damage	296	449	712
Future Conditions			
Savings in Cost to Fill	0	65	65
Total Benefits			
-With Induced Damages	295	511	769
-Without Induced Damages	296	514	777

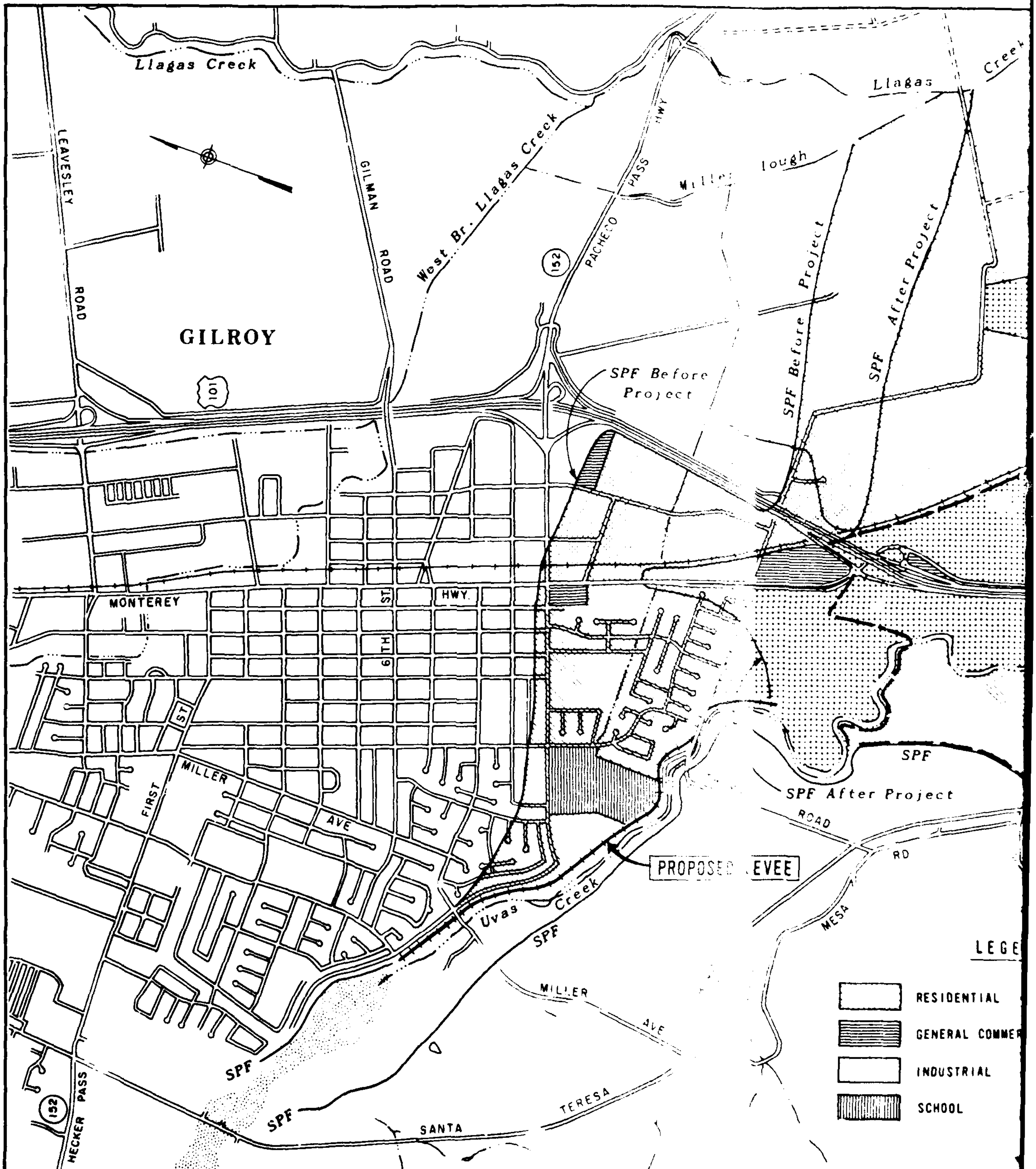
TABLE 24 (Continued)

ALTERNATIVES 2 AND 3

	50-Year	100-Year	SPF
Current Conditions			
Flood Damage Reduction	264	406	640
Affluence Benefits	32	43	72
Advanced Bridge Replacement	43	43	43
Induced Flooding Damages	(-1)	(-2)	(-3)
Subtotal for Current Conditions			
With Induced Damages	338	490	752
Without Induced Damages	339	492	755
Future Conditions			
Savings in Cost to Fill	0	65	65
Total Benefits			
-With Induced Damages	338	555	817
-Without Induced Damages	339	557	819

ALTERNATIVE 7

	50-Year	100-Year	SPF
Current and Future Conditions			
Flood Damage Reduction	264	406	640
Affluence Benefits	32	43	72
TOTAL BENEFITS	296	449	712


Llagas Creek
LEAVESLEY ROAD
GILMAN ROAD
West Br. Llagas Creek
PACHECO PASS HWY
152
GILROY
101
Llagas Creek
Miller Slough
SPF Before Project
SPF After Project
SPF Before Project
MONTEREY
9TH ST.
HWY.
FIRST ST
MILLER AVE
FIRST
SPF
SPF After Project
ROAD
RD
PROPOSED LEVEE
Uvas Creek
SPF
MESA
MILLER AVE
SPF
SPF
152
HECKER PASS
SANTA TERESA
LEGE
RESIDENTIAL
GENERAL COMMER
INDUSTRIAL
SCHOOL

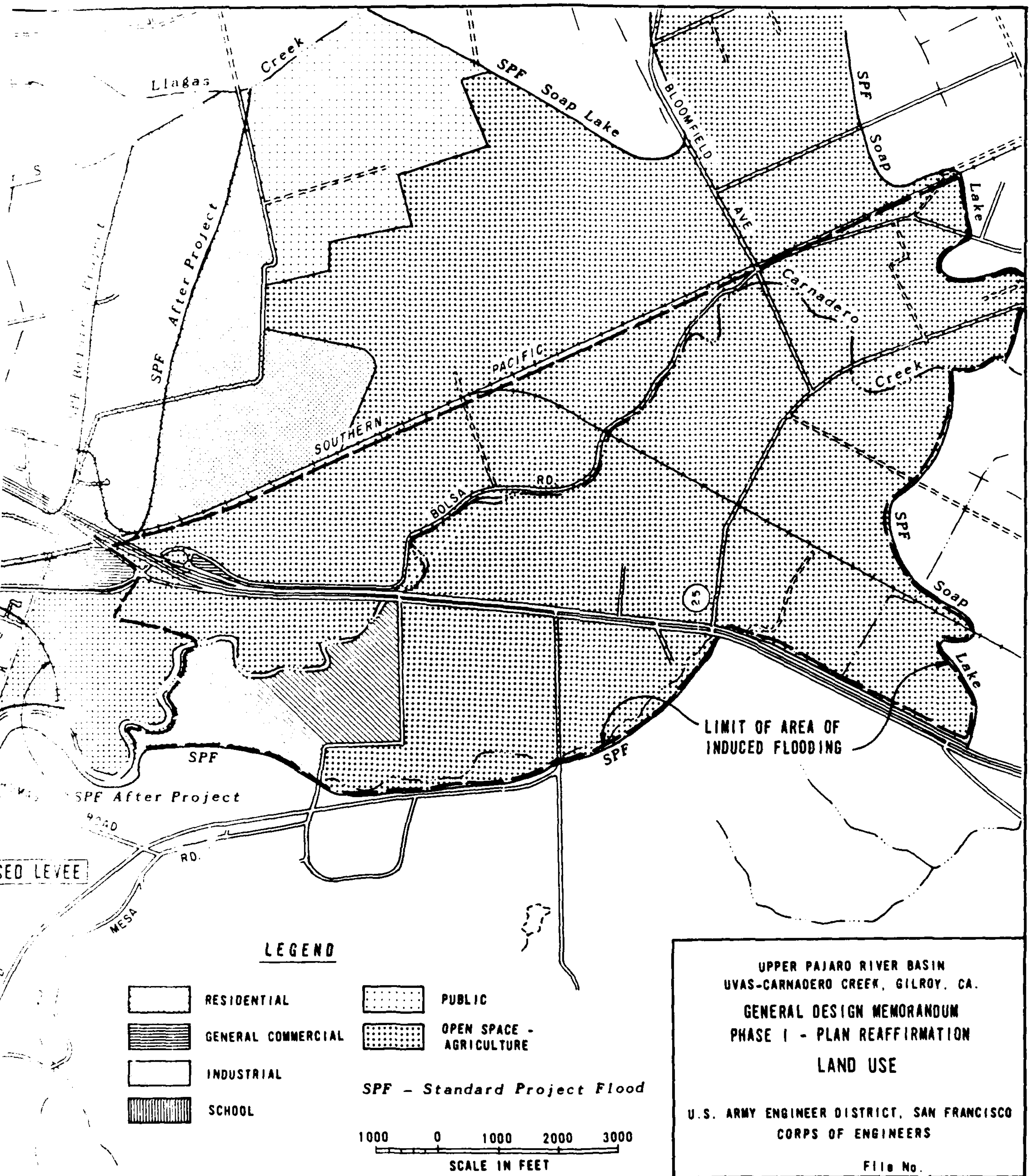
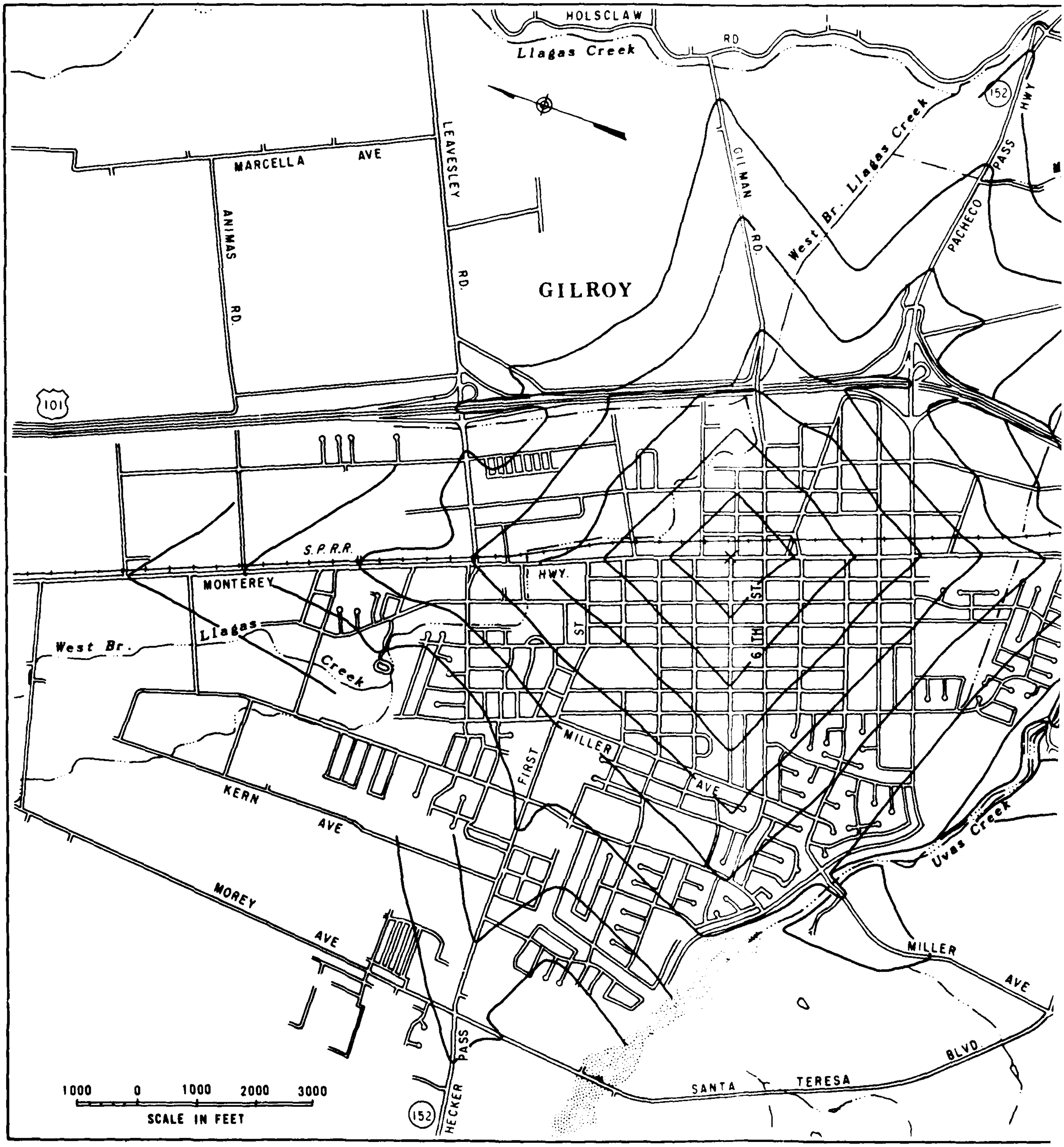
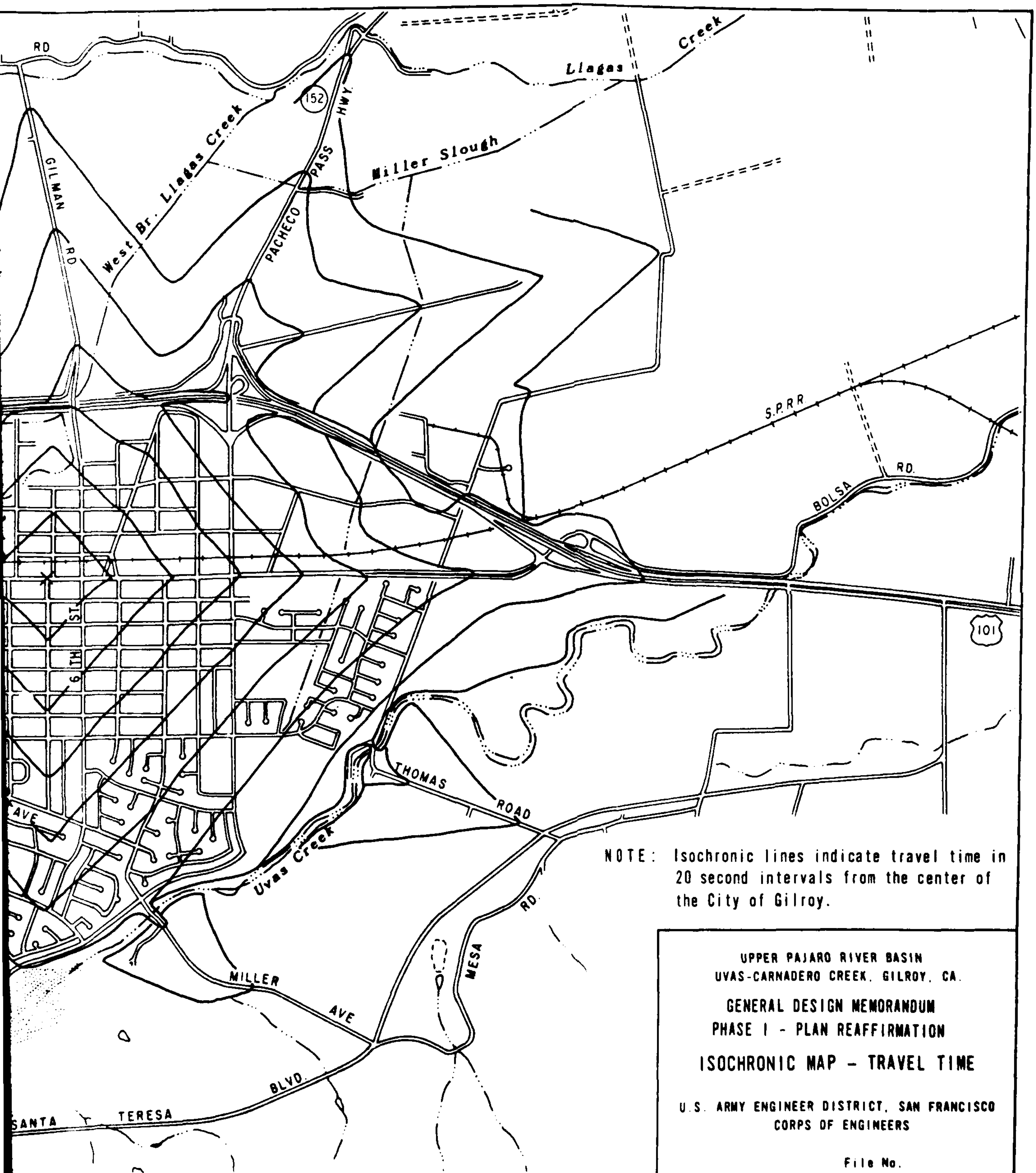

Llagas Creek
SPF Soap Lake
BLOOMFIELD AVE
SPF Soap Lake
SPF After Project
Carnadero Creek
SOUTHERN PACIFIC
BOLSA RD.
25
SPF Soap Lake
LIMIT OF AREA OF INDUCED FLOODING
SPF
SPF
SPF After Project
ROAD
RD.
MESA
SED LEVEE
LEGEND
RESIDENTIAL
GENERAL COMMERCIAL
INDUSTRIAL
SCHOOL
PUBLIC
OPEN SPACE - AGRICULTURE
SPF - Standard Project Flood
1000 0 1000 2000 3000
SCALE IN FEET
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
LAND USE
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 1



HOLSCLAW
RD
Llagas Creek
152
HWY
West Br. Llagas Creek
PASS
PACHECO
GILMAN
RD
MARCELLA
AVE
LEAVESLEY
RD.
ANIMAS
RD.
GILROY
101
S.P.R.R.
HWY.
MONTEREY
West Br.
Llagas
Creek
ST
6 TH
ST
FIRST
MILLER
AVE
KERN
AVE
MOREY
AVE
Uvas Creek
MILLER
AVE
BLVD.
SANTA
TERESA
PASS
HECKER
152
1000
0
1000
2000
3000
SCALE IN FEET



NOTE: Isochronic lines indicate travel time in 20 second intervals from the center of the City of Gilroy.

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

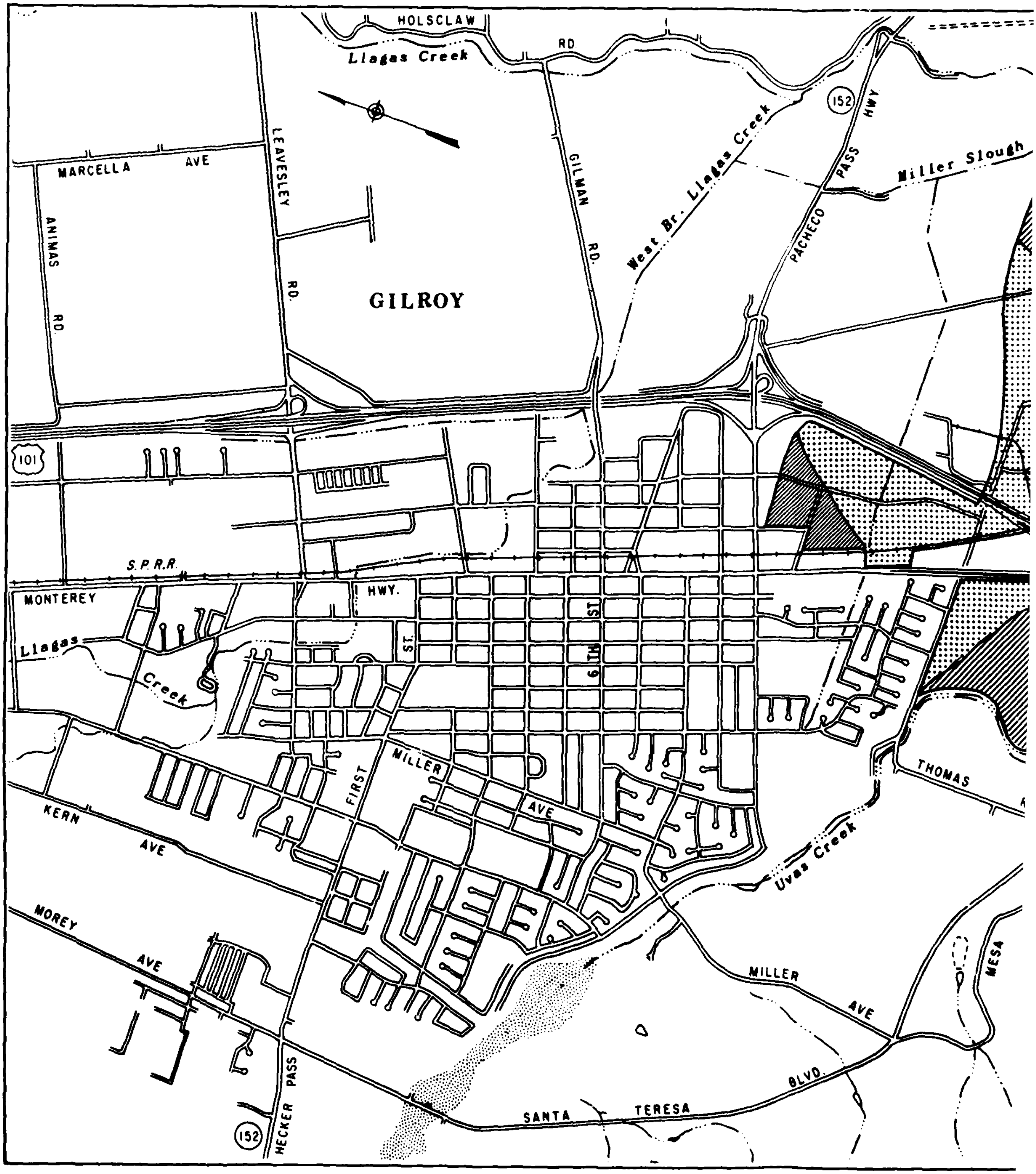
ISOCHRONIC MAP - TRAVEL TIME

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

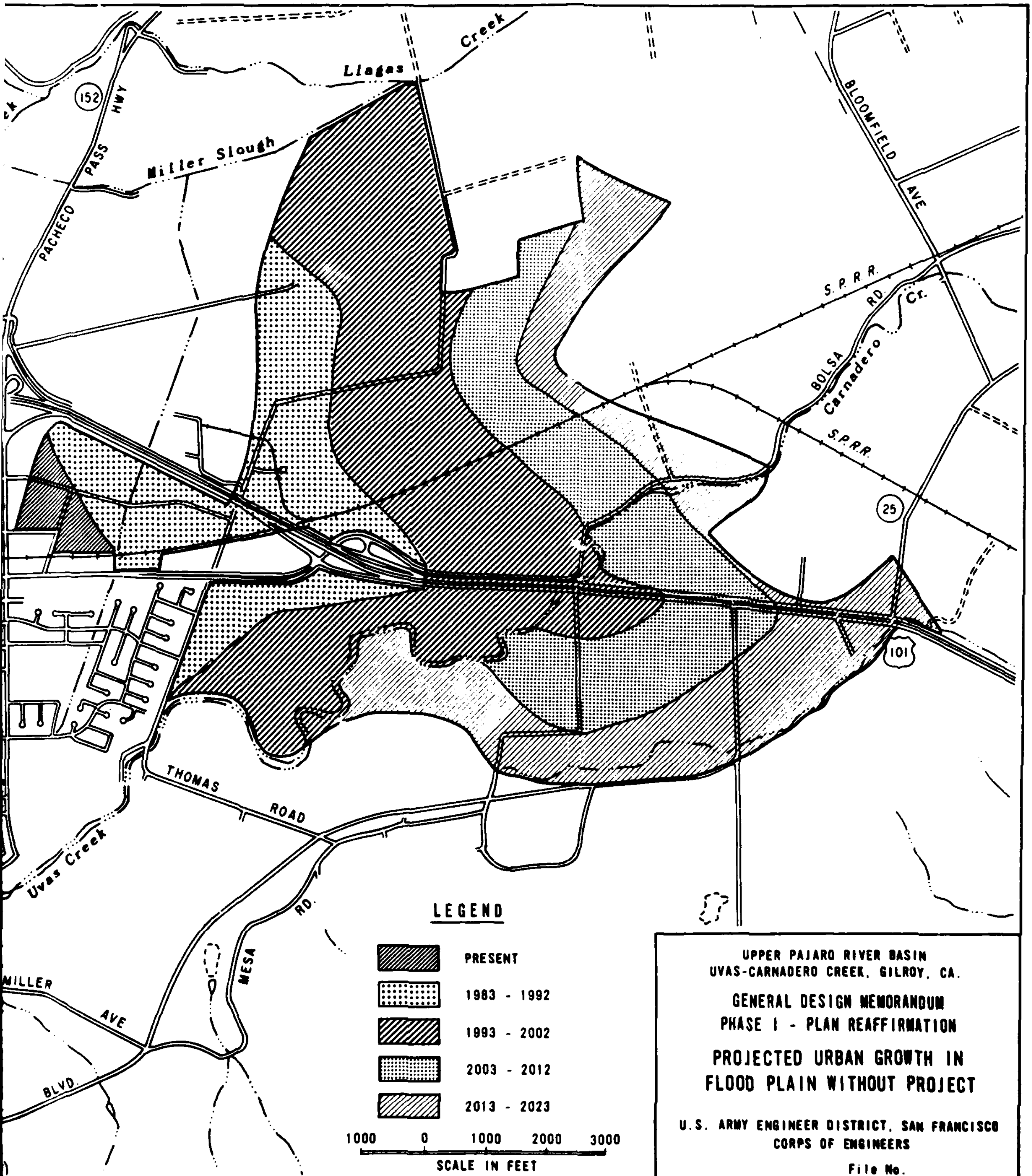
File No.

Plate 2

2

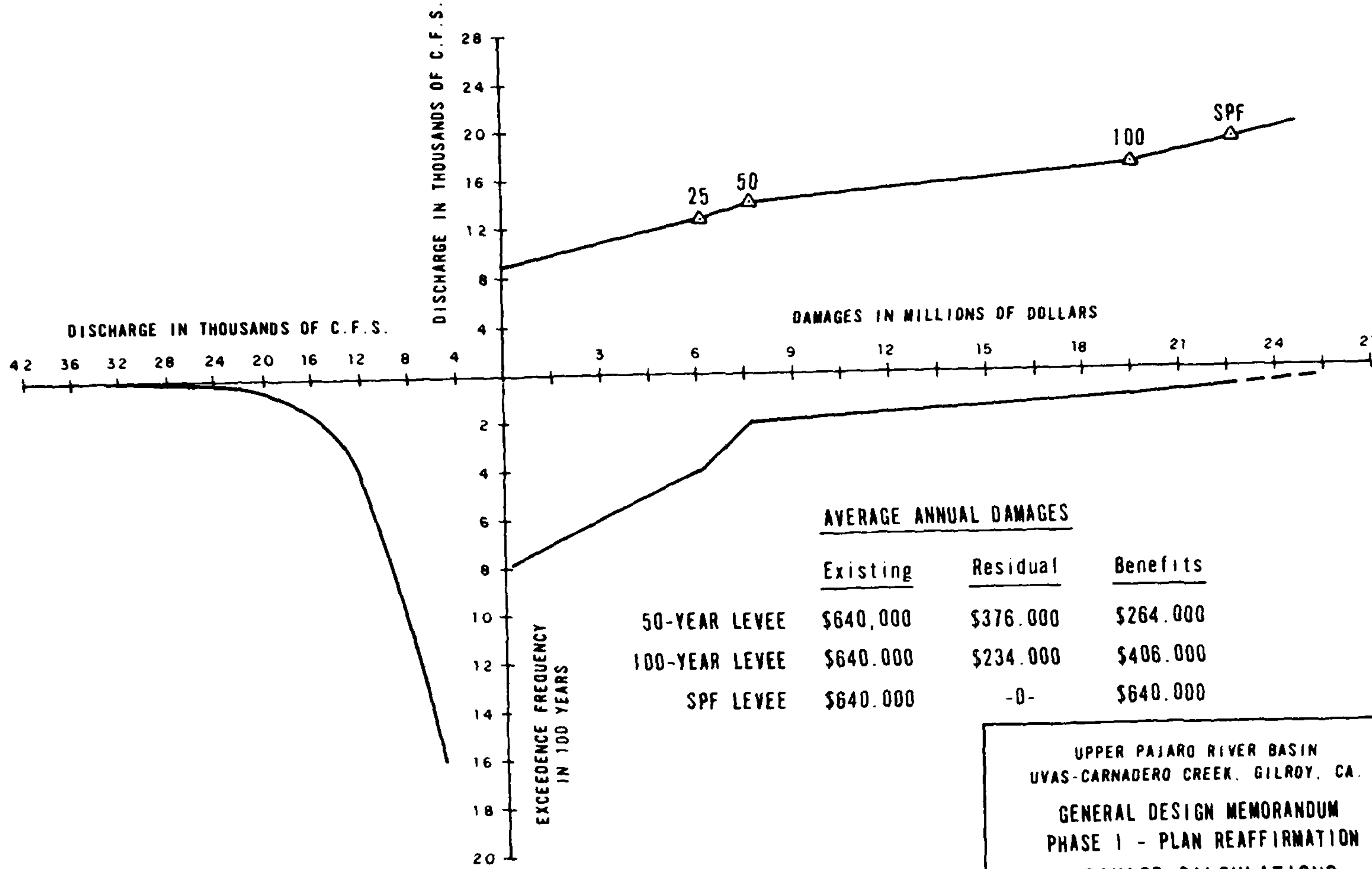


GILROY
HOLSCLAW
RD
Llagas Creek
MARCELLA AVE
ANIMAS RD
LEAVESLEY RD.
GILMAN RD.
West Br. Llagas Creek
152
PACHECO PASS HWY
Miller Slough
101
S.P.R.R.
MONTEREY HWY.
Llagas Creek
ST.
6 TH ST
FIRST
MILLER AVE
THOMAS
KERN AVE
Uvas Creek
MOREY AVE
MILLER AVE
MESA
HECKER PASS
SANTA TERESA BLVD.



Llagas Creek
Miller Slough
152
PACHECO PASS HWY
BLOOMFIELD AVE
S.P.R.R.
BOLSA RD.
Carnadero Cr.
S.P.R.R.
25
101
THOMAS ROAD
Uvas Creek
MESA RD.
MILLER AVE
BLVD.
LEGEND
PRESENT
1983 - 1992
1993 - 2002
2003 - 2012
2013 - 2023
1000 0 1000 2000 3000
SCALE IN FEET
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
PROJECTED URBAN GROWTH IN
FLOOD PLAIN WITHOUT PROJECT
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate 3



AVERAGE ANNUAL DAMAGES

	Existing	Residual	Benefits
50-YEAR LEVEE	$640,000	$376.000	$264.000
100-YEAR LEVEE	$640.000	$234.000	$406.000
SPF LEVEE	$640.000	-0-	$640.000

UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

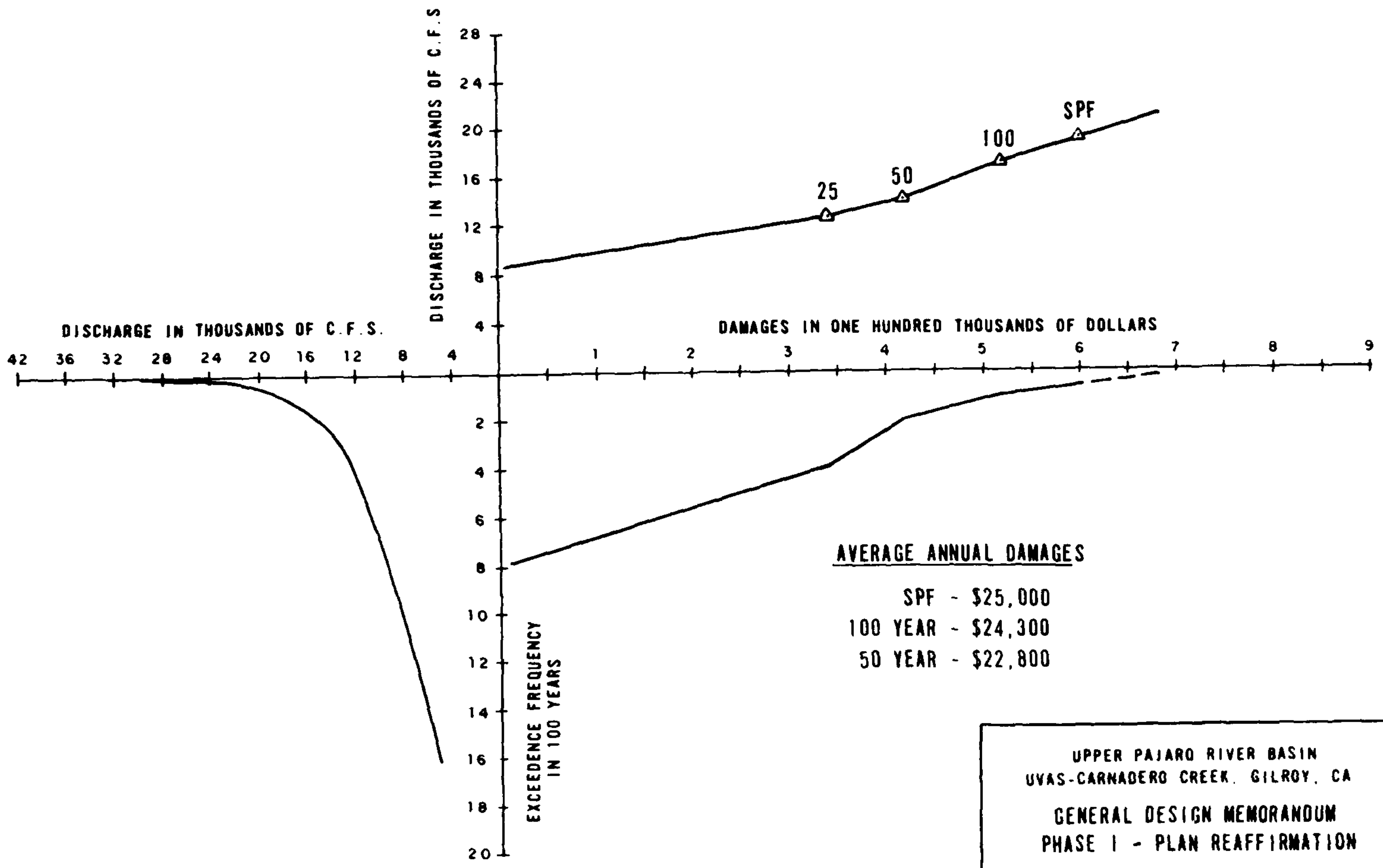
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

DAMAGE CALCULATIONS
ALTERNATIVES 1,2,3 AND 7

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No.

Plate No. 4



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA

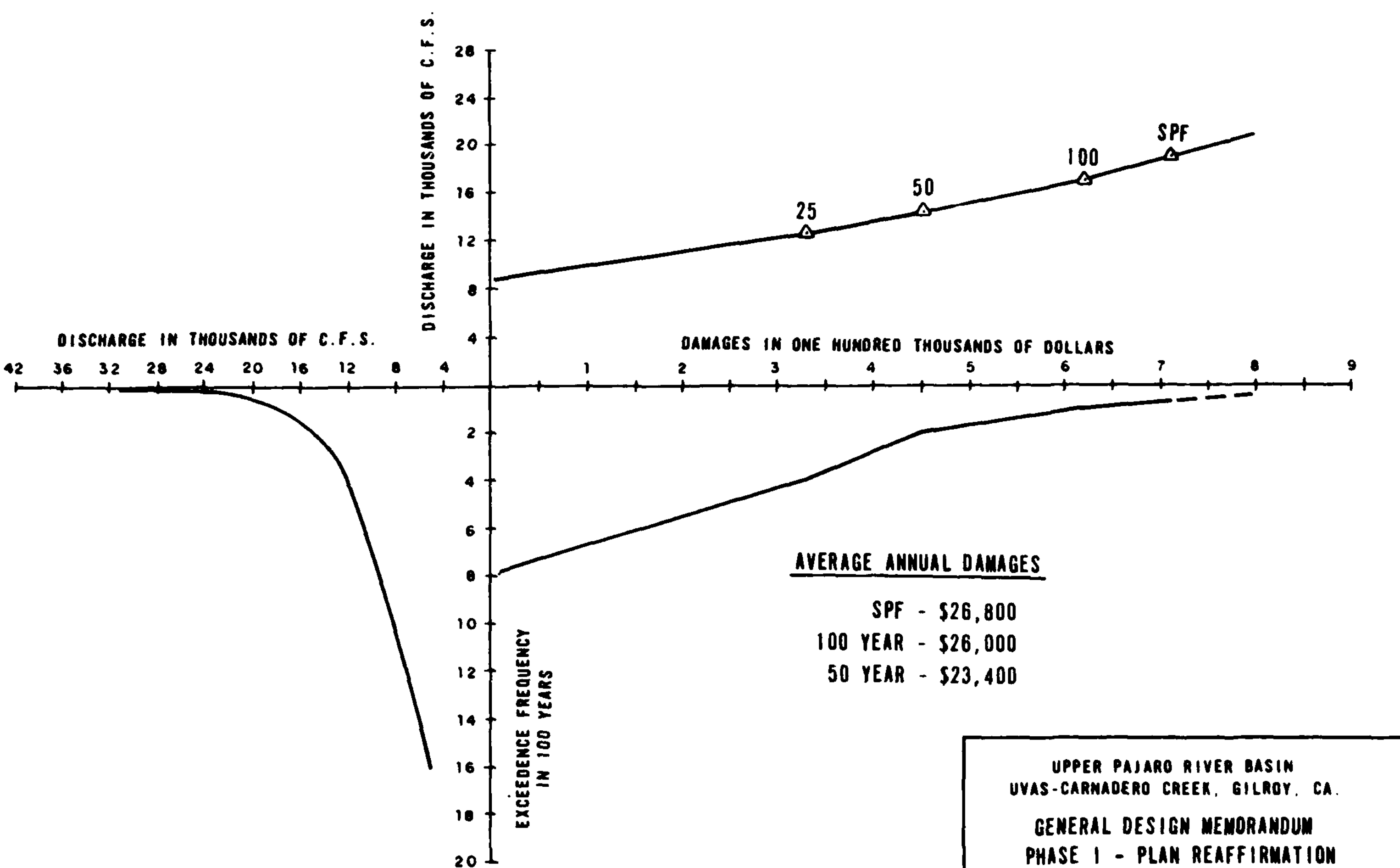
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

DAMAGE CALCULATIONS
AREAS OF INDUCED FLOODING
EXISTING CONDITIONS

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS

File No

Plate No. 5



UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.

GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION

DAMAGE CALCULATIONS
AREAS OF INDUCED FLOODING
POST PROJECT CONDITIONS

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
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File No.

Plate No. 6

HYDROLOGY

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TABLES

APPENDIX 6
HYDROLOGY

Purpose and Scope

1. This appendix summarizes the data and procedures used in the determination of the Standard Project Flood (SPF) and peak discharge vs. frequency curves for Uvas-Carnadero Creek for use in the design of the levee system to protect the City of Gilroy from flood events which exceed the existing channel capacity in the effected area. Authority for construction of levees on Uvas-Carnadero Creek near Gilroy was granted under the Flood Control Act of December 1944. This appendix was approved by the South Pacific Division, Corps of Engineers, on 3 August 1979.

Prior Studies

2. Uvas-Carnadero Creek was studied extensively for the "Review Report for Flood Control and Allied Purposes for Pajaro River Basin, California," dated April 1965, which dealt with a proposed dam on Uvas Creek near Gilroy. The report was never released because of lack of public support for the Uvas Dam project. At that time, SPF hydrographs were developed for several locations on Uvas-Carnadero Creek but were never submitted for approval. Hydrologic studies were conducted in conjunction with the "Flood Plain Information Report, Uvas-Carnadero Creek, Pajaro River to Uvas Reservoir, Santa Clara County, California," dated May 1973. The SPF and the peak discharge frequency curves developed for this report were approved by the South Pacific Division by letter dated 7 August 1972.

Basin Description

3. Uvas-Carnadero Creek is located in southern Santa Clara County and drains an area of approximately 90 square miles with its headwaters in the Santa Cruz Mountains. The basin is primarily mountainous being bounded on the north, west, and south by the Santa Cruz Mountains and to the east by the Llagas Creek drainage basin. The creek generally flows southeast to join the Pajaro River about six miles south of Gilroy. The stream is approximately 32 miles in length with elevations ranging from 120 feet to 3,800 feet above mean sea level. Upstream of Highway 101, the stream is known as Uvas Creek and downstream as Carnadero Creek. A map showing the location of the basin is presented as Plate 1.

4. Stream flows in Uvas-Carnadero Creek are regulated by the Uvas Reservoir, which was constructed in 1958 for water supply purposes (10,350 acre-feet storage capacity). Stream slopes on Uvas Creek above and below Uvas Reservoir range from 90 feet per mile to 30 feet per mile, respectively. Four-fifths of the basin is primarily forested with the remaining one-fifth devoted to agriculture and orchards. There are no large urbanized areas in the basin. The City of Gilroy, located just outside the drainage basin but within the floodplain from Uvas Creek, has a population of 20,000 (1979).

5. Approximately 93 percent of the annual precipitation occurs during the six month period of November through April. Snowfall is rare and has no measurable influence on flood runoff. Normal annual precipitation (NAP) ranges from 50 inches in the northwest corner of the basin to 20 inches in the southwest corner. Lines of NAP for the basin are presented on Plate 2. Above Uvas Reservoir, the stream follows steep sided canyons; downstream of the reservoir, the stream broadens into a valley with significant channel and overbank storage effects. Downstream of Hecker Pass Road (Highway 152), gravel operations have a further pronounced effect on channel storage.

Flood Characteristics

6. Damaging floods have occurred on the Uvas-Carnadero Creek in 1937, 1940, 1955, 1958 and 1963. The flood of record occurred in December 1955 with a flow of 14,000 cubic feet per second (cfs) at Highway 101. According to the local newspapers in Gilroy, the December 1955 flood event was reported to be the greatest event since 1880. At least 82 homes were inundated in 1955 from floodwaters from Uvas-Carnadero Creek and other nearby streams. Flooding was mainly limited to the area just south of the proposed project area. In the project area, Uvas Creek was reported to be running nearly bank full at 14,000 cfs. This flood occurred prior to the construction of Uvas Reservoir which would have reduced the peak by about 5,000 cfs. Most of the damages that occurred during the 1963 flood event occurred in the area south of the Uvas Creek near Gilroy streamgage, as did the December 1955 flood. Any damages in the project area from this event would have benn due to bank erosion and from flooding from other nearby streams. The damages from flood events since 1940 occurred mainly to the south of the proposed project area where the channel capacity is less than 9,000 cfs. The Uvas Reservoir, completed in 1958, significantly reduces potential flood damages as mentioned in paragraph 4 of the subject report. The existing levee below Miller Raod was built before 1955 and probably after 1937. The existing levee upstream of Miller Road was built between 1975 and 1978 and will contain the 100-year flood event. The estimated channel capacity of Uvas Creek within the project areas is approximately 15,000 cfs (equivalent to slightly greater than a 50-year event), assuming the structural stability of

the existing levee is adequate. The estimated channel capacity is 9,000 cfs assuming a complete failure of the existing levee. The floodwaters in excess of the existing channel capacities flow away from the channel in a southeasterly direction inundating the southern third of the City of Gilroy before returning to the main channel south of Highway 101.

Proposed Project

7. The proposed project ot protect the City of Gilroy would consist of a single, 5,000 to 7,000 foot levee along the east bank of Uvas Creek which would extend upstream from a point just north of the Thomas Road bridge or approximately 2,000 feet south of Thomas Road. The new levee would replace an existing, inadequate levee. Refer to Plate 1 for the location of the proposed levee. The proposed levee is considered to have an economic life span of 100 years; consequently a land use classification map for the year 2040 was used in the development of hydrologic design parameters. In comparison, the year 2040 land use classification map and the existing conditions map reveal only minor changes in land use as the majority of the watershed is either public or reserved land. The hydrologic paramenters adjusted to account for future conditions were the basin roughness coefficient, $\bar{n}$, and precipitation loss rates. In actuality, little change between existing and future conditions is anticipated when comparing the project land use classification maps of the basin for the years 1980 and 2040.

Hydrologic Data

8. Six recording and 13 non-recording raingages were used to develop rainfall amounts for selected frequencies and durations for the computation of flood hydrographs on Uvas Creek. These raingages were also used in the development of the Normal Annual Precipitation Map, presented on Plate 2, and for the reconstitution of several historical storms. Four U. S. Geological Survey(USGS) streamgaging stations have been operated in the Uvas Creek basin at one time or another since 1931. One streamgaging station in the basin is operated by the Santa Clara Valley Water District and has been in operation since 1964. The locations of the precipitation and streamgaging stations are presented on Plate 1. Summary data for the precipitation and streamgaging stations are presented on Tables 1 and 2, respectively. Annual maximum peak discharges for the streamgaging stations in the basin are presented in Table 3.

AD-A122 273 PAJARO RIVER BASIN UVAS - CARNADERO CREEK SANTA CLARA COUNTY CALIFORNIA G..(U) CORPS OF ENGINEERS SAN FRANCISCO CA SAN FRANCISCO DISTRICT JUL 81

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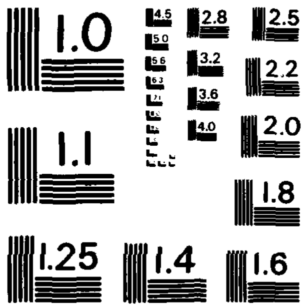


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Unit Hydrograph Development

9. Hydrologic parameters for sub-basins in the Uvas Creek basin, used in the development of one-hour unit hydrographs, are presented in Table 4. The physical parameters for each sub-basin were developed from USGS topographical maps. Sub-basin roughness coefficients, $\bar{n}$, were based upon unit hydrograph studies of the USGS streamgaging station "Uvas Creek near Morgan Hill" and past experience with similar basins. Unit hydrographs for the Uvas Creek sub-basins, which represent the response of each sub-basin to runoff-producing rainfall, were derived from a S-curve hydrograph developed from data collected at the streamgaging station "Uvas Creek near Morgan Hill," the physical parameters presented in Table 4, and the following lag realtionship:

$$\text{Lag} = 24\bar{n}\left(\frac{L\,L_{CA}}{S^{0.5}}\right)^{0.38}$$

Where: Lag = Time from beginning of excess rainfall to time at which 50 percent of ultimate discharge occurs, in hours;

$\bar{n}$ = basin roughness coefficient;

L = length of primary watercourse, in miles;

L_{CA} = distance from index point to point along watercourse opposite centroid of area, in miles;

S = average slope of primary watercourse, in feet per mile

10. The "Uvas Creek near Morgan Hill" dimensionless S-curve and unit hydrographs used in the study are presented on Plate 3. Unit hydrographs adopted for each sub-basin and their respective lag times are presented in Table 5.

11. To verify the adequacy of the adopted unit hydrograph for the area below Uvas Reservoir, reconstitution of the storm of 8-9 February 1960 was accomplished and is presented on Plate 4. The storms of 10-12 December 1937 and 8-10 February 1941 were reconstituted to verify the adopted unit hydrograph above Uvas Reservoir and are presented on Plate 5.

Peak Discharge vs. Frequency Curves

12. The USGS streamgaging station "Uvas Creek near Morgan Hill," 27 years of record (1931-57), was used to determine the peak inflow discharge-frequency curve at the Uvas Reservoir. This streamgaging

TABLE 1
PRECIPITATION STATIONS
UVAS CREEK LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

MAP KEY	PRECIPITATION STATION	AGENCY	ELEVATION (ft. msl)	TYPE OF Gage	LENGTH OF RECORD (YEARS)	NAP (INCHES)
A	Almaden Reservoir	SCVWCD	640	NR	38	30.1
B	Coyote Reservoir	SCVWCD	800	NR	38	20.7
C	Freedom 8NNW	NWS	1495	R	32	41.9
D	Gilroy	NWS	173	NR	98	20.5
E	Gilroy 9 WNW	Private	1000	NR	22	45.8
F	Little Uvas Creek	Private	675	NR	21	33.8
G	Loma Prieta	NWS	3790	R	9	48.2
H	Mare Vista Vineyards	Private	2500	NR	11	51.6
I	McGrath Ranch	Private	150	NR	9	24.3
J	Morgan Hill 2E	NWS	225	NR	27	19.6
K	Morgan Hill 6WSW	NWS	640	R	4	35.0 1/
L	Morgan Hill Bossana	NWS	770	R	20	27.7
M	Morgan Hill SCS	NWS	350	R	26	19.8
N	Mt. Madonna	NWS	1000	R	27	33.9
O	Paradise Valley	Private	425	NR	27	21.8
P	San Martin	NWS	312	NR	47	17.1
Q	Sargent	SPRR CO.	150	NR	13	17.8
R	Sheldon Ranch	Private	375	NR	30	22.6
S	Ward "A"	Private	425	NR	49	25.4

1/ Estimated Nap

NAP	Normal Annual Precipitation
NWS	National Weather Service
SCVWCD	Santa Clara Valley Water Conservation District
SPRR Co.	Southern Pacific Railroad Company
R	Recording Rainage
NR	Non-recording Rainage

TABLE 2
STREAMGAGING STATIONS
UVAS CREEK LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

MAP KEY	STREAMGAGING STATIONS	AGENCY	DRAINAGE AREA2/ (Sq. Mi.)	BASIN NAP (INCHES)	PERIOD OF RECORD	PEAK DISCHARGE (c.f.s./date)
T	Bodfish Creek near Gilroy	USGS	7.4	24.7	1959-	1,240/31 Jan 63
U	Little Arthur at Redwood Retreat Road	SOSCVWD	9.2	38.1	1964-	2,116/16 Jan 70
V	Uvas Creek above Uvas Reservoir	USGS	21.0	39.4	1961-	6,580/13 Oct 62
W	Uvas Creek near Gilroy	USGS	71.2	32.0	1959-	9,490/ 1 Feb 63
X	Uvas Creek near Morgan Hill	USGS	30.4	38.1	1930-57	10,300/23 Dec 55

1/ Located at Sanders Road prior to 31 May 1975
2/ As published by operating agency

NAP Normal Annual Precipitation
SOSCVWD South Santa Clara Valley Water Conservation District
USGS U.S. Geological Survey
c.f.s. cubic feet per second

TABLE 3
ANNUAL MAXIMUM PEAK DISCHARGES 1/
UVAS CREEK LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

WATER YEAR	BODFISH NR GILROY	LITTLE ARTHUR CR AT REDWOOD RETREAT ROAD	UVAS CR ABOVE UVAS RESERVOIR	UVAS CR NR GILROY	WATER YEAR	UVAS CR NR MORGAN HILL
1959				2,660	1931	385
1960	585			2,700	1932	4,340
1961	37			2.8	1933	1,020
1962	332		3,390	1,540	1934	970
1963	1,240		6,580	9,490	1935	1,340
1964	236		2,450	906	1936	3,020
1965	913	880	2,320	2,270	1937	4,180
1966	130	340	1,380	288	1938	8,630
1967	1,120	1,150	5,200	7,880	1939	975
1968	121	370	2,160	560	1940	5,720
1969	638	589	3,100	4,540	1941	4,700
1970	630	2,116	2,340	3,120	1942	4,340
1971	57	140	1,470	239	1943	6,740
1972	64	98	350	120	1944	1,990
1973	338	1,130	3,230	1,770	1945	8,300
1974	500	1,486	3,380	2,430	1946	1,660
1975	160	822	2,910	2,460	1947	1,700
1976	9.9	36	72	1.4	1948	305
1977	3.3	18	35	0	1949	1,380
1978	360	2/	3,530	2,560	1950	2,710
					1951	4,450
					1952	4,090
					1953	4,680
					1954	1,370
					1955	1,090
					1956	10,300
					1957	1,040
Drainage 3/ Area (sq/mi)	7.4	9.2	21.0	71.2		30.4

1/ Cubic Feet Per Second 2/ Not Available 3/ As Published

TABLE 4
HYDROLOGIC PARAMETERS
UVAS CREEK LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

Index Point	Drainage (Sq. Mi.)	SUB-BASIN DESCRIPTION	L (Mi.)	L_{CA} (Mi.)	n	S (ft./Mi.)	LAG (Hrs)	NAP (in.)
1	30.4	Uvas Creek at Uvas Reservoir	10.04	5.11	0.091	92	4.27	38.1
4	38.6 (68.9)1/	Local Drainage Between Uvas Reservoir and Thomas Road	12.01	6.06	0.091	33	5.65	27.0

1/ Total basin drainage area

- L — Length of primary watercourse, in miles
- L_{CA} — Distance along primary watercourse from index point to point opposite centroid of area, in miles
- S — Average slope of primary watercourse, in feet per mile
- n — Basin roughness coefficient, dimensionless
- Lag — Time from beginning of rainfall excess to time at which 50 percent of ultimate discharge occurs, in hours
- NAP — Normal annual precipitation, in inches

station was conveniently located at the present location of Uvas Reservoir. For statistical analysis, the 27 years of record were extended to 44 years by using the additional 17 years of record (1962-78) at the USGS streamgaging station "Uvas Creek above Uvas Reservoir" which is located 2.3 miles upstream from Uvas Reservoir. The annual peak discharges at the upstream station were converted to those at the lower station by applying a factor of 1.3, which was determined by rations of drainage area and NAP between the two stations. The peak discharges at selected frequencies were determined by using statistical methods establised by the Water Resources Council in their Bulletin 17A. A correction factor for expected probability, based upon 44 years of record, was applied to the frequency curve. The floods have been appreciably altered by reservoir regulation that in accordance with the Water Resources Council guidelines, expected probability was not applied to the frequency curves determined for locations situated downstream of Uvas Reservoir.

13. For routing purposes, inflow hydrographs at selected frequencies were determined at the Uvas Reservoir by synthetic means and were then adjusted slightly so that the synthetic peak discharges and the peak discharges determined from statistical analysis of the streamgaging data agreed. The synthetic analysis was accomplished by applying statistical rainfall data from the National Weather Service Freedom 8 NNW precipitiation station, corrected for local NAP, to the adopted unit hydrograph presented in Table 5. A 12-hour statistical rainfall amount for each frequency studied, randomly distributed, was included within a 72-hour rainfall amount. The 72-hour rainfall amount was based upon long duration rainfall data at the Gilroy raingage, 99 years of record, which was adjusted for local NAP of the sub-basin in question. The adopted skew coefficient of -0.79 used for the Uvas Reservoir inflow discharge-frequency curve was based upon data from the "Uvas Creek near Morgan Hill" streamgage (located at the damsite) supplemented with data from the "Uvas Creek above Uvas Reservoir" streamgage. Using a regional skew of -0.7, the weighted station skew would be -0.73. Using the weighted station skew, and considering the effects of downstream routing, the resultant change to the adopted one-percent project design discharge is considered negligible. The flowing tabulation presents skew values at streamgages within the region:

Streamgage	Drainage Area (Sq. Mi.)	Skew
Bodfish Creek Near Gilroy	7.4	-0.5
Little Author Creek at Redwood Retreat Road	9.2	-0.7
Pacheco Creek near Dunnville	146.	-0.8
Pajaro River near Chittenden	1188.	-0.6
Pajaro River near Gilroy	399.	-0.6
Uvas Creek near Gilroy	71.2	-0.8
Uvas Creek near Morgan Hill	30.4	-0.8
Estimated Regional Skew		-0.7

TABLE 5
UNIT HYDROGRAPHS 1/
GILROY LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

TIME (HOURS)	UVAS RESERVOIR INFLOW	TIME (HOURS)	LOCAL DRAINAGE UVAS DAM TO THOMAS ROAD
1	0	1	0
2	850	2	630
3	2,560	3	1,530
4	3,750	4	3,680
5	2,100	5	3,400
6	1,400	6	2,030
7	1,100	7	1,650
8	900	8	1,150
9	700	9	1,060
10	650	10	860
11	570	11	760
12	490	12	730
13	430	13	670
14	370	14	610
15	330	15	550
16	290	16	500
17	250	17	460
18	230	18	420
19	200	19	380
20	190	20	350
21	180	21	320
22	170	22	290
23	160	23	260
24	150	24	240
25	140	25	220
26	130	26	200
27	120	27	180
28	110	28	160
29	100	29	150

TABLE 5 (cont'd)

TIME (HOURS)	UVAS RESERVOIR INFLOW	TIME (HOURS)	LOCAL DRAINAGE UVAS DAM TO THOMAS ROAD	TIME (HOURS)	LOCAL DRAINAGE UVAS DAM TO THOMAS ROAD
30	100	30	140	45	30
31	90	31	120	46	30
32	90	32	110	47	25
33	80	33	100	48	25
34	80	34	95	49	20
35	70	35	85	50	20
36	60	36	80	51	15
37	60	37	70	52	10
38	50	38	65	53	5
39	50	39	60	54	0
40	40	40	55		
41	30	41	50		
42	20	42	45		
43	10	43	40		
44	0	44	35		
Drainage Area (Sq. Mi.)	30.4		38.6		
Lag (Hours)	4.3		5.6		

1/ Hydrograph ordinates in cubic feet per second

14. For comparative purposes, the following tabulation presents historical and statistical short-duration rainfall information at the Freedom 8 NNW raingage:

Rainfall Duration (Hours)	Maximum Recorded Rainfall (Inches)	Statistical Rainfall (Inches) 2-Year Event	10-Year Event	100-Year Event	500-Year Event	Years of Record
1	1.32	0.72	1.20	1.76	2.10	35
12	6.65	3.22	5.39	7.94	9.48	23
24	11.94	4.60	7.68	11.32	13.51	35

15. For periods of rainfall when precipitation exceeds losses, the initial loss rates presented on Plate 8 are reduced to the minimum shown values at a rate of 0.01 inches per hour. During periods when loss rates exceed precipitation rates, the loss rate is increased at rate 0.003 inches per hour (not to exceed the initial amount). Precipitation loss rates were adopted from reproduction of historical discharge hydrographs in the basin and from experience with other similar type watersheds. The adopted loss rates, in inches per hour, are as follow:

Event	Initial	Minimum
10-Year	0.20	0.10
50-Year	0.10	0.10
100-Year	0.19	0.09
500-Year	0.17	0.08

Adopted base flow rates varied from 6 to 10 cubic feet per second per square mile, depending upon the frequency of occurrence selected. Base flow did not represent a significant portion of flood runoff.

16. In order to determine at what storage Uvas Reservoir should be at the beginning of each synthetically derived storm, monthly inflow routings were accomplished for the period 1931 through 1977, using a maximum monthly diversion rate of 22 Cfs for water supply purposes. Starting storage levels for Uvas Reservoir at selected flood event frequencies were determined by analyzing the historical reservoir storage levels from 1957-77. In addition, monthly inflows at the "Uvas Creek near Morgan Hill" streamgage (located at the damsite) were routed through the reservoir for the period 1931-57, accounting for evaporation losses and local diversions. From the historical levels and routed data, the percent chance of any given reservoir storage level being reached at any one time during the year was calculated. Knowing the percent chances of storage levels being reached and the historical fact that the reservoir spills on the order of one out of two years, starting storage levels for flood frequencies were assigned. The following storage levels based on these routings were adopted:

Event	Starting Storage Levels (acre-feet)
10-Year	8,300
50-Year	8,800
100-Year	10,350 (full reservoir)
500-Year	10,350 (full reservoir)

17. For the area below Uvas Reservoir, synthetic discharge hydrographs were developed using the adopted unit hydrograph presented in Table 5 and rainfall data from the Mt. Maddona precipitation station. Adopted loss rates and base flow values were the same as those mentioned previously above for the area above Uvas Reservoir. The outflow hydrographs were routed downstream to a point just below Bodfish Creek, then combined with the hydrograph from the drainage area below Uvas Dam, with the resultant hydrograph routed further downstream to Thomas Road. The Modified Puls method of routing, based on backwater studies, was used to account for the significant effect of channel and overbank storage between Thomas Road and Uvas Reservoir.

18. Because of the short term record (1959-78) the streamgaging station "Uvas Creek near Gilroy," located at Thomas Road, and the mixed population of spill and non-spill events, a peak discharge vs. frequently curve based on streamgaging data was not attempted. Plotting position, based on the Weibull method, are presented, however, for review on Plate 7.

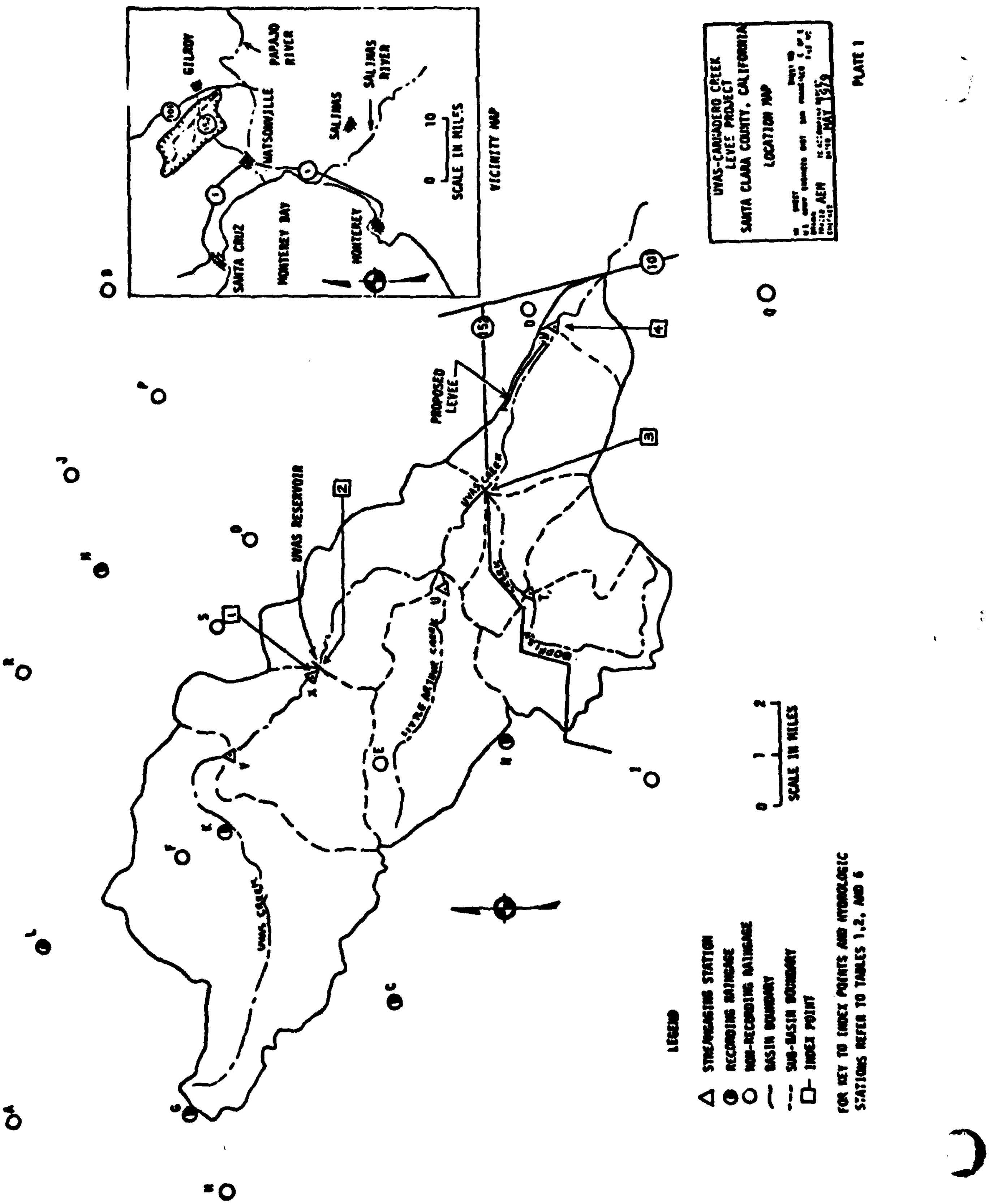
19. Computed peak discharges at each index point for the 10-,50-, 100-, and 500-year events are presented in Table 6. Adopted peak discharge vs. frequency curves for each index point are presented on Plates 7 and 8. Peak discharge vs. frequency curves for the streamgaging station "Uvas Creek above Uvas Reservoir," "Bodfish Creek near Gilroy," and "Little Authur Creek near Gilroy," are presented for review on Plate 9. The adopted 100-year inflow and outflow hydrographs at Uvas Reservoir as well as that at Highway 152 are presented for review as Plate 6.

20. It should be noted that the adopted peak discharges for Uvas Creek at Thomas Road are slightly smaller than those at Uvas Creek at Highway 152, even though the former is located approximately two miles downstream of the latter. This reduction in the peak discharges is due to the significant channel storage between the two points, caused in large part by gravel mining operations in the channel. The slightly higher discharges at Highway 152 will be used in determining levee height requirements of the proposed levee to protect Gilroy.

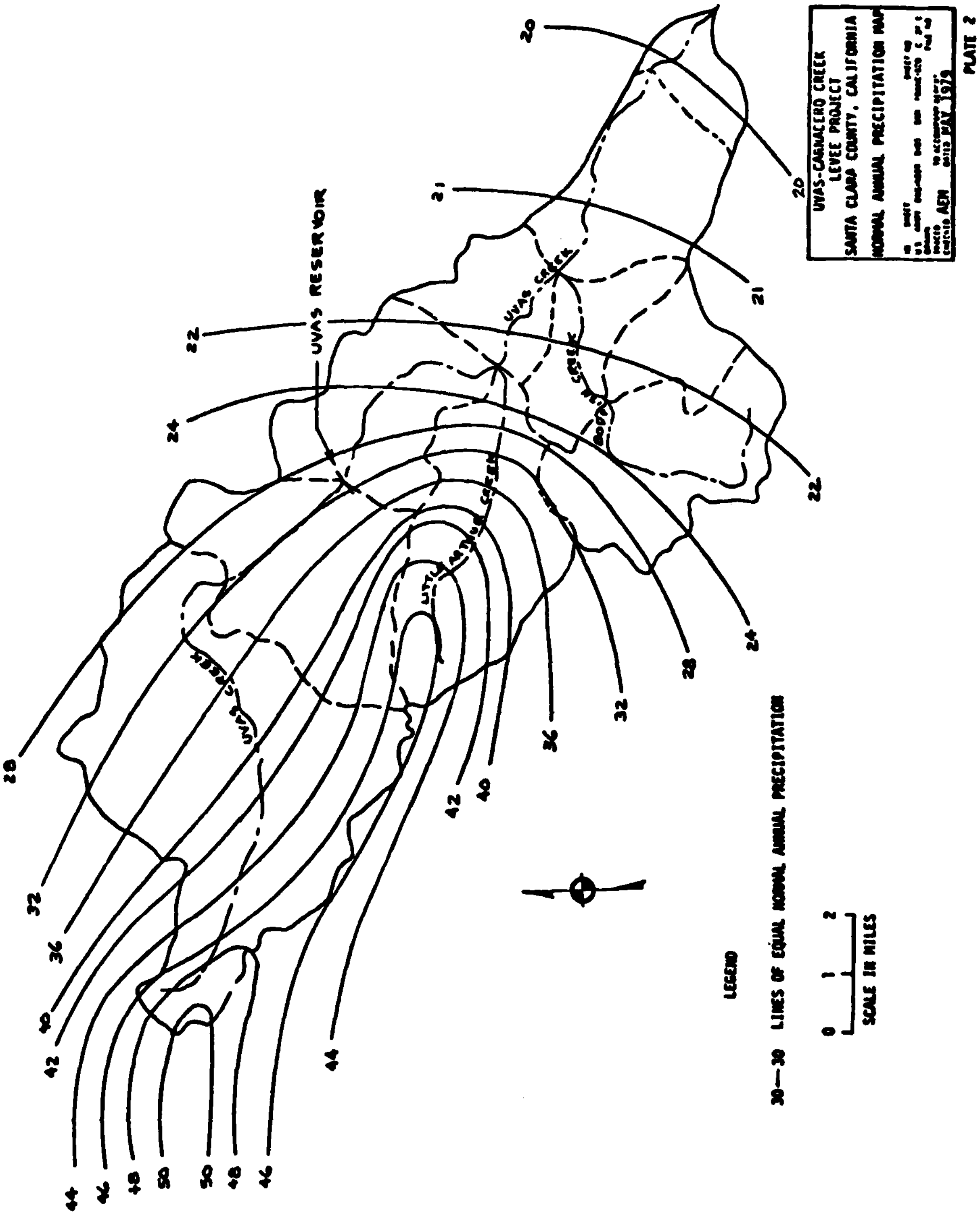
Standard Project Storm and Flood

21. The 21-24 December 1955 storm pattern was used to compute SPF discharges at index points in the basin. A study of various major storms that have occurred in the Pajaro River Basin (which includes the Uvas-Carnadero Creek Basin) indicated that the 21-24 December 1955 storm was the most severe of record and the best documented by rainfall records. The local type thunderstorm was also found to be not critical in the Pajaro River Basin. Reference is made to the attached Plate 8A which indicates a reasonable spread between the flood of record, the one-percent chance event, and the Standard Project Flood which has a 0.35 percent of occurrence before adjustment for expected probability. The December 1955 storm, centered near Holister, California, about 13 miles south of Gilroy, was transposed over the basin. Plate 10 presents the isopercentual lines and the depth vs. area curve for this storm. The depth vs. area curve indicates that 52 percent of the NAP could occur as rainfall during the Standard Project storm above and below Uvas Reservoir. Rainfall distribution for the storm was based on the average of the Freedom 8 NNW, Hollister, and the Stayton Mine raingages.

22. Loss rates used for developing the SPF varied from an initial loss rate of 0.17 inches per hour to a minimum of 0.08 inches per hour. The adopted loss rates and SPF rainfall were applied to the unit hydrographs presented in Table 5 for the areas above and below Uvas Reservoir. The same routing procedures as those addressed in paragraph 8, above, were used to route the SPF. Uvas Reservoir was considered to be full at the beginning of the storm. The adopted SPF inflow and outflow hydrographs at the Uvas Dam and the adopted hydrograph at Highway 152 are presented for review on Plate 11. The adopted SPF peak discharges for the selected index points are presented for review in Table 6.



UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA
LOCATION MAP
MAY 1979
PLATE 1
GILROY
PAJARO RIVER
WATSONVILLE
SALINAS
SALINAS RIVER
SANTA CRUZ
MONTEREY BAY
MONTEREY
0 10
SCALE IN MILES
VICINITY MAP
PROPOSED LEVEE
UVAS RESERVOIR
LITTLE ARTHUR CREEK
UVAS CREEK
0 1 2
SCALE IN MILES
LEGEND
STREAMGAGING STATION
RECORDING RAINGAGE
NON-RECORDING RAINGAGE
BASIN BOUNDARY
SUB-BASIN BOUNDARY
INDEX POINT
FOR KEY TO INDEX POINTS AND HYDROLOGIC
STATIONS REFER TO TABLES 1,2, AND 6


UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA
NORMAL ANNUAL PRECIPITATION MAP
PLATE 2
UVAS RESERVOIR
UVAS CREEK
LEGEND
30—30 LINES OF EQUAL NORMAL ANNUAL PRECIPITATION
0 1 2
SCALE IN MILES
20
21
22
24
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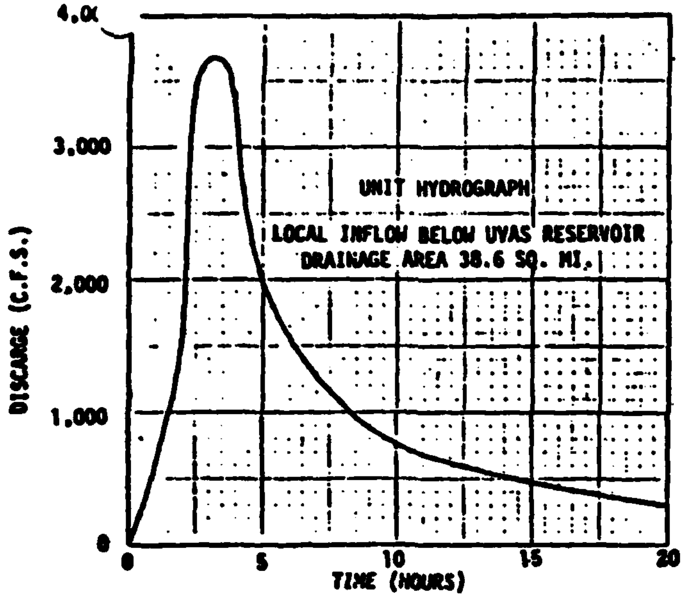
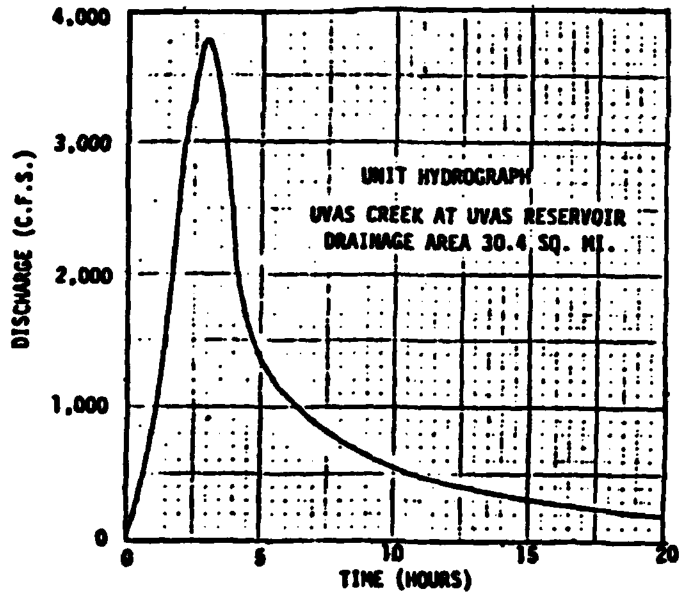
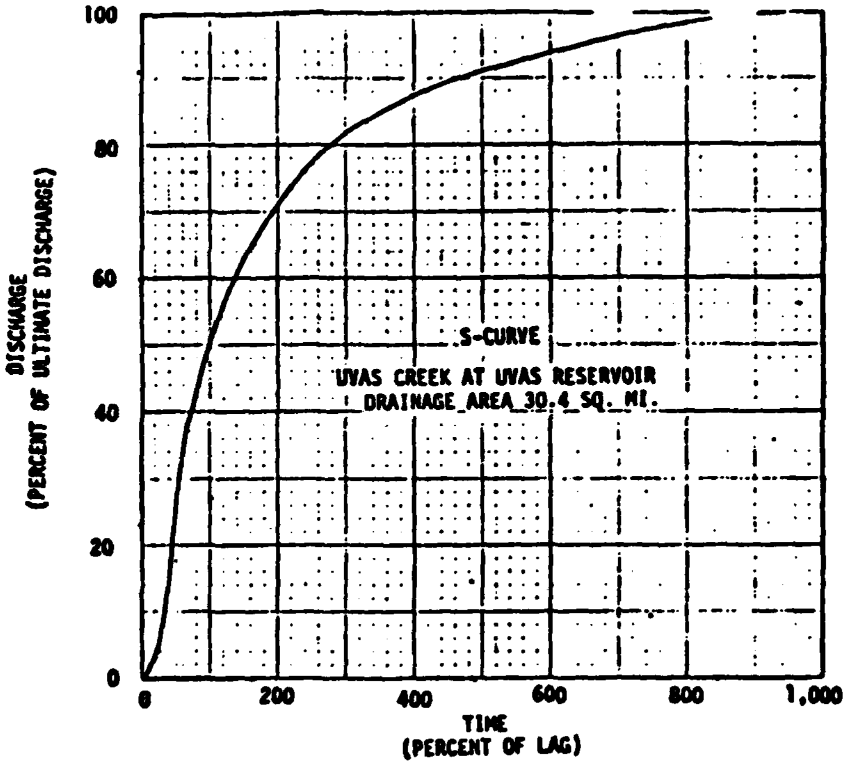
48
50



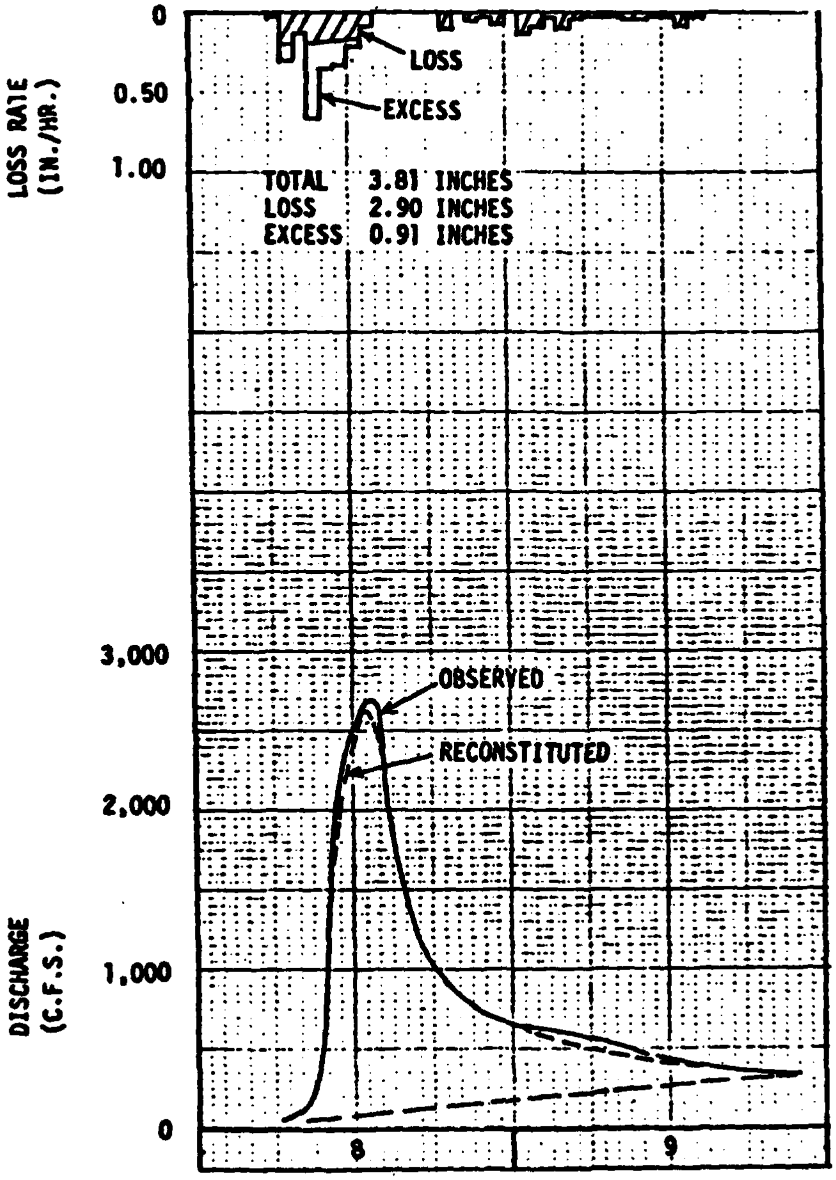




UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA
UNIT HYDROGRAPHS
S-CURVE

AEM MAY 1979

PLATE 3



FEBRUARY 1960

UVAS CREEK NEAR GILROY

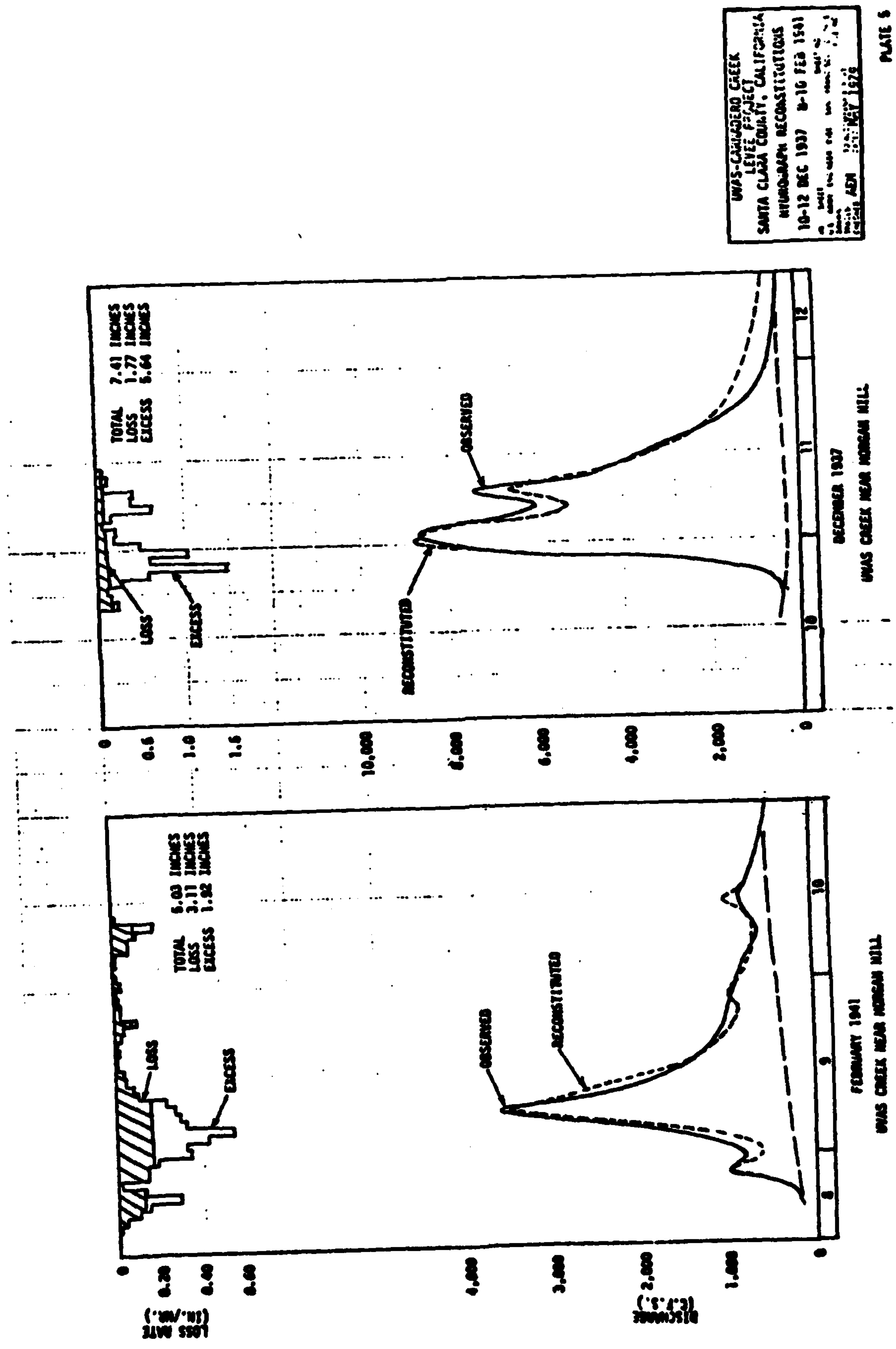
UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

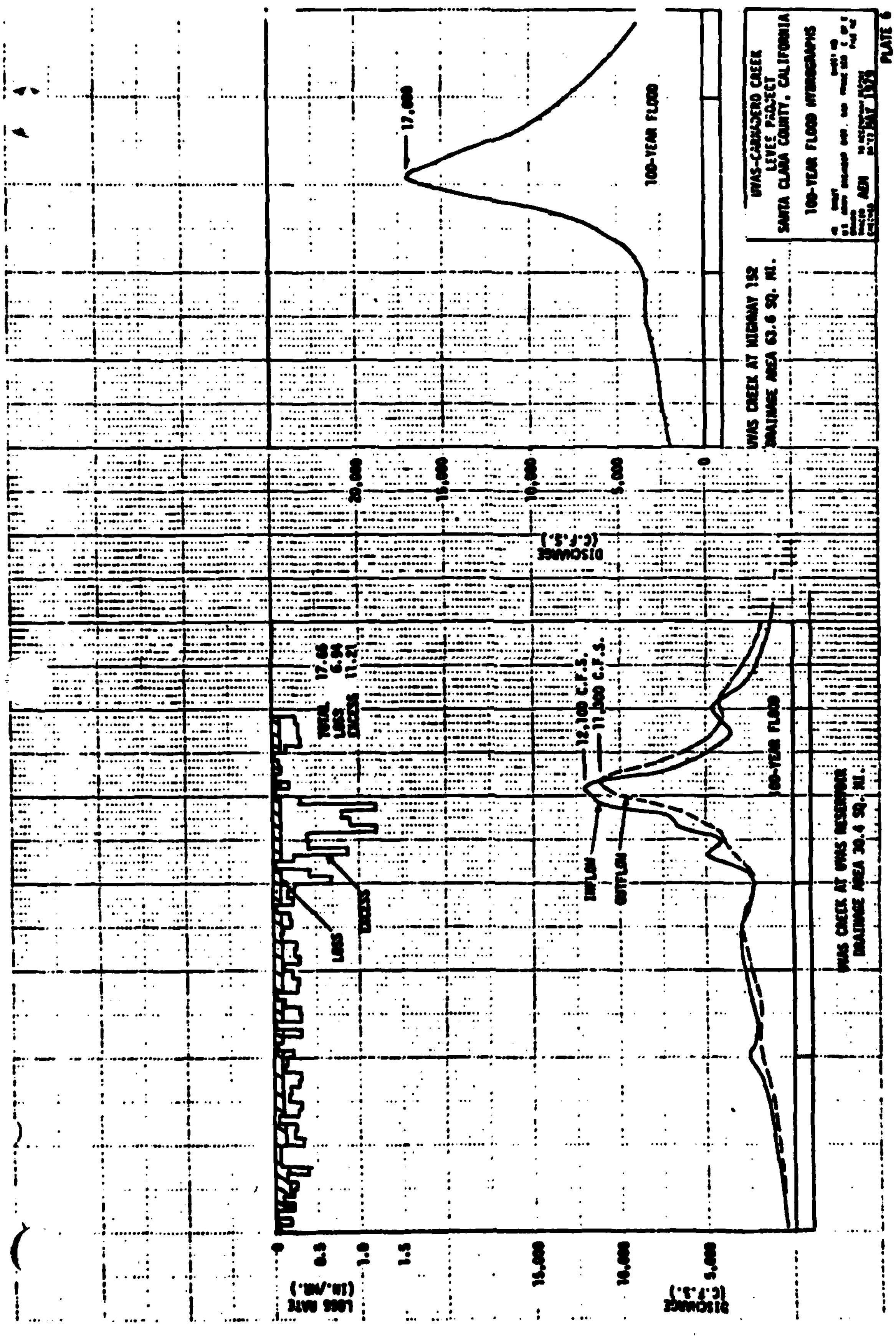
HYDROGRAPH RECONSTITUTION
8-9 FEBRUARY 1960

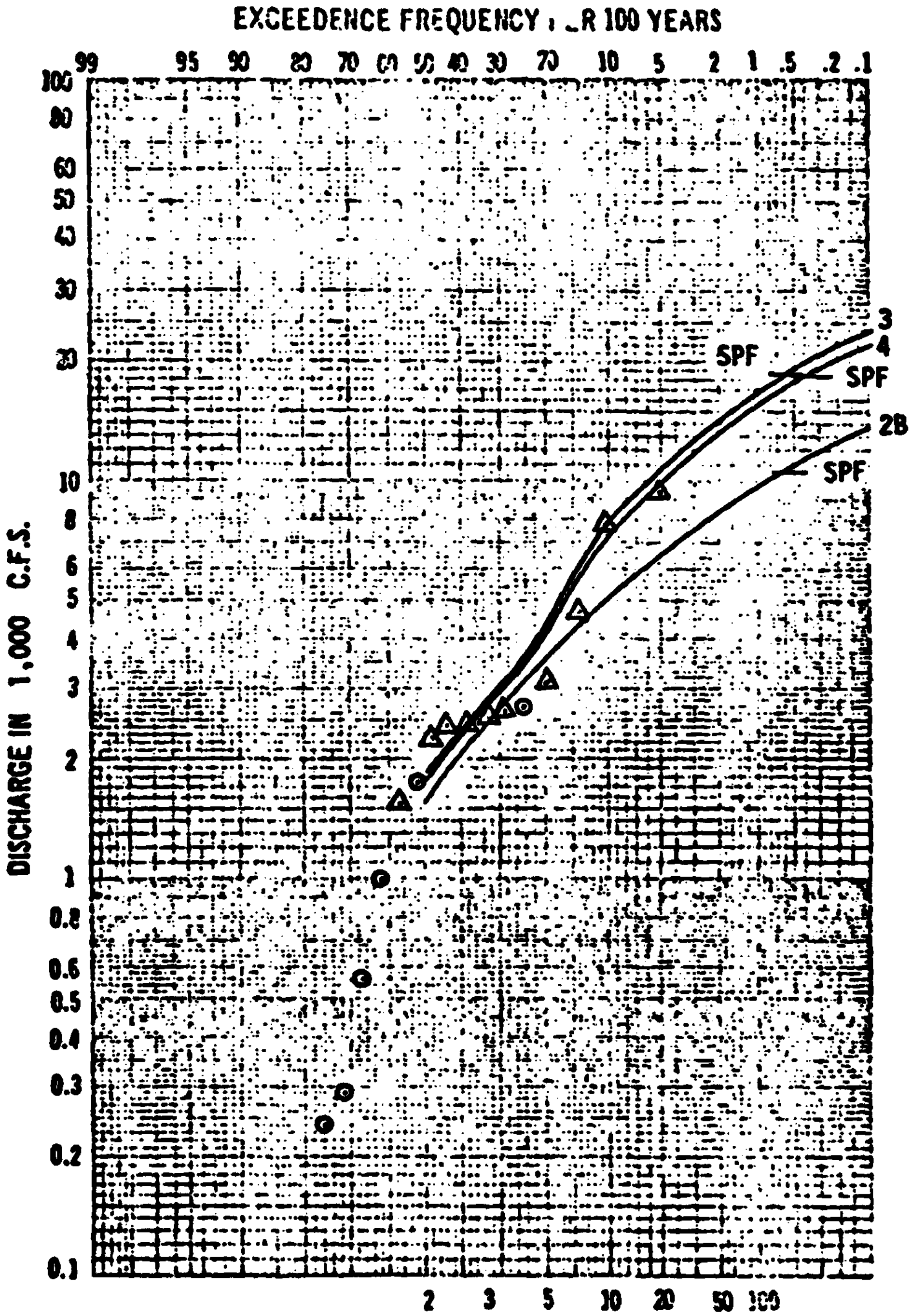
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E

TRACED CHECKED AEM DATED MAY 1979

PLATE 4


UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA
HYDROGRAPH RECONSTITUTIONS
10-12 DEC 1937 8-10 FEB 1941
PLATE 6
TOTAL 7.41 INCHES
LOSS 1.77 INCHES
EXCESS 5.64 INCHES
LOSS
EXCESS
RECONSTITUTED
OBSERVED
DECEMBER 1937
UVAS CREEK NEAR MORGAN HILL
TOTAL 5.03 INCHES
LOSS 3.11 INCHES
EXCESS 1.92 INCHES
FEBRUARY 1941
UVAS CREEK NEAR MORGAN HILL
LOSS RATE (IN./HR.)
DISCHARGE (C.F.S.)


UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA
100-YEAR FLOOD HYDROGRAPHS
PLATE 6
UVAS CREEK AT HIGHWAY 152
DRAINAGE AREA 63.6 SQ. MI.
100-YEAR FLOOD
17,000
UVAS CREEK AT UVAS RESERVOIR
DRAINAGE AREA 30.4 SQ. MI.
100-YEAR FLOOD
12,100 C.F.S.
11,000 C.F.S.
INFLOW
OUTFLOW
LOSS
EXCESS
TOTAL
LOSS
EXCESS
LOSS RATE (IN./HR.)
DISCHARGE (C.F.S.)
DISCHARGE (C.F.S.)
0
0.5
1.0
1.5
5,000
10,000
15,000
20,000



2B LOCAL INFLOW BELOW UVAS RESERVOIR EXCEEDENCE INTERVAL IN YEARS
D.A. 38.6 SQ.MI.

3 UVAS CREEK AT HIGHWAY 152
D.A. 63.6 SQ. MI.

4 UVAS CREEK AT THOMAS ROAD
D.A. 68.9 SQ. MI.

△ SPILL EVENT ⊙ NON-SPILL EVENT

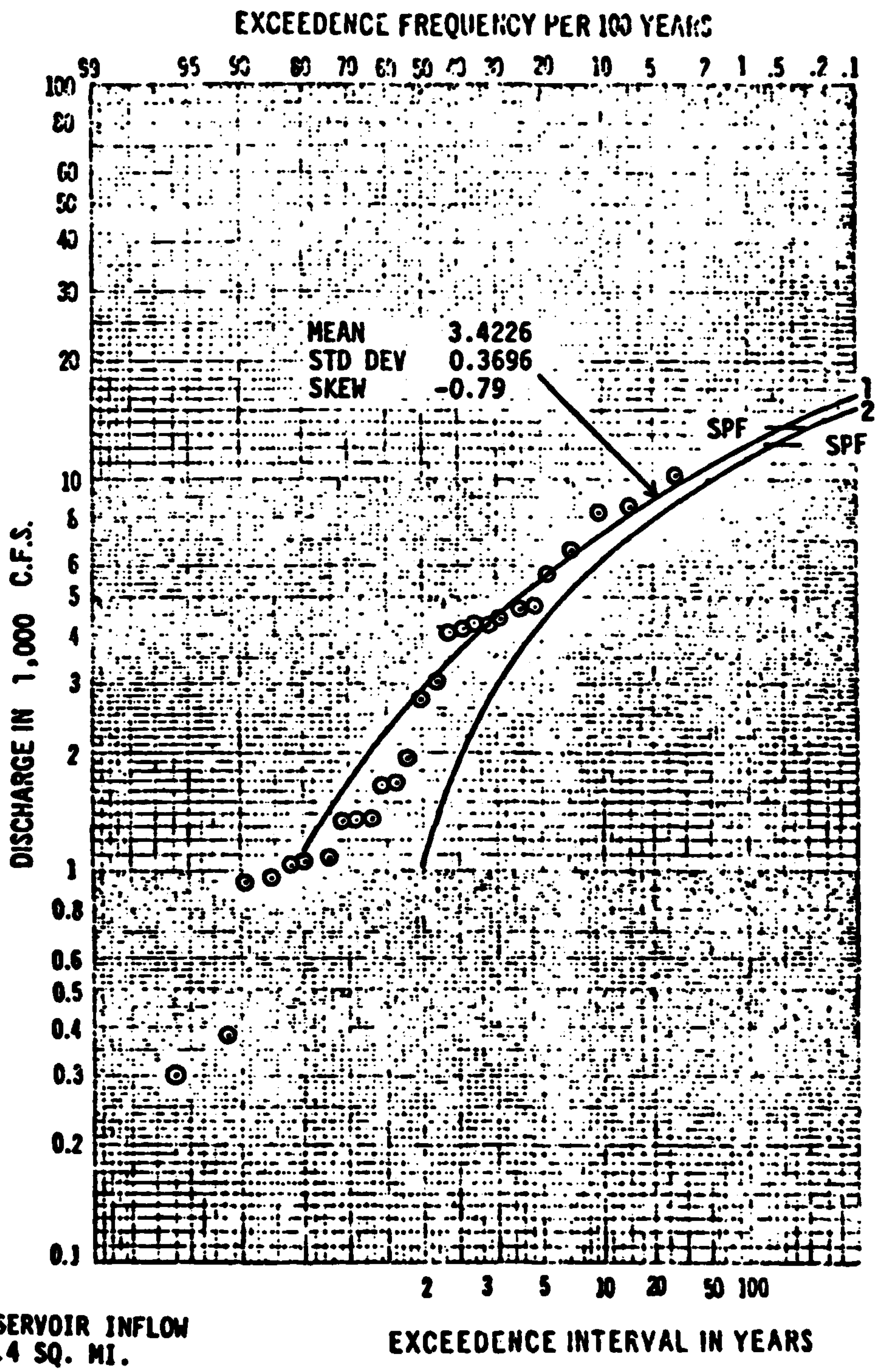
SPN FORM 34
1 APR 72

UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

PEAK DISCHARGE-FREQUENCY CURVES

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C...
DRAWN FILE NO.
TRACED AEM
CHECKED MAY 1979

PLATE 7



1 UVAS RESERVOIR INFLOW
D.A. 30.4 SQ. MI.

2 UVAS RESERVOIR OUTFLOW
D.A. 30.4 SQ. MI.

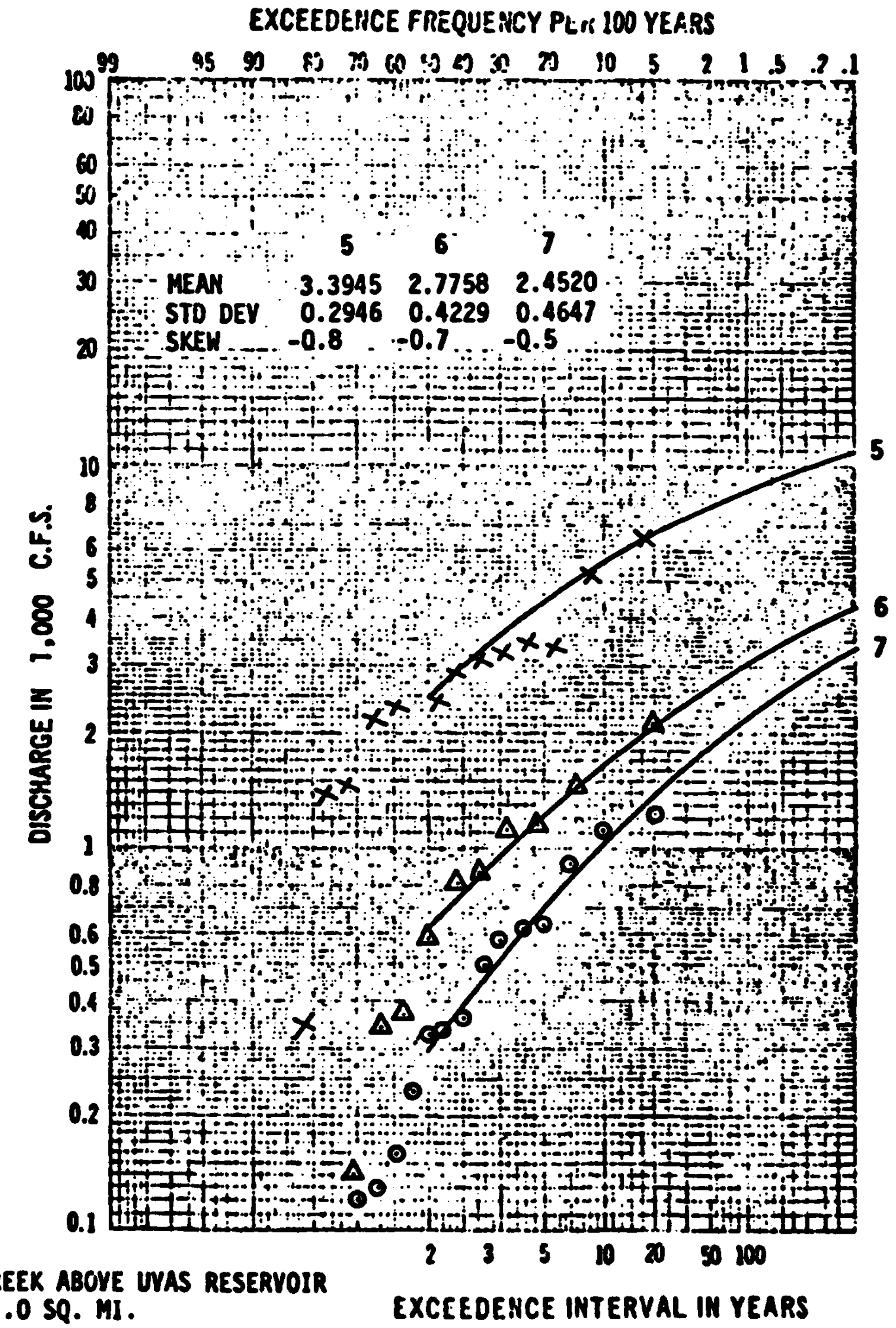
⊙ OBSERVED DATA

UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

PEAK DISCHARGE-FREQUENCY CURVES

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.
AEM MAY 1979

SPN FORM 96
1 APR 72



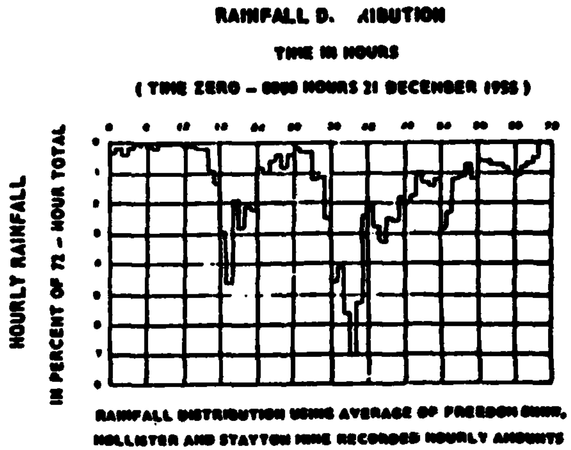
5 UVAS CREEK ABOVE UVAS RESERVOIR
D.A. 21.0 SQ. MI.

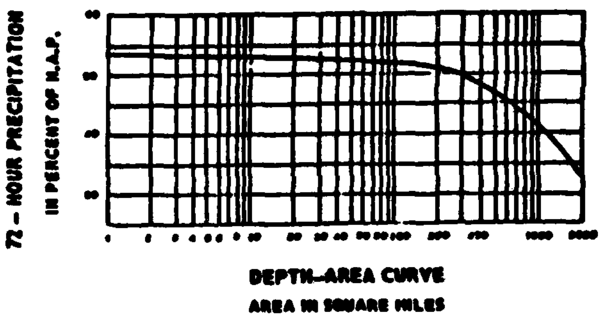
6 LITTLE ARTHUR CREEK AT
REDWOOD RETREAT ROAD
D.A. 9.2 SQ. MI.

7 BODFISH CREEK NEAR GILROY
7.4 SQ. MI.

X ⊙ ▲ OBSERVED DATA

UVAS-CARNADERO CREEK LEVEE PROJECT SANTA CLARA COUNTY, CALIFORNIA
PEAK DISCHARGE-FREQUENCY CURVES
U.S. ARMY ENGINEER DIST., SAN FRANCISCO TRACED. AEM



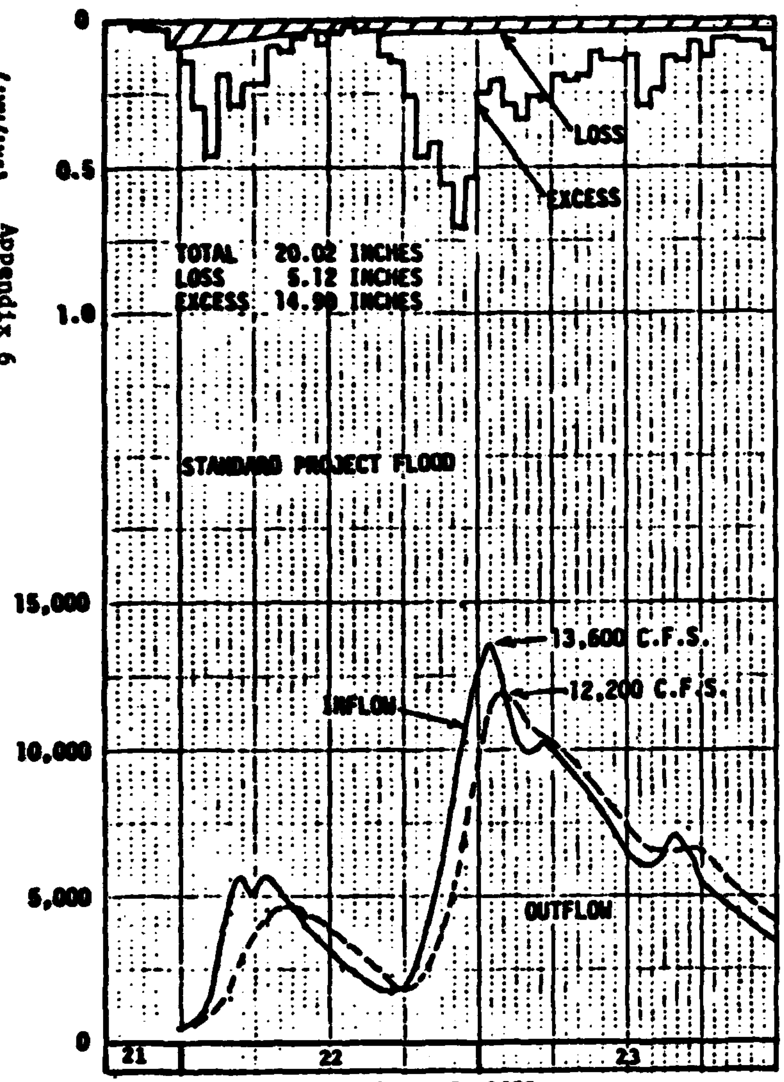


UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

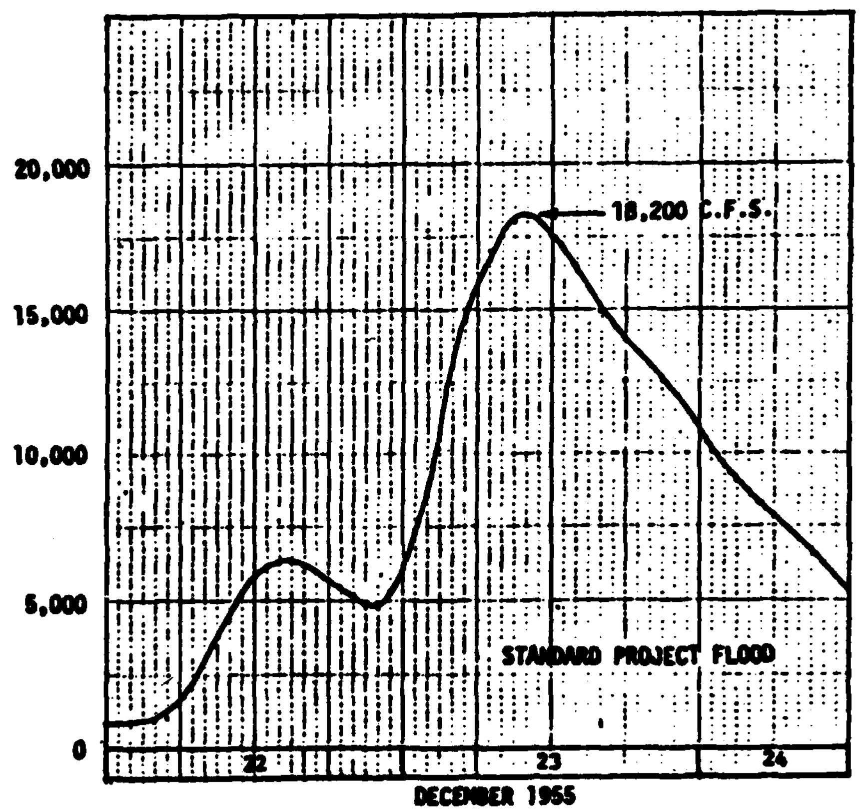
STANDARD PROJECT STORM
21-24 DECEMBER 1955

IN SHEET SHEET NO.
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
DRAWN: FILE NO.
TRACED: AEM TO ACCOMPANY REPORT
CHECKED: DATED MAY 1979

PLATE 10



UVAS CREEK AT UVAS RESERVOIR
DRAINAGE AREA 30.4 SQ. MI.



UVAS CREEK AT THOMAS ROAD
DRAINAGE AREA 68.9 SQ.MI.

UVAS-CARNADERO CREEK
LEVEE PROJECT
SANTA CLARA COUNTY, CALIFORNIA

STANDARD PROJECT FLOOD
HYDROGRAPHS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C. OF E.
TRACED AEM TO ACCOMPANY REPORT
DATED MAY 1979

PLATE 11

Appendix 6

APPENDIX 7

SOILS AND GEOLOGY

APPENDIX 7

SOILS AND GEOLOGY

SECTION A - PRELIMINARY GEOTECHNICAL INVESTIGATION
GENERAL DESIGN MEMORANDUM PHASE I
FLOOD CONTROL STUDY
UVAS-CARNADERO CREEK
BY J. H. KLEINFELDER & ASSOCIATES

SECTION B - SUMMARY OF SOILS INVESTIGATION AND DATA
FOR LLAGAS CREEK WATERSHED PROJECT

SECTION A

PRELIMINARY GEOTECHNICAL INVESTIGATION
GENERAL DESIGN MEMORANDUM PHASE I
FLOOD CONTROL STUDY
UVAS-CARNADERO CREEK
BY
J. H. KLEINFELDER & ASSOCIATES

PRELIMINARY GEOTECHNICAL INVESTIGATION
GENERAL DESIGN PHASE I
FLOOD CONTROL STUDY
UVAS - CARNADERO CREEK
GILROY, CALIFORNIA

J.H. KLEINFELDER & ASSOCIATES
Geotechnical Consultants • Materials Testing

Appendix 7

JAMES H. KLEINFELDER
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EARL C. KLEINFELDER
MICHAEL J. MAHONEY
RICHARD M. WARY

J. H. KLEINFELDER & ASSOCIATES

GEOTECHNICAL CONSULTANTS • MATERIALS TESTING
1501 NORTH BROADWAY SUITE 308
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(415) 938 5610 • TELEX 171266

ROBERT D HOWELL
WILLIAM E ELLIS
ROBERT A WILKINSON

August 9, 1979
B-1034-1

Mr. Rick R. Bettis
Gill and Pulver Engineers, Inc.
1300 Ethan Way, Suite 675
Sacramento, CA 95825

Subject: PRELIMINARY GEOTECHNICAL INVESTIGATION
GENERAL DESIGN PHASE I
FLOOD CONTROL STUDY
UVAS - CARNADERO CREEK
GILROY, CALIFORNIA

Dear Mr. Bettis:

We are pleased to submit the attached report, which contains the results of our preliminary geotechnical study for the Flood Control Study - Phase I at Uvas - Carnadero Creek, Gilroy, California. This study was performed in accordance with your authorization dated June 12, 1979. The report presents descriptions of the studies performed and the soils and geologic conditions encountered.

In general, the entire study area is underlain by silty clay/clayey silt which is in turn underlain by silty sand/gravelly sand or sand and gravel.

The most significant problem at the study area seems to be erosion. Stability of certain portions of the existing embankment slopes appear to be marginal and may become critical in the future.

We trust the information contained in this report is sufficient for preliminary planning and cost estimating. If there are any questions regarding the conditions encountered, or the recommendations provided herein, please contact us.

Very truly yours,

J. H. KLEINFELDER & ASSOCIATES

Viarnes

P. M. Viarnes
Engineering Manager

PMV/pal

TABLE OF CONTENTS

PLATES

PRELIMINARY GEOTECHNICAL INVESTIGATION

GENERAL DESIGN PHASE I

FLOOD CONTROL STUDY

UVAS - CARNADERO CREEK

GILROY, CALIFORNIA

INTRODUCTION

This report presents the results of a preliminary geotechnical investigation for a flood control study along a portion of Uvas - Carnadero Creek in Gilroy, California. This work was performed for the General Design Memorandum, Phase I, to be prepared for the U.S. Army Corps of Engineers. This report provides geologic and soils information for construction cost estimates and to act as a supplement for future studies.

Since this investigation was conducted for preliminary study and specific designs are not yet developed, the conclusion and recommendation presented in this report must be considered general and preliminary in nature.

PROJECT DESCRIPTION

The project area is located about one mile southwest of the center of the City of Gilroy in Santa Clara County, California as shown on Plate No. 1. Two alternatives are being considered to improve a portion of the Uvas Carnadero Creek.

The first suggested alternative for construction at the site is to improve and extend the existing 3,000 foot levee along the southwest bank of the creek to result in approximately 7,500 feet of levee. The second alternative is to construct a new levee. It is our understanding that the maximum height of the levees will be 10 to 12 feet.

PURPOSE AND SCOPE OF INVESTIGATION

The purpose of this preliminary investigation was to explore the subsurface conditions in the study area and to provide information for preliminary cost estimates and to act as a supplement for future studies.

The scope of our work included a site reconnaissance, a review of the local geology, a field exploration program, laboratory testing, an engineering evaluation of the data gathered, and the preparation of a preliminary geotechnical report summarizing our findings. The report describes the geotechnical engineering studies which were conducted. The following items were considered:

1. Geology
2. Soils
3. Groundwater
4. Levee and Stream Bank Stability

5. Seepage
6. Flood Protection
7. Borrow Materials

GENERAL SITE DESCRIPTION

The site consists of about 7,500 feet of unlined creek channel. The area adjacent to the channel is relatively flat with the exception of the channel itself and an earthen embankment which parallels the northeast side of the channel for about one-half of the project length.

The embankment is about 6 to 8 feet high at the northern end of the project area at Miller Avenue (See Plate No. 1), but gradually decreases to about 4 feet high at its terminus along the high school property north of drill hole DH-3. The downstream or land side of the embankment has a slope of approximately 1 horizontal to 1 vertical (1:1). The crest of the embankment starts at about 10 feet wide at the northern end and becomes narrower within about 200 feet of Miller Avenue. The channel side of the embankment is quite variable in slope averaging about 1.5 or 2:1, except near the southern end of the project where it is nearly vertical.

The grass covered channel was running at a depth of about two feet during our field studies; however, based upon the condition of the sides of the channel, erosional markings and stream deposition areas, it appears that the stream flow has extended to within a few feet of the top of the channel on numerous occasions during the winter high flow periods. Vegetation within the channel area ranges from trees to two feet in diameter to water resistant bushes and grasses.

The total channel depth including the embankment is on the order of 15 to 20 feet. As previously discussed, the side slopes average about 1.5 or 2:1 at the north end of the project area and are nearly vertical at the south end of the project area. It appears that the channel is wider at the north end causing slower and smoother stream flows, and more narrow along the south end of the project causing faster flows which tend to erode the sides of the channel walls resulting in their present vertical configuration.

FIELD EXPLORATION

The field exploration at the site was conducted in two phases. Phase I consisted of a site reconnaissance by a project engineer from our firm. Phase II consisted of the drilling and sampling of six test borings at the locations shown on Plate No. 1.

All test borings were drilled with a CME-55 truck mounted drill rig using either continuous flight augers or hollow stem augers. These borings were advanced and sampled at appropriate intervals to a depth of 25 feet below the adjacent ground surface. Material encountered in each boring was visually classified in the field and logged by a field engineer who also obtained relatively undisturbed soil samples for detailed laboratory testing.

Relatively undisturbed samples were obtained by driving a 2 inch I.D. California Modified Sampler containing thin brass liners into the bottom of the borings. The sampler was driven by a 140 pound hammer falling 30 inches in accordance with ASTM Designation D-1586-67.

When the sampler was withdrawn from the boring, the brass liners containing the samples were removed, examined and sealed to preserve the soil's natural moisture content.

Penetration Resistance Values (N) are recorded on the boring logs as the number of blows required to drive the sampler 12 inches. This value is used as a measure of relative density of cohesionless soils, or relative stiffness of cohesive soils. In some cases the sampler could not be driven the full 18 inches as required by the ASTM procedure. When this occurred, the blows delivered and the actual depth of penetration were noted on the log. For evaluation purposes, all penetration resistance values obtained by the use of the California Modified Sampler were adjusted to correlate to the Standard Penetration Test values by multiplying by a factor of 0.7. The actual blow counts obtained in the field are shown on the logs of borings (Appendix A, Plate Nos. A-1 through A-6).

SITE GEOLOGY

Geologic Setting (1)

The study area is at the west edge of the lower Santa Clara Valley, an intermontane basin of the California Coast Ranges geologic province. Bedrock of the surrounding hills and flooring of the valley includes consolidated marine Jurassic through Miocene (approximately 150 to 15 million years old). Younger, Pliocene to Holocene (recent) rocks are well-consolidated to poorly consolidated continental deposits of alluvial fans and streams that filled the valley with folding and uplift of the Coast Ranges.

Structures of the Coast range are of two ages. Older structures than the Coast Range Uplift are discontinuous compared to the Coast Ranges. Late Tertiary uplift and faulting in the Coast Ranges results in today's exposures of linear north to northwest trending folds and faults, including the San Andreas Fault System, that continue to be active. The nearest faults of this system are listed in Table I with pertinent related data. Plate No. 2 shows faults and earthquake epicenters.

The site is part of the alluvial plains of the lower Santa Clara Valley and underlain by unconsolidated sand and gravel with some silt and clay. These are undeformed, geologically recent deposits.

TABLE I

Fault	Maximum Probable [1/] (Design) Earthquake (Richter Magnitude)	Nearest Point on [1/] Fault to Site (Miles)	Maximum Estimated Bedrock [3/] Acceleration at Site* (gravity, g)
San Andreas	8	6	0.56
Sargent	7	3	0.63
Calaveras	7½	4½	0.57

* Bedrock acceleration is modified by the overlying soils and is reduced or amplified depending on the soil type, vibration frequency, and other factors. The table is presented only for comparision of the possible effects on the site of earthquakes on various faults.

Groundwater

Although no groundwater was found in the course of our study, it has been detected by others (2) at depths of 25 and 65 feet. The creek recharges the watertable seasonally, so that groundwater could reach levels as high as the normal wet season stream level within the study area.

SITE SOIL CONDITIONS

As indicated by the test borings, the site is underlain by a varying thickness of dry to damp medium stiff to stiff clayey silt/silty clay. This material exhibits a low plasticity to a non-plastic nature and a low to very low expansion potential.

1/, 3/ See References, Page A-18

It is moderately stable when dry, but instability of slopes greatly increases with water content and slope angle. As discussed in the General Site Description section of this report, evidence of erosion and slides are common along the banks of the stream and the existing levee.

The surface clayey material is underlain by silty to gravelly sand or sand and gravel. These materials are medium dense to dense in place and are also somewhat susceptible to erosion. A typical subsurface soil profile along the Uvas - Carnadero Creek is presented on Plate No. 3.

LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the test borings to evaluate their strength and other physical characteristics. The tests performed included moisture content and dry density, Atterberg limits, sieve analyses, unconfined compressive strength and direct shear. Results of the laboratory tests are summarized in Appendix A on Plate No. A-7 and graphically illustrated on Plate Nos A-8 through A-14.

CONCLUSIONS AND RECOMMENDATIONS

General Discussion

Data collected during our field exploration and laboratory testing programs were analyzed in order to evaluate the compatibility of proposed flood protection measures along Uvas-Carnadero Creek to the site soil conditions. An evaluation of measures for flood proofing of structures susceptible to flooding was also conducted. In general, it is our conclusion that the stability of the existing levee and of the channel slopes varies from marginal to fair. Although the existing levee and channel slopes can be considered stable at this time, they may in time become unstable due to erosion.

As discussed in the site soil conditions section of this report, the on-site silty soils are susceptible to erosion. The silty soils are stable when their moisture content is low; however, they tend to become moderately unstable when wet. The underlying sandy and gravelly materials are more stable than the silty soils; however, they are subject to stability problems. Near vertical slope faces are formed as a result of minor erosion. The cohesionless nature of this material in turn causes minor slope failures. This continuing cycle of erosion, slope failure and erosion can eventually cause major problems.

<u>Levee and Stream Banks Stability</u>

Our laboratory tests show that the materials underlying the levees along the Uvas-Carnadero Creek exhibit a high variation of shear strength. Cross sections of the levee and stream at different points also differ significantly. This diversity of conditions precludes recommending a unified treatment applicable to the whole section. On the basis of the tests results, surface observation, and general engineering principles, the following opinions can be presented:

A - The stability of the levee and stream bank varies from fair to marginal. Plate No. 4 illustrates the relationships between height of a cut slope, unconfined compressive strength required for a factor of safety equal to one, and slope angle. This Plate is intended to illustrate the various elements involved in estimating stability and is not directly applicable as a design tool.

B - Some areas of the levee and banks, specifically near the south end of the project, can be expected to deteriorate more rapidly than others. The erosional cycle mentioned in the general discussion section is obviously at work in this area, where numerous instances of sloughing were observed. The process will probably accelerate during the wet season, when an increase in the moisture content of the soils will result in a loss of strength and towards the end of that season when drawdown conditions could exist near the b ks.

C - The northern section of the project appears to be generally more stable than the rest. However, we believe some levee reinforcement or reconstruction will be necessary to bring the structure up to safe standards.

D - The cross section of the creek and levees will need to be adjusted along most of its length to assure its stability. Depending on the hydraulic characteristics of the design flow in the creek, riprap or other bank protection may be required.

E - If a new levee is constructed, minimum setback should be established on the basis of the stability of the slope, as exemplified in Plate No. 5.

F - Where setback required for slope stability can not be obtained, shifting of the stream channel and construction of structural bank elements, such as retaining walls or gabions, should be considered.

Seepage Zones

The near surface silty soils at the site are moderately slow draining. The soils beneath the surface soils are permeable and fairly well drained. These subsoils, sandy and gravelly material, may be considered as seepage zones at the site. However, our laboratory test results suggest that the chance of piping is remote.

Flood Protection

As indicated by Plate No. 1 of Appendix 2, the entire area adjacent to the Uvas-Carnadero Creek is within the potential flood plain.

In order to minimize flood damage, we recommend that all structures susceptible to flooding be placed on fills sufficiently above the level of the 100 year flood. In many areas, such as those already developed, it may be impossible or impractical to elevate structures. In such cases, other means of flood prevention such as retaining walls, berms and others should be considered.

Borrow Material

Materials encountered in our test borings in the study area may be grouped in two categories - 1) silty to clayey; 2) sandy to gravelly.

The on-site silty to clayey soils will provide fair to good foundation support. It is our opinion that these soils may be used sucessfully as fill, provided close compaction control is implemented. The silty to clayey material provides very poor to moderate stability for embankment construction. Proper compaction and slope protection are essential for erosion control if they are utilized in the construction of embankments.

The on-site sandy to gravelly soils are suitable for fill or embankment construction. They can provide very good foundation support. However, these materials are somewhat susceptible to erosion and slope protection may be necessary.

ADDITIONAL SERVICES

It is our understanding that this preliminary geotechnical investigation is intended for preliminary cost estimates, design concepts and suitability of construction only. Additional detailed studies will be conducted in the later phases of the project. These additional studies should furnish a more complete understanding of the soil shear strength, necessary levee locations, flood protection requirements, and design and construction details. Continuous coordination between the project design engineer and the foundation engineer is recommended to assure that the design is compatible with the soil conditions defined by this preliminary investigation.

LIMITATIONS

The services provided under this contract as described in this report include professional opinions and judgements based on the data collected. These services have been performed according to generally accepted soil and foundation engineering practices. The recommendations contained in this report are based on information obtained from: (1) six test borings, (2) the observations of our soils engineer, (3) the results of laboratory tests, (4) data from literature, and (5) our experience in the area. The test hole logs do not provide a warranty as to the conditions which may exist between test holes. The nature and extent of soil variations between the borings may not become evident until construction occurs. If conditions are encountered in the field which differ from those described in this report, our firm should be contacted immediately to provide any necessary revisions to these recommendations. In addition, if the purpose of this preliminary investigation change from that assumed in the preparation of this report, our firm should be notified and a review of the recommendations performed. The validity of the recommendations contained in this report is dependent upon additional studies and an adequate testing and monitoring program during the construction phase. It is recommedned that our firm review the final project plans and specifications prior to bidding, and that the field observations during construction be provided by or coordinated with our firm to verify predicted conditions.

Respectfully submitted,

J. H. KLEINFELDER & ASSOCIATES

Philip L. Chang

Philip L. Chang
Staff Engineer

Donald R. Curphy

Donald R. Curphy
Project Engineer
CE 22057

DRC:PLC:pal

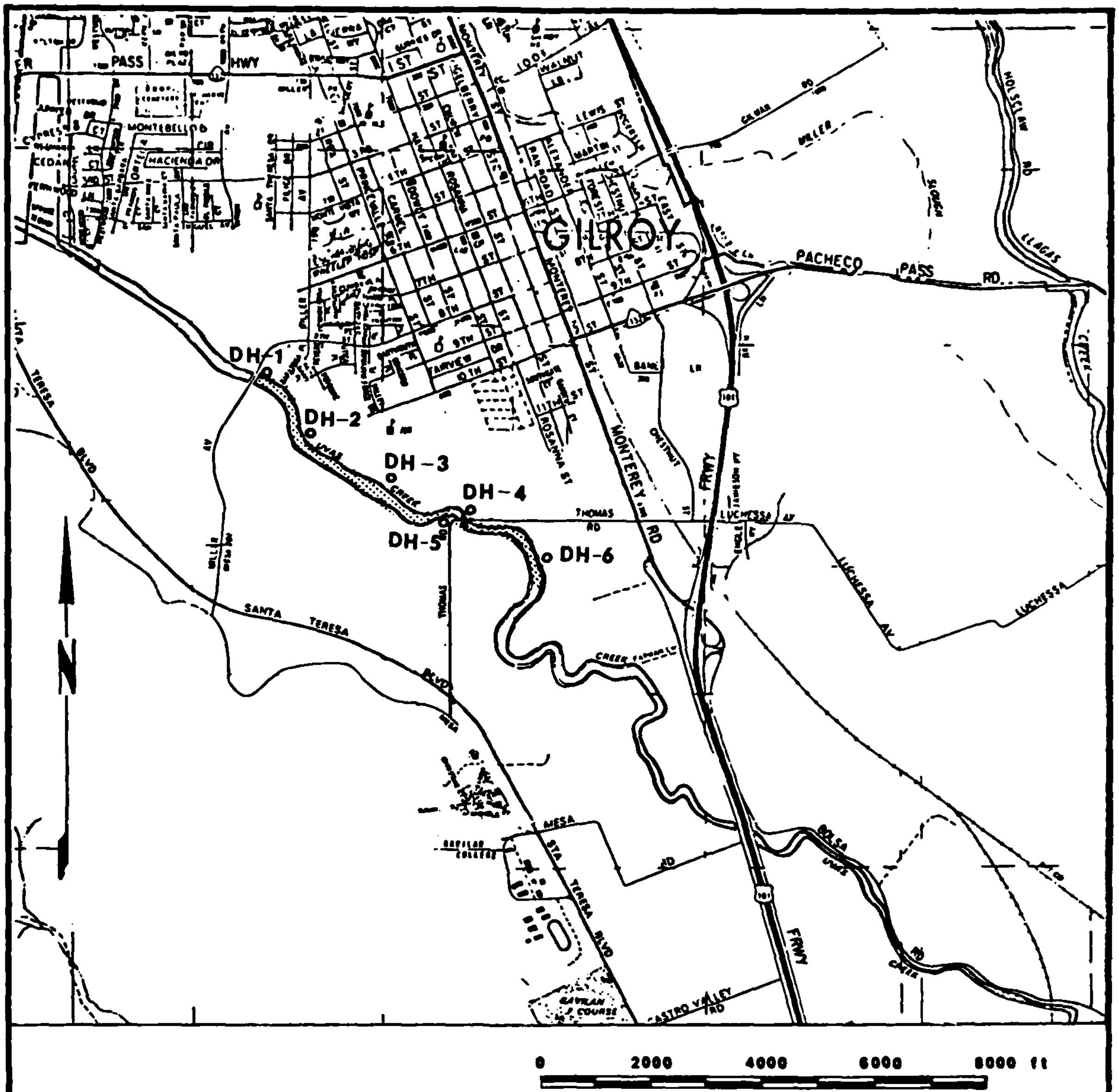
REFERENCES

1. Williams, John W., et al, "Environmental Geological Analysis of the South County Study Area, Santa Clara County, California", California Division of Mines and Geology, Preliminary Report 18 (1973).

Page, Ben M., "Geology of the Coast Ranges of California" and Christensen, Mark N., "Quaternary of the California Coast Ranges", Geology of California, Edgar H. Bailey, Ed.: California Division of Mines and Geology Bulletin 190 (1966)

2. Rogers, Thomas H., and John W. Williams, "Potential Seismic Hazards in Santa Clara County, California", California Division of Mines and Geology Special Report 107 (1974).

3. Seed, H. Bolton and Schnabel, Per B., "Accelerations in Rock for Earthquake in the Western United States," College of Engineering, University of California, Berkeley, Report No. EERC 72-2, July 1972.



DH o APPROX. LOCATION OF DRILL HOLE

STUDY AREA

J. H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS — ENGINEERING LABORATORIES		BORING LOCATION MAP	
PREPARED BY: PLC	DATE: 7-9-79		
CHECKED BY: DRC	DATE: 7-9-79	PROJECT NO B-1034-1	PLATE NO. 1

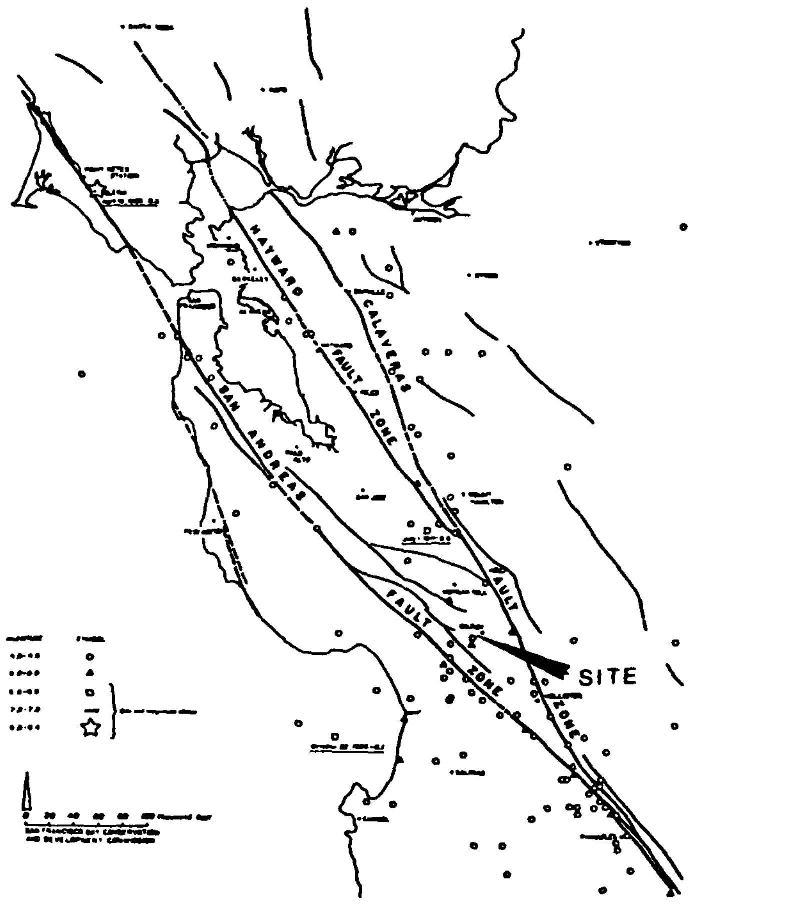
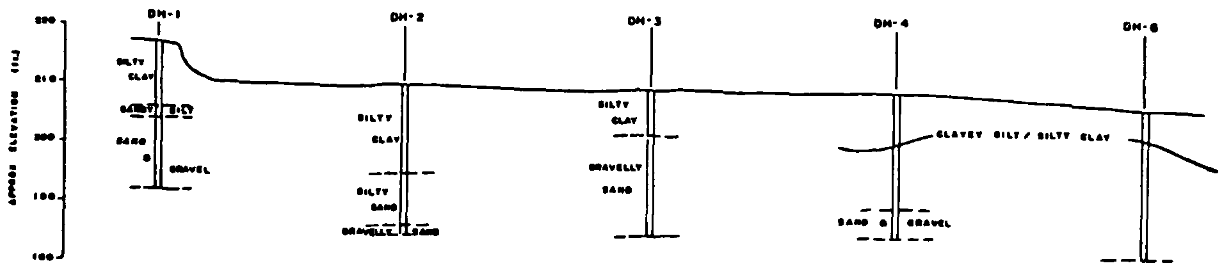


Figure 1. Earthquake epicenters and magnitudes, 1934–65. Source: Data from 1934–1962 from Department of Water Resources. After 1962 from other sources.

SOURCE: CALIFORNIA DIVISION OF MINES AND GEOLOGY
SPECIAL REPORT 97

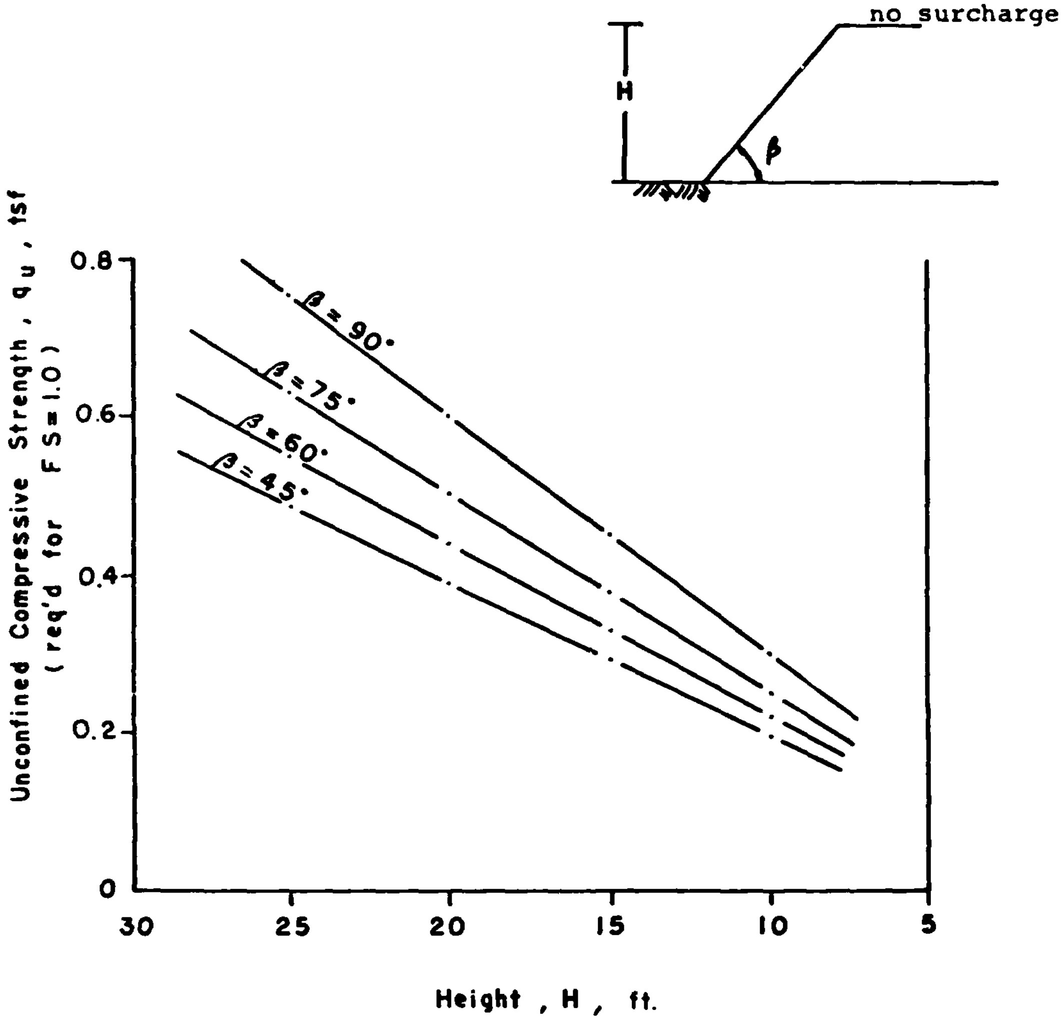
J. H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS — ENGINEERING LABORATORIES	FAULTS AND EARTHQUAKES UVAS - CARNADERO
PREPARED BY: TN DATE: 8/1/79	
CHECKED BY: TN DATE: 8/1/79	PROJECT NO. R-1034-1 PLATE NO. 2



SECTION A-A

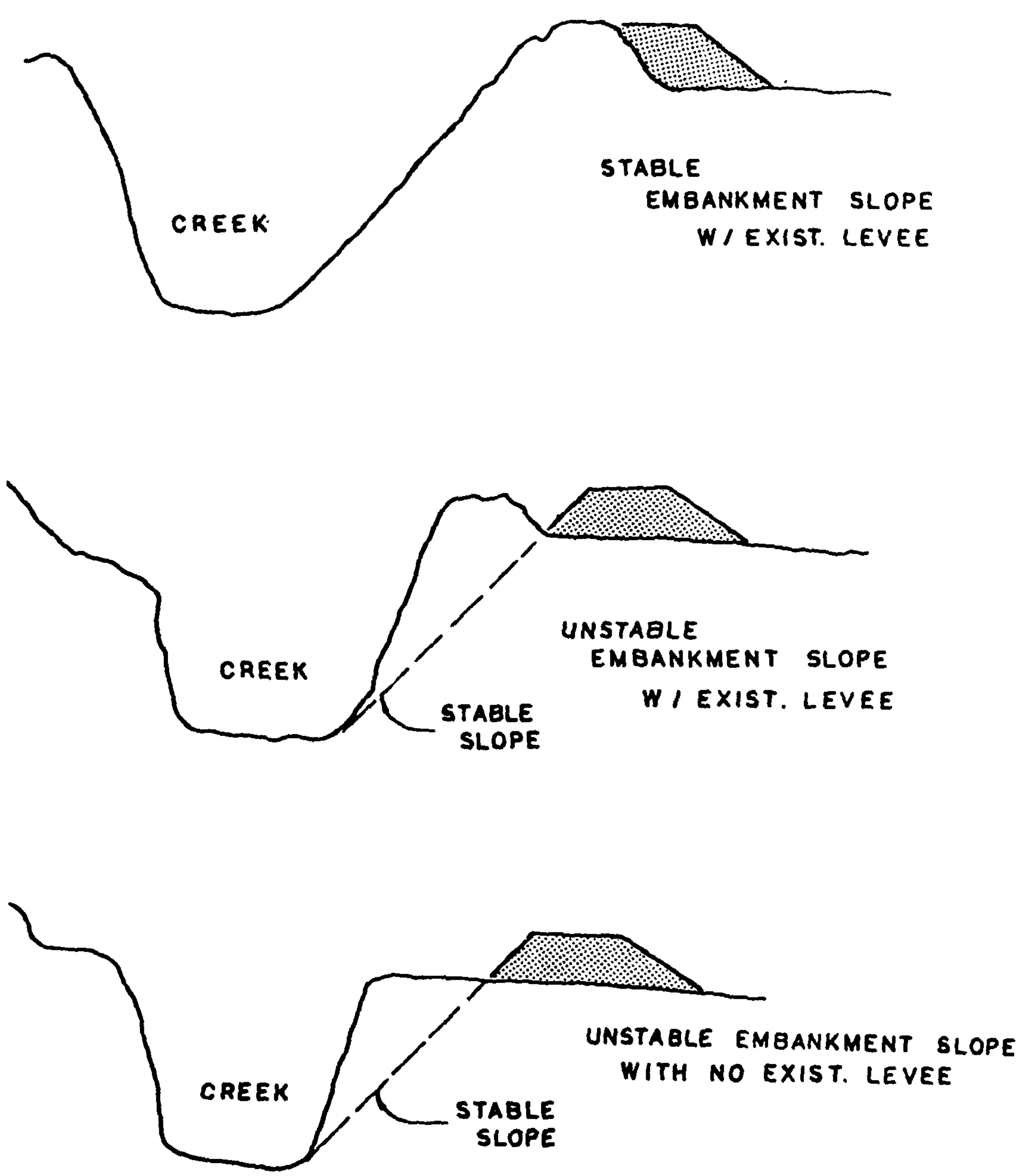
NOTE: THE SOIL PROFILE IS NECESSARILY INFERRED AND PRESENTS ONLY A BROAD AND GENERAL INDICATION OF SUBSURFACE SOIL CONDITIONS THE BORING LOGS ALONE INDICATE ACTUAL SOIL CONDITIONS AND THEN ONLY AT THE TIME OF DRILLING AND AT THE LOCATIONS INDICATED. ACTUAL SOIL CONDITIONS MAY VARY FROM THOSE SHOWN ON THE SOIL PROFILE.

J. H. KLEINFELDER & ASSOCIATES		SUBSURFACE SOIL PROFILE	
PREPARED BY PC	DATE 8-1-79		
CHECKED BY DC	DATE 8-1-79	PROJECT NO B-1034-1	PLATE NO 3



NOTE: Curves shown are for dry cut slopes, a factor of safety of one, and should not be used for design.

J. H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS — ENGINEERING LABORATORIES		SLOPE STABILITY	
PREPARED BY: PLC	DATE: 8-3-79		
CHECKED BY DRC	DATE: 8-3-79	PROJECT NO. B-1034-1	PLATE NO. 4



J. H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS — ENGINEERING LABORATORIES		SUGGESTED LEVEE LOCATION	
PREPARED BY: PLC	DATE: 8-9-79		
CHECKED BY: DRC	DATE: 8-9-79	PROJECT NO. B-1034-1	PLATE NO. 5

J H KLEINFELDER & ASSOCIATES

APPENDIX A

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	SYMBOL	DESCRIPTION	MAJOR DIVISIONS		LTR	SYMBOL	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW		Well-graded gravels or gravel sand mixtures, little or no fines.	FINE GRAINED SOILS	SILTS AND CLAYS LL<50	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		GP		Poorly-graded gravels or gravel sand mixture, little or no fines.					
		GM		Silty gravels, gravel-sand-silt mixtures.			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		GC		Clayey gravels, gravel-sand-clay mixtures.			OL		Organic silts and organic silt-clays of low plasticity.
	SAND AND SANDY SOILS	SW		Well-graded sands or gravelly sands, little or no fines.		SILTS AND CLAYS LL>50	MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		SP		Poorly-graded sands or gravelly sands, little or no fines.			CH		Inorganic clays of high plasticity, fat clays.
		SM		Silty sands, sand-silt mixtures.			OH		Organic clays of medium to high plasticity, organic silts
		SC		Clayey sands, sand-clay mixtures.	HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic Soils.

Standard Penetration Split Spoon Sample

Modified California Sample

Shelby Tube Sample

Water Level Observed in Boring

* No Recovery

N F W E No Free Water Encountered

NOTE: The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

J. H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS — ENGINEERING LABORATORIES		BORING LOG LEGEND
PREPARED BY: PC	DATE: 8-1-79	
CHECKED BY: DC	DATE: 8-1-79	PROJECT NO. B-1034-1

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Location

Boring No. DH-1

Job No. B-1034-1

Plate No. A-1

Depth In Feet	Dry Density Lbs./Cu. Ft.	Moisture Content % Dry Weight	Blow Count	Sample No.	Description
0					
2					Brown, gravelly silty CLAY, dry, stiff, 10 to 15% gravel. (CL)
4					More gravel with depth
	114	7	16	5	
6					
8					
10					
	86	6	16	10	Brown, fine sandy SILT, medium dense, dry, trace of dry roots (ML)
12					
14					Brown, SAND and GRAVEL, gravel to 1.5 inches, dry medium dense to dense. (GW-GP)
	131	3	41	15	
16	117	4			
18					
20					
	107	6	36	20	
22					
24					
	116	6	23/6"	25	
26			Refusal On Rock		Bottom of Boring at 25 feet NFWE
28					

LOG OF BORING

Appendix 7
A-26

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Location

Boring No. DH-2

Job No. B-1034-1

Plate No. A-2

Depth In Feet	Dry Density Lbs./Cu. Ft.	Moisture Content % Dry Weight	Blow Count	Sample No.
5	116	11	22	5
10	94	11	14	10
15	93		16	15
20	113 102	9 14	18	20
25			32	25

Description

0 to 15 feet: Brown, silty CLAY, trace of fine sand and gravel, stiff to hard, dry. (CL)

Color changed to reddish brown below 8 feet.

15 to 24 feet: Brown, silty SAND, trace of gravel, dry, medium dense, more gravel with depth. (SM)

Below 24 feet: Brown, gravelly SAND with trace of silt, moist to wet, dense. (SW)

Bottom of Boring at 25 feet
NFWE

LOG OF BORING

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Location

Boring No. DH-3

Job No. B-1034-1

Plate No. A-3

Depth In Feet: 0 – 28

Dry Density Lbs./Cu. Ft.	Moisture Content % Dry Weight	Blow Count	Sample No.	Description
				Dark brown, silty CLAY/clayey SILT, medium stiff, trace of fine gravel and roots to 5 ft. dry. (CL-ML)
109	11	8	5	
				Brown, gravelly SAND, medium dense, damp, gravel to 1.5 inches, well graded. (SW)
109 116	5 4	19	10	
118	4	26	15	
129	9	15/**	25	
				**Sampler packed
		15/**	25	Bottom of Boring at 25 feet NFWE

LOG OF BORING

Appendix 7

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Location

Boring No. DH-4

Job No. B-1034-1

Plate No. A-4

Depth In Feet	Dry Density Lbs./Cu. Ft.	Moisture Content % Dry Weight	Blow Count	Sample No.	Description
0					Dark brown, clayey SILT /silty CLAY, medium stiff to stiff, dry to damp (ML-CL)
5	107	18	9	5	
10	110	10	8	10	Non-plastic below 10 ft.
15	110	15	15	15	
20	105 101	18 20	11	20	Brown, SAND and GRAVEL, moist, med dense to dense, more gravel with depth, size of gravel to 1.5 inches. Moist to wet at 25 ft. (GW-GP)
25	118	6	30	25	Bottom of Boring at 25 ft. NFWE

LOG OF BORING

Appendix 7

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Location

Boring No. DH-5

Job No. B-1034-1

Plate No. A-5

Depth In Feet	Dry Density Lbs./Cu. Ft.	Moisture Content % Dry Weight	Blow Count	Sample No.	Description
0					Brown, clayey SILT/silty CLAY, with some fine gravel, dry, medium stiff. (ML-CL)
2					
4					Become sandy SILT at 5 ft.
5	123	11	66	5	
6					
8					
10	116	12	36/6"	10	
12					
14					
15	119	15	28/6"	15	
16					
18					
20	117	15	30/6"	20	Brown, fine to medium sandy SILT/ sandy CLAY, stiff to very stiff, dry to damp. (ML-CL)
22					More gravelly and moist with depth.
24					
25	116	15	40	25	Bottom of boring at 25 ft. NFWE
26					
28					

LOG OF BORING

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Location

Boring No. DH-6

Job No. B-1034-1

Plate No. A-6

Depth In Feet	Dry Density Lbs./Cu. Ft.	Moisture Content % Dry Weight	Blow Count	Sample No.	Description
0					Brown, silty CLAY/clayey SILT, hard to very stiff, dry. (CL-ML)
5	116	11	31	5	
10	115	7	32	10	
15	101	17	14	15	Damp at 15 ft.
20	116	15	11	20	Become sandy CLAY at 20'
25	108	20	14	25	Moist to wet at 25 ft.
					Bottom of boring at 25 ft. NFWE

LOG OF BORING

J. H. KLEINFEI R AND ASSOCIATES
CONSUI - ENGINEERS

SUMMARY OF LABORATORY TESTS

PROJECT NO. B-1034 DATE 8/9/79

PROJECT and LOCATION Uvas-Carnadero Creek PLATE NO. A-7

BORING NO.	SAMPLE NO.	DRY UNIT WEIGHT P.C.F.	MOISTURE CONTENT % OF DRY WT.	GRADING ANALYSES — SIEVE SIZE - PERCENT PASSING						HYDROMETER ANALYSIS			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH TONS/SQ.FT.
				1"	3/4"	4	10	40	200	SILT SIZE	CLAY SIZE	COLLOIDS	L.L.	P.I.	
DH-1	5	114	7										26	10	1.83
	10	86	6										NP		0.29
	15-1	131	3	100	83	55	38	22	6						
	15-2	117	4	90	86	66	46	19	7						
	20	107	6	100	100	87	56	33	15						
	25	116	6	100	96	60	41	24	7						
DH-2	5	116	11										25	11	10
	10	94	11										26	12	1.83
	15	93		100	100	89	83	63	39						
	20-1	113	9	100	94	88	87	69	31						
	20-2	102	14	100	100	99	98	88	42						
	25-1	126	8	100	94	64	50	33	16						
	25-2	129	6	90	86	49	34	18	9						

J. H. KLEINF DER AND ASSOCIATES
CONS ING ENGINEERS

SUMMARY OF LABORATORY TESTS

PROJECT NO. B-1034 DATE 8/9/79

PROJECT and LOCATION Uvas-Carnadero Creek PLATE NO. A-7

BORING NO.	SAMPLE NO.	DRY UNIT WEIGHT P.C.F.	MOISTURE CONTENT % OF DRY WT.	GRADING ANALYSES SIEVE SIZE - PERCENT PASSING						HYDROMETER ANALYSIS			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH TONS/SQ.FT.
				1"	3/4"	4	10	40	200	SILT SIZE	CLAY SIZE	COLLOIDS	L.L.	P.I.	
DH-3	5	109	11										21	5	1.71
	10-1	109	5		100	72	54	28	6						
	10-2	116	4	100	92	65	43	15	4						
	15	118	4	90	81	56	44	24	9						
	20	129	9	100	98	56	35	16	7						
DH-4	5	107	18										22	5	1.11
	10	110	10										NP		1.74
	15	110	15										NP		1.29
	20-1	105	18		100	98	98	96	76						
	20-2	101	20										NP		0.48
	25	118	6	100	93	48	33	18	8						

Appendix 7

J. H. KLEINFELDER AND ASSOCIATES
CONSULTING ENGINEERS

SUMMARY OF LABORATORY TESTS

PROJECT NO. B-1034 DATE 8/9/79

PROJECT and LOCATION Uvas-Carnadero Creek PLATE NO. A-7

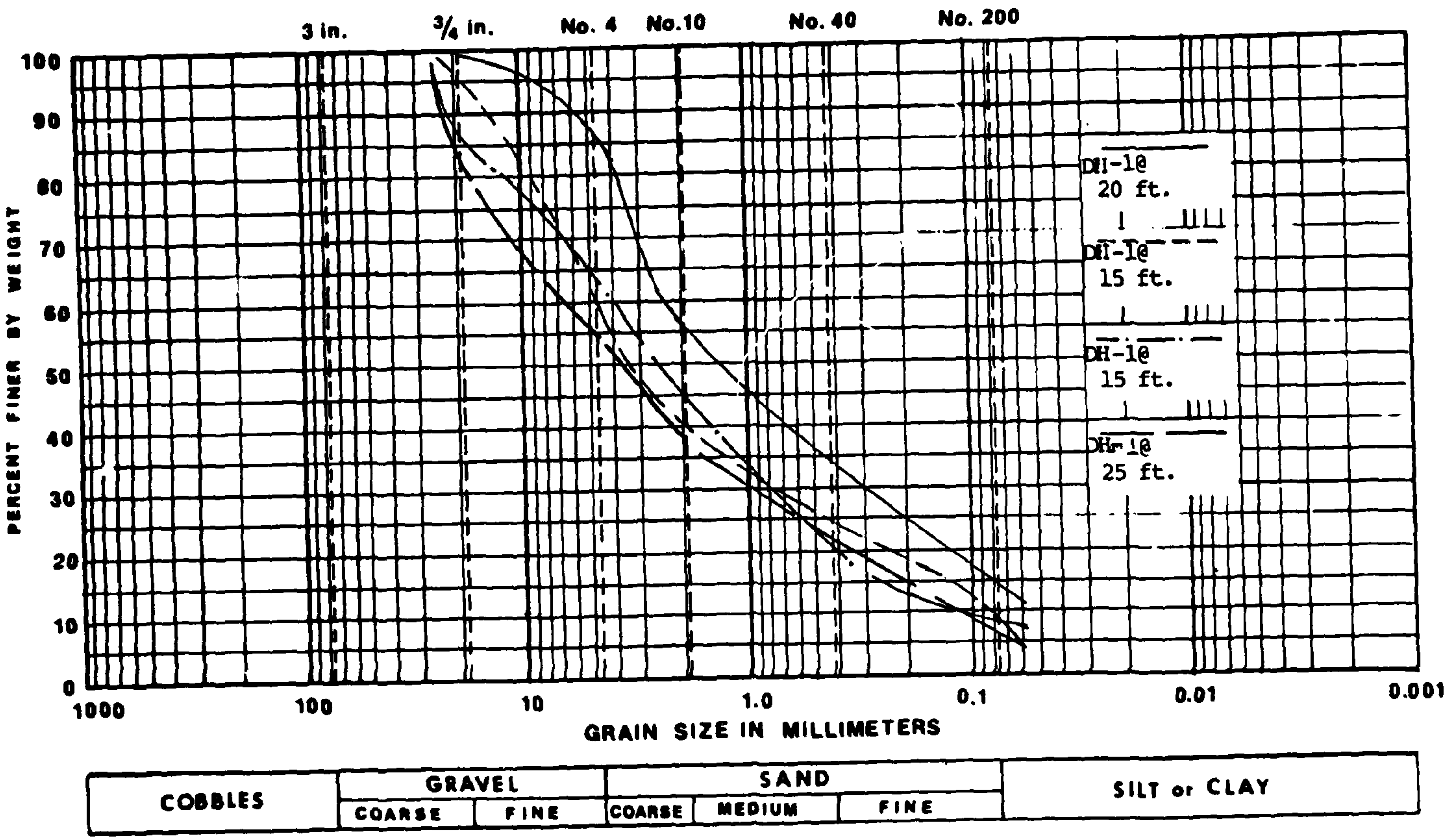
BORING NO.	SAMPLE NO.	DRY UNIT WEIGHT P.C.F.	MOISTURE CONTENT % OF DRY WT.	GRADING ANALYSES SIEVE SIZE - PERCENT PASSING						HYDROMETER ANALYSIS			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH TONS/SQ.FT.
				1"	3/4"	4	10	40	200	SILT SIZE	CLAY SIZE	COLLOIDS	L.L.	P.I.	
DH-5	5	123	11		100	93	85	71	50						10
	10	116	12		100	70	58	46	19						
	15	119	15		100	87	76	56	24						4.9
	20	117	15			100	97	84	59						9.5
	25	116	15	100	100	89	76	67	47						5.9
DH-6	5	116	11										26	11	10
	10	115	7										20	7	
	15	101	17										24	7	1.19
	20	116	15										22	7	0.66
	25	108	20										27	10	0.55

J. H. Kleinfelder & Associates

Project UVAS - CARNADERO CREEK

Job No. B-1034-1

Plate No. A-8



GRAIN SIZE DISTRIBUTION

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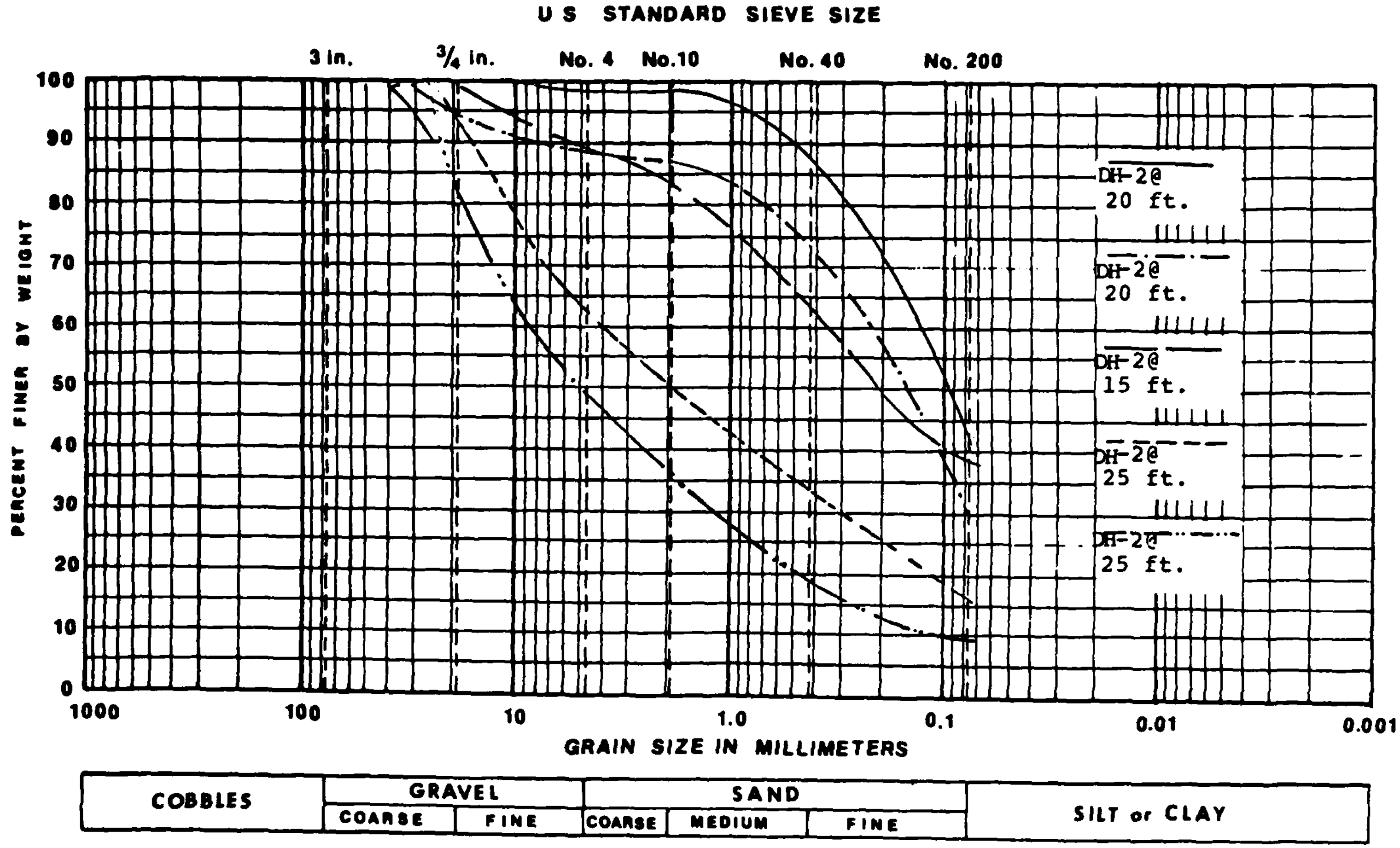
Project UVAS - CARNADERO CREEK

Job No. B-1034-1

Plate No. A-9



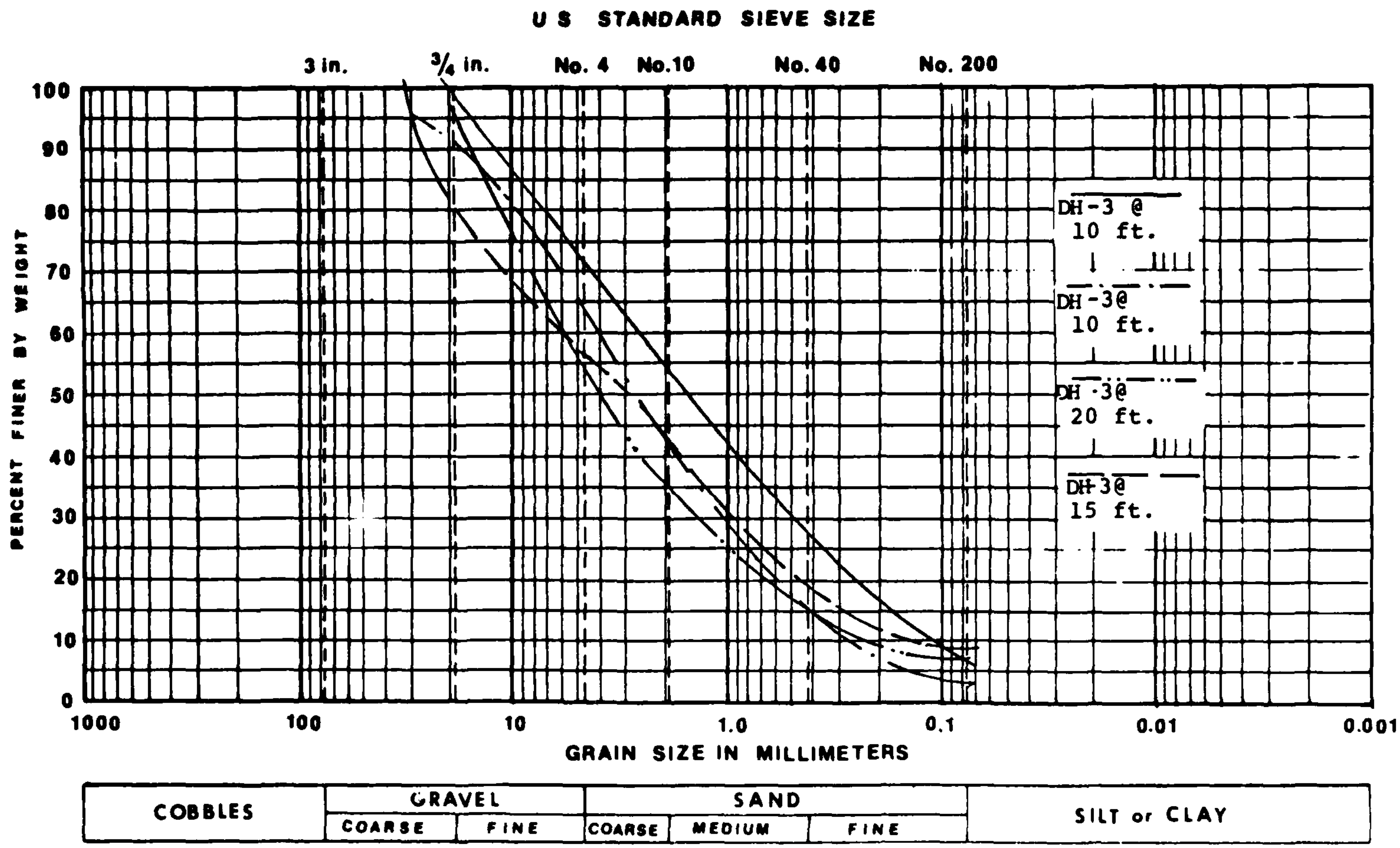
GRAIN SIZE DISTRIBUTION

Project UVAS - CARNADERO CREEK

J. H. Kleinfelder & Associates

Job No. B-1034

Plate No. A-10



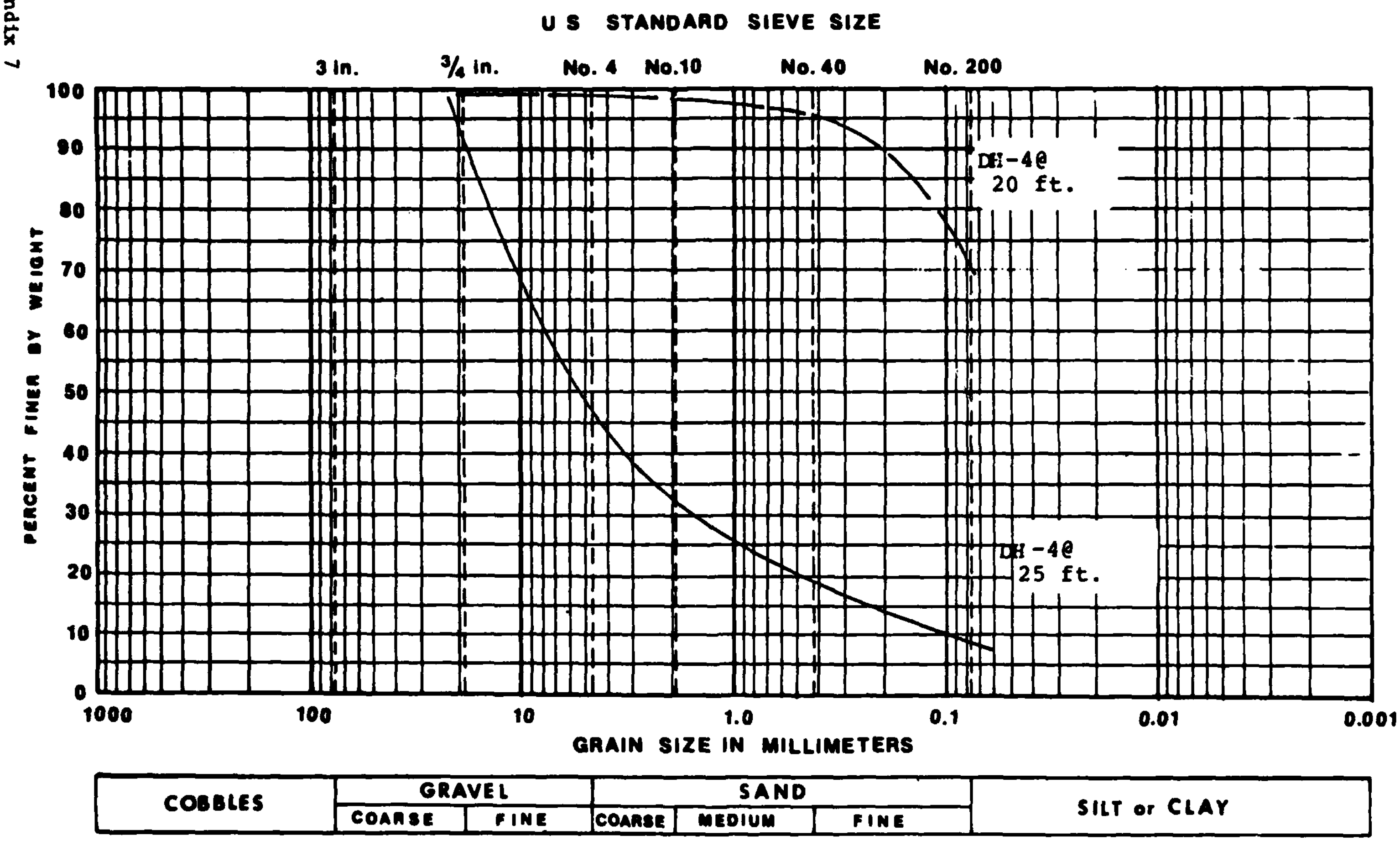
GRAIN SIZE DISTRIBUTION

Project UVAS - CARNADERO CREEK

J. H. Kleinfelder & Associates

Job No. B-1034-1

Plate No. A-11



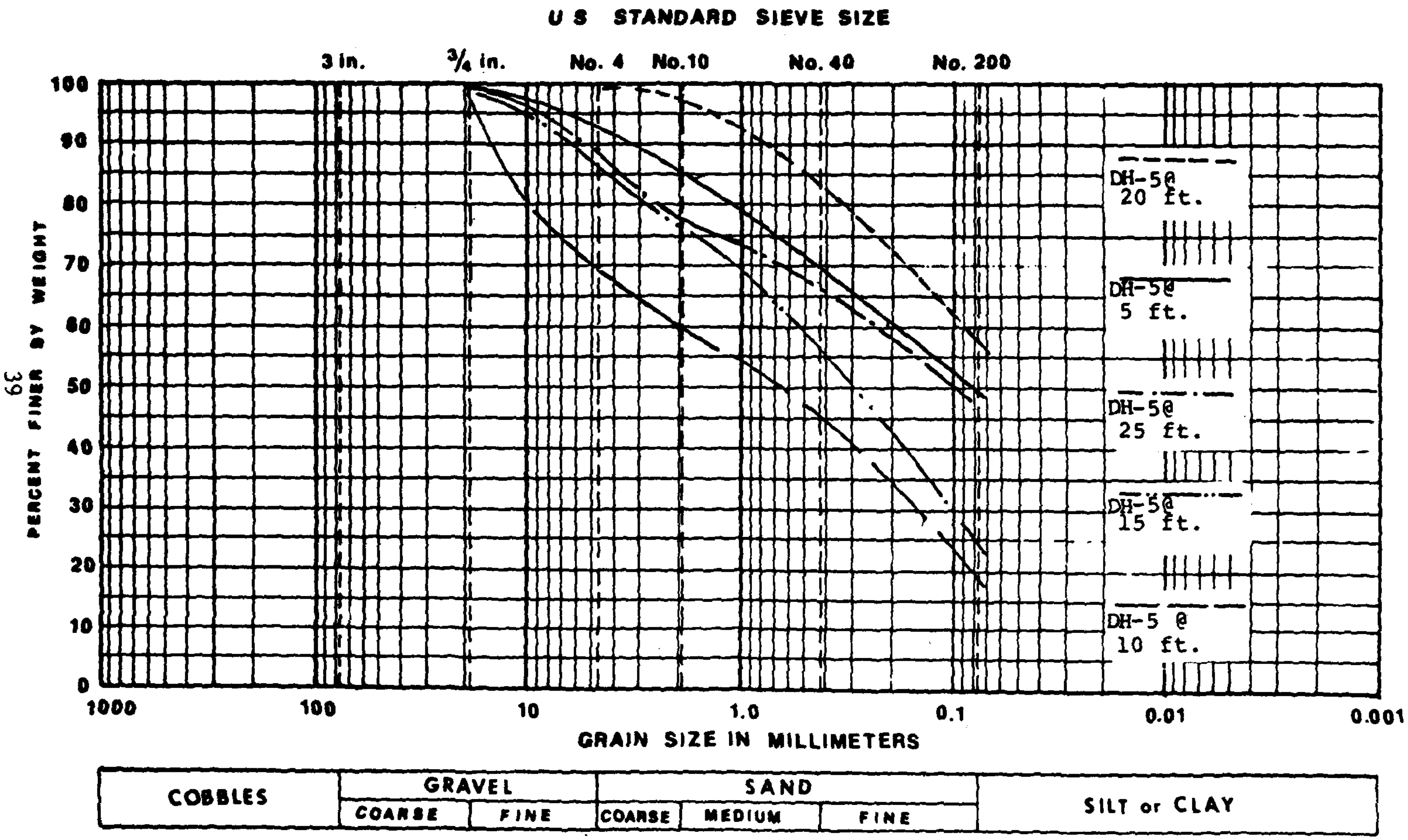
GRAIN SIZE DISTRIBUTION

J. H. Kleinfelder & Associates

Project UVAS - CARNADERO CREEK

Job No. B-1034-1

Plate No. A-12



GRAIN SIZE DISTRIBUTION

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Job No. B-1034-1

Plate No. A-13

Boring No. DH-2

Sample No. 20-1, 20-2

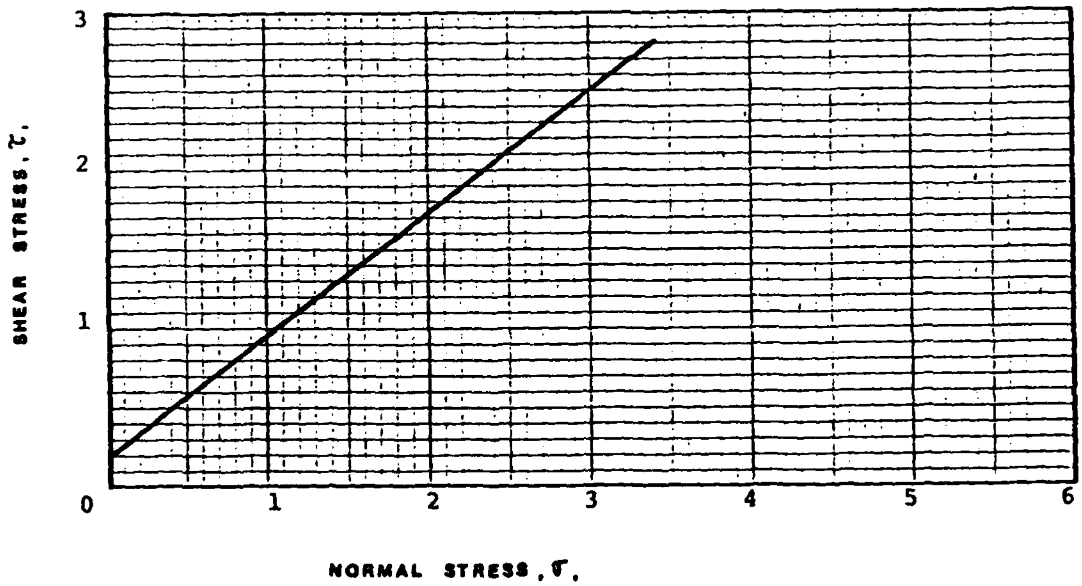
Description Brown to light brown, silty fine to coarse SAND.

Initial Dry Density 102 pcf

Initial Water Content 14% Soaked Water Content

Cohesion 200 psf Internal Friction Angle, Ø = 37%

Remarks



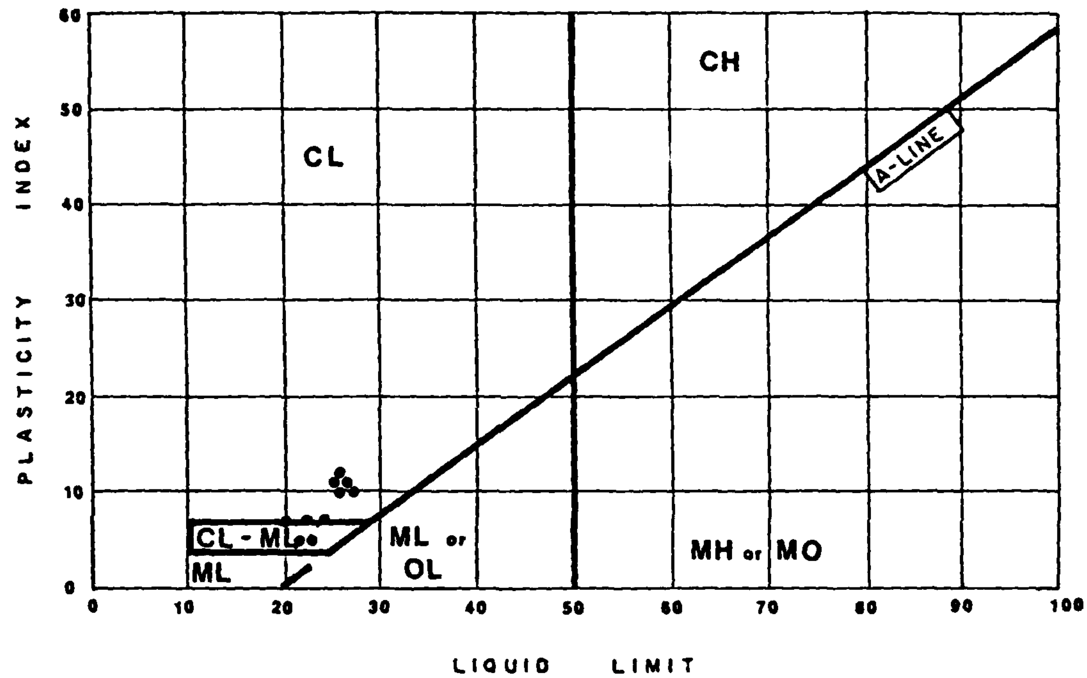
DIRECT SHEAR TEST

J. H. Kleinfelder & Associates

Project UVAS CARNADERO CREEK

Job No. B-1034-1

Plate No. A-14



TEST SYMBOL	BORING NUMBER	SAMPLE NUMBER	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
	DH-1	5	26	10	Brown, silty CLAY (CL)
	DH-2	5	25	11	Brown, silty CLAY (CL)
	DH-2	10	26	12	Brown, silty CLAY (CL)
	DH-3	5	21	5	Brown, CLAY/SILT (CL-ML)
	DH-4	5	22	5	Brown, CLAY/SILT (CL-ML)
	DH-6	5	26	11	Brown, silty CLAY (CL)
	DH-6	10	20	7	Brown, CLAY/SILT (CL-ML)
	DH-6	15	24	7	Brown, CLAY/SILT (CL-ML)
	DH-6	20	22	7	Brown, CLAY/SILT (CL-ML)
	DH-6	25	27	10	Brown, sandy CLAY (CL)

PLASTICITY CHART

APPENDIX 7

SECTION B

SUMMARY OF SOILS INVESTIGATION AND DATA FOR LLAGAS CREEK WATERSHED PROJECT

SUMMARY OF SOILS INVESTIGATION AND DATA FOR LLAGAS CREEK WATERSHED PROJECT

TABLE OF CONTENTS

TABLES

SECTION B

SUMMARY OF SOILS INVESTIGATIONS AND DATA

FOR LLAGAS CREEK WATERSHED PROJECT

INTRODUCTION

1. The following soils information has been excerpted from the "Geology Appendix" of the U. S. Soil Conservation Service, Llagas Creek Project Report, dated December 1965.

SOILS INVESTIGATIONS

2. In the investigations prior to the design of the Llagas Creek Watershed Project, stream bank soils samples were obtained for laboratory analysis to determine the type of soil materials existing in the area.

3. The drilling program utilized a Mobil B-36 flight auger rig. Holes were drilled adjacent to existing channels to depths below proposed grade, except where heavy gravels prematurely stopped the drill, and disturbed samples were obtained from the more important horizons. These samples were submitted to a soils laboratory which performed mechanical analyses and Atterberg limits tests.

4. Results of the soils tests are related to the reaches specified in the main report and tabulated in Table 1.

GENERAL DESCRIPTION OF SOILS

5. Llagas Creek from the upstream end of improvements to its junction with the Lower Llagas Creek Project at station 458 flows generally through coarse-grained fluvial material. The gravel fraction of this coarse-grained material is generally well-rounded and for the most part consists of chert, metavolcanic, and graywacke fragments. The gravels are set in a matrix of silty or clayey sand and, in some instances, the mass appears to be skip-graded, with the coarse sand sizes essentially not represented. Away from the channel area the soils and underlying alluvium are of flood plain origin and thus comprise generally fine-grained materials. In most instances this soil will classify as sandy clay or clayey sand with fairly strong cohesive characteristics. However, even these deposits are somewhat lenticular and considerable textural differences occur laterally as well as vertically.

6. The existing channel of Upper Little Llagas Creek traverses cohesive materials of generally high plasticity with the exception of several short reaches above its junction with Llagas Creek. These reaches probably represent channel deposits emplaced by Llagas Creek during its meandering across the fan formed on the valley floor by its rather abrupt decrease in gradient on leaving the mountain.

7. In the uppermost part of Little Llagas Creek, the plasticity index averages well over 20. A test pit in the reach between Spring and Dunne Avenues indicates the presence of clayey sand of low plasticity and then layers of sandy fine gravel.

8. The entire length of Lower Little Llagas Creek consists of clays and sand clays with a placticity index generally greater than 20.

9. The East Branch Little Llagas Creek traverses the central part of the South Santa Clara Valley flood plain. Soils are chiefly clayey sand and sandy clays of moderate to high plasticity. Locally the channel bottom is composed of sandy gravel.

10. Miller Slough and its tributaries flow in a broad, shallow trough along the boundary between the flood plain deposits of Llagas Creek and the colluvium, slope wash and fan deposits derived from the hills to the west. The channel materials are therfore much finer-grained than those found along Llagas Creek.

11. A review of all available soils data indicates that nearly all the material that will be available from excess excavation from the Llagas Creek Project will be suitable for levee embankment construction for the Uvas Creek Project.

TAB 1
SOIL CLASSIFICATION TEST SUMMARY
LLAGAS CREEK PROJECT

Reach	Location			MECHANICAL ANALYSIS - % FINER															Atterberg Limits		Classification	
				Gravel					Sand						Silt & Clay							
	Hole No	F.S. No	Depth	6"	3"	1½"	3/4"	3/8"	4	8	16	30	50	100	200	5M	2M	1M	L.L.	P.I.		
2	L12	1	2			100	97	85	70	54	46	39	32	24	17	8	5	4		NP	Silty Gravelly Sand	SM
		2	7				100	99	96	95	95	94	92	73	51	19	14	12	28	10	Sandy Clay	CL
		3	15			100	96	77	59	49	38	32	27	19	14	6	5	4	25	6	Clayey Gravel Sand	SC
		4	20				100	96	76	64	60	57	53	46	40	-	-	-	45	24	Clay	CL
		5	27						100	98	95	92	88	79	72	-	-	-	46	28	Sandy Clay	CL
	L13	1	5			100	98	93	85	78	75	72	68	63	58	34	28	24	46	27	Clay	CL
		2	12							100	99	99	98	89	76	-	-	-	41	22	Sandy Clay	CL
		3	22				100	99	98	93	88	83	78	72	65	-	-	-	42	24	Sandy Clay	CL
	L15	1	8				100	97	93	89	86	83	78	73	63	-	-	-	63	34	Fat Clay	CH
		3	22						100	98	96	91	86	81	78	-	-	-	76	43	Fat Clay	CH
3	L8	1	8					100	97	94	91	89	84	72	61	28	23	21	31	17	Sandy Clay	CL
		2	14								100	98	95	91	85	46	36	32	46	27	Sandy Clay	CL
	L9	1	3				100	97	96	94	93	92	87	65	47	19	16	13	26	8	Clayey Sand	SC
		2	7				100	97	92	88	83	77	60	29	20	10	7	6		NP	Silty Sand	SM
		3	14.5			100	96	64	28	16	12	11	10	8	7	4	3	3		NP	Sandy Gravel	GP
	L10	1	7					100	98	97	96	94	87	69	54	22	17	15	20	17	Sandy Clay	CI
		2	15					100	99	97	96	94	92	86	81	-	-	-	52	32	Fat Clay	CH
		3	26.5				100	98	94	91	89	87	83	72	63	-	-	-	35	26	Sandy Clay	CL
	L11	1	4					100	97	96	95	95	94	82	63	26	20	16	31	13	Sandy Clay	CL
		2	12				100	85	71	52	38	28	21	15	11	-	-	-	25	9	Gravelly Sand	SW
		3	15				100	96	83	71	59	48	35	33	31	-	-	-	41	23	Clayey Sand	SC
		4	21						100	99	96	90	80	69	61	-	-	-	40	22	Sandy Clay	CL
		5	28					100	99	96	92	88	81	73	67	-	-	-	44	26	Sandy Clay	CL
	A12	1	9			100	96	88	77	68	58	50	40	32	26	14	13	11	31	16	Sand	SC
4		2	12			100	94	85	74	65	56	47	38	30	22	16	13	11	32	17	Sand	SC
	A12P	1	10	100	77	67	55	42	27	19	14	8	5	3	2	-	-	-		NP	Sandy Gravel	GW
	L6	2	13				100	81	50	29	19	13	10	7	5	-	-	-	25	6	Sandy Gravel	GW
	L6P	1	10		100	98	88	66	45	32	22	14	7	3	2	-	-	-		NP	Sandy Gravel	GW
	L7P	1	7				100	99	99	98	98	96	89	59	50	24	16	10	32	13	Sandy Clay	SC
	L7Q	1	9	100	95	94	82	65	40	27	18	10	5	3	2	-	-	-		NP	Sandy Gravel	GW

TABLE 1
SOIL CLASSIFICATION TEST SUMMARY
LLAGAS 'EK PROJECT

Location				MECHANICAL ANALYSIS - % FINER															Atterberg Limits		
				Gravel					Sand						Silt & Clay						
Reach	Hole No	F.S. No	Depth	6"	3"	1½"	3/4"	3/8"	4	8	16	30	50	100	200	5M	2M	1M	L.L.	P.I.	Classification
9	M8	1	2			100	98	81	56	45	39	36	33	29	26	17	14	13	49	30	Clayey Sandy Gravel GL
		2	8				100	96	89	78	72	65	55	45	37	-	-	-	27	13	Clayey Sand SC
		3	10				100	92	71	56	47	41	34	28	24	13	10	9	29	15	Clayey Gravelly SandSC
	M9	1	5					100	99	98	97	95	93	86	78	-	-	-	43	24	Sandy Clay CL
		2	8					100	99	99	98	97	94	84	71	-	-	-	42	24	Sandy Clay CL
		3	12				100	98	91	85	80	76	60	37	26	14	11	10		NP	Silty Sand SM
10	M6	1	5				100	98	94	92	90	88	82	70	59	34	25	24	36	20	Sandy Clay CL
		2	8.5			100	96	78	57	42	31	23	18	15	13	9	7	7	48	29	Clayey Gravelly SandSC
11A	M5	1	5					100	98	93	86	80	71	61	52	30	25	22	33	22	Sandy Clay CL
		2	9				100	99	93	86	79	67	48	38	34	21	19	17	39	23	Clayey Sand SC
	M6	1	5				100	98	94	92	90	88	82	70	59	34	25	24	36	20	Sandy Clay CI
		2	8.5			100	96	78	57	42	31	23	18	15	13	9	7	7	48	29	Clayey Gravelly SandSC
11b	M3	2	5				100	85	74	68	64	61	58	55	47	-	-	-	42	24	Gravelly Clayey SandSC
12	NONE																				
13 North	NONE																				
13 South	NONE																				

APPENDIX 8

AIR QUALITY

AIR QUALITY

1. Air pollution in the Gilroy area is considered light with respect to gaseours pollutants as the carbon monoxide/nitrogen dioxide and sulphur dioxide standards were not exceeded in period between 1976 and 1979. Pollution with respect to suspended particulates and oxidents (photochemical smog) can be considered moderate to heavy because of the regional impact of the Santa Clara Valley. The Federal and State oxident standards were exceeded 45 times during the 1976 to 1979 period, but were not exceeded in 1979 and have been exceeded only 4 times since the standard was modified in 1978. The particulates standard has been exceeded on about 10 percent of the days during the 1976 to 1979 period. A summary of the air quality data for the City of Gilroy over the past four years is shown on Table 1.

2. During construction of the proposed project, the main types of pollutants emitted would be particulates and carbon monoxide for the excavation and grading activities. Heavy duty construction equipment used for these operations would have varying emission rates depending upon running time, fuel consumed, and power consumed. This would be a short term impact, however, only during the construction of the levees. Controls during the construction can minimize the impact of dust generated by earth moving and grading activities.

3. The project itself has an indirect impact on air quality in the Gilroy area, that impact coming from occasional maintenance vehicles and from automobile traffic coming to the site to use the trail and other recreation facilities. There will also be a minor short term impact during construction generated by earth hauling and other construction related equipment. The recreational trail facilities will be served by 15 parking spaces at Thomas Road. It is also projected that an ultimate development will be 17,000 visitor days per year. The vast majority of these visitors are expected to come from Gilroy and as a result these people will be driving a significantly shorter distance for their recreation use than if they were to drive to other recreation areas a greater distance away. This should result in an overall regional net decrease in milage driven and in pollutants from automobiles.

4. An analysis 1/ of the line source impact shows that within a one kilometer square area centered on the recreational parking lot, there are two primary line sources, Thomas Road and Tenth Street. Thomas Road presently has about 1,200 2/ vehicles per day average traffic, and Tenth Street, 1,320 2/ vehicles per day. The total computed carbon monoxide pollution under existing conditions, for these two line impact sources is less than .5 ppm, and the total measured within Gilroy are primarily caused by the U. S. 101 Highway is approximately 7 ppm less than allowed by standards.

1/ Bay Area Air Pollution Control District, Guidelines for Air Quality Impact Analysis of Projects, June 1975.

2/ Technical Appendix, General Plan Revision Program, City of Gilroy, June 25, 1979.

5. For the proposed projects, it is assumed that 75% of the visits are by automobile with an average of 1.5 visitors per vehicle. 17,000 visitor days give an average of 23 automobiles driving to the Thomas Road parking lot per day. Estimates are that the peak daily traffic will be 120 vehicles, per peak hour traffic, 15 vehicles, maximum consecutive eight hour traffic, 60 vehicles. The increase in carbon monoxide levels for this traffic of both line source and parking lot will be less than 0.1 ppm (.03 ppm). The traffic and pollutants generated by the short term construction activities are estimated to be a maximum of about one-third of the above values and therefore can be considered insignificant.

6. Available data indicates that Gilroy does not have a major carbon monoxide problem at the present time. The annual maximum hourly carbon monoxide levels for the City of Gilroy range from 6.2 to 7.2 ppm. During the period from 1976 to 1979 the Federal Standard of 9 ppm was not exceeded. As shown in paragraph 5, the addition of the small recreation facilities at the levee would only slightly increase the impact. On a regional basis, the project would actually decrease auto emitted air pollution because of the shorter distance Gilroy residents will drive to the new facility over what they have previously been driving to other similar facilities. Vehicular emmissions of hydrocarbons and oxides of nitrogen occur on a regional scale and even without accounting for the net decrease in vehicular miles travelled, the impact of the new project is too low to be measurable.

TABLE 1

AIR POLLUTION LEVELS AND STANDARDS

City of Gilroy, California

Substance	Federal Standard[1/]		State Standard	Level Recorded in Gilroy				No. of Days Gilroy exceeded the Standard[2/]			
	Primary	Secondary		1976	1977	1978	1979	1976	1977	1978	1979
Oxidant (Ozone) - 1 hour average (parts per 100 million)	8 12	8 12	10	21	12	15	12	30	11	4	0
Carbon Monoxide - 8 hours average (parts per million)	9	9	40ppm (during peak hr)	6.80	7.20	6.6	6.2	0	0	0	0
Nitrogen Dioxide - max hr average (parts per 100 million)	5 (annual average)	5 (annual average)	25 (during peak hr)	23	21	18	17	0	0	0	0
Sulfur Dioxide - 24 hour average (parts per million)	0.14		0.04	0.001	0.007	.004	.002	0	0	0	0
Particulates-annual mean - 24 hour average (micrograms/cubic meter)	75	60	60	62	62	57	55	11.7[3/]	10.2%[3/]	13.1[3/]	8

[1/] Federal Air Quality Standards are divided into two categories, primary standards designed to protect human health and more stringent secondary standards to protect property and aesthetics. Federal standard for oxidents changed from 8 to 12 parts per 100 million in January 1978.

[2/] Number of days the strictest, whether Federal or State Ambient Air Quality Standard was exceeded, except for oxidents where the Federal standard is used.

[3/] Percent of observed days when State Air Quality Standard was exceeded.

SOURCES: California Air Resources Board, "Air Pollution Control in California," 1976
Bay Area Air Quality Management District, Air Polution in the Bay Area By Station and Contaminant, 1976, 1977, 1978, and 1979

APPENDIX 9

LAND USE ANALYSIS

LAND USE ANALYSIS

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LAND USE ANALYSIS

INTRODUCTION

1. The increase in population from 7,350 to 19,900 in the 20 year period since 1960 has caused a gradual but continuing shift of agricultural lands to residential development. Gilroy's growing role as a suburb and bedroom community for San Jose will continue, and the City's general plan allows for a continuing gradual transformation of some agricultural lands to urban development and for carefully planned industrial development.

AFFECTED AREA

2. The affected area encompasses the flood plain (Plate 1 of Appendix 2) plus all other areas likely to serve as alternative sites for any activity which might use the flood plain if it were not protected. Because development in the flood plain is taking place presently at a fast rate and because what flooding occurs is basically shallow flooding and because the location advantage within the flood plain is offsetting the potential damages from flooding in the minds of the people developing the property, there is no expected effect on land use as a direct result of the flood hazard. The designated floodway which, according to the Federal Emergency Management Agency's Flood Insurance Study, generally consists of the natural stream channel and local overbank areas, will not be encroached upon by the proposed project levees. Therefore, the affected area and the flood plain are essentially one and the same.

GENERAL FLOOD PLAIN CHARACTERISTICS

FLOODING

3. Typical depths of flooding for the Standard Project Flood event are about two to three feet above street grades with no flooding for the 15 year or more frequent events. Incidences of localized flooding up to three and a half feet above street grades may occur in some industrial and residential low lying areas. Nearly all the residential construction in the flood plain has first floor levels located about two feet above street grades. Some of the commercial and industrial buildings are at street grade while others are elevated.

FLOODWAY NATURAL STORAGE

4. The flood plain in the City of Gilroy is almost completely urbanized. Part of the future growth will fill in the remaining vacant areas. Other future growth will be outside of the flood plain and is not expected to cause a significant change in flooding characteristics. The downstream end of the study area and the area downstream of Highway 101 which would not be protected by any of the alternatives presently considered provides significant storage during moderate and large storm events.

OPEN SPACE, RECREATION AND WILDLIFE

5. A linear park is planned along Uvas Creek. The area is presently under heavy use as hiking and jogging trails. Extensive natural vegetation along the creek provides habitat for native wildlife.

TRANSPORTATION

6. Gilroy is located on the main north-south route historically serving San Francisco and Los Angeles, U. S. Highway 101. The original city grew up along the highway and the old highway is now bypassed by a new freeway. State Route 152 is an east-west highway connecting Gilroy with San Joaquin Valley through Pacheco Pass to the east and Watsonville and Monterey Bay to the west. The Southern Pacific Railroad serves the southern Santa Clara Valley on its mainline through the state. Gilroy is served by the San Jose Airport located 20 miles to the north.

PHYSICAL CHARACTERISTICS

7. Soils in the Gilroy area are moderately well to somewhat excessively drained, medium to fine textured soils of the alluvial plains and fans. Soils are suitable for irrigated row crops, sugar beets, orchards, vineyards, dryland hay, and pasture. Found in a few areas immediately upstream of the center of Gilroy and also in the transition area between the Santa Clara Valley and the foothills are older alluvial fans and terraces that are characterized by slow to very slow impermeable subsoils. In these areas irrigated orchards and vineyards are suitable. In the upland areas of the watershed there are well drained soils, shallow to moderately deep overlying sedimentary igneous and serpentine rock. The soil is moderately fine to fine textured and is suitable for dryland grain, hay, pasture, wildlife and watershed. In the study area erosion has been a problem in some areas and some of the older poorly constructed earth embankment sections have evidence of erosion and marginal stability.

AVAILABLE SERVICES

8. Water supply is available to the area through the Santa Clara Valley Water District. Most of the area's water comes from groundwater sources. Urban services are provided by the City of Gilroy.

EXISTING LAND USE ACTIVITIES

9. Over 66% of the 4,268 acres of Gilroy are involved in urban uses. Of the remainder, a little over half is in vacant land with the remaining in agricultural production. Within the flood plain study area, almost all urban development is within the City of Gilroy, and the vast majority of lands surrounding the city are in agricultural production (Table 1).

10. Within the flood plain to be protected by the proposed project there is little undeveloped land and what there is is targeted for development. Land previously in agricultural use between Uvas Creek and Monterey Highway (Old U.S. 101) is being developed at a fast rate and will be completely filled with new single family homes constructed prior to the beginning of construction of the proposed project. Land further to the east (east of the highway) is undergoing a transformation into warehouse and manufacturing construction. Several firms have been there for some time and additional construction is underway. Further to the east land is in agricultural production but is targeted for industrial use in the General Plan.

11. Within Gilroy the majority of housing is single family detached housing. 85% of all housing in the city is single family homes, with 11% multi-family construction and a small number of mobile homes.

PROJECTIONS OF ANTICIPATED ACTIVITIES

12. Within the flood plain the land within the protected area of the proposed project is either fully developed or will develop in accordance with the City of Gilroy General Plan land designations shown in Plate 1. The protected area by land use projected for the year 2000 in the Gilroy General Plan is shown in Table 2. Development of the land in recent years in the protected flood plain area is somewhat in response to the proposed Corps project, in that knowledge of the impending project allowed the city to proceed with subdivision construction. In the residual flood plain outside the protected area most of the land will remain in agriculture, and if development does occur, will meet the requirements of the Federal Flood Insurance Program. Most flooding in this area is shallow flooding and it is economically possible to construct so the first floor elevation is above the 100-year flood. An economic evaluation of the project affect on the future flood proofing is included in Appendix 5 of this report. Project implementation will not affect future land uses in the Gilroy area. Table 3 of Appendix 5 of this report summarizes project land use in the flood plain area both with and without the implementation of the proposed project.

TABLE 1

PRESENT LAND USE (1979)

LAND USE	ACRES/%		
	Region 1/	Gilroy 2/	Floodplain 3/
Agriculture	6061.4/50	607.0/17.1	3325/79
Residential			
Single Family	787.9/6.2	787.9/22.2	195/4.6
Multi Family	106.8/1.0	106.8/3.0	15/0.4
Mobile Home	36.2/0.3	36.2/1.0	23/0.5
Assorted Urban (outside) Gilroy)	229.4/2.0		
Commercial			
Public Service	158.6/1.3	158.6/4.4	32/0.7
Industrial Areas	358.4/3.0	240.9/6.8	134/3.1
Public Lands			
Recreational	158.7/1.4	158.7/4.5	28/0.7
School	121.4/1.0	121.4/3.4	41/1.0
Other	489.7/4	489.7/13.8	
Miscellaneous			
Roads, Transportation	1121.5/9.3	711.9/	43/1.0
Water Surface or Creek Channel			184/4.4
Vacant	2462.9/20	843.1/23.7	189/4.5
Total	12092.9/100	4268.2/100	4209/100

1/ Includes City of Gilroy and Unincorporated Area within urban service area

2/ Includes rural transition zone as defined in City of Gilroy General Plan

3/ Standard Project Floodplain under existing conditions

SOURCE: Technical Appendix, General Plan Revision Program, City of Gilroy, June 1979

TABLE 2

DESIGNATED LAND USE IN PROTECTED AREA 1/

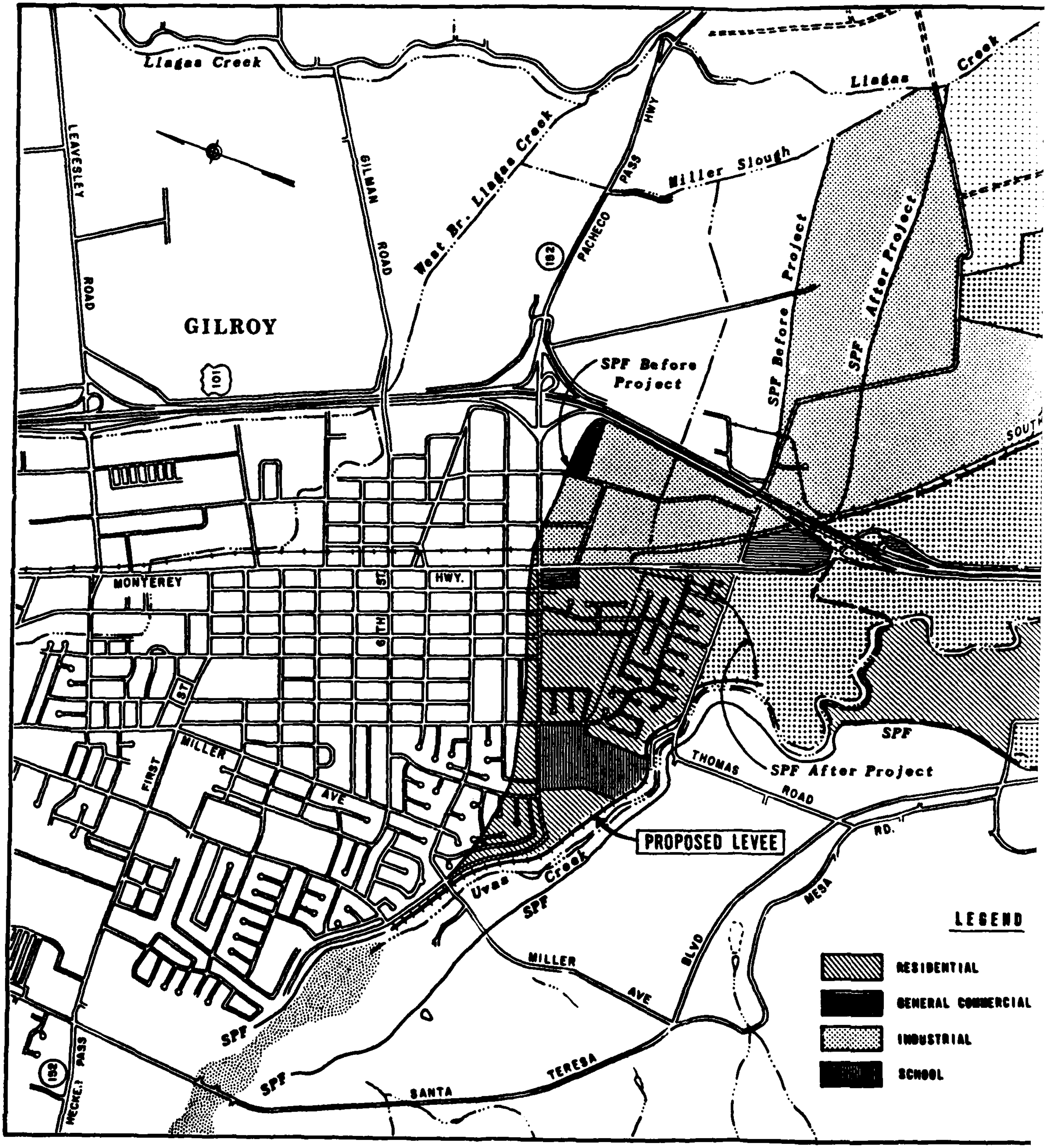
STANDARD PROJECT FLOOD DESIGN

(Areas in Acres)

	Alternatives 1, 2, 3, and 7	Alternatives 4, 5, and 6
Residential	240	85
General Commercial	10	0
Industrial	365	0
School	40	40
Public 2/	5	0
Open Space Agriculture	20	0
Total	680	125

1/ Based on City of Gilroy General Plan, November 1979, Land Uses Projected to Year 2000

2/ Public Ownership - Includes City of Gilroy Wastewater Treatment Facility, but most of land is in open space - agriculture. Does not include streets and roads.



Llagas Creek
Llagas Creek
LEAVESLEY ROAD
GILMAN ROAD
West Br. Llagas Creek
Miller Slough
PACHECO PASS HWY
152
GILROY
101
SPF Before Project
SPF Before Project
SPF After Project
SOUTH
MONTEREY
6TH ST
HWY.
ST
FIRST
MILLER AVE
THOMAS ROAD
SPF
SPF After Project
PROPOSED LEVEE
Uvas Creek
SPF
RD.
MESA
BLVD
MILLER AVE
SPF
SPF
SANTA TERESA
152
WECKER PASS
LEGEND
RESIDENTIAL
GENERAL COMMERCIAL
INDUSTRIAL
SCHOOL

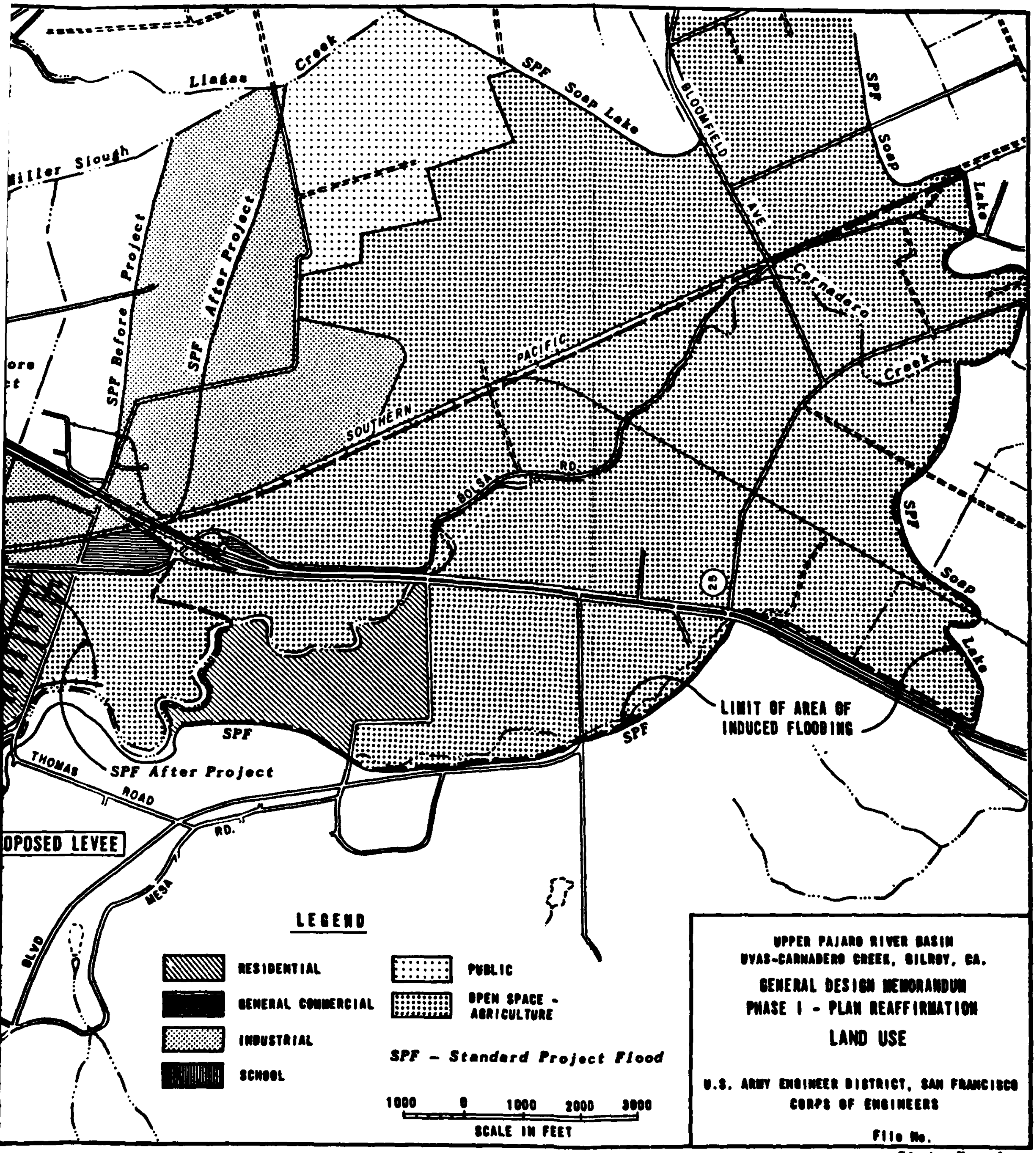

Llagas Creek
Miller Slough
SPF Soap Lake
BLOOMFIELD AVE
SPF Soap Lake
SPF Before Project
SPF After Project
SOUTHERN PACIFIC
Carnadero Creek
BOLSA RD.
25
SPF Soap Lake
LIMIT OF AREA OF
INDUCED FLOODING
SPF
SPF
SPF After Project
THOMAS ROAD
RD.
MESA
BLVD
OPOSED LEVEE
LEGEND
RESIDENTIAL
GENERAL COMMERCIAL
INDUSTRIAL
SCHOOL
PUBLIC
OPEN SPACE -
AGRICULTURE
SPF - Standard Project Flood
1000 0 1000 2000 3000
SCALE IN FEET
UPPER PAJARO RIVER BASIN
UVAS-CARNADERO CREEK, GILROY, CA.
GENERAL DESIGN MEMORANDUM
PHASE I - PLAN REAFFIRMATION
LAND USE
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
File No.

Plate No. 1

2

APPENDIX 10

SECTION 404 EVALUATION

SECTION 404 EVALUATION

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APPENDIX 10

SECTION 404 EVALUATION

PROJECT DESCRIPTION

1. Abbreviated Description - The project is located in the Uvas-Carnadero and Llagas Creeks watersheds of the upper Pajaro River Basin in south Santa Clara County in the vicinity of the Town of Gilroy about 75 miles south of San Francisco. The recommended plan of improvement consists of construction of a variable setback levee on the north side of Uvas Creek. The levee begins approximately 1,300 feet upstream of Miller Avenue and ends 2,000 feet below the Thomas Road Bridge. The bridge was found to be too low to pass the 100-year or SPF floods and requires replacement. The project would provide SPF protection for that portion of Gilroy, California. SPF protection was found to be more economically eiable that 100-year flood protection.

2. Fill Material - The fill material would range in size from fine grained material to riprap. The quantity of material for the total project is estimated to be 85,000 cubic yards. The material would come from the proposed U. S. Soil Conservation Service, Llagas Creek Watershed Project in the project area. The slope protection (riprap) and filler material are available at the Aromas Quarry located about 15 miles southwest of Gilroy (2,050 cubic yards).

PHYSICAL EFFECTS

3. Wetlands - The placement of riprap would result in an insignificant localized loss of riparian wetland. The elimination of riparian vegetation would result in a small loss in food and shelter for birds and mammals.

4. Water Column - The placement of riprap in the streambed for construction of the set back levees would not have an adverse effect on water quality since work will be accomplished during the low-flow season. Controls for minimizing turbidity during construction would be coordinated with the State Regional Water Quality Control Board.

5. Benthos - Placement of the riprap would eliminate the existing stream bottom along 1,700 linear feet length of slope protection (about 17,000 square feet). The stream community that now exists is expected to continue.

CHEMICAL-BIOLOGICAL INTERACTIVE EFFECTS

6. The criteria for chemical evaluation has not been applied because the fill material is rock size. The riprap is not expected to contaminate the water column. Since the purpose of the riprap is only to protect erosion of the stream channel, water quality is not expected to be impacted.

REVIEW OF APPLICABLE WATER QUALITY STANDARDS

7. Construction activities will be required to comply with discharge requirements as specificed by the Regional Water Quality Control Board.

SELECTION OF DISCHARGE SITE FOR FILL MATERIAL

8. Need - The need for the proposed construction has been identified in the Problem Identification section of the Main Report of this GDM.

9. Alternative Sites - The proposed construction is the result of plan formulation and evaluation of alternatives included in the Formulation of the Preliminary Plans and Assessment and Evaluation of Detailed Section of the Main Report of this GDM.

10. Specified Concerns - Chemical, Physical, Biological Integrity - No significant chemical impact is expected. Physical changes are expected to occur with the stream character being impacted by placement of riprap. Biological changes are also expected with the losses to riparian vegetation and streams benthos.

- Food-chain - The existing food-chain network will be altered due to placement of riprap.

- Species Diversity - No significant changes are expected.

- Movement into Habitat - Fish Migration to spawning and nursery areas would not be blocked.

- Wetlands with Significant Functions - Not impacted.

- Retention of flood flows by wetlands - Not applicable.

- Methods to minimize turbidity - To be identified by Regional Water Quality Control Board.

- Methods to minimize loss to aesthetic, recreational, and economic values. The proposed riprap is not located near a municipal water supply. The riprapping is not located in shellfish beds or significant benthic life. No endangered or threatened wildlife would be affected by the riprap. The proposed construction will eliminate some riparian vegetation and benthic life; however, measures have been incorporated into the plan to minimize these effects.

11. Impacts of Water Uses At Proposed Discharge Site - The placement of riprap would not impact other water uses.

12. Considerations to Minimize Harmful Effects - Water quality criteria as established by the State Regional Water Quality Control Board specifically for construction will be satisfied. Alternatives have been considered in relation to the proposed plan.

STATEMENT AS TO CONTAMINATION OF FILL MATERIAL

13. The riprap would not contain pollutants other than those minerals naturally occurring in the rock. Since the structural material is large sized erosion or leaching of the material would not occur.

CONCLUSIONS AND DETERMINATIONS

14. Determinations - An ecological evaluation has been made following the evaluation guidance of 40 CFR 230.4, in conjunction with the evaluation considerations in 40 CFR 230.5.

15. Appropriate measures have been identified and incorporated in the proposed plan to minimize adverse effects on the aquatice environment as a result of riprap placement.

16. Consideration has been given to the need for the proposed activity, the availability of alternate plans and such water quality standards that are appropriate and applicable by law.

17. The activity associated with this project must be located in the water in order to fulfill its basic purposes and the proposed activity will not cause permanent unacceptable disruption to the beneficial water quality uses of the Uvas-Carnadero Creek ecosystem.

18. Findings - The sites for riprap (the proposed flood control project) have been selected and evaluated following Section 404 (b) (1) guidelines of the Clean Water Act.

STATE OF CALIFORNIA — RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
CENTRAL COAST REGION
1102 A LAUREL LANE
SAN LUIS OBISPO, CALIFORNIA 93401
(805) 549-3147

July 21, 1981

Mr. Paul Bazilwich, Jr.
Colonel, CE, District Engineer
Department of the Army
Corps of Engineers
211 Main Street
San Francisco, CA 94105

Dear Mr. Bazilwich:

SUBJECT: UVAS-CARNADERO CREEK LEVEE PROJECT, SANTA CLARA COUNTY

We have received your letter dated June 12, 1981, in which you request certification from this agency for the placement of fill materials for the Uvas-Carnadero Creek flood control project. You propose to construct a levee along the north bank of Uvas Creek from approximately 1,000 feet upstream of Miller Avenue to approximately 2,000 feet below the Thomas Road Bridge. Approximately 85,000 cubic yards of fill material ranging in size from fine grained to riprap will be used to construct the levee.

Certification for this project is waived by this agency in accordance with Section 13269 of the California Water Code provided the following conditions are met:

1. Construction is in the dry season under low or no flow conditions.

2. Equipment and fill soils are excluded from all flowing water.

3. The stream channel is reconstructed and all loose soils removed from the channel by October 1.

This waiver may be terminated if the project creates or threatens to create a water quality problem. Please advise us when this project is expected to begin.

If you have any further questions, please refer them to Jay Cano of this office.

Very truly yours,

KENNETH R. JONES
Executive Officer

JFC:bf

cc: State Water Resources Control Board, Kathy Haitz

RESPONSE TO CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD 21 JULY 1981
COMMENTS FOR THE SECTION 404 EVALUATION

1. Project construction will take place between May through November with instream work occurring during 1 July and 1 October, the dry season of the year.

2. Equipment and levee construction will be excluded from all flowing water. The only fill required is rip-rapping at two locations along the stream channel.

3. All levee construction is set back away from the stream at variable distances to minimize losses to riparian vegetation. Stream channel work will be completed by 1 October where rip-rapping and bridge construction is required. Appropriate clean up activities will be included in the specifications for construction.

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
211 MAIN STREET
SAN FRANCISCO, CALIFORNIA 94105

7

SPNED-E

18 June 1981

PUBLIC NOTICE - 404 EVALUATION REPORT   RESPONSE REQUIRED BY: 18 July 1981

TO WHOM IT MAY CONCERN:

1. The U. S. Army Corps of Engineers, San Francisco District proposes flood control improvements in the Uvas-Carnadero Creek watershed, Pajaro River Basin, Santa Clara County, California. This notice is published to conform with the Clean Water Act as amended in 1977, Section 404(b), Public Law 92-500 (33 U.S.C. 1251 et seq). This notice is part of the process to obtain a California State water quality certificate and to provide public notice of the proposed activity.

2. The Uvas-Carnadero Creek project is located in the vicinity of the ~~city~~ of Gilroy, Santa Clara County, California. The proposed flood control project was authorized by the 78th Congress in the Flood Control Act of 1944.

3. A Draft Environmental Impact Statement (DEIS) for the Uvas-Carnadero Creek Flood Control Project was filed in January 1981 with the Environmental Protection Agency. A Final Environmental Impact Statement is being prepared by this office which addresses issues inadequately covered previously or those that are the subject of current regulations.

4. The proposed work includes the construction of a variable setback levee on the north side of Uvas Creek. The levee begins approximately 1,000 feet upstream of Miller Avenue and ends 2,000 feet below the Thomas Road Bridge, which will be replaced. The proposed work would be performed during the dry season (May through November) of the construction year.

5. The purpose of the proposed project is to reduce flood damage and would provide Standard Project Flood (SPF) protection for that portion of Gilroy. SPF protection was found to be more economically viable than 100-year flood protection.

6. The attached 404 evaluation is being coordinated with the following Federal, State, and local agencies:

- U. S. Environmental Protection Agency
- U. S. Department of the Interior
  - U. S. Fish and Wildlife Service
- U. S. Department of Commerce
  - U. S. National Marine Fisheries Service
- State of California Resources Agency
  - California Department of Fish and Game
  - California Regional Water Quality Control Board
- State of California Coastal Commission
- Santa Clara Valley Water District

We have reviewed subject project or report & have no comments at this time.
Regional Manager
Department of Fish & Game
Region III
Date: JUL 10 1981

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

July 17, 1981 F/SWR33:PL

Colonel Paul Bazilwich, Jr.
District Engineer
San Francisco District
Corps of Engineers
211 Main Street
San Francisco, CA 94105

Dear Colonel Bazilwich:

We have reviewed the Public Notice - 404 Evaluation Report (SPNED-E, June 18, 1981) on the UVAS-Carnadero Creek, Pajaro River Basin, Flood Control Project in Gilroy, California and are providing the following comments:

The National Marine Fisheries Service (NMFS) provided comments (letter, dated April 13, 1981) to the U.S. Fish and Wildlife Service (USWFS) on their Draft Fish and Wildlife Coordination Act (FWCA) Report (March 15, 1981) on this project. A copy of this letter was furnished to Mr. J. Soper of your staff. Our letter included recommendations regarding timing of construction work, planting of riparian vegetation to offset project losses, and impact of borrow areas on migrating steelhead. Our recommendations were included in the Final FWCA Report, dated May 7, 1981. This report recommended that construction work be performed between July 1 and October 30 in order to avoid impacts to migrating adult steelhead and smolts.

The public notice states that construction work would be performed from May through November. Although your proposed work period differs from our proposed timing by only three months, this could be critical to steelhead. In years with heavy November rains, adult steelhead would ascend the river system during your proposed construction period. Although the peak smolt outmigration occurs in April (personal communication, April 9, 1981, Dennis Eimoto, California Department of Fish and Game), some smolts may still be in the river system in June. We strongly recommend that the timing of construction work follow the dates included in the Final FWCA Report (i.e., from July 1 to October 30).

We will not object to this project if all of the recommendations in the Final FWCA Report are included.

If you wish to contact us further on this matter, please direct comments to Ms. Paget Leh at: National Marine Fisheries Service, 3150 Paradise Drive, Tiburon, CA 94920; phone (415) 556-0565.

Sincerely yours,

Alan W. Ford
Regional Director

cc:
USFWS, J. McKevitt
CDF&G, D. Lollock
EPA, G. Baker

RESPONSE TO NMFS 17 JULY 1981 COMMENT ON SECTION 404 EVALUATION

As shown in our Phase I GDM on Plate 8 and discussed in the Plan Descriptions of the Assessment and Evaluation of the Detailed Plans, only two areas require rip-rapping in the stream. All levee construction occurs set back away from the stream. The required rip-rapping in the stream will be performed within the July through October time period to avoid impacts to migrating steelhead and smolts. Section 5.17 of the EIS aptly describes that there would be no adverse effects upon fish resources of the creek. However, the overall construction season of May through November would permit timely project completion and, in turn, would keep work in the stream well within the July through October period of concern.

AD-A122 273 PAJARO RIVER BASIN UVAS - CARNADERO CREEK SANTA CLARA COUNTY CALIFORNIA G..(U) CORPS OF ENGINEERS SAN FRANCISCO CA SAN FRANCISCO DISTRICT JUL 81

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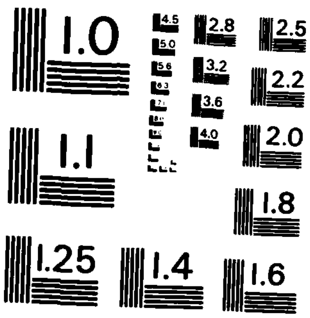

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Area Office
2800 Cottage Way, Room E-2740
Sacramento, California 95825

JUL 2 ? 1981 In reply refer to: ES-S

District Engineer
Corps of Engineers, San Francisco District
211 Main Street
San Francisco, California 94105

Subject: Public Notice 404 Evaluation Report, U.S. Army Corps of Engineers, San Francisco District, Gilroy, California; Uvas-Carnadero Creeks

Dear Sir:

We have reviewed the subject public notice dated June 18, 1981 regarding a proposal to construct a variable setback levee on the north side of Uvas Creek. The levee begins approximately 1,000 feet upstream of Miller Avenue and ends 2,000 feet below the Thomas Road Bridge.

These comments have been prepared under the authority, and in accordance with the provisions, of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The Fish and Wildlife Service has recently completed a Fish and Wildlife Coordination Act Report on the subject project (Attached). The Service will not object to the issuance of a permit for the work described in the subject public notice providing the recommendations included in the Service's report are incorporated into the project.

Sincerely yours,

Gene J. Fortes

ACTING Area Manager
(for) U.S. Department of the Interior Coordinator

Attachment

cc: Dir., CDF&G, Sacramento, CA (w/o attachment)
Reg. Mgr., CDFG, Reg. III, Yountville (w/o attachment)
Resources Agency, Sacramento, CA (w/o attachment)
EPA, Region IX, San Francisco, CA (w/o attachment)
NMFS, Tiburon, CA (w/o attachment)

APPENDIX 11

LOCAL COOPERATION AGREEMENTS

LOCAL COOPERATION AGREEMENTS

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SPNED-PW 4 May 1981

Mr. John T. O'Halloran
General Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Dear Mr. O'Halloran:

As you are aware, we are currently finalizing the Phase I, General Design Memorandum and Environmental Impact Statement for the Uvas-Carnadero Creek Levee Project in Gilroy.

As part of the final report, it is desirable to include a letter from the Santa Clara Valley Water District indicating a willingness to sign a contractual agreement for local cooperation of this project. Attached is a draft of the contract for your review which will be finalized at a later date.

Your continued support of the project is appreciated.

Sincerely,

1 Incl
as stated

PAUL BAZILWICH, JR.
Colonel, CE
District Engineer

DRAFT

PUBLIC LAW 91-611 SECTION 221

CONTRACTUAL AGREEMENT BETWEEN

THE UNITED STATES OF AMERICA

AND

THE BOARD OF DIRECTORS

SANTA CLARA VALLEY WATER DISTRICT

FOR LOCAL COOPERATION ON

UPPER PAJARO RIVER BASIN, CALIFORNIA, UVAS-CARNADERO CREEK LEVEE PROJECT

THIS AGREEMENT entered into this_________day of_____________19 _ be and between the UNITED STATES OF AMERICA (hereinafter called the "Government") represented by the Contracting Officer executing this agreement, and the SANTA CLARA VALLEY WATER DISTRICT (hereinafter called the "District") under the authority granted it by the Santa Clara Valley Water District Act, Appendix of Water Code, Stats. 1951, C 1405, WITNESSETH THAT:

WHEREAS, construction of the Upper Pajaro River Basin, California, Uvas-Carnadero Creek Levee Project (hereinafter called the "Project"), was authorized by the Flood Control Act of 1944 (Public Law 78-534).

WHEREAS, the County considering the provisions of Section 221 of Public Law 91-611 hereby represents that it has the authority and capability to furnish the non-Federal cooperation required by the Federal legislation authorizing the Project and by other applicable law.

NOW, THEREFORE, the parties agree as follows:

1. The District agrees that, if the Government shall commence construction of the Project substantially in accordance with Congressional resolutions authorizing such Project, the County shall, in consideration of the Government commencing construction of such Project, fulfill the requirements of non-Federal cooperation for the flood control aspect of the project specified in such legislation, to with:

a. Provide without cost to the United States, all lands, easements, and rights-of-way necessary for construction of the project;

b. Hold and save the United States free from damages resulting from construction of the works.

c. Make at their expense all necessary changes in existing improvements, including utilities and highway bridges.

d. Maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of the Army.

e. Furnish without cost to the United States induced flood damage easements or flood proof structures in the areas of induced flooding as a result of the project as shown on Plate 15 of the Draft Phase I, General Design Memorandum dated December 1980.

f. Prevent encroachment upon the project channels of any works detrimental to the flood control purposes of the Project.

g. Provide guidance and leadership in preventing unwise future development of the flood plain by use of appropriate flood plain management techniques to reduce flood losses.

h. At least annually inform affected interests of the degree of protection provided by the project.

i. Comply with the applicable requirements of "The Uniform Relocation Assistance and Real Property Acquisition Policies Act" of 1970 (Public Law 91-646, 84 STAT, 1894).

j. Maintain and operate after completion the existing project channels and manage the land between the setback levees for wildlife in accordance with regulations prescribed by the Secretary of the Army.

And provided further, That whenever expenditures for lands, easements, and rights-of-way by the District for the project shall have exceeded the present estimated construction cost therefor, the District concerned will be reimbursed one-half of its excess expenditures over said estimated construction cost: And provided further, That the Secretary of of Army shall determine the proportion of the present estimated cost of said lands, easements, and rights-of-way that the District should contribute in consideration for the benefits to be received by the District.

2. The District hereby gives the Governmentg a right to enter upon, at reasonable times and in a reasonable manner, lands which the District owns or controls for access to the Project for the purpose of inspection, and for the purpose of operating, repairing and maintaining the Project, if such inspection shows that the District for any reason is failing to repair and maintain the Project in accordance with the assurances hereunder and has persisted in such failure after a reasonable notice in writing by the Government delivered to the District. No operation, repair and maintenance by the Government in such event shall operate to relieve the District of responsibility to meet its obligations as set forth in paragraph 1 of this Agreement, or to preclude the Government from pursuing any other remedy at law or equity.

3. This Agreement is subject to the approval of the San Francisco District Engineer acting on behalf of the Secretary of the Army.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

By__________________________
Colonel, Corps of Engineers
District Engineer,
San Francisco on Behalf of
the Secretary of the Army

BOARD OF DIRECTORS
SANTA CLARA VALLEY WATER DISTRICT

By__________________________
Title

DATE: ____________________

I, ______________, Chief Legal Officer for the Santa Clara Valley Water District, have reviewed this agreement, and after considering the requirements of Section 221 of Public Law 91-611, am of the opinion that the Santa Clara Valley Water District has the legal authority to enter into this agreement, and, furthermore, is capable of responding in damages in the event the Water District fails to perform its obligations as agreed to in this document.

____

Counsel, Santa Clara Valley Water District

1929 50th Anniversary 1979
Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265 2600

June 9, 1981

Colonel Paul Bazilwich, Jr.
District Engineer
San Francisco District
Corps of Engineers
211 Main Street
San Francisco, California 94105

Dear Colonel Bazilwich:

This letter is to confirm our willingness to sign a contractual agreement to provide local cooperation for the Uvas-Carnadero Creek levee project.

I also want to reiterate our and other strong local support for this project.

Sincerely yours,

John T. O'Halloran
John T. O'Halloran
General Manager

RECEIVED JUN 1 8 1981

Appendix 11

SPNED-PW

4 May 1981

Mr. Fred Wood
Manager, City of Gilroy
Gilroy City Hall
7390 Rosanna
Gilroy, California 95020

Dear Mr. Wood:

As you are aware, we are currently finalizing the Phase I, General Design Memorandum and Environmental Impact Statement for the Uvas-Carnadero Creek Levee Project in Gilroy.

As part of the final report, it is desirable to include a letter from the City of Gilroy indicating a willingness to sign a contract for cost sharing and operation and maintenance of the recreational portion of this project. Attached is a draft of the contract for your review which will be finalized at a later date.

Your continued support of the project is appreciated.

Sincerely,

1 Incl
as stated

PAUL BAZILWICH, JR.
Colonel, CE
District Engineer

DRAFT

CONTRACT BETWEEN
THE UNITED STATES OF AMERICA
AND
THE CITY OF GILROY
FOR
RECREATION DEVELOPMENT
FOR THE
UPPER PAJARO RIVER BASIN, CALIFORNIA
UVAS CARMADERO CREEK LEVEE PROJECT

THIS CONTRACT entered into this ____ day of _____ 19 ______ by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented by the Contracting Officer executing this contract and THE CITY OF GILROY (hereinafter called the "City"), WITNESSETH THAT

WHEREAS, construction of the Upper Pajaro River Basin, California, Uvas Carmadero Creek Levee project, (hereinafter called the "Project"), was authorized by the Flood Control Act approved 1944, (Public Law 78-534,78, Congress 2nd session), and

WHEREAS, the City is authorized to administer project land areas for recreational purposes, and operate, maintain and replace facilities provided for such purposes and is empowered to contract for such purposes, and is empowered to contract in these respects; and

WHEREAS, the Government is authorized by the Federal Water Project Recreation Act, (Public Law 89-72, 16 U.S.C. 460L-12, et seq) to make contracts with non-Federal public bodies for development, management, and administration of the recreation and fish and wildlife resources of Federal water resources projects;

NOW, THEREFORE, the parties agree as follows:

ARTICLE 1 - DEFINITION OF TERMS. For the purpose of this contract certain terms are defined as follows:

(a) Joint costs. The total cost of the project minus the sum of the separable costs for all project purposes.

(b) First costs, used interchangeably with the terms "capital costs" and "project costs," is the initial capital cost of the project, including: engineering, design, supervision, and administration; land acquisition; construction; and interest during construction.

(c) Separable costs, as applied to any project purpose, means the difference between the capital cost of the entire multipurpose project and the capital cost of the project with the purpose omitted.

(d) Interest during construction consists of an amount of accrued interest computed on and added to expenditures for establishment of project services during the period between the actual outlay and the time the recreation or fish and wildlife services become available.

ARTICLE 2(a) - LANDS AND FACILITIES.

2(a) The government agrees to design and construct those portions of the project's levee and channel works associated with recreation development to provide for optimum enhancement of general recreation consistent with other authorized project purposes. Details on lands necessary for the provision of recreation facilities are shown in the project Recreation & Natural Resources Appendix to the Phase I General Design Memorandum, as concurred in by the City and incorporated herein by reference.

2(b) In addition to the lands to be acquired by the Santa Clara Valley Water District for authorized project purposes, the City will acquire certain lands specifically to enhance the recreation potential of the project. The lands anticipated to be acquired for recreation are shown on Plate 1 of the above-referenced approved Recreation & Natural Resources Appendix to the General Design Memorandum.

(c) The government in cooperation with the City will prepare a mutually acceptable Plan of Recreation Development and Management which will depict and identify the types and quantities of facilities which the Government and the City will construct in accordance with this contract. The presently estimated cost of facilities to be so provided is contained in Exhibit A entitled "Estimated Separable Recreation Costs," attached hereto and made a part hereof. Such estimate of facility cost is subject to reasonable adjustment as appropriate upon completion of construction and approval of the above mentioned "Plan of Recreation Development and Management."

(d) The facilities as shown in Exhibit A, as it may be adjusted in accordance with paragraph (c) above, shall be constructed jointly by the parties through mutually satisfactory division of responsiblity for construction which takes into account direct and indirect cost savings which may be gained by the parties in the public interest for certain specific facilities, Provided, that the facilities to be constructed by each party shall be formally agreed upon by the two parties prior to construction, consistent with the provisions of Article 3.

(e) Title to all lands and facilities specifically acquired, developed or constructed by or with Government assistance to enhance the recreation potential of the project shall at all times be in the name of a legally constituted public body with full authority and capability to perform the terms of this agreement. Changes in the title and/or cessation of general recreation uses shall not be made without the written consent of the District Engineer, San Francisco District, U.S. Army Corps of Engineers, or his successor in authority. A copy of this paragraph shall be recorded in such a fashion as to become part of the chain of title of all lands acquired.

(i) The performance of any obligation or the expenditure of any funds by the Government under this contract is contingent upon Congress making the necessary appropriations and funds being allocated and made available for the work required hereunder.

ARTICLE 3 - CONSIDERATION AND PAYMENT. Each party hereto will pay or contribute in kind fifty percent (50%) of the separable first costs of recreation development and fifty percent (50%) of the separable costs of future development. In addition, as between the parties hereto and except as may be specified to the contrary in any separate contract between the parties, the Government will pay one hundred percent (100%) of the joint costs of the project allocated to recreation.

(a) Initial Development. Fifty percent (50%) of the estimated separable first costs of initial recreation development is estimated to be $________. The City's share of such estimated separable first costs shall be paid to the Government as follows:

(1) There shall be deducted from the City's share an amount equal to the sum of the fair market value of any lands or facilities provided by the City, (such value being computed as of the date such lands or facilities were provided and not including enhancement due to the Project) and cash expenditures made by the City towards separable first costs of the Project.

(2) The amount remaining after such deduction shall be paid to the Government with interest on the unpaid balance within fifty (50) years after the recreational facilities are first available for future operation. Such repayment will be made annually in such equal amounts as to complete repayment within such fifty (50) year period.

(3) Interest during construction and interest on the upaid balance shall be at a rate to be determined by the Secretary of the Treasury of the United States as of the beginning of the fiscal year in which Project construction is initiated, pursuant to the formula prescribed by Section 301(b) of the Water Supply Act of 1958 (Public Law 85-500, 43 U.S.C. 390b(b)). The interest rate in effect at the time of negotiation of this contract (United States Fiscal Year ______) is ______ percent. Such interest rate shall not change during the repayment period.

(4) The estimated schedule of repayment for this project, based on current estimate of separable first costs, the interest rate in effect on the date of execution hereof (______%), and 50-year repayment, is contained in Exhibit ______ of this contract. This repayment schedule will be recomputed by the parties upon completion of construction on the basis of actual separable first costs incurred, the interest rate in effect for the Government fiscal year in which Project construction is initiated, and the amount of the City's share remaining unpaid at the time the Contracting Officer notifies the City in writing that the lands and facilities are available for useful operation. Interest during construction shall be paid over a period of years as part of the separable first costs of the Project, but subsequently accruing interest shall be paid with the installment due at the end of the period in which such interest has accrued.

(5) The initial installment shall be due and payable within thirty (30) days after the City is notified in writing by the Contracting Officer that the lands and facilities are available for useful operation. Subsequent installments shall be due and payable to the Treasurer of the United States within thirty (30) days of the yearly anniversary date of such notice.

(6) The City may, without penalty, prepay at any time or times any part or all of the principal and interest due and payable under this contract. Interest with respect to any prepaid principal shall accrue only through the date of repayment.

(b) Future Development. Neither party is obligated by this contract to undertake any future development of the project, except to the extent this contract may be so modified by future supplemental agreement signed by the parties and approved by the Secretary of the Army or his authorized representative. If at any time the City wishes to undertake further development of the facilties to be developed hereunder, it may do so at its expense provide prior approval of the Contracting Officer is obtained, but the Government shall not be obligated to reimburse the City for any portion of such expense in the absence of a supplemental agreement hereto as aforesaid.

(c) Other Federal Funds. No repayment credit of any kind whatsoever will be allowed the City for expenditures financed by, involving, or consisting of, either in whole or in part, contributions or grants of assistance received from any Federal Agency, in providing any lands or facilities for recreation enhancement hereunder.

(d) Adjustments to reflect costs. The dollar amounts set forth in this Article are based upon the Government's best estimates, and are subject to adjustments based on the costs actually incurred. Such estimates are not to be constructed as representations of the total financial responsibilities of each of the parties.

ARTICLE 4 - CONSTRUCTION AND OPERATION OF ADDITIONAL FACILITIES. Certain types of facilities, including but not necessarily limited to restaurants, lodges, golf courses, cabins, clubhouses, overnight or vacation-type structures, stables, swimming pools, commissaries, and such similar revenue producting facilities, may be constructed by the City or third parties and may be operated by the City or by third parties on a concession basis. Any such construction and operation of these types of facilities shall be compatible with all project purposes and shall be subject to the prior approval of the Contracting Officer. However, the City shall not receive credit for costs of such facilities against amounts due and payable under Article 2, and such facilities shall not be deemed to be developed or constructed with Government assistance for purpose of Article 2(e).

ARTICLE 5 - FEES AND CHARGES. The City may assess and collect fees for entrance to developed recreation areas and for use of the project facilities and areas, in accordance with a fee schedule mutually agreed to by the parties. Not less often than every five (5) years, the parties will review such schedule and, upon the request of either, renegotiate the schedule. The renegotiated fee schedule shall, upon written agreement thereto by the parties, supersede the previous schedule without the necessity of modifying this contractual document.

ARTICLE 6 - FEDERAL AND STATE LAWS.

(a) In acting under its rights and obligations hereunder, the City agrees to comply with all applicable Federal and State laws and regulations, including but not limited to the provisions of the Davis-Bacon Act (40 U.S.C. 276 a-a(7)); the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333); and Part 3 of Title 29, Code of Federal Regulations.

(b) The city furnishes, as part of this contract, an assurance (Exhibit _____) that it will comply with Title VI of the Civil Rights Act of 1964 (78 Stat. 241, 42 U.S.C. 2000d, et seq) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations. The City agrees also that it will obtain such assurances from all of its concessionaires.

(c) The City furnishes as part of this contract an assurance (Exhibit _____) that it will comply with Section 210 and 305 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646).

ARTICLE 7 - OPERATION AND MAINTENANCE.

(a) The City shall be responsible for operation, maintenance, and replacement without cost to the Government, of all facilities developed to support project recreation opportunities.

(b) The County of Santa Clara will maintain the levees, channels, and associated lands, structures, and facilities. The Government will encourage the County of Santa Clara to maintain those portions of the levees and channels associated with the recreation development, as identified in the project Recreation & Natural Resources Appendix to the Phase I General Memorandum, in a manner to provide optimum enhancement of general recreation consistent with other authorized project purposes.

ARTICLE 8 - RELEASE OF CLAIMS.

(a) The Government and its officers and employees shall not be liable in any manner to the City for or on account of damage caused by the development, operation, and maintenance of the general recreation facilities of the project. The City hereby releases the Government and agrees to hold it free and harmless and to indemnify it from all damages, claims, or demands that may result from development, operation, and maintenance of the general recreation areas and facilities.

(b) The City shall require its concessionaires to obtain from an insurance company licensed in the State and acceptable to the Government, liability or indemnity insurance providing for minimum limits of $______ per person in any one claim, and an aggregate limit of $________ for any number of persons or claims arising from any one incident with respect to bodily injuries or death resulting therefrom, and $_______for damage to property suffered or alledged to have been suffered by any person or persons resulting from operations under any agreement between the City and its concessionaires.

ARTICLE 9 - TRANSFER OR ASSIGNMENT. The City shall not transfer or assign this contract nor any rights acquired thereunder, nor grant any interest, privilege, or license whatsoever in connection with this contract without the approval of the Secretary of the Army or his authorized representative except as provided in Article 4 of this contract.

ARTICLE 10 - DEFAULT. In the event the City fails to meet any of its obligations under this agreement, the Government may terminate the whole or part of this contract and any lease or license granted to the City for accomplishing the purpose of this agreement. The rights and remedies of the Government provided in this Article shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

ARTICLE 11 - EXAMINATION OF RECORDS. The Government and the City shall maintain books, records, documents, and other evidence pertaining to costs and expenses incurred under this contract, to the extent and in such detail as will properly reflect all net costs, direct and indirect, or labor, materials, equipment, supplies, and services and other costs and expenses of whatever nature involved therein. The Government and City shall make available at their offices at reasonable times, the accounting records for inspection and audit by authorized representative of the parties to this contract during the period this contract is in effect.

ARTICLE 12 - RELATIONSHIP OF PARTIES. The parties to this contract act in an independent capacity in the performance of their respective functions under this contract and neither party is to be considered the officer, agent or employee of the other.

ARTICLE 13 - INSPECTION. The Government shall at all times have the right to make inspectionns concerning the operation and maintenance of the lands and facilities to be provided hereunder.

ARTICLE 14 - OFFICIALS NOT TO BENEFIT. No member of or delegate to the Congress, or Resident Commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE 15 - COVENANT AGAINST CONTINGENT FEES. The City warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the City for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to add to the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 16 - ENVIRONMENTAL QUALITY.

(a) In furtherance of the purpose and policy of the National Environmental Policy Act of 1969 (Public Law 91-190, 42 U.S.C. 4321, 4331-4335) and Executive Order 11514, entitled "Protection and Enhancement of Environmental Quality," March 5, 1970 (35 Federal Register 4247, March 7, 1970) the Government and the City recognize the importance of preservation and enhancement of the quality of the environment and the elimination of environmental pollution. Actions by either party will be after consideration of all possible effects upon the project environmental resources and will incorporate adequate and appropriate measures to insure that the quality of the environment will not be degraded or unfavorably altered.

(b) During construction and operation undertaken by either party, specific actions will be taken to control environmental pollution which could result from their activities and to comply with applicable Federal, State, and local laws and regulations concerning environmental pollution. Particular attention should be given to (1) reduction of air pollution by control of burning, minimization of dust, containment of chemical vapors, and control of engine exhaust gases and smoke from temporary heaters; (2) reduction of water pollution by control of sanitary facilities, storage of fuels and other contaminants, and control of tubidity and siltation from erosion; (3) minimization of noise levels; (4) on and offsite disposal of waste and spoil activities; and (5) prevention of landscape defacement and damage.

ARTICLE 17 - VALUE OF LAND AND FACILITIES. If the parties hereto cannot agree on the fair market value of any lands or facilities and cannot otherwise resolve such differences, each party shall name an appraiser and the two appraisers so named shall name a third appraiser, and the decision of at least two of such three appraisers as to the fair market value shall be final and conclusive upon both parties.

ARTICLE 18 - EFFECTIVE DATE. This contract shall take effect upon approval by the Secretary of the Army or his authorized representative.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

By______________________________
Colonel, Corps of Engineers
District Engineer
Contracting Officer

DATE______________________________
APPROVED:

By______________________________
DATE______________________________

____
Secretary of the Army

DATE______________________________

THE CITY OF GILROY

By______________________________
(Chairman, Gilroy City Council)

Approved as to legal form and sufficiency, including the effects of Section 221, Public Law 91-611.

____
Chief Legal Officer
City of Gilroy

Appendix 11
16

EXHIBIT A
ESTIMATED SEPARABLE RECREATION COSTS
(February 1980)

ITEM	UNIT	QUANTITY			UNIT COST		ITEM COST	
Ramp Earth Borrow and Haul	CY			730	2	50	1	830
Ramp Embankment	CY			630	1	50	1	080
Aggregate Base	SF		15	140	0	40	6	060
Asphalt Concrete	SF		82	500	0	45	37	130
Hiking Trail Clearing	SY		3	330	0	60	2	010
Timber Erosion Control and Steps	MBF			0.40	1500	00		600
Seeding-Landscaping	AC			2.5	2500	00	6	250
Chainlink Fencing	LF		1	350	10	00	13	500
Subtotal							68	460
Contingencies 20%							14	010
Total Construction							82	470
Engineering and Design 15%							13	320
Administration and Supervision 10%							8	210
GRAND TOTAL							104	000
50% FEDERAL							52	000
50% Non-Federal							52	000

City of Gilroy
7390 Rosanna Street, P. O. Box 66
GILROY, CALIFORNIA
95020

Telephone 842-3191

FRED O. WOOD
CITY ADMINISTRATOR

RECEIVED JUN - 1 1981

May 19, 1981

Paul Bazilwich, Jr.
Colonel, CE
District Engineer
Department of the Army
San Francisco District, Corps of Engineers
211 Main Street
San Francisco, California 94105

Dear Colonel Bazilwich:

At the May 18, 1981 regular Council meeting the Gilroy City Council indicated their willingness to sign a contract for cost sharing and operation and maintenance of the recreational portion of the Uvas-Carnadero Creek Levee Project in Gilroy.

Please forward said contract for execution of same by the City.

Very truly yours

Fred O. Wood
City Administrator

FOW:ss

APPENDIX 12

REFERENCE MATERIAL AND DATA

APPENDIX 12

REFERENCE MATERIAL AND DATA

TABLE OF CONTENTS

APPENDIX 12

REFERENCE MATERIAL AND DATA

FEDERAL, STATE AND LOCAL LAWS AND POLICY ORDERS OR STATEMENTS

FEDERAL

Chief of Engineers Wetland Policy
Clean Air Act of 1970
Clean Water Act, as Amended in 1977
Endangered Species Act of 1973
Executive Order 11593 - Cultural Resources
Executive Order 11988 - Floodplain Management
Executive Order 11990 - Wetland Protection
Federal Water Project Recreation Act of 1965
Fish and Wildlife Coordination Act of 1958
Flood Control Act of 1936
Flood Control Act of 1944
Flood Disaster Protection Act of 1973
Flood Insurance Act of 1968
National and Environmental Policy Act of 1969
National Historic Preservation Act
Water Resources Planning Act of 1965
Water Resources Council, Principles and Standards for Planning Water and Land Related Resources
Wild and Scenic Rivers Act of 1973

STATE

State of California Wetland Policy

LOCAL

City of Gilroy General Plan
Santa Clara County - Urban Development and Open Space Plan

CORPS OF ENGINEERS REGULATIONS AND MANUALS

ENGINEER REGULATIONS

ER 200-2-2
ER 405-2-680
ER 1105-2-32
ER 1105-2-129
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ENGINEER MANUALS

EM 1110-2-301
EM 1110-2-400
EM 1110-2-1301
EM 1110-2-1411
EM 1110-2-1601
EM 1110-2-1803
EM 1110-2-1913
EM 1120-2-101
EM 1160-2-101

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