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DEPARTMENT OF
PUBLIC WORKS

DIVISION OF
FLOOD CONTROL AND SEWERS

CITY OF SACRAMENTO
CALIFORNIA

1391-35TH AVENUE
SACRAMENTO, CA
95822-2911

916-449-5271

December 10, 1991

City Council
Sacramento, California

HONORABLE MEMBERS IN SESSION:

SUBJECT: **MAGPIE CREEK FLOOD CONTROL FEASIBILITY STUDY (PN:WD16) ($473,000)**

LOCATION AND COUNCIL DISTRICT:

Magpie Creek Diversion Channel, and Historic Magpie Creek are located in the northeastern portion of the City, west of the McClellan Air Force Base, and east of the Natomas East Main Drainage Canal, in Council District 2.

SUMMARY:

The Magpie Creek and Magpie Diversion Channel provide less than a 100-year level of flood protection. This results in a threat to public health and safety, and imposes flood insurance requirements on existing owners and building restrictions on new development. The Corps of Engineers completed a reconnaissance level investigation identifying a cost-effective flood control project and a Federal interest (See attached report). The Corps of Engineers has transmitted the reconnaissance report to their Division office in San Francisco, recommending that a feasibility study for Magpie Creek be initiated. In order to proceed with the study, a Feasibility Cost Sharing Agreement between the Corps of Engineers and the City of Sacramento must be executed. This agreement commits the City to paying 50 percent ($473,000) of the $946,000 feasibility study cost.

STAFF RECOMMENDATION:

It is recommended that the City Council authorize the Mayor to sign the attached Letter of Intent, stating that the City is willing to enter into negotiations with the Corps of Engineers for the cost sharing of a feasibility study of flood control improvements in Magpie Creek. It is recommended that the City Council authorize the City Manager and City Clerk to sign and execute the Feasibility Cost-Sharing Agreement between the Corps of Engineers and the City of Sacramento for the Magpie Creek, California Section 205 Feasibility Investigation.

BACKGROUND:

In 1989 the City of Sacramento and McClellan Air Force Base were proceeding to design improvements to Magpie Creek. The improvements included realigning approximately 700 linear feet of Magpie Creek extending from Patrol Road on McClellan Air Force Base to the Magpie Creek Diversion. It was believed at that time that the partial realignment project would handle the 100-year flood. The design and construction cost for the local project were estimated to be $3.5 million. The funding, in accordance with the cost sharing agreement, would have been shared approximately ⅓ each by the City, McClellan Air Force Base and the Robla Viejo Assessment District. The City cost would have been approximately one million.

During the design phase it was discovered that the stream flows that were used had been underestimated by about 50%. The flow used in the $3.5 million project was 1,800 cfs and the revised flow were estimated at 2,800 cfs. In order to safely pass the higher flows down the existing diversion, the local project costs were estimated to be $13 million.

Consequently, the funds identified in the cost sharing agreement between McClellan AFB, the City of Sacramento, and the AD were no longer adequate to proceed with the project. Due to the funding shortfall and because the existing diversion structure had been originally designed and constructed by the Corps of Engineers and State of California, the Flood Control and Sewer Division, on September 22, 1989, asked the Corps of Engineers to initiate a 205 small project study to investigate the potential for a federal project in this watershed.

Acting favorably on this request, the Corps completed the attached 205 reconnaissance report. In the 205 report, the Corps has identified a cost effective project at $10 million that can be cost-shared by the local sponsors and by the Federal Government. The Corps has forwarded a favorable letter report to their South Pacific Division requesting authority to proceed with feasibility level studies.

Prior to proceeding with the feasibility work a Federal Cost Sharing Agreement between the local

sponsor and Corp of Engineers must be executed. Since several agencies, including the American River Flood Control District (ARFCD), State Department of Water Resources, McClellan AFB, and the City of Sacramento, will be involved with this project, Public Works informally requested SAFCA staff if they would act as the local sponsor. SAFCA staff responded that they did not have the resources necessary to manage the project at this time and recommended that the City proceed as the project sponsor.

The State Reclamation Board was also asked if they could serve as the local sponsor. They responded by saying that their authority did not allow them to be the local sponsor for 205 small project studies. Staff also contacted ARFCD board and staff. The ARFCD board tentatively has agreed to share the local cost of the study with the City as the local sponsor. Therefore, Public Works is recommending that the City act as the local sponsor for the feasibility phase of the study.

The project alternatives include channel modifications, realignments, and detention; however, this will be further verified in the feasibility study. A prospective detention site is located at McClellan Air Force Base. The approximate schedule and cost for completing the feasibility study, designing the improvements, and constructing the project are shown on figure 1.

Upon completion of the feasibility report, the results will be brought back to the City Council for their consideration and approval. The potential sources of funding for the selected alternative will be addressed at that time.

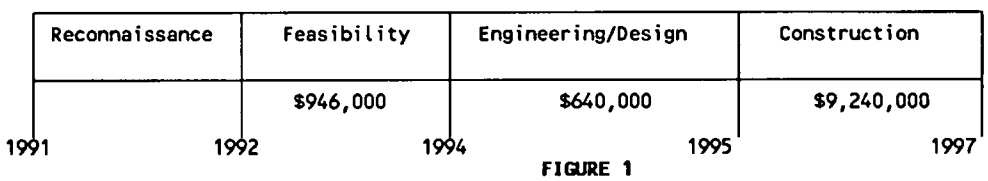

FIGURE 1

SAFCA staff has agreed to consider the project for funding once a favorable feasibility level report has been completed.

FINANCIAL CONSIDERATIONS:

By signing the Feasibility Cost Sharing Agreement, the City agrees to participate in the Feasibility Study and be the local sponsor. The American River Flood Control District (ARFCD) tentatively has agreed to participate in the Feasibility Study phase as a non-Federal partner with the City of Sacramento. The U.S. Air Force (McClellan Air Force Base) has stated that they may be willing to provide easements for project lands required on the Base.

Of the total estimated cost of $946,000, the non-Federal share will be 50%, or approximately $473,000. This amount is to be paid over the 22 month duration of the study, beginning in April 1992 and ending in February of 1994. The ARFCD tentatively has agreed to contribute 50% of the non-Federal share of the costs effective in July 1992, so that the City's final cost will be approximately $236,500. A local cost sharing agreement between the ARFCD and the City of Sacramento will to be executed at a later date.

Funding for this agreement is available in CIP #WD16, Magpie Creek Diversion (425-500-WD16-48XX), which has an unobligated balance of $842,133 as of November 27, 1991.

POLICY CONSIDERATIONS:

Acting as a local sponsor is consistent with the interagency agreement between the Sacramento Area Flood Control Agency (SAFCA), the County of Sacramento, and the Housing Authority of the City of Sacramento.

MBE/WBE EFFORTS: Not Applicable as no goods or services are being purchased at this time.

Respectfully submitted,

ALBERT E. McCOLLAM, JR.
Division Manager

RECOMMENDATION APPROVED:

SW WALTER J. SLIPE
City Manager

APPROVED:

MELVIN H. JOHNSON
Director of Public Works

FOR COUNCIL MEETING OF:
December 10, 1991

CONTACT PERSON:
Terry Paxton
Supervision Engineer
449-6294

RESOLUTION NO. 91-790

ADOPTED BY THE SACRAMENTO CITY COUNCIL

ON DATE OF _____

APPROVED
BY THE CITY COUNCIL
DEC 10 1991
OFFICE OF THE
CITY CLERK

RESOLUTION TO AUTHORIZE THE MAYOR TO SIGN THE LETTER OF INTENT AND THE CITY MANAGER AND CITY CLERK TO SIGN AND EXECUTE A FEASIBILITY COST-SHARING AGREEMENT WITH THE U.S. ARMY CORPS OF ENGINEERS

BE IT RESOLVED BY THE SACRAMENTO CITY COUNCIL THAT:

1. The Mayor is authorized to sign a Letter of Intent, stating that the City is willing to enter into negotiations with the Corps of Engineers for the cost sharing of a feasibility study of flood control improvements in Magpie Creek.

2. The City Manager and City Clerk are authorized to sign and execute a Feasibility Cost-Sharing Agreement with the U.S. Army Corps of Engineers.

_____
MAYOR

ATTEST:

_____
CITY CLERK

FOR CITY CLERK USE ONLY

RESOLUTION NO.: _____

DATE ADOPTED: _____

DEPARTMENT OF
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FLOOD CONTROL AND SEWERS

CITY OF SACRAMENTO
CALIFORNIA

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916-449-5271

December 10, 1991
91960:MF:ds

Col. Lawrence R. Sadoff
U.S. Army Corps of Engineers
Attn: CESPR-PD
1325 J Street
Sacramento, CA 95814-2922

SUBJECT: **MAGPIE CREEK FLOOD CONTROL STUDY**

Dear Col. Sadoff:

During the past year your Planning Division has been conducting a study of possible flooding problems along Magpie Creek under Section 205, Continuing Authorities. We have participated in meetings with your staff concerning the progress of this study and exchanged data and information. Potential flooding along Magpie Creek has been and is a major concern to the City.

We understand that the work accomplished to date by your staff is the reconnaissance report, or first, stage of a two-stage study process which has been federally funded, and that a report on this work is to be issued in the near future. We also understand that for the Corps of Engineers to proceed to the second, or feasibility, stage of this process local interests would be required to provide fifty per cent (50%) of the funding for these more detailed studies. We further understand that a portion of the local cost share could be supplied as in-kind services, and that agreement to participate in a feasibility study does not obligate either the City or the federal government to provide construction funding for implementing projects recommended by the study.

We also understand that if a project is recommended by the feasibility study and approved, and concurred in by the non-Federal sponsors, a local cooperation agreement (LCA) with the federal

government for project construction would be required. We understand that under such an agreement costs for pre-construction engineering and design of a project are treated as first year construction costs and are shared in the same percentage and that we would be required to pay in cash 5 percent of the cost of the project during the construction of the project and provide all lands, easements, rights of ways, relocations, and disposal areas (LERRD). Should the sum of the initial 5 percent cash contribution and the value of LERRD be less than 25 percent of the cost of the project assigned to flood control, an additional contribution would be required such that our minimum total contribution would be 25 percent of the cost of the project. Our maximum share would not exceed 50 percent of the cost of the project. Unless a locally preferred project that deviated from one that provided the greater economic benefit were constructed.

We anticipate that the non-federal portion of the funding required for the above items would be provided from existing program funds, special taxing districts, or assessment fees.

Based on the above understanding the City is willing to enter into negotiations with the Corps of Engineers for the cost sharing of a feasibility study of flood control improvements in the Magpie Creek watershed. The attached City Council Resolution specifically authorizes the Mayor and City Clerk to sign and execute a Feasibility Cost-Sharing Agreement with the Corps of Engineers.

A formalized local cost sharing agreement may be negotiated at a later date.

Sincerely,

ANNE RUDIN
Mayor

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US Army Corps
of Engineers
Sacramento District
South Pacific Division

Section 205
Reconnaissance Investigation

Magpie Creek,
California

November 1991

CONTINUING AUTHORITIES
SECTION 205, RECONNAISSANCE INVESTIGATION
MAGPIE CREEK, CALIFORNIA

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CHAPTER I - INTRODUCTION

STUDY AUTHORITY

This study is being conducted under authority of Section 205 of the 1948 Flood Control Act, as amended (33USC 701S).

PURPOSE AND SCOPE

The purpose of this report is to present the results of the reconnaissance study. The purpose of the reconnaissance study is to accomplish the following:

- Define flood problems and opportunities and potential solutions.

- Determine whether planning should proceed further into the feasibility phase, based on a preliminary appraisal of the Federal interest, cost, benefits, and environmental effects of the identified potential solutions.

- Estimate the time and cost of the feasibility phase study.

- Assess the interest and support of Federal and non-Federal interests in the identified potential solutions.

RELATED WATER RESOURCES PROJECTS

Features of the Corps of Engineers constructed Sacramento River Flood Control Project in the study area include the Natomas East Main Drainage Canal, Dry Creek, Linda Creek, and Magpie Creek Diversion. The Magpie Creek Diversion conveys normal flows away from the natural Magpie Creek channel to Robla Creek (formerly known as Linda Creek) and thence to Dry Creek. Large floodflows will exceed the capacity of the diversion and overflow along the natural Magpie Creek channel to a pumping plant and then to the Natomas East Main Drainage Canal. South of Magpie Creek is Arcade Creek which flows into the Natomas East Main Drainage Canal. The improvements completed in the mid-1950's are maintained by non-Federal interests.

RELATIONSHIP BETWEEN MCCLELLAN AFB AND SECTION 205 WORK

The study of Magpie Creek under authority of the Section 205 study required that the portion of Magpie Creek that runs through McClellan Air Force Base (AFB) also be studied concurrently. This report describes alternatives and plan features and impacts both on and off the AFB but the flood control benefits evaluation is limited to that portion within the city boundaries, the primary focus of the reconnaissance studies. Benefits on the AFB will be included in the Feasibility Report.

CHAPTER II - STUDY AREA DESCRIPTION

STUDY LOCATION

Magpie Creek watershed is situated partly in Sacramento County, City of Sacramento, and McClellan Air Force Base (AFB). The approximately 10 square mile watershed is located in the Northeast portion of the City of Sacramento and adjoining areas. The headwaters of Magpie Creek which is in the County of Sacramento flows southwesterly to McClellan AFB, thence westerly through the base. From the AFB, Magpie Creek then meanders in a northwesterly direction to the Magpie Creek Diversion Channel. The diverted Magpie channel then flows north and then east to Dry Creek. Historic Magpie Creek meanders in a southwesterly direction through the City and to the east levee of the Natomas East Main Drainage Canal (NEMDC). At the levee, water is then pumped into NEMDC. (see Plate 1)

AREA DESCRIPTION

The principal streams in the study area are Magpie Creek and a tributary, Don Julio Creek. The watershed, a subbasin of Dry Creek and a minor subbasin of the American River basin, drains an area of approximately 10 square miles (see Plate 2).

Magpie and Don Julio Creeks are intermittent streams which originate east of the AFB in Sacramento County. Both Magpie Creek and Don Julio Creek originate north of I-80. The two creeks flow westerly through McClellan AFB and presently join upstream from the Magpie Creek Diversion Channel. The combined flows are conveyed through the diversion channel to Robla Creek which is tributary to Dry Creek and thence into Natomas East Main Drainage Canal (NEMDC). On the AFB, there is a lateral canal between the two creeks that permits some equalization of flows in the two creeks and form a comman floodplain.

Prior to the construction of the Magpie Diversion Channel by the Corps, Magpie Creek flowed southwesterly to the NEMDC. A small gated culvert in the diversion channel allows releases to the original Magpie Creek which flows to a pump station at the NEMDC.

The project drainage area is characterized by nearly flat to gently rolling hills where the average precipitation is about 17 inches per year. Stream flow varies significantly throughout the year, with high flows occurring between October and March and often no flows in the summer months.

The present land use within the watershed is as follows: east of the AFB is primarily residential, with few undeveloped areas; land use in the area west of the AFB is pastureland and with some industrial, commercial and residential developments; and land use within the AFB consists of a large airfield with supporting facilities and industrial, storage, logistics, and aircraft maintenance facilities.

Urban development in the watershed including development and channelization within the AFB has increased peak runoff and flood volume to Magpie Creek and the existing diversion channel, thereby increasing

the flood hazard to the area. Increases in runoff are due to the decrease in the amount of land available to store floodwater and to absorb rainfall and runoff resulting from urbanization.

CLIMATE

Abundant sunshine in the summer with temperatures ranging from about 20 to above 100 degrees Fahrenheit is characteristic of the area. The normal annual precipitation in the study area is about 17 inches.

FLOODPLAIN

The floodplain in the study area was mapped by Federal Emergency Management Agency (FEMA) in 1978 and revised in 1982 and revised again in February 1988. The most recent revisions are based on a 100-year peak flood flow of 1,880 cfs in the Magpie Creek Diversion Channel immediately downstream of Raley Boulevard. The Flood Insurance Rate Maps (FIRMs) currently in use reflect Magpie Creek hydrology developed in 1978 with a 100-year discharge of 1,880 cfs and a 500-year discharge of 2,400 cfs. The future condition hydrology developed in 1984, updated in 1988 by the Sacramento District, was used to delineate floodplains for use in the economic analysis for the reconnaissance study. The present condition and future condition 100-year flows are 2800 cfs and 2900 cfs, respectively, in the Magpie Creek Diversion Channel.

HYDROLOGY

The Sacramento District completed a hydrology office report on Dry Creek in 1984, which includes the Magpie Creek subbasin. The report presented hydrologic data and criteria. The report discussed the hydrologic characteristics of the basin, presented historic rainfall and flood data, an analysis of peak flow frequencies, and development of stage frequency relationships. Following the flooding of 1986, the COE reexamined the hydrology of the Dry Creek watershed (including Magpie and Don Julio Creeks). The 1984 Office Report was revised in 1988 to include the 1986 and other recent rainfall data.

The Corps study of Magpie Creek for the Dry Creek report subdivided the entire watershed into three subbasins. Those subbasins are: 1) Magpie Creek east of Watt Avenue, 2) North Fork Magpie Creek at Watt Avenue, and 3) Magpie and Don Julio Creeks west of Watt Avenue at Robla Creek. The study examined flood flows with watershed development reflecting projected 1990 and 2040 land use conditions.

Dewante & Stowell Engineers consultants to the City of Sacramento, performed additional studies of the watershed hydrology in 1989. The Dewante & Stowell study used the COE Dry Creek model but added detail to the Magpie Creek portion of the model. Their study results compared favorably with the COE study.

TOPOGRAPHY

The topography of the study area which lies in the alluvial plains of the Sacramento River is very flat along the western portion and transitions into gently rolling hills at the upper reaches. The surface slopes gently to the west at a gradient of less that 1 percent.

SOILS

The soils in the project site are primarily San Joaquin sandy loams; however, clay is found in depressions and in the historic floodplain of Magpie Creek, downstream of Raley Boulevard. The San Joaquin soils have strongly developed profiles with clay subsoils that rest on hardpan layers and are underlain by partially consolidated materials. These soils have developed on transported mixed rock deposits on the valley floor. Most of these materials were derived from granite and some volcanic and metamorphosed sedimentary rocks. San Joaquin Sandy Loam soil surface ranges from 4 to 14 inches and averages about 6 inches. It is light-brown or reddish-brown acidic sandy loam that contains many fine roots, puddles easily, and dries out hard.

The clay surface soil extends to depths of 6-15 inches and is dark grey adobe clay. It swells and becomes only slightly permeable when wet but shrinks and cracks deeply when dry.

SEISMICITY

The Sacramento region is generally considered to lie in a relatively inactive area with respect to seismic activity. There is no known evidence of surface displacement in Sacramento County. However, earthquake activity in neighboring regions have produced ground shaking in Sacramento. The nearest fault to the project area is the Midland Fault, about 25 miles to the east and the Dunnigan Hills Fault about 25 miles to the northwest.

VEGETATION

Vegetation in the project study area includes annual grasslands and weedy vegetation. The grassland predominates in the project study area with the weedy vegetation occurring in the non-agricultural rural area adjacent to roadways, on former agricultural land not in use and along waterways. Grasslands occur in open fields with non-native species predominant in formerly cultivated fields and native species predominating in relatively undistributed area.

There are several freshwater marsh sites along Magpie Creek, Don Julio Creek and Magpie Diversion Channel. The dense bands of freshwater marsh occur along the bottom of Don Julio Creek and along the Magpie Creek Diversion Channel.

Woody riparian vegetation is scattered along Don Julio Creek and Magpie Creek Diversion Channel. The woody vegetation includes cotton wood, willows, box elder thickets and ash. A cluster of elderberry trees is present along Don Julio Creek in the AFB (Wymer 1987).

Portions of the upper grassland contain vernal pools. The vernal pools support typically diverse floral representative of northern hardpan vernal pools in the region. The vernal pool vegetation is dominated by native annual species and herbaceous perennials.

WILDLIFE

The grasslands are used for foraging and nesting by wildlife and those adjacent to riparian habitat and water are further enhanced as wildlife habitat, for breeding, and resting. Reptiles, small mammals and birds inhabit these areas. Reptiles include lizards and snakes; mammals include rabbits, squirrels, gophers and badgers; and birds include owls, larks, vultures, kites, hawks, sparrows, mallards and coots.

VERNAL POOLS

The hardpan soils and undulating surface cause rainwater to accumulate, creating ponds during the wet season that linger until late spring. The climate is such that these ponds, technically northern hardpan vernal pools, support highly specialized plant communities that could include threatened or endangered species. These vernal pools and the plants they support are not unique to the project area or northern California; however, the number of vernal pool communities in the Central Valley has decreased significantly from historic levels.

CULTURAL RESOURCES

A record search was conducted for the project area and vicinity by the California Archeological Inventory, North Central Information Center at California State University in Sacramento. The search revealed no recorded cultural sites on or near the project area. A record search of the sacred lands file at the Native American Heritage Commission also did not reveal any special Native American cultural resources that would be of concern to local Native Americans, tribal groups, or elders. Information from these reports is excerpted below.

The Sacramento area in the prehistoric period was occupied by the Nisenan Maidu. Their territory was comprised of the drainage of the Feather and American Rivers and extended from the Sacramento River east to the crest of the Sierra Nevada. The Nisenan concentrated their settlements along major waterways, such as the Sacramento River but probably used outlying areas for food gathering. Site studies along major drainages have documented this pattern of settlement.

The study area has not previously been subject to cultural resource studies. The nearest reported cultural site is more than 1 mile to the north a short distance from Dry Creek. This site was reported by the landowner in 1955 but was never confirmed by a qualified archeologist. Other recorded sites are located further east along Dry Creek and about 2 miles southeast on Arcade Creek.

HISTORIC PERIOD

The study area was part of the Del Paso land grant of 1841. The route of the first transcontinental railroad (Central Pacific Railroad), begun

in 1863 in Sacramento, crossed Arcade Creek about 2 miles south of Magpie Creek. The crossing point on Arcade Creek was designated on January 12, 1864, as the official base of the Sierra Nevada by President Abraham Lincoln. Subsequently, the Federal Government subsidized railroad construction through the mountains. This point on Arcade Creek is designated as a California Historic Landmark. The route of the former Sacramento Northern Railroad which dates back at least to the 1870's, but which right-of-way is not considered historically significant, traverses the western boundary of the study area.

McClellan AFB, which lies in the study area was originally named McClellan Field in 1939 by the War Department in memory of Major Hezekiah McClellan of the Army Air Corps. It became McClellan AFB in 1948.

AIR QUALITY

The Federal Clean Air Act established air quality standards for several pollutants and requires governments of areas that violate these standards to prepare and implement plans to achieve the standards by specified deadlines. These standards are divided into primary standards, which are designated to protect the public health, and secondary standards, which are intended to protect the public welfare from effects such as reduced visibility, soiling, nuisance, and other forms of damage.

Both the State of California and the Federal Government have established a variety of ambient air quality standards, including those for ozone and carbon monoxide (CO). The deadline for attaining both the ozone and CO standards was December 31, 1987. The current plan for achieving these standards, the Sacramento Air Quality Management Plan, was prepared by the Sacramento Area Council of Governments (SACOG) in 1982. SACOG did not project attainment of the air quality standards by 1987. A new air quality plan is currently being developed.

The study area lies within the Sacramento Air Quality Maintenance Area (Sacramento County, Yolo County, northern Solano County, and southwestern Placer County). Urban emission sources in the Sacramento Valley are a primary source of the existing air quality problem. The Federal air quality standards for ozone and CO are being exceeded several times per year in Sacramento County.

The North Highlands monitoring station is the closest monitoring station near the study area. This monitoring station is located at the McClellan AFB golf course maintenance yard and is representative of air quality in the study area. The North Highlands station reported no CO violations from 1985 to 1987. Ozone standards were violated more often than CO standards in Sacramento County from 1985 to 1987. The North Highlands monitoring station reported 10 days exceeding the ozone standards in 1985, 13 days exceeding standard in 1986, and 3 days exceeding the standard in 1987.

NOISE

Sound measurements based on sound pressure levels at various frequency ranges, with results reported using a decibel (dB) scale are found in a Draft Administrative EIR prepared by Jones and Stokes Association Inc.. The dB values reported here are day-night average sound levels (Ldn). Ldn is a measurement of noise levels over a 24-hour period.

The Noise Element of the City General Plan contains general guidance concerning acceptable noise levels for various types of land uses. In general, noise-sensitive land uses (schools, hospitals, residential development, etc.) are considered compatible with outdoor Ldn levels of 60 dB or less. The land use compatibility guidelines do not apply to areas adjacent to freeways. The City uses the Federal Highway Administration guidelines for such areas.

The main source of noise near the potential plan site is roadway traffic. The noisiest streets near the potential plan site are Raley Boulevard and Marysville Boulevard, which experience 66 dB Ldn, 75 feet from the roadway. Noise levels on Rio Linda Boulevard and Dry Creek Road in the area average approximately 65 dB Ldn at 75 feet from the roadway. Some of the residential areas near Rio Linda Boulevard, Marysville Boulevard, and Dry Creek Road are exposed to traffic noise above normally acceptable levels (City of Sacramento 1987).

Aircraft noise from McClellan AFB also provides a source of noise in the study area. The AFB periodically tests jet engines, and numerous planes take off and land at the base daily. Plate 3 displays isopleth (contours) from McClellan AFB in the vicinity of the potential plan site.

TRAFFIC CIRCULATION

The major roads serving the study areas are Del Paso Boulevard, Rio Linda Boulevard, Marysville Boulevard, Norwood Avenue, Grand Avenue, Silver Eagle Road, Watt Avenue, and Main Avenue. Important secondary roads include Arcade Avenue, Raley Boulevard, Bell Avenue, Roseville Road, Winters Street, Royal Oaks Drive, Dry Creek Road, and South Avenue. I-80 provides freeway access to and from the study area.

Of the roads listed above, only Raley Boulevard and Dry Creek Road cross over the potential plan. Raley Blvd. is inundated and impassable with storms with a 5-year or higher frequency.

PUBLIC HEALTH AND SAFETY

Magpie Creek Diversion Channel is located on generally flat terrain. Flows in the channel vary by the amount of rainfall received each year. The channel depth is approximately 5-12 feet, depending on location. Much of the surrounding land is vacant, although there are some homes near the channel on Vinci Avenue, Neal Road, and Dry Creek Road. The channel backs up to the rear property line for many of these homes.

LAND USE

There are several land uses surrounding the existing Magpie Creek Diversion Channel and the route of the potential plan within the city limits.

Land uses in the vicinity of the existing channel are Low-Density Residential and Vacant Open Space. The land in the vicinity of the potential plan area east of Raley Boulevard to McClellan AFB is currently vacant.

The on-base portion of the proposed new channel route is surrounded by open space. This area was rather recently acquired by the AFB and has not yet been extensively developed. This area has greater environmental sensitivity than other portions of the base and less convenient access (McClellan Air Force Base 1987). The AFB has constructed an ammunition storage facility north of Don Julio Creek and warehouses near Magpie Creek.

CHAPTER III - TECHNICAL STUDIES

Several of the technical studies carried out during this investigation are described in this chapter. These studies were key in establishing data for making the evaluations of alternatives.

HYDROLOGY

Magpie Creek is included in the Dry Creek, Placer and Sacramento Counties, California, Hydrology Office Report, July 1984 (Revised April 1988). The office report provides the following future condition hydrology for Magpie Creek, including Don Julio Creek flows, in the area that a potential project is being studied.

Current (year 1990)		Future (year 2040)	
500 yr	4,400 cfs	500 yr	4,600 cfs
100 yr	2,800 cfs	100 yr	2,900 cfs

A consultant for the City of Sacramento that performed more detailed HEC I studies of the watershed also developed 100 year future condition (year 2040) flows of 2,900 cfs (rounded).

The Federal Emergency Management Agency Flood Insurance study circa 1978 indicates a 100 year flow of 1880 cfs. This flow does not reflect development and channel and hydraulic structure improvements that occurred between 1978 and the present nor does it consider future developments. Plate 4 depicts the 100-year floodplains used for the economic analysis.

DESIGN

Design and cost estimates developed by Dewante and Stowell, Consulting Engineers, for the City of Sacramento for a Preliminary Design Report Magpie Creek Diversion Channel Improvement Project, were utilized for the reconnaissance studies. This design report included hydrology, hydraulics, and design and cost estimates for the potential plan evaluated prior to the reconnaissance study phase.

The design, quantities, and relocations used by the consultant cost estimate were reviewed and accepted for the reconnaissance study. The back-up for the design assumptions and quantity computations received from Dewante and Stowell, was thoroughly reviewed. The quantity computations were reasonable and the design assumptions acceptable for reconnaissance level studies. The consultant report did not include any utility relocations or bridge relocations, and none are known to be required.

Soils - The local surficial soils consist of San Joaquin Loam, undulating, 3-8 percent slopes with moderately shallow (20-36") with low water holding capacity. The soils vary from silty sand (SM) to silt clay (CL-ML) and the hard pan layer varies from a few inches to 6 feet or more in thickness. This layer typically consists of cemented clayey

sand (SC) or clay (CL). Deposits below the hardpan are similar to the surficial soils. The numerous non-plastic sand and silt layers are subject to erosion. Standard penetration blow count N varies from 3 to 50 in non cemented deposits and N varies from 50 to refusal in hardpan deposits. The average N for the looser cohesionless layers range from 3 to 21 and averages 10. This translates to an allowable bearing capacity of about 1 ton PSF, relative density (Dr) of 40% and internal angle of friction of about 30 degrees.

Groundwater - Based on McClellan AFB borings perched water is locally encountered at depths of 5 to 8 feet and both Don Julio and Magpie Creek lose or discharge water into permanent water aquifer located at approximately minus 40 feet (90 feet below the ground surface).

Field Observations - The surficial soils are erodible and the upper part of the channel banks are scarred with small gullies except for outside bends in the channel. Over the bank storm runoff rather than flood flows has eroded the slopes. The hard pan present is very resistant to erosion but has an irregular surface and varies in depth from 0 to 6 feet. Sharp outside curves have eroded more than the straight reaches and should be protected with slope protection.

Hydraulic Design - Additional feasibility level studies are required to establish the maximum allowable velocity in the earth channel, further study erosion protection needs and hydraulic design factors including freeboard and sedimentation studies.

COST ESTIMATES

The detailed estimates of first cost are based on 1 October 1990 price levels. The quantities for the cost estimate are those provided by the consultant Dewante and Stowell preliminary design report. The cost of lands was furnished by the City of Sacramento. Cost Engineering Branch has reviewed the consultant cost estimate and assigned unit cost prices to the quantities. A 25 percent contingency allowance is included in the estimate. The cost estimates have been separated into the Section 205 project and McClellan AFB project based on the cost of the project features, either within the City of Sacramento or the Air Force Base. The costs will not necessarily be the final criteria for construction financing. Suitable allowances have been included for engineering design and construction management, based on costs experienced for similar work in the Sacramento District. The estimates of annual costs shown are based on 1 October 1990 price levels, 8-7/8 percent interest rate and 100 year amortization period.

ECONOMIC ANALYSIS

The economic analysis was developed to measure the flood damage reduction benefits for potential projects for Magpie Creek This analysis included the assessment of potential damages and flood damage reduction benefits which would be creditable to flood control improvements to

Magpie Creek. This does not include benefits which could occur on McClellan AFB.

Flood plain inventory - There are approximately 1,860 structures in the 100-year floodplain. The number of structures in the 100-year floodplain categorized by land use category is shown in Table 1 as follows:

Table 1
Number of Structures in the Floodplain

	100-Year
Single Family Residential	1,288
Multi Family Residential (units)	452
Mobile Homes	60
Commercial	13
Industrial	41
Public	3
Total	1,857

The floodplain was inventoried by site surveys and use of aerial photographs. Ground surveys encompassed the entire floodplain. All structures were visually inspected and inventoried. The floodplain was delineated into flood hazard zones (100-year and 500-year) on one inch equals 400 feet aerial photographs. The extent of the 100-year and 500-year flood plains are essentially the same.

Structure enumeration was accomplished through site surveys that identified the location of each structure by flood hazard zone. A list of structures by flood hazard zone was made and the square footage, foundation height, type, and value of each structure (residential, commercial, industrial and public) was clearly identified. In addition consultation was made with the Sacramento County Assessor's office in compiling information.

Structure values were determined by the replacement costs less depreciation method. The replacement costs and depreciation values were estimated from unit cost data contained in Marshall and Swift Valuation Cost handbooks.

For residential structures, content values of fifty percent of structure value was used. For commercial, industrial, and public structures the value of contents percentages were based on information from other studies.

Total depreciated replacement value of all floodplain structures and contents in the 500-year overflow area is approximately $456 million and is shown in Table 2.

Table 2
Total Depreciated Replacement Value

Land Use Type	Structure Value	Content Value
Single Family Res.	$129,034,000	$64,517,000
Multi Family Res.	17,314,000	8,657,000
Mobile Homes	915,000	458,000
Commercial	26,570,000	28,562,000
Industrial	80,763,000	91,263,000
Public	3,725,000	4,850,000
Sub-Total	$258,321,000	$198,307,000

Total (Structures + Content) = $456,628,000

Depth-Damage Relationships - Depth-damage relationships describe the damages that occur under different depths of flooding. The 1988 Federal Emergency Management Agency depth-damage relationships were used for residential and public structures. The depth-damage relationships developed by the Tennessee Valley Authority for the Department of Housing and Urban Development (HUD) in December 1969 were used in estimating damages to commercial and industrial structures. For the Morrison Creek, CA Investigation, interviews with owners and/or managers of commercial buildings established depth-percent damage relationships that are very similar to those mentioned in the aforementioned HUD study. Therefore, it is felt that the HUD depth-percent damage relationships are acceptable and reflect actual damage information.

Emergency Costs - Emergency costs include losses over and above physical flood damages. Emergency costs include those costs that would not otherwise be incurred, such as the costs of evacuation, and reoccupation of the floodplain, floodfighting and disaster relief; and increased costs of fire, and medical activity, and military patrol. Average annual damages were found to be $30,000.

Damages To Automobiles - Damages to automobiles were based on an estimate of the total number of automobiles in the floodplain. Based on discussions with insurance companies, the total number of automobiles in the floodplain was estimated by multiplying 1.7 by the number of residential structures. It was assumed that 50 percent of the automobiles would be damaged during a flood event. The estimated number of cars was multiplied by the average value of an automobile, $6,000, to determine the value of automobiles in the floodplain. Average annual auto damages were found to be $52,300.

Damage-Frequency Relationships - Damage-frequency relationships show the damages associated with a specific frequency of flooding. The Damages computer program was used to estimate flood damages. Damages by flood event for structures and contents under existing conditions are shown in Table 3.

Table 3
Existing Flood Damages By Flood Event
October 1990 Prices
(in $1,000)

Damage Category	Flood Event 25-Year	50-Year	100-Year	500-Year
Single Family Res Struc .	$7,722	$20,024	$34,421	$71,900
Single Family Res Cont.	3,665	9,504	16,336	35,247
Multi Family Res Struc.	378	980	1,685	4,002
Multi Family Res Cont.	231	599	1,030	2,546
Mobile Home Struc.	16	43	73	467
Mobile Home Cont.	0	0	0	22
Commercial	1,008	2,615	4,495	12,052
Industrial	12,186	31,602	54,322	119,428
Public	26	67	115	1,037
Emergency Costs	239	620	1,066	1,066
Auto Damages	417	1,080	1,857	1,857
Total	$25,888	$67,134	$115,400	$249,630

Average Annual Damages - Average annual damages are damages for a given economic condition and point in time. They are determined by weighing the estimated damages from varying degrees of flooding by their probability of occurrence and may be approximated by measuring the area under the damage-frequency curve using standard integration procedures. Table 4 shows the average annual damages under without project conditions for the present year, the base year, and by decade throughout the study period. Average annual equivalent damages for the period 1995-2095 were estimated on the basis of an 8-7/8 percent interest level and October 1990 prices, using standard discounting procedures.

Table 4
Without Project Damages
(in $1,000)

Damage Category	1990	1995	2005	2015	2025	2045-2035	2095	Average Annual Equivalent
Single Fam.Res.Struct.	$1811	$1184	$1189	$1194	$1198	$1203	$1208	$1190
Single Fam.Res.Cont.	567	568	570	573	575	578	580	571
Multi-Fam.Res.Struct.	60	61	61	61	61	62	62	61
Multi-Fam.Res.Cont.	37	38	38	38	38	38	38	38
Mobile Home Structure	4	4	4	4	4	4	4	4
Mobile Home Content	0	0	0	0	0	0	0	0
Commercial	169	169	170	171	172	173	174	170
Industrial	1897	1901	1909	1917	1925	1934	1942	1911
Public	8	8	8	8	8	8	8	8
Emergency Costs	30	30	30	30	30	30	30	30
Auto Damages	52	52	52	52	52	52	52	52
TOTAL	$4006	$4015	$4032	$4049	$4066	$4083	$4100	$4035

HAZARDOUS AND TOXIC WASTE

The City of Sacramento has performed laboratory analysis of the Magpie Creek sediment. Results of the analysis shows that Magpie Creek sediments are relatively clean and free of organic and inorganic contaminants with the exception of trace amounts of bis (2 ethylyhexyl) phatalate (DEHP). Environmental studies performed for the City of Sacramento have concluded that toxic wastes from McClellan AFB are not known to have leaked into Magpie Creek. Studies on the AFB are currently in progress to identify possible ground water contamination. Additional HTW studies will be performed at the feasibility level to satisfy Corps requirements.

CHAPTER IV - PLAN FORMULATION

PLANNING OBJECTIVES

The primary purpose of the reconnaissance level study is to determine if a viable flood control alternative exists to solve the identified problems in the area. The following planning objectives were established to address the problems and realize the opportunities identified by local interests and to serve as guidelines for the formulation and evaluation of alternative plans: 1) to increase flood protection and 2) to preserve environmental and cultural resources.

Potential flooding poses a threat to property on McClellan AFB from Magpie and Don Julio Creeks and to the community west of the AFB from Magpie Creek, Don Julio and Magpie Creek Diversion overflow. Subject to flooding are residential industrial property and public facilities. The floodplain developed for the 100 year flood is shown on Plate 4.

PROBLEMS AND OPPORTUNITIES

Magpie Creek overflows its banks and periodically floods lands within McClellan AFB and within the Sacramento city boundaries. The limited channel capacity of Magpie Creek from Raley Blvd. to the AFB results in periodic flooding of land adjacent to the AFB and overtopping of Raley Blvd, which creates hazards to motorists including emergency vehicles and creates road maintenance problems. Hydrologic and hydraulic studies indicate that downstream of Raley Blvd, the Magpie Creek Diversion Channel has a top of levee channel capacity of 1,635 cubic feet per second. Overtopping of the levee would cause flooding along the original Magpie Creek channel and upslope of the east levee of the Natomas East Main Drainage Canal.

The study of Magpie Creek under authority of the Section 205 study area (within the City of Sacramento boundary) required that the portion of Magpie Creek that runs through McClellan Air Force Base (AFB) also be studied concurrently.

A high level of flood protection to this area can be provided by channelization on the AFB and within the city boundaries. Provision for a detention basin on the base could also be a cost effective flood control measure. A combination of channel work and detention is also a possible solution. The beneficiaries of increased flood protection from detention basin construction on the AFB would be the City of Sacramento and the AFB.

DEVELOPMENT OF ALTERNATIVES

Potential alternatives to address the flood problems were developed based on previous studies performed by the Corps and the City of Sacramento. These measures were evaluated with respect to technical, economic, environmental and local acceptance criteria.

Magpie Creek and its tributary Don Julio Creeks and Magpie Creek Diversion channel overflow their banks within McClellan AFB and in the area west of the AFB. An integrated flood control plan that considers

improvements both on and outside the AFB needs to be developed to effectively control flooding in the area. Over the years, Magpie Creek and Don Julio Creeks have been realigned within the AFB. Magpie Creek was realigned in 1988. Containment and channelization of flood flows on the Base must be accomplished in coordination with improvements off the AFB to the west. Currently, Magpie Creek and Don Julio Creeks flow across the AFB from east to west and eventually drain into Magpie Creek Diversion Channel. The City of Sacramento conducted studies of the drainage problems of Magpie Creek where channelization and enlargement of Magpie Creek Diversion were studied. Both a concrete lined and earth lined channels and detention basins were investigated. The study concluded that an earthlined channel would be less costly and favored but recognized that concrete lined channels would be required where right-of-way is limited due to development along the channel. Under this study specific potential project features and cost estimates for a 2-phase construction project which included work both on the AFB and within City boundaries were developed. The City also in 1989 completed an administrative Draft Environmental Impact Report (EIR), pursuant to California Environmental Quality Act. The EIR analyzed the potential plan and five alternatives listed below:

o Potential Plan - This plan is called the "Proposed Project" in the EIR. This plan calls for channelization within the AFB, a new channel from the AFB boundary to the Magpie Creek Diversion Channel and enlargement of the diversion channel. (see Plates 5, 6, and 7).

o No Project Alternative - This represents the existing condition with no changes to Magpie or Don Julio Creeks. This plan does not satisfy the objective of decreasing flood damages. (see Plate 8).

o Modified No-Project Alternative - This would include modifications on the AFB and channel construction from the AFB downstream to Raley Blvd. within an existing right-of-way. This plan does not alleviate flooding from Magpie Creek within the City and might actually make flooding worse. (see Plate 9).

o Concrete Lined Channel Alternative - This is similar to the Potential Plan except that the channel would be concrete lined. This plan would require less excavation for a channel and less right-of-way than the potential plan. (see Plate 10).

o Expanded Earthen Channel Alternative - This plan would follow the same alignments as the potential plan. Vegetation would be allowed to grow on the bank slopes resulting in increased channel size and right-of-way requirements. (see Plate 11).

o Detention Basin Alternative - A detention basin would be constructed between Raley Boulevard and Patrol Road on the AFB. This alternative presents opportunities for reducing channelization requirements and needs to be studied in detail during feasibility stage as a viable, and possibly less costly alternative. This alternative would essentially be a flood control project on the AFB's property to provide flood

protection mostly to City lands. This alternative was not studied in detail by the City since it appeared that the AFB would disallow this option at the time of the study. Since that study, the AFB has supported the study of this alternative and intends to provide easements within the constraints of the Base Comprehensive Plan needed for this alternative.(Plate 12).

The Draft Administrative EIR reports on the investigation of impacts on hydrology, vegetation and wildlife, geology and soils, aesthetics, cultural resources, air quality/noise/disruption, public health and safety, land use, public service and water quality of the identified alternatives.

Further discussion of vegetation and wildlife as well as cultural resources impacts may include the loss and/or degradation of riparian and freshwater marsh, vegetation, grassland habitat, woody riparian habitat, and herbaceous riparian vegetation within the project area. These losses could affect roosting and nesting practices, breeding, feeding, and resting habitat for birds, small mammals, amphibians, and reptiles. However, vernal pools that lie near the proposed project area will be protected from impacts during channel and access road construction. In addition, the "Proposed Project" may affect cultural resources through disturbance of a cultural resource site during excavation. These and other impacts indicated in the Draft Administrative EIR will be discussed in detail in the feasibility report.

Non-Structural measures were considered but dismissed for the City is in the FEMA Flood Insurance program, and this alternative would leave many existing structures subject to flood damage. Under the No-Project Alternative the flooding will continue. The report presents an analysis of the alternative and a "Proposed Project". (This "Proposed Project" is the potential plan analyzed in this reconnaissance phase study). The report states that with the exception of potential downstream flooding impact, the proposed project with appropriate mitigation can meet the project objectives without significant adverse impacts. Nevertheless, the aforementioned impacts will be addressed in detail in the feasibility report.

POTENTIAL PLAN

The potential plan refers to the plan analyzed during the reconnaissance phase to demonstrate Federal interest for proceeding to the feasibility phase studies. The potential plan is a continuous channel plan that can be divided into two parts; one part is the improvements on McClellan AFB and the other is the improvements within the City of Sacramento Boundary. A security structure on the AFB side of the AFB - City boundary separates the two segments. The two segments are hydraulically interconnected but physically separable. The project is however inter-related for whatever flood control work done on the AFB will affect the Section 205 studies. Therefore, the reconnaissance and feasibility reports will include, in the plan formulation, that portion of Magpie Creek on and off the AFB.

The potential plan channel improvement begins at the confluence of

Magpie Creek Diversion Channel and Robla Creek, north of Rose Street and extends upstream to a point about 700 feet south of Vinci Avenue. From that point about 700 feet south of Vinci Avenue a new channel would be constructed to the AFB boundary. Channel work would continue within McClellan Air Force Base to connect with Magpie Creek at Patrol Road. A security structure at the fence line and an earthen berm would be provided along the base boundary to direct Don Julio Creek flows to Magpie Creek.

Vegetation and wildlife mitigation could be provided by plantings especially within McClellan AFB by designating currently unused portions for development into wildlife habitat.

The potential plan features are as follows:

CITY OF SACRAMENTO

o Improvement of Dry Creek Road Bridge

o Concrete-lined rectangular section through Dry Creek Road Bridge, 36 feet in width, 850 feet in length downstream and 170 feet in length upstream of the bridge, plus transition

o Levee along Magpie Creek Diversion from confluence with Robla Creek upstream, 1,500 feet in length along the south bank of Robla Creek and 1,000 feet in length along the north bank of Magpie Creek Diversion Channel, 12 feet crown width, 2:1 side slopes, 5 feet average height,

o Channel widening and deepening of Magpie Creek Diversion Channel from approximately 25 feet to 50 feet bottom width, for a distance of approximately 1,500 feet in length upstream of the confluence with Robla Creek and approximately 5,400 feet in length downstream from McClellan AFB boundary, 2:1 side slopes and

o Demolition and removal of Vinci Street Bridge.

o Replace Raley Boulevard Bridge

McCLELLAN AFB

o Concrete lined channel with 25-foot bottom width, 1,150 feet in length, 1:1 side slopes,

o Earth lined channel with 80-foot bottom width, 2,650 feet in length, 2:1 side slopes, including transitions,

o Security structure, 50 feet in width with piers and access bridge,

o Culvert at Ammunition Access Road with two 8′ by 10′ box culverts and embankment,

o Levee along existing Don Julio Creek, 1,400 feet in length, 12-foot crown width, 2:1 side slopes and

o Energy dissipater at junction of Don Julio and extension of Magpie Creek diversion channel.

POTENTIAL PLAN
First and Annual Costs (October 1990 prices)

City of Sacramento		
Lands and Damages		2,000,000
Environmental Mitigation (20%)[1]		1,140,000
Channels		3,700,000
Planning, Engineering and Design		440,000
Construction Management		260,000
Subtotal First Cost	$	7,540,000
Interest and Amortization (8-7/8 percent)		669,000
Maintenance and Operation Levee and Channels		16,000
Subtotal Annual Costs		$ 685,000
McClellan AFB		
Lands and Damages[2]		0
Environmental Mitigation (20%)[1]		340,000
Channels		1,670,000
Planning, Engineering, and Design		200,000
Construction Management		130,000
Subtotal First Cost	$	2,340,000
Interest and Amortization (8-7/8 percent)		208,000
Maintenance and Operation Levee and Channels		11,000
Subtotal Annual Costs	$	219,000
TOTAL PROJECT COST	$	9,880,000
TOTAL ANNUAL COST	$	904,000

[1] Environmental mitigation related to fish and wildlife facilities and cultural resources is assumed to be reasonable mitigation for this type of project based on past experience.

[2] The fair market value of lands and damages will be determined and included in the feasibility report. For this plan 9 acres of AFB land would be required which is not conservatively expected to exceed $100,000 per acre. This would increase the first and annual cost on McClellan AFB to $3,240,000 and $288,000, respectively.

PLAN POTENTIAL
Average Annual Damages and Benefits

Inundation reduction benefits for the City of Sacramento segment of the potential plan were found by evaluating damages with and without the potential plan (no inundation reduction benefits evaluations were made for that portion of the project on McClellan AFB in this report. However, they will be included in the feasibility report). Primary tangible flood damage reduction benefits are the difference between the equivalent average annual damages under with and without project conditions. The flood damage reduction benefits for the freeboard in the leveed channel were taken as one-half of the incremental flood damage reduction benefits between the design water surface and the top of levee. Equivalent annual damages were calculated by applying an 8-7/8 percent discount rate.

The summary of average annual equivalent damages and benefits for 100-year level of protection are presented in Table 5.

Table 5
Average Annual Equivalent
Damages and Benefits
($1,000)

Without Project Damages	
Single Family Residential	$1,761
Multi-Family Residential	99
Mobile Homes	4
Commercial	170
Industrial	1,911
Public	8
Emergency Costs	30
Auto Damage	52
Total	$4,035
With Project Damages - 100-Year Level of Protection	
Single Family Residential	$531
Multi-Family Residential	31
Mobile Homes	2
Commercial	56
Industrial	586
Public	4
Emergency Costs	6
Auto Damage	10
Total	$1,230
Inundation Reduction Benefit	
100-Year Level of Protection	$2,805

Benefit-Cost Ratio - The benefit to cost analysis was performed for the portion of the potential plan and floodplain that lie outside the AFB, that portion of the Potential Plan that is in the City of Sacramento. The Potential Plan includes both on-base and off-base portions, and it is intended that Section 205 funds would be used to construct both portions.

The benefits to costs ratio of the potential plan that excludes on-base benefits and costs and provides 100-year level of protection are summarized below.

Total Annual Benefits:	$2,805,000
Total Annual Costs:	$ 685,000
Benefit to Cost Ratio:	4.1
Net Benefits:	$2,220,000

The benefit to cost ratio including the costs of the potential plan on both the AFB and the city but excluding flood reduction benefits on the AFB (these potential benefits were not developed during reconnaissance phase studies) is as follows. It is noted that including the costs of the land on the AFB does not materially impact the benefit to cost ratio.

Total Annual Benefits:	$2,805,000
Total Annual Costs:	$ 904,000
Benefit to Cost Ratio:	3.1
Net Benefits:	$1,901,000

CHAPTER V - FEASIBILITY PHASE STUDIES

REQUIRED STUDIES

A number of studies will be required during the feasibility phase of the investigation. The Magpie Creek flood problems and potential solutions within the City and the Air Force Base are hydraulically interrelated. A feasibility Cost-Sharing Agreement (FCSA) between the Department of the Army (represented by the Sacramento District Engineer) and the non-Federal sponsor is the cost sharing agreement for the feasibility study. A draft FCSA and Initial Project Management Plan (IPMP) are included in this report (see Attachment II and Appendix A). Accompanying submission of the FCSA for approval is a letter of intent from the non-Federal sponsor stating that the FCSA is acceptable and that the sponsor will sign the agreement upon certification of the reconnaissance report.

STUDY MANAGEMENT

The non-Federal sponsor will be involved in study management. In order to manage a cost-shared study, an Executive Committee and a Study Management Team will be formed. The management structures are formalized in the FCSA.

The Study Management Team will develop the studies, guide their accomplishment, and participate in selection of potential solutions. The team will be directly involved in establishing mutual roles and in focusing on the critical issues.

The Executive Committee will be responsible for resolving any disputes that may arise during the study. The Committee will agree on the solutions and study direction, which may include termination.

The Corps study manager will be named to provide specific direction for the study conduct and for the management of the study itself. The study manager will ensure that funds are allocated to the proper organizational elements and that appropriate analyses are conducted to develop the information needed to evaluate the resource problems in the study area. The study manager will also direct the flow of technical information between the Corps and the local sponsor in order to accomplish the work in efficient and timely manner.

FINANCIAL ANALYSIS

Feasibility Phase

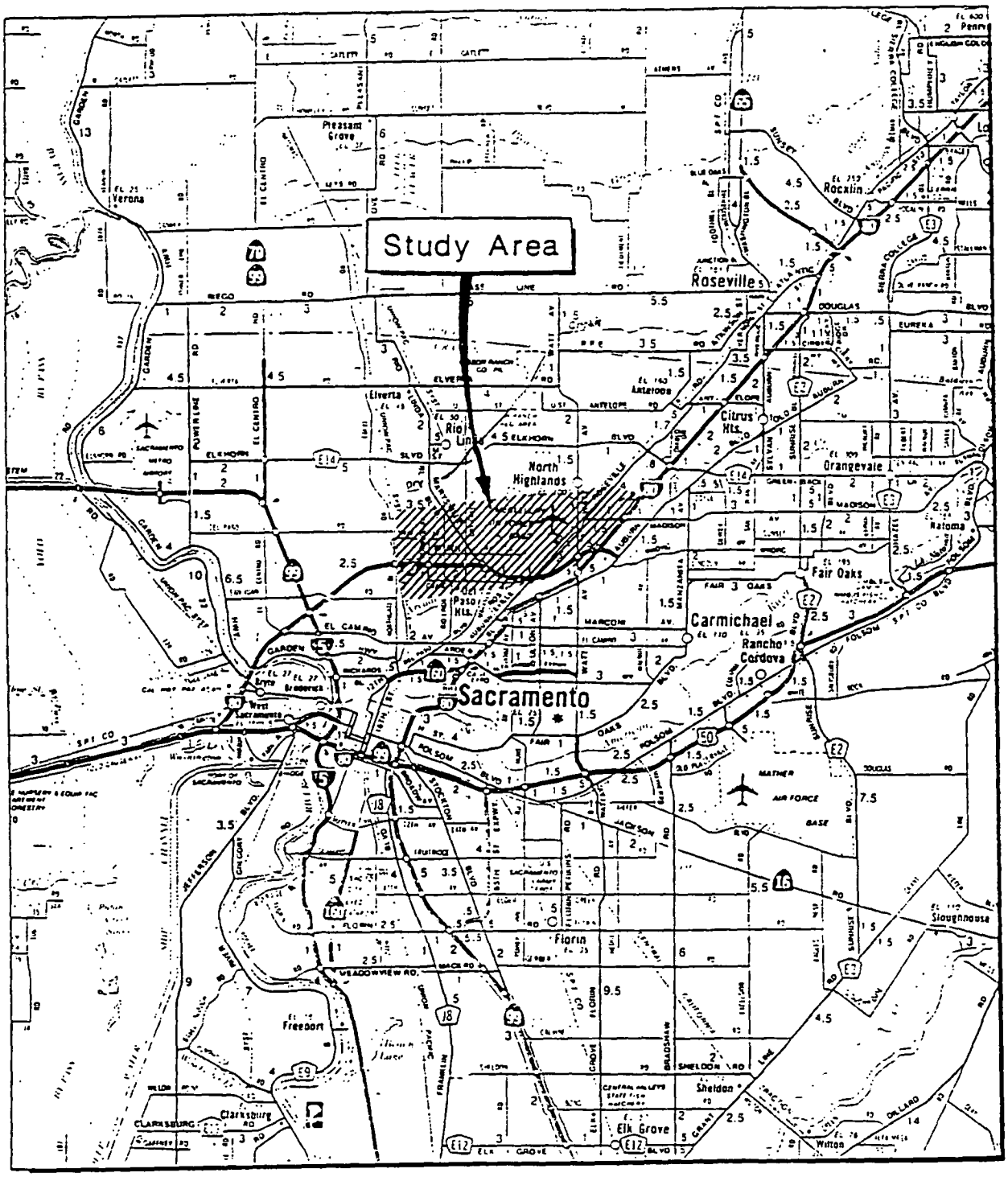
The feasibility phase will be cost shared 50 percent Federal/50 percent non-Federal recognizing that portion of the study area is on McClellan AFB. The City of Sacramento will divide the non-Federal costs with appropriate agencies. Study costs will be funded from the yearly working budgets of these agencies. The non-Federal fiscal year begins in July, and the study costs for the first year will have been set aside in their respective budgets.

Construction Phase

The cost of constructing the Section 205 project will be shared in accordance with the Water Resources Development Act of 1986. During construction of a project, the non-Federal sponsor must pay in cash 5 percent of the total costs assigned to flood control. In addition, the sponsor must provide all lands, easements, rights-of-way, and relocations. If the total of the two is less than 25 percent of the total project cost, the sponsor will pay the difference in additional cash during construction. However, the total non-Federal cost will not exceed 50 percent of the total project cost. The AFB intends to provide the needed easements while the project will fund the construction.

CHAPTER VI RECOMMENDATIONS

The results of this reconnaissance study indicate that there is a Federal interest in a potential solution that can solve local and regional water resources problems. The potential plan for channelization has non-Federal support, appears economically feasible, and has a non-Federal sponsor that is willing and able to cost share the feasibility phase. Also, upstream detention facilities on McClellan Air Force Base with downstream levee and channelization appears to be a viable feasible alternative. Therefore, it is recommended that feasibility studies for the Magpie Creek Investigation be initiated.



LOCATION OF STUDY AREA

PLATE 1

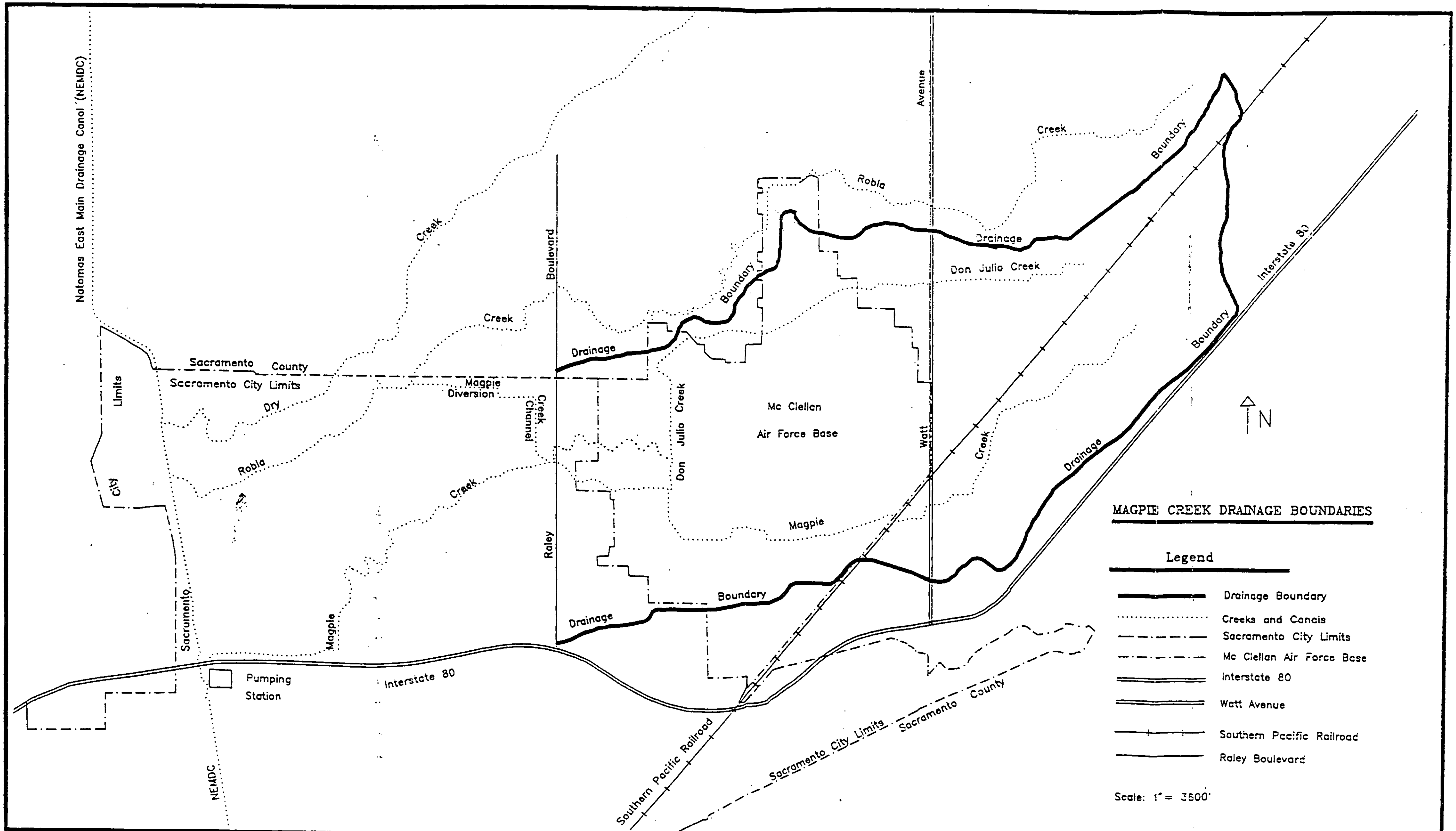
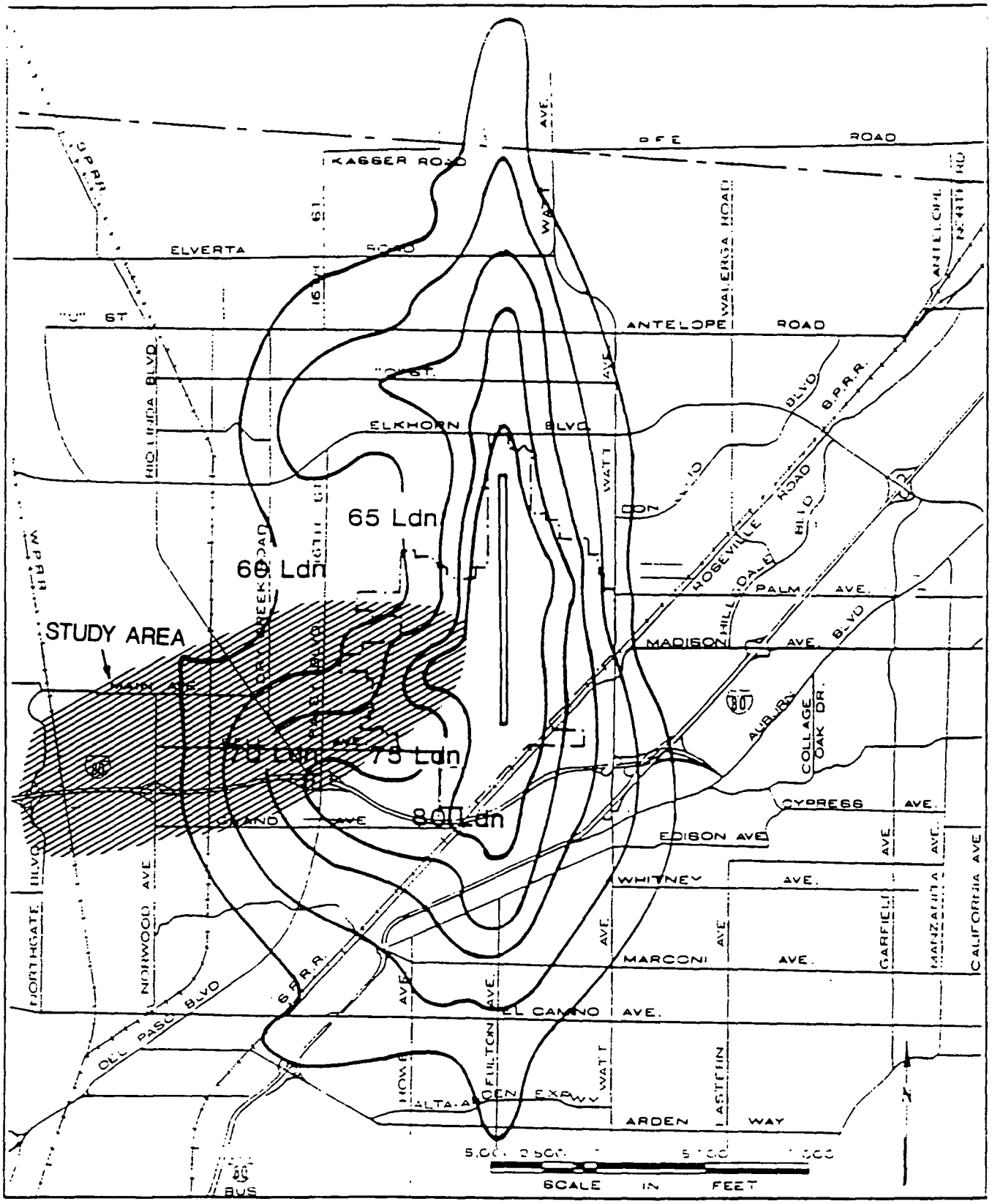

MAGPIE CREEK DRAINAGE BOUNDARIES
Legend
Drainage Boundary
Creeks and Canals
Sacramento City Limits
Mc Clellan Air Force Base
Interstate 80
Watt Avenue
Southern Pacific Railroad
Raley Boulevard
Scale: 1" = 3600'
N
Natomas East Main Drainage Canal (NEMDC)
NEMDC
Sacramento County
Sacramento City Limits
City Limits
Sacramento
Pumping Station
Interstate 80
Dry Creek
Robla Creek
Magpie Creek
Magpie Diversion
Creek Channel
Raley Boulevard
Drainage Boundary
Don Julio Creek
Mc Clellan Air Force Base
Watt Avenue
Southern Pacific Railroad
Sacramento City Limits
Sacramento County

PLATE 2



NOISE CONTOURS FOR MC CLELLAN AFB

Source: City of Sacramento 1987

PLATE 3

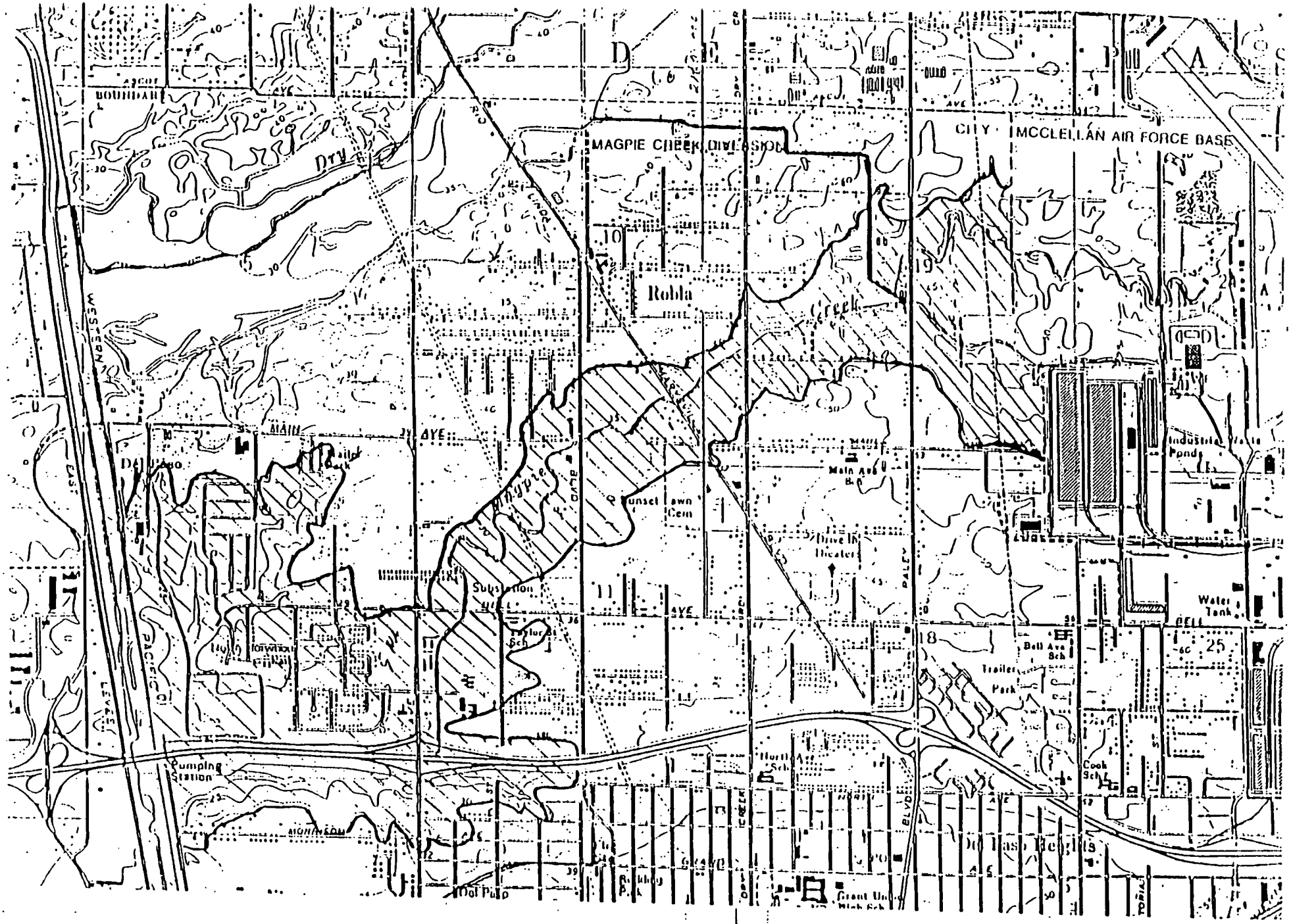


PLATE 4

FLOODPLAIN MAP

100-year floodplain
(Section 205 Study)

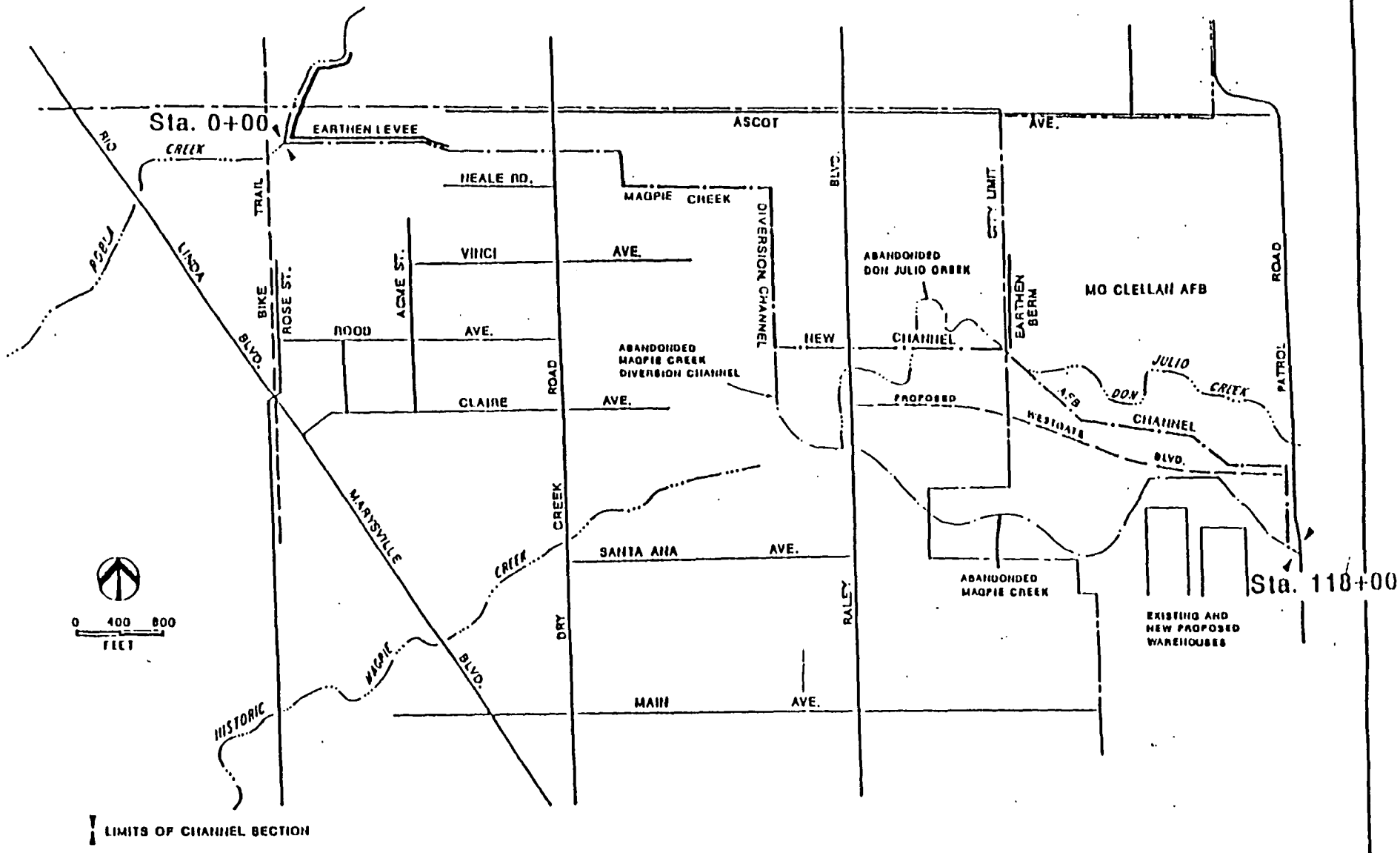
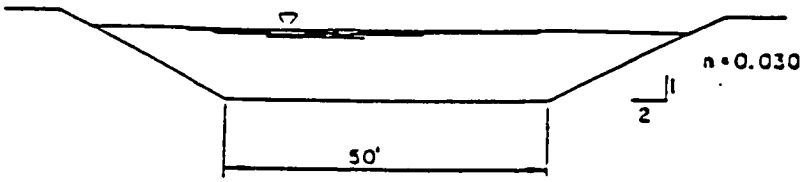


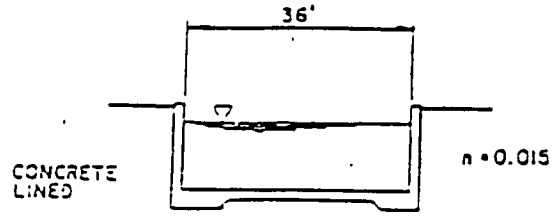
PLATE 01

POTENTIAL PLAN

Source: Jones and Stokes Assoc., Inc.
August 1989



STA. 0.48 - 15.58
STA. 26.14 - 81.02



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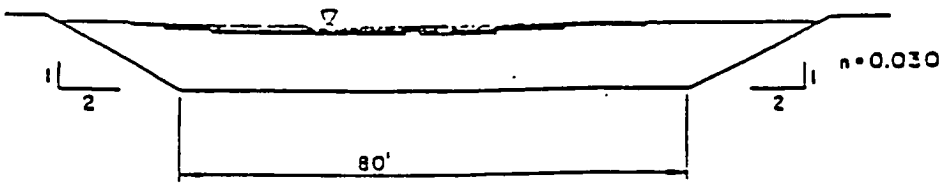
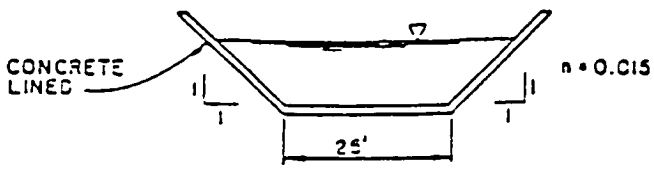


STA. 81.02 - 106.5

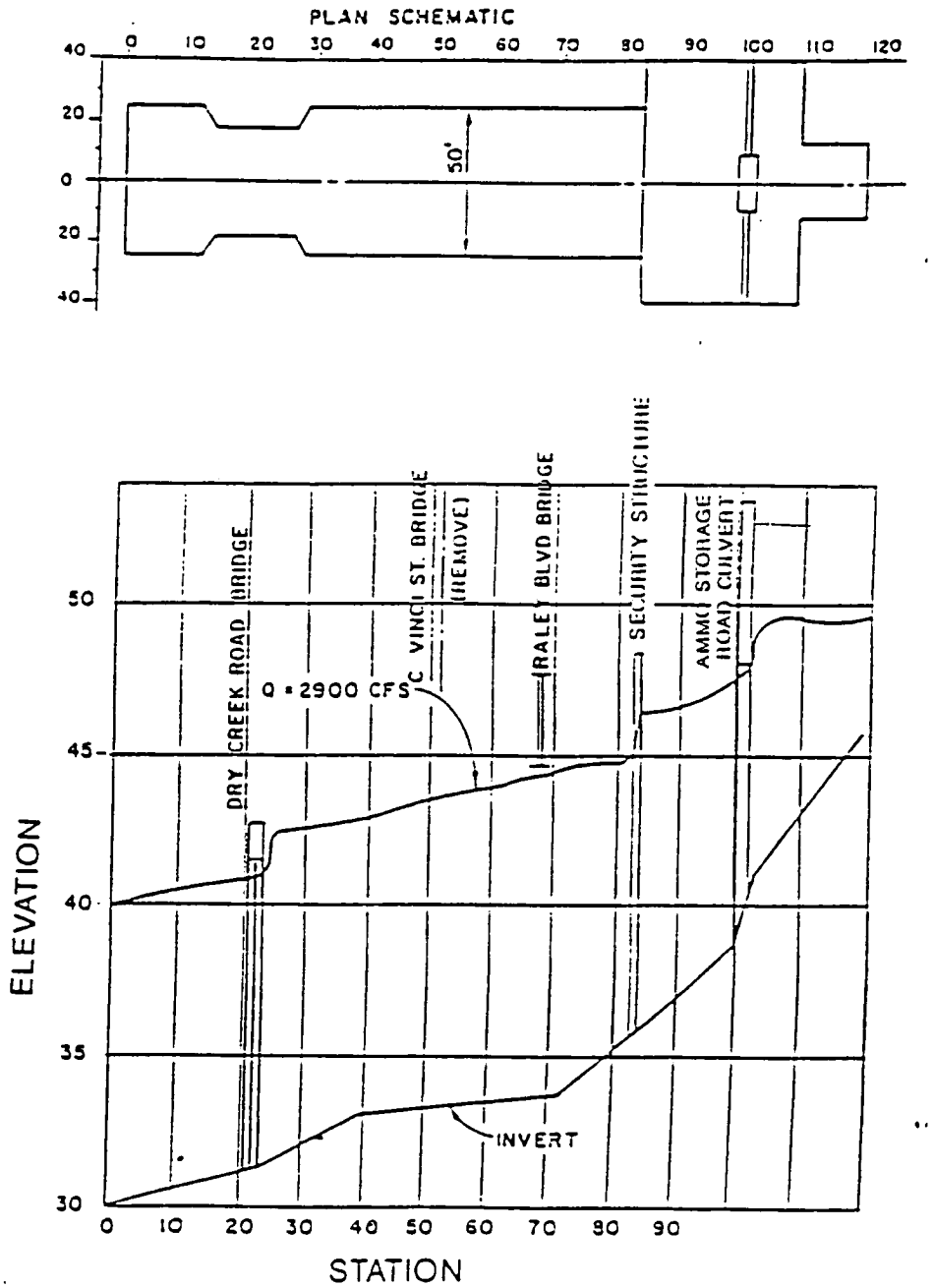


STA. 106.5 - 118.0

TYPICAL CROSS SECTION-POTENTIAL PLAN

Adapted From: Dewarest and Stockwell 1939

PLATE 6



Adapted From: Dewante and Stowell, 1989

SCHEMATIC PLAN AND PROFILE-POTENTIAL PLAN

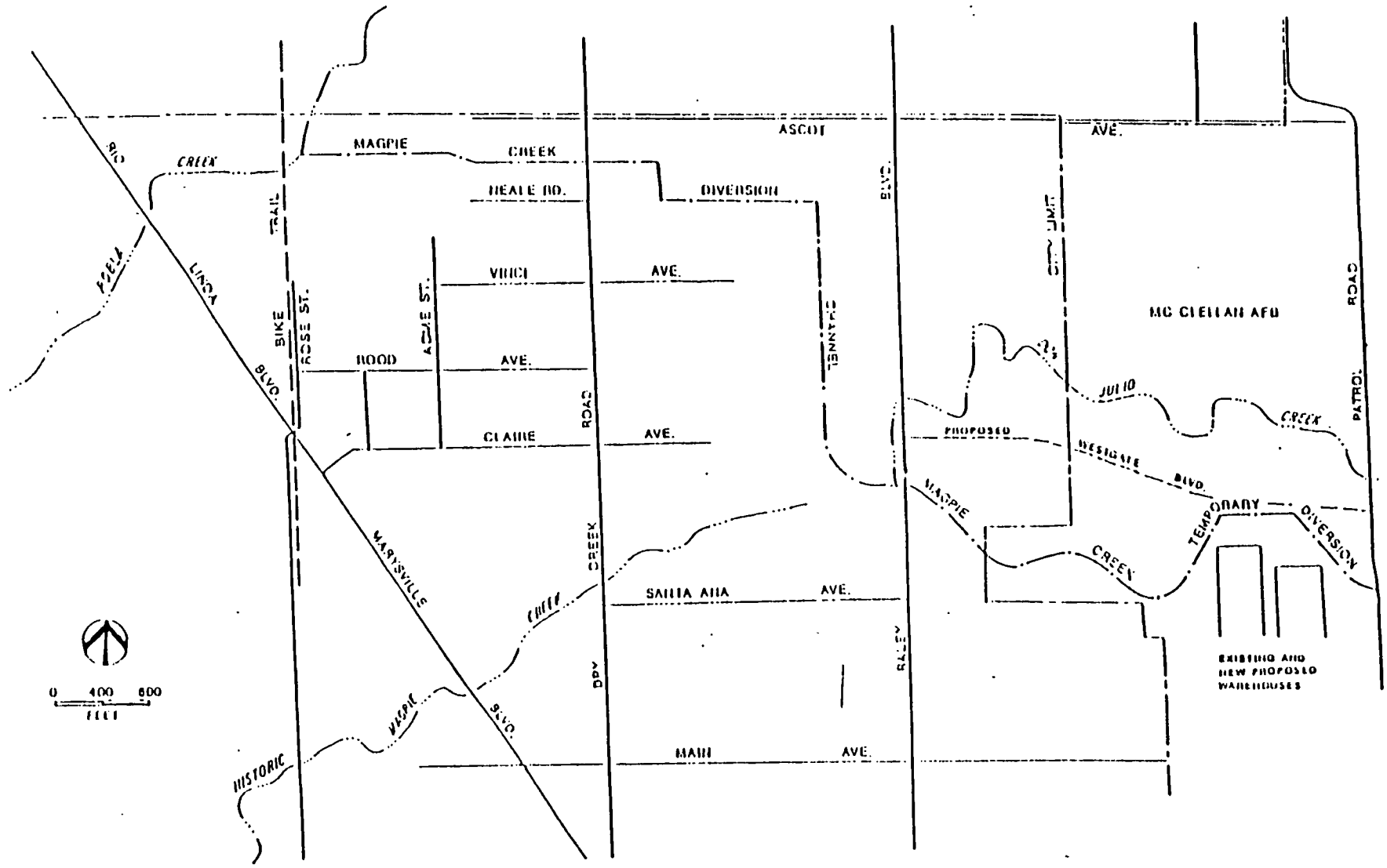


PLATE 8

Source: Jones and Stokes Assoc., Inc., August 1989

THE NO-PROJECT ALTERNATIVE

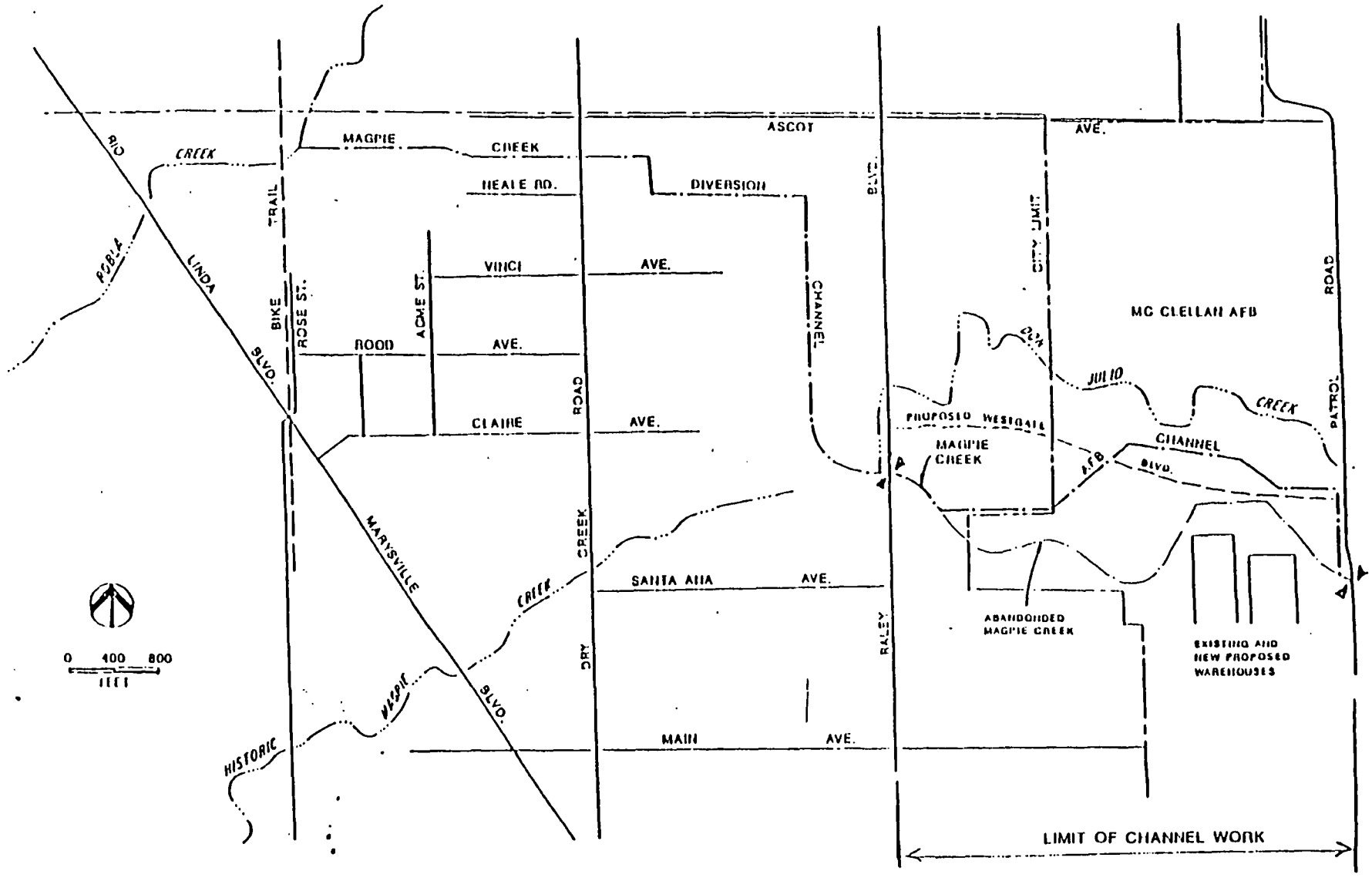
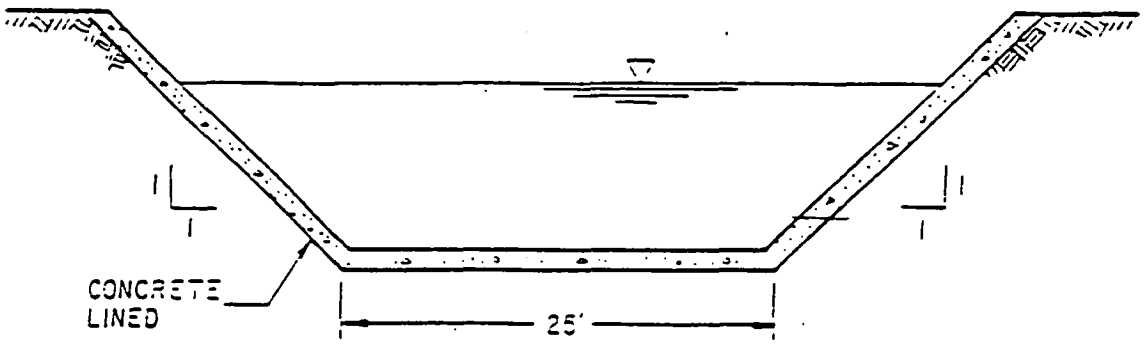


PLATE 9

MODIFIED NO-PROJECT ALTERNATIVE CHANNEL ALIGNMENT

Adapted From:
Jones and Stokes Assoc., Inc, August 1989

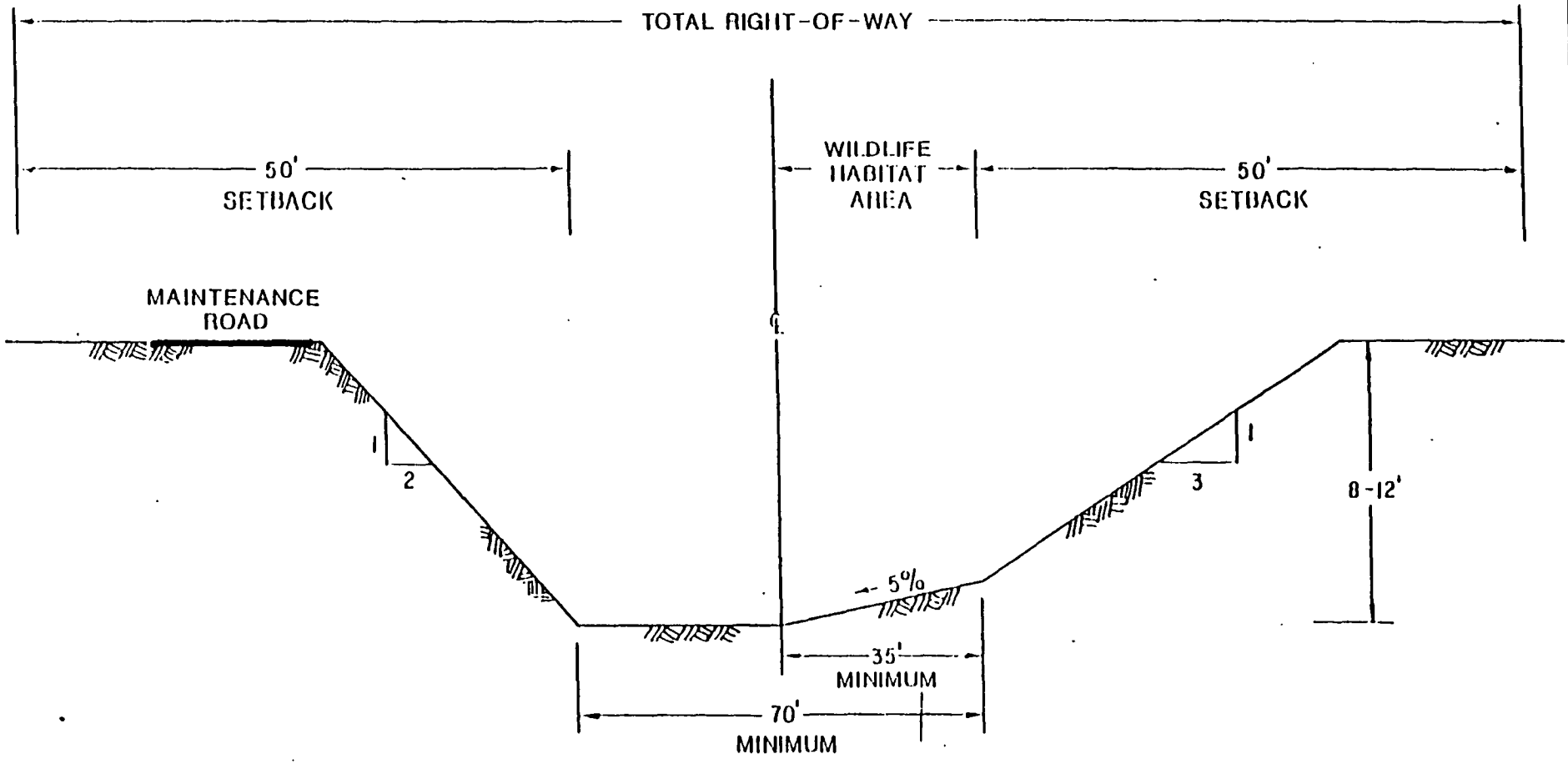


Source: Jones and Stokes Assoc., Inc., August 1989

CONCRETE LINED CHANNEL ALTERNATIVE - TYPICAL SECTION

(CHANNEL ALIGNMENT IS SIMILAR TO THE POTENTIAL PLAN)

PLATE 10



Adapted From: Jones and Stokes Assoc., Inc., August 1989

EXPANDED EARTHEN CHANNEL ALTERNATIVE - TYPICAL SECTION

(CHANNEL ALIGNMENT IS SIMILAR TO THE POTENTIAL PLAN)

PLATE 11

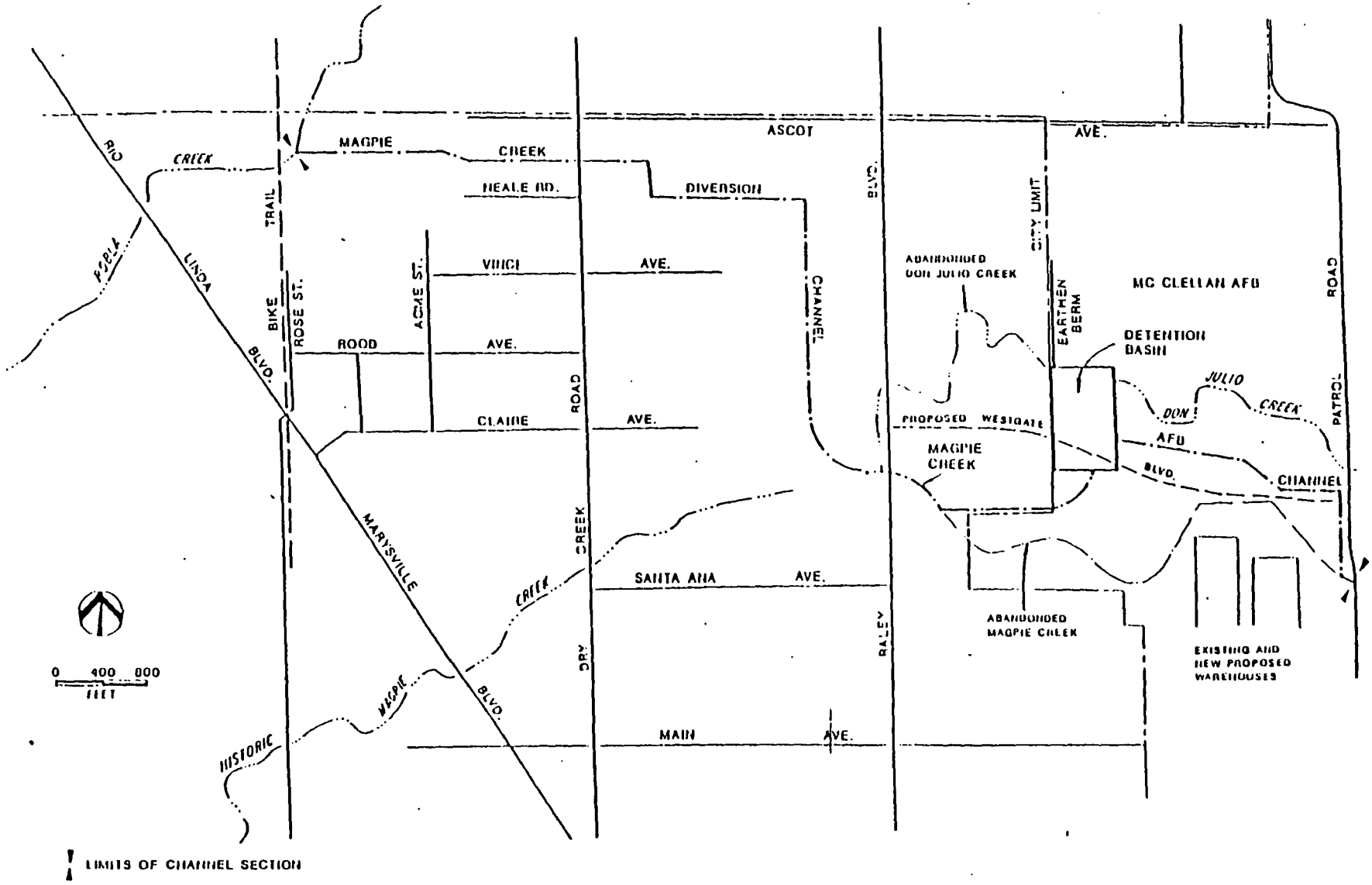


PLATE 12

Adapted From: Jones and Stokes Assoc., Inc., August 1989

DETENTION BASIN ALTERNATIVE

ATTACHMENT I

CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-91-SP-383

April 17, 1991

Mr. Walter Yep
Chief, Planning Division
Sacramento District Corps of Engineers
650 Capitol Mall
Sacramento, California 95814-4794

Subject: Species List for the Proposed Magpie Creek Investiation for Flood Protection to the Area Within and West of McClellen Air Force Base, Sacramento County, California

Dear Mr. Yep:

As requested by letter from your agency dated March 14, 1991, you will find attached a list of the listed endangered and threatened species that may be present in the subject project area. (See Attachment A.) To the best of our knowledge, no proposed species occur within the area. This list fulfills the requirement of the Fish and Wildlife Service to provide a species list pursuant to Section 7(c) of the Endangered Species Act, as amended.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is also attached. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Attachment B for a discussion of the responsibilities Federal agencies have under Section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

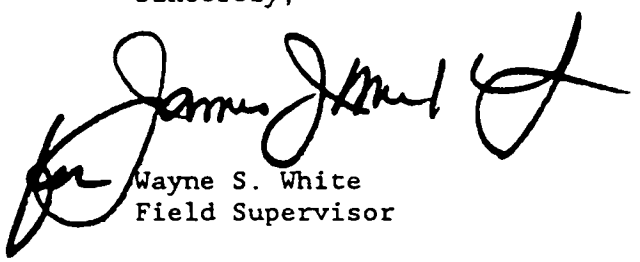
Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Also, for your consideration, we have included a list of the candidate species that may be present in the project area. (See Attachment A.) These species are currently being reviewed by our Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the

you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Peggie Kohl at 916/978-4866 (FTS 460-4866) if you have any questions regarding the attached list or your responsibilities under the Endangered Species Act.

Sincerely,



Wayne S. White
Field Supervisor

Attachments

ATTACHMENT A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED MAGPIE CREEK INVESTIGATION FOR FLOOD PROTECTION TO THE AREA WITHIN AND WEST OF MC CLELLEN AIR FORCE BASE, SACRAMENTO COUNTY, CALIFORNIA (1-1-91-SP-383, APRIL 17, 1991)

Listed Species

Invertebrates

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Candidate Species

Amphibian

California tiger salamander, *Ambystoma tigrinum californiense* (2)

Reptiles

giant garter snake, *Thamnophis gigas* (1R)

Birds

tricolored blackbird, *Agelaius tricolor* (2)

Invertebrates

Sacramento Valley tiger beetle, *Cicindela hirticollis abrupta* (2R)
vernal pool fairy shrimp, *Branchinecta lynchi* (1R)
California linderiella, *Linderiella occidentalis* (1R)
Conservancy fairy shrimp, *Branchinecta conservatio* (1R)
vernal pool tadpole shrimp, *Lepidurus packardi* (2R)
Sacramento anthicid beetle, *Anthicus sacramento* (2)

Plants

Boggs Lake hedge-hyssop, *Gratiola heterosepala* (2)

(E)--Endangered (T)--Threatened (CH)--Critical Habitat
(1)--Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.
(1R)-Recommended for Category 1.
(2R)-Recommended for Category 2.
(*)--Possibly extinct.

ATTACHMENT B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER
SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; 2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and 3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment--Major Construction Activity[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

VALLEY ELDERBERRY LONGHORN BEETLE

(*Desmocerus californicus dimorphus*)

CLASSIFICATION: Threatened - **Federal Register** 45:FR52803 August 8, 1980.

CRITICAL HABITAT: Federal Register 17.95(c), May 7, 1980.

California. Sacramento County.

(1) Sacramento Zone. An area in the city of Sacramento enclosed on the north by the Route 160 Freeway, on the west and southwest by the Western Pacific railroad tracks, and on the east by Commerce Circle and its extension southward to the railroad tracks.

(2) American River Parkway Zone. An area of the American River Parkway on the south bank of the American River, bounded on the north by latitude 38 37'30" N, and on the South and east by Ambassador Drive and its extension north to latitude 38 37'30" N, Goethe Park, and that portion of the American River Parkway northeast of Goethe Park, west of the Jedediah Smith Memorial Bicycle Trail, and north to a line extended eastward from Palm Drive.

(3) Putah Creek Zone. California. Solano County. R 2 W T. 8 N. Solano County portion of Section 26.

DESCRIPTION:

Horn described the valley elderberry longhorn beetle in 1881 and it was redescribed in 1921 by Fisher. Morphological description: In general, longhorn beetles are characterized by somewhat elongate and cylindrical bodies with long antennae, often in excess of 2/3 of the body length. In contrast, males of VELB are stout-bodied and their elytra (thickened, hardened forewings) are coarsely punctured, with a metallic-green pattern of 4 oblong maculations, surrounded by a bright red- orange border. The border eventually fades to yellow on museum specimens. The maculations are fused on some males, more closely resembling the nominate subspecies. Antennae are about as long as the body or slightly shorter. Body length is about 13-21 mm.

Females are more robust, elytra are subparallel, and the dark pattern is not reduced. Antennae reach to about the middle of the elytra and body length is about 18-25 mm. Both sexes of VELB are readily identified due to their distinctive appearance. As noted earlier, males with fused maculations resemble the nominate subspecies, *Desmocerus californicus dimorphus*, Fisher, 1921.

DISTRIBUTION:

VELB is endemic to moist valley oak woodlands along the margins of rivers and streams in the lower Sacramento and upper San Joaquin Valley of California, where elderberry (*Sambucus* spp.), its foodplant, grows. During the past 150 years over 90

percent of the riparian habitat in California has been destroyed by agricultural and urban development. Although the entire historical distribution of VELB is unknown, the extensive destruction or riparian forests of the Central Valley of California strongly suggests that the beetle's range may have shrunk and become greatly fragmented.

Due to the limited knowledge about the VELB's life history, and its ecological requirements, precise threats to its survival are difficult to enumerate. Clearly the primary threat to survival of the VELB has been and continues to be loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, rip-rapping of shoreline, plus recreational, industrial and urban development. Insecticide and herbicide use in agricultural areas may be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands as a foodplant for VELB may also be a factor in the beetle's limited distribution.

There is little information on former abundance of VELB for comparison with current population levels. A. T. McClay collected 51 adults during May 1947. Dr. John A. Chemsak, a cerambycid specialist from the University of California, Berkeley, believes that VELB has probably always been rather rare and of limited abundance.

SPECIAL CONSIDERATION:

The riparian habitat of the beetle is still being degraded by urban development and levee repair work along the rivers. There has been some successful elderberry transplantings in specific areas along the rivers. This has increased the viable habitat for the beetle.

Special recovery efforts needed: Protect the only known VELB colonies; conduct further research on life history and habitat requirements of VELB; survey areas in Central Valley of California to locate additional colonies; formulate management plans as appropriate information on VELB's biology becomes available; establish VELB at rehabilitated habitat sites within present-day range; monitor VELB colonies to determine population status and success of management actions as implemented; increase public awareness of VELB through educational and information programs. Studies on the physiological requirements of the beetle and of the elderberry plants are needed.

REFERENCES FOR ADDITIONAL INFORMATION:

Arnold, R. A. 1984. Interim report for contract C-616 with the California Department of Fish and Game. 14 pp.

Burke, H.E. 1921. Biological notes on *Desmocerus*, a genus of roundhead borers, the species of which infests various elders. J. Econ. Ent. 14:450-452.

Craighead, F.C. 1923. North American cerambycid larvae. A clarification and the biology of North American cerambycid larvae. Can. Dept. Ag., Ottawa. Bull. 27. 239 pp.

ATTACHMENT II

DRAFT

FEASIBILITY COST SHARING AGREEMENT

-DRAFT-

**FEASIBILITY COST SHARING AGREEMENT
BETWEEN THE UNITED STATES OF AMERICA
AND
THE CITY OF SACRAMENTO
FOR THE MAGPIE CREEK, CALIFORNIA INVESTIGATION**

THIS AGREEMENT, 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 Agreement, and the City of Sacramento (hereinafter called the "Sponsor"),

WITNESSETH, that

WHEREAS, the Congress has authorized the Corps of Engineers to conduct studies of flood control pursuant to the continuing authority provided by Section 205 of the 1948 Flood Control Act, as amended, (33 USC 701s), and

WHEREAS, the Corps of Engineers has conducted a preliminary study of flood problems of Magpie Creek, California, pursuant to Section 205 of Public Law 80-858, hereinafter referred to as the "Reconnaissance Phase Study", pursuant to this authority, and as determined that further study in the nature of a "Feasibility Phase Study" (hereinafter called the "study") is required to complete the determination of the extent of the Federal interest in participating in a solution to the identified problems; and

WHEREAS, the Sponsor has the authority and capability to furnish the co-operation hereinafter set forth and is willing to participate in study cost sharing and financing in accordance with the terms of this agreement; and

WHEREAS, the Sponsor and the Government both understand that entering into this agreement in no way obligates either party to implement a project and that whether a project is supported for authorization and budgeted for implementation depends upon the outcome of this feasibility study and whether the proposed solution is consistent with the Principles and Guidelines and with the budget priorities of the Administration and that at the present time, favorable budget priority is being assigned to projects providing primarily commercial navigation and flood or storm damage reduction outputs; and

WHEREAS, the Water Resources Development Act of 1986 (P.L. 99-662) specifies the cost sharing requirements applicable to the study;

NOW THEREFORE, the parties agree as follows:

ARTICLE I - DEFINITIONS

For the purposes of this Agreement:

a. The term "Study Cost" shall mean all disbursements by the Government pursuant to this Agreement, whether from Federal appropriations or from funds made available to the Government by the Sponsor, and all Negotiated Costs of work performed by the Sponsor pursuant to this Agreement. Such costs shall include but not be limited to: labor charges; direct costs; overhead expenses; supervision and administration costs; and contracts with third parties, including termination or suspension charges; and any termination or suspension costs (ordinarily defined as those costs necessary to terminate ongoing contracts or obligations and to properly safeguard the work already accomplished) associated with this Agreement.

b. The term "Study Period" shall mean the time period for conducting the Study, commencing with the issuance of initial Federal feasibility funds following the execution of this Agreement, and ending with the Chief of Engineers' acceptance of the study.

c. The term "Negotiated Cost" is the fixed fee for a work item to be accomplished by the sponsor as in-kind services as specified in the Initial Project Management Plan incorporated herein and which is acceptable to both parties.

ARTICLE II - OBLIGATIONS OF PARTIES

a. The Sponsor and the Government, using funds contributed by the Sponsor and appropriated by the Congress, shall expeditiously prosecute and complete the Study, currently estimated to be completed in 24 months from the date of this Agreement, substantially in compliance with Article III herein and in conformity with applicable Federal laws and regulations, the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, and mutually acceptable standards of engineering practice.

b. The Government and the Sponsor shall each contribute, in cash and in-kind services, fifty (50) percent of all Study Costs, which total cost is currently estimated to be $946,000, as specified in Article IV herein; provided, that the Sponsor may, consistent with applicable Federal statues and regulations, contribute up to 25 percent of the Study Costs as in-kind services; provided further, the Government shall not obligate any cash contribution by the Sponsor toward Study Costs until such cash contribution has actually been made available to it by the Sponsor.

c. No Federal funds may be used to meet the local sponsor share of study costs under this Agreement unless the expenditure of such

funds is expressly authorized by statute as verified by the granting agency.

d. The award of any contract with a third party for services in furtherance of this Agreement which obligates Federal appropriations shall be exclusively within control of the Government. The award of any contract by the Sponsor with a third party for services in furtherance of this Agreement which obligates funds of the Sponsor and does not obligate Federal appropriations shall be exclusively within the control of the Sponsor, but shall be subject to applicable Federal statutes and regulations.

e. The Government will not continue with the Study if it determines that there is no solution in which there is a Federal interest or which is not in accord with current policies and budget priorities unless the Sponsor wishes to continue under the terms of this Agreement and the Department of Army grants an exception. If a study is discontinued, it shall be concluded according to Article XII and all data and information shall be made available to both parties.

g. The Sponsor may wish to conclude the Study of it determines that there is no solution in which it has an interest or which is not in accord with its current policies and budget priorities. When such a case exists the study shall be concluded according to Article XII and all data and information shall be made available to both parties.

ARTICLE III - INITIAL PROJECT MANAGEMENT PLAN

Appendix A, the Initial Project Management Plan, is hereby incorporated into this Agreement. The parties to this Agreement shall substantially comply with the Initial Project Management Plan in prosecuting work on the Study. The following modifications, to be approved by the Executive Committee, shall require an amendment to this Agreement:

a. any modification which increases the total Study Costs. (see Appendix A);

b. any extension of the completion schedule for a Study work item of more than thirty (30) days (see Appendix A); or

c. any reassignment of work item between the Sponsor and the Government (see Appendix A).

ARTICLE IV - METHOD OF PAYMENT

a. The Government shall endeavor to obtain during each fiscal year the appropriation for that fiscal year at least in the amounts specified in the Initial Project Management Plan incorporated herein. Subject to the enactment of Federal appropriations and the allotment of funds to the Contracting Officer, the Government shall then fund the Study at least in the amounts specified in the Initial project Management Plan herein.

b. The Sponsor shall endeavor to obtain each Government fiscal year the cash contribution for that Government fiscal year at least in the amounts specified in the Initial Project Management Plan incorporated herein and, once it has obtained funds for a cash contribution, shall make such funds available to the Government. The Government shall withdraw and disburse funds made available by the Sponsor subject to the provisions of this Agreement.

c. Funds made available by the Sponsor to the Government and not disbursed by the Government within a Government fiscal year shall be carried over and applied to the cash contribution for the succeeding Government fiscal year; provided, that upon study termination any excess cash contribution shall be reimbursed to the Sponsor after a final accounting, subject to the availability of appropriations, as specified in Article XII herein.

d. Should either party fail to obtain funds sufficient to make obligations or cash contributions or to incur Study Costs in accordance with the schedule included in the initial project Management Plan incorporated herein, it shall at once notify the Executive Committee established under Article V herein. The Executive Committee shall determine if the Agreement should be amended, suspended, or terminated under Article XII herein.

ARTICLE V - MANAGEMENT AND COORDINATION

a. Overall study management shall be the responsibility of an Executive Committee consisting of:

Col. Laurence R. Sadoff, Corps of Engineers,
District Engineer, Sacramento District

Walter Yep, Chief, Planning Division
Sacramento District

Don Dodge, Deputy Director, Public Works
City of Sacramento

Col. James F. Wilson, Base Commander
McClellan Air Force Base

b. To provide for consistent and effective communication and prosecution of the items in the Initial Project Plan, the Executive Committee shall appoint representatives to serve on a Study management Team.

c. The Study management Team will coordinate on all matters relating to prosecution of the Study and compliance with this Agreement, including cost estimates, schedules, prosecution of work elements, financial transactions and recommendations to the Executive Committee for termination, suspension, or amendment of this Agreement.

d. The Study Management Team will prepare periodic reports on the progress of all work items for the Executive Committee

ARTICLE VI - DISPUTES

a. The Study Management Team shall endeavor in good faith to negotiate the resolution of conflicts. Any Dispute arising under this Agreement which is not disposed of by mutual consent shall be referred to the Executive Committee. The Executive Committee shall resolve such conflicts or determine a mutually agreeable process for reaching resolution or for termination under Article XII herein.

b. Pending final decision of a dispute hereunder, or pending suspension or termination of this Agreement under Article XII herein, the parties hereto shall proceed diligently with the performance of this Agreement.

ARTICLE VII - MAINTENANCE OF RECORDS

The Government and the Sponsor each shall keep books, records, documents and other evidence pertaining to study costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect total Study costs. The Government and the Sponsor shall maintain such books, records, documents and other evidence for inspection and audit by authorized representatives of the parties to this Agreement. Such material shall remain available for review for a period of three (3) years following the termination of this Agreement.

ARTICLE VIII - RELATIONSHIP OF PARTIES

a. The parties to this Agreement act in an independent capacity in the performance of their respective functions under this Agreement, and neither party is to be considered the officer, agent, or employee of the other.

b. To the extent permitted by applicable law, any reports, documents, data, findings, conclusions, or recommendations pertaining to the Study shall not be released outside the Executive

Committee of the Study Management Team; nor shall they be represented as presenting the views of either party unless both Parties shall indicate agreement thereto in writing.

ARTICLE IX - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, or other elected official, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE X - FEDERAL AND STATE LAWS

In acting under its rights and obligations hereunder, the local sponsor agrees to comply with all Federal and state laws and regulations, including section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88-352) and Department of Defense Directive 5500 II issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, as well as Army Regulation 600-7, entitle "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

ARTICLE XI - COVENANT AGAINST CONTINGENT FEES

The local sponsor warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement 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 local sponsor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this agreement without liability, or in its discretion , to add to the Agreement or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE XII - TERMINATION OR SUSPENSION

a. This Agreement shall terminate at the completion of the Study Period; provided, that prior to such time and upon thirty (30) days written notice, either party may terminate or suspend this Agreement without penalty.

b. Within ninety (90) days upon termination of this Agreement the Study Management Team shall prepare a final accounting of Study Costs, which shall display disbursements by the Government of Federal funds, cash contributions by the Sponsor, and credits for the Negotiated Costs of the Sponsor. Subject to the availability of funds, within thirty (30) days thereafter the Government shall reimburse the Sponsor for the excess, if any, of cash contributions and credits given over fifty (50) percent of total Study Costs.

Within thirty (30) days thereafter, the Sponsor shall provide the Government any cash contributions required so that the total Sponsor share equals fifty (50) percent of total Study Costs.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THE UNITED STATES OF AMERICA

BY _____
Laurence R. Sadoff
Colonel, Corps of Engineers
District Engineer
Contracting Officer

STUDY SPONSOR

_____
(title)

APPENDIX A - Initial Project Management Plan

APPENDIX A

INITIAL PROJECT MANAGEMENT PLAN

APPENDIX A
DRAFT
INITIAL PROJECT MANAGEMENT PLAN
MAGPIE CREEK, CALIFORNIA
SECTION 205, FEASIBILITY STUDY

OCTOBER 1991

PURPOSE AND SCOPE

The purpose of this Scope of Study is to identify, schedule, and estimate the cost of tasks and work items required for the feasibility phase of the Magpie Creek, California. The cost-sharing responsibilities will be borne by the Corps of Engineers and the City of Sacramento.

Reconnaissance studies have identified flooding problems and potential solutions. Channelization was the alternative which was selected as the potential plan for reconnaissance level studies. The alternatives and potential plans involve features on and off the McClellan Air Force Base that are hydraulically inter-related. The feasibility study cost of $946,000 wil be cost shared 50/50 by the Corps and the City of Sacramento.

FEASIBILITY STUDY PARTICIPANTS

The cost-sharing study participants include the Corps of Engineers and the City of Sacramento. Other participants will include Federal, State and local agencies, interested organizations, and individuals.

An Executive Committee will be established to resolve any conflicts and will meet only if there are unresolved issues. The Executive Committee will include the Corps District Engineer and Chief of the Planning Division or their appointed staff, the Base Commander, McClellan Air Force Base, and the Non-Federal Sponsor, or its appointed staff.

The Study Management Team, consisting of a planning engineer from the Corps of Engineers, the Air Force and the City of Sacramento, will oversee the study to ensure the establishment of desired mutual roles, interests, and study objectives. The members of the study team will coordinate the study efforts to assure compliance with governing regulations, the cost-sharing agreement the Water Resources Development Act of 1986 and other pertinent legislation.

WORK TASKS AND RESPONSIBILITIES

The feasibility report will be prepared by the Planning Division Corps of Engineers. Cash participants include the Corps and the Non-Federal Sponsor. In-kind service participant will be the non-Federal Sponsor.

The purposes of the Feasibility Report is to provide a complete presentation of study results and findings, indicate compliance with applicable statutes, executive orders and policies, and provide a sound basis for decision makers to judge the recommended solutions. The feasibility report will be prepared in accordance with ER 1105-2-100.

The following is description of the required studies and responsibilities for the accomplishment of the tasks. Corps guidance is identified for those tasks having Sponsor responsibility. A summary of these tasks, the division of in-kind services and Corps expenditures is provided in Table 1. A schedule of quarterly expenditures by task and division of responsibility are shown in Table 2.

FINANCIAL CAPABILITY

This task will be performed jointly by the Corps and the non-Federal sponsor. These studies will consist of the non-Federal sponsor's statement of financial capability and financing plan and the Sacramento District commander's assessment of the non-Federal sponsor's financial capability in order to determine the financial and legal arrangements required to implement the recommended plan and will include development of preliminary draft local cooperation agreement (LCA).

CULTURAL RESOURCES

This task entails activities required for compliance with Section 106 of the National Historic Preservation Act (PL95-515), as amended, to determine impacts, if any, on alternatives and the recommended plan upon historical, architectural and archeological resources. Records search, site visits of known pre-historic and historic sites, coordination with the State Prehistoric Preservation Office, and a cultural resources report will be prepared that outlines the cultural resources of significance and preservation efforts. This task will be performed by the Corps.

ENVIRONMENTAL

These studies to be performed by the Corps and the non-Federal sponsor are divided into several subtasks, as shown below.

1. Preparation and Circulation of Scoping Notice. - Identification of significant resources and evaluation of project impacts to these resources are key steps in determining if significant impacts would result from a proposed project. Public and agency input to this process is important to determine if an EA or EIS NEPA document is required. This activity would consist of developing a project description, identifying known significant resources and potential impacts, compiling a mailing list, and preparing and distributing the notice. (Non-Federal Sponsor prepares and Corps distributes)

2. Field Studies. - Coordination in the field with the U. S. Fish and Wildlife Service (FWS) and the California Department of Fish and Game is necessary to quantify impacts based on the final project alignment and to determine any required mitigation. (Non-Federal Sponsor)

3. Recreation Studies. - None.

4. Endangered Species Investigation. - Plants and animals are listed as threatened or endangered within the state of California and the study area. This task includes work needed to comply with the requirements of the Endangered Species Act. Activities include requesting an updated list of species from the FWS Endangered Species Office, preparing a biological Data Report and Biological Assessment addressing potential impacts of the project on listed species, and coordinating with the Endangered Species Office on potential impacts. If significant impacts are likely, formal consultation will be requested with the FWS (and additional funds requested to complete the consultation). (Non-Federal Sponsor)

5. Fish and Wildlife Coordination. - The work to be performed and the associated costs under this task item have been coordinated with the U. S. Fish and Wildlife Service (FWS). Funds will be provided to the FWS for coordination on the project as required by the Fish and Wildlife Coordination Act. (Corps and Non-Federal Sponsor)

6. Section 404 (b) (1). - Water quality impacts will be evaluated and coordinated with State and Federal water quality agencies to ensure adequate consideration. (Non-Federal Sponsor)

7. Preparation of the Draft Environmental Impact Statement. - The EIS will tie together all pertinent existing information and new data from the Detailed Project Study and provide a detailed assessment of project impacts. (Non-Federal Sponsor)

8. Coordination of EIS and Preparation of Final Documents.- The Draft EIS will be circulated to appropriate State and Federal Agencies and interested organizations and individuals. Comments

received on the draft will be addressed and the documents revised as appropriate. (Corps does circulation and document preparation and revisions by Non-Federal sponsor)

9. EIR. - The non-Federal sponsor will prepare all documentation needed solely for the EIR and perform work needed for development of an EIS/EIR document if desired by sponsor. This work is not costed to this cost-shared study. It is a non-Federal responsibility.

ECONOMICS

These studies include field inventory, analysis of data, and documentation. Field inventory work will consist of consolidating data from local and state agencies, and making field visits to update inventory of damageable properties. Types of damageable property include residential, commercial, and industrial properties; public facilities; and utilities. Damage categories include flood damage (both present and future), traffic disruption, and savings in flood proofing. Analysis of data will include computer work to generate results from the field inventory. Documentation will consist of describing assumptions, methods, and conclusions for the economic analysis as well as generating the appropriate tables and graphs in report format. Land use maps of the watershed for the present and future (year 2045) condition will be prepared. This task is to be performed by the Corps.

HYDROLOGY

Hydrologic Office Report, Dry Creek, Placer and Sacramento Counties, prepared in 1985 by the Corps of Engineers includes data on Magpie Creek. Additional detailed studies have been conducted for the City of Sacramento by a consultant. The 1985 Corps and City's consultants results were used in the Reconnaissance Report. The non-Federal sponsor will develop all hydrologic information and perform all studies needed for Don Julio Creek, Magpie Creek to its junction with Magpie Creek Diversion Channel, Robla Creek and original Magpie Creek below the Diversion Channel. A hydrology report will be prepared and coordinated between the Corps and the City of Sacramento. The Sacramento District is to review the work by the City and the hydrology report and obtain Division certification.

HYDRAULIC DESIGN

The consultant for the City of Sacramento has developed a HEC 2 model of Magpie Creek for existing conditions and for a number of improved channel conditions. During the feasibility phase the HEC 2 model will be certified by the Corps and used for pre-project and project condition studies. In collaboration with design and Geotechnical personnel the existing channel capacity throughout the study area will be established by the Sacramento District. The non-Federal sponsor will perform hydraulic studies for further evaluation of alternatives and optimization studies. The Sacramento

District will perform all hydraulic design studies for the NED/selected plan. The hydraulic studies will include determination of hydraulic design parameters, sediment transport, addressing upstream impacts, freeboard, impacts of exceeding design event and preparing an office report.

SURVEYS

For Feasibility level design and cost estimate for the selected plan, accurate ground data and survey control need to be provided. The non-Federal sponsor has prepared topographic surveys of the proposed plan channel alignment. Additional surveys of over 40,000 feet of channel, stream thalweg elevations, and bridge section surveys are needed. These surveys will be performed by the non-Federal sponsor. The Corps will perform channel surveys of original Magpie Creek below Magpie Creek Diversion Channel and limited surveys of lower Robla Creek.

FLOOD PLAINS

This task item includes preparing hydraulic studies necessary to evaluate channel capacity; determine 50-year, 100-year, 200-year, and 500-year flood plains; plotting flood plains on USGS quadrangle sheets on a scale of 1"=1000' or larger, and preparing an office report. This task will be performed by the Corps.

DESIGN AND ESTIMATES

This task item includes project engineering design; drafting of plates and figures showing the plan, profile, and sections; quantity take-off; cost estimating; documentation; reproduction; construction scheduling, and a site visit. Code of Account Cost estimates shall be prepared for two alternatives at three levels of protection each and M-CACES cost estimate shall be prepared for the NED or recommended plan, if required. This task, including preparation of the "Basis of Design" report, shall be performed by the Corps.

REAL ESTATE

This task will consist of Corps review of the Sponsor obtaining Right-of Entry's as determined necessary by the Corps of Engineers Real Estate Division. The Corps Real Estate Division will produce ownership mapping, determine the estates to be acquired and establish a project acquisition boundary take line.

The Sponsor will provide a Feasibility Design level cost estimate for the Lands, Easements, Rights-of Way, and Relocations (LERR's) for all project lands including McClellan AFB, in the format prescribed by the Corps Real Estate Division. The Corps Real Estate Division will be responsible for the review and approval of the LERR

Cost Estimate and preparation of a Real Estate Supplement (RES) for inclusion in the Feasibility Report.

SOILS AND MATERIALS

This task includes a visit to the field by Geotechnical personnel to assess the subsurface soil profile; assess the potential borrow material for use in the levee; conduct sampling and exploration program of the study area at bridges and concrete channel sections; explorations to include drilling; laboratory test for classification, direct shear strength, and consolidation; prepare, issue and monitor contract and prepare Geotech office report. This task will be performed by the Corps.

STUDY MANAGEMENT

This task will be shared by the Corps and the non-Federal sponsor. This task includes all activities related to study management such as scheduling, managing and monitoring assigned work items as required, reviewing results and reports provided by the technical support staffs, and coordinating with other offices. Also included are budget preparation, correspondences, and inter-agency coordination.

PLAN FORMULATION

The potential plan has been identified during the Reconnaissance study. During the Feasibility stage, we will address alternative measures, formulate mitigation measures, identify the NED plan and, in conjunction with the non-Federal Sponsor, identify a locally preferred plan, if different from the NED Plan. Non-Structural measures will be considered.

REPORT PREPARATION

This task will primarily be the responsibility of the Corps. The non-Federal Sponsor will provide information of the report related to the city's work efforts and be responsible for local interest review and comments.

This task includes assembling pertinent data, writing, editing, drafting, reviewing, revising, reproducing, and distributing the draft and final feasibility reports.

This task also includes work items necessary to support the review process, including answering comments, attending certain meetings, and making minor report revisions.

PUBLIC COORDINATION

The Corps recognizes the importance of good public coordination for water resources projects. The Corps will look to the city for lead in this area and will support any related city functions.

REVIEW CONTINGENCY

The review contingency is estimated at about 5 percent of the total feasibility phase study cost.

FEASIBILITY STUDY COST ESTIMATE

All feasibility phase study costs are required to be cost shared between the Corps and the non-Federal sponsor which may provide up to half of its cost share as in kind service. Table 1 outlines the tasks to be performed, the estimated cost of each task (which includes indirect and overhead costs), and study obligations for the Corps and the non-Federal Sponsor. The items on this table were negotiated by the study management team, and the study items were allocated accordingly. The value of services was based on equivalent government cost.

FEASIBILITY STUDY SCHEDULE

It is currently estimated that the feasibility study can be completed in 24 months.

DRAFT

TABLE 1

FEASIBILITY STUDY COST ESTIMATE

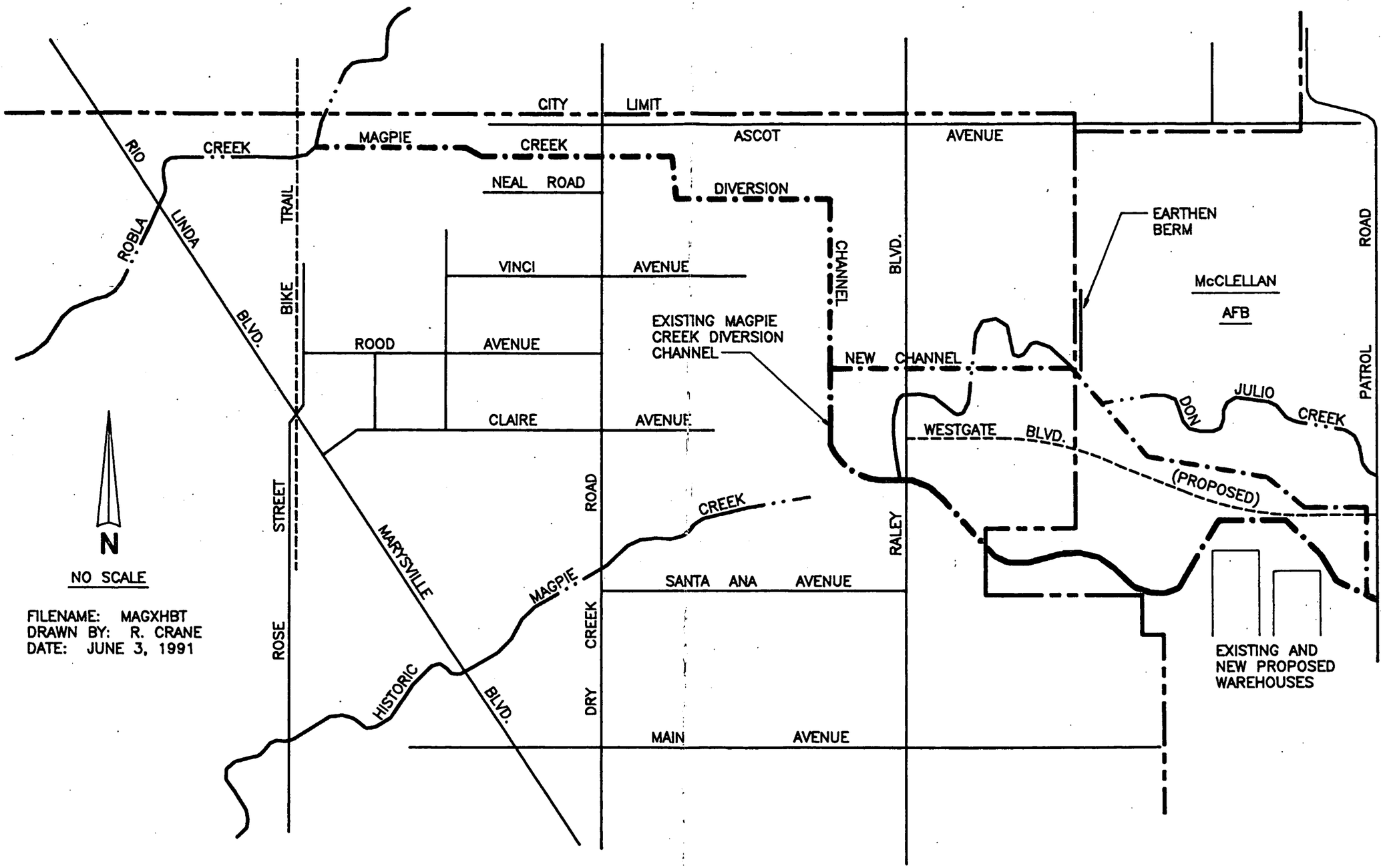
MAGPIE CREEK, CALIFORNIA, SECTION 205

TASK	TOTAL COST	CORPS EXPENDITURES	SPONSOR'S IN-KIND SERVICE
Financial & Capability	$5,000	$2,200	$2,800
Environmental Studies	130,000	40,800	$89,200
Economic Studies	58,000	58,000	—
Hydrology	73,000	3,000	70,000
Hydraulic Design	160,000	135,000	25,000
Flood Plains	42,000	42,000	—
Surveys	50,000	40,000	10,000
Cost Estimates	22,000	22,000	—
Real Estate	50,000	30,000	20,000
Soils and Materials	88,000	88,000	—
Design	88,000	80,000	8,000
Study Management	50,000	45,000	5,000
Plan Formulation	80,000	80,000	—
Report Preparation	25,000	20,000	5,000
Public Involvement	5,000	3,500	1,500
Review Contingency	20,000	20,000	—
SUB-TOTAL		$709,500	$236,500
TOTAL	$946,000		

Federal Section 205 Contribution	$473,000
Non-Federal In-Kind Work Contribution	$236,500
Non-Federal Cash Contribution	$236,500
Total Estimated Study Cost	$946,000

TABLE 2
MAGPIE CREEK
FEASIBILITY STUDY SCHEDULE
WITH QUARTERLY EXPENDITURES
($1,000)

TASK	1ST QUARTER			2ND QUARTER			3RD QUARTER			4TH QUARTER			5TH QUARTER			6TH QUARTER			7TH QUARTER			8TH QUARTER			9TH QUARTER			TOTAL EXPENDITURES
MILESTONE												F-3			F-4		F-5	F-5A			F-6	F-7			F-8			
Financial Capability *(In-Kind Service)*															$0.8 *$1.0*	$0.5 *$0.6*	$0.5 *$0.6*	$0.4 *$0.6*										$2.2 *$2.8*
Environmental Studies *(In-Kind Service)*	*$6.0*	*$6.0*	*$6.0*	*$6.0*	*$6.0*	*$6.0*	$3.1 *$6.0*	$3.1 *$6.0*	$3.1 *$6.0*	$3.0 *$6.0*	$3.0 *$6.0*	$3.0 *$6.0*	$3.0 *$5.8*	$3.0 *$5.7*	$3.0 *$5.7*	$1.5	$1.5	$1.5	$1.5	$1.5	$1.5	$1.5	$1.5	$1.5				$40.8 *$89.2*
Economic Studies *(In-Kind Service)*									$10.0	$14.3	$14.3	$14.4						$3.0	$2.0									$58.0 *$0.0*
Hydrology *(In-Kind Service)*	$0.2 *$17.5*	$0.2 *$17.5*	$0.3 *$17.5*	$0.3 *$17.5*														$1.0	$1.0									$3.0 *$70.0*
Hydraulic Design *(In-Kind Service)*	$4.3	$4.3	$4.4			$23.4 *$5.0*	$23.4 *$5.0*	$23.4 *$5.0*	$23.4 *$5.0*	$23.4 *$5.0*								$3.0	$2.0									$135.0 *$25.0*
Flood Plains *(In-Kind Service)*					$7.0	$8.0	$11.0	$11.0										$3.0	$2.0									$42.0 *$0.0*
Surveys *(In-Kind Service)*			$12.0 *$3.5*	$12.0 *$3.5*	$11.0 *$3.0*													$3.0	$2.0									$40.0 *$10.0*
Cost Estimates *(In-Kind Service)*			$2.0							$5.0	$5.0	$5.0	$5.0															$22.0 *$0.0*
Real Estate *(In-Kind Service)*			$2.0 *$1.0*	$2.0 *$1.0*					$9.0 *$6.0*	$8.0 *$6.0*	$6.0 *$6.0*							$3.0	$2.0									$30.0 *$20.0*
Soils and Materials *(In-Kind Service)*			$20.0	$13.0	$13.0	$14.0	$23.0											$3.0	$2.0									$88.0 *$0.0*
Design *(In-Kind Service)*		$4.5 *$0.5*	$4.5 *$0.5*	$5.6 *$0.8*	$5.7 *$0.8*	$5.7 *$0.8*	$9.0 *$0.8*	$9.0 *$0.8*	$9.0 *$0.8*	$7.3 *$0.8*	$7.3 *$0.7*	$7.4 *$0.7*						$3.0	$2.0									$80.0 *$8.0*
Study Management *(In-Kind Service)*	$1.8 *$0.3*	$1.7 *$0.3*	$1.7 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$1.8 *$0.3*	$2.0 *$0.2*	$2.0 *$0.2*	$2.0 *$0.2*	$2.0 *$0.2*	$2.0	$2.0	$2.0	$2.0	$2.0	$2.0				$45.0 *$5.0*
Plan Formulation *(In-Kind Service)*	$3.3	$3.3	$3.4	$3.3	$3.3	$3.4	$3.3	$3.3	$3.4	$3.3	$3.3	$3.4	$3.3	$3.3	$3.4	$3.3	$3.3	$3.4	$3.3	$3.3	$3.4	$3.3	$3.3	$3.4				$80.0 *$0.0*
Report Preparation *(In-Kind Service)*																$3.5 *$0.5*	$3.5 *$0.5*	$3.5 *$0.5*	$1.6 *$0.5*	$1.6 *$0.6*	$1.6 *$0.6*	$1.6 *$0.6*	$1.6 *$0.6*	$1.5 *$0.6*				$20.0 *$5.0*
Public Involvement *(In-Kind Service)*	$0.6 *$0.1*	$0.7 *$0.2*	$0.7 *$0.2*																	$0.5 *$0.2*	$0.5 *$0.3*	$0.5 *$0.5*						$3.5 *$1.5*
Review Contingency *(In-Kind Service)*																									$6.6	$6.7	$6.7	$20.0 *$0.0*
Subtotal (CORPS)	$10.2	$14.7	$51.0	$38.0	$41.8	$56.3	$74.6	$51.6	$59.7	$84.1	$40.7	$35.0	$13.1	$8.1	$9.2	$10.8	$10.8	$32.8	$23.4	$8.9	$9.0	$8.9	$8.4	$8.4	$6.6	$6.7	$6.7	$709.5
Subtotal (IN-KIND)	*$23.9*	*$24.5*	*$29.0*	*$29.1*	*$10.1*	*$12.1*	*$12.1*	*$12.1*	*$18.1*	*$18.1*	*$13.0*	*$7.0*	*$6.1*	*$6.0*	*$6.9*	*$1.3*	*$1.3*	*$1.3*	*$0.5*	*$0.8*	*$0.9*	*$1.1*	*$0.6*	*$0.6*	*$0.0*	*$0.0*	*$0.0*	*$236.5*
TOTAL	$34.1	$39.2	$80.0	$67.1	$51.9	$68.4	$86.7	$63.7	$77.8	$82.2	$53.7	$42.0	$19.2	$14.1	$16.1	$12.1	$12.1	$34.1	$23.9	$9.7	$9.9	$10.0	$9.0	$9.0	$6.6	$6.7	$6.7	$946.0



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POTENTIAL PLAN - MAGPIE CREEK