Volume III - Appendix M

ORANGE COUNTY WATER DISTRICT APPLICATION TO APPROPRIATE SANTA ANA RIVER WATER

Recirculated Draft Program Environmental Impact Report
SCH # 2002081024

Prepared for:
Orange County Water District

March 2006

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Volume III
Administrative Appendices

Volume III contains an administrative record of prior environmental assessments prepared pursuant to CEQA for OCWD's diversion and recharge facilities on the SAR.

Appendix M

OCWD Environmental Review Documents for Santa Ana River Facilities and Operations

This new appendix contains copies of environmental review documents for OCWD facilities and operations on the SAR. The contents of this appendix are listed below:

- Appendix M-1. 1972: Santa Ana River between Ball Road and Imperial Highway, EIR
- Appendix M-2. 1975: OCWD's Proposed Acquisition of Land for Development of Additional Off-channel Water Spreading Grounds, DEIR
- Appendix M-3. 1976: Burris Pit Water Conservation Facility, FEIR
- Appendix M-4. 1986: Santiago Creek Replenishment Program Pump Station and Pipeline, Initial Study/Traffic Study
- Appendix M-5. 1991: Initial Study and Negative Declaration for Santa Ana River Rubber Dam and Bypass Project
- Appendix M-6. 1992: Prado Dam Operation for Water Conservation Final Report and EIS
- Appendix M-7. 2000: Santiago Creek Recharge Turnout, Negative Declaration
- Appendix M-8. 2000: River Trails Recharge Basin, Mitigated Negative Declaration
- Appendix M-9. 2002: Santiago Pits Pump Station, Negative Declaration
- Appendix M-10. 2004: Prado Basin Water Conservation Feasibility Study, Main Report and Draft EIS/EIR

ESA

Appendix M-1

1972: Santa Ana River between Ball Road and Imperial Highway, EIR

santa ana river

BETWEEN BALL ROAD AND IMPERIAL HIGHWAY

prepared for
orange county flood control district

environmental impact report

MAY, 1972

KOEBIG & KOEBIG, INC.

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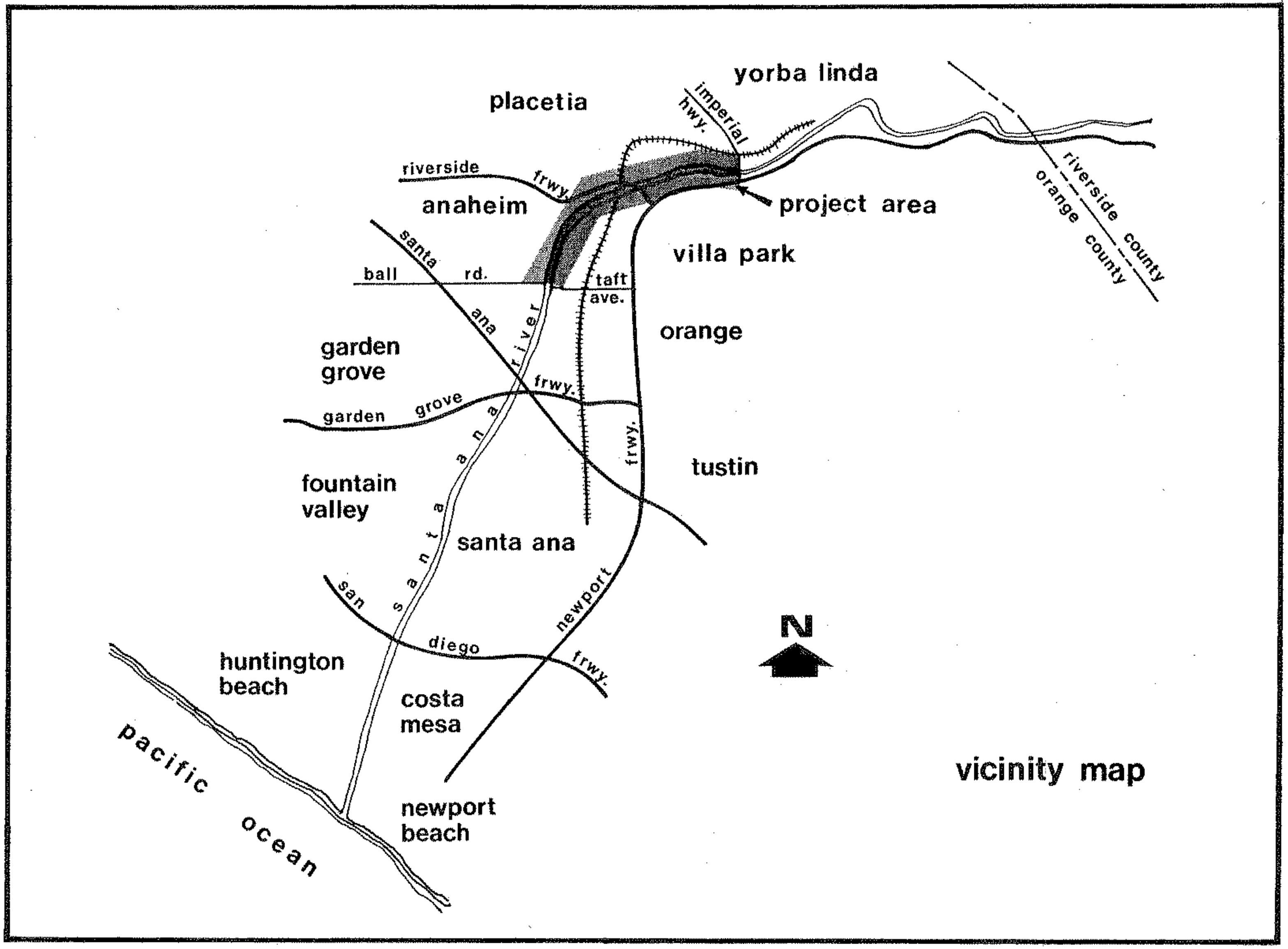
introduction


yorba linda
placetia
imperial hwy.
riverside frwy.
anaheim
project area
villa park
riverside county
orange county
santa ana frwy.
ball rd.
taft ave.
orange
garden grove
santa ana river
garden grove frwy.
fountain valley
tustin
santa ana
san diego frwy.
newport frwy.
N
huntington beach
costa mesa
pacific ocean
newport beach
vicinity map

major environmental objectives and their implementation

The purpose of the National Environmental Policy Act of 1969 - Public Law 91-190, 83 Stat. 852 (1970) - is to fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; assure safe, healthful, productive, and esthetically and culturally pleasing surroundings; attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice; achieve a balance between population and resource use which permits a high standard of living and a wide sharing of life's amenities; and enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

To implement these major environmental objectives requires (1) a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment; (2) identification and development of methods and procedures which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making, along with economic and technical considerations; and (3) preparation of a detailed statement relating to the environmental impact of the proposed project, any adverse environmental effects which cannot be avoided should the project be implemented, alternatives to the proposed project, relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources which would be involved in the proposed project should it be implemented. The Santa Ana River Project is not subject to the requirements of the National Environmental Policy Act of 1969. The project, however, must comply with the State of California Environmental Quality Act of 1970, which is similar to the Federal Act in its requirements, and in addition, mandates the consideration of measures to mitigate negative environmental factors.

characteristics and conditions of existing environment

The proposed project represents a small segment of the overall physical flood protection and environmental enhancement features either existing or proposed for the Santa Ana River and contiguous areas. Even though the proposed project may be limited in extent, it definitely affects the environment of both the upstream and downstream reaches of the Santa Ana River. Therefore, the existing conditions and physical features along the Santa Ana River are briefly described herein.

The Santa Ana River originates in the San Bernardino Mountains and flows some 69 miles, traversing San Bernardino, Riverside, and Orange Counties, before discharging into the Pacific Ocean between Newport Beach and Huntington Beach. Historically, storm flows have left the confines of the Santa Ana River and caused widespread damage to property and loss of life, as documented by the 1938 storm.

Located approximately 32 miles from the Pacific Ocean in Riverside County, near the Orange County boundary, is Prado Dam, which was constructed by the Corps of Engineers in 1941. This dam was designed as a flood protection type of facility which would reduce the anticipated flood peak of 200,000 second-feet to about 9,300 second-feet. However, since the original design and construction of Prado Dam, due to the population explosion and development of new method-

1938 Flood.

ology in computing runoff, this dam, together with downstream channelization, may be inadequate by current criteria to sustain a major flood. The Corps of Engineers presently is preparing a study which includes raising the height of Prado Dam, increasing the capacity of the gated outlets to discharge 20,000 second-feet or more, and widening of channels along the Santa Ana River. Their study, scheduled to be completed in 1973, will consider the various alternatives. With the maximum discharge being considered, a channel of about 1,000 feet wide may be necessary, which appears to be impractical due to the number of homes required to be relocated. It appears that a compromise solution may be recommended which results in increasing the height of Prado Dam and widening of the Santa Ana River channel to some extent.

Between Prado Dam and the Pacific Ocean, there are two major confluences to the Santa Ana River. Of the two, only the Carbon Canyon Diversion Channel is within the project study area. These are: (1) Santiago Creek, entering the Santa Ana River from the east, just southerly of Garden Grove Boulevard; and (2) Carbon Canyon Diversion Channel, discharging into the Santa Ana River from the north, just westerly of Glassell Street. Santiago Creek has the greatest discharge into the Santa Ana River, amounting to about 13,000 second-feet, as contrasted with Carbon Canyon Diversion Channel's approximate discharge of 4,300 second-feet under standard project storm criteria.

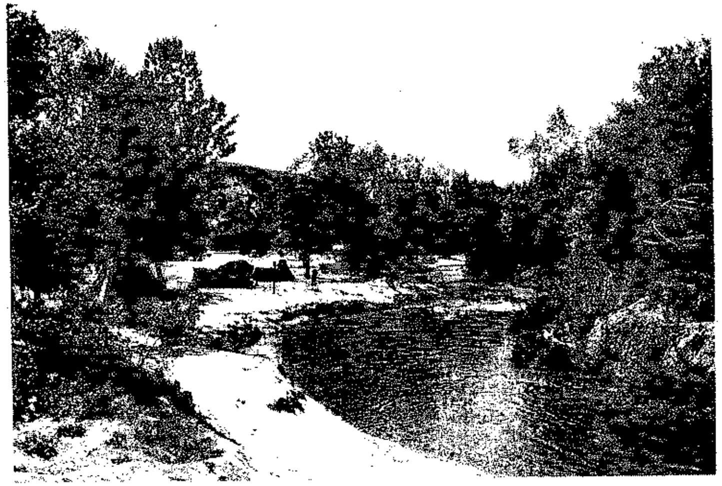
Levees exist along the Santa Ana River from the Pacific Ocean to the Metropolitan Water District's outlet, located about two and one-half miles upstream from Imperial Highway. Peak design discharges in the Santa Ana River, based on 1964 design criteria reported by Leeds, Hill and Jewett[2], is 9,200 cubic feet per second (cfs) release from Prado Dam, 29,900 cfs in the reach from the Carbon Canyon Diversion Channel to Lincoln Avenue, and 37,000 cfs below Santiago Creek. The 1969 Leeds, Hill and Jewett report shows for these same reaches, 20,000 cfs, 40,700 cfs, and 54,700 cfs, respectively, based upon design criteria established by the Corps of Engineers. The channel between these levees varies in bottom width from 127 feet to more than 1,000 feet, and in height from 12 feet to 19 feet. The slope of the channel varies from 0.0011 to 0.0038 feet per feet. Side slopes of channels vary from vertical to a slope of 3:1, with various types of revetment consisting of concrete and rock, rock, and asphalt, or in some locations virtually no protection. Bottom of channels are earth to allow for percolation of storm flows within the reach of the Santa Ana River between Katella Avenue and Imperial Highway. Further details of existing and proposed levee construction are fully described in the Leeds, Hill and Jewett reports.[2,3]

Recharging of the groundwater basin has been practiced by the Orange County Water District since its formation in 1933. One of the recharge areas used is the project area from Imperial Highway downstream to Ball Road. Other areas used are artificially constructed pits, former but worked out commercial sand and gravel pits, flood control channels, and flood control retarding basins located outside the project area but in its general vicinity. The artificially constructed pits are produced by the Water District entering into contracts with sand and gravel processors to allow excavation of sand and gravel pits which eventually are shaped for use as water spreading basins.

The first basin of this type was the Crill Basin, named for an early director of the District and now known as Anaheim Lake, located in the City of Anaheim. Management of the water conservation features of this lake is the responsibility of the Water District. Responsibility for operation of the recreational features of Anaheim Lake has been delegated to the City of Anaheim. This lake, with a water surface area of about 80 acres, also accommodates fishing and boating. The water is obtained entirely from the Metropolitan Water District.

The primary source of water for replenishment purposes is the natural flow in the Santa Ana River and streams originating in the local hills and mountains. Beginning in 1949, this primary source has been augmented by imported water obtained from the Metropolitan Water District, and what started as a simple basin replenishment activity has grown into a sophisticated program of groundwater basin management. Before the first units of the proposed project were undertaken, the spreading of both natural and imported water in the Santa Ana River was by means of a series of dikes and ponds which worked well during the summer and fall months, but were subject to extensive damage during winter storms. In those portions of the project where units of the project have been completed, temporary dikes which wash out during a major storm, are constructed within the flood channel to form ponds for water spreading and to divert water into the off-channel water spreading areas. These off-site spreading areas are not exposed to damage from storm waters and consequently are more easily and efficiently operated.

Since 1954, the Flood Control District has issued permits which allow horseback riding and hiking along portions of the Santa Ana River levee. At present, these trails extend approximately 14 miles upstream from Pacific Coast Highway to the Southern Pacific Railway Bridge northerly of Katella Avenue. As part of the continuing plan for providing environmental enhancement features along the Santa Ana River,



Featherly Park.

Featherly Park, located about 25 miles from the Pacific Ocean in Santa Ana Canyon, between the River and Gypsum Canyon Road, has been opened to the public, together with the Riverview Golf Course located between the Garden Grove Freeway and Seventeenth Street, and the privately-owned Green River Golf Course located in the flood plain within Orange and Riverside Counties. Also, the Flood Control District has begun to implement a plan for landscaping the levees. Trees, shrubs, and ground cover have been planted along the lower reaches of the Santa Ana River. The environmental enhancement plans mentioned above are compatible with the features proposed in the Santa Ana River-Santiago Creek Greenbelt Plan[4] adopted by the Orange County Board of Supervisors. As previously mentioned, Anaheim Lake was the first water spreading basin to be placed in operation to serve a multi-purpose use. This lake, opened to the public in 1969, is a semi-permanent basin which allows fishing, boating, and picnicking. Landscaping around the lake is to be accomplished by the concessionnaire from revenues set aside by the concessionnaire for this purpose. Other basins having a dual purpose of flood control and water spreading were placed in operation prior to Anaheim Lake. These basins are Miller, Placentia, Raymond, and Gilbert.

Transects of the Santa Ana River from the Pacific Ocean to Prado Dam, were recently made at one-mile intervals to determine the existence of flora and fauna. The results of the field survey are contained in a comprehensive report entitled, "*Plants and Animals of the Santa Ana River in Orange County*."[5] That report summarized the results of the survey of plants which indicated a total of 367 different species of plants attributed to this 31-mile lower portion of the river course. Also, that report summarized the results of the survey of animal life, which indicated a total of 272 species.

koebig & koebig authorization

Koebig & Koebig, Inc. was authorized by purchase order No. B44276, issued by the Orange County Flood Control District, to prepare an environmental impact study for the Santa Ana River Project from Ball Road to Imperial Highway, including the following special items:

1. Best system for water spreading for optimum conservation of natural flows consistent with flood safety and sand movement to the ocean.
2. Critique of Orange County Water District's environmental enhancement plan as it relates to the flood channel.
3. Treatment to reduce dust nuisance on completed portions.
4. Best alternative to provide maintenance roads and hiking-riding trails.
5. Effect of proposed levee construction on flora and fauna inventoried in the Marsh report.[5]

conclusions

The specific project relates to flood control construction of levees, together with reconstruction of the AT & SF Railway Bridge crossing the river between Ball Road and Imperial Highway. Therefore, this specific environmental impact statement (E.I.S.) is primarily concerned with the proposed levees and flood control channel construction features, together with the recreational trails along the levees.

Without adequate protection, a major storm could cause inundation of about 75 percent of the developed land in Orange County, resulting in damage to property and loss of life. Therefore, this specific project should proceed as scheduled since time is of the essence. Furthermore, the benefits to be derived by this project will outweigh the minor adverse impacts set forth in this report. The overall environmental impact of the project will be positive. Hiking, bicycling, and equestrian trails will add significantly to the recreational opportunities and landscaping of the levees will provide new habitat for wildlife and aesthetic enjoyment by man.

In addition to the above flood control E.I.S. considerations, this report also discusses the environment impacts related to recreational concepts presented in a report entitled, *"Environmental Enhancement Plan - Middle Santa Ana River Greenbelt."*

In the overall recreational plan, the facilities associated with flood control features are integrated closely with the facilities associated with water conservation features. It is virtually impossible to treat the recreational aspects related to one of these primary uses without also considering the other. The overall recreational plan, however, is still in a conceptual stage and must therefore be treated generally. It is obviously beyond the scope of this report to treat each of virtually endless possibilities within the conceptual plan in sufficient detail to answer all the questions that may be raised. Such an analysis must necessarily await proposal of a specific recreational alternative.

description of proposed project

objectives

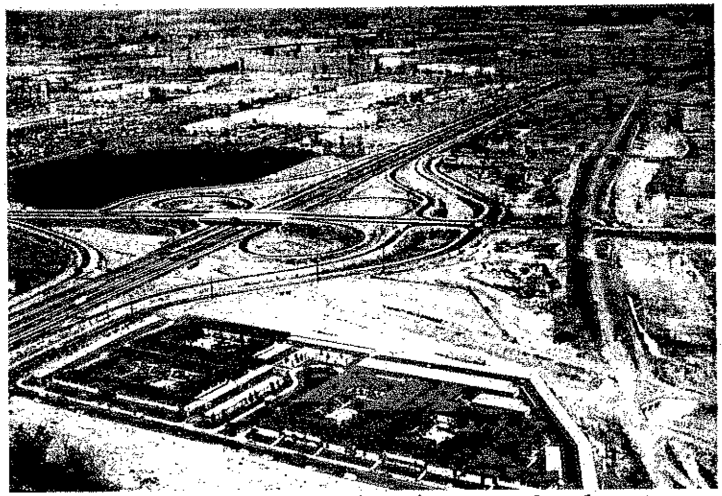
The major objective at this time is to complete the construction of the Santa Ana River levees located between Lincoln Avenue and Imperial Highway, for which definitive plans are being developed. This will be a joint project by the Orange County Water District and the Orange County Flood Control District, with the Flood Control District administering the plans and construction, and furnishing over 90 percent of the required funds. Secondly, the water spreading operations conducted by the Orange County Water District, together with the associated environmental enhancement features also will be considered as part of the proposed project due to their interfacing. Thirdly, the preliminary environmental enhancement plan prepared by Banks[6] for the reach of the Santa Ana River from Ball Road to Imperial Highway will be considered as part of the proposed project due to the operation of facilities constructed within the River channel for diversion into the spreading basins.

Furthermore, construction of the proposed project should be accomplished to optimize environmental enhancement features compatible with the primary purposes of providing flood protection and recharge of the groundwater basin.

project description

general

The proposed project extends along the Santa Ana River from Ball Road to Imperial Highway, a distance of about six miles. About two-thirds of the flood protection has been completed. Remaining to be completed is the other one-third of the flood channel and all of the landscaping and trail construction, as shown on Plate A. Completion of present plans for containment of storm flows within this reach of the River requires the construction of a northerly rock revetted levee between Carbon Canyon Diversion Channel and Jefferson Street, and both a northerly and southerly rock revetted levee between Lakeview Avenue and Imperial Highway, together with reconstruction of the AT & SF Railway Bridge. This levee



Confluence of Carbon Canyon Diversion Channel and Santa Ana River.

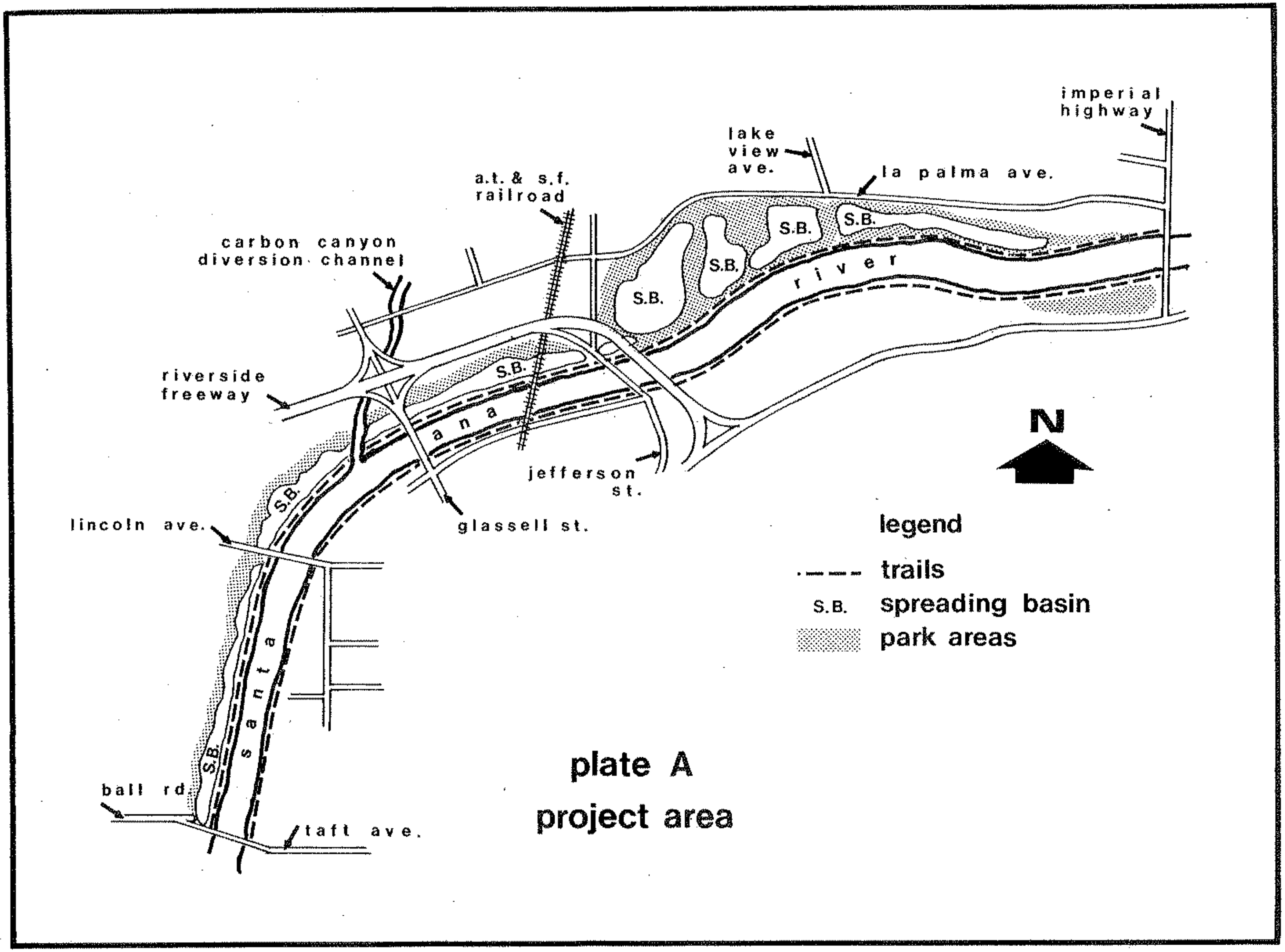
work must be accomplished first in order to provide flood protection and additional water spreading facilities, followed by construction of the important environmental enhancement features.

The Orange County Water District has at its disposal three sources of water available for recharge of the groundwater basin. These are: (1) subsurface inflow; (2) storm flows; and (3) imported water purchased from the Metropolitan Water District. Although it is most prudent for the Water District to conserve storm flows to the extent of minimizing the cost of the imported water supply, it is more important to prevent the adverse impact of an overdrafted groundwater basin. Hence, the necessity for providing permanent water spreading basins for conservation of local water supplies.

flood protection channelization

The history of the project's evolution is discussed under Alternatives to the Proposed Project, hereinafter.

Flood protection facilities planned for construction along the Santa Ana River will consist essentially of levee con-


imperial highway
lake view ave.
la palma ave.
a.t. & s.f. railroad
carbon canyon diversion channel
riverside freeway
S.B.
S.B.
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S.B.
S.B.
S.B.
S.B.
river
ana
santa
jefferson st.
glassell st.
lincoln ave.
ball rd.
taft ave.
N
legend
trails
S.B. spreading basin
park areas
plate A
project area

struction, together with drop structures. With the completion of levee construction within the reach of the Santa Ana River from Ball Road to Imperial Highway, a major portion of the water spreading basins of the Orange County Water District will be protected from the ravages of storms due to their physical separation from the river channel. It should be emphasized that the flood channel itself will act as recharge facility by virtue of its unpaved bottom.

Capacity of the designed channel within the study reach will vary from 36,400 second-feet to 41,700 second-feet, with velocities varying between 10 feet per second to 14 feet per second. The channel will consist of a trapezoidal section with a 320-foot-wide natural earth bottom, side slopes of 2:1, with rock protection on the channel side slopes, and a height of 13 to 19 feet from bottom of channel to top of levee to accommodate a designed normal flow depth of 8 to 11 feet. Channel slope will be about 0.0021, designed on the basis of 50 percent sediment load, as recommended in the Leeds, Hill and Jewett reports.[2,3] Crown width of levees will be approximately 21 feet. It is estimated that the channel will provide protection from floods in the 80-100 year recurrence range under existing conditions. Modification of Prado Dam, as recommended by Orange County interests, will bring the protection level of the proposed project to the standard project level.

artificial recharge

general

There are many methods available, depending on hydrologic, cultural, topographic, geologic, and soil conditions to accomplish artificial recharge, which can be defined as increasing the infiltration of precipitation or surface flows into groundwater basin(s) by artificially changing natural conditions. These methods can consist of percolation basins, utilization of river bed, ditches, pits, injection wells, or flooding. The two methods presently being used by the Orange County Water District, utilization of abandoned sand and gravel pits and utilization of the Santa Ana River bed are practical and economical. Water spreading basins are the most desirable method of artificial recharge due to ease of operation, maintenance, and utilization of open space. Also, complete separation of basins from flood control channels is desirable in order to minimize damage to water conservation facilities. Notwithstanding the fact that conservation of storm runoff is very important to Orange County, any temporary or permanent structures installed within the flood control channel must be compatible with the primary purpose of flood protection, so as not to cause an obstruction resulting in overbank flows and consequent damage to property and loss of life.

The quality of water for water conservation is very important whether it relates to conservation within the flood control channel or within the separate water spreading basins. Water containing silt or clay is known to clog the soil pores, resulting in rapid reduction in percolation rates. The type of recharge facilities within the confines of the flood control channel should take into consideration the release of the poor quality water resulting from the initial runoff from a major storm. The standards set for water quality, as defined by McKee and Wolf, 1963, should apply to the various uses of water proposed for the project area. These uses, in addition to water recharge, would include: stock and wildlife water; propagation of fish and aquatic life; swimming and bathing; and boating and aesthetic enjoyment.

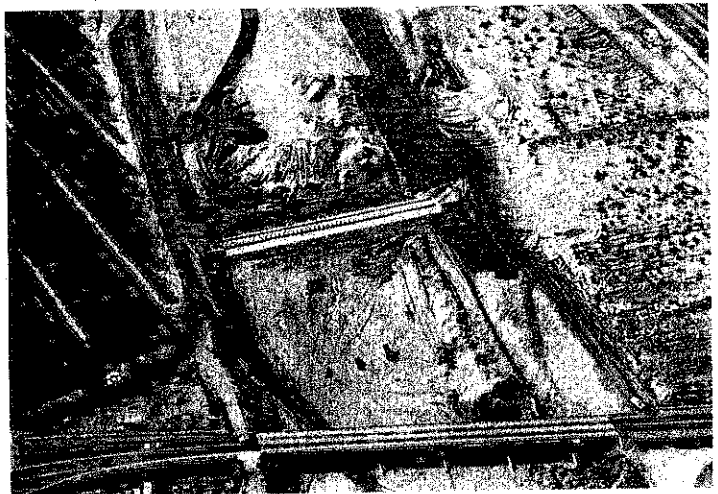
In order to transfer water from the river channel to the water spreading basins, adequate diversion facilities must be available, together with facilities at the downstream spreading basin for returning excess diverted storm flows to the Santa Ana River. Silt carry-over from the river channel will normally settle to the bottom of the spreading basins, resulting in clogging of the soil surface openings and virtual elimination of desired percolation. Thus, these basins require periodic dewatering to facilitate silt removal, operation, and maintenance. For efficient basin operation, it is best to plan an alternating wet and dry period rather than continuous water spreading. Such an alternating operation allows scarification of the basin soil surface at the conclusion of the dry period to re-open the soil pores and also provides drying time for the microbial growths to die, resulting in increased water spreading efficiency.

river channel recharge

Although definitive plans for conservation of water within the Santa Ana River channel have not been adopted by the Orange County Water District or approved by the Orange County Flood Control District, the current practice utilizes erodible sand embankment type of interior dikes up to a height of about seven feet to form holding ponds within the river channel, which allows percolation through the sandy channel bottom to the groundwater basin. These holding ponds are in the reach of channel between Ball Road and Imperial Highway. This type of facility requires rebuilding the dikes following major and many minor storm flows since they are constructed to be overtopped and will wash out. Although this practice is in no way counter productive to the flood protection purposes of the channel, a more permanent type of facility may be warranted, as discussed below and under Alternatives.

off-channel spreading basins

The Orange County Water District presently has the capability of diverting storm flows and imported water from the Santa Ana River Channel to the off-channel spreading basins. In order to obtain greater flexibility both in diverting storm flows and in basin operation and maintenance, six diversion structures are planned, of which four have been constructed. Each would be located just upstream of the six drop structures constructed by the Orange County Flood Control District. The purpose of the drop structures is to



Drop Structure - Santa Ana River, Lincoln Avenue Bridge, Spreading Beds.

prevent excessive lowering of the river channel and to serve as a control for the diversion facilities for transfer of water from the channel to the spreading basins. Presently, each temporary diversion structure includes an earth dike approximately seven feet high, extending from each of the flood control levees. In order not to obstruct storm flows in the Santa Ana River channel, these dikes are temporary facilities intended to wash out during major storm flows.

It has been pointed out by the Flood Control District and the Leeds, Hill and Jewett reports,[2,3] that the integrity of the flood control levees is in question since recent storm flows have caused erosion at the point where the dike joins the levees. If temporary dikes are to continue in use, then it would be prudent to provide additional protection to the channel levees either by utilizing larger rock revetment, grouted riprap, or providing concrete slope protection at the join point with the dike.

Recent discussions with representatives of the Orange County Water District indicate that spreading basins immediately adjacent to the center levee will have basin inverts of approximately the same elevation as the river channel. The Warner Complex and future basins will be excavated to greater depths.

Dikes constructed within the spreading basins will not exceed 15 feet in height. In any event, the Water District plans to limit the maximum water surface in these basins to about seven feet above the channel invert. One exception to this limitation would be just downstream of the flood control drop structure where the drop could be as high as nine feet, resulting in a water surface in the Water District's basins about 16 feet above the channel invert. Recent field observations revealed serious erosion of the middle levee on the basin side, undoubtedly caused by wave action. The middle levee should be made either wider or be revetted with rock on the basin side. It is important to both Districts to protect the integrity of the middle levee from failure due to piping or erosion.

environmental enhancement features

Plates B and C show diagramically a typical cross section of the Santa Ana River channel and water spreading basin, respectively. Closely associated with the construction of the

Santa Ana River channel and the water spreading basins is the conceptual plan for (1) creation of greenways, recreational areas, bicycle trails, and hiking trails along the westerly side of the spreading basins; (2) landscaping of the center levee; and (3) an equestrian trail along the easterly levee between the Southern Pacific Railroad Bridge southerly of Ball Road and Imperial Highway, a distance of about six miles. Although the primary purpose of the spreading basins is water conservation, these basins are intended for multi-purpose uses. As detailed in the Banks report,[6] which is compatible with the Santa Ana River-Santiago Creek Greenbelt Plan,[4] development of spreading basins will provide the following recreational features:

1. Imperial Woods -- a natural wooded area, with provisions for picnicking, stables, nature trail, and study area.
2. Yorba Greenway -- a semi-permanent basin connecting Warner Basin Park with Imperial Woods.
3. Warner Basin Park -- a semi-permanent basin providing boating, fishing, swimming, picnicking, and play area.
4. Peralta Greenway -- an intermittent-use basin connecting Warner Basin Park with Lincoln Lagoon, providing an active playground.
5. Lincoln Lagoon -- a semi-permanent basin providing boating, swimming, and picnicking.
6. El Parque Del Rio -- a semi-permanent basin providing fishing and picnicking.
7. Sandy Ridge Greenway -- an intermittent-use basin connecting Lincoln Lagoon with its terminus southerly of Ball Road.
8. Anaheim Lake -- a remote-located, semi-permanent basin which commenced operations in 1969, providing boating, fishing, and picnicking.

"Semi-permanent" basins are basins designed to be used continuously for intended uses, except for planned maintenance and operation outages or due to the shortage of water.

Intermittent-use basins are basins which may not always have water for recreational activity. When a shortage of water occurs, it is assumed that supplemental water could be made available via the Metropolitan Water District facilities.

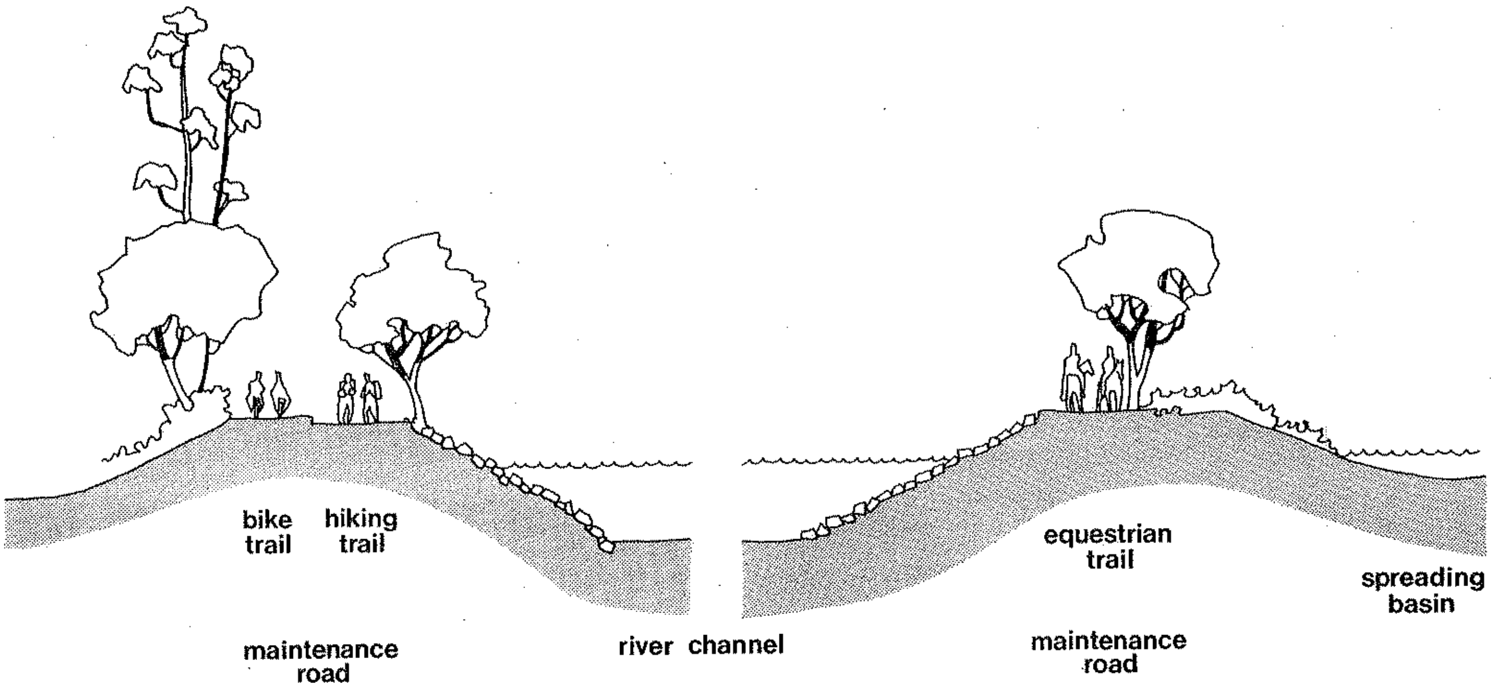
environmental impact of proposed project

In order to assess the environmental impacts of the separate actions which comprise the project, viz., flood control channelization, water spreading facilities, and environmental enhancement features, it is helpful first to generally describe the areas of environmental consideration.

The Santa Ana River channel between Imperial Highway and Ball Road is, and historically has been, in a mode of constant flux in terms of stream flows. The river has always been of a seasonal nature with periods of summer low flow and fall or winter flooding or highwaters.

Topography Upstream from Study Area.

plate B
typical cross section



Man has influenced the river water in a number of ways. He has controlled flood surge by the construction of Prado Dam, polluted its content with domestic and agricultural wastes, and disrupted its course and flow with controlled channelization and groundwater table restoration by use of water spreading basins. The largest single impact on the river was the irrigation diversion initiated in the previous century and only recently tapering off in response to urbanization or orange groves.

The segment of the river which was included in the project area was divided into four regions for study: (1) the Imperial Highway-Lakeview Avenue segment, characterized by wide-channel flow and shallow water with expanses of mudflats and sand bars; (2) the Lakeview Avenue-Jefferson Street segment, characterized by river division (by a central levee) with a flood channel on one side and a water-spreading basin normally containing water on the other; (3) the Jefferson Street-Carbon Canyon Diversion Channel segment, with characteristics similar to the first segment; and (4) the Carbon Canyon Diversion Channel-Ball Road segment, with the same basin topography as the second segment, but in a dry state.

In the cases of segments (2) and (4), above, used for water table restoration, the water is periodically diverted from the flood channel to fill the basin. The continuity of flow in the river is determined by which basin is being serviced at any given time.

areas of environmental consideration

physical resources

land features

The Santa Ana River traverses the project site, flowing generally in a northeasterly-southwesterly direction, with a slope of 16 feet per mile. Within the channel, alluvial deposits, consisting of muds, silts, gravel, and rock rubble are evident, which is a typical pattern of streams of the surrounding region. The flood plain consists of various alluvial soils, spread to the north and south of the project site in the upper reaches (above Riverside Freeway) and east and west of the site in the lower reaches (below Riverside Freeway). Flooding on the southern and eastern boundaries is limited by the Peralta Hills, which constitutes a natural boundary along this bank.

The general topography of the region is characterized by coastal foothills, with the western and northern margins consisting of reclaimed flood channel. As mentioned earlier, the only tributary of the river within the site boundaries is the Carbon Canyon Diversion Channel. Within the flood plain, between Ball Road and Imperial Highway, now protected by a levee system, the Towns of Anaheim and Orange have developed and expanded.

water

The only water available within the project area is derived from direct precipitation, which averages almost 14 inches a year; storm flows and base flows in the Santa Ana River; and imported Colorado River water and imported State Project water (future) for supplemental groundwater recharge. Since basic water quality data was not available for determination of existing or potential pollution, a water quality survey and analysis was conducted. During the course of the survey, large amounts of particulate matter, detergents, and fatty floatables were observed in the Santa Ana River water. Table I summarizes the water quality data for the study portion of the Santa Ana River. Origin of the pollutants is probably domestic sewage. A direct assessment of the origin of the inflow was not attempted. No evidence of self-purification was noted in the estimated five miles of river channel flow. The physical and chemical indicators of pollution included: high turbidity (88-140 JTU's); high nitrogen content (.28-.30 ppm nitrite - nitrogen); 9-18 ppm NO_3 - nitrogen; moderate phosphates (9-9.8 ppm ortho phosphates); and high sulfates (150-200 ppm sulfate). The water quality is probably partially responsible for the reduction in numbers of all but the most tolerant fish species.

geology and soils

Consistent with the alluvial nature of this site, deposition of materials (sands, muds, and other sediments) is very active. Combined with the region's geological activity, periods of high flood waters, and numerous landslide areas upstream from the project site, a tremendous sediment deposition has occurred of approximately 20,000 feet of sediments and rock of Tertiary and Quaternary age.* All of the surface sediments are classified as of recent origin. The original flood plain which has been subsequently developed for urban use is a Quaternary flood plain terrace.

Soils are all alluvial in nature; most of the soils within the project area are classified as sandy alluvial land, containing cobbly gravels.

**Analyses of Ground-Water System in Orange County, California By Use of an Electric Analog Model, Wm. F. Hardt and E. H. Cordes, U.S.G.U. May 1971, pg. 6.*

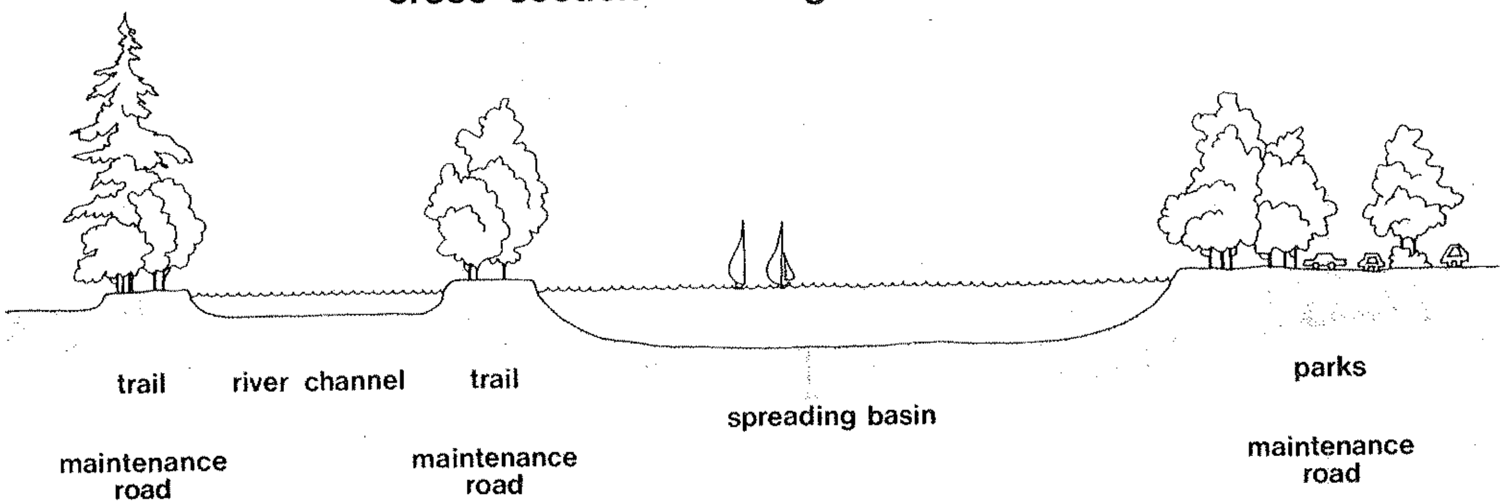
climate and weather

The climate of the region is characterized as mild, with a dominant marine influence as a result of the close proximity of the Pacific Ocean. Occasional fog or high cloudiness occur (less than 20 percent of the time). The climatic year is divided into two distinctive seasons: a warm gentle winter with maximum rainfall occurring, and a cool, dry summer. The average annual maximum monthly temperature is 75.7 degrees F.; the average annual minimum monthly temperature is 48.3 degrees F. A high of 112 degrees F. was recorded in the hottest month (June) and a low of 22 degrees F. was experienced in the coldest month (January).

Santa Ana winds, most frequent during the months of August through November, have a great influence on the site by the

plate C

cross section – looking down stream



creation of dust storms, and sometimes exceed velocities greater than 70 m.p.h. Annual average relative humidity is 50 percent at 10:00 A.M. and 61 percent at 5:00 P.M.

biological

As previously mentioned, the report entitled, *"Plants and Animals of the Santa Ana River in Orange County,"*[5] covered a distance of approximately 31 miles - from the Pacific Ocean to Prado Dam. Although that report represents a comprehensive inventory of the biota for the entire Santa Ana River below Prado Dam, no special emphasis was placed on assessing the biota for the reach of the Santa Ana River between Ball Road and Imperial Highway, included in this project.

supplemental studies

An additional survey was conducted between March 12 and 19, 1972 in the area of the Santa Ana River between Ball Road and Imperial Highway, to supplement the information found in the report entitled, *"Plants and Animals of the Santa Ana River in Orange County."*[5] Information was lacking on fishes and other aquatic fauna, as well as on the existing biota within the project area. The basic data relating to this additional survey are contained in the Appendices.

In summary, the aquatic biology of the project area can be characterized by an abundance of associated wetlands flora between Imperial Highway and Lakeview Avenue, with little continuation downstream. The survey of streamside plants in the river basin is listed in Appendix V. As indicated in the Appendix, a total of 56 species was noted. Sampling sites south of Lakeview Avenue contained no vegetation, due to the unstable nature of the river diversion downstream and the continually changing configuration of landform and river channel due to spreading basin construction and repair.

The ichthyological considerations were centered in the area adjacent to the water spreading basins between Lakeview Avenue and the Riverside Freeway Bridge. The survey of animal life in the Santa Ana River between Imperial Highway and Ball Road yielded findings summarized in Appendices I through IV. A total of 125 animal species was noted. Five introduced species of fish were found and are summarized in Appendix I, according to sample site location.

table i

water quality data

Parameter	Sample Station[1] 1	6	8
Dissolved Oxygen (ppm)	7.0	9.3	4.0
Nitrate (NO_3) (ppm)	18.0	9.0	13.0
Nitrite (NO_2) (ppm)	0.28	0.28	0.30
Ortho-phosphate (ppm)	9.8	9.0	9.0
Sulfate (ppm)	200.0	185.0	150.0
Alkalinity (ppm $CaCO_3$)	285.0	210.0	155.0
Carbon Dioxide (ppm)	44.0	25.0	30.0
pH	7.4	7.4	7.4
Turbidity (JTU's)	105.0	140.0	88.0
Temperature (degrees C.)	21.6	21.0	24.8
Flow Velocity (M/sec)	0.7	1.0	0
Flow Volume (gpm)	22,500	36,000	0

[1] *Sample Stations are mapped on Plate D.*

NOTES:

A. Orange County Water Pollution Control Department data shows a range in chlorides from 134 to 150 ppm at the gaging station near Imperial Highway.

B. Orange County Water District data shows an average T.D.S. of 793 for the period of July 1969 to October 1970.

cultural influences

The general area surrounding the project falls within the boundaries of the Cities of Anaheim and Orange. The area extending upstream from Ball Road (Taft Avenue) on the southeasterly side of the river to within one-half mile of the Riverside Freeway Bridge, lies within the City of Orange, except for several small areas of unincorporated land. Similarly, the area extending upstream from the City of Orange boundary to Imperial Highway on the southerly side of the river and around the northerly side of the river from Imperial Highway Bridge downstream to Ball Road, lies primarily within the City of Anaheim.

Most of the lands adjacent to the project area on the Anaheim side is residential in nature, from the river for several miles westward. This area is sprinkled with some commerical development, ranging from a corner service station through neighborhood shopping centers to a few industrial and manufacturing concerns. Several of the latter, including semi-permanent sand and gravel operations are concentrated between La Palma Avenue and the river in the area near the proposed Yorba Greenway and Warner Park Basin.

The City of Orange, or easterly side of the river, is primarily residential, but in general is less heavily developed and has more undeveloped land with residential zoning adjacent to the project.

The City of Orange has two small public parks that serve this area but both are limited in physical size and activities offered. The City of Anaheim maintains five small neighborhood parks within one and one-half miles of the river, and while they are of considerable local importance they, nevertheless, do not offer the variety or quantity of recreation that is proposed to be offered by the project facilities.

The changes which will result from the project will have significant and diverse impacts on the present community. Positive aspects will include: a major addition to the available areas for passive and active outdoor recreational activities; a significant increase in "open space" and appropriate habitat for flora and fauna, including man; a probable increase in dollar value of most local properties; increase in local business; and an increase in local building activity.

Negative aspects include: an increase in traffic, noise, and general "people" problems which will have the greatest impact on the people living nearest the project, especially if located near a project facility such as a parking area, entrance or exit way, stable, bicycle rack, or picnic area; a potential increase in localized vandalism, rowdy behavior, thefts, and other related behavioral problems due to the numbers of "outsiders" attracted to the area by the project; and other effects, such as air pollution, insects, and differences among various special interest groups as to priorities, time, and space allotments among the varied types of recreational offerings.

There are no known historical and/or archaeological points of interest within the project boundaries or in any nearby area that would be adversely affected by construction of the project.

environmental impact of major project elements

general

Present authorized usage of the Santa Ana River and water spreading basins for recreational activities is virtually non-existent in the project area. The greenbelt proposal offers opportunity for significant multi-purpose benefits with a minimum impact on present utilization.

The comments of this section apply both to the recreational concepts, as presented in the Banks report[6], and also to the more specific plans for recreational use of the flood control levees of this project. In the overall recreational plan the facilities associated with flood control features are integrated closely with the facilities associated with water conservation features. It is virtually impossible to treat the recreational aspects related to one of the primary uses without also considering the other. The overall recreational plan, however, is still in a conceptual stage and must therefore be treated generally. It is entirely beyond the scope of this report to treat each of virtually endless possibilities within the conceptual plan in sufficient detail to answer all the questions that may be raised.

Perhaps the most important consideration in planning recreational facilities is that they be designed to properly handle the users they attract and not create conflict with other uses of the area. It should be noted that, as indicated in the Banks report[6], it is highly probable that there will be many changes made in the project plans between the time they may be adopted and the time the project is completed. Therefore, it is important to assess the impact of certain general recreational considerations rather than the specific size or shape of the proposed development.

For example, power boating does not appear to be practicable because the space requirements - directly proportional to its speed - exceed that available. Furthermore, power boat noise would lower overall environmental quality. Much thought should be given before permitting the use of sail boats since this use reduces the total numbers of recreationists. However, the recreational value per user is quite high, and the total recreational benefit may be high enough to warrant sail boating. This is also one of the uses that does not depreciate the environment. A rowing concession providing properly designed row boats might offer the best choice to complement the quiet and peaceful interlude a greenbelt should provide an urban area.

Those facilities generating congregation and noise should be back from the paths or water, and buffered by noise-deadening vegetation. Care should be taken to design waters with both passive and active recreation in mind. Bird watching, walking, evening strolls, and dawdling are as important as swimming, boating, and land sports.

The present biota of the channel and levees within the study section is relatively limited due to a combination of man's use of the channel for flood control and water conservation and the annual cycles of flooding and drought. Vegetation on the levee banks and within the flood channel is generally ephemeral in nature, and the vegetative communities which have survived in this reach of the river have adapted to the changed and changing conditions of present river management. There is a variety of animal life present, primarily regulated by the absence of humans. Changes proposed by the project will principally enhance the present conditions with addition of new vegetation and the resultant increased recruitment of new animals to the area. There will be additional food, cover, and "living space" for animals created by the proposed project. The only foreseen adverse impact on animal life is the fact that many more people will use the area after its development, and consequently, the fauna will have to adapt to or adjust to this increased human activity.

channelization and water spreading

flood control

Construction of the necessary levees to contain storm flows for protection of property and prevention of loss of life will require utilization of existing stream bed material and imported rock for revetment, which is a depletion of a natural resource. The river channel will occupy approximately 350 acres of land which will change the land use status from that of a dual-purpose to multi-purpose uses.

The nature of the project area is subject to strong winds emanating from the northeast. Dust abatement measures should be taken to minimize the effect during and following construction of the levees. Periodic sprinkling during construction will alleviate some of the dust problem. After construction, a fast-growing, temporary plant can be seeded to fill in until the more permanent vegetation is established.

The Leeds, Hill and Jewett reports[2,3] considered in detail the sediment transport in the Santa Ana River System. However, neither report appears to give any consideration to the effects that deposition or erosion phenomena in the Santa Ana River will have on the shoreline. Insofar as sediment transport to the ocean is concerned, the proposed project may interfere with the normal beach nourishment process, in that a diminution in volume transport to the ocean might result. This would be an undesirable consequence insofar as the shoreline to the south of the Santa Ana River is concerned, in that any present tendencies toward shore erosion will be aggravated.

"*An Evaluation of the Health of the Benthic Marine Biota of Ventura, Los Angeles, and Orange Counties*," February 1972, prepared for Southern California Association of Governments - Page 18 states, "Relatively meager amounts of sand are provided by streams of the Wilmington-Newport bluff coast and much of this is lost from the beaches to Newport Canyon."

Water fowl and wading birds presently use the river channel for resting. Increased human activity during construction in the project area, may frighten these birds into extended relocation.

Construction of levees will result in a short-term disturbance of vegetation within the river channel. Long-term effect is to provide a different substrate for vegetation and subsequently will cause a change in composition of vegetative communities.

water spreading

Construction of the water spreading basins for water conservation will, for some basins, require excavation of the native material for shaping the basins and constructing dikes, which is a depletion of a natural resource. All of the basins will occupy about 450 acres of land which changes the land use status and substitutes multi-purpose uses for the present use, which is mainly single-purpose.

Water fowl and wading birds presently use the spreading basins for resting. Increased human activity during and subsequent to construction of recreational features may frighten those birds into extended relocation.

Construction of spreading basins will result in a short-term disturbance of vegetation, whereas the long-term effect is to provide a different substrate for vegetation, and subsequently will cause a change in composition of vegetative communities.

recreation features

general

Proper planning of a recreational development must consider the recreational needs of the people to be served, the potential of the area to meet those needs, the interfacing of the proposed recreational development with other land or water uses, the community itself, and the economic feasibility. The present greenbelt concept appears to meet and answer these general criteria, with the possible exception of economic feasibility. However, costs of development and operation are not available at this time. It should be recognized that the availability of funds will determine the shape, timing, and quality of the project. This, in turn, will bear on the impact that the project will have on the existing environment.

water-oriented activities

Water-oriented activities include active pursuits such as boating, swimming, fishing, and wading, and the more passive activities such as contemplation, water-gazing, picnicking, and bird-watching. None of these activities is permitted within the project area at this time.

The proposed developments will enhance the present water areas by making them larger, more permanent and scenic, and open to public access and use.

Safety must be a consideration in the active water recreational uses, and will necessitate reasonably close supervision and enforcement of safety regulations.

land-oriented activities

Land-oriented activities proposed within the project area include picnicking, hiking, horseback riding, bicycling, playground sports, nature walks, bird-watching, and quiet contemplation.

Consideration in the planning of the areas where recreational land activities occur should include a variety of influencing factors. For example, the prevailing wind direction, as well as any major significant seasonal deviations, should be considered in deciding upon which levee to place the equestrian trail. Dust raised by horses could be screened by tree barriers to prevent annoyance to nearby residents or the horse trail could be located so that the prevailing wind would blow the dust across the flood channel and/or spreading basin to provide a chance for settlement before reaching adjoining homes.

Parking areas, picnic grounds, and other areas that tend to concentrate use should be designed with a buffer zone separating such areas from nearby homes. Parking areas should be designed not only as to traffic flow but also as to noise and annoyance of those living nearest to the facility.

Fencing is necessary to separate the recreational area from the residential or commercial area which adjoins, and this fence should be a minimum of six feet general height with three-strand barbed wire on top, but, even so, fences of this nature are no barrier to juveniles who wish to climb over. There will be unauthorized use within the area and this will be very difficult to control. A small fence, three or four feet high, will be necessary to divide areas within the park, e.g., the equestrian trail from the hiking and bicycle trail, or an access road from either or both. Such low fences will prove to be very little deterrent to energetic youngsters and may even be challenges both to people on foot and to people on horseback.

Conflicting traffic within the project should be separated as much as possible. Equestrians should not use the same trail as bicyclists and hikers. Crossovers from one levee to the other should take advantage of available facilities and should probably be limited to one at each end of the project. Crossovers for horses should utilize the river channel if conditions are favorable. Bicyclists and hikers should not use the river channel for crossovers.

All proposed land-based recreational features should result in an enhancement of the levees and basins, and the community in general.

unavoidable adverse impacts

adverse impacts

Adverse impacts include: adjustment of residents along the riverbank to increased activity; possible depreciation of property value of certain riverfront houses - theft and vandalism may increase along this area; special police patrols, or a special greenbelt ranger patrol for adequate enforcement of park rules and City laws.

Water spreading basins will make the maintenance of the proposed area as an "oasis-like" atmosphere difficult. Despite the overall recreational and aesthetic enhancement benefits, there will be times when the water spreading basins will be taken out of service. At such times, the muddy or dry lake basins will not be aesthetically appealing nor will they contribute significantly to recreational use. The barrenness of the basins will be difficult to conceal, notwithstanding permanent vegetated strips on levees which could greatly reduce this impact. The area is not presently visible to the general public; opening it to the public will attract public attention and draw public comment.

Dust will continue to be a problem in the project area. Earthmoving equipment used to construct the Santa Ana River levees and the water spreading basins will have a short-term adverse environmental impact due to dust aggravation and noise. Following completion of the levees and spreading basins, dust will continue to be a problem unless some mitigative measures are taken as subsequently discussed.

Once the environmental enhancement features are open to public use, regional and local street traffic may cause considerable problems which can be alleviated by implementation of traffic improvements based on a traffic study and analysis.

Also, slow-moving vehicles to the recreational areas will create the increased air pollution of vehicle emissions. Air pollution also will result due to the operation of construction equipment for a limited time but to a lesser degree.

Noise pollution will be prevalent during construction operations. This type of pollution will be aggravated at the temporary heavy equipment yards, levees, and spreading basins during construction periods.

Physical quality of water within the Santa Ana River and adjacent water spreading basins will be affected during construction by the increase in turbidity.

mitigative measures

Theft, vandalism, noise, and street traffic can be minimized by enforcement of local laws, regulations, and ordinances controlling the operation of the recreational features of the project.

Adequate use of trees and shrubs for screening to form a dust, sound, and sight barrier will aid in dust abatement and general aesthetics of the area. The dust problem can be further alleviated by use of water trucks and/or an irrigation system.

alternatives to proposed project

channelization

The project, as heretofore described, was developed by the Flood Control District over a number of years following the 1938 flood when, with State aid, the District constructed sand levees protected by rail and wire revetments from the vicinity of Imperial Highway downstream to Seventeenth Street in the City of Santa Ana. Much of the history of the construction of these levees is lost. However, it seems that they were constructed to form a channel occupying the broad wash that had been left from the 1938 flood. This resultant channel varied considerably in width, in some locations exceeding 1,000 feet. Prior to 1938 and in subsequent years, the Orange County Water District purchased most of the land between the levees between Imperial Highway and Ball Road for the purpose of spreading both the natural flows in the river and imported water. Under the 1956 Bond Issue, the Flood Control District performed a number of improvements on the river, particularly in the lower portions below Seventeenth Street. In studying design possibilities for the extension of the improvements through the project area, suitable solutions for three major interrelated problems were sought. The problems were: (1) adequate flood protection; (2) maximum water conservation potential consistent with flood protection; and (3) sediment transport.

The sediment transport was a problem of major magnitude. During the decade following the completion of Prado Dam the changed regimen of the river wrought by the levee construction and the dam caused a rapid sedimentation in the river between Imperial Highway and Ball Road. It is estimated that the average depth of accumulation of material during those years was on the order of four to five feet over the entire riverbed. Beginning about 1952, the Water District and the Flood Control District jointly embarked on a program of removing this sediment in the interest of flood protection and maintaining the absorptive capabilities of the river bottom for spreading purposes. The sediment had a relatively high percentage of sand, in large demand for the construction needs of Orange County, and was consequently easy to sell.

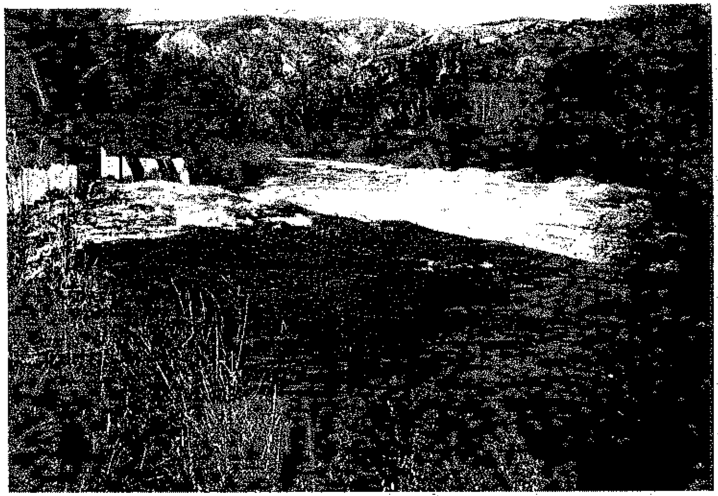
Under this program several million tons of material were removed, a portion of which could otherwise have been used for beach nourishment had an economic mode of transportation been available, such as movement to the ocean by flood flows.

Studies in the early 1960's indicated that four general alternative plans deserved consideration. Three of the plans envisioned dividing the wide area between the previously-built levees into two portions, one to be used primarily for flood flows and the other entirely for water spreading. The other alternative would have utilized the entire river bottom for both flood control and water spreading. Some of the general advantages and disadvantages of each are presented below.

single channel—combined floodway and spreading area

Advantages: Maximum water spreading capability for imported water in dry months.

Disadvantages: (1) Extremely deep and heavy levee revetments required; (2) Limited technology available to base revetment design upon;



Santa Ana River at S.A.V.I. Diversion.

(3) Lowest in sand transport ability; (4) Poor flood flow conservation; and (5) Uncertain flood security due to lack of proven technology.

dual channel—vertical concrete floodway

Advantages: (1) Highest level of flood protection; (2) Requires the least amount of land; (3) Has the maximum sand transport possible; (4) Shortest bridges and utility crossings; and (5) Low maintenance cost.

Disadvantages: (1) No water spreading possible; (2) No recreational use; and (3) Very high construction cost.

dual channel—trapezoidal concrete floodway

Advantages: (1) Higher level of flood protection; (2) Good sand transport capability; and (3) Relatively low maintenance cost.

Disadvantages: (1) Limited recreational use; (2) No water spreading possible; (3) Requires more land than vertical concrete; and (4) Relatively high cost.

dual channel—soft bottom floodway

Advantages: (1) Probable acceptable flood security; (2) Design of revetments probably within available experimental technology; (3) Maximum conservation of natural flows; (4) Probably good sand transport ability; and (5) Probably a favorable construction cost.

Disadvantages: (1) Research required for satisfactory design; (2) Required wide center levee would reduce water spreading area; and (3) Higher maintenance costs than concrete.

In 1964, the Flood Control District and Water District jointly retained a firm of engineers from San Francisco, Leeds, Hill and Jewett, Inc. to study the problem and make general recommendations for the design upon which detailed plans and specifications for construction could be based. Following the 1969 flood, the same firm was retained to restudy the previous recommendations in the light of experience gained during the 1969 floods and the higher peak flows the Corps of Engineers' studies were predicting. Their studies showed that the dual channel with a soft bottom floodway was the best from the point of view of flood control, water conservation, and sediment transport. The consultants determined that the most effective levee protection means would be heavy and deep rock rip rap. In order to limit the size and depth of the rip rap they found that velocity control through slope restrictions would be necessary. Their recommendation for slope restrictions was the construction of a series of reinforced concrete drop structures. The recommended waterway width, depth, and slope promised adequate movement of sediment through the system, with adequate protection from erosion and scour at the levees.

Approximately two-thirds of the project area has been improved with the fourth alternative described above following their recommendations and its use for the remainder is being planned.

A fifth alternative, that of doing nothing, was hypothetically possible but never seriously considered. The result of such an alternative would eventually be a breakout of the river somewhat similar to that which occurred in 1938, but with an enormously greater property damage and loss of life on the overflow area largely occupied by farms in 1938 but now constituting the most heavily urbanized portion of Orange County. Another negative result would have been the continued trapping of sediment with the necessity for removal and lessened amounts reaching the ocean beaches.

water spreading

There are alternatives to water spreading but each alternative would be found to be more expensive in terms of initial costs of construction, together with the costs of maintenance and operation. The groundwater basin must be replenished if well water supplies for municipal use is to continue economically.

Positive alternatives would be: (1) use only imported Colorado River water or California Project water; (2) construct waste water reclamation plants, together with artificial recharge into the groundwater basin; (3) construct desalinization plants; (4) use injection wells; and (5) do nothing.

An alternative to the present use of erodible sand embankment type of interior dikes within the river channel is an inflatable type of diversion structure. This alternative lends itself to conservation of better quality water in addition to being more permanent and affords a greater degree of water conservation by minimizing losses due to washout of dikes.

The Leeds, Hill and Jewett report[3] recommends installation of at least two inflatable rubber dams across the Santa Ana River at drop structures in lieu of continually reconstructing earth dikes presently used for diversion of storm flows to water spreading basins. That report states that collapsible rubber dams "....in addition to permanence, is the ability to resume the conservation of water near the end of the falling limb of the flood hydrograph which would be otherwise lost...because the sand embankment had been breached previously." Capitalizing the cost of water that would be otherwise lost, "would support an additional expenditure of one million dollars for rubber dams over temporary diversion works." If these basins have the recharge capability to hold the storm flows that otherwise would be lost, and if financing the costs of the inflatable dams is not a problem, then such construction is justified. An economic study should be made to verify the additional costs for installation of inflatable dams, before reaching a final decision in this regard.

environmental enhancement features

The proposed environmental enhancement features are directly associated with the basic function of water conservation. To do nothing results in continuation of a blighted area.

short term-long term environmental effects

Construction of the Santa Ana River levees and the water spreading basin facilities, together with the environmental enhancement features, will have both a short-term and long-term beneficial effect for Orange County as a whole and the project area in particular.

short-term

beneficial

Construction of the levees and water spreading basins will result in temporary employment of local construction workers. Water conservation can continue to be practiced while construction is underway for the Santa Ana River levees. Aesthetics of the project area will improve with the initial installation of landscaping along the levees.

adverse

As previously discussed, earthmoving equipment used for construction of the levees and basins will create noise and aggravate the dust problem unless properly controlled. Removal of an appreciable quantity of sand and gravel from the Santa Ana River bed for construction of the levees may adversely affect nourishment of the shoreline by aggravating beach erosion conditions. Water quality of the stream flow will be degraded due to increase in turbidity during construction but will not present a serious problem. Social problems may result initially due to the new recreational activities within the community.

Vegetation below Lakeview Avenue does not exist. Although vegetation upstream will be destroyed, natural regrowth and landscaping will create a new habitat equal to or superior to the old within a period of two to three years.

Under present and proposed water conservation operations, some fish are stranded in the Santa Ana River below the drop structures when all water is diverted to a water spreading basin. The stranded fish may die unless sufficient water to create a holding pool is permitted to flow over the drop structure. Presence of dead fish would result in adverse public comment from recreationists using the hiking, bicycle, and riding trails.

long-term

beneficial

Construction of the levees for the purpose of providing protection from storm flows will minimize damage to property and loss of life. Construction of semi-permanent water spreading basins will allow continuation of an economical plan for providing a water supply to the cities and communities in Orange County. Construction of levees and water spreading basins will cause disturbance of vegetation. The long-term effect is to provide a different substrate for vegetation and subsequently will cause a change in composition or vegetative communities.

Making available badly needed open space and trails for recreation will provide passage for hikers, bicyclists, and equestrians from the Pacific Ocean to Yorba Park.

California State Project water may be available in the near future to the Orange County Water District, resulting in a higher water quality since California Project water will have about 300 ppm of total dissolved solids (TDS), as compared to Colorado River water with a TDS of about 750 ppm.

Permitting the natural region of the Santa Ana Canyon upstream of Imperial Highway to remain undisturbed would result in minimal impacts following construction within the project area. Completion of the recreation facilities and landscaping of the area will provide an aesthetically pleasing atmosphere to the community in particular and the County as a whole.

Greater quantities of sand and sediment will be carried through the project than in the former state. The portion of this greater quantity that actually reaches the beaches will be a positive factor. Some sand will be trapped within the proposed project. The Flood Control and Water Districts plan jointly to sell this material to contractors and material suppliers with the revenue used for environmental enhancement in and along the project area. This will be a strong positive environmental factor.

adverse

Human activity within the recreation areas may reduce the numbers of wildlife by indirect means, as discussed earlier. Cultivated vegetation might compete with native species of vegetation unless specifically controlled or considered during design.

The future will bring increased population to the area. This population increase may reach a point where the number of people exceed the recreational capacity of the environment, resulting in environmental depreciation unless control measures, or in effect rationing, are employed.

If, for any reason, an appreciable quantity of sand and gravel is removed from the Santa Ana River streambed, the result may be aggravation of beach erosion conditions at the mouth of the Santa Ana River.

A point in time may be reached when an imported water supply for replenishment of the water spreading basins used for recreation is not available.

Exhaust emissions from local vehicular traffic to the recreation sites will add to the already polluted atmosphere if present vehicular emission control technology is not improved. Noise resulting from vehicular traffic and recreation use adjacent to residential development may be objectionable.

Of the greater quantity of sand that passes through the project area only a part will reach the beaches directly. Other parts (percentage unknown at present) will deposit in portions of the downstream river channel and may require removal at public expense in the future, an adverse factor. On the other hand, it may be possible to obtain revenue for the material just as it will be in the project area and if so, what appears to be a negative factor may become positive, particularly if the revenue is used for greenbelt purposes.

irreversible and irretrievable commitments

physical resources

Construction of the Santa Ana River levees and water spreading basins will preclude this land from being used for other purposes than the multi-purpose uses of the proposed project.

Sand and gravel used for construction of levees will not be available for other uses.

Water must be made available to maintain the greenbelt and recreational facilities.

biological

Except for minor vegetation changes and associated fauna, from a biological viewpoint, there appears to be no other irreversible and irretrievable commitments.

cultural

As community attachment to the facility grows, so will public awareness and involvement in the project increase with every successive environmental change which is made. People will demand more consideration and more of a say in management which affects environmental areas within which they feel they have an interest.

Public involvement with this project will cause curtailment of present commercial and industrial development adjacent to the recreational areas.

bibliography and appendces

bibliography

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appendices

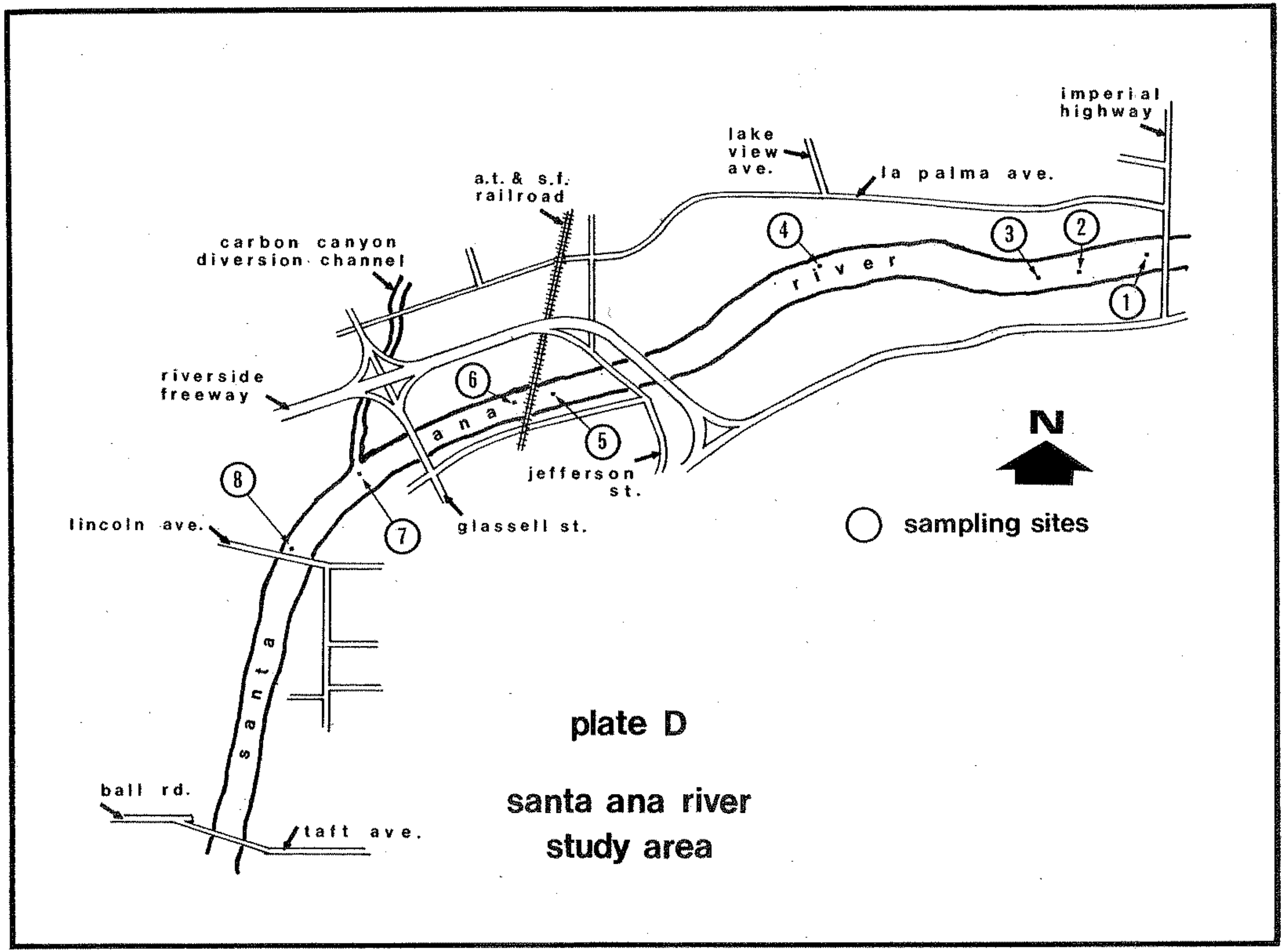
supplemental studies

Supplementation of ichthyological and water quality studies was quantitative in nature, while all other biota were qualitatively assessed by general observation and random sampling.

Eight sampling sites for seining were chosen as representatives of different riverbed habitats and are shown on Plate D. Station one (100 meters south of Imperial Highway Bridge) included five collections across the various channels. Station two (.6 mile downstream of Imperial Highway) included four collections. Station three (.8 mile downstream of Imperial Highway) included three collections. Station four (.3 mile downstream of Lakeview-flood channel site of central levee) included species identification from stranded specimens. Station five (under the Riverside Freeway Bridge-basin side of central levee) included species identified from specimens stranded in a drop structure of the river channel. Station six (.1 mile downstream of Riverside Freeway Bridge-flood channel side of levee) included one collection in the basin below a drop structure. Station seven (adjacent to Carbon Creek diversion channel) included two collections. Station eight (terminal basin .1 mile upstream of Lincoln Avenue) included two collections.

Streamside flora were assessed at station one. Other vertebrates, especially birds and mammals, were observed along the entire study segment. A plankton tow was taken at station eight.

Water samples were taken at stations one, six, and eight and selected chemical and physical analyses were made. The Hach DR-EL Water Quality Test Laboratory was used for testing, using standard Hach procedures. Chemical analysis included: dissolved oxygen (DO) in ppm; nitrogen nitrates in ppm; nitrogen nitrites in ppm; orthophosphate in ppm; sulfates in ppm; carbon dioxide in ppm; alkalinity in ppm; and pH. Physical parameters include temperature in degrees Centigrade, turbidity as Jackson Turbidity Units (JTU's), assessment of stream velocity in meters per second (M/sec), and estimated flow in gallons per minute (GPM). Notation of general substrate was made at each of the seining sites.


imperial highway
lake view ave.
la palma ave.
a.t. & s.f. railroad
carbon canyon diversion channel
riverside freeway
jefferson st.
lincoln ave.
glassell st.
ball rd.
taft ave.
santa ana river
1
2
3
4
5
6
7
8
N
sampling sites
plate D
santa ana river study area

In addition to the report entitled, *"Plants and Animals of the Santa Ana River in Orange County,"*[5] specific references were made to fish studies conducted in previous years (Culver and Hubbs 1917, Evermann and Clark 1931) to detect major changes in the fish fauna present in the Santa Ana River basin.

The data taken from stations and sight observations, supplemented with literature records, were tabulated as the plant and animal checklists (Appendix I through V). Due to the short duration of the project study, it is inappropriate to overly quantify the data collected, as a longer series of observations is necessary for annual or semiannual predictions.

appendix i

Checklist of Fishes Associates With the Middle Santa Ana River.

CODES FOR RELATIVE ABUNDANCE

U = uncommon - number of individuals comprise less than 10% of the catch/individuals · 20

C = common - number of individuals comprise more than 10% of the catch/individuals · 20

R = rare - individual occurrence 5% of total catch/ individuals · 5

* = historical literature - not collected

	Station # 1	2	3	4	5	6	7	8
Cyprinidae (minnow family)								
**Gila orcutti* (arroyo chub)								
Pimephales promelas (fathead minnow)				C	U	C	U	
Catostomidae (sucker family)								
**Catostomus santa anne* (Santa Ana sucker)								
Poecillidae (top minnow family)								
Gambusia affinis (mosquito fish)	U			C	U	C		U
Ictaluridae (catfish family)								
Lepomis macrochirus (bluegill)				U				
Lepomis cyanellus (green sunfish				C	U	U		
Gasterosteidae (sticklebacks)								
**Gasterosteus aculeatus* (3-spine stickleback)								

appendix ii

Checklist of Amphibians and Reptiles Associated With the Middle Santa Ana River*

Codes for relative abundance are in accordance with the Marsh and Abbott Report (1972) R=rare; C=common; U=uncommon

* - After Marsh and Abbott (1972). Species observed during the study are marked with an asterisk.

Urodela (salamanders)	
Batrachoseps attenuatus (California Slender Salamander)	U
Anura (toads and frogs)	
**Bufo boreas* (common toad)	C
Hyla regilla (Pacific treefrog)	U
Squamata (lizards and snakes)	
Gerrhonotus multicarinatus (southern alligator lizard)	R
Lampropeltis getulus (common kingsnake)	R
Sceloporus occidentalis (western fence lizard)	C
Uta stansburiana (side-blotched lizard)	C

appendix iii

Checklist of Mammals Associated With the Middle Santa Ana River.*

* After Marsh and Abbott (1972). Species observed during the study are marked with an asterisk.

Codes for relative abundance are in accordance with the Marsh Report (1972). R=rare; C=common; U=uncommon

Marsupialia (opossum)	
Didelphis marsupialis (opossum)	C
Chiroptera (bats)	
Myotis spp. (evening bats)	U
Pipistrellus hesperus (western pipistrelle)	R
Lagamorpha (hares and rabbits)	
**Lepus californicus* (black-tailed hare)	C
**Sylvilagus audubonii* (Audubon cottontail)	C
Rodentia (squirrels and mice)	
Mus musculus (house mouse)	C
**Otospermophilus beecheyi* (beechey ground squirrel)	C
Rattus norvegicus (Norway rat)	R
Rattus rattus (black rat)	R
Reithrodontomys megalotis (western harvest mouse)	U
Thomomys bottae (botta pocket gopher)	C
Carnivora (foxes, weasels, skunks)	
Mephitis mephitis (striped skunk)	
Mustela frenata (long-tailed weasel)	R
Procyon lotor (raccoon)	R
Spilogale putorius (spotted skunk)	C

Domestic Mammals	
**Canis familaris* (domestic dog)	C
**Felis domestica* (domestic cat)	C

appendix iv

Checklist of Birds Associated With the Middle Santa Ana River*

* After Marsh and Abbott (1972). Species observed during the study are marked with an asterisk.

Codes for relative abundance are in accordance with the Marsh and Abbott Report (1972). R=rare; C=common; U=uncommon

Species	I[1]	II[2]
CICONIIFORMES - (herons, egrets, bitterns)		
Ardea herodias (great blue heron)	R	
Casmerodius albus (common egret)	R	
Leucophoyx thula (snowy egret)	R	
Nycticorax nyticorax (black-chinned night heron)	R	
ANSERIFORMES - (ducks, geese)		
Aix sponsa (wood duck)	R	
**Anas acuta* (pintail)	U	C
**Anas carolinensis* (green-winged teal)	U	U
**Anas cyanoptera* (cinnamon teal)	U	C
**Anas platyrhynchos* (mallard)	U	U
**Aythya affinis* (lesser scaup)	U	C
Anas strepera (gadwall)	U	
Aythya americana (redhead)	U	
Aythya collaris (ring-necked duck)	U	
Aythya valisineria (canvasback)	U	
**Bucephala albeola* (buffle-head)	-	U
Mareca americana (American widgeon)	U	
**Oxyura jamaicensis* (ruddy duck)	U	C
**Spatula clypeata* (shoveler)	U	C

appendix iv – cont'd.

Species	I[1]	II[2]
FALCONIFORMES - (vultures, hawks, falcons, etc.)		
Buteo jamaicensis (red-tailed hawk)	C	
Buteo lineatus (red-shouldered hawk)	R	
**Cathartes aura* (turkey vulture)	C	C
Circus cyaneus (marsh hawk)	R	
Elanus leucurus (white-tailed kite)	R	
Falco sparverius (sparrow hawk)	C	
GALLIFORMES - (quail, pheasants, etc.)		
**Lophortyx californicus* (California quail)	C	C
**Phasianus colchicus* (ring-necked pheasant)		U
GRUIFORMES - (coots, rails, etc.)		
Fulica americana (American coot)	C	
Gallinula chloropus (common gallinule)	U	
Porzana carolina (sora rail)	R	
Rallus limicola (Virginia rail)	R	
CHARADRIFORMES - (shore birds, gulls, etc.)		
Actitis macularia (spotted sandpiper)	R	
Capella gallinago (common snipe)	R	
**Charadrius vociferus* (killdeer)	C	C
Chilidonias niger (black tern)	R	
Ereunetes mauri (western sandpiper)	R	
Erolia minutilla (least sandpiper)	R	
**Himantopus mexicanus* (black-necked stilt)	C	U
Largus argentatus (herring gull)	U	
**Larus californicus* (California gull)	U	C
**Larus delawarensis* (ring-billed gull)	U	C
**Limnodromus griseus* (short-billed dowitcher)	-	U
**Recurvirostra americana* (American avocet)	R	C
Steganopus tricolor (Wilson's phalarope)	R	
Sterna forsteri (Forster's tern)	R	
Totanus flavipes (lesser yellowlegs)	R	
**Totanus melanoleucus* (greater yellowlegs)	U	U

Species	I[1]	II[2]
COLUMBIFORMES - (pigeons, doves)		
**Columba livia* (domestic pigeon)	C	C
Columbigallina passerina (ground dove)	R	
Streptopelia chinensis (spotted dove)	U	
**Zenaidura macroura* (mourning dove)	C	C
CUCULIFORMES - (cuckoos, roadrunners)		
**Geococcyx californianus* (roadrunner)	-	U
STRIGIFORMES - (owls)		
Asio flammeus (short-eared owl)		
Bubo virginianus (great horned owl)		
Otus asio (screech owl)		
Speotyto cunicularia (burrowing owl)		
Tyto alba (barn owl)	R	
APODIFORMES - (swifts, hummingbirds)		
Archilochus alexandri (black-chinned hummingbird)	U	
**Calypte anna* (Anna's hummingbird)	C	C
Selasphorus sasin (Allen's hummingbird)	C	
PICIFORMES - (woodpeckers)		
Colaptes cafer (red-shafted flicker)	U	
PASSERIFORMES - (perching birds)		
**Agelaius phoeniceus* (red-winged blackbird)	R	C
Agelaius tricolor (tricolored blackbird)	R	
**Aphelocoma coerulescens* (scrub jay)		C
**Carpodacus mexicanus* (house finch)	C	C
Chamaea fasciata (wrentit)	R	
Chondestes grammacus (lark sparrow)	R	
**Corvus brachyrhynchos* (common crow)	C	C
Corvus corax (common raven)	C	

appendix iv – cont'd

Species	I[1]	II[2]
PASSERIFORMES - Cont'd.		
Dendroica auduboni (Audubon's warbler)	R	
Eremophila alpestris (horned lark)	U	
Euphagus cyanocephalus (Brewer's blackbird)	C	
Hirundo rustica (barn swallow)	R	
Icterus bullockii (Bullock's oriole)	R	
Icterus cucullatus (hooded oriole)	R	
Lanius ludovicianus (loggerhead shrike)	C	
**Melospiza melodia* (song sparrow)	R	U
**Mimus polyglottos* (mockingbird)	C	C
Molothrus ater (brown-headed cowbird)	C	
**Passer domesticus* (house sparrow)	C	C
Passerculus sandwichensis (Savannah sparrow)	C	
**Petrochelidon pyrrhonota* (cliff swallow)	C	C
**Pipilo fuscus* (brown towhee)	R	U
Pooecetes gramineus (vesper sparrow)	R	
Riparia riparia (bank swallow)	C	
**Sayornis nigricans* (black phoebe)		C
Spinus psaltria (lesser goldfinch)	R	
Spinus tristis (American goldfinch)	R	
Spizella passerina (chipping sparrow)	R	
**Sturnella neglecta* (western meadowlark)	C	C
**Sturnus vulgaris* (starling)	U	C
Toxostoma redivivum (California thrasher)	R	
Turdus migratorius (robin)	U	
Tyrannus verticalis (western kingbird)	U	
Xanthocephalus xanthocephalus (yellow-headed blackbird)	R	
Zonotrichia leucophrys (white-crowned sparrow)	C	

[1] *Recorded by Marsh and Abbott.*

[2] *Recorded during supplemental study.*

appendix v

Checklist of Plants Associated With the Middle Santa Ana River*

* After Marsh and Abbott (1972). Species with an asterisk denotes sighting during study at Station 1.

FAMILY

Species

AMARANTHACEAE (Amaranth family)

Amaranthus albus (=A. graecizans) (tumbleweed tumbling pigweed)
Amaranthus blitoides (prostrate tumbleweed)
Amaranthus californicus (California amaranth)
Amaranthus hybridus (green amaranth, slender pigweed)
Amaranthus retroflexus (rough pigweed, careless weed)

BORAGINACEAE (Borage family)

Heliotropium curassavicum var. oculatum (salt heliotrope)

CHENOPODIACEAE (Goosefoot family)

**Chenopodium album* (lamb's quarters)
Chenopodium murale (nettle-leaf goosefoot)
Salsola pestifera (=S. kali var. tenuifolia) (Russian thistle)

COMPOSITAE (Sunflower family)

Ambrosia acanthicarpa (=Franseria acanthicarpa) (annual bur-weed)
Ambrosia psilostachya (western ragweed)
Anthemis cotula (mayweed)
**Baccharis viminea* (mule fat)
Cnicus benedictus (blessed thistle)

appendix v – cont'd

FAMILY

Species

COMPOSITAE - Cont'd.

Conyza canadensis (=Erigeron canadensis) (horse weed)
Helianthus annuus spp. lenticularis (common sunflower)
Heterotheca grandiflora (telegraph weed)
Lactuca serriola (wild lettuce)
Pulicaria hispanica
Senecio douglasii (bush groundsel, sandwash groundsel)
Silybum marianum (milk thistle)
Sonchus oleraceus (common sow thistle)
Stephanomeria virgata (tall stephanomeria)
Xanthium strumarium (cockle bur)

CRUCIFERAE (Mustard family)

**Brassica campestris* (field mustard)
Brassica geniculata (summer mustard)
**Nasturtium officinale* (=Radicula nasturtium-aquaticum) (water cress)

CUSCUTACEAE (Dodder family)

Cuscuta californica (California dodder)

CYPERACEAE (Sedge family)

Cyperus esculentus (nut grass, chufa, yellow nut grass)
**Cyperus laevigatus* (smooth cyperus)
Cyperus niger var. capitatus (=C. melanostachyus) (brown cyperus)
Scirpus validus (great bulrush, giant bulrush)

EUPHORBIACEAE (Spurge family)

Croton californicus (California croton)
**Ricinus communis* (castor bean)

FAMILY

Species

GERANIACEAE (Geranium family)

**Erodium cicutarium* (red-stemmed filaree)

GRAMINEAE (Grass family)

Arundo donax (giant reed, giant cane)
**Cynodon dactylon* (Bermuda grass)
Echinochloa crusgalli (barnyard grass, water grass)
Heleochloa schoenoides (swamp timothy)
Lolium multiflorum (Italian rye grass)
Lolium perenne (perennial rye)
Muhlenbergia asperifolia (=Sporobolus asperifolius) (scratch grass)
Paspalum distichum (knot grass)
Polypogon monspeliensis (beard grass, rabbit foot grass)
Setaria lutescens (yellow bristle grass, yellow foxtail)

LEGUMINOSAE (Pea family)

Lotus hermannii (woolly lotus)
**Mililotus albus* (white sweet clover)
Melilotus indicus (Indian sweet clover)

ONAGRACEAE (Evening primrose family)

Epilobium adenocaulon var. parishii (E. californicum) (California cottonweed)

POLYGONACEAE (Buckwheat family)

Polygonum lapathifolium (willow-weed)
Rumex acetosella (sheep sorrel)
**Rumex hymenosepalus* (canaigre)

PORTULACACEAE (Purslane family)

Portulaca oleracea (purslane)

appendix v– cont'd

FAMILY

Species

SALICECEAE (Willow family)

Populus fremontii (Fremont's cottonwood or poplar)
**Salix hindsiana var. leucodendroides* (=S. argophylla)
(sandbar willow, grey-bark willow)

SCROPHULARIACEAE (Figwort family)

Mimulus guttatus (common monkey-flower)

SOLANACEAE (Nightshade family)

**Nicotiana glauda* (tree tobacco)

TYPHACEAE (Cat-tail family)

**Typha latifolia* (common cattail)

ZYGOPHYLLACEAE (Caltrop family)

Tribulus terrestris (puncture vine)

appendix vi

letters of comment

CITY OF ORANGE CIVIC CENTER

P.O. BOX 449
300 EAST CHAPMAN AVENUE
TELEPHONE 633-2300
ORANGE, CALIFORNIA 92666

DEPARTMENT OF DEVELOPMENT AND COMMUNITY SERVICES
PLANNING DIVISION

May 23, 1972

Mr. Harold Keple, Environmental Specialist
Orange County Flood Control District
400 Civic Center Drive West
Santa Ana, California

Dear Mr. Keple:

The City of Orange Planning staff has reviewed the April 24, 1972 Environmental Impact report for the Santa Ana River between Ball Road and Imperial Highway prepared for Orange County Flood Control District by Koebig & Koebig, Inc.

The Orange planning staff has two observations:

1. On page 36 it is stated that public involvement of the project will cause "curtailment" of present commercial and industrial development adjacent to recreational areas. This statement precludes technological changes that would make select industries compatable or planning techniques to interface the two uses. It is suggested the word be changed to "temper" rather than "curtail."

2. Consideration should be given to the design of the drop structures/diversion channels north of the R. J. Noble gravel pits to anticipate using the gravel pits for recreation/perculating basins in the future.

In general, the staff sees no insurmountable problems in the project and finds it should add appreciately to the recreational future use to meet the needs of the Orange County community.

It should be noted that review of the staff's analysis is scheduled to be held at the June 5, 1972 meeting of the City of Orange Planning Commission. Thus, the Planning Commission comments will be forthcoming soon after June 5, 1972.

Very truly yours,

RECEIVED
MAY 24 1972
ORANGE COUNTY FLOOD CONTROL DIST.

Norvin E. Lanz
Associate Planner

NEL:sb

INCORPORATED APRIL 6, 1888

Directors
PRESTON K. ALLEN
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ROBERT L. CLARK
PAUL H. CLEARY
H. LOUIS LAKE
CHARLES A. PEARSON
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MERWIN WAGNER
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E. T. WATSON

ORANGE COUNTY WATER DISTRICT
1629 WEST SEVENTEENTH STREET • TELEPHONE (714) 547-6781
SANTA ANA, CALIFORNIA 92706

Officers
HENRY T. SEGERSTROM
President
COURTNEY R. CHANDLER
First Vice President
H. LOUIS LAKE
Second Vice President

LANGDON W. OWEN
Secretary Manager

June 8, 1972

Mr. H. G. Osborne
Chief Engineer
Orange County Flood Control District
P. O. Box 1078
Santa Ana, California 92702

Dear Mr. Osborne:

As requested, we have reviewed the final draft of the Environmental Impact Report for the Santa Ana River between Ball Road and Imperial Highway, dated April 24, 1972.

In general, we concur with the findings and conclusions presented in the report, and feel that the report meets the National, State and County requirements of presenting the project's impact. We would also like to present the following comments on the report:

Page 13, paragraph 2 - We agree with the opinion stated in the first sentence that recent storm flows have caused erosion of the flood levees and their integrity is in question; however, the erosion has occurred after completion of the two Leeds, Hill and Jewett reports and corrective works to restore the integrity of the flood levee has not yet been determined.

Page 28, paragraph 5 - During inspection tours of the river facilities we are often asked what can be done to the construction to make the levees and structures look more compatible with their surroundings. We feel that this point should have been discussed under the adverse impacts of the projects, especially when your office has taken the positive step in the contract for facilities constructed between Imperial Highway and Lakeview to include "colored concrete" to improve the general aesthetics of the works.

Page 33, paragraph 4 - The alternatives presented to ground water basin replenishment are not "positive". The alternatives suggested would require direct delivery systems to each water user and would eliminate the safety factor involved in the conjunctive systems utilized throughout the County and require utilization of large land areas for water storage facilities. To put the alternatives in their proper perspectives, over 60 percent of the water usage in the District originates from the ground water basin.

Very truly yours,

RECEIVED
JUN 12 1972
ORANGE COUNTY FLOOD CONTROL DIST.

Langdon W. Owen
Secretary Manager

LWO:JRC:lrh

May 17, 1972

Honorable City Council
City Hall
Anaheim, California

Gentlemen:

The following is an excerpt from the minutes of the regular meeting of the Anaheim City Planning Commission held on May 15, 1972:

ENVIRONMENTAL IMPACT REPORT — Review of Environmental Impact Report prepared by Koebig and Koebig, Inc. for the Orange County Flood Control District for the Santa Ana River in an area located between Ball Road and Imperial Highway.

Assistant Development Services Director Ronald Thompson reviewed for the Planning Commission the report to the Commission regarding the study made for the Orange County Flood Control District regarding levees, flood control, channels, and water spreading basins as it pertained to the Community Goals, Parks, Recreation and Open Space Element, Storm Drain System Element, and the Water Distribution System Element of the Anaheim General Plan, noting that the representatives of the Orange County Flood Control District and staff had met with the Commission previously, at which time the detailed report had been reviewed; that the Planning Commission, after having discussed said report with the aforementioned representatives, determined the project proposed by the Orange County Flood Control District would appear to be highly beneficial in providing for needed flood control, ground water recharge, open space, enhancement and recreational opportunities for both the City of Anaheim and the Region; and that it might be in order for the Commission to make their recommendations to the City Council regarding their findings, including the Commission's concern pertaining to the problems of water quality as supported by the City Council when the General Manager of the Orange County Water District appeared before them May 9, 1972, regarding a complaint to the State Supreme Court for a review of the practices of both the Regional and State Water Quality Boards concerning upstream discharges into the Santa Ana River.

The Commission expressed the opinion that this would be a step in the right direction, since staff had recommended preservation of the wildlife and ecology; and that staff's recommendations be recommended for adoption, including the Planning Commission's concern regarding the water quality.

Commissioner Seymour offered a motion, seconded by Commissioner Kaywood and MOTION CARRIED, to recommend to the City Council that the Environmental Impact Report for the Santa Ana River in an area located between Ball Road and Imperial Highway as prepared for the Orange County Flood Control District by Koebig and Koebig, Inc. is in close conformance with the adopted Anaheim General Plan; that the proposed project will be beneficial to the environment; and that staff be directed to resolve the concern regarding water quality with the Orange County Water District and the responsible agencies.

Respectfully submitted,

Ann Krebs

ANN KREBS, Secretary
Anaheim City Planning Commission

AK:hm

CITY OF ANAHEIM, CALIFORNIA
Office of City Clerk

May 24, 1972

Orange County Flood Control District
400 Civic Center Drive West
Santa Ana, California 92702

Gentlemen:

RE: Environmental Impact Report

At their regular meeting held May 16, 1972, the Anaheim City Council reviewed the Environmental Impact Report prepared by Koebig and Koebig, Inc. for the Orange County Flood Control District for the Santa Ana River in an area located between Ball Road and Imperial Highway, together with recommendations submitted by the City Planning Commission.

This is to advise that the City Council concurred with the Planning Commission's recommendations and ordered them forwarded to the Orange County Flood Control District. A copy of said recommendations is enclosed for your information.

Very truly yours,

CITY OF ANAHEIM

Dene M. Daoust

(MRS.) DENE M. DAOUST, CITY CLERK

ldr

cc Development Services

RECEIVED
MAY 26 1972
ORANGE COUNTY FLOOD CONTROL DIST.

P. O. Box 3222, Anaheim, California 92803

Appendix M-2

1975: OCWD's Proposed Acquisition of Land for Development of Additional Off-channel Water Spreading Grounds, DEIR

ESA

Draft
Environmental Impact Report

Prepared for
Orange County Water District's
Proposed Acquisition of Land for
Development of Additional Off-Channel
Water Spreading Grounds

JONES & STOKES ASSOCIATES, INC. / 455 CAPITOL MALL, SUITE 835 / SACRAMENTO, CA. 95814

Draft
Environmental Impact Report

Prepared for
Orange County Water District's
Proposed Acquisition of Land for
Development of Additional Off-Channel
Water Spreading Grounds

September 16, 1975

Jones & Stokes Associates, Inc.
455 Capitol Mall, Suite 835
Sacramento, CA 95814

TABLE OF CONTENTS

INTRODUCTION

Concern for energy conservation and future availability of imported water in both time and quantity for groundwater replenishment purposes has caused the Orange County Water District (OCWD) to reevaluate its spreading operations in the Orange County forebay area. In order to maintain management options utilizing these new parameters, OCWD proposes to purchase additional land for future development of off-channel spreading grounds. This report is an environmental analysis of the impacts of immediate purchase of these lands, and serves as a preliminary assessment of the future environmental impacts of an enlarged spreading program.

Expedient evaluation of the proposed project has been necessary to assure that this option would not be lost. Impacts of the land purchase and proposed spreading program have been found to be beneficial. Should evaluation of the construction phase of the project be negative, other land purchases and alternatives would not be precluded by this project.

Project Background

The OCWD has pursued a multiple-phase approach to continued use and replenishment of the Orange County groundwater basin. Present projects include: 1) the Alamitos Barrier Project, 2) the Orange County Coastal Project, including Water Factory 21, and 3) the Spreading Grounds Replenishment Program. The spreading grounds operations include approximately 425 acres of in-channel shallow basins along the Santa Ana River and approximately 250 acres of off-channel deep basins including Anaheim Lake (80 acres) and the Warner Basin complex (170 acres). An additional 80 acres of off-channel spreading grounds is being developed at the Burris Pit location. Through use of the Atwood and Carbon Creek flood control channels, additional storm flows can be conserved through delivery to Orange County Flood Control retention basins. Figure 1 illustrates the existing and proposed spreading ground facilities. Inlet facilities to the spreading ground facilities from the Santa Ana River have a 300 cfs capacity.

At the present time these facilities are used to percolate Santa Ana River water and imported Colorado River and State Project water. During the 1973-1974 water year, 57,770 acre-feet of Santa Ana River water and 115,001 acre-feet of imported water was used for groundwater replenishment.

Figure 2 illustrates the anticipated replenishment water sources and amounts for water years 1974-1975 through 1978-1979.

The initial purpose of the replenishment program was to supply adequate quantities of water to the groundwater basin. In recent years, attention has also been directed to supplying good quality replenishment waters. Recent environmental factors are now dictating a further change in district policy. Replenishment water objectives can now be summarized as follows:

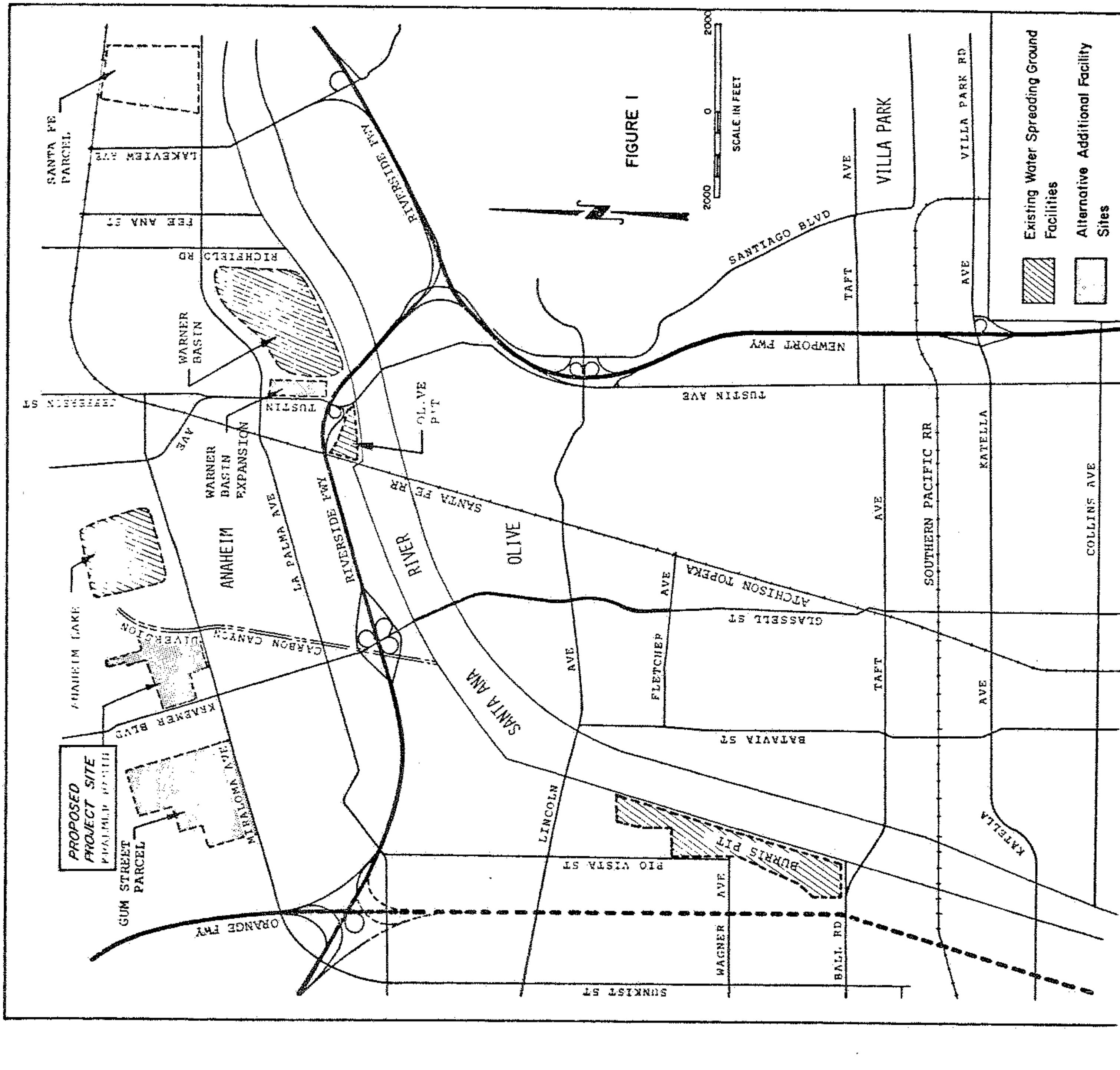


FIGURE I
SCALE IN FEET
2000
0
2000
Existing Water Spreading Ground Facilities
Alternative Additional Facility Sites
PROPOSED PROJECT SITE
GUM STREET PARCEL
SANTA FE PARCEL
WARNER BASIN
WARNER BASIN EXPANSION
OLIVE PIT
BURRIS PIT
ANAHEIM LAKE
CARBON CANYON DIVERSION
ANAHEIM
OLIVE
VILLA PARK
SANTA ANA RIVER
RIVERSIDE FWY
NEWPORT FWY
ORANGE FWY
LAKEVIEW AVE
FEE ANA ST
RICHFIELD RD
JEFFERSON ST
TUSTIN AVE
LA PALMA AVE
KRAEMER BLVD
MIRALOMA AVE
SANTA FE RR
ATCHISON TOPEKA
GLASSELL ST
FLETCHER AVE
BATAVIA ST
LINCOLN AVE
RIO VISTA ST
WAGNER AVE
BALL RD
SUNKIST ST
TAFT AVE
SANTIAGO BLVD
SOUTHERN PACIFIC RR
KATELLA AVE
VILLA PARK RD
COLLINS AVE

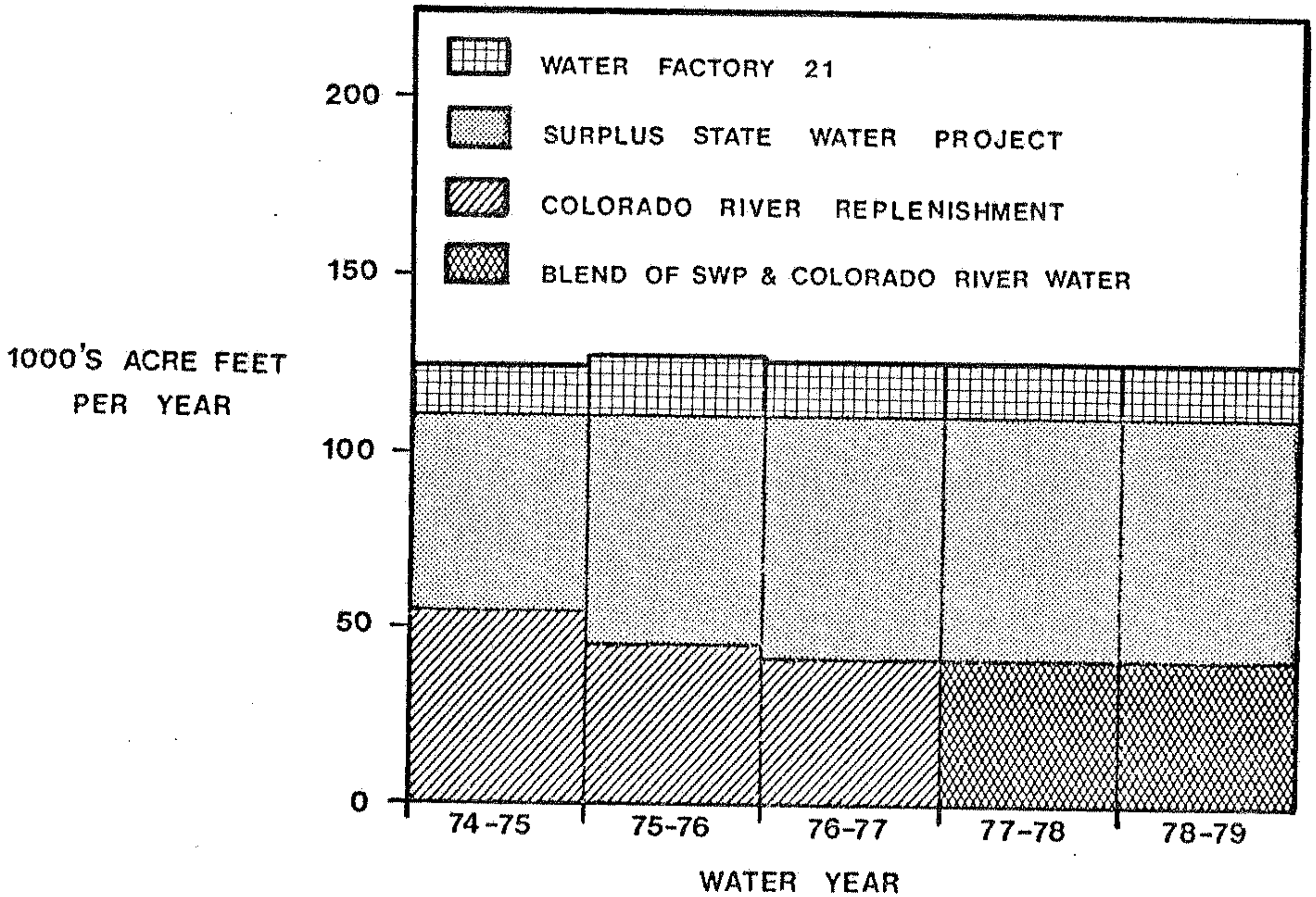


FIGURE 2

ANTICIPATED SOURCES OF REPLENISHMENT WATER
1974-75 THROUGH 1978-79

SOURCE: Orange County Water District, 1975.

OBJECTIVES
Supply adequate water quantity
Maintain adequate water quality
Maximize energy conservation
Maximize conservation of Santa Ana River base and storm flows.

The amounts of different sources of water needed to maintain quantity and quality in the groundwater basin have been described by the Santa Ana Watershed Planning Agency and in the Toups Engineering report (1974). Major future replenishment water sources include Santa Ana River base and storm flows, and imported water (Tables 1 and 2). Base flows of the river will increase substantially in the future as importation of water and reuse in the upper basin is increased.

The conservation of large amounts of imported water has been essential in the management of the groundwater basins. However, potential reductions in the amounts of imported water available for spreading pose a serious problem to OCWD. Discussions with Metropolitan Water District indicate that the future availability of State Water Project water and Colorado River water is not known at the present time. In all likelihood, this uncertainty will not be resolved until the ramifications of the current energy situation are known. If the amounts of imported water are severely reduced, greater quantities of storm runoff must be conserved. Therefore, the feasibility of developing additional or enlarging existing water conservation facilities must consider this possibility. In addition, it appears that what imported water is available will

Table 1

MONTHLY SPREADING REQUIREMENTS IN 1990
(1000's of acre-feet)

Month	(1) Base Flow	(2) State Water	(3) Storm Water	(4) Total Monthly	(5) Div. to Desalter	(6) Prado to S.G.	(7) Desalter to S.G.	(8) Lwr Feed to S.G.	(9) Total to S.G.
JUL	5.4	2.6	0.0	8.0	6.1	1.9	4.8	8.0	14.7
AUG	5.0	2.6	0.0	7.6	6.1	1.5	4.8	8.0	14.3
SEP	5.4	4.4	0.0	9.8	6.1	3.7	4.8	13.7	22.2
OCT	6.7	9.6	0.2	16.5	6.1	10.4	4.8	29.9	45.1
NOV	8.5	7.2	0.5	16.2	6.1	10.1	4.8	22.4	37.3
DEC	11.2	4.4	1.8	17.4	6.1	11.3	4.8	13.6	29.7
JAN	12.8	3.4	3.2	19.4	6.1	13.3	4.8	10.4	28.5
FEB	12.2	3.5	4.4	20.1	6.1	14.0	4.8	10.9	29.7
MAR	13.1	3.4	7.6	24.1	6.1	18.0	4.8	10.4	33.2
APR	11.6	4.0	2.5	18.1	6.1	12.0	4.8	12.3	29.1
MAY	10.0	2.8	0.7	13.5	6.1	7.4	4.8	8.6	20.8
JUN	8.3	2.5	0.1	10.9	6.1	4.8	4.8	7.6	17.2
TOTAL	110.2	50.4	21.0	181.6	73.2	108.4	57.6	155.8	321.8

Column 1: Base flow at Prado
Column 2: State Water Project water released above Prado
Column 3: Storm Water
Column 4: Total flow into Prado
Column 5: Diversion of flow from Prado releases to Anaheim desalter
Column 6: Flow from Pardo to spreading grounds
Column 7: Flow to sprading grounds from Anaheim desalter and Anaheim waste water reclamation desalter project
Column 8: Lower Feeder spreading water
Column 9: Total Monthly spreading Requirement

Source: Toups Engineering, 1974.

Table 2

MONTHLY SPREADING REQUIREMENTS IN 2020
(1000's of acre-feet)

Month	(1) Base Flow	(2) State Water	(3) Storm Water	(4) Total Monthly	(5) Div. to Desalter	(6) Prado to S.G.	(7) Desalter to S.G.	(8) Lwr Feed to S.G.	(9) Tota to S.
JUL	8.7	2.6	0.0	11.3	6.1	5.2	7.7	1.0	13.9
AUG	8.0	2.6	0.0	10.6	6.1	4.5	7.7	1.0	13.2
SEP	8.7	4.4	0.0	13.1	6.1	7.0	7.7	1.7	16.4
OCT	10.9	9.6	0.2	20.7	6.1	14.6	7.7	3.7	26.0
NOV	13.7	7.2	0.5	21.4	6.1	15.3	7.7	2.8	25.8
DEC	18.2	4.4	1.8	24.4	6.1	18.3	7.7	1.7	27.7
JAN	20.7	3.4	3.2	27.3	6.1	21.2	7.7	1.3	30.2
FEB	19.8	3.5	4.4	27.7	6.1	21.6	7.7	1.4	30.7
MAR	21.2	3.4	7.6	32.2	6.1	26.1	7.7	1.3	35.1
APR	18.7	4.0	2.5	25.2	6.1	19.1	7.7	1.5	28.3
MAY	16.2	2.8	0.7	19.7	6.1	13.6	7.7	1.1	22.4
JUN	13.4	2.5	0.1	16.0	6.1	9.9	7.7	1.0	18.6
TOTAL	178.2	50.4	21.0	249.6	73.2	176.4	92.4	19.5	288.3

Column 1: Base flow at Prado
Column 2: State Water Project water released above Prado
Column 3: Storm Water
Column 4: Total flow into Prado
Column 5: Diversion of flow from Prado releases to Anaheim desalter
Column 6: Flow from Pardo to spreading grounds
Column 7: Flow to sprading grounds from Anaheim desalter and Anaheim waste water reclamation desalter project
Column 8: Lower Feeder spreading water
Column 9: Total Monthly spreading Requirement

Source: Toups Engineering, 1974.

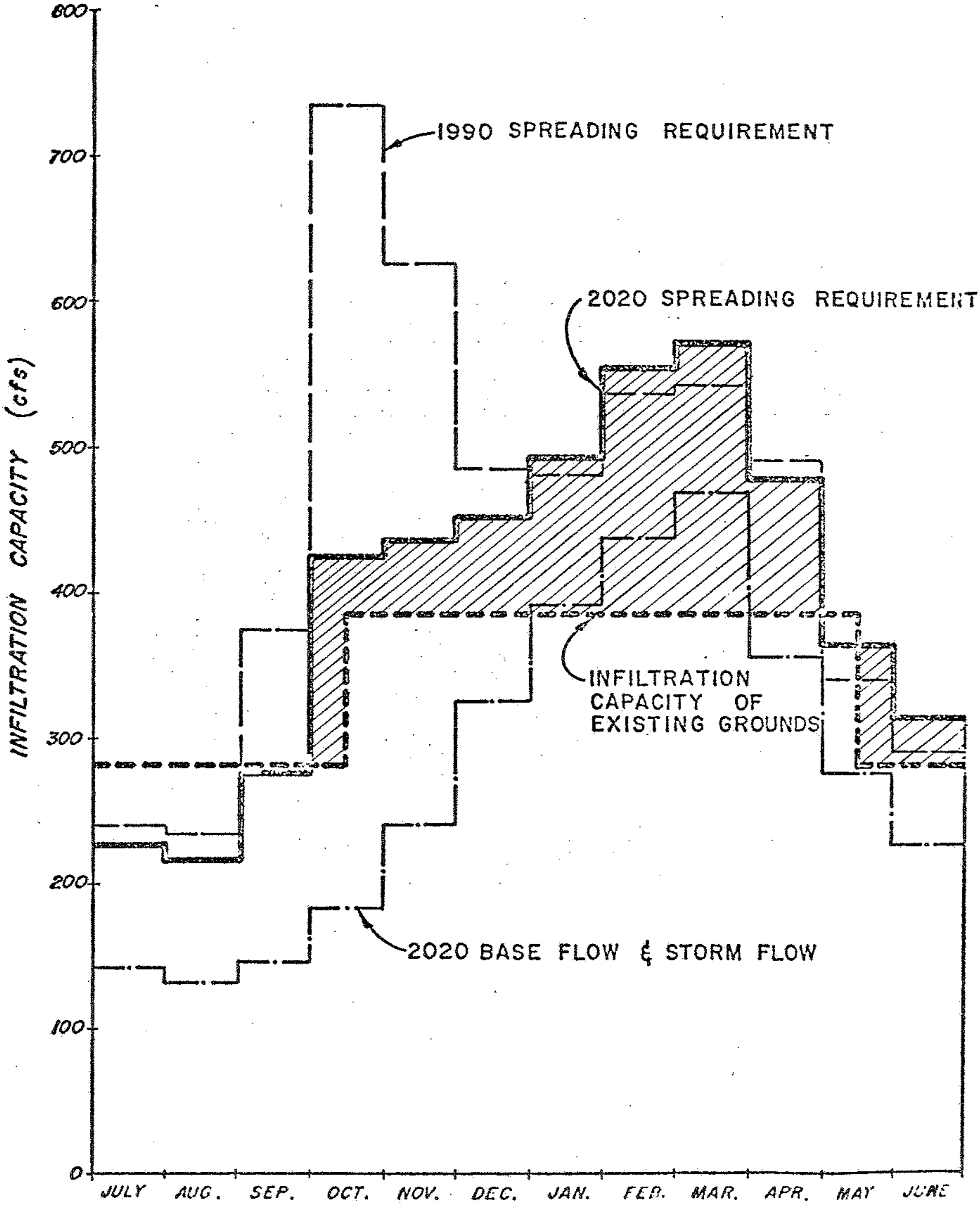
be delivered during the winter months when storm runoff is greatest. Thus the problem of available storage and percolation facilities is compounded.

In addition, Metropolitan Water District of Southern California (MWDSC) is currently reevaluating the policy of a differential water rate for groundwater replenishment and discussions are presently being held on the abolition of the differential. The differential is also being challenged in the Dar-Reynolds vs. MWDSC court case. Elimination of this pricing differential would further increase the conservation of storm flows from an economic standpoint.

In 1974, OCWD contracted with Toups Engineering to study their spreading ground program. Primary consideration was given to conservation of storm flows. The design factors for the study included infiltration rates, amount of storage, load factors to maintain infiltration rates, and dry time for scarification and midge control. The 2020 spreading requirements (Table 2) were selected for design size because they appear to be a better representation of ultimate requirements. Toups determined that a maximum of from 370 to 265 acres of additional spreading grounds (depending on the acreage of shallow or deep basins developed) was required to conserve the maximum Santa Ana River runoff potential. This needed increase in spreading ground capacity is illustrated in Figure 3. Development of the Burris Pit was a first step in this direction. Acquisition of the project land will be a second step.

FIGURE 3

SPREADING REQUIREMENTS



Source: Toups Engineering, 1974.

PROJECT ALTERNATIVES

Alternative methods of achieving OCWD objectives are discussed in this section. The no action alternative is discussed first. Alternative methods of solving water supply problems are then discussed. The third section describes alternate means of implementing the proposed project.

No Action Alternative

A no action alternative will lead to degradation of the Orange County groundwater basin which constitutes the loss of a major OCWD objective. In the future, it is highly probable that imported water supplies for replenishment purposes will be reduced, both in total quantity and duration of delivery. This means that available water will be delivered in a more concentrated period of time during the winter months coinciding with the period of maximum local storm flow runoff. The present spreading grounds cannot maximize the use of storm flows, and will be unable to absorb the increased peaking factor of imported water. No action, thus represents a significant curtailment in the use of available water supplies.

Alternative Water Supply Methods

1. Conversion to a Direct Delivery Imported Water Supply System

OCWD could substantially restrict use of the groundwater basin reducing the need for expansion of replenishment facilities.

Enlargement and restructuring of the direct delivery system could be used for water supply. Additional above-ground storage facilities would also need to be constructed. This option would reduce the overall reliability of the water supply system through elimination of the dual surface-groundwater delivery systems. Resources would be consumed by the additional required pipeline expansion. Noise, traffic, and dust impacts would result from pipeline construction; and, as with the no action alternative, available water supplies in the form of peaking storm flows would continue to be lost.

2. Reduction of Water Consumption

Orange County residents can restrict their per capita use of water. A reduction from the present 150 gallons per day per capita use to 100 gallons per day per capita water use would significantly decrease the need for water supply facilities of all types. In addition, substantial energy savings would be realized and the need for water sewage treatment facilities would be decreased. Opinion studies (Opinion Research of California, 1973) have shown that public opinion in the Orange County area is favorable on this issue. This alternative should be implemented in addition to the proposed project.

Methods of attaining this alternative might include education, changes in the water rate structure to one which requires an increasing charge for amounts of water used over a base amount, and introduction of water efficient household items such as shower heads and toilets.

Alternative Site Locations

Four alternative sites for spreading grounds use have been investigated. These alternatives primarily relate to options concerning land purchases to expand the spreading ground area, increasing both storage and percolation capacity. Two prerequisites were considered in alternate site relocation. These are:

1. Size. The proposed parcels must be large enough to represent a significant contribution to the required new spreading grounds. This is because of the economics of scale in developing the basin and delivery facilities. In addition, multiple uses of the basin can be maximized.
2. Open Space. The district feels that it should not purchase improved lands because of higher costs and severe impacts on communities.

1. Warner Basin Expansion

This alternative consists of the purchase of 9.64 acres between Tustin Avenue and Warner Basin. Warner Basin would be enlarged resulting in an annual increase of storage capacity of 50 acre-feet and an increased percolation of 5-10 cfs. This option has not been implemented because of the excessively high purchase cost, and the large setback required adjacent to Tustin Avenue. Due to easy access from Riverside Freeway, the cost of this property is more than double the cost of acreage nearby.

2. Santa Fe Land Improvement Company Property

This 106-acre parcel located between Orangethorpe Avenue and La Palma Avenue and east of Orchard Drive meets the OCWD prerequisites and would make a good off-channel deep basin site. OCWD is strongly considering use of this land as part of its spreading ground enlargement program. Urgency of purchase, however, is not required. The land is primarily open and is farmed for truck crops (strawberries). Table 3 provides assessment information for this site and the following alternatives.

3. Red Gum Avenue Property

This property located northwest of the Miraloma-Red Gum Street intersection is 61.35 acres. This land also meets the OCWD prerequisites. This property might be used by OCWD in the future. It is farther away from existing spreading grounds, however, which would increase the costs of water delivery facilities as well as operating costs.

4. Miller Basin Expansion

The OCWD is to investigate the possibility of deepening the existing Miller Basin. The facility is presently owned, used and operated by the Orange County Flood Control Basin for flood control purposes. OCWD feels it may be possible to deepen the 15-foot basin to 50 feet. By using the increased 35-foot depth, OCWD could increase their storage and percolation capacity. By leaving the upper 15 feet of the basin empty, the Orange County Flood Control District could maintain their emergency storage capacity for flood control purposes.

Table 3

ASSESSED VALUATION FOR ALTERNATE PROJECT SITES

Property	Acres	Assessed Value	Market Value 4 x AV	Market Value 5 x AV
Warner Basin	9.64	$ 54,180	$ 216,720	$ 270,900
Santa Fe	106.13	643,760	2,575,040	3,218,800
Red Gum	61.35	341,410	1,379,640	1,707,050
Kraemer	46.47	258,060	1,032,240	1,290,300

Source: Cederic A. White, 1975; Robert H. Harrison, 1975.

5. Kraemer Basin Property

This parcel is located directly southwest of the Miller Basin, north of Miraloma Avenue and east of Kraemer Boulevard. It is approximately 47 acres in size. There are two hcuses and appurtenant buildings on the land. The rest of the area is open and is used to grow strawberries.

This parcel has the advantages of being near other OCWD and Orange County Flood Control District facilities. A channel or pipeline to the Carbon Creek Channel will connect the proposed basin to the other facilities. Purchase of this parcel is the proposed project.

THE PROPOSED PROJECT

OCWD purposes to purchase approximately 47 acres of land located north of Miraloma Street and east of Kraemer Avenue in Anaheim, California (Figures 4 and 5). Presently, the land is open space with two small residences and appurtenances. Truck crops, primarily strawberries, are grown on the land. OCWD will purpose to purchase the land over a 5-year period. Current use would continue during this time, and property may remain vested in current owners until final payment is made. This will be negotiated with individual owners. Relocation plans would be developed during this time as well as plans to excavate spreading basins. An enhancement plan would also be developed for the basin. Board of Directors' policy sets aside 25 percent of sand and gravel revenues derived during basin excavation for enhancement implementation. It is possible that a multi-purpose use of the spreading basin could allow public use of the area for water-oriented recreation. It is anticipated that project development will occur 5 to 10 years in the future.

The appraised purchase price for the 47 acres was approximately $1,700,000. It is estimated that the capital costs will be recovered by profits realized through the sale of sand and gravel.

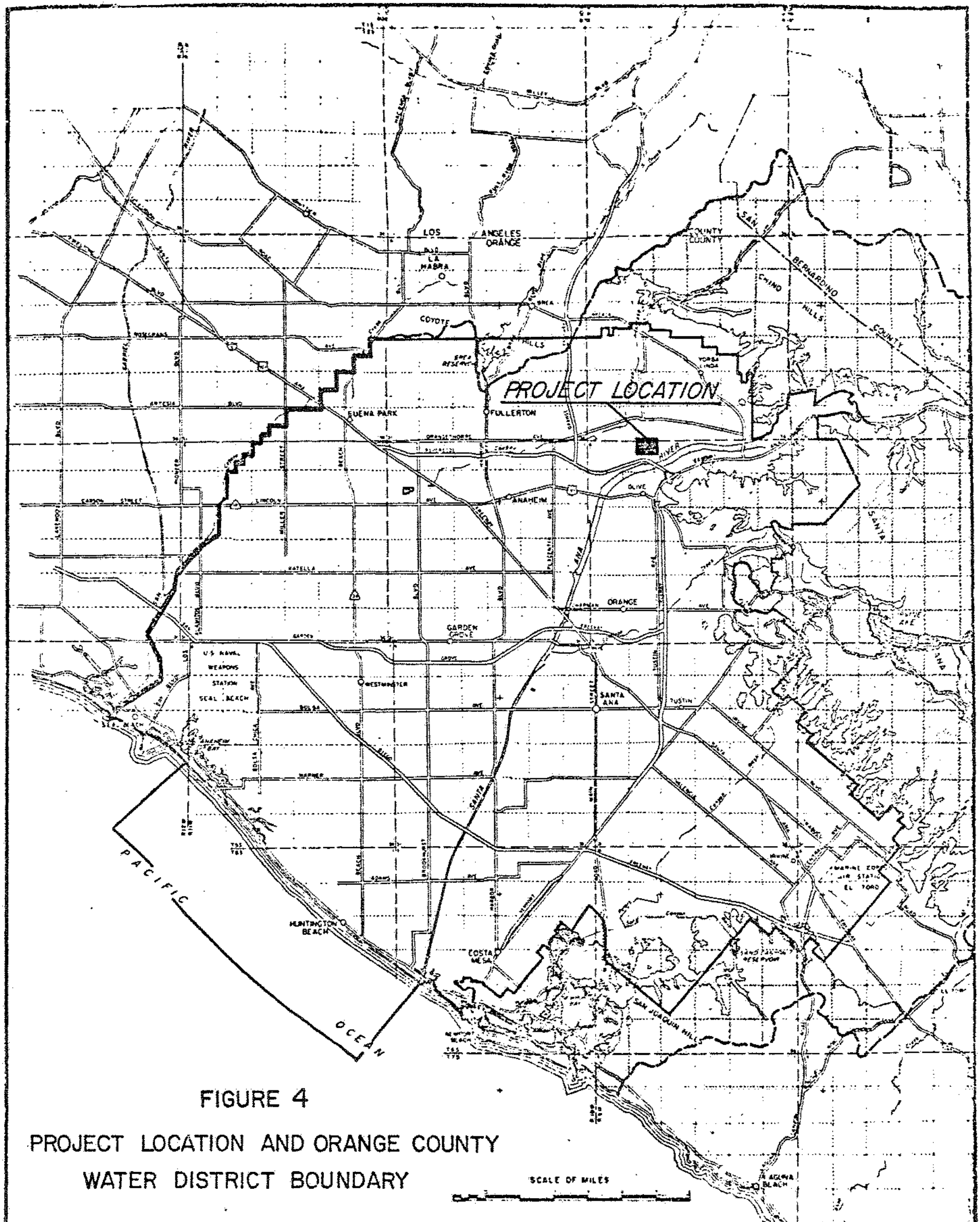
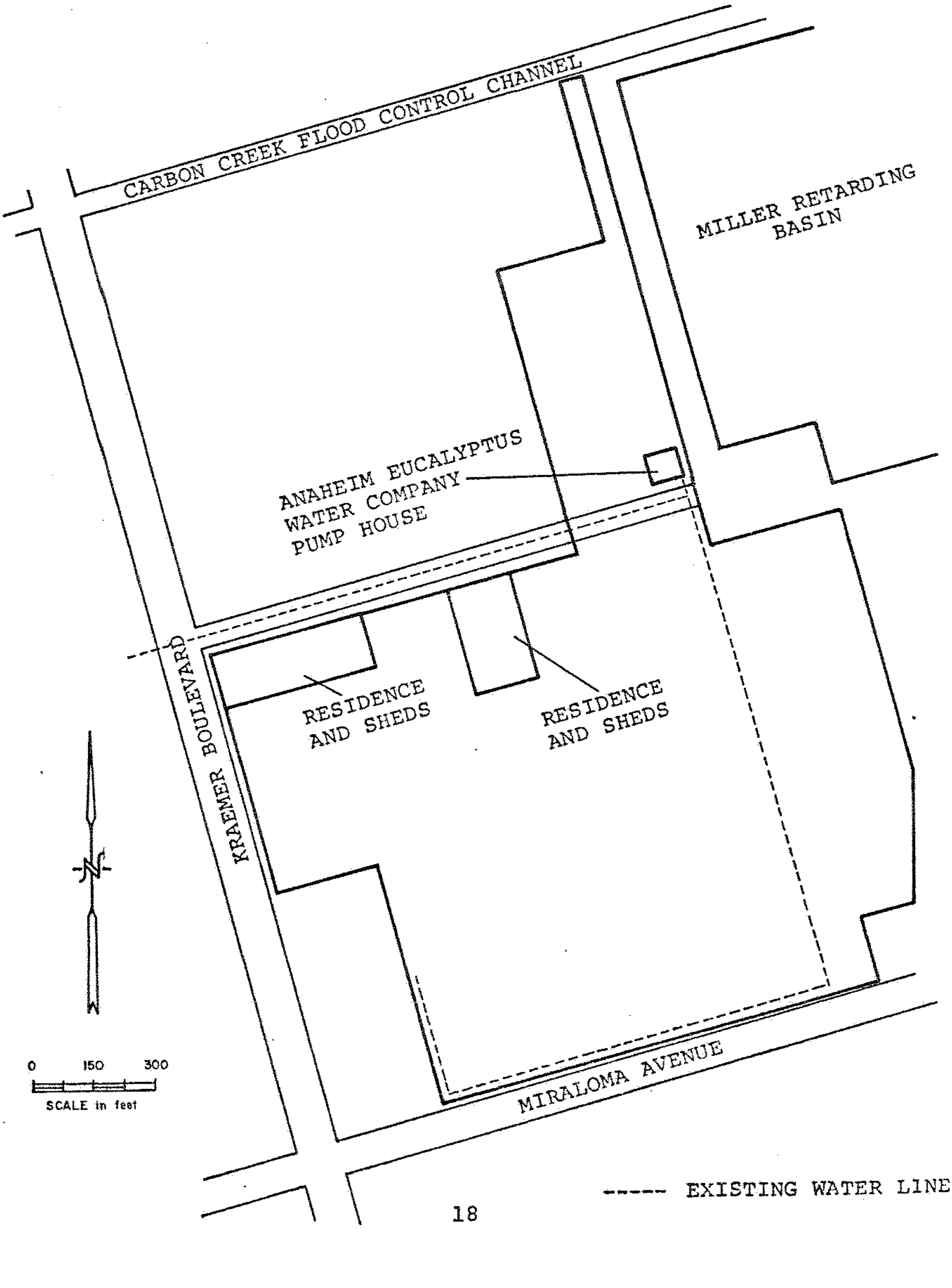


FIGURE 4

PROJECT LOCATION AND ORANGE COUNTY WATER DISTRICT BOUNDARY

SOURCE: ORANGE COUNTY WATER DISTRICT, 1975

FIGURE 5: PROJECT AREA



Future Project Development

The purchased land will be developed as an off-channel, deep spreading basin. Approximately 40 acres of the 47 acres purchased will be deepened to form a basin 50 feet deep. This will represent about 15 percent of the additional 265 acres required to meet Orange County storm flow water conservation needs. The spreading ground storage capacity would be increased by 200 acre-feet and the percolation capacity would be increased by an average of 100 cfs (3,000 AF/month). The project will be gravity fed, thus requiring little or no energy for operation.

For comparison, the Burris Pit now under construction is 80 acres and represents 30 percent of the required area. Existing plus additional new facilities will be capable of delivering Santa Ana River base and storm flows, Colorado River water and State Project water to the basin. New facilities which will be needed include a pipeline or channel from the Orange County Flood Control District's Atwood flood control channel to the new basin. The possibility of routing storm flows through the Miller basin to the new basin will be investigated. Miller Basin could, in effect, act as a settling basin thus helping to maintain the percolation capacity of the new basin.

ENVIRONMENTAL SETTING

The project area is located in northeast Orange County in the forebay area of the Orange County groundwater basin. Impacts of the project, however, will affect the entire Orange County coastal plain area which utilizes water from the groundwater basin. This section of the report describes the existing environmental setting of the affected area. A general review is made of the larger coastal plain area. This is followed by a more detailed description of the actual proposed project area. Emphasis is placed on areas of potential impact which may affect the decision making process.

The Orange County Coastal Plain

Orange County, located on the semi-arid southern California coastal plain, receives barely 12 inches of rainfall annually. The Santa Ana River, the largest river in southern California, traverses and with its tributaries brings additional water to the county.

Early settlers in the county were able to utilize the river and groundwater for water supplies and the region blossomed into an important agricultural center. However, it was apparent as early as 1925 that the coastal plain was a water deficient area. In the 1930's the 242-mile long Colorado River aqueduct was constructed to bring imported water to the area.

Following World War II, Orange County and much of southern California began a dynamic transition from a rural-agricultural economy to an urban-industrial economy. Completion of the Santa Ana Freeway contributed to an acceleration of growth in Orange County. In order to meet the increased water demand resulting from this growth, the State Water Project was constructed. The first deliveries of this water to Orange County were begun in 1973.

It has been estimated that on January 1, 1975, the Orange County population exceeded 1,700,000 people with a per capita water use of approximately 150 gallons per day. The OCWD has determined that the demand for groundwater production that this population generates (235,000 acre-feet) in 1975-1976 will require a total of 131,000 acre-feet of replenishment water as shown in Table 4. In addition, an estimated 65,000 acre-feet of Santa Ana River water will be needed to spread for replenishment purposes.

Water Pricing Structure, Energy Costs and Quality

Table 5 lists the present water pricing structure for imported water purchased from Metropolitan Water District of Southern California. There is a $10 differential between Colorado River water and State Project water in all categories. Metropolitan Water District of Southern California has stated intentions of decreasing this surcharge to $6 in 1976-1977 and completely eliminating the differential in 1977-1978. Orange

Table 4

ESTIMATED LIMIT OF THE TOTAL
REPLENISHMENT ASSESSMENT TO BE COLLECTED
IN 1975-76

	Water Source	Acre Feet	Quality mg/l* TDS	Cost $/AF	Amount
1.	Water Factory 21	10,000	500	35**	$ 350,000
2.	Colorado River Replenishment	51,000	740	31	$1,581,000
3.	SWP Replenishment	70,000	250	43	$3,010,000
	TOTALS	131,000			$4,941,000

Average Quality = 460 mg/l*

Average Cost = $37.70/acre foot

** Figure is one-half the cost of treatment and operating costs for producing water, based on 1974-1975 figures.

Source: Orange County Water District, 1975.

Table 5

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
IMPORTED WATER RATES AS OF JULY 1, 1975

	Colorado River Water	State Project Water
Domestic & municipal use*		
Treated	$67	$77
Untreated	58	68
Groundwater replenishment use		
Treated	41	51
Untreated	32	42
Agricultural use		
Treated	34	44
Untreated	25	35

* Note: Those agencies purchasing a 50-50 blend of Colorado River-State Project water for domestic-municipal use will continue to pay $72.

Source: Orange County Feeder, July-August, 1975.

County water agencies are concerned about this, because they fear there will be less surplus high quality State Project water available for groundwater replenishment purposes.

Consideration is being given to elimination of the pricing tier system. All water, no matter what the intended use, would be priced the same.

The present water pricing structure does not reflect the true energy costs of obtaining State Water or Colorado River water. It requires about 2,000 kilowatts to pump one acre-foot of Colorado River water through the Colorado Aqueduct. The price of this energy is directly tied to the cost of fossil fuels. In comparison, it requires about 3,360 kilowatts to pump one acre-foot of water through the State Water Project aqueduct.

The energy needed to pump this water is presently tied to long-term contracts which expire in 1983. These contracts have kept the price of this energy relatively low. Renegotiation of these contracts, however, is expected to increase energy costs about 5 times present costs (Kline, pers. comm.).

In 1974 the average quality of water for Colorado River water was 710 parts per million (ppm) total dissolved solids (TDS), while the quality of State Project water was 250 ppm TDS. The Regional Water Quality Control Board water quality objective for the Orange County groundwater basin is 600 ppm TDS in the forebay area and 500 ppm in the pressure area. These objectives cannot be attained if Colorado River water is the sole water import.

Miller Basin Property

Physical Environment

The Miller Basin Property consists of 47 acres of land located north of Miraloma Avenue and east of Kraemer Boulevard in the City of Anaheim (Figure 5, page 18). La Jolla Street borders most of the north portion of the property. The land is generally flat at an elèvation of about 220 feet. Located north of the area is the Carbon Creek Flood Control Channel and located directly northeast of the property is the Miller Retarding Basin owned and operated by the Orange County Flood Control District.

Soils in the area are sandy with high percolation rates which have allowed the area to be developed without storm drains. The area is underlain by sands and gravels deposited by the Santa Ana River. Percolation tests conducted by Woodward-Clyde Consultants (1975) in four exploratory boring holes demonstrated the high transmissivity of the underlying materials. No active fault traces pass through this site.

Air quality in the area often fails to meet state and federal air quality standards (Table 6). Winds channeling through the Santa Ana River Canyon bring in outside pollutants that contribute to the buildup of air pollutant concentrations in the project area.

Table 6

AIR QUALITY MEASURED AT ANAHEIM, CALIFORNIA - 1974

Pollutant	Federal Air Quality Standards	Data Format	Location: Anaheim	Location: County Wide	California Air Quality Standards	Data Format	Location: Anaheim	Location: County Wide
Oxidant (Ozone)	0.08 ppm 1 hr avg.	Days[1] Max.[2]	73 days .31 ppm	218 days .54 ppm	0.10 ppm 1 hr avg.	Days[1] Max.[2]	61 days .31 ppm	194 days .54 ppm
Nitrogen Dioxide (NO_2)	0.05 ppm Annual avg.	Annual avg.	—	—	0.25 ppm 1 hr avg.	Days Max.	12 days .37 ppm	20 days .50 ppm
Carbon Monoxide (CO)	9 ppm 8 hr avg.	Days Max.	8 days 14 ppm	66 days 25 ppm	10 ppm 12 hr avg.	Days Max.	3 days 12 ppm	37 days 22 ppm
	35 ppm 1 hr avg.		0 days 17 ppm	0 days 33 ppm	40 ppm 1 hr avg.		0 days 17 ppm	0 days 33 ppm
Sulfur Dioxide (SO_2)	0.14 ppm 24 hr avg.	Days Max.	0 days .04 ppm	9 days .04 ppm	0.10 ppm 24 hr avg.	Days Max.	0 days .04 ppm	0 days .04 ppm
	0.03 ppm Annual avg.	Annual avg.	—	—	0.50 ppm 1 hr avg.		0 days .08 ppm	0 days .18 ppm
Suspended Particulate Matter	75 µg/m^3 AGM[3]	AGM[3]	94	—	60 µg/m^3 AGM[3]	AGM[3]	94	—
	260 µg/m^3 24 hr avg.	% over[4] Max.	0% 223	0.2% 273	100 µg/m^3 24 hr avg.	% over[4] Max.	46% 223	37% 273
Hydrocarbons (Corrected for Methane)	0.24 ppm 3 hr avg. (6-9 a.m.)	Days Max.	(9 mo.) 178 days 4 ppm	(11 mo.) 259 days 8 ppm	1.5 µg/m^3 30 day avg.	Months Max.	11 mo. 3.76	—

[1] Days - Numbers of days standard exceeded.
[2] Max. - Highest value over averaging time.
[3] AGM - Annual Geometric Mean.
[4] % over - Percent of samples over criterion.

AIR POLLUTION EPISODES

Pollutant	Federal Criteria (ppm/time)	Stage	Episodes Declared	California Criteria (ppm/time)	Stage	Episodes Declared
Oxidant	0.20 / 1 hr	1	37	0.20 / 1 hr	1	37
	0.40 / 1 hr	2	2	0.40 / 1 hr	2	2
Sulfur	0.50 / 1 hr or 0.20 / 24 hr	1	0	0.50 / 1 hr or 0.20 / 24 hr	1	0
Carbon Monoxide	40 / 1 hr or 20 / 12 hr	1	0	40 / 1 hr or 20 / 12 hr	1	0

Source: Orange County Air Pollution Control District, 1975.

Biological Environment

The property is presently farmed and primarily produces strawberries. At the time of the field investigation, most of the area had been plowed or was being replanted with strawberries.

The intensive agricultural use of the area has eliminated wild vegetation. The only wildlife use would be by wide-ranging birds such as crows or seagulls which occasionally scavenge on the area. One of the features of modern strawberry culture is the gassing of the topsoil to eliminate nematodes and which also eliminates small rodents or other subsurface life.

Socio-Economic Environment

The property is located in the Anaheim redevelopment area. The portion of the industrial area in which the property is situated is presently about 40 percent developed. In the immediate area surrounding the property is developed industrial property. North of the property area across the Carbon Creek Flood Control Channel is a subdivision. Another potentially sensitive area is a residence located adjacent to the southeast corner of the property.

The property consists of seven different parcels of land owned by:

1. Task Corporation
2. Anaheim Eucalyptus Company
3. Mr. and Mrs. Ogawa
4. Mr. and Mrs. Hori

5. Meyer, Pierina and Henry Ponterprino

6. Mr. and Mrs. Hartunian

7. Mr. and Mrs. Rau

The property is presently zoned RS-A-43,000 (residential and agricultural use) except for the narrow northern-most piece which is zoned M-L (light manufacturing). All of the properties are included in City of Anaheim Resolution of Intent No. 61-62-69 to be rezoned to M-L.

Two residences and several sheds and irrigation equipment are presently located on the property. The Anaheim Eucalyptus Water Company also maintains a well, pumphouse and water line on the property.

All utilities including sewer, water, gas and electricity are available in close proximity to the property.

Figure 6 illustrates the arterial street system in the general area of the property.

Most of the property is presently farmed primarily for strawberries. Strawberries produce over $10,000 FOB per acre, the highest gross value of any crop grown in Orange County. The project area is estimated to represent 3 percent of county agricultural lands used for growing strawberries.

Employment involves approximately 90,000 hours or 45 man-years on the estimated 37 acres of strawberry production.

The assessed value of the property is $258,060, and the 1974-1975 tax rate was $9.3190 per $100 of assessed value. Thus, in 1974-1975, $24,048.61 in taxes were paid on the property.

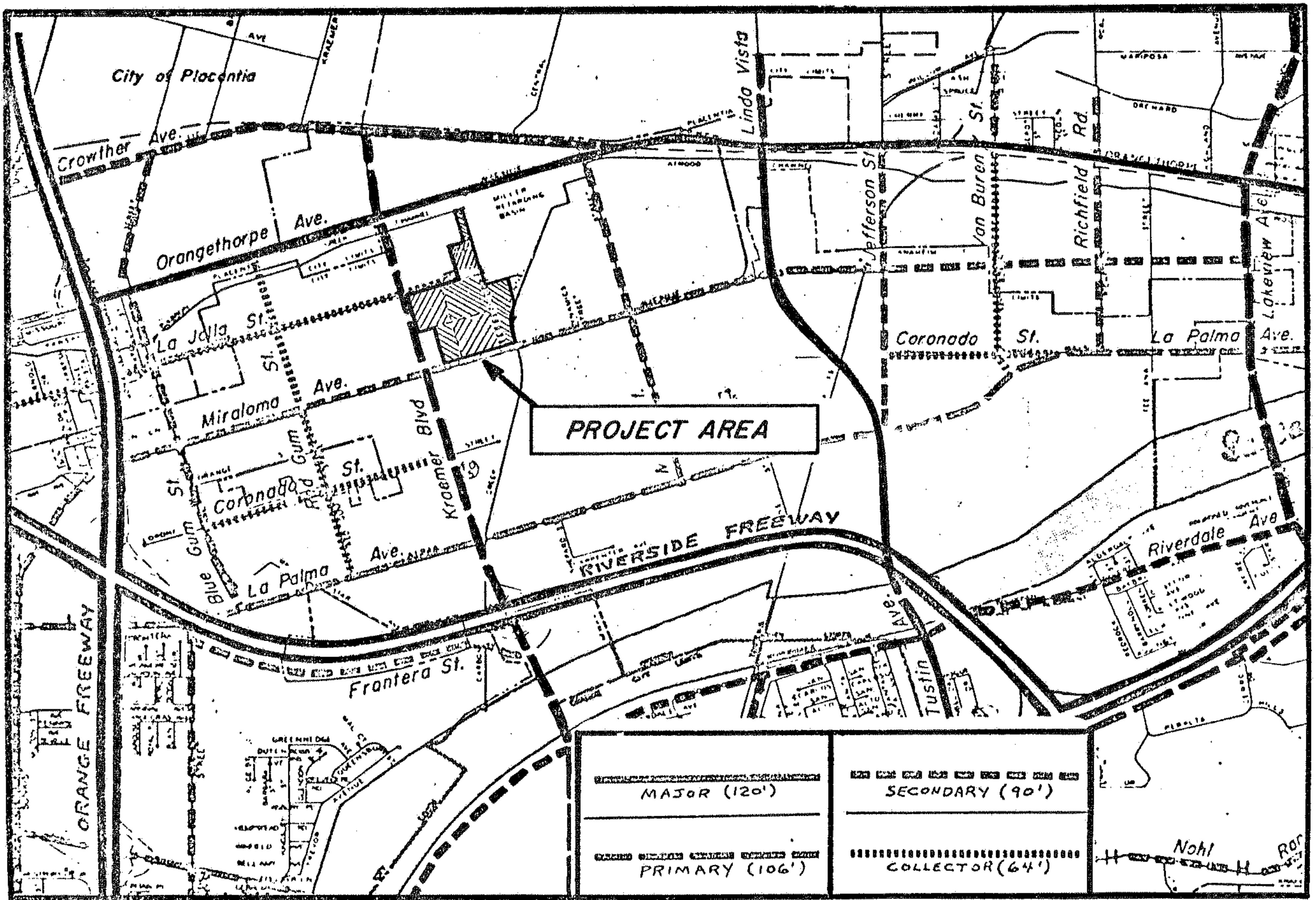


FIGURE 6: CIRCULATION ELEMENT OF THE ANAHEIM GENERAL PLAN -- ARTERIAL STREETS AND HIGHWAYS

The site has been subjected to intensive agricultural use and all surface archeological sites have been destroyed.

IMPACTS AND MITIGATION MEASURES

Introduction

In this section, both short-term and long-term environmental impacts of the proposed project are identified, discussed and evaluated. Appropriate recommended remedial, protective or mitigative measures are described.

The discussion of impacts is divided into two sections. The first section deals with the immediate purchase of land. This is considered to be a reversible action. In the second section impacts of the future development of the project into a deep off-channel spreading basin are discussed. When the construction bid is let the project will in effect become irreversible. This second section is designed to be a preliminary assessment of the environmental effects of that action. It may be desirable to reevaluate the environmental aspects of the project at the time of irreversible decision, anticipated to be 5 to 10 years in the future.

Impacts of Purchase of the Land

Impact 1. Loss of Agricultural Productivity

Purchase of the property by OCWD could result in the withdrawal of approximately 37 acres of agricultural land presently growing strawberries. (This represents 3 percent of county agricultural land in strawberry cultivation.)

Impact 2. Dislocation of Residences

Two families presently living in residences on the land would have to be relocated.

Impact 3. Loss of Jobs

Approximately 90,000 hours or 45 man-years of employment growing strawberries on the parcel will be lost.

Impact 4. Loss of Tax Base

Approximately $24,000 annually in property taxes would no longer be paid to the city and county.

Mitigation Measures. OCWD purposes to continue the present use of the land for 5 to 10 years. During this time the land would continue to remain productive and jobs would be maintained. In addition, OCWD would attempt to negotiate purchase in a manner which would assure that property taxes would continue to be paid during the next 5 years. If these measures are followed, these impacts will not take place until future construction occurs. A period of 5 to 10 years, however, will be available to relocate the residents and establish new jobs.

Impact 5. Loss of Use of the Anaheim Eucalyptus Well

This would not really be an impact as OCWD would assure use of the well or an alternative water supply to the Anaheim Eucalyptus Water Company until surrounding farm lands are converted to planned industrial use. The well could continue to be used to supply water to landscape amenities around the basin area.

Impacts of Future Project Construction

Impact 1. Construction Impacts

These impacts are considered short term in nature. They consist of noise, dust and traffic generated during excavation of the basin.

Because the surrounding area is primarily industrial, these impacts will be less heavily felt than if the area were residential in character.

Mitigation Measures. As the pit is deepened the noise impact will decrease in importance. Precautions should be taken to avoid raising dust when the Santa Ana winds occur, particularly when the pit is still shallow. Truck haul routes should be routed to cause minimal disruption to existing traffic patterns.

Impact 2. Maintenance of Water Supply

The project will contribute to the maintenance of an adequate Orange County groundwater basin water supply. Expansion of the spreading grounds will allow:

1. Conservation of base and storm flows of the Santa Ana River which are expected to increase in the future.
2. Conservation of all available high quality State Project water.

It appears that State Project water which becomes available for replenishment purposes will be delivered in the winter at the same time as the peaking storm flows occur. The spreading ground facilities will be capable of handling this peaking capacity.

Impact 3. Reduction in Sand Transport to Ocean Beaches

The bulk of sand transport to local beaches occurs during Santa Ana River storm flow periods. The storm flows of 1969 were the last time significant amounts of material were moved along the river channel. The storm was approximately 25-year flood magnitude.

The OCWD project will reduce the peaking amount of storm flow waters reaching the ocean. However, this will have a very small impact on major storm flows such as those experienced in 1969, which are known to move most of the sand. In addition, the proposed project will not increase the 300 cfs spreading ground inlet facility.

Impact 4. Reduction of the Midge Problem

Midges are small pests whose larva develop in wet, sandy soils. Shallow percolation ponds form ideal habitats and further construction of this type of basin might compound the problem.

Mitigation Measures. The OCWD is actively attempting to solve the midge problems. Construction of additional deep basins which are not suitable midge habitat instead of shallow basins will help curb the problem. The availability of these basins will allow greater drying times in the shallow basins during some periods of the year reducing the existing problem. The OCWD is contracting with the Department of Entomology, University of California, Riverside to develop solutions to the *midge problem. To date, midge species have been identified and work has commenced on pesticides and application frequencies and methods.*

Impact 5. Removal of Topsoil and Sand and Gravel

The proposed project will require the removal of 40 acres of material to a depth of 50 feet, about ~~8~~ 3.2 million cubic yards. OCWD will contract to have the material removed. The sand and gravel will be used for fill in the Orange County area.

Mitigation Measures. Special consideration should be given to protecting the topsoil resource through removal and reuse in another location as topsoil. (Perhaps this topsoil could be used in the Santa Ana River greenbelt project.)

Impact 6. Reduction of Energy Demand

The proposed project will increase energy conservation. Each acre-foot of Santa Ana River storm flow or increased base flow conserved in place of imported Colorado River or State Project water will save 2,000 or 3,360 kilowatts per acre-foot, respectively.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

The following adverse impacts are unavoidable:

- Loss of Agricultural Productivity
- Dislocation of Residences
- Loss of Jobs
- Construction Impacts
- Reduction in Sand Transport to Ocean Beaches

IRREVERSIBLE ENVIRONMENTAL CHANGES AND COMMITMENT OF RESOURCES

Purchase of the project lands is not considered an irreversible action. Resale and selection of alternative locations or projects is a realistic possibility prior to letting of the excavation contract. Once this contract is let (estimated to be 5 to 10 years in the future) the project will essentially become irreversible.

The primary commitment of resources will involve the land and energy used during excavation. This energy use will be more than offset by the long-term energy savings resulting from use of low energy cost Santa Ana River water instead of imported water.

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed project is designed to maintain the long-term productivity of the Orange County groundwater basin. In addition, the project will reduce future demand for energy. Approximately 37 acres of agricultural land will be removed from production during development and use phases of the project. Underlying sand and gravel deposits will be extracted and utilized. The proposed project does not limit or restrict future groundwater management options. However, failure to purchase the project lands might result in restrictions on the use of this management option.

GROWTH INDUCING IMPACTS

The proposed project is designed to conserve the increased base flow and storm flows of the Santa Ana River and available State Project and Colorado River water needed to maintain the quantity and quality of water in the groundwater basin. The project is not growth inducing in that it does not increase the existing amount of planned future water supply for the area. It reallocates the sources from which the planned future supply will be obtained.

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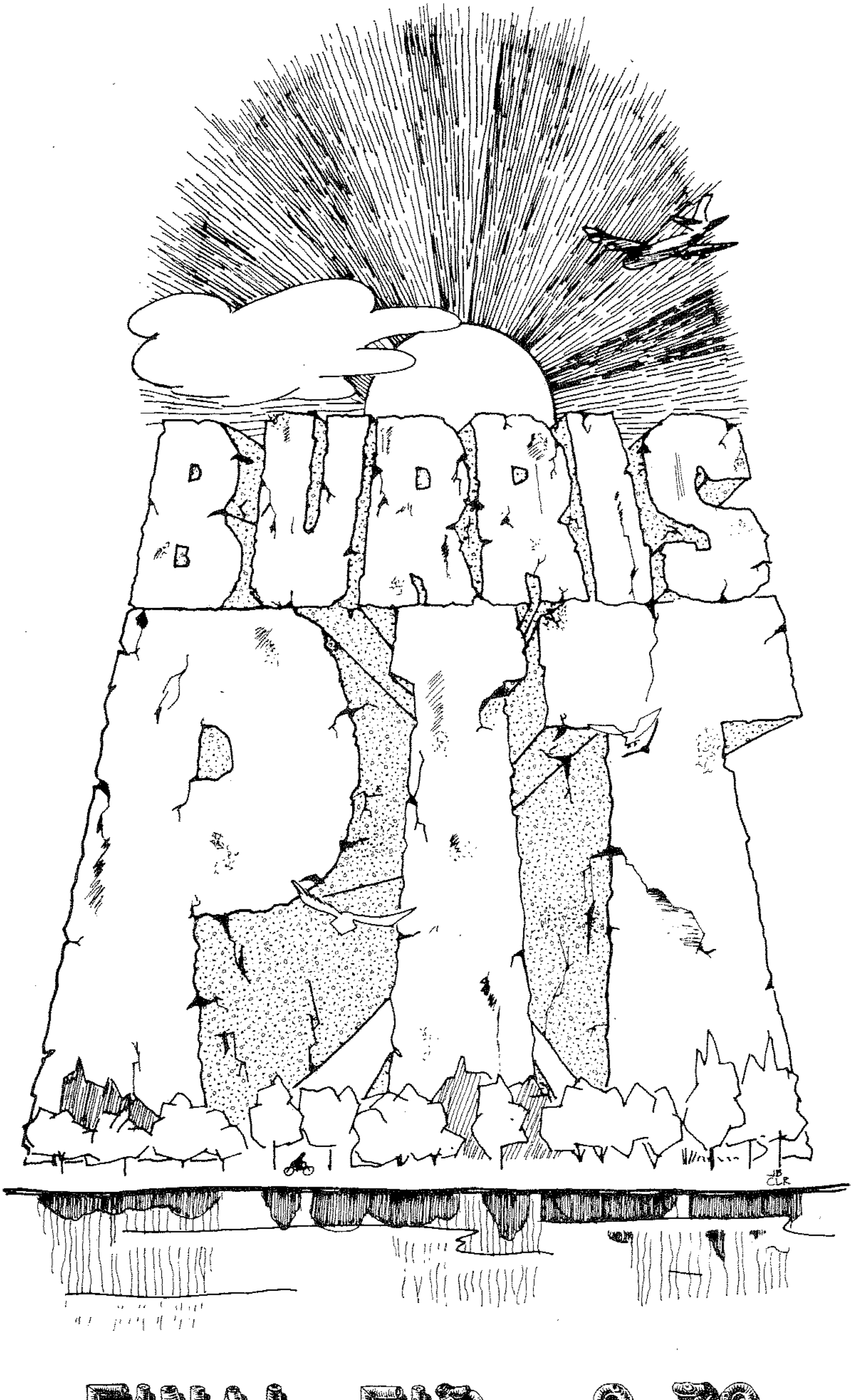
Appendix M-3

1976: Burris Pit Water Conservation Facility, FEIR



FINAL EIR 2-76

FINAL
ENVIRONMENTAL IMPACT REPORT

BURRIS PIT
WATER CONSERVATION FACILITY

BY
ORANGE COUNTY WATER DISTRICT

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I. Summary and Conclusions

The proposed rehabilitation and conversion of Burris Pit, a former sand and gravel pit, into a water conservation basin involves a major rehabilitation of the basin slopes on the westerly and northerly sides of the pit, a substantial amount of clearing and grubbing in all areas of the pit, establishment of the basin bottom at a uniform elevation, relocation of the easterly side of the existing pit, creation of a screening berm on the westerly side of the basin and construction of hydraulic structures. This proposed work is to be divided into three phases as follows:

Phase I

1. Cut and fill to stabilize west slope
2. Install screening berm
3. Install hydraulic structures
4. Relocate existing electrical transmission lines
5. Begin spreading operations

Phase II

1. Removal, sale or storage of clay from clay lens
2. Development of additional spreading area
3. Development of multipurpose facilities

Phase III

1. Removal of remaining sand and gravel from relocated berm area
2. Expand water conservation and multipurpose facilities

The following conclusions are based on the studies conducted for this report:

1. There is an immediate need to expand Orange County Water District groundwater recharge facilities to enable conservation of increasing storm and base flows of the Santa Ana River together with imported replenishment water.
2. There is a limited number of parcels which are geo-hydrologically suitable for development as spreading grounds.
3. The long range benefits to be gained from storm water conservation and percolation is estimated to be between $5.5 to $5.9 million.
4. Estimated costs to develop the Burris Pit amount to $3.0 million, which costs may be offset by revenues from surplus sand and gravel available after slope rehabilitation.
5. Potential short term adverse environmental impacts could occur during rehabilitation and construction including: dust, noise, traffic congestion, litter, safety hazards and air pollutant emissions.
6. Impacts of the project can be mitigated or minimized through proper design and construction procedures.
7. The project has been found to be environmentally positive. The combination of values to be received as positive impacts from the multipurpose facility, including

the primary purpose of water conservation, as well as recreation opportunity on a regional and local basis, together with safety benefits from slope rehabilitation undeniably overshadow the relatively few short term adverse impacts disclosed.

II. Project Description

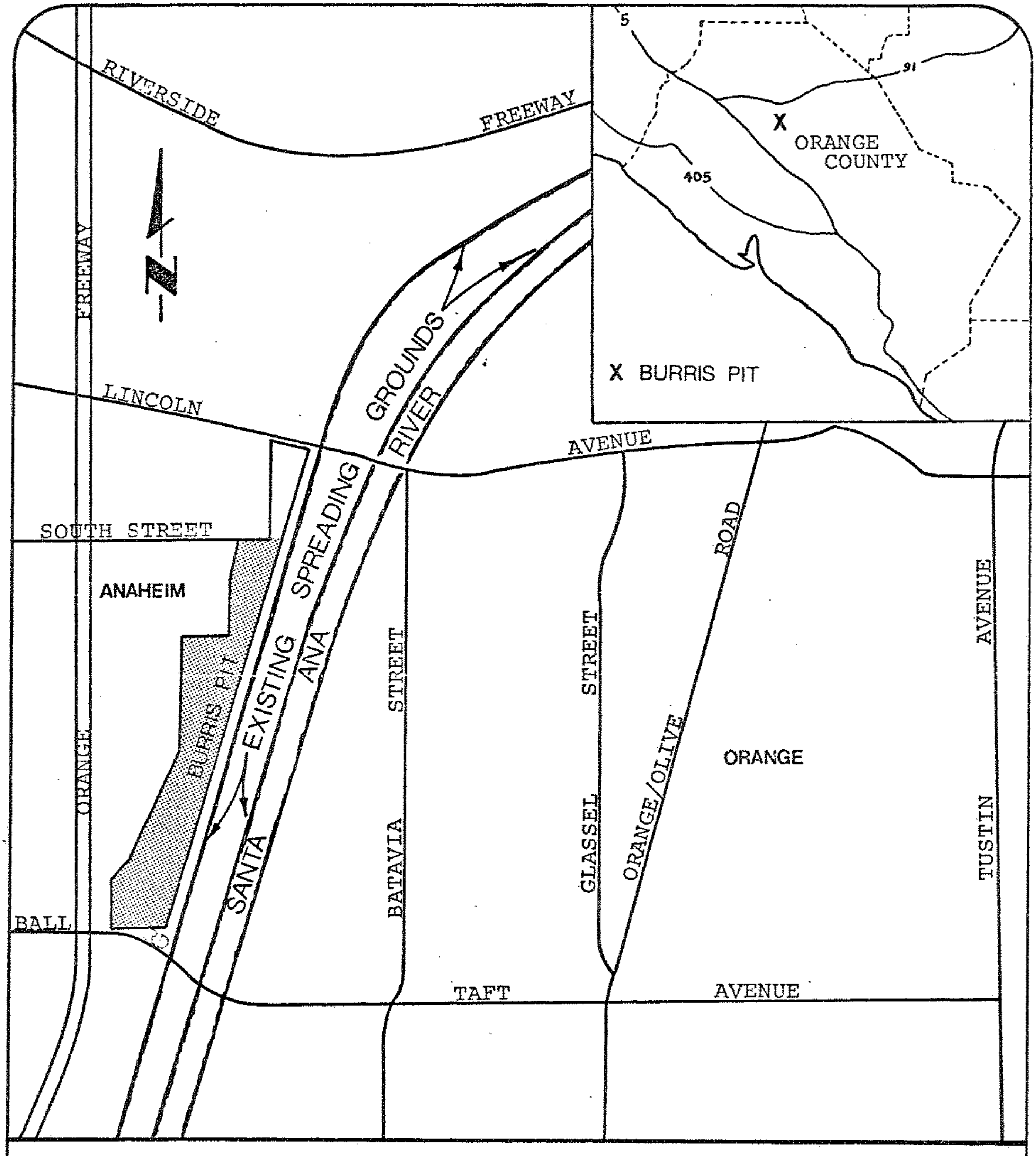
INTRODUCTION

This Environmental Impact Report considers the proposed excavation of sand, gravel and earth materials to be undertaken in the construction of the Burris Pit Water Conservation Facility.

Studies have been undertaken by the Orange County Water District to develop a master plan for spreading grounds within the District.[1] One of its objectives was to optimize the amount of imported and storm waters which could be spread. The need for additional spreading facilities appears conclusive.

A major part of the master plan for spreading grounds is the Burris Pit area. In general, the area is bounded by South Street on the north, Ball Road on the south, the existing spreading grounds on the east and residential development on the west (see Figure 1).

A report by Toups Engineering, Inc., December 1974[2] was prepared to determine Orange County Water District's overall goals for the development of water conservation capabilities and to determine whether or not the Burris Pit is required to meet those goals. The report concludes that the acquisition and development of Burris Pit into a water conservation facility would be beneficial.



SITE LOCATION MAP

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Purpose and Scope of Report

The purpose of this report is to evaluate in detail the impacts of all phases of work to be undertaken following preliminary slope stabilization in the construction of the proposed project, including an evaluation of alternative sites,[2] designs and projects, with emphasis on a multipurpose recreational facility.

PROPOSED WATER CONSERVATION FACILITY

Construction of Fence

Approximately 14,000 linear feet of chain link fence were installed around the perimeter of Burris Pit and the adjacent spreading basins. As the pit, in its then existing condition, was an extreme safety hazard, this work did not require the preparation of a negative declaration or an EIR as set out in Article IV-Emergency Projects, Section 26-C of the District's Objectives, Criteria and Procedures for Implementing the California Environmental Quality Act[3]; a categorical exemption was filed.

Phase I Slope Rehabilitation

Under the Phase I contract for slope rehabilitation the north and west side slopes of Burris Pit were restored at a slope of three horizontal to one vertical; although not in the contract, the powerline and towers will be relocated in one of two possible areas: (1) 100 feet from the existing center dividing levee of the SAR; or, (2) new lines will be constructed on the east side of the Santa Ana River levee. The District will also construct an inlet facility into the basin allowing for water conservation in the Burris Pit. The work covered under this phase, as the fence construction phase, was declared an emergency project by both the Department of Building and Safety and by the Orange County Water District. On February 26, 1969, Orange County Emergency Ordinance #2299 was adopted declaring Burris Pit to be a "public nuisance" and authorizing "emergency measures to conter-act and diminish this danger". As provided for in Article IV, Section 26-C of the District's Objectives, Criteria and Procedures for Implementing the California Environmental Quality Act, a negative declaration or an EIR is not required. Restoration of the pit side slopes will be completed in late 1975, the inlet facility by March 1976, and powerlines relocated by the end of 1976. The contract for construction of Phase I was awarded on May 21, 1975, with completion anticipated in January 1976.

Phase II and III

The work involved during these two phases will enlarge the present pit area to provide for water storage and conservation. This work consists of excavation of sand, gravel and other earth materials; transportation and recompaction of some silt and clay materials; and construction of various hydraulic structures required for transfer of water from the Santa Ana River storm channel into the conservation basin.

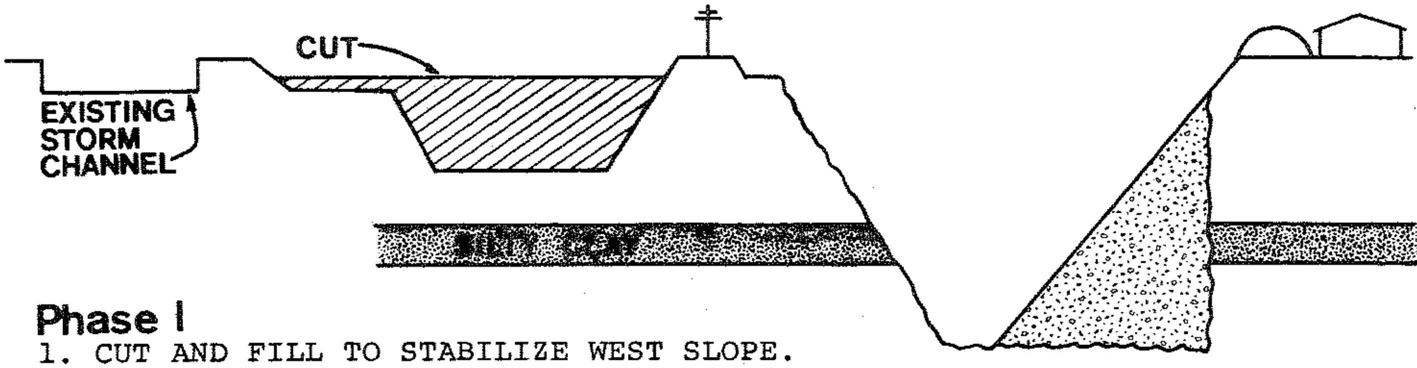
Excavation of sand, gravel and other earth materials will be conducted during both Phase II and III of this project.

During Phase II, it is anticipated that approximately 800,000 cubic yards of sand and gravel and 900,000 cubic yards of clay will be excavated over a period of 24 months beginning in January 1976. This excavation will take place in a strip cut approximately 20' deep beginning in the area of Orange County Flood Control District Station 798, proceeding downstream and ending in the vicinity of Station 752 (see Figure #2). This cut will expose an underlying lens of silty or sandy clay (see Figure 3).

Two alternatives are being considered for this Phase. Alternative A involves removal of all of the clay material along the entire strip prior to removal of the remaining sand and gravel to maximum depth. Alternative B would involve excavation of the strip in sections, removing both the sand, gravel and the clay to full depth before moving to the next section.

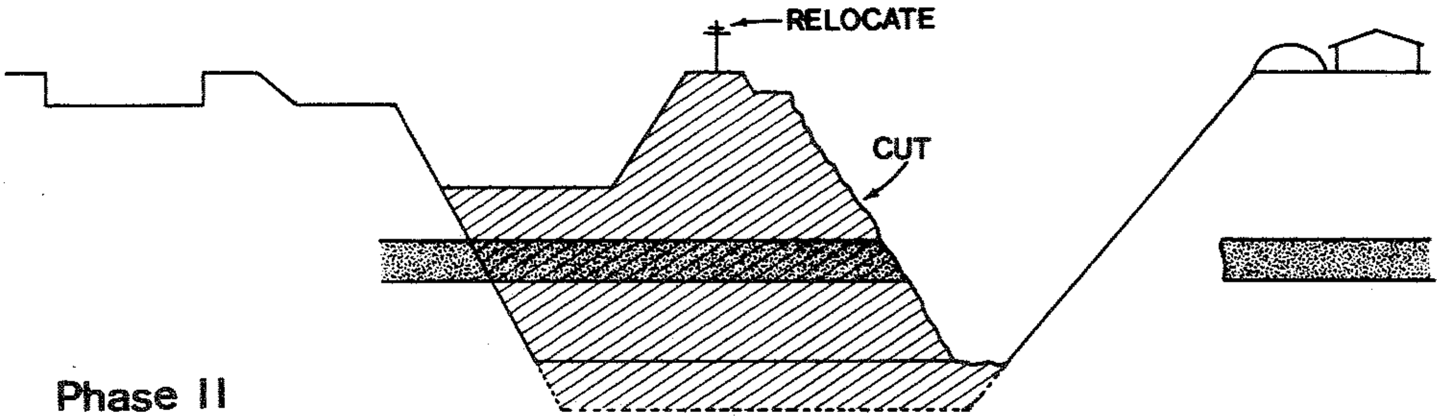
Through a public works contract, this clay will be loaded and hauled from the conservation area to either the desilting portion of the basin near Ball Road or onto the 100 foot wide strip parallel to the existing center dividing levee of the Santa Ana River (see Figure 4).

Excavation of these materials may be conducted by two or more firms simultaneously, depending upon the then current level of activity in the construction industry. If three contractors were excavating simultaneously, a reduction in time to accomplish the work from 24 months to approximately 15 months could be expected.



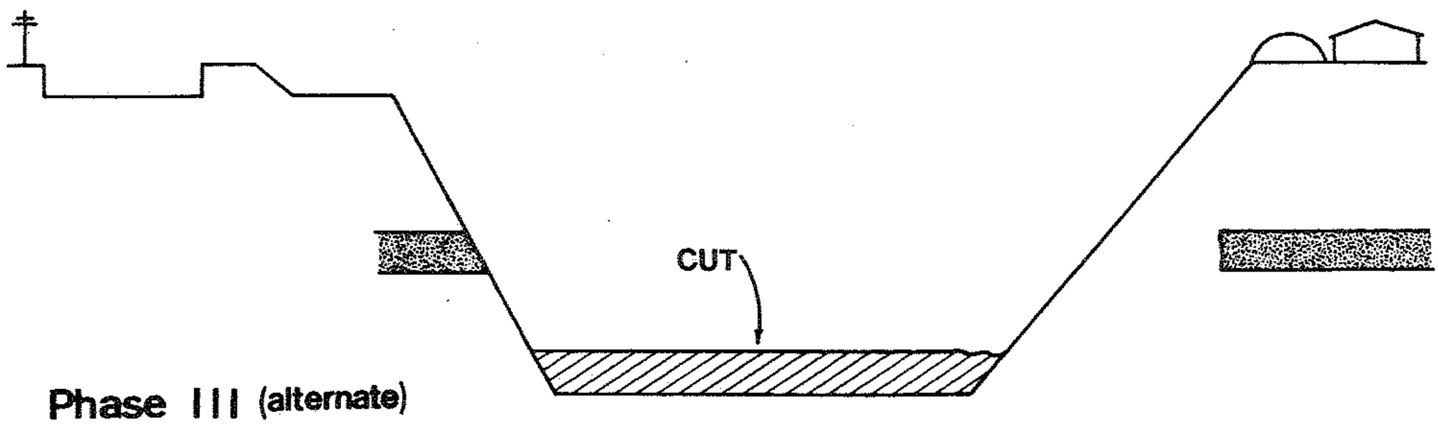
Phase I

1. CUT AND FILL TO STABILIZE WEST SLOPE.
2. INSTALL INLET
3. BEGIN SPREADING OPERATIONS



Phase II

1. REMOVAL, SALE OR STORAGE OF EARTH MATERIAL
2. DEVELOPMENT OF ADDITIONAL SPREADING AREA.
3. DEVELOPMENT OF RECREATION FACILITIES - TRAILS/WATER.



Phase III (alternate)

1. REMOVAL OF REMAINING EARTH MATERIAL
2. EXPAND WATER CONSERVATION AND RECREATIONAL FACILITIES.

NOTE: Phases II and III may be combined in order to complete the project in a more timely manner.

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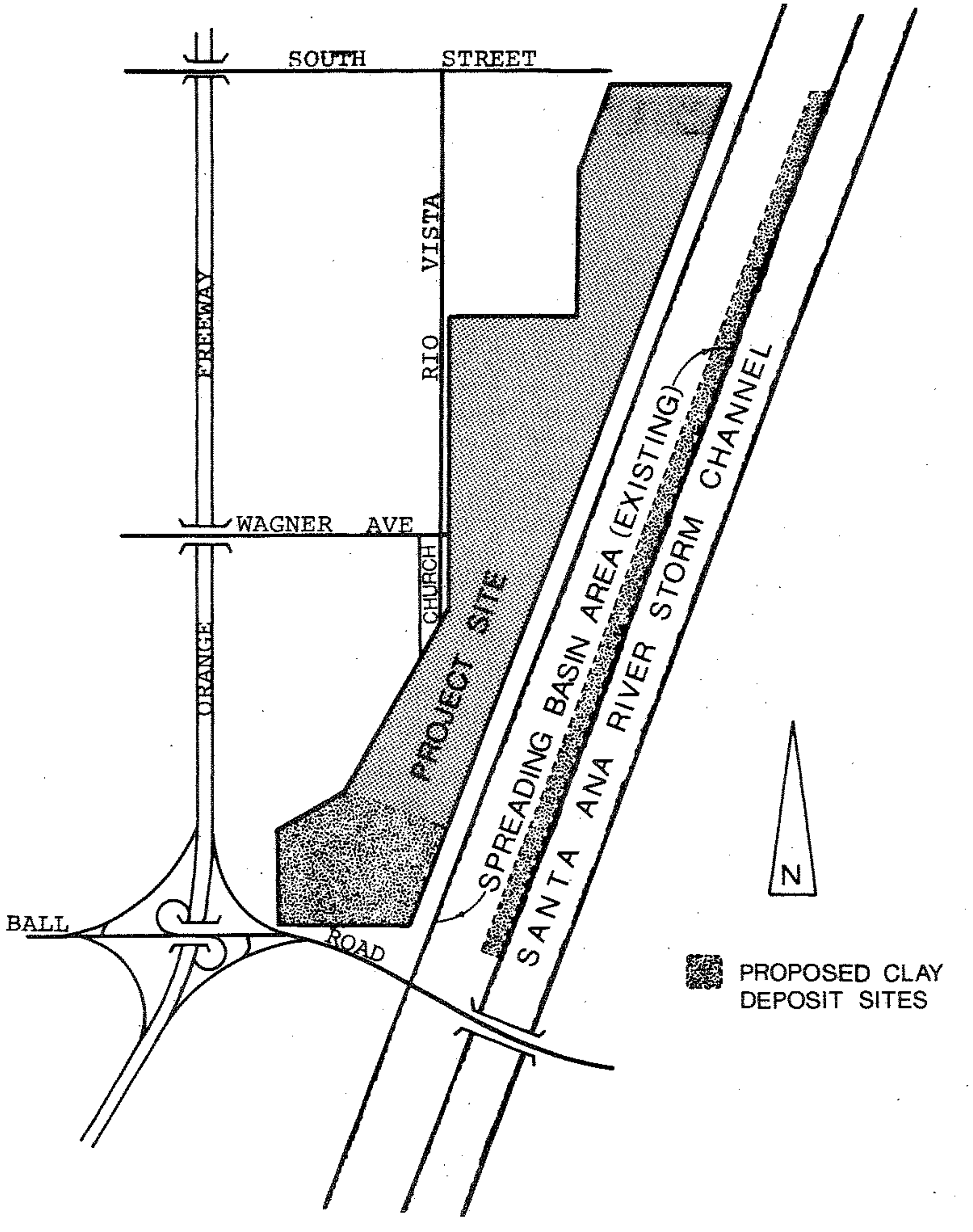

PROPOSED CLAY DEPOSIT SITES

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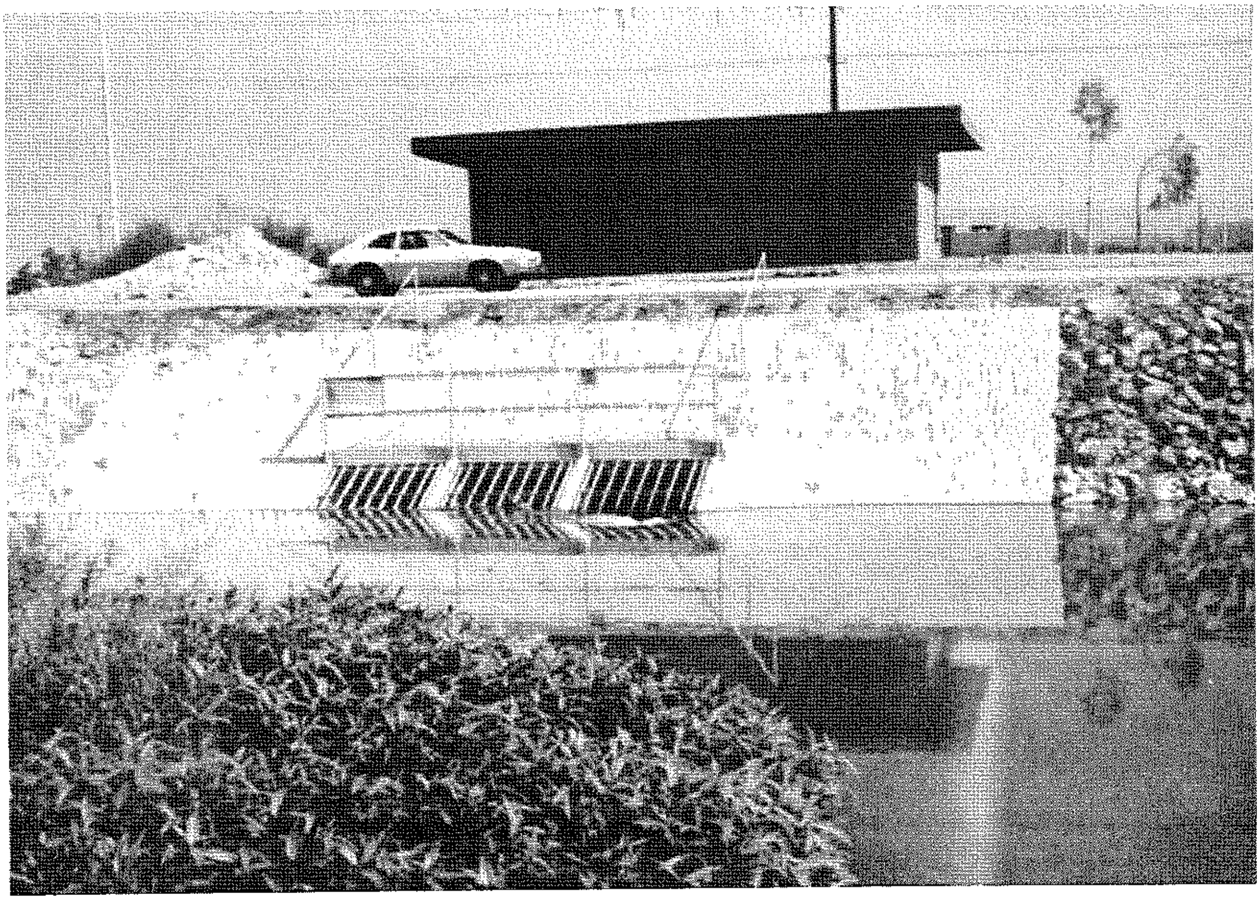
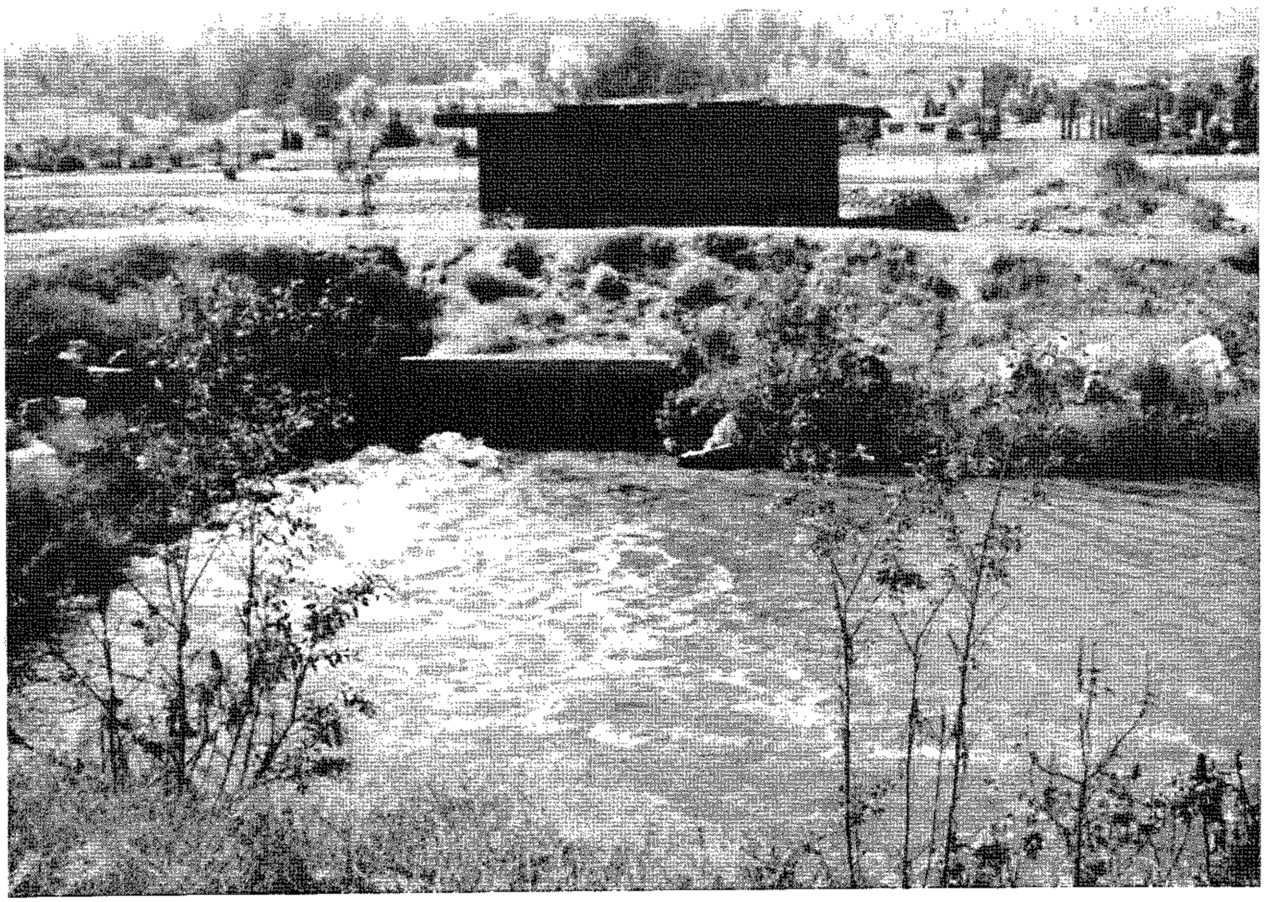
Plans, specifications and contract documents for the excavation of materials have not yet been prepared; however, it is anticipated that the District's standard excavating contract specifications will be utilized as a guide (see Appendix A). There will be a revision to the section regarding electrical power which will limit the utilization of portable power plants on the construction site.

The District's existing weigh station will be relocated from its present site at Warner Basin to Burris Pit in the vicinity of Ball Road, which is proposed for use as the primary ingress and egress route.

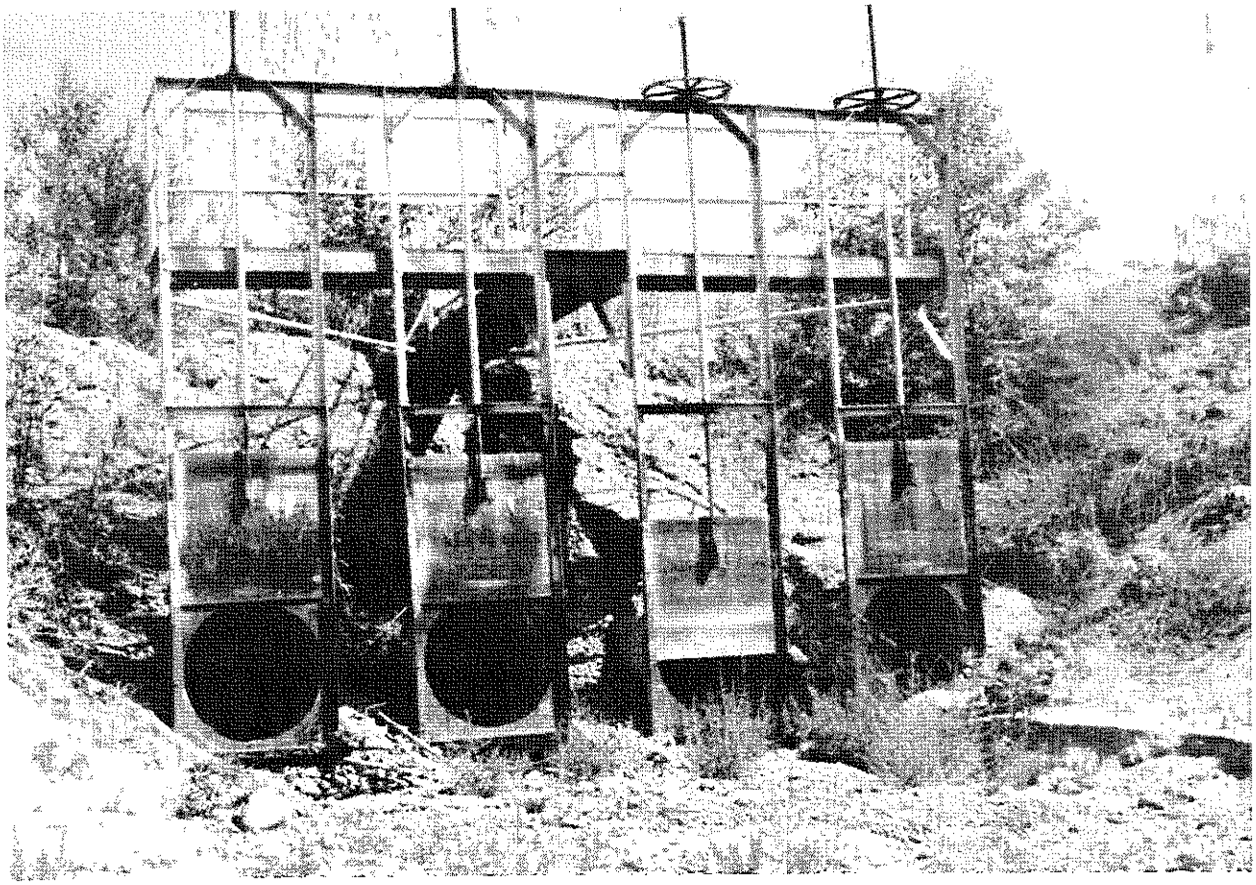
During Phase III, if alternative A is used, the remaining sand and gravel will be removed through a public works contract, bringing the pit down to a total depth of 100 feet. The completion time for this work largely depends upon the construction industry; however, it is anticipated that basin construction will be completed by December 1979.

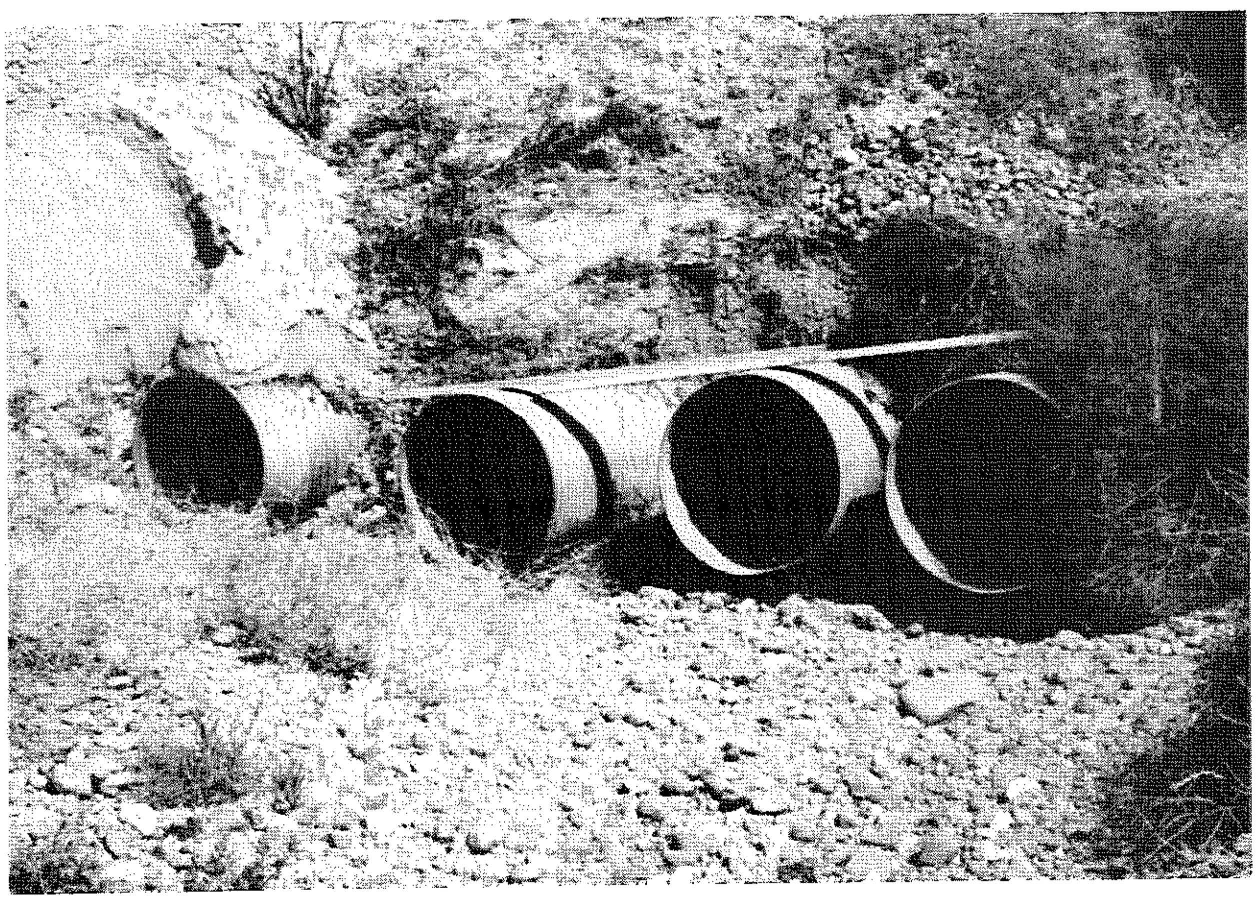
The major hydraulic structures in the project will consist of inlet gate structures constructed on the center dividing levee in the vicinity of Orange County Flood Control District Stations 745 and 801 (see Figure #2). These inlet gates will be similar to either the inlet structure leading from the SAR storm channel to District conservation basins located near Imperial Highway (see Photo 1), or those structures located at Orange County Flood Control District station 801. Other hydraulic facilities will include a shallow flood spillway from Burris Pit into the Santa





Ana River Storm Channel, and various corrugated metal pipe tube inlets to transfer water from the desilting basins into the major conservation basin (see Photo 2).





III. Existing Environmental Conditions

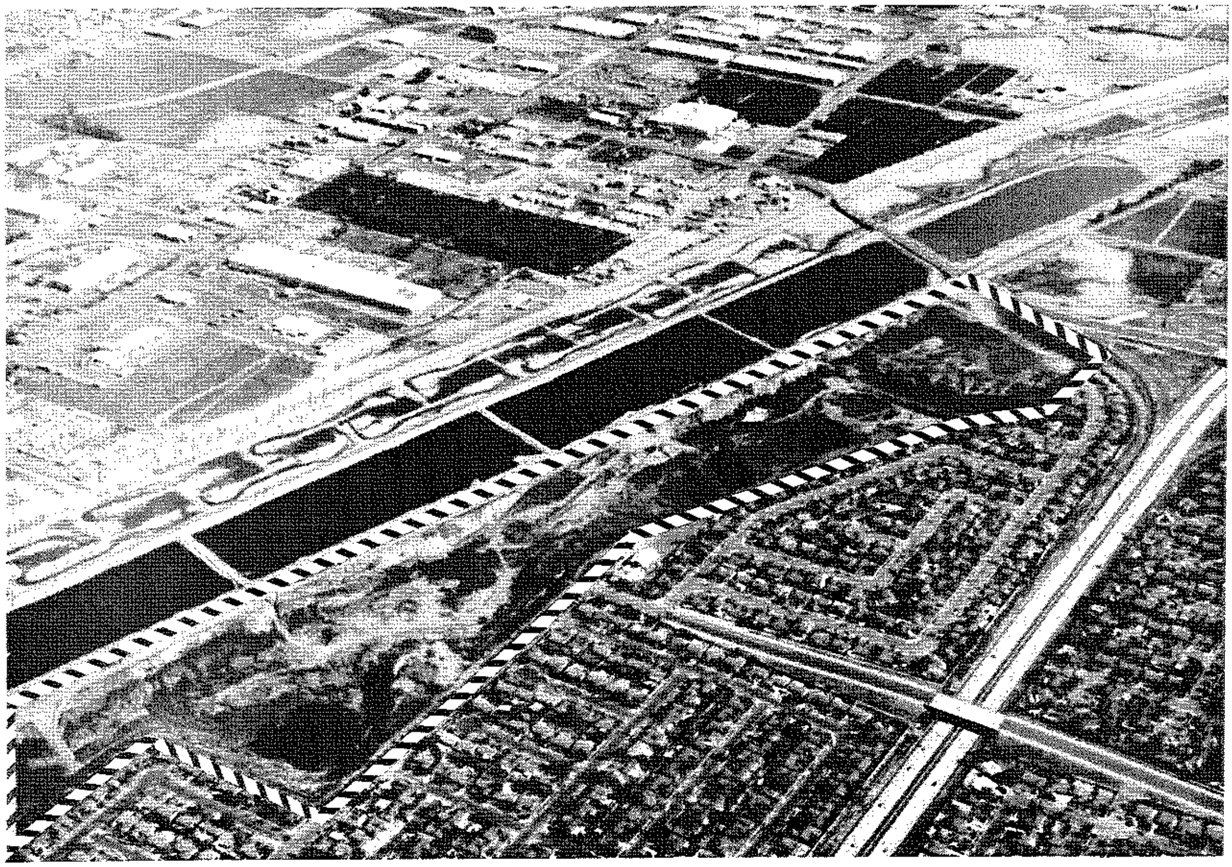
LAND RESOURCES

The Burris Pit is located along the westerly side of the Santa Ana River between South Street and Ball Road. It is separated from the storm channel of the Santa Ana River by Orange County Water District percolation basins. The site is bounded on the west by single family residential development which is totally within the City of Anaheim. The area of Burris Pit is zoned A-1 (General Agriculture) and both the Santa Ana River Greenbelt plan and the Orange County General Plan which includes the Master Plan of Regional Parks have indicated the property as a potential site for a regional park. The site is included in the Santa Ana River multiple use corridor in the open space and conservation element of the Anaheim General Plan. The aerial photo in Figure 5 indicates the local environmental setting.

Landform

The Burris Pit consists of a number of interconnected excavations stretching over the one-mile reach between South Street and Ball Road. The pits were the result of previous sand and gravel extraction operations which resulted in several deep excavations with relatively steep cut slopes. It is estimated that prior to the beginning of the pit rehabilitation the depth of the pit ranged between 85 feet in depth near Ball Road to 125 feet in depth near the north end of the pit.[4] Figure 2 is a topographic map of the site as it existed prior to work on OCWD Contract B-75-2.

FIGURE 5



The Orange County Water District conservation facilities lie between Burris Pit and the west levee of the Santa Ana River storm channel. The spreading basin is approximately 500 feet in width and extends along the entire easterly boundary of the project site. The purpose of the basin is to percolate surface water into the underground aquifers as part of the Water District's recharge program. The aerial photographs in Figure 5 illustrate the existing landform prior to slope stabilization.

<u>Open Space</u>

The conservation element of the Orange County General Planning program has established a plan for recreation and open space use of the Santa Ana River corridor. In the area of the project site, the recommended implementation plan indicates that the Santa Ana River greenbelt would include the Burris Pit area and would extend several hundred feet easterly of the presently defined Santa Ana River Channel. The Santa Ana River/Santiago Creek Greenbelt Plan prepared for the Orange County General Planning program in March 1971, indicated the Burris Pit site as a water oriented regional park.

In its present condition, however, the Burris Pit area has little to offer in terms of either visual open space or amenity and, prior to slope stabilization, presented an extreme safety hazard to local residents.

Riparian Factors

The site of the Burris Pit excavations lies within the natural flood plain of the Santa Ana River. The Orange County Flood Control District and Orange County Water District have, however, sought to confine storm flows to a more defined channel by construction of levees and appurtenant facilities. The floods of 1969 are graphic indications that the Burris Pit in its condition prior to slope stabilization was a severe liability in terms of flood control and conservation.

The site offers none of the advantages normally associated with riparian areas since it exists as an artificial feature.

Percolation Function

In its present condition, the Burris Pit offers a potential groundwater recharge basin. The Orange County Water District determined that the Burris Pit is a feasible, necessary and suitable site for introduction of water to the underground basin.

Geologic Resources

In the past, large amounts of sand and gravel were extracted from the Burris Pit for use as construction materials. This resource has now been depleted due to the proximity of the groundwater table and the instability of the walls of the existing excavation. The many soils engineering investigations conducted on this site throughout the years[5] have not disclosed any other valuable geologic resources within or below this site. Examination of soils reports may be made at the offices of the District at 10500 Ellis, Fountain Valley, California.

Soil Characteristics

An extensive discussion of the soils and the geologic conditions existing on the Burris site is contained in a report by Woodward-McNeill & Associates dated August 2, 1974[6]. Additional reports are on file at the District as set out in the paragraph above.

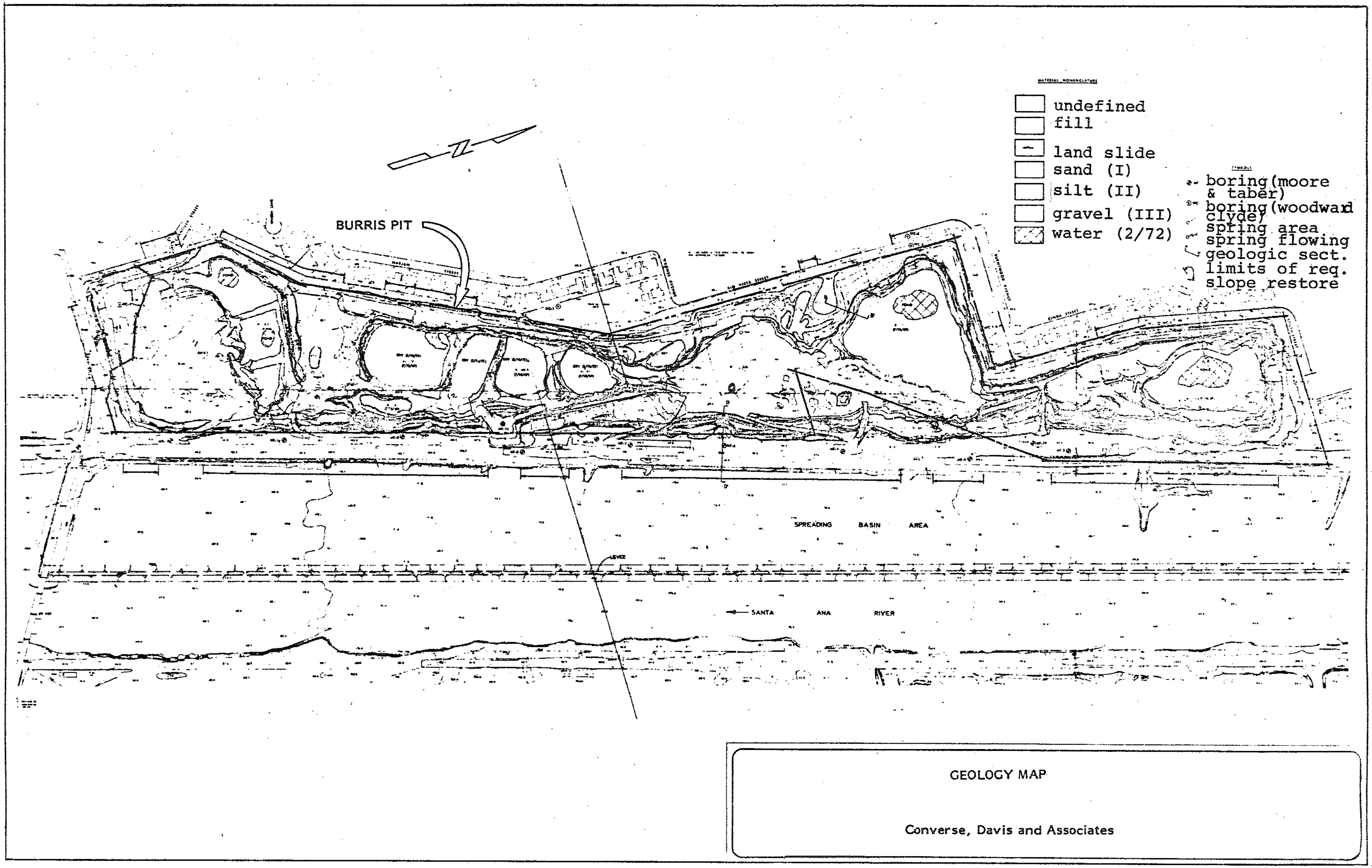
Stability

Preliminary slope stability evaluations were contained in the reports on the soils engineering investigations.[5] The pit has a maximum depth of approximately 125 feet with side slopes ranging from vertical to 2:1 horizontal to vertical. Slopes around the 2-1/2 mile perimeter of the excavation were examined and critical sections were analyzed to determine their stability. The results of the analyses indicated considerable variation in both the existing slope geometrics and the margin of safety against slope failure. However, several of the slopes appeared to be unstable under conditions of seepage. Figure 6 consists of a geologic map indicating the various material composites of the Burris Pit along with the locations where some cross sections were made. Typical cross sections can be found in Figure 7.

Soil Types

The soils engineering investigations[5] reported that subsurface conditions in the project area consisted of alluvial soils material in three rather distinct and relatively continuous types of river channel deposits. The beds appear to dip gradually

FIGURE 6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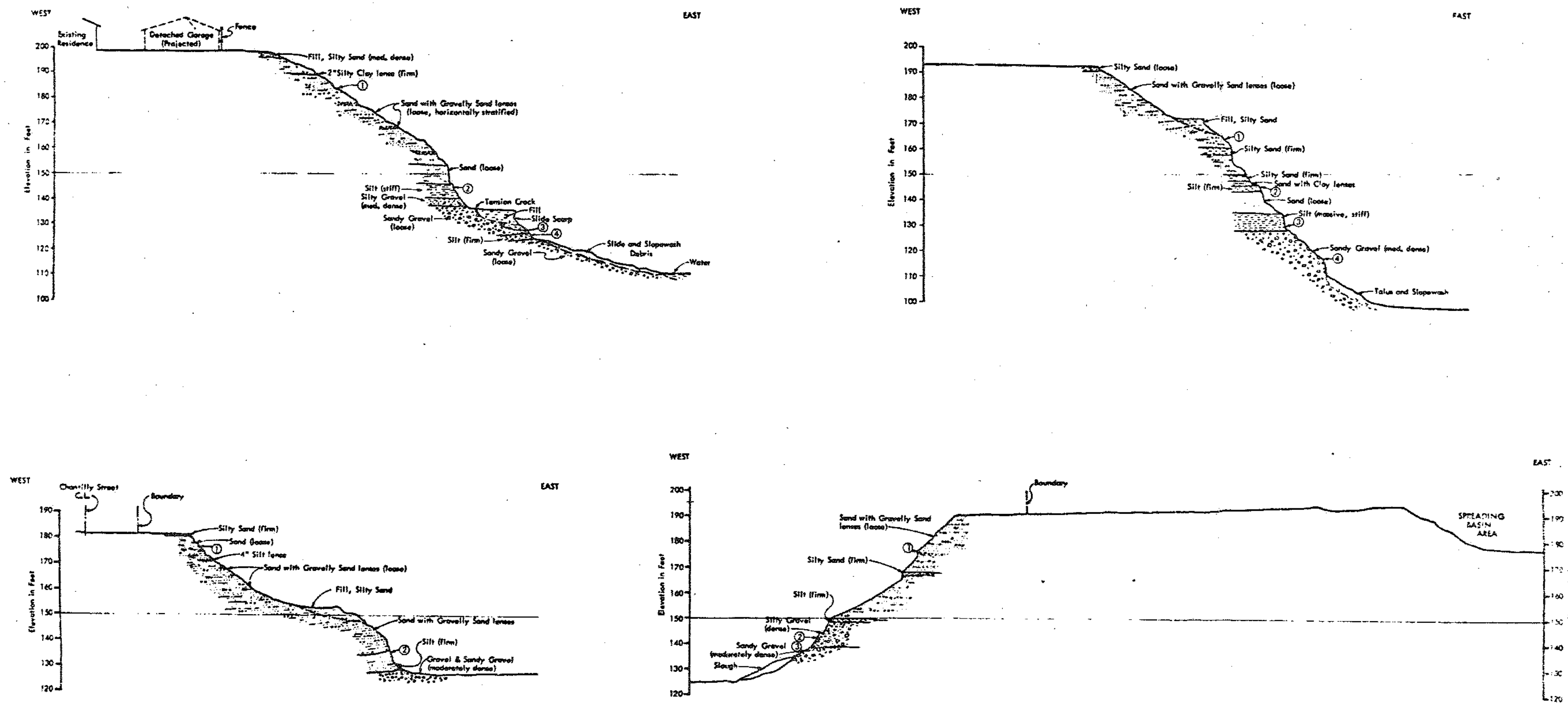
fill
land slide
sand (I)
silt (II)
gravel (III)
water (2/72)
boring (moore & taber)
boring (woodward clyde)
spring area
spring flowing
geologic sect.
limits of req. slope restore
BURRIS PIT
SPREADING BASIN AREA
SANTA ANA RIVER
GEOLOGY MAP
Converse, Davis and Associates



TYPICAL CROSS SECTIONS

Converse, Davis and Associates

to the southwest. Some deformation of beds was observed near the north end of the pit and may have been associated with movement along the buried fault north of the property.

The soils encountered in exploration are materials typical of stream and flood-plain deposits. The soils are quite variable and erratic in both horizontal and vertical directions. Generally, the materials are fine - to - coarse grained sand with fluctuating quantities of gravels and silts. Below is a generalized profile representative of the soils in the vicinity of the Burris Sand Pit.[6]

MATERIAL	DEPTHS BELOW GROUND SURFACE (ft)
1. Fill, Sand with gravel, loose to medium dense.	0 to 15-20
2. Sand, with gravel and occasional pockets of cobbles, medium dense.	15-20 to 25-60
3. Silt, clayey or sandy, with some gravels - usually medium stiff or medium dense.	25-60 to 40-75
4. Gravelly sand or sandy gravels, dense to very dense.	40-75 to 500-1000
5. Bedrock	500 to 1000

<u>Seismicity</u>

The Burris Pit site is located within eight miles south of the main trace of the Whittier-Elsinore Fault which has a continuous record of seismic activity. The Newport-Inglewood Fault, fifteen miles south, is also seismically active. The buried trace of the seismically active Norwalk Fault is located approximately two miles north of the site. None of these faults have been known to rupture the ground surface within historic time.[7]

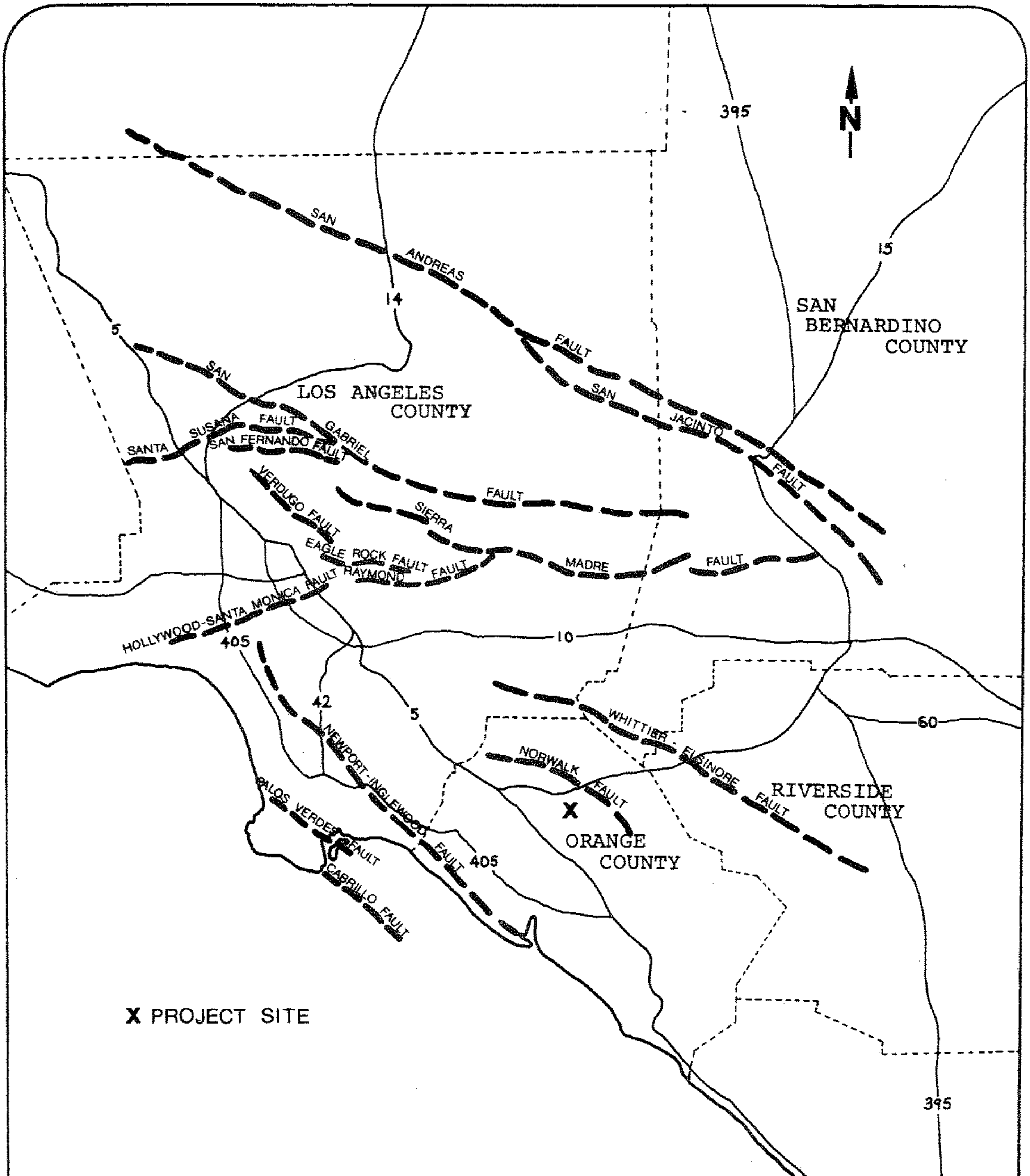
The San Jacinto and San Andreas Faults, 36 and 40 miles north respectively, are seismically active.

A deformation of bedding plains near the northern end of the Burris Pit indicates possible movement along the buried Norwalk fault further to the north. The projection of the fault tends northwesterly, and its location is estimated to be near Washington Street in Buena Park. Figure 8 indicates the project location in relationship to faults.

Based on analyses contained in the Woodward-McNeill Report[6], it is concluded that there is a low potential for areal liquefaction due to the magnitude of ground motions from a design earthquake. Liquefaction describes a phenomenon in which cohesionless soil looses strength during an earthquake and behaves as a heavy fluid. The behavior of soil in this state is quite variable and can be evidenced by small surface "sand boils" to massive slides depending upon surface configuration and regional geology.

CULTURAL AND SCIENTIFIC RESOURCES

An archaeological resources survey of the Burris Pit area was conducted in early June, 1974, by Archaeological Research Inc. in the development of an Orange County EIR entitled "Burris Pit Reclamation Project and Class III Waste Disposal"[4]. The area was investigated systematically with special attention being paid to any resources that might remain at or near the original ground surface. The pit bottom was also inspected; however, the factors



SOUTHERN CALIFORNIA REGIONAL FAULT SYSTEM

cm/ 8-75

of depth in the extreme disturbance greatly reduced the likelihood of archaeological resources in this portion of the area. No archaeological resources were observed on the project site.

Aesthetics

The photographs contained in Figure 5 illustrate views of the project site from various perspectives. While the question of aesthetics is a very subjective one and one which varies markedly with individual preference, it is difficult to imagine the Burris Pit area as being considered to have any significantly aesthetic value. The weathering of the excavated slopes and growth of natural vegetation has softened their artificial appearance, but the overall condition of the property is one which would be considered unsightly by most observers.

WATER RESOURCES

Water resources in the vicinity of the Burris Pit are associated with the Santa Ana River Flood Plain and its groundwater basin.

Municipal Potable Supply

The nearest domestic water supply is operated by the Water Division of the City of Anaheim Municipal Utilities Department. The staff of the Water Division has indicated that the City has no municipal water supply facilities in the vicinity of the Burris Pit project other than temporary construction water service from Wagner and South Street. OCWD records show that a well located across Rio Vista was drilled in 1915 and owned by Section 13 Water Company.

Groundwater Recharge Facilities

The Orange County Water District maintained groundwater recharge facilities known as spreading basins for replenishment of the area's underground water supply. The spreading basins are approximately 500 feet in width in the general vicinity of the project including utilized area in the SAR storm channel. Between South Street and Ball Road, the spreading basin covers an area of approximately 60 acres.

The Orange County Water District owns 1,030 acres of land which are used for groundwater recharge operations. Of this, approximately 730 acres are contained within the Santa Ana River Flood Plain between Imperial Highway and Katella Avenue. During the water year 1973-74, the District spread 116,151 acre-feet of water for the purposes of groundwater replenishment.

The Orange County Water District's Annual Report indicates that groundwater levels in the project vicinity were approximately 35 feet above sea level in November 1973. Groundwater levels in the overall basin were generally two feet higher in November 1974 than they were in the preceding year.

Groundwater Quality

Water produced from the Santa Ana River groundwater basin during fiscal year 1973-74 had an average of 509 parts per million (ppm) of total dissolved solids (TDS). The average hardness of the water was 276 ppm.

Surface Supply

The principal source of surface water flow in the vicinity of the Burris Pit is the Santa Ana River. In the past, the Orange County portion of the Santa Ana River was perennial. However, heavy upstream usage of the river, construction of spreading basins by the Orange County Water District, and the construction of Prado Dam in neighboring Riverside County, have virtually eliminated any dry weather flow. Like most water courses in Southern California, the Santa Ana River now carries most of its natural surface water flow during the storm season.

Surface Water Quality

The quality of surface flow in the Santa Ana River is subject to large variations. The Santa Ana River's use as a facility in which to discharge secondary effluent by upstream cities sewage treatment plants is responsible to a great degree for these variations. Recorded total hardness of the SAR surface flow in Orange County ranges from 150 ppm to 300 ppm with a historic average of 230 ppm. The historic average TDS is approximately 570 ppm, ranging from 300 ppm to 750 ppm. The quality of the water generally deteriorates as it flows southerly towards the ocean.

Quantity and Accessibility

The quantity of surface water flowing in the Santa Ana River is subject to great degrees of variation. Surface flow is generally limited to the winter months and is generally related to intensity and duration of storms. In early 1969, a series of storms produced two major floods which severely taxed the carrying capacity of the Santa Ana River Channel. The Orange County Flood Control District has estimated that the peak discharge in the Santa Ana River at the Prado gaging station was 6,000 cfs in February 1969. Total runoff during 1968-69 was 375,390 acre-feet, and total runoff during 1973-74 was 63,382 acre-feet.[8]

Drainage and Runoff Conditions

The Burris Pit is located in the Santa Ana River Flood Plain and, prior to becoming a pit, drained into the Santa Ana River Channel. The extraction of sand and gravel, however, has created a series of large pits varying from 85 to 125 feet in depth. As a result, the site no longer drains as storm water collects in the pit until it either percolates into the underground or evaporates. Ponded water exists in some areas of the site where it is found several months out of the year.

In its recent condition prior to reconstruction, the Burris Pit presented a flood control hazard. During the 1969 floods, emergency repairs were necessary to protect private property and streets from imminent danger caused by failing slopes in addition to the threat of the Santa Ana River breeching its west levee and filling the sand pit. Had this occurred, flood waters may have filled the pit, routing outflow that could have caused extensive damage in downstream areas. There was additional concern that the filling of the pit might weaken underlying soils and cause caving of the steep pit walls, thereby further endangering adjacent homes.

Following the remedial work performed during and immediately after the 1969 floods, the Flood Control District worked extensively on reshaping the river channel in order to minimize flooding dangers.

At that time, the U.S. Army Corps of Engineers was reviewing the operational criteria of Prado Reservoir with consideration to enlargement of Prado Reservoir and an increase in schedule of controlled releases over that currently in effect. The release criteria under study were 20,000, 40,000 and 60,000 cfs, compared to the then existing maximum release of 9,200 cfs. This review would probably lead to significantly higher project design flood flows in the SAR. In addition, the floods of 1969 provided data on the behavior of the channel under flood conditions as well as new hydrologic information. As a consequence of these new developments, the Orange County Water District and Orange County Flood Control District retained Leeds, Hill and Jewett, Inc. to conduct a new investigation of the SAR to update the flood control plan recommended in their 1964 report. This was paid for by Orange County Water District and Orange County Flood Control District at a cost of $6 million.

To insure the safety of the homes adjacent to the west edge of the pit, a contract was let in May 1975 by Orange County Water District to begin rehabilitation of the pit slopes in order that a later contract could be let to implement the District's water conservation plan.

Ocean

The site of the Burris Pit project is approximately 13-1/2 miles from the Pacific Coast shoreline. Because of its remoteness, the ocean is not a significant factor in the water resources environment of the Burris Pit project. The increase in the amount of storm flow to be diverted to the Burris Conservation Facility is estimated to be between 900 - 1400 acre-feet per year. Therefore a potential 900 - 1400 acre-feet per year will not reach the ocean. This, in turn, will slightly reduce the amount of sand migration to the ocean each year.

AIR RESOURCES

The air resources in the project vicinity are typical of those in the Anaheim-Orange area of the County.

Air Quality

Air quality in the project area is similar to that found in most parts of the South Coast Air Basin. Table 1 summarizes air quality of Orange County for 1974. Based on the latest available observations, an estimate of the annual number of days that California Emission Standards were exceeded in the Burris Pit area is as follows: oxidants, 61 days; nitrogen dioxide, 12 days; carbon monoxide, 3 days.

TABLE I

CALIFORNIA STANDARDS -- AIR QUALITY FOR 1974

POLLUTANT	CALIFORNIA AIR QUALITY STANDARDS	DATA FORMAT	AIR MONITORING STATIONS: Anaheim	Costa Mesa	La Habra	El Toro	Los Alamitos	Santa Ana Canyon	San Juan Capistrano	Laguna Beach	County Wide
OXIDANT (OZONE)	0.10 ppm 1 hr avg.	Days 1. / Max. 2.	61 days / .31 ppm	67 days / .27 ppm	141 days / .54 ppm	(10 mo.) 118 days / .48 ppm	(10 mo.) 112 days / .34 ppm	(1 mo.) 5 days / .14 ppm	(11 mo.) 79 days / .31 ppm	(9 mo.) 53 days / .20 ppm	194 days / .54 ppm
NITROGEN DIOXIDE (NO_2)	0.25 ppm 1 hr avg.	Days / Max.	12 days / .37 ppm	1 day / .30 ppm	7 days / .32 ppm	(3 mo.) 6 days / .33 ppm	(1 mo.) 3 days / .50 ppm	-	-	(9 mo.) 3 days / .32 ppm	20 days / .50 ppm
CARBON MONOXIDE (CO)	10 ppm 12 hr avg.	Days / Max.	3 days / 12 ppm	6 days / 15 ppm	37 days / 22 ppm	(9 mo.) 0 days / 4 ppm	(8 mo.) 2 days / 11 ppm	-	-	(9 mo.) 0 days / 8 ppm	37 days / 22 ppm
	40 ppm 1 hr avg.		0 days / 17 ppm	0 days / 23 ppm	0 days / 33 ppm	(9 mo.) 0 days / 8 ppm	(8 mo.) 0 days / 19 ppm	-	-	(9 mo.) 0 days / 13 ppm	0 days / 33 ppm
SULFUR DIOXIDE (SO_2)	0.10 ppm 24 hr avg.	Days / Max.	0 days / .04 ppm	0 days / .03 ppm	0 days / .03 ppm	(8 mo.) 0 days / .02 ppm	(8 mo.) 0 days / .03 ppm	-	-	(8 mo.) 0 days / .02 ppm	0 days / .04 ppm
	0.50 ppm 1 hr avg.		0 days / .08 ppm	0 days / .14 ppm	0 days / .15 ppm	(8 mo.) 0 days / .04 ppm	(8 mo.) 0 days / .18 ppm	-	-	(8 mo.) 0 days / .08 ppm	0 days / .18 ppm
SUSPENDED PARTICULATE MATTER	60 ug/m^3 AGM 3.	AGM 3.	94	64	115	69	100	-	-	69	-
	100 ug/m^3 24 hr avg.	% over 4. / Max.	46% / 223	17% / 181	64% / 273	24% / 188	(10 mo.) 50% / 229	-	-	(10 mo.) 16% / 203	37% / 273
LEAD (PARTICULATE)	1.5 ug/m^3 30 day avg.	Months 5. / Max.	11 mo. / 3.76	6 mo. / 3.89	9 mo. / 3.67	3 mo. / 2.15	5 mo. / 4.85	-	-	5 mo. / 2.76	-

AIR POLLUTION EPISODES

Pollutant	Criteria (ppm/time)	Stage	Episodes Declared
Oxidant	0.20 / 1 hr	1	37
	0.40 / 1 hr	2	2
Sulfur Dioxide	0.50 / 1 hr or 0.20 / 24 hr	1	0
Carbon Monoxide	40 / 1 hr or 20 / 12 hr	1	0

1. Days - Number of days standard equalled or exceeded
2. Max. - Highest value over averaging time
3. AGM - Annual Geometric Mean
4. % over - Percent of samples over criterion
5. Months - Number of months standard equalled or exceeded

(California Ambient Air Quality Standards are not danger levels. These are levels required to protect public health with an adequate margin of safety.) Revised 4/24/75

The quality of air in the project area is affected by effluent discharges throughout the greater Los Angeles Air Basin, particularly during periods of weak, large scale circulation. Estimates made by the Orange County Air Pollution Control District indicate that the total of average daily contaminant emissions within the County during 1972 was 4,731 tons per day. Of this total, about 83 percent was carbon monoxide, ten percent was hydrocarbons, six percent nitrogen dioxide, with less than one percent of both sulphur dioxide and particulates. The Orange County Air Pollution Control District reports that motor vehicles contribute approximately 97 percent of the total emissions accounted for within the County.

Observations on the project site have indicated no localized conditions of unusual air quality. During repeated site inspections, no indication was found of any gasses, chemicals, particulates, or other air pollutants not associated with the general air quality conditions of the County. Visibility and aesthetic appearance were also typical of the County, and no unusual odors were encountered.

Temperature

Temperatures in the Burris Pit area are generally moderate with relatively short periods of excessive heat during the summer. Average minimum temperatures range from the low 40's during January to the low 60's in August. Average daily maximum temperatures range from the middle 60's in the winter to the middle 80's in August.

Moisture

Cloudy days range from an average of nine per month in December through March to one to two days per month in August. The predominant cloud type is low stratus and is associated with the coastal marine layer. Clear days range from an average of 12 to 16 days per month from late fall through spring; 19 to 21 days of clear weather is typical during July, August and September. Fog is most frequent from October through February with an average of three to four days per month.[9]

Wind

Windflow is predominantly west southwesterly with averaging of speeds of from five to ten miles per hour. Westerly winds occasionally exceed 25 mph for short periods during strong winter storms. The average of westerly winds due to afternoon sea breezes ranges from 10 to 15 mph.

Easterly winds associated with the daily climatic cycle are mild, averaging between three and six mph. Occasional high winds from the east are associated with Santa Ana conditions and can reach speeds exceeding 50 mph.

Calms occur on the average of 10 to 15 percent of the time. These are most frequent during the late evening and early morning hours, particularly during the summer.[9]

Precipitation

Rainfall averages nearly 15 inches per year, with the average during the wettest months of December, January and February ranging from two to three inches per month. Measurable rainfall occurs on an average of about 32 days per year. Relative humidity averages from 70 to 80 percent during the early morning and from 45 to 55 percent during the afternoon.[9]

Other Related Conditions

Climatological investigations have revealed no significant or unusual conditions involving the vibration, radiation, sonic booms, or objectionable electronic transmissions.

Noise

Noise levels in the vicinity of the project are relatively low. Noise produced by traffic on Lincoln Avenue at the north end of the project and on Ball Road and the recently completed Orange Freeway at the south end are the primary contributors to the sound levels in the area.

Other minor noise contributors are infrequent aircraft fly-overs, equipment of the Orange County Water District or Orange County Flood Control District performing routine maintenance on adjacent flood control and spreading facilities, construction equipment working on the Orange Freeway extension, and the normal activities associated with the adjacent residential development.

BIOLOGICAL RESOURCES

Flora

The Burris Pit contained a moderately dense growth of vegetation that had developed since the 1969 floods. The common plants within the project site include mulefat, castor bean, wild mustard, willow and dove weed. All of the vegetation found in the pit are fast growing plants common to Orange County. No rare or endangered plants were encountered.[4] It was necessary to remove vegetation to commence construction of the emergency slope rehabilitation project.

Fauna

A high diversity of wildlife specie existed in the pit area. Avi-fauna on the property include crows, ravens, pheasants, California quail, burrowing owls, pintail ducks and cliff swallows.

Three species of rabbits, gophers and the California ground squirrel are frequently seen on the property. No evidence of large carnivor activity was seen although weasels, skunks and coyotes are possible residents of the area. Reptile species common to the area include the Western fence and side-blotched lizards. The pond of water at the bottom of the pit provides an ample breeding ground for the Pacific tree frog and Western toad; and an abundance of these species is found on the site.[4] The removal of vegetation and water from the pit in order to begin emergency slope restoration caused migration of most of the aforementioned species.

IV. Environmental Impacts of Proposed Project

INTRODUCTION

The purpose of this section is to identify and discuss the environmental impacts of construction and operation of the proposed facilities.

GENERAL SHORT TERM IMPACTS

Short term impacts are usually those that occur during project construction and are for the most part temporary in nature. Short term impacts which may occur during excavation and construction of the proposed facilities include:

1. *Dust may be created during excavation and construction.*

Excavation along with the general use of heavy equipment may add dust to the air. Normal onshore breezes may carry some dust out of the project area. This potential adverse impact can be largely avoided by regular watering of the area; however, the construction and excavation will produce some dust particulate emissions and distribution of dust that may be troublesome to near-by residents and workmen, even though normal wetting procedures are used.

2. *Excavation and construction activities will increase noise levels.*

A noise analysis of the Burris Pit and surrounding community was conducted by Ultrasystems, Inc., and a comprehensive report was prepared[10]. This report concludes that in order for the sand and gravel operation not to exceed the level specified in Orange County Noise Ordinance #2870 (median noise level not to exceed 55 dba), these operations should be restricted to areas beyond 750 feet of any residence. This limits the operations to only 1/3 of the desired operating area; however, with a noise barrier such as berming constructed on the west side of the pit, the community noise levels would fall within the requirements of the Orange County Noise Ordinance while still allowing the operations in any of the desired areas. The increase in average daily traffic on Ball Road and Lincoln Avenue due to activities relative to this project is not considered significant in terms of increased noise; however, the increase in large truck and earth moving equipment movements will contribute to the noise impact.

During Phase II sand and gravel operations, approximately 110 truck movements per day are expected during the week. The majority of these additional daily truck movements along Ball Road and Lincoln Avenue will probably occur between the Orange Freeway and the site. Truck movements on Ball Road and Lincoln Avenue east of the site are expected to remain unaffected as are those westerly of the freeway. (see Figure I)

Since it is expected that most of the truck movements will arrive in the project vicinity via the new Orange Freeway (Route 57), the impact of truck noise on properties adjacent to Ball and

Lincoln will be minimal. State Vehicle Code Noise Regulations will effectively limit the noise increases resulting from the truck movements.

3. *Excavation and construction activities will increase litter and human waste.*

The presence of construction workers will be a potential source of litter and human waste. Furnishing adequate and convenient toilets and litter receptacles during excavation and construction can minimize this impact.

4. *Construction and excavation will create safety hazards.*

Potential safety hazards normally associated with operation of heavy equipment exist to workers and supervisors; however, this impact should be minimal since proper safety precautions will be taken at all times. There should be little safety hazard to the general public during excavation and construction because the site is closed to general public access.

5. *Excavation will create material for disposal.*

Approximately 900,000 cubic yards of clay will be placed in the desilting basin areas for landscape use and stockpiled on the site for later use. Most of the remaining material not used will be sold through a contract for the removal of sand and gravel.

6. *Excavation and construction activities will displace wildlife.*

Site clearing and presence of excavation and construction operations coupled with the noise generally attendant to such work has displaced many of the resident animal species. This has eliminated most wildlife found on the site. Continued activity may preclude wildlife re-entering the area. While many will relocate their habitat because of disturbance and loss of cover, many may re-enter the site during periods of inactivity such as on weekends and during evening hours. This may result in a problem with rodents and reptiles entering nearby residential areas; however, Phase I grading operations have eliminated much of this smaller wildlife.

Most of the wildlife found on the site are common rapid-reproducing species. The species more transient to the area would probably relocate to nearby parts of the river. Because of the intended landscaping and water amenities, some wildlife will return to the area upon project completion. The permanent reduction of wildlife habitat will reduce the area's total wildlife population; however, the site is not a key area for any wildlife species, so there will be no measurable offsite impacts.

7. *Excavation and construction activities will curtail some spreading operations.*

During Phase I operations, fill material was brought in from nearby water spreading basins to be used for the slope stabilization. This has made it necessary to temporarily curtail spreading operations in these shallow basins. The basins cover a total area of approximately 140 acres owned by Orange County Water District. During Phases II and III, excavation of additional material will continue in construction of the large spreading basin. It will continue to be necessary to curtail spreading operations in the immediate area.

The Orange County Water District owns about 1,030 acres of land primarily used for groundwater recharge and conservation purposes in Orange County, with 730 acres situated within the Santa Ana River and 300 acres immediately adjacent to the river.[8] The total number of acres to be used during construction of the project represents approximately 13 percent of the total groundwater recharge facilities in Orange County.

8. *Excavation and construction activities will increase air emissions.*

Air quality in the project area is similar to that found in most parts of the South Coast Air Basin. Information supplied by the Orange County Air Pollution Control District (Table 1) summarizes air quality in Orange County for 1974.

The transitory nature of the atmosphere causes any project involving motor vehicles to have some cumulative effect on regional air quality. From a practical standpoint, however, the magnitude of air quality impacts is such that incremental changes would be difficult to measure.

Some adverse local impacts on the air resources may also be observed as a result of excavation and earth moving equipment use. These will probably be limited to areas within a few miles of the project site.

The generation and circulation of airborne dust in the area resulting from the project will largely depend on the strength of local windflow and the methods of handling and transporting the material. In general, appreciable amounts of dust from an exposed dry earth surface will be generated when surface winds exceed 12 mph. Annually, wind speeds of this magnitude can generally be expected to occur about 10 percent of the time, between the hours of 7 a.m. and 4 p.m..

Some variations in the windflow pattern occur seasonally, with the lowest amount occurring about six percent of the time during November, December and January; and the highest occurring about 15 percent of the time during March, April and May. Strong winds exceeding 25 mph are infrequent and can be expected to occur less than one percent of the time.

Operations within the Burris Pit will largely be protected from exposure to windflow over the general terrain of the area since most operations will take place well below the rim. With proper precautions, the impact of dust on the surrounding community will be minor.

9. Excavation and construction activities will increase local traffic.

The Orange Freeway north of Katella Avenue has recently been opened, and the portion south of Katella Avenue to the Garden Grove Freeway is expected to open in late 1975 or early 1976. The increased traffic to the adjacent circulation system is not expected to cause any significant traffic problems.

GENERAL LONG-TERM IMPACTS

There are several long-term impacts, both beneficial and potentially adverse, associated with various elements of the proposed project:

1. *Construction of the facilities will require the long-term commitment of land.*

The project site is a man-made pit which resulted as the by-product of a sand and gravel excavation. In its present condition, the area is non-functional; however, the proposed project would create an 80 acre man-made lake suitable for a number of open space recreational uses while operating as a groundwater recharge basin. As a large amount of money will be necessary to establish the proposed facility, a long-term commitment to the proposed use must be made.

2. *Construction of the facilities will affect the percolation function of the soil.*

The development of the proposed project would increase the percolation function of the site through removal of the clay lens thereby making the site's use for groundwater recharge possible.

The net effect would be to make available approximately 80 acres of land which could be used for groundwater recharge.

3. *Construction of the facilities will change the appearance of the area as they will become a permanent feature of the environment.*

The question of aesthetics is one subject to individual preference. Nevertheless, it is unlikely that many people will find the Burris Pit in its existing condition to be an aesthetically pleasing feature. The pit consists of a number of interconnected excavations stretching over the one-mile reach between South Street and Ball Road. From a long-range perspective, the development of the Burris Pit into a groundwater recharge and multi-purpose recreational facility would eliminate the artificial and unsightly appearance of the pit through grading and landscaping.

4. *Construction of the facilities would increase the total area available for groundwater recharge facilities.*

As previously mentioned, 1,030 acres of land are being used by the Orange County Water District for its groundwater recharge operations in Orange County. The infiltration capacity of these existing facilities is approximately 243,800 acre-feet/year. The projected average annual spreading requirements for the years 1980-2020 (see Table II) show an increase of 80 percent at 277,000 acre-feet per year.[8] At the present infiltration capacity, the

TABLE II

MONTHLY SPREADING REQUIREMENTS
(1000's of acre-feet)

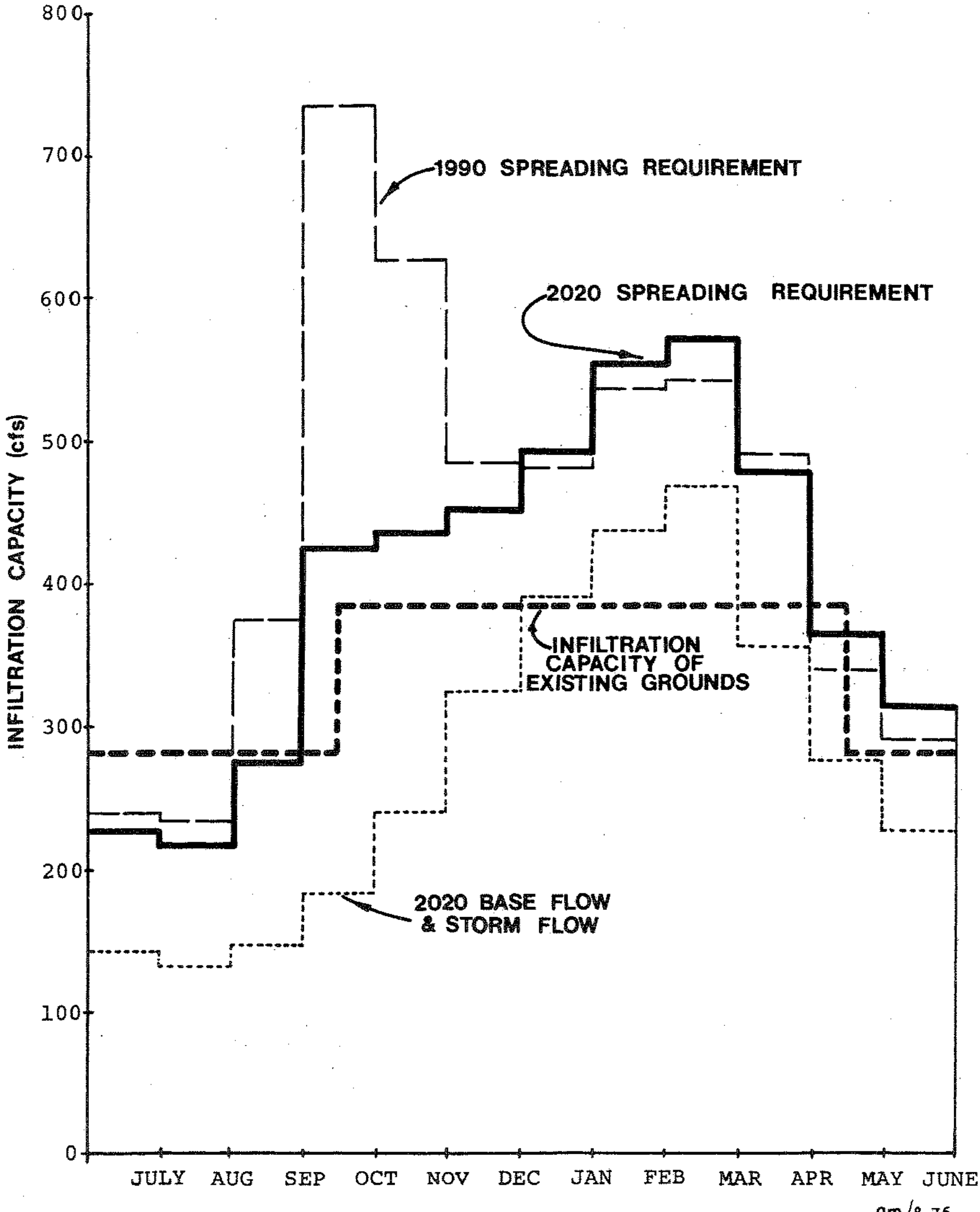
Month	1980	1985	1990	1995	2000	2010	2020
JULY	10.1	12.2	14.7	12.6	13.1	13.8	13.9
AUGUST	9.8	11.9	14.3	12.1	12.6	13.2	13.2
SEPTEMBER	12.4	19.5	22.2	17.9	17.8	17.1	16.4
OCTOBER	19.7	41.4*	45.1*	34.3*	33.3*	28.3	26.0
NOVEMBER	18.5	33.8	37.3	29.7	29.4	26.9	25.8
DECEMBER	18.3	26.3	29.7	26.1	26.8	27.2	27.7
JANUARY	19.6	25.0	28.5	26.3	27.5	29.1	30.2
FEBRUARY	20.5	26.3	29.7	27.3	28.4	29.7	30.7
MARCH	24.2*	28.3	33.2	31.1	32.3	34.0*	35.1*
APRIL	18.7	25.7	29.1	26.0	26.8	27.6	28.3
MAY	14.4	17.8	20.8	19.0	20.0	21.5	22.4
JUNE	12.0	13.6	17.2	15.6	16.5	17.9	18.6
TOTALS	198.2	281.8	321.8	278.0	284.5	286.3	288.3

*Maximum requirement for the year

SOURCE: These requirements and sources of water were based on a preliminary draft of a recommended water quality management plan by SAWPA, July 30, 1973. These were used as the bases for determining the required spreading facilities.

District would be unable to capture and percolate approximately 33,200 acre-feet of potential recharge water or approximately 12 percent per year from 1980-2020 (see Figure 9). The development of the Burris Pit into a groundwater recharge facility would increase the total groundwater recharge area by approximately eight percent.

FIGURE 9



800
700
600
500
400
300
200
100
0
INFILTRATION CAPACITY (cfs)
1990 SPREADING REQUIREMENT
2020 SPREADING REQUIREMENT
INFILTRATION
CAPACITY OF
EXISTING GROUNDS
2020 BASE FLOW
& STORM FLOW
JULY
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
cm/8-75

5. *Construction of the facilities would provide a greater capacity for storm water conservation.*

Because storms occur in a very stochastic manner, large storage capacities must be available in order to capture a substantial portion of the storm flows. Based on past experience, about 300 to 500 percent more storm flows can be conserved on a given parcel by developing a deep basin instead of a shallow basin. Although there is a considerable amount of storage capacity within the spreading grounds, a large portion will not be available due to the anticipated spreading of the Base Flows and imported water. Assuming, however, that all spreading areas are used for storm periods (not including the flood channel), the average annual capture of base flows and storm flows would be 70,400 acre-feet. With the additional storage capacity for storm flow capture provided by the Burris Pit area, the average annual capture of base and storm flows should increase to about 71,300 - 71,800 acre-feet, an increase of 900 - 1,400 acre-feet.[1] Needless to say, capture of storm flows are increasingly important due to the ever rising cost of imported water.

The unit value of storm water and base flow capture is estimated to be $69.00 per acre foot. The value of storm water was assumed to be the same as the equivalent uniform annual cost of the projected rates for State Project water shown in MWD's 1973-74 Water Pricing Policy.[11] The value of storm flows was equated to State water because the water quality of the two sources are similar.

6. *Construction of the facilities may alter the meteorology of the area.*

The impact of the proposed project on the general weather and climate in the area will be minimal; however, the ultimate replacement of the existing terrain with a lake and landscaping may result in slightly decreased average temperatures near the immediate site. In terms of standard meteorological measurements, the change in the area's atmosphere will be slight.

7. *Excavation and construction will affect biological resources.*

Most of the plants in the Burris Pit site are common, rapid growing species. No rare or endangered plant specie was found. The existing emergency project has cleared the site of all existing flora. On a long-term basis, the reclamation and development of the Burris Pit area would afford opportunities for re-establishment of native varieties or introduction of ornamental plants and trees in the creation of a park-like atmosphere.[4]

Most of the wildlife varieties found on the site are common, rapid-reproducing species. The pintail ducks are the most transient to the area, and have relocated to nearby parts of the river. Because of the intended landscaping and water amenities, some wildlife will return to the area upon project completion. The permanent loss of wildlife habitat will reduce the area's total wildlife population; however, the site is not a key area for any wildlife species, so there will be no measurable offsite impacts.[8]

8. Operation of the inlet structure may require the intermittent use of electrical energy.

Powered gates may be installed for the intake facility; however, there is no design for power output at this time. It is anticipated that the gate will be similar in structure to an Orange County Water District inlet facility northeast of Lincoln Avenue on the Santa Ana River spreading grounds. This facility is equipped with a 220/440 v, 3- Phase, 60- Cycle electric motor with a Model TM2-00-3/4 HP weatherproof electric motor operator. It should be noted that, although not desirable, the gate could be operated by hand.

9. The creation of a lake and inlet facilities poses a potential safety hazard.

The presence of a lake poses a potential safety hazard especially to children, however, design of the final recreational facilities as well as the slopes as proposed will provide adequate safety measures. The inlet facilities will be equipped with adequate warning signs and fencing to minimize any potential danger.

10. Construction of the facilities will alleviate the damage potential to adjacent homes.

In 1969, the principal concern was the possibility of failure of the Santa Ana River levee adjacent to the pit during flood flows. The erosion of the steep slopes of the pit due to seepage suggested the possibility of eventual failure. Failure of the levee during flood flows would allow water into the pit and erode the steep west slope, thereby threatening the safety of adjacent homes. Under the provisions of this project, all pit walls would be rehabilitated to a 3:1 slope with a 150' setback from the SAR storm channel levee. This would eliminate any likelihood of slope or levee failure due to the existence of the proposed basin. Possible plans by the U. S. Corps of Engineers to raise the flood channel levees have also been considered. The 150 foot setback provided in the plans will accommodate any levee widening without endangering levee stability.

11. Development of a recreational facility will increase local noise levels.

Local residents may experience a noise level increase with the development of a recreational facility; however, due to the distance from activities and the difference in elevation, this impact is expected to be minimal. There will be an increase in average daily traffic on Lincoln Avenue and Ball Road. Most of this traffic will only occur between the Orange Freeway and the project site, traffic on Ball and Lincoln east of the site is expected to remain unaffected, as is the case westerly of the freeway. Noise level increases at the facility can be minimized with construction of the noise barrier proposed in the early stages of development.

12. *Development of a recreational facility may cause a parking nuisance in local residential areas.*

Design of the recreational facilities has not been completed at this time; however, two public meetings were held at a local grammar school for the purpose of informing the local homeowners of the Burris Pit plans, and to solicit suggestions for the proposed recreational facilities. A large majority of the homeowners were in favor of the proposed project, and suggested facilities for fishing, sailing, swimming and picnicing. They also suggested that the facilities be set up as a local walk-in park or a regional park with ample parking facilities having access at Lincoln Avenue and Ball Road.

A contest for the best design of Burris Pit was held at a local school on a classroom basis. The ideas presented include: skate board track, jungle-gym, various sports fields, riding, hiking, fishing, outdoor stadium, wading pool and a petting zoo.

All of these suggestions will be considered in the final design of the recreational facilities.

13. *Development of a recreational facility will increase litter and human waste.*

Access to the general public for use of the facilities will increase litter and human waste. Furnishing permanent adequate and convenient toilets and litter receptacles can minimize this impact.

V. Mitigation Measures Proposed to Minimize Environmental Impacts

Several potential short term adverse impacts for the proposed project were identified. All of the short term impacts are the potential result of construction activities. Measures recommended to mitigate construction impacts are described in Section IV and include the following.

1. The potential adverse dust impact can be largely avoided if dust control measures such as regular watering of the area are used during construction.
2. Construction equipment should be properly muffled and construction operations limited to the daylight hours for noise control. A noise barrier in the form of a landscaped berm will be constructed on the west side of the pit so that community noise levels will fall within the requirements of the Orange County Noise Ordinance.
3. Adequate sanitary facilities and litter containers should be provided for workers.
4. Excavation and construction activities should be conducted in conformance with approved safety procedures. The site will be closed to general public access during the course of these activities.
5. Most excess excavated material will be sold through a contract for the removal of sand and gravel. The remaining material may be stockpiled at the site for later use.

6. The use of proper wetting procedures will decrease the generation and circulation of airborne dust in the area which would minimize the air emissions impact resulting from the project.
7. Adequate traffic control and warning signs should be used at the appropriate locations.

These recommended mitigation measures could be required by their inclusion in the project's Contract Specifications and enforced by inspectors.

There are several potential long term impacts related to the construction and operation of the proposed water recharge/recreational facility. Suggested mitigation measures include:

1. Design of the final recreational facilities as well as the slopes as proposed will provide adequate safety measures. Fencing will also help to mitigate the safety hazard by controlling access to the site.
2. Noise level increases at the recreational facility can be minimized with construction of the noise barrier in the form of a landscaped berm proposed in the early stages of development.
3. Provision for ample parking space in the design of the proposed recreational facility can minimize the local parking nuisance impact.
4. Furnishing permanent, adequate and convenient toilets and litter receptacles can minimize the litter and human waste impact resulting from public access to the facility.

VI. Unavoidable Adverse Impacts

The construction activities will cause temporary short term direct adverse impacts by creating dust, increasing local noise levels, preventing return of terrestrial vegetation and wildlife, curtailing some water spreading operations, emitting air pollutants from motorized vehicles, and increasing local traffic flow.

The only direct adverse environmental impacts which cannot be avoided or mitigated are:

1. Curtailment of Water Spreading Operations - The amount to be used represents approximately 13 percent of the total groundwater recharge facilities in Orange County.
2. Increased Air Emissions - Construction of the facilities will contribute air emissions through operation of equipment and travel of workers to and from the site.
3. Effect on Biological Resources - Construction of the project may reduce the area's total wildlife population; however, site is not a key area for any wildlife species. The site has been cleared of all existing flora; however, no rare or endangered species were found on the site. This impact can be considered minimal.
4. Use of Electrical Energy - Operation of the inlet facility may require the intermittent use of electrical energy. This impact can also be considered minimal.

VII. Evaluation of Alternative Sites

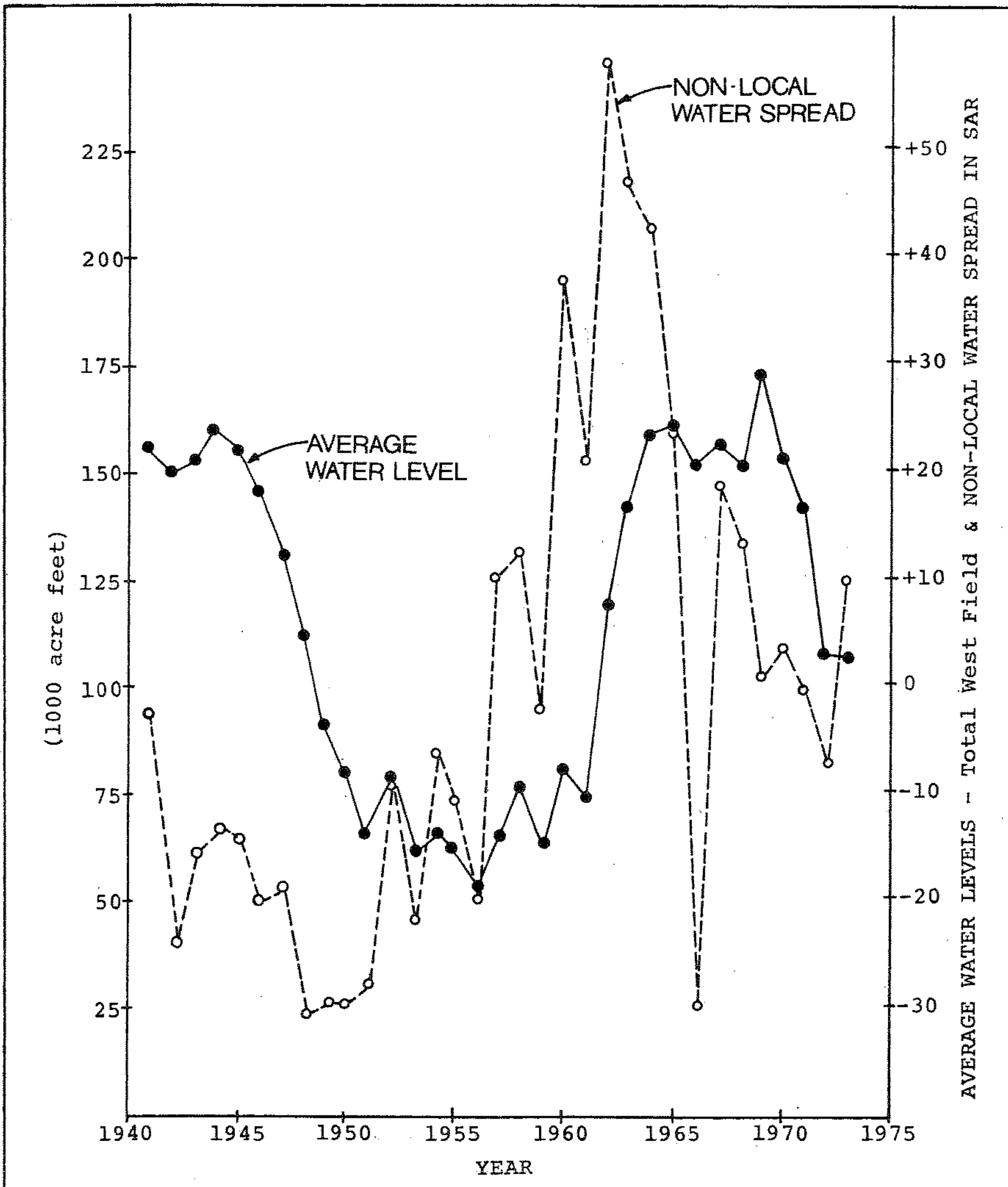
INTRODUCTION

The suitability of potential water conservation basins to spread additional quantities of non-local waters into the forebay of the Santa Ana River depends on numerous geohydrologic factors. All of these factors have been analyzed in order to determine the suitability of various areas and specific potential basins in the forebay for spreading.[2]

HISTORICAL SPREADING

Large quantities of SAR base flow, storm waters and imported waters have been spread in the forebay during the last four decades. A review of past data has been made to determine the relationship of quantities of water spread and change in groundwater elevations.[2] The response of the groundwater basin to the large quantities of Colorado River water spread in the forebay during 1957-1965 is shown graphically in Figure 10. Table III presents the annual and cumulative volumes of non-local water spread since 1941 together with changes in groundwater elevations in the west field and intake areas.

Since even larger quantities of water will be spread in the basin in the next 30 years, future spreading basins must be sized and located to avoid excessively high groundwater mounds beneath the basins that will reduce percolation rates. Recharge areas must be planned to avoid interference with the existing water conservation system of deep basins and shallow spreading grounds.



AVERAGE WATER LEVEL
and
NON-LOCAL WATER SPREAD

cm - 10/75

TABLE III

Year	Total Non-Local Water* Spread in Santa Ana River (1000 af) Annually	Cumulative	Average Ground-water Level Elevation (feet) Total West Field	Intake Area-West Field
1941	93	93	+22.7	
42	41	134	20.4	
43	62	196	21.5	
44	67	263	24.0	+39.8
45	65	329	22.3	
1946	50	379	18.6	
47	53	432	12.6	
48	24	456	5.0	
49	26	482	- 3.8	
50	26	508	7.9	
1951	30	538	13.9	- 6.7
52	76	614	8.4	+ 0.5
53	45	659	15.5	- 5.5
54	84	743	13.8	2.9
55	74	817	14.8	3.4
1956	50	867	18.3	8.6
57	125	992	14.2	0.1
58	131	1,123	9.8	+ 7.4
59	94	1,217	15.2	- 0.6
60	193	1,410	7.9	+16.8
1961	152	1,562	10.1	13.6
62	245	1,807	+ 7.2	37.9
63	216	2,023	17.0	49.2
64	206	2,229	23.7	57.0
65	158	2,387	24.0	55.8
1966	26	2,413	20.5	49.4
67	147	2,560	22.6	50.4
68	133	2,693	20.3	48.0
69	101	2,794	28.4	59.0
70	108	2,902	21.6	47.8
1971	99	3,001	16.8	39.7
72	82	3,083	2.9	18.6
73	122	3,205	2.1	19.9

*Includes SAR base flow and storm flow, MWD replenishment water, and SARD Co. discharge.

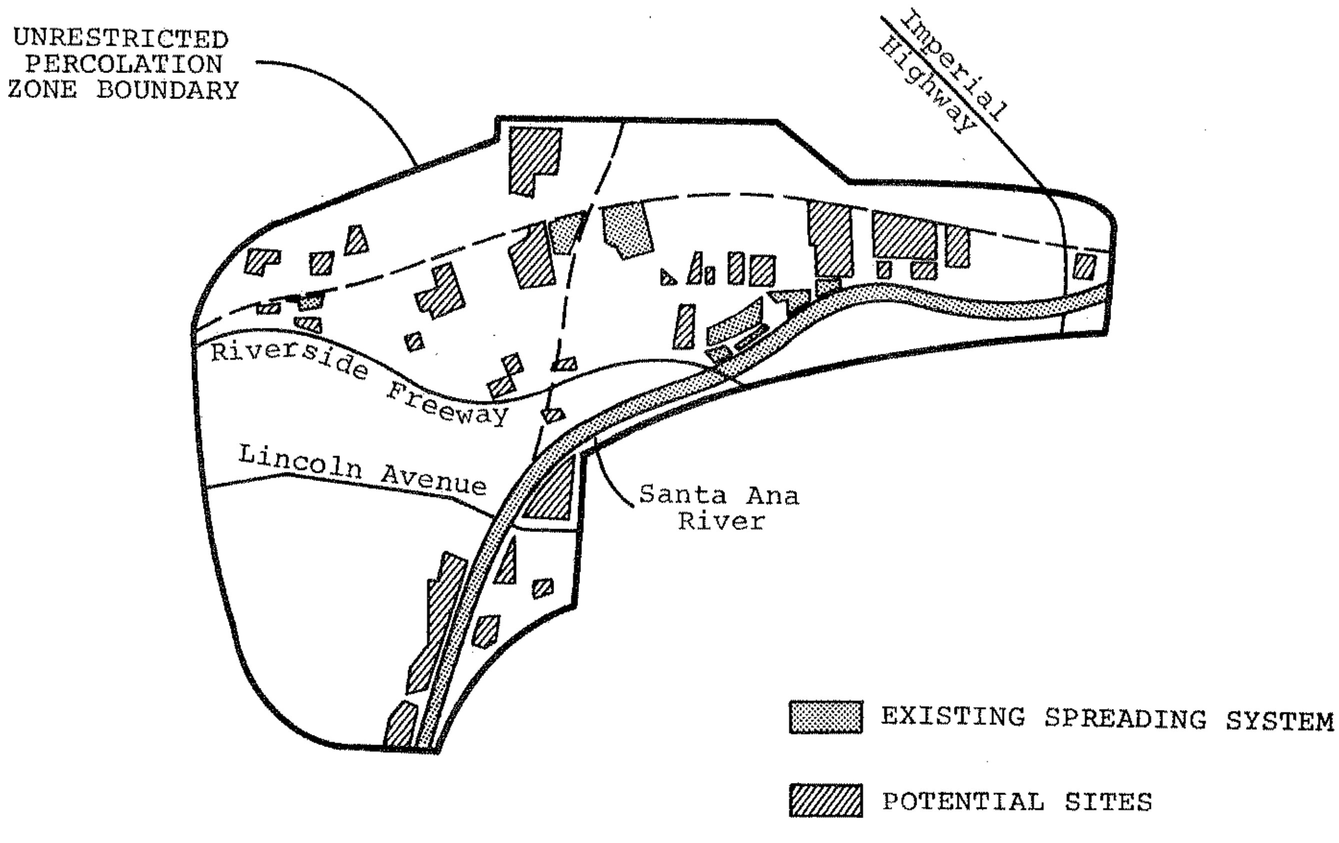
GEOHYDROLOGIC ANALYSIS

The existing OCWD groundwater recharge system is shown in Figure 11, together with additional spreading basin sites evaluated for possible development.[2] The boundary line shown on the figure indicates the limits of the geohydrologic analysis and represents the zone of unrestricted percolation into the groundwater basin. The areas shown indicate potential sites that contain sufficient acreage to warrant feasibility investigations.

In order to determine the potential for developing a particular spreading basin as opposed to possible basins in other locations, a detailed hydrodynamic analysis of projected conditions of the groundwater basin underlying the Santa Ana River forebay was conducted[2] by Toups Engineering with the aid of Dr. Richard Brock. Dr. Brock is an expert in the field of groundwater hydrodynamics, and is the Chairman of the Civil Engineering/ Engineering Mechanics Department at California State University, Fullerton. Through their analyses, the height of recharge mounds that would result from development of each of the potential spreading basin sites have been estimated (see Table IV). The increase in water levels adjacent to the existing water conservation system as a result of future additions to that system have also been developed. In addition, interference between closely-spaced recharge basins have been estimated.[2]

Based on this geo-hydrodynamic analysis, the potential groundwater interference problem that could result from an expanded water conservation program can generally be avoided in two

FIGURE 11



LOCATION OF POTENTIAL SPREADING SITES

cm/10-75

TABLE IV

Spreading Basin		Mound Height (Σs)(ft)[b]			Effectiveness	
Location	Area (acres)	At S.A.R.	At Basin	y (ft)	Percent	Area for 100% (acres)
Upper Reach	40	69	61	50	0	0
Upper Reach	100	87	100	55	23	25
Upper Reach	80	87	81	70	47	40
Upper Reach	220[a]	101	114	55	22	50
Near Anaheim Lake	70	-	44	100	100	70
SE/o S.A.R.	50	37	-	100	100	50
Burris Pit	70	54	54	60	100	70

[a] = 40, 100, and 80-acre parcels

[b] t = 60 days

y = vertical distance - spreading basin invert to groundwater elevation.

ways: 1) locating future basins so that sufficient space exists between each other, and the existing system; and 2) locating future basins in areas with greater effective aquifer depth, such as the western portion of the recharge area.

SUITABILITY OF POTENTIAL SPREADING GROUNDS

The potential recharge areas in the eastern portions of the area are not totally effective. The height of the recharge mounds that would develop under those basins or adjacent to the existing system is greater than the vertical distance between recent ground-water levels and the estimated basin bottom elevations. These possible interference conditions would result in either reduced effectiveness of the existing system of deep and shallow basins, or percolation rates under the future basins would be substantially less than optimum values. To avoid these conditions, it would be necessary to limit the area of future basins located in the upper reaches of the forebay. Recharge interference by new spreading grounds is minimized by development of recharge basins in the western portion of the study area.

BURRIS PIT ALTERNATIVE

The fact that Burris Pit is adjacent to the Santa Ana River will permit the conservation of large amounts of future Base and Storm Flows. The spreading facility will not require large, extensive or complex conveyance facilities.

There will be minimum interference from the large spreading facilities (Warner Basin/Anaheim Lake). The Burris Pit encompasses a large area and therefore will satisfy a large portion of the underground basin's needs at one site instead of an accumulation of smaller parcels. The pit is located where high rates of underflow into the confined aquifers can be expected. The Burris Pit will provide the last opportunity to capture Santa Ana River flows which would otherwise be wasted to the ocean. This large area will permit the capture of storm flows more effectively than most of the other potential sites.

VIII. Alternatives to the Proposed Project

The purpose of this section is to evaluate different project alternatives and their environmental impacts.

CLASS III WASTE DISPOSAL SITE

This proposed project is the establishment of an inert fill dump in the Burris Pit.[4] The dump would be a Class III disposal site which is defined by the State Water Resources Control Board to include the filling of pits and quarries. Such disposal sites are permitted to receive only non-water soluble, non-decomposable inert solids.

This proposed project would develop in the following three general phases:

Phase I - Remedial measures would be taken to eliminate or to reduce to acceptable levels, the existing hazardous conditions on the project site. The estimated duration of operations in this phase is six months.

Phase 2 - The second phase of the project would involve the placement of an estimated 10 million cubic yards of inert waste materials within the pit area. The duration of this phase is estimated to be between 10-15 years.

Phase 3 - The final phase of the project would be the placement of earthfill material and the establishment of a landscaping system. The estimated duration of this work is six months.

The first two phases of the project would be characterized by those activities usually associated with earthwork and landfill operations. Heavy construction equipment would be utilized in both the stabilization and remedial work and in the placement of inert waste materials.[4] This alternative project was rejected for the following reasons:

Significant adverse dust, noise and air quality impacts on local residents as a result of operation of the disposal site for the prolonged time period (material calculations estimated at twenty years) required to fill the pit.

At the present time, Orange County Water District does not have adequate capacity to replenish the water supplies of the lower SAR basin. Filling of the pit would eliminate 80 acres of potential ground water recharge basin area.

IX. Irreversible and Irretrievable Commitment of Resources

Construction of the proposed recharge and recreational facilities would commit the potential long-term use of: (1) about 80 acres of land; (2) electrical energy; and, (3) sand and gravel. There is no viable alternative to this commitment of resources.

X. Relationship of Project to Area Planning

The Burris Pit is within the County Greenbelt Plan as shown on the Orange County Master Plan, and is known as the old Santa Ana Park. The end result of the proposed development of Burris Pit will be in conformance with the County Master Plan. A conceptual design of multipurpose uses has been developed by EDAW.

A grant for gravel pit rehabilitation and enhancement was applied for by Orange County, Harbors, Beaches and Parks, City of Anaheim, and Orange County Water District, with Harbors, Beaches and Parks as the lead agency. A $300,000 grant was awarded from the Department of the Interior Secretary's Contingency fund for pit rehabilitation. An additional $292,000 grant for amenities is available for the Five Coves Project of which Burris Pit is a part, through the State Parks and Recreation Department. These grants will be matched by local funding and the project will be underway on or before 10/1/77.

While functioning as a recreational facility, the basin will be recharging water into the groundwater basin thereby serving a dual purpose. This type of multipurpose use is similar to other facilities within Orange County Water District, such as Anaheim Lake, and the Santa Ana River trails.

APPENDIX A

STANDARD SPECIFICATIONS (SAMPLE)

SECTION 1 - LEGAL RELATIONS AND RESPONSIBILITY

1-01. Contractor's Insurance

The Contractor shall not commence work under this Contract until he has obtained all insurance required hereunder in a company or companies acceptable to the District nor shall the Contractor allow any subcontractor to commence work on his subcontract until all insurance required of the subcontractor has been obtained. The Contractor shall take out and maintain at all times during the life of this Contract the following policies of insurance:

1. Workmen's Compensation Insurance to cover his employees as required by the Labor Code of the State of California; and the Contractor shall require all subcontractors similarly to provide such compensation insurance for all of the latter's employees.

2. For all operations of the Contractor or any subcontractor in performing the work provided for herein, insurance with the following minimum limits and coverage:

   a. Public Liability - bodily injury (not auto)
   $500,000 each person; $1,000,000 each accident.

   b. Public Liability - property damage (not auto)
   $500,000 each accident; $500,000 aggregate.

   c. Contractor's Protective - bodily injury
   $500,000 each person; $1,000,000 each accident.

   d. Contractor's Protective - property damage
   $1,000,000 each accident; $1,000,000 aggregate.

   e. Automobile - bodily injury
   $500,000 each person; $1,000,000 each accident.

   f. Automobile - property damage
   $500,000 each accident

3. Each such policy of insurance provided for in subparagraph 2 shall:

   a. Be issued by an insurance company approved in writing by the District, which is qualified to do business in the State of California;

   b. Name and list as additional insured the persons and entities designated in the special provisions. The inclusion of more than one named insured shall not operate to impair the rights of one insured against another insured, and the coverages afforded shall apply as though separate policies had been issued to each insured;

   c. Specify it acts as primary insurance and that no insurance held or owned by the designated additional insureds shall be called upon to cover a loss under said policy;

   d. Contain a clause substantially in the following words:

      "It is hereby understood and agreed that this policy may not be cancelled, nor the amount of the coverage thereof reduced until thirty (30) days after receipt by the District of a written notice of such cancellation or reduction on coverage, as evidenced by receipt of a registered letter."

   e. Otherwise be in form satisfactory to District.

4. The policy of insurance provided for in subparagraph 1 shall contain an endorsement which:

   a. Waives all right of subrogation against those persons and entities designated in the special provisions to be listed as additional insureds in the policy of insurance provided for in subparagraph 2 by reason of any claim arising out of or connected with the operations of contractor or any subcontractor in performing the work provided for herein;

   b. Provides it shall not be cancelled or altered without thirty (30) days written notice thereof given to District by registered mail.

5. The contractor shall at the time of the execution of the contract present the original policies of insurance required in paragraph 1 and 2 hereof, or present a certificate of the insurance company, showing the issuance of such insurance, and the additional insureds and other provisions required herein.

1-02. <u>Contractor's Liability</u>

The District, its agents and employees, the Board of Directors and the Engineer shall not be answerable or accountable in any manner for any loss or damage that may happen to the work or any part thereof, or for any of the materials or other things used or employed in performing the work, or for injury or damage to any person or persons, either workmen, employees or contractor or its subcontractors or the public, or for damage to adjoining or other property, from any cause whatsoever arising out of or in connection with the performance of the work. The contractor shall be responsible for any damage or injury to any person or property resulting from defects or obstructions or from any cause whatsoever arising out of or in connection with the performance of the work, except the sole negligence or willful misconduct of District, its agents, servants or independent contractors who are directly responsible to District.

Contractor will indemnify District, its agents, employees and Board of Directors and the Engineer, against and will hold and save them and each of them harmless from any and all actions, claims, damages to persons or property, penalties, obligations or liabilities that may be asserted or claimed by any person, firm, entity, corporation, political subdivision or other organization arising out of or in connection with the work, operation or activities of contractor, its agents, employees, subcontractors or invitees, provided for herein, whether or not there is concurrent passive or active negligence on the part of the District, its agents, employees or Engineer, but excluding such actions, claims, damages to persons or property, penalties, obligations or liabilities arising from the sole negligence or willful misconduct of District or its agents, employees or Engineer and in connection therewith:

1. Contractor will defend any action or actions filed in connection with any of said claims, damages, penalties, obligations or liabilities and will pay all costs and expenses, including attorneys' fees incurred in connection therewith.

2. Contractor will promptly pay any judgment rendered against contractor or District covering such claims, damages, penalties, obligations and liabilities arising out of or in connection with such work, operations, or activities of contractor hereunder and contractor agrees to save and hold District harmless therefrom.

3. In the event District is made a party to any action or proceeding filed or prosecuted against contractor for such damages or other claims arising out of or in connection with the work, operation or activities of contractor hereunder, contractor agrees to pay to District any and all costs and expenses incurred by District in such action or proceeding together with the reasonable attorney's fees.

1-03. Personal Liability

Neither the District, the Engineer, nor any other officer or authorized assistant, or agent of or consultants to the District shall be personally responsible for any liability arising under the contract.

1-04. Assignment

The contractor shall not assign, transfer, convey, sublet, or otherwise dispose of this contract, or of his right, title or interest in or to the same or any part thereof, without the previous consent in writing of the District. If the contractor shall without such previous written consent, assign, transfer, convey, sublet, or otherwise dispose of the contract, or of his right, title or interest therein, to any other person, company, or other corporation, the contract may at the option of the District, be terminated, revoked, and annulled, and the District shall thereupon be relieved and discharged from any and all liability and obligations growing out of the same to the contractor, and to his assignee or transferee.

1-05. Notice and Service Thereof

Any notice required or given by one party to the other under the contract shall be in writing and shall be dated and signed by the party giving such notice by a duly authorized representative of such party. Any such notices shall not be effective for any purpose whatsoever unless served in the following manner, namely:

If the notice is given to the District by personal delivery thereof to the Engineer or by depositing the same in the United States mail, enclosed in a sealed envelope registered and with postage prepaid, addressed to:

Orange County Water District
P. O. Box 8300
10500 Ellis Avenue
Fountain Valley, CA 92708

If the notice is given to the contractor by personal delivery thereof to said contractor or to his authorized representative at the site of the project, or by depositing the same in the United

States mail, enclosed in a sealed envelope addressed to said contractor at his regular place of business or such other address as may have been established for the conduct of the work under this contract; postage pre-paid and registered.

If the notice is given to the surety, or any other person, by personal delivery to said surety or other person, or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to such surety or persons at the address of said surety or persons last communicated by him to the party giving the notice, postage prepaid and registered.

1-06. Termination for Breach

If the contractor refuses or fails to prosecute the work or any separable part thereof with such diligence as will insure its completion within the time specified herein, or any extension thereof, or fails to complete such work within such time, or if the contractor should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or should contractor become involved in labor disputes which in the opinion of the District will prevent completion of the work within the time limits set forth, or if he or any of his subcontractors should violate any of the provisions of this contract, the District may serve written notice upon the contractor and his surety of its intention to terminate this contract, said notice to contain the reasons for such intention to terminate this contract, and unless within ten (10) days after the service of such notice such violations shall cease and satisfactory arrangements for the corrections thereof be made, this contract shall upon the expiration of said ten (10) days, cease and terminate.

In the event of any such termination, the District shall immediately serve written notice thereof upon the surety and the contractor, and the surety shall have the right to take over and perform the contract, providing however, that if the surety within fifteen (15) days after the serving upon it of a notice of termination does not give the District written notice of its intention to take over and perform the contract, or does not commence performance thereof within thirty (30) days from the date of serving said notice, the District may take over the work and prosecute the same to completion by contract or by any other method it may deem advisable for the account and at the expense of the contractor and his surety shall be liable to the District for any excess cost or other damage occasioned the District thereby, and in such event the District may, without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plants and other property belonging to the contractor that may be on the site of the work and be necessary therefor.

In the event that it is necessary that District enforce any of the provisions of this agreement or collect any amounts thereunder, District shall be entitled to all costs in regard thereto including a reasonable amount for attorney's fees.

1-07. Time of Completion

The contractor shall complete all of the work within ________ consecutive calendar days from the date of execution of the agreement.

1-08. Observing Laws and Ordinances

The contractor shall keep himself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency is discovered in the plans, specifications or contracts for the work in relation to any such law, ordinance, regulation, order or decree, shall forthwith report the same to the Engineer in writing. He shall at all times observe and comply with and shall cause all his agents and employees to observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees, and shall protect and indemnify the District, and all of its officers and agents, and the Engineer against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by himself or his employees.

1. Labor Code of California - The contractor's attention is directed to the following provisions of the State Labor Code: Chapter One of Labor Code of California relative to Article Two, Wages; and Article Three, Working Hours.

a. In accordance with Section 1773 of the Labor Code, The Board of Directors of the District has found and determined the general prevailing rates of wages in the locality in which the public work is to be preformed are those contained in that certain document entitled PREVAILING WAGE SCALE, copies of which are maintained at the District's principal office at 10500 Ellis Avenue, Fountain Valley, California, and are available to any interested party on request.

b. The contractor shall pay travel and subsistence payments to each workman needed to execute the work as such travel and subsistence payments are defined in the applicable collective bargaining assurances filed with the Department of Industrial Relations in accordance with Section 1773.8 of the Labor Code.

c. Pursuant to Labor Code 1810 it is stipulated hereby that eight hours labor constitutes a legal day's work hereunder.

d. Pursuant to Labor Code 1813 it is stipulated hereby that the contractor shall, as a penalty to the District, forfeit $25.00 for each workman employed in the execution of this contract by the contractor or by any subcontractor hereunder for each calendar day during which such workman is required or permitted to work more than eight hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of Article III (commencing with Labor Code 1810), Chapter 1, Part VII, Division II of the Labor Code.

2. Registration of Contractors - Before submitting bids, contractors shall be licensed in accordance with the provisions of Division III, Chapter 9 of the Business and Professions Code of the State of California.

1-09. Permits and Licenses

Unless otherwise specified the contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work. The contractor shall comply with all provisions of the permits whether obtained by the District or by the contractor.

1-10. Public Convenience and Safety

The contractor shall so conduct his operations as to cause the least obstruction and inconvenience to the public.

The contractor shall furnish, erect and maintain such fences, barriers, lights and signs as are necessary to give adequate warning to the public at all times of a dangerous condition to be encountered as a result of the construction work. The contractor shall furnish the Engineer with the name, address and local telephone number of the person responsible for the maintenance of barriers, signs, lights, and all other accident prevention devices.

1-11. Provisions for Emergencies

Unusual conditions may arise on the work which will require that immediate and unusual provisions be made to protect the public from danger or loss or damage to life and property, due directly or indirectly to the prosecution of the work, and it is part of the service required of the contractor to make such provisions and to furnish such protection.

The contractor shall use such foresight and shall take such steps and precautions as his operations make necessary to protect the public from danger or damage, or loss of life, or property, which would result from the interruption or contamination of public water supply, irrigation or other public service, or from the failure of partly completed work.

Whenever, in the opinion of the Engineer, an emergency exists against which the contractor has not taken sufficient precaution for the safety of the public or the protection of utilities or of adjacent structures of property which may be injured by process of construction on account of such neglect; and whenever, in the opinion of the Engineer, immediate action shall be considered necessary in order to protect public or private, personal and property interests, or prevent likely loss of human life or damage on account of the operations under the contract, then and in that event the Engineer may provide suitable protection to said interest by causing such work to be done and material to be furnished as, in the opinion of the Engineer, may seem reasonable and necessary.

The cost and expense of said labor and material together with the cost and expense of such repairs as may be deemed necessary, shall be borne by the contractor, and if he shall not pay said cost and expense upon presentation of the bills therefor, duly certified by the Engineer, then said cost and expense will be paid by the District and shall thereafter be deducted from any amounts due, or which may become due said contractor. Failure of the District, however, to take such precautionary measure, shall not relieve the contractor of his full responsibility for public safety.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the District.

1-12. Public Utilities

In any case it should be necessary to move the property of any owner of a public utility or franchise, the cost of which because of the terms of any franchise, or for any reason, must be borne by the owner thereof, such owner will, upon proper application by the contractor be notified by the Engineer to move such property within a specified reasonable time, and the contractor shall not interfere with said property until after the expiration of the time specified.

In case it should be necessary to move or temporarily maintain the property of any public utility or any other property, the cost of which is not required to be borne by the owner thereof, the contractor shall bear all expenses incidental to the removal or temporary maintenance of such property in a manner satisfactory to the owner thereof, it being understood that in such cases, the owner has the option of doing such work with his own forces or permitting the work to be done by the contractor.

The right is reserved to the state, county, or city and to owners of public utilities and franchises to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the work, and for the purpose of maintaining and making repairs in their property.

SECTION 2 - CONTROL OF THE WORK

2-01. Authority of District Engineer

The District Engineer shall have general supervision and direction of the work and may be represented on the work of duly authorized Assistant Engineer, District Superintendent, or other person or agent authorized to act for District Engineer. The District Engineer shall decide any and all questions which may arise as to the quality or acceptability of work performed, and as to the manner of performance and rate of progress of the work; all questions as to the interpretation of the plans and specifications; and all questions as to acceptable fulfillment of the contract on the part of the contractor.

2-02. Plan

The approved plan shall be supplemented by such working drawings as are necessary to control the work adequately. All such drawings shall be consistent with the contract document, true development thereof, and reasonably inferable therefrom. All drawings signed by the Engineer and delivered to the contractor shall be deemed written instructions to the contractor.

The plans for the work will show conditions as they are supposed or believed by the Engineer to exist, but it is not intended to be inferred that conditions as shown thereon constitute a representation by the District that such conditions are actually existent, nor shall the District be liable for any loss sustained by the contractor as a result of any variance of the conditions as shown on the plans and the actual conditions revealed during the progress of the work, or otherwise.

2-03. Coordination of Plans and Specifications

The specifications, plans, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all; they are intended to be cooperative, to describe and provide for the complete work. Specifications shall govern over the plan.

SECTION 3 - EXCAVATION

3-01. Location

The excavation shall be made within the area of District's property known as the ___________ Water Spreading Facility, Orange County, California, as specified on the plan. The exact limits of excavation shall be as directed by the District or its authorized representative, within the area of said property, which shall be staked in the field prior to the beginning of excavation.

3-02. Quantity of Material

The contractor shall excavate and remove ________________ tons of sand and all other material within the designated limits of the area to be excavated.

3-03. Conditions and Quality of Material

The District makes no representations or warranty as to the condition or quality of the material to be excavated as provided for in the contract documents. Nothing set forth in said contract documents shall in any way be construed as a representation or warranty of condition or quality of material to be excavated upon which contractor shall have a right to rely. It is the full and sole responsibility of the contractor to make his own determinations relating to condition and quality of material.

3-04. Depth and Slide Slopes

The contractor shall agree to remove all material from the assigned area to the exact depth as shown on the plan and as designated in the field by the District Engineer. The contractor shall agree to trim all slopes to within a tolerance of six (6) inches of grades as established by the District Engineer. Any violation of this specific sub-section shall constitute a breach of the contract.

3-05. Non-Exclusive Contract

This contract is not an exclusive contract or right to remove sand and other material from the District's property. District expressly reserves the right to grant additional contracts to remove sand and other material from the District's property to other persons, concerns, companies or corporations during the term thereof. Such contracts shall contain appropriate limitations and conditions to the end that the operations of such other contractors shall not unreasonably interfere with the rights and operation of contractor.

SECTION 4 - METHOD OF PAYMENT

4-01. Royalty

The contractor shall agree to pay District for all sand and other material removed from defined area of excavation at the rate in cents per ton as provided for on his proposal. Payment shall be based on actual weight of all material removed, or approved alternatives.

4-02. Scaled Weight

All sand and other material excavated and removed shall be weighed using one or a combination of the following methods.

(1) Trucks - District has installed truck scales seventy (70) feet long with a capacity of fifty (50) tons. District will provide a weighmaster who will operate said scales and retain one (1) copy of the scale weights for each load. The weighmaster will not serve as a dispatcher of trucks or perform any other service for the contractor.

(2) Conveyor - If contractor installs a belt conveyor system to move excavated material from District property, then in that event, contractor shall install scales in the belt conveyor system at contractor's expense and provide District with a certified copy of the daily tonnage removed from District property. Said belt conveyor system, if installed, shall be located and constructed to plans approved by District Engineer.

(3) Alternates - Alternative methods of determining weight, such as using the estimate average tonnage per load of large earthmoving equipment, may be allowed. The contractor shall notify the District Engineer, in writing, of the proposed alternative method. The District Engineer shall be the sole judge as to the accuracy and suitability of the alternative, the measure of estimated tonnage and frequency of reporting loads and his decision shall be final.

(4) For the purposes of this contract it shall be assumed that screened residuals will equal seven percent (7%) of the total contract and payment for screened residuals shall be made on a monthly basis as provided for in Section 4-03 by adding to the monthly total of daily tally sheets an amount equal to seven percent (7%) of the monthly total amount of materials hauled over the scales.

4-03. Payment Procedures

(1) On or before the 15th day of each succeeding month contractor shall make payments to District at its office at

10500 Ellis Avenue, P. O. Box 8300, Fountain Valley, California 92708, for any and all such products removed from the real property during the preceding calendar month. Each payment shall be accompanied by true copies of the daily tally sheets kept by contractor during the month for which such payment is made.

(2) District shall have the right at all times during reasonable business hours to inspect the records of contractor regarding the transactions involved in this contract and shall have the right to have a representative present at any and all times to check and measure such products removed, all without cost or expense to contractor.

SECTION 5 - BUILDING AND PLANT

5-01. Structures

Contractor shall not construct or install any building, structures, or machinery which are attached to the land, or upon the land without prior permission being obtained in writing from District. Contractor shall comply with all requirements of the laws of the State of California applicable hereto as well as with the laws and regulations of the City of Anaheim, California, and any other entity having jurisdiction.

5-02. Screening Plant

Subject to the foregoing, contractor will be permitted to install a screening plant, provided said plant meets the requirements of Section 5-01 above. Said screening plant shall be built on skids and said plant and all equipment of contractor shall be maintained above high water line as it may exist from time to time.

5-03. Screened Materials

If screening of excavation materials is accomplished, contractor shall pay royalty to District for said screened residual products at the same rate provided for in this contract for all material excavated.

The contractor shall remove from the construction site all screened residual products from time to time at the direction of the District Engineer. At no time during the contract period, shall the contractor be allowed to stockpile upon District properties, screened residual products in an amount in excess of one (1) percent of the total tons provided for in this contract.

5-04. Hauling of Screened Materials For District Purposes

District may from time to time need material for the construction or maintenance of various conservation facilities or other works in and along the Santa Ana River. At such times as the contractor may load and haul screened residuals to locations designated by District Engineer. District shall pay to contractor the then currently effective rate tariff in cents per ton per mile as established by the Public Utilities Commission of the State of California; copies of such rates are on file at the District's office.

Said screened residuals shall be subject to all provisions of Section 4 - Method of Payments. Contractor shall present to District a monthly statement for all materials loaded and hauled. Said statement shall set forth the date and amount of hauling and shall be accompanied by a copy of the weighmaster's weight tickets.

5-05. Wash Plant

Contractor may be allowed to install or operate a Wash Plant on District property defined in this contract.

SECTION 6 - INGRESS AND EGRESS

6-01. Access to Property

Contractor agrees to use only the following described access roads for ingress and egress to the District property unless otherwise directed by District Engineer.

1. Ingress - Contractor may enter District property through access roads on Lincoln Avenue or Ball Road.

2. Egress - Contractor shall leave the District property by means of the access roads described above.

6-02. Hours

Contractor agrees to keep all gates enclosing premises locked between the hours of 7:00 p.m. and 6:00 a.m. and all other times when not excavating on property. Contractor further agrees to keep all unauthorized individuals and vehicles off property at all times when excavation operations are under way. To implement this particular paragraph, contractor shall furnish at his expense a padlock of his own choosing to be affixed to each gate or other means of ingress into the property; contractor shall be the only one having a key to said padlock or locks; District shall likewise furnish a lock or locks of its own choosing which shall be affixed to each means of ingress or gate to the property and shall impose a like requirement on any other contractor(s) to whom District shall issue a contract to extract material from the property; contractor, District and any other contractor(s) shall have the affirmative duty to likewise comply with the hereinabove disclosed requirement of keeping the gates to the property closed between the hours of 7:00 p.m. and 6:00 a.m.; contractor and

District and any other contractor(s) which first enters the property at any one particular day and unlocks its padlock in order to gain access shall have the affirmative duty to lock the premises on that particular day upon the close of business operations irrespective of the fact that District or other contractor(s) may have come onto the premises after the entrance thereon.

6-03. Contractor's Roadways

Materials contractor uses in the construction and maintenance of any roadways on said property shall be of rock or gravel origin and shall be free from any silt, dirt, or other material which will be detrimental to the use of the property for groundwater recharge purposes. The District Engineer shall have complete and final authority in approving the quality of material which may be used on the construction of such roadways, the same, nevertheless, to be exercised reasonably and according to custom in connection with the development of groundwater replenishment facilities.

6-04. Maintenance of Roads

Contractor shall be responsible for the maintenance of the access roads or levee road he uses. Maintenance may include grading, watering or oiling the surfaces at the direction of the District Engineer. District has and may let future contracts for excavation of sand and other material from the District property. Other contractors also have the responsibility to maintain said roadway systems and to keep said roads in usable condition and watered or oiled while being used by said contractors to the extent necessary to keep dust from arising therefrom. In the event a dispute should develop between any contractor concerning the responsibility for maintenance, watering or oiling of a particular roadway at a particular time, said dispute shall be resolved at the sole discretion of District Engineer.

SECTION 7 - WATER AND POWER

7-01. Obtaining Service

All construction water and power required for contractor's operations shall be obtained and handled at contractor's own expense. District Engineer shall have final authority in approving method of transportation or conveying water or power to contractor's operations.

7-02.

No power generators shall be used for contract operations unless approved in advance in writing by the Orange County Water District Engineer.

SECTION 8 - ACTIVITIES OF DISTRICT

8-01. Right of Entrance

District reserves the right to itself, its employees and agents, also to permit others to cross the herein described real property for purposes of ingress and egress to other properties of District and failure of contractor to permit such crossing of the herein described property shall constitute a breach of contract.

8-02. Water Spreading Operations

District plans to maintain extensive spreading operations whereby water will be spread, ponded or otherwise retarded so as to cause its percolation into the groundwater supplies for the purpose of replenishing such supplies. District is not aware of the effect, if any, of such water spreading activities upon contractor's operations on the property and, therefore, contractor hereby waives any damages or claims of damages which it might now have or have in the future which might be caused by the spreading operations of District and while contractor is operating on the property. Contractor acknowledges the prior right of District to conduct such spreading operations for the benefit of the lands within District's exterior boundaries. District, however, covenants to take, or cause to be taken, reasonable precautions to protect contractor and its operations, and rights hereunder, from undue interference or unnecessary damage.

8-03. Temporary Suspension of Work

The District in its sole discretion shall have the authority to suspend the work, wholly or in part, for such period as it may deem necessary due to unsuitable weather, labor disputes, or such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as it may deem necessary due to the failure on the part of the contractor to carry out orders given or to perform any provisions of the work or otherwise. The contractor shall immediately comply with the written order to suspend the work wholly or in part, and shall not resume the work until ordered in writing to do so.

In the event that a suspension of work is ordered because of failure on the part of the contractor to carry out orders given or to perform any provisions of the work, such suspension of work shall not relieve the contractor of his responsibility to complete the work within the time limit set forth in the information for bidders, and shall not be considered cause for extension of the time for completion; and further, such suspension of work shall not entitle the contractor to any additional compensation.

8-04. Extension of Time

The District may from time to time extend the time fixed for completion of the work under the contract. All applications for extensions of time shall be in writing and shall be filed with the District before the expiration of the original time fixed in the contract or of time granted by extension, as the case may be. An extension of time may be granted by the District after the expiration of time originally fixed in the contract or as previously extended, and the extension so granted shall be deemed to commence and be effective from the date of such expiration. Any extension of time shall not release the sureties upon any bond required under the contract.

APPENDIX B

BURRIS PIT NOISE STUDY

For
Orange County Water District

Prepared By

ULTRASYSTEMS, INC.
500 Newport Center Drive
Newport Beach, California 92660

February 1975

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1.0 INTRODUCTION

A noise analysis of the Burris Pit and surrounding community was conducted in order to establish the existing noise environment in the community surrounding the Burris Pit and to make estimates of the future noise environment of the community if the Burris Pit were used for sand and gravel mining prior to use as a spreading basin for the Orance County Water District. It has been established that slopes and grades in the Burris Pit are unacceptable and must be reworked for the protection of homes bordering along the pit. Noise measurements were taken in the community near the pit where noise from the sand and gravel operations may have its greatest impact. Further, noise measurements were made at a similar pit where sand and gravel operations are currently occurring. This was done in order to establish the noise characteristics of a sand and gravel operation so that meaningful estimations of a simlar operation at the Burris Pit can be made. This report is divided into three parts which describe the following: (1) the existing noise environment in the community surrounding the Burris Pit, (2) the noise characteristics of a sand and gravel operation at the Warner Pit, and (3) estimations of the noise environment in the community near Burris Pit if the pit were used for sand and gravel operations.

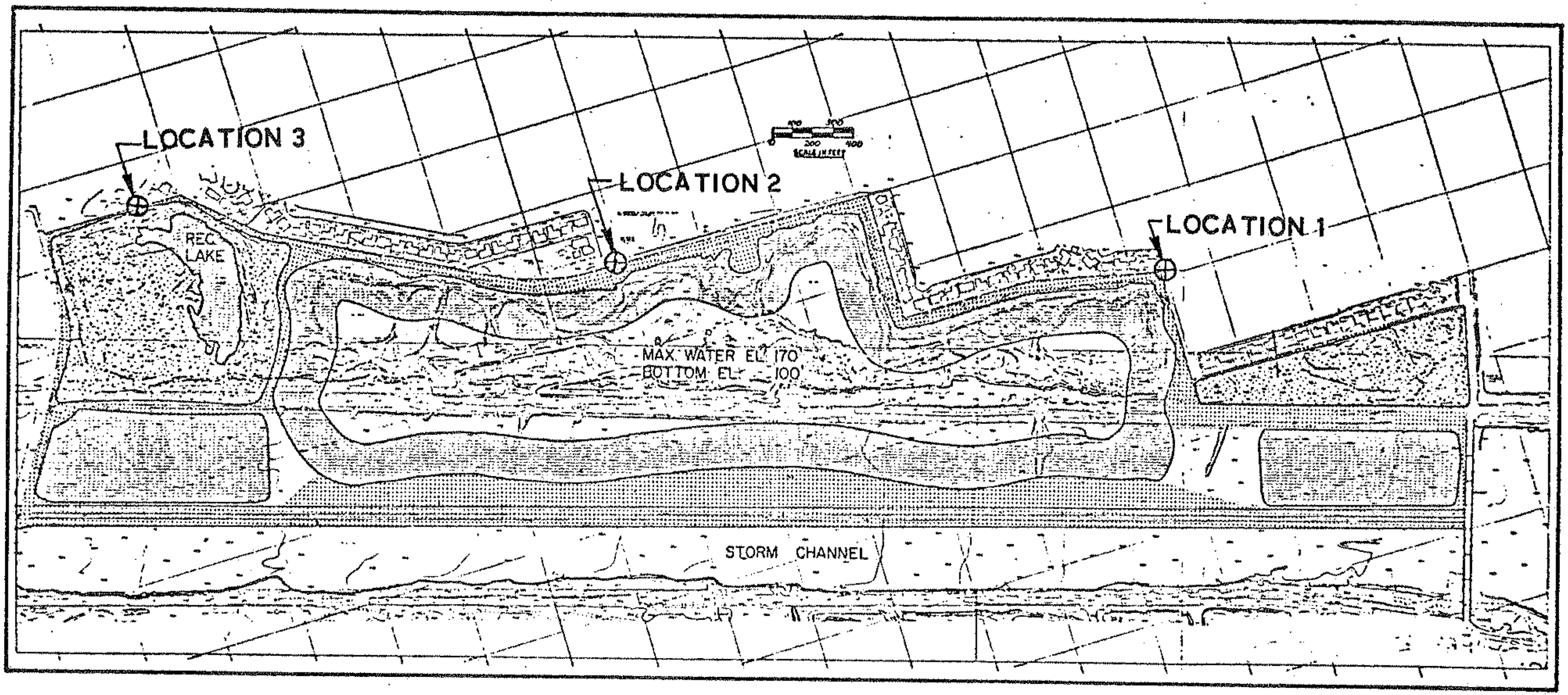
2.0 THE EXISTING NOISE ENVIRONMENT IN THE COMMUNITY NEAR BURRIS PIT

The eixsting noise environment in and around the community near the Burris Pit was evaluated by on-site measurement. Currently, there are no major noise sources in the area; thus, most of the noise measured was due to automobile traffic on local streets.

2.1 Measurement Locations

Three measurement locations were chosen to evaluate the noise in the community. These locations are shown in Figure 1 and detailed in Figures 2, 3, and 4. Location 1 was located on South Street even with the rear property line of the homes on Cinda Drive. Location 2 was located on Rio Vista Avenue near Wayne Avenue. This measurement location was right on the property line of the pit and immediately adjacent to a roadway that

FIGURE 1 NOISE MEASUREMENT LOCATIONS IN BURRIS PIT COMMUNITY



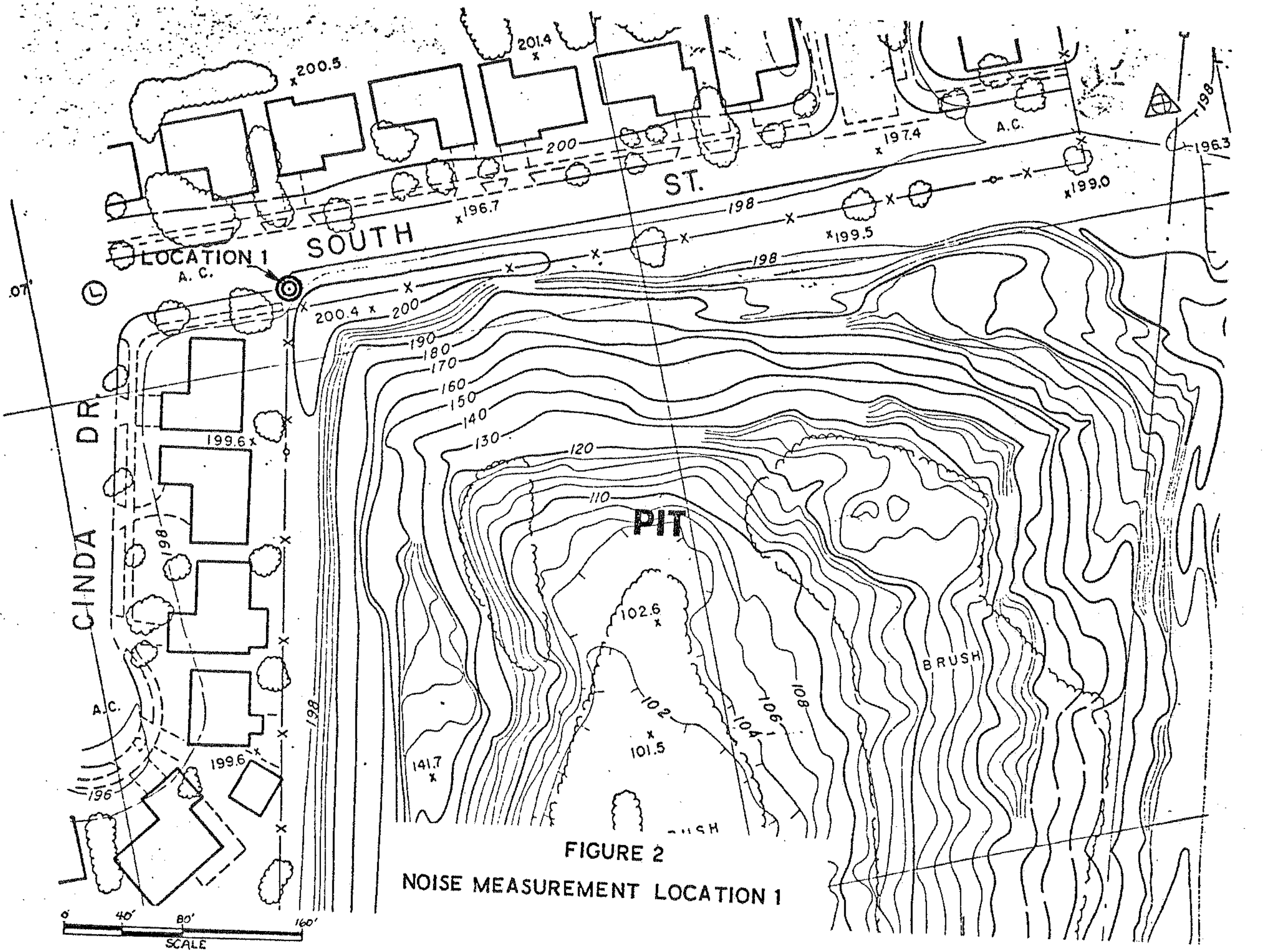


FIGURE 2
NOISE MEASUREMENT LOCATION 1

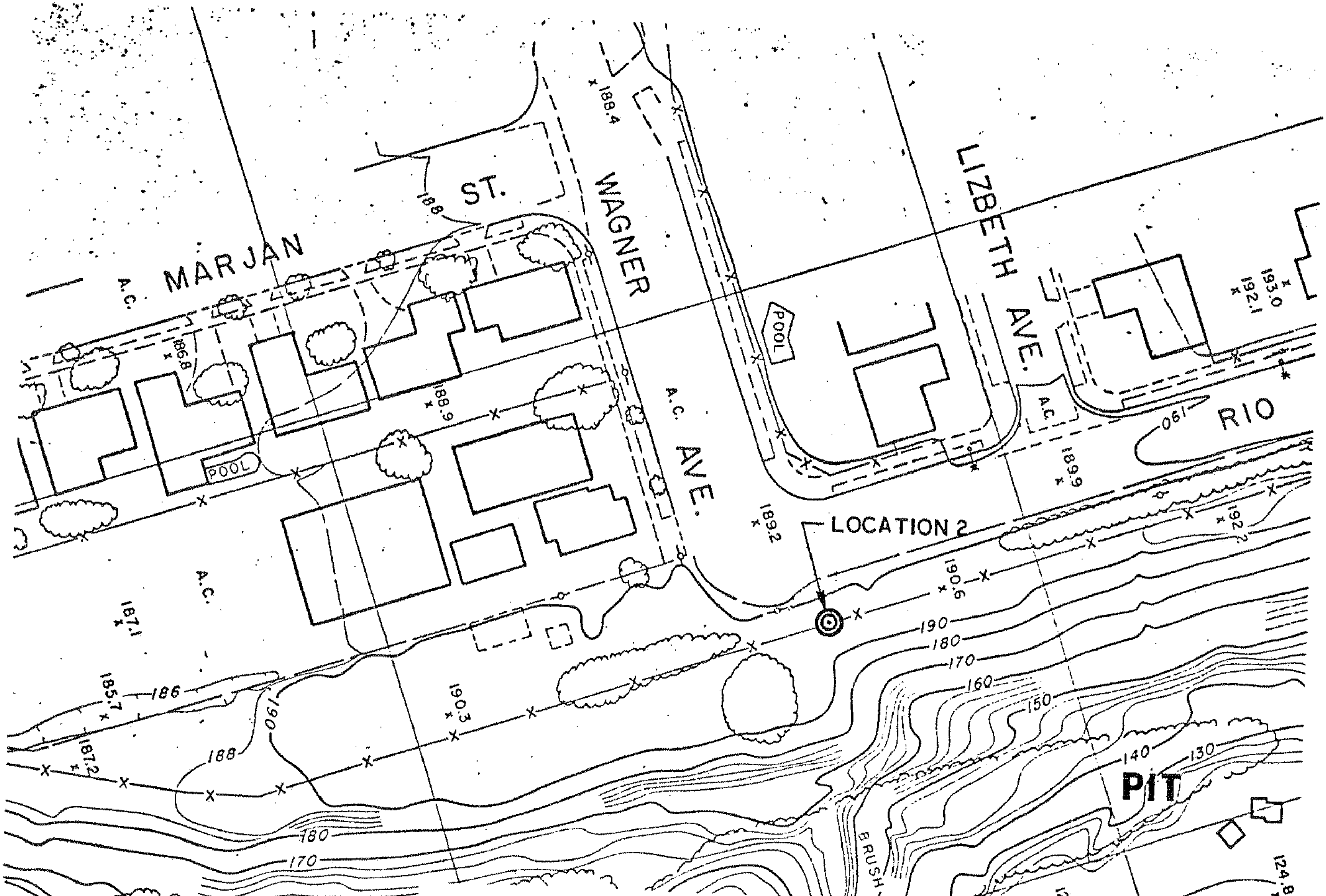


FIGURE 3

NOISE MEASUREMENT LOCATION 2

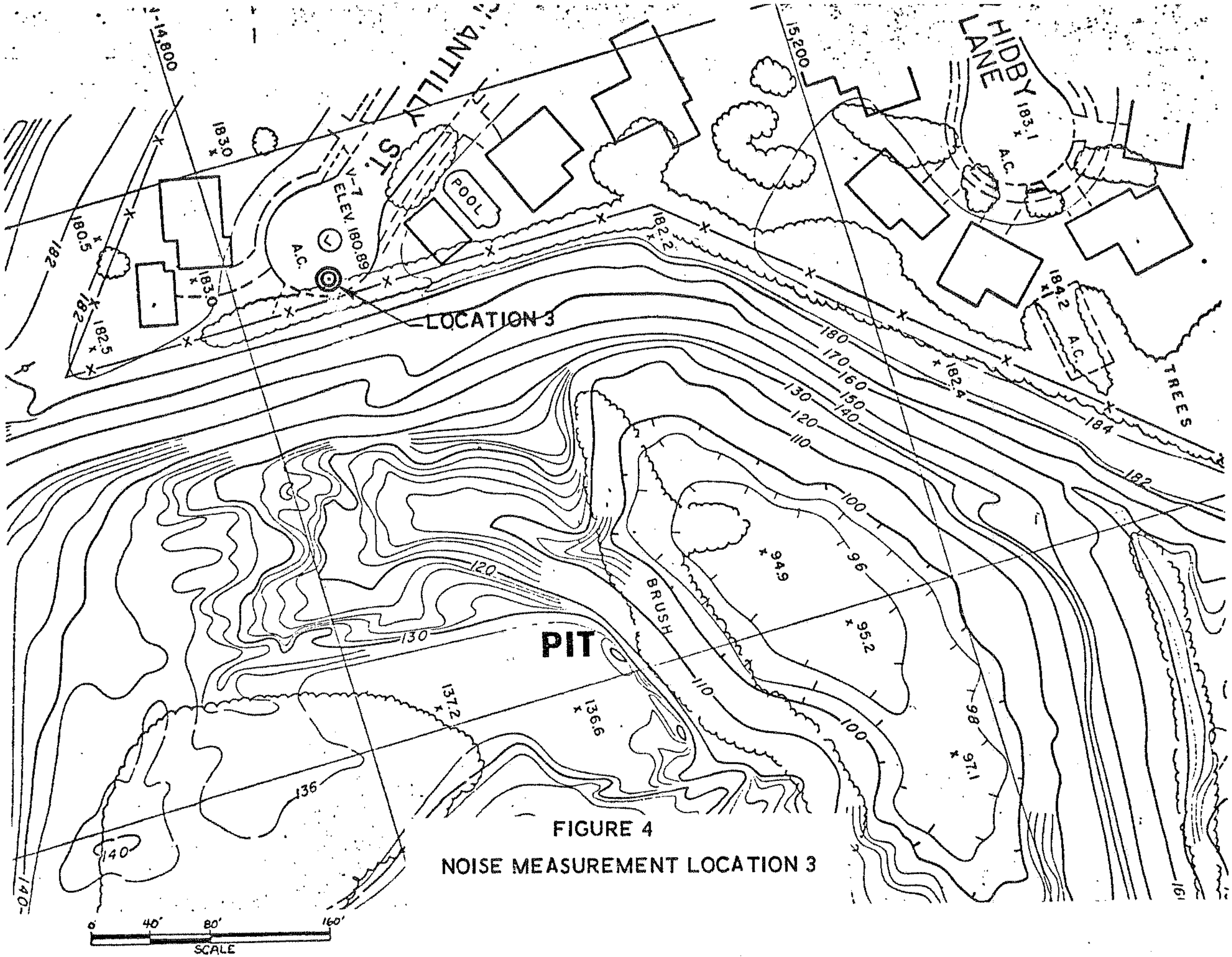


FIGURE 4

NOISE MEASUREMENT LOCATION 3

is heavily traveled by residents of the community. Location 3 was located on Chantilly Street near the end of the cul-de-sac near the rear property line of the homes that border along the pit.

2.2 Noise Measurement Equipment

The equipment used to carry out the field measurements consisted of a sophisticated digital data acquisition system in which the time varying sound pressure level was sampled at a known rate and converted into a digital signal which was recorded on mganetic tape. The digital signal from the magnetic tape was then interfaced with a programmable calculator and analyzed statistically. This system allowed the acquisition of many more data points than could have been gathered using a hand held sound level meter. The following equipment was used to measure, record, analyze, and calibrate the system:

- Digital Acoustics Sound Level Meter DA-100
- Digital Acoustics Tape Interface DA-126
- Digital Acoustics Processor Interface DA-600
- Sony Superscope Tape Recorder TC-126
- Wang Programmable Calculator 600-14TP
- Quest Acoustic Calibrator

2.3 Noise Measurement Results

The results of the measurements taken near the Burris Pit can be presented in several ways. First, it must be realized that noise is a time varying quantity that can best be described using statistical quantities. The measurements taken consisted of recording the A-weighted sound pressure level once per second for a 15-minute period at each location. From this data the statistical distribution of the sound pressure level was determined and reported in terms of the L_{10}, L_{50}, and L_{90} noise levels. The L_{10} noise level is that level which was exceeded 10 percent of the time and is called the "peak" noise level. The L_{50} noise level is that level exceeded 50 percent of the time and is called the "median" noise level. The L_{90} noise level is that noise level exceeded 90 percent of the time and is called the "background" noise level. Also, the equivalent noise level and the noise pollution level were recorded. The equivalent noise level, or L_{eq}, is the "energy average" noise level during the measurement period (as compared to the average of sound pressure level) and the noise pollution level or L_{np}, is merely the L_{eq} with an additional correction for the variability of noise. For example, a steady noise is not as annoying as an unsteady noise and L_{np} takes this into account.

Figure 5 is presented to indicate typical noise levels that are experienced from various noise sources for comparison with the measured noise levels near the Burris Pit. For comparison purposes, assume that the noise levels given in Figure 5 are "peak" noise levels.

Results of the noise measurements are presented in Table 1 in terms of the L_{10}, L_{50}, and L_{90} noise levels. Also shown in Table 1, are the equivalent noise levels and noise pollution levels. Noise measurements were made in the late afternoon during the peak traffic hour.

In the absence of any local noise ordinance, these levels can be evaluated using standards developed by the Federal Department of Housing and Urban Development (HUD).* According to the HUD noise evaluation criteria for residential sites, the noise is classified as clearly acceptable, normally unacceptable, and clearly unacceptable. These classifications are defined as follows:

> <u>Clearly Acceptable</u> - The noise exposure is such that both the indoor and outdoor environments are pleasant.
>
> <u>Normally Acceptable</u> - The nosie exposure is great enough to be of some concern but common building construction will make indoor environment acceptable, even for sleeping quarters, and the outdoor environment will be reasonably pleasant for recreation and play.
>
> <u>Normally Unacceptable</u> - The noise exposure is significantly more severe so that unusual and costly building construction is necessary to ensure some tranquility indoors, and barriers must be erected between the site and prominent noise sources to make the outdoor environment tolerable.

* U. S. Department of Housing and Urban Development, <u>Noise Assessment Guidelines</u>, HUD Report No. TE/NA-71 (1971).

SPL (dBA)	Subjective impression	Community* (outdoor)	Home or industry* (indoor)	Relative loudness (human judgment of different sound levels)
130				32 times as loud
	Uncomfortably	Military jet aircraft takeoff with afterburner from aircraft carrier at 50 ft (130 dBA)	Oxygen torch (121 dBA)	
120	loud	Turbofan aircraft at takeoff power under flight path at 200 ft (118 dBA)	Riveting machine (110 dBA). Rock-n-roll band (108-114 dBA)	16 times as loud
110	Very	Same jet flyover at 1,000 ft. (103 dBA). Boeing 707, DC-8 at 6,080 ft. before landing (106 dBA). Bell J-2A helicopter at 100 ft. (100 dBA)		8 times as loud
100	loud	Boeing 737, DC-9 at 6,080 ft. before landing (97 dBA). Motorcycle at 25 ft. (90 dBA)	Newspaper press (97 dBA)	4 times as loud
90	Moderately	Car wash at 20 ft. (89 dBA). Prop. plane flyover at 1,000 ft. (88 dBA). Diesel truck, 40 mph at 50 ft. (84 dBA). Diesel train, 45 mph at 100 ft. (83 dBA). Power mower at 25 ft. (85 dBA).	Food Blender (68 dBA) Milling Machine (83 dBA) Garbage Disposal (80 dBA)	2 times as loud
80	loud	High urban ambient sound (80 dBA). Passenger car, 65 mph at 25 ft. (77 dBA). Freeway at 50 ft. from pavement edge 10 A.M. (76±6 dBA)	Living room music (76 dBA) TV-audio, vacuum cleaner (70 dBA)	Reference loundess
70			Cash register at 10 ft (65-70 dBA). Electric typewriter at 10 ft (64 dBA). Dishwasher, rinse at 10 ft (60 dBA). Conversation (60 dBA)	1/2 as loud
60		Air-conditioning condensing unit at 15 ft (55 dBA). Large transformers at 100 ft (50 to 60 dBA)		1/4 as loud
50	Quiet	Bird calls (44 dBA). Lower-limit urban daytime ambient noise (40 dBA)		1/8 as loud
40	Just audible	(Scale Interrupted)		1/16 as loud
10	Threshold of hearing			
0				

Figure 5 NOISE LEVEL AND RELATIVE LOUDNESS OF TYPICAL NOISES IN INDOOR AND OUTDOOR ENVIRONMENTS, FROM BERANEK, L.L., NOISE AND VIBRATION CONTROL, McGRAW-HILL, N.Y. (1971)

Table 1

RESULTS OF NOISE MEASUREMENTS MADE
IN COMMUNITY NEAR BURRIS PIT

Location Number	Time of Day	Noise Level (dBA)				
		L_{90}(1)	L_{50}(2)	L_{10}(3)	L_{eq}(4)	L_{np}(5)
1	4:52 PM	43	45	60	63.4	81.8
2	4:08 PM	47	54	61	58.0	71.1
3	4:27 PM	51	54	57	55.7	61.7

Notes:

(1) Noise Level Exceeded 90 percent of the time ("Background")

(2) Noise Level Exceeded 50 percent of the time ("Median")

(3) Noise Level Exceeded 10 percent of the time ("Peak")

(4) Equivalent Noise Level

(5) Noise Pollution Level

Clearly Unacceptable - The noise exposure at the site is so severe that the construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would still be intolerable.

Figure 6 shows these HUD criteria in terms of percentage of time exposed to a particular noise level. Exposure for more than 33 percent of the time to 65 dBA or greater results in a "normally unacceptable" noise condition.

From Figure 6 and Table 1 it is clear that the community near the Burris Pit experiences a very quiet noise environment that is relatively free of major noise intrusions.

3.0 NOISE ANALYSIS OF A SAND AND GRAVEL OPERATION

In order to establish the noise characteristics of a sand and gravel operation, noise measurements were taken at an operation similar to the proposed operation for the Burris Pit. The existing sand and gravel operation was located along the Santa Ana River, no more than three miles from the Burris Pit at the current spreading basin known as Warner Pit.

The sand and gravel operation consisted of a large shovel and tractor which loaded gravel onto a conveyor which carried the gravel onto a loading device under which large trucks were filled. A diesel generator provided power to the conveyor and sifter. Thus, there were numerous noise sources, both stationary and mobile. The following noise sources were observed at the Warner Pit sand and gravel operation:

- diesel trucks
- power shovel
- tractor
- conveyor
- sifter
- diesel power generator

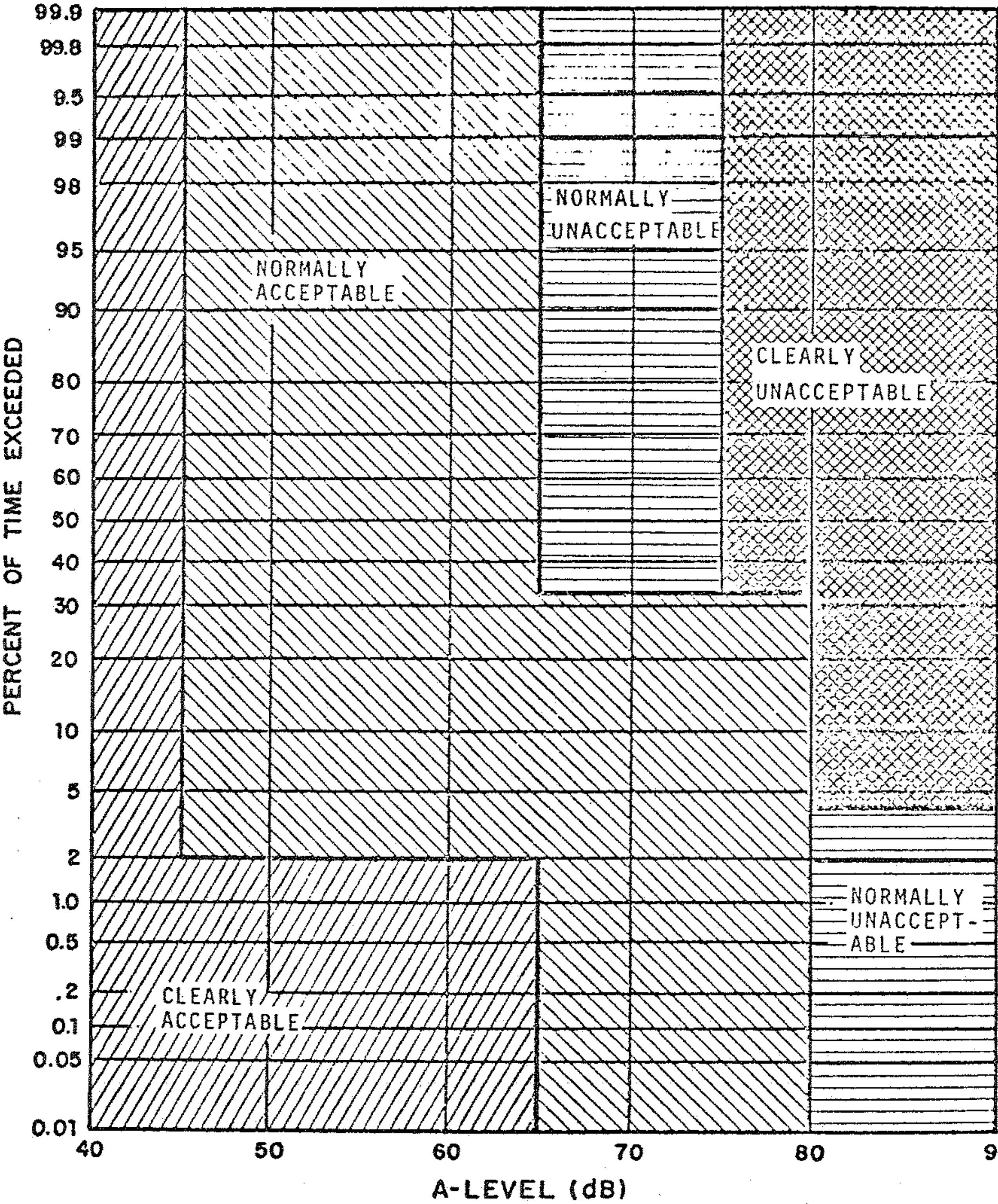


FIGURE 6 CURRENT HUD CRITERIA FOR NON-AIRCRAFT NOISE

SOURCE: HUD NOISE ASSESSMENT GUIDELINES,
TECHNICAL BACKGROUND, HUD, 1971.

The layout and noise measurement locations for this study are shown in Figure 7. Noise measurement results are given in Table 2. Noise levels at Location 1 are reported for two conditions observed during the measurement sequence; tractor operating or not operating.

Because the tractor generated considerable noise, this had a significant effect on measured noise levels. The results shown in Table 2 indicate that a sand and gravel operation generates considerable noise and that caution should be exercised before placing such an operation near a residential community.

The following section estimates noise levels that would occur in the residential community near Burris Pit if a sand and gravel operation were to be used in the Burris Pit.

4.0 ESTIMATES OF NOISE LEVELS NEAR BURRIS PIT FOR SAND AND GRAVEL OPERATIONS

4.1 Introduction

The noise levels that will be experienced in the community near Burris Pit if sand and gravel operations are carried out is highly dependent on several factors. These factors include:

- Location and elevation of the conveyor and loading apparatus.
- Location of area that tractor is operating.
- Location access routes for trucks going into and out of the site.
- Existence of noise barriers such as walls, etc.

The issue is further complicated by the fact that the operation would not be located in any one location exclusively, but will probably move around the pit. Another factor that affects impact of the noise on residents is the time of day that the noise occurs. An attemp will be made to address all these factors in the following section.

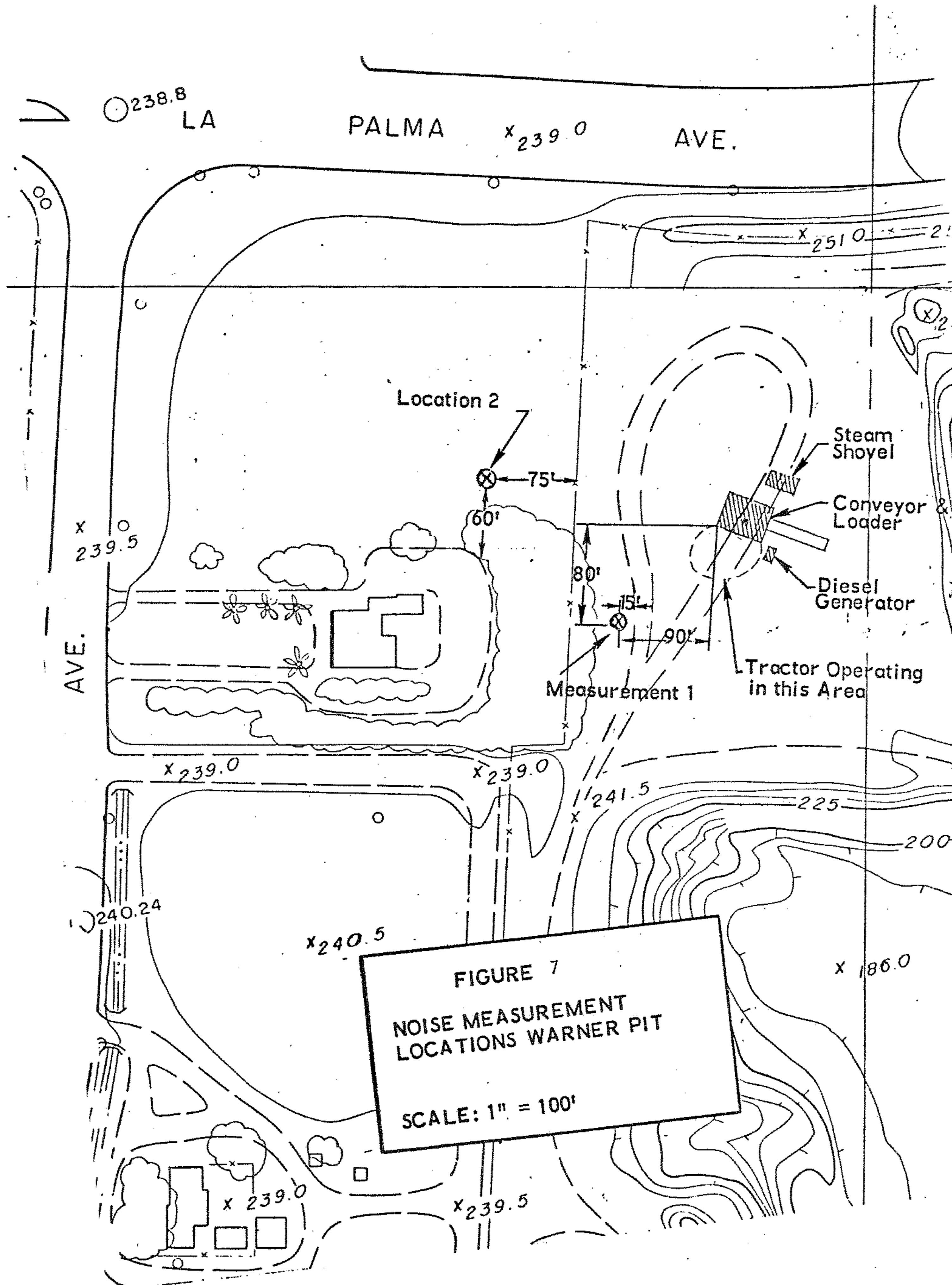


FIGURE 7

NOISE MEASUREMENT LOCATIONS WARNER PIT

SCALE: 1" = 100'

TABLE 2

RESULTS OF NOISE MEASUREMENTS TAKEN AT
EXISTING SAND AND GRAVEL OPERATION AT WARNER PIT

Location	Distance to Center of Operation (feet)	Noise Level (dBA)*					
		L_{90}(1)	L_{50}(2)	L_{10}(3)	L_{eq}(4)	L_{np}(5)	Peak (6)
Location 1 (with tractor operating)	135	69	70	73	72	77	84
Location 1 (without tractor operating)	135	64	66	68	68	73	81
Location 2 (without tractor operating)	210	61	63	65	64	68	72

* Based on 15 to 20 minute samples with a sample rate of 1 per second; these levels are based on a minimum of 900 data points.

(1) Noise Level Exceeded 90% of the time ("background")
(2) Noise Level Exceeded 50% of the time ("Median")
(3) Noise Level Exceeded 10% of the time ("peak")
(4) Equivalent Noise Level
(5) Noise Pollution Level
(6) Peak noise level observed during measurement period.

4.2 Noise Level Predictions

The area in which the sand and gravel operation will be restricted to is shown in Figure 8. In order to calculate the noise levels in the residential areas from these operations it is necessary to extrapolate the data measured at the Warner Pit to the Burris Pit. This is done by drawing graphs from which one can determine the noise level for a given 'line of sight' distance between the noise source (sand and gravel operation) and the point in question (residential property line). Table 3 is a list of assumptions and advantages and disadvantages of the assumptions used in calculating the estimated noise levels. Figure 9 is a graph which can be used to predict noise levels from the sand and gravel operation. For example, if the estimated noise levels of a residential site 500 feet from the sand and gravel equipment is desired, find 500 feet on the abscissa of the graph Figure 9 and, using the curves presented, locate the noise level in dBA on the ordinate. At 500 feet from the sand and gravel operation the median noise level (L_{50}) is 58 dBA. The distance used in Figure 9 must be the straight-line distance between the receiver and the sand and gravel operation; that is, elevation differences must be considered when calculating the distance between source and receiver. Thus if the sand and gravel operation were located below grade in the pit it would be quieter than if operated at the same grade as the residences.

Using Figure 9 the noise levels for it can be shown that a receiver must be located 750 feet from the center of the sand and gravel operation in order to keep the median noise level below 55 dBA. A median noise level of 55 dBA should be used as the criteria for determining the acceptability of the noise because this is the level specified in the Orange County Noise Ordinance.* Table 4 is a summary of the Orange County Noise Ordinance.

Using the Orange County Noise Ordinance as a guideline, a boundary can be drawn in the Burris Pit outside of which a sand and gravel operation can be located withoug violating the noise ordinance. Table 5 lists the maximum noise levels that will not be exceeded for the time

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* Orange County Noise Ordinance, Ordinance Number 2715.

Figure 8 AREA IN WHICH SAND AND GRAVEL OPERATION WILL LOCATE

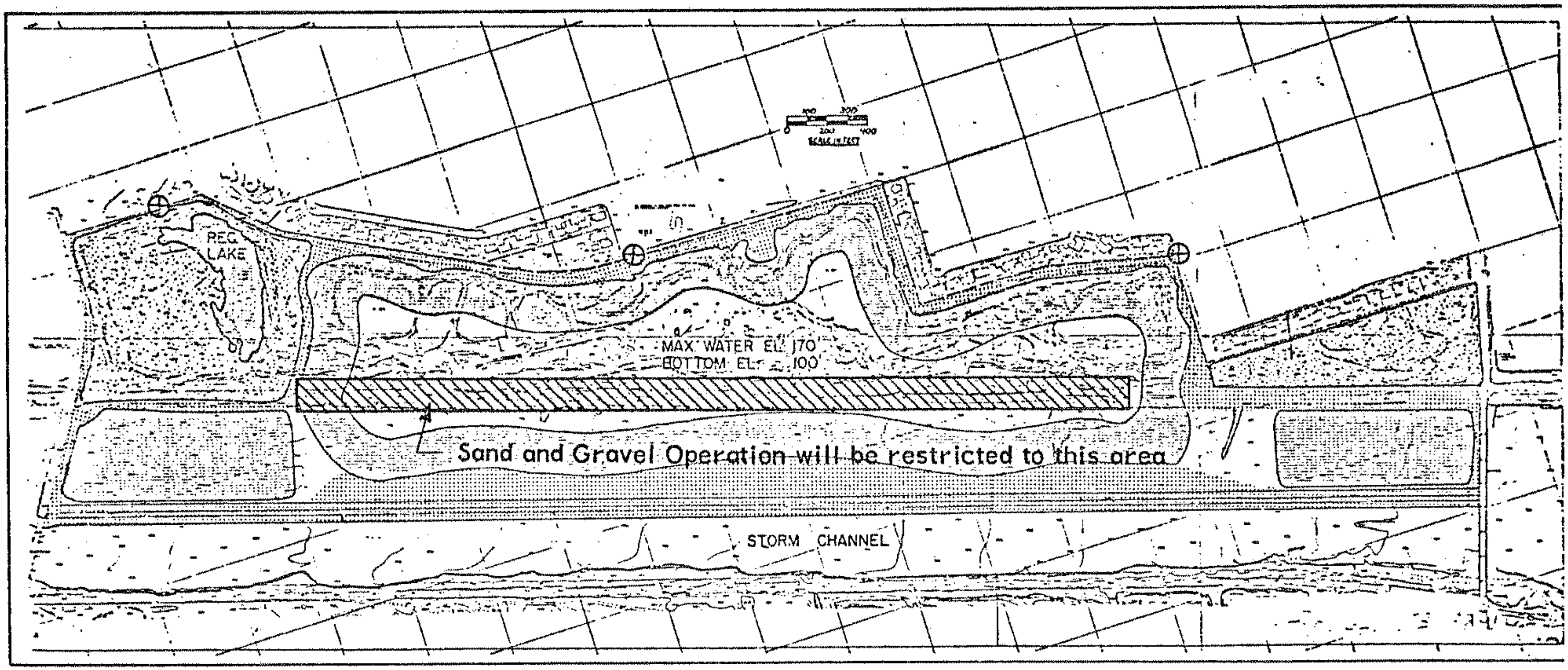


Table 3

ASSUMPTIONS USED FOR CALCULATING NOISE LEVELS

Assumption	Advantage or Disadvantage
1. Operation has characteristics of ideal point source.	• Not valid close to the source (close to the source individual sources should be treated separately).
2. There exists a 'line of sight' between source and receiver.	• Valid if no barriers either natural (terrain) or man-made (walls) interrupt 'line-of-sight' between source and receiver.
3. All distances are this straight line distance between source and receiver.	
4. Proposed ooerations at Burris Pit have same noise characteristics as operations measured at Warner Pit.	• Assumes same equipment or types of equipment will be used.
5. Assumes tractor operating all the time during operations.	• During observed operations tractor was only operating 1/2 of the time that loading of trucks was occurring.

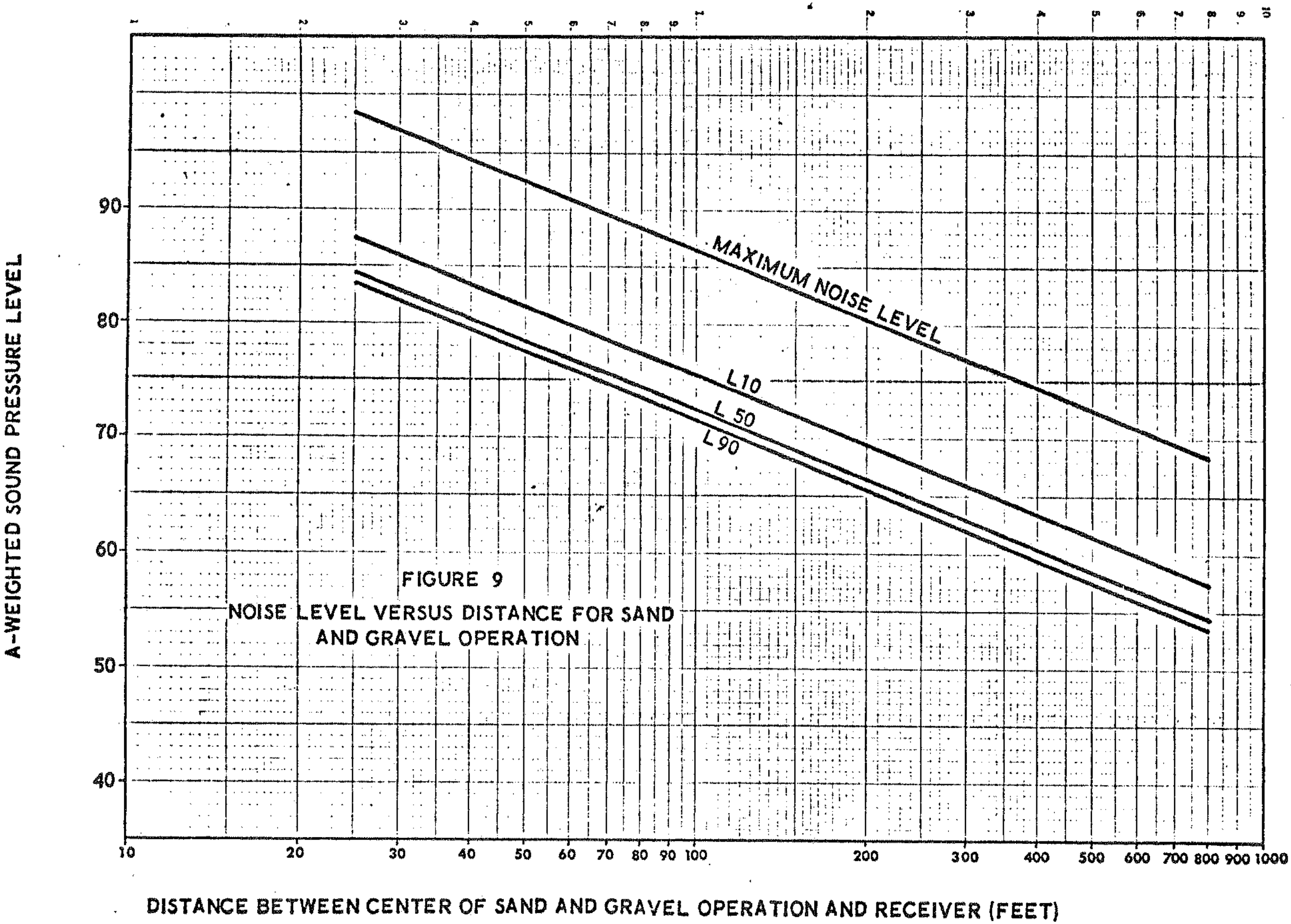


FIGURE 9

NOISE LEVEL VERSUS DISTANCE FOR SAND AND GRAVEL OPERATION

Table 4 ORANGE COUNTY NOISE ORDINANCE

Noise Level (dBA)	Number of Minutes Per Hour*
55	30
60	15
65	5
70	1
75	0

* Number of minutes per hour during the daytime that the noise level can be exceeded without violating noise ordinance.

Table 5 NOISE LEVELS AT 750 FEET FROM SAND AND GRAVEL OPERATION

Number of Minutes Per Hour	Maximum Noise Level That Will Not Be Exceeded (dBA)
30	55
15	58
5	60
1	62
0	69

periods specified in the ordinance if the receiver is 750 feet from the sand and gravel operation.

Therefore, using this criteria (median noise level not to exceed 55 dBA) the sand and gravel operation should not be located within 750 feet of any residence. This restriction is shown in Figure 10 in relation to the desired operating area. From Figure 10 it is seen that only one-third of the desired operating area is acceptable if the guidelines of the Orange County Noise Ordinance are to be adhered to. Note that this calculation does not take the effect of barriers (if any) into account.

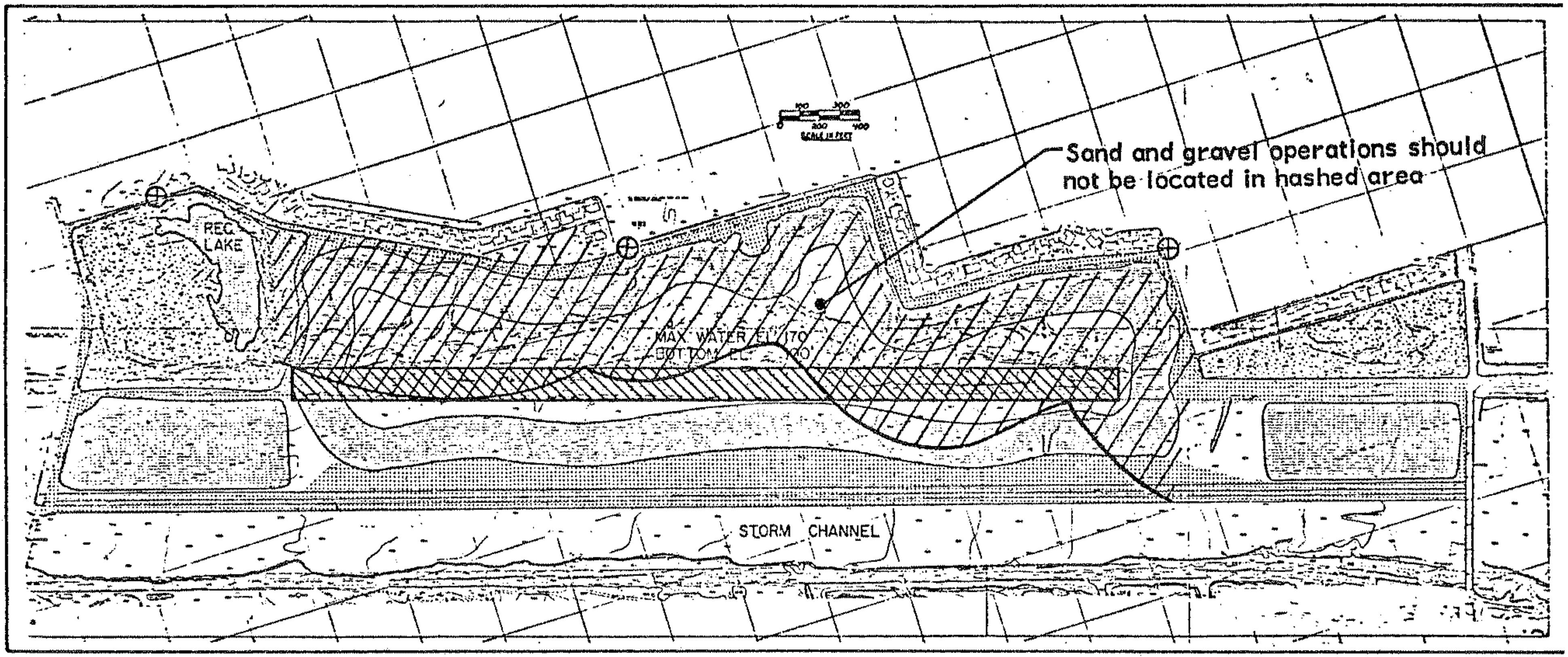
The effect of barriers is more difficult to calculate. The attenuation due to a barrier is dependent not only on the height of the barrier but also on the distance between source and receiver, the location of the barrier between the source and the receiver, and the relative elevation of the source and receiver. A barrier can be formed from either natural terrain or from a man-made wall. A combination earth berm and solid wall is acceptable. The wall must be at least four pounds per square feet and have no holes or cracks. Several barrier calculations were done for the Burris Pit. The objective being to design a berm which would allow the sand and gravel operation to operate anywhere along the desired strip shown in Figure 8. The assumptions that went into the barrier calculation were as follows:

- The sand and gravel operation would not be located outside the area shown in Figure 8.
- The receiver height is 5 feet.
- The source has an equivalent height of 8 feet (this is reasonable since the tractor, trucks, and diesel generator are the major source of noise).
- The sand and gravel operation would not be located on an elevation higher than the homes (this has been verified by topography maps).
- The berm would be located on the western edge of the pit and run the entire length of the pit.

The results of the calculation indicate that an eleven-foot berm would provide adequate sound attenuation to meet the requirements of the Orange County Noise Ordinance.

Another important consideration is the location of truck access routes. Large diesel trucks can produce noise levels as high as 95 dBA at

Figure 10 AREA IN WHICH SAND AND GRAVEL OPERATIONS SHOULD NOT BE LOCATED ACCORDING TO ORANGE COUNTY NOISE ORDINANCE, ASSUMING NO SOUND BARRIER IS CONSTRUCTED



a distance of 50 feet. For this reason trucks must not be allowed on residential streets or should trucks use access to the west side of the pit.

5.0 SUMMARY

Noise measurements made in the residential community near Burris Pit indicate that the community enjoys a relatively quiet noise environment and that currently there are no major noise sources in the neighborhood.

Noise measurements at an existing sand and gravel operation in Warner Pit show that sand and gravel operations are major noise generators and that the noise environment near the equipment can be quite loud. The major noise sources associated with sand and gravel operations are the large diesel trucks entering and exiting the site and tractors which are used to move earth.

The impact of the renovation of Burris Pit should be determined by considering the impact of each phase. During Phase I will the reworking of Burris Pit be directed at the west side of the pit near the homes. In that case the impact of the noise would be a short-term impact occurring for only the 6-month duration of Phase I (even shorter at any given location because equipment will work at one spot on the west only a short time compared to the 6-month span of Phase I). Phase II and III (5 to 6 years in length) cannot be considered as 'short-term' and therefore the impact of this project should be directed at Phase III operations. During Phase II and III sand and gravel operations should be avoided on the west side of the pit and restricted to the east side of the pit in the area shown in Figure 8 of this report. Further, a noise barrier constructed on the west side of the pit will allow community noise levels to fall within the requirements of the Orange County Noise Ordinance.

APPENDIX C

COUNTY OF ORANGE
ENVIRONMENTAL MANAGEMENT AGENCY
811 NORTH BROADWAY
SANTA ANA, CALIFORNIA

TELEPHONE: 834-5678
AREA CODE 714

MAILING ADDRESS:
P.O. BOX 4048
SANTA ANA, CALIFORNIA 92702

H. G. OSBORNE
DIRECTOR

January 9, 1976

FILE DEIR 65-75

Mr. Neil M. Cline, Secretary Manager
Orange County Water District
P. O. Box 8300
Fountain Valley, California 92708

Dear Mr. Cline:

This is in response to a letter dated December 4, 1975 by which a Draft Environmental Impact Report for the Burris Sand Pit Water Conservation Facility was transmitted and written comments were requested prior to January 10, 1976.

The Environmental Management Agency has reviewed the overall project and the Draft EIR and considers the Draft EIR to be inadequate particularly relating to potential impacts from the sand and gravel extraction operations and to the inadequate information pertaining to the site's future recreational use. Other errors or oversights on matters related to flood control have also been noted. Specific suggestions for additional items to be included in Final EIR are as follows:

1. Indicate that the project will include a Commercial Sand and Gravel operation removing approximately ______cubic yards of material over a period of ____years.

2. Indicate that the material will be removed in compliance with the applicable provisions of the Orange County Sand and Gravel District zoning regulations and the applicable provisions of the Orange County Sand and Gravel Mineral Extraction Code. The above working was copied from the Agreement between OCFCD and the OCWD dated June 18, 1975. Copies of the Agreement, SG District Regulations and the Mineral Extraction Code are attached.

3. Include appropriate sections of the County's Sand and Gravel Extraction Zoning District Regulations and the Sand, Gravel and Mineral Extraction Code or make appropriate statements indicating the specific performances required for compliance.

4. Indicate that the project will be developed consistent with the County's Master Plan of Regional Parks and that the Water District will cooperate and work with the Orange County Harbors, Beaches and Parks District in the construction of the park and recreation elements of the project.

5. Include a Recreation Facilities Exhibit that shows the planned recreational improvements and/or uses.

6. Include a Map Exhibit that shows the location and sections of excavation areas, the location of proposed facilities for the commercial sand and gravel operation and the proposed on-site traffic routes with special emphasis on entrance and exit areas.

7. Include additional information regarding the anticipated traffic volume and size of the commercial sand and gravel operation.

8. Indicate that project will be subject to an SG site permit in compliance with the County's Sand and Gravel Extraction Zoning District Regulations.

9. Indicate the mitigation measures for the project will be included for implementation in the "Plan of Operations" that is called for in the Sand and Gravel Extraction District Regulations.

Other comments related to the specific wording of the draft EIR are as follows:

Page 6, 1st paragraph. The report does not evaluate in detail the impacts of all phases of work with emphasis on a multi-purpose recreational facility, as stated.

Page 8, 4th paragraph. The strip of land referred to is to be 150 feet wide rather than the 100 feet as stated.

Page 9, Figure 2. The exhibit should be more readable and it should show the land configuration as of the completion of Phase I.

Page 10, Figure 3. The sections should show depths, width of cuts, and side slope ratios. Also, the typical section or sections should be correlated with Figure 2, the site location map.

Page 12, 1st paragraph. It should be noted that the Standard Specifications included as Appendix A will be revised to comply with applicable provisions of the SG District Regulations and the Sand, Gravel and Mineral Extraction Code.

Page 12, last paragraph. The "shallow flood spillway" intended to direct storm waters back into the Santa Ana River may not be functional without a raised berm in the vicinity of Ball Road which would prevent the westward flow of storm waters.

Page 21, Figure 6. The exhibit should be more readable.

Page 22, Figure 7. The sections should be correlated with Figure 6, the geology map.

Page 30, 2nd paragraph. The $6 million cost for the 1964 Leeds, Hill and Jewett report appears to be in error.

Page 38, 1st paragraph. It would be more informative if the noise analysis referred to could be included in the appendix.

Page 38, last paragraph. The following statement is challenged "...the impact of truck noise on properties adjacent to Ball and Lincoln will be minimal".

Current impact of freeway noise plus acceleration of trucks onto the freeway, and the acceleration noise from trucks entering surface streets from the pit could cause significant impacts. Additional impacts may occur from noise generated by empty trucks entering the pit area from local streets.

Page 43, 1st paragraph. Impact on local traffic should discuss (1) hours of trucking and its effect on peak hour traffic, (2) possible need for signalization and (3) possible need for acceleration and deceleration lanes for trucks entering and exiting the pit area.

Page 51, last paragraph. The following statement is questioned "...traffic on Ball and Lincoln east of the site is expected to remain unaffected, as is the case westerly of the freeway". There is no apparent reason to assume that all recreational traffic will use the Orange Freeway.

Pages 53 and 54. The mitigation measures should be reworded to indicate their intended implementation.

The Orange County Planning Commission has approved the Revised Sand and Gravel Extraction District Regulations and has recommended them to the Board of Supervisors for adoption. The Revised Regulations were considered by the Board on January 7, 1976 and returned to staff for relatively minor changes. The Board has rescheduled the adoption of the Revised Regulations for 10:00 AM January 28. Ms. Shirley Grindle, Chairman of the County Planning Commission has offered to meet with you to discuss these regulations if it would be helpful to you.

As a point of information, it should be noted that this letter is not intended as a response to your December 15, 1975 letter. EMA Development is currently preparing a response that will discuss the County's participation in the project and implementation of the June 18, 1975 Agreement.

Thank you for the opportunity of reviewing your Draft EIR. If there are any questions regarding the above comments, please contact Mr. Ballinger at 834-2439.

Very truly yours,

HG Osborne

H. G. Osborne, Director

JEB:mlt

cc: Ms. Shirley Grindle
EMA/Regulations
EMA/Development
ESD Project File
Reading File

Directors
PRESTON K. ALLEN
COURTNEY R. CHANDLER
ROBERT L. CLARK
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ORANGE COUNTY WATER DISTRICT

10500 ELLIS AVENUE - P.O. BOX 8300
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TELEPHONE (714) 963-5661 / 556-8260

Officers
PRESTON K. ALLEN
President
ROBERT L. CLARK
First Vice President
NOBLE J. WAITE
Second Vice President

NEIL M. CLINE
Secretary Manager

February 18, 1976

Mr. H. G. Osborne, Director
Environmental Management Agency
811 North Broadway
Santa Ana, CA 92707

Dear Mr. Osborne:

Enclosed are copies of the Orange County Water District's final Environmental Impact Report on the Burris Pit Water Conservation Facility. The draft report was distributed to governmental agencies, organizations, and interested individuals for their review and comment.

This final report consists of the Draft Environmental Impact Report and three new appendices (Appendix B, C and D). Appendix B consists of a noise study for the Burris Pit. Appendix C contains copies of review comments received by this District, and copies of the District's responses to these communications. Appendix D identifies text revision and clarification based on the comments received.

The following are the District's responses to the comments contained in your letter of January 9, 1976 regarding the District's Draft Environmental Impact Report.

1. The total amount of material to be excavated from the pit cannot be accurately estimated due to the fact that clay materials will remain in the pit. The geologic structure of the material in varying layers of sand, gravel and clay coupled with the fact that the needs of the industry fluctuate with the construction industry, make such a determination difficult at best. Total basin completion time was estimated at three to five years (see page 12, third paragraph).

2. The District awards sand and gravel contracts to comply with any applicable provisions of the Sand and Gravel District Zoning Regulation and the Sand and Gravel Mineral Extraction Code if and when it should produce sand and gravel for commercial purposes on the three parcels conveyed by the agreement dated June 18, 1975, and on the property known as the Burris Pit. It should be kept in mind that the primary purpose of the project is to construct a water conservation basin, and the District will in no way be directly involved in any commercial operation.

3. The District interprets the "as applicable" provisions to be in compliance with noise, dust, light, traffic regulations, and hours of operation, all of which have been considered in this report.

4. The Orange County Water District has made consistent efforts to coordinate development of Burris Pit with Orange County Harbors, Beaches and Parks District. Due to lack of participation, and insufficient time remaining to acquire and use awarded grant funds, it is somewhat doubtful whether Harbors, Beaches and Parks District has further interest in the construction of the park and recreation elements of the project. For this reason the District has considered a less elaborate plan which could be more easily financed.

5. The District concurs with your recommendation and has included a potential recreational facility exhibit. Refer to Figure I, Appendix D.

6. Excavation will ultimately take place throughout the entire Burris Pit, a section at a time; therefore, the location of the facilities for the sand and gravel operation will change periodically, but will be confined only to that area as set out in Appendix B. Since both the excavation area and the sand and gravel facilities are subject to change, definite on-site traffic routes cannot be determined at this time; however, sole ingress and egress to the site will be from Ball Road. The Road Department has been contacted with regard to appropriate striping on Ball Road to accommodate the increased traffic flow to and from the site. This was done in conjunction with the current widening program for Ball Road. Further, when bids for the material have been received, more evaluation of traffic impacts will be done. It is immediately apparent that the operator chosen, and perhaps his plant location, may further effect traffic.

7. Based on earlier expenses, the commercial sand and gravel operation for the project is expected to generate approximately 110 movements per weekday on Ball Road. The Traffic Division of the Road Department estimates 12,000 cars and trucks per weekday on Ball Road at present; therefore the sand and gravel operation will increase the existing traffic volume 1 percent.

8. This District, under its formation, is not required to obtain a sand and gravel site permit for the construction of a water conservation basin. However, the District has made public its intention to comply with the "as applicable" provisions of the code and has been working closely with the Orange County Planning Commission to set out these items in "plan form". This serves to synopsize work previously done.

9. The District will not be submitting a "plan of operation" for this project for approval. Rather, the plan is being done on a "review and comment" basis. The required mitigation measures will be included for implementation in the permit for excavation.

Page 6, first paragraph: This Environmental Impact Report evaluates the development of a water conservation facility with <u>potential</u> for multi-purpose recreational uses. These suggested uses have been identified and evaluated in this report since they are being considered in future development plans, but they have not as yet been finalized. The section you referred to has been rewritten (see Appendix D).

Page 8, fourth paragraph: In the agreement dated June 18, 1975, between Orange County Flood Control District and Orange County Water District, it was agreed that <u>excavation</u> will not take place on the 150-foot parcel immediately <u>adjacent</u> to the existing west levee of the Santa Ana River. The reviewer has apparently confused this 150-foot strip with the 100-foot strip set out in the report as a <u>deposit</u> area.

Page 9, Figure 2: The District concurs with your recommendation. Refer to Figure 2, Appendix D.

Page 10, Figure 3: The total depth of excavation is estimated at approximately 100 feet as was indicated on Page 12, third paragraph. The width of each cut will vary with the existing pit configuration. As was indicated on Page 6, last paragraph, the proposed side slope ratios will be 3 feet horizontal to 1 foot vertical. <u>Figure 3 is a typical example and was not intended to represent a true cross-section</u>.

Page 12, first paragraph: We concur with your recommendation. Appendix A will be revised to comply with the applicable provisions.

Page 12, last paragraph: The berm will not be necessary. The "shallow flood spillway" has been deleted.

Page 21, Figure 6: The District concurs with your recommendation. Refer to Figure 3, Appendix D.

Page 22, Figure 7: Figure 7 is a "typical example" and was not intended to represent a true cross-section.

Page 30, second paragraph: The $6,000,000 figure represents the cost for the entire Flood Control Project implementation recommended in the Leed, Hill and Jewit Report. This section has been reworded (see Appendix D).

Page 38, first paragraph: We concur with your recommendation (see Appendix B).

Page 38, last paragraph: All noise impacts have been considered in the noise study conducted by Ultra Systems (see Appendix B). Truck traffic will be controlled to the Ball Road entrance of the pit so that all other local streets in the immediate area will not be effected. See comment response 6.

Page 43, first paragraph: Excavation will be limited to between the hours of 7:00 a.m. and 4:00 p.m. on weekdays thereby effecting only morning peak hour traffic between 7:00 and 8:00 a.m. From past experience of the District, it is estimated that approximately 11 to 13 trucks per day will be going to and from the site; however, taking under consideration the setup and loading time each morning, approximately 8 to 10 truck movements can be expected between 7:00 and 8:00 a.m., the first hour of the day. The Road Department has been contacted and appropriate striping at the Ball Road entrance will adequately handle this increase.

Page 51, last paragraph: It should be kept in mind that this is planned as a regional facility. The majority of its users will be from outside the immediate area. We do not assume that all of the recreational traffic will use the Orange Freeway; however, it is expected that most recreational traffic will arrive via this freeway. There should be no substantial increase in local traffic as a result of development of this facility. Local use is restricted to the west side of the pit and would be "walk in" traffic only.

Page 53, and 54: We concur with your recommendation (see Appendix D).

Thank you for your analysis and review of the various elements of the Draft Environmental Impact Report. We are confident that many of your comments included in your letter review will improve the context of the report.

Sincerely,

Joyce Truby

Joyce Truby
Environmental Projects Manager

Enclosure

SANTA ANA RIVER/SANTIAGO CREEK
GREENBELT COMMISSION
625 North Ross Street, Suite B110
Santa Ana, California 92701

16 January 1976

Orange County Water District
10500 Ellis Avenue
P. O. Box 8300
Fountain Valley, California 92708

Attention: Mrs. Joyce Truby
Environmental Projects Manager

Gentlemen:

This responds to your request for comments on the draft Environmental Impact Report (EIR) for the Burris Sand Pit Water Conservation Facility, which was received by this office on 7Jan76.

Based on a review of the draft EIR, the following comments and recommendations are provided:

COMMENTS.

1. The purpose of the EIR is to evaluate the impacts of work to be undertaken following the recently completed slope stabilization (denoted in the EIR as phase I of the project), for the construction of the Burris Sand Pit Water Conservation Facility.

2. Phases II and III of the project concern the enlargement of the present pit area to provide for water storage and conservation, with an emphasis on a multipurpose recreational facility.

3. The EIR indicates that a design for the recreational facilities for the project area has not been completed at this time; however, it has been suggested by local homeowners that the project include a local walk-in park or a regional park with ample parking facilities.

4. This proposed multipurpose facility including the primary purpose of water conservation as well as recreational opportunities on a local and regional basis, together with the safety benefits resulting from the completed slope rehabilitation, will constitute a significant beneficial contribution to the Greenbelt Corridor.

RECOMMENDATIONS.

1. Refer the design for recreational plans for the

project area to the Greenbelt Commission for review and comments prior to approval.

2. Include the Santa Ana River/Santiago Creek Landscape Guide as a reference in the development of landscape plans for the project area.

3. Consider the provision of bicycle, equestrian and hiking trails in the recreational area plan, which will link to the main river trails system, and where practical to the local community trails.

The opportunity to review this EIR for the Greenbelt Commission is appreciated.

Very truly yours,

E. J. Berger

E. J. BERGER
Greenbelt Coordinator

EJB:RLH:ee

ORANGE COUNTY WATER DISTRICT

10500 ELLIS AVENUE - P.O. BOX 8300
FOUNTAIN VALLEY, CALIFORNIA 92708
TELEPHONE (714) 963-5661 / 556-8260

February 18, 1976

Santa Ana River/Santiago Creek
Greenbelt Commission
625 N. Ross Street, Suite B110
Santa Ana, California 92701

Gentlemen:

Thank you very much for your response to the District's Draft Environmental Impact Report for the Burris Sand Pit Water Conservation Facility. We wish to reassure you that your three recommendations will be carried out.

The District certainly is considering the provision of bicycle, equestrian and hiking trails in the recreational area plan which will link to the main river trail system. We have added Figure 1 in Appendix B to show this. The Orange County Water District has adopted the Santa Ana River/Santiago Creek landscape guide as a reference in the development of all landscape plans. Therefore, this guide would also serve in developing the Burris Pit landscape plans. Sometime before recreational plans for the project area have been finalized, a presentation will be made to the Greenbelt Commission. At that time it would be appropriate to make comments.

Again, thank you for your attention to this matter.

Very truly yours,

Joyce Truby

Joyce Truby
Environmental Projects Manager

APPENDIX D

APPENDIX D

Text changes made in response to comments received on the Draft Burris Pit Project Environmental Impact Report

Appendix D contains changes in the draft text which have been made in response to comments received by reviewing agencies and the public. We feel they have improved the report content and thank these people for their comments.

Page 6, paragraph 1:

Change to: The purpose of this report is to evaluate in detail the impacts of all phases of work to be undertaken following preliminary slope stabilization in the construction of the proposed water conservation facility. Included is an evaluation of alternative sites[2], designs and projects. The proposed water conservation facility has potential for multi-purpose recreational uses; therefore, preliminary plans for the development of a recreational facility are underway at this time and have also been evaluated in this report.

Page 9, Figure 2:

This figure has been updated to show the land configuration as of completion of Phase I. See Figure 2, Appendix D.

Page 21, Figure 6:

This figure has been revised. See Figure 3, Appendix D.

Page 30, second paragraph:

Rewrite last sentence to read: This updated Flood Control Plan was implemented and paid for by the Orange County Water District and the Orange County Flood Control District. The total project cost was $6 million.

Page 54, first paragraph:

Change to: These recommended mitigation measures will be required by their inclusion in the project's Contract Specifications and enforced by inspectors.

A proposed recreational facility exhibit has been included. See Figure 1, Appendix D.

References

1 Acquisition of Parcels Adjacent to Warner Basin and Evaluation Criteria for Acquisition of Additional Spreading Grounds, Toups Engineering, Inc., February 1974.

2 Evaluation of Burris Sand Pit, Toups Engineering, Inc., December 1974.

3 Objectives, Criteria and Procedures of the Orange County Water District Implementing the California Environmental Quality Act, Revised April 1, 1975.

4 EIR on Burris Pit Reclamation Project, Envista, Inc., September 19, 1974.

5 List of Soils Engineering Investigations:

(1) Buttress Stabilization of Burris Sand Pit, Foundation Engineering Co., Inc., April 15, 1975.

(2) Interim Stability Study Report - Burris Sand Pit, L. T. Evans, Inc., May 9, 1966.

(3) Stability Investigation - Santa Ana River Levee, South Street to Ball Road, Moore and Taber Engineers, May 13, 1966.

(4) Stability Investigation - Santa Ana River Levee, South Street to Ball Road, Moore and Taber Engineers, Addendum dated August 22, 1966.

(5) Stability Investigation - Santa Ana River Levee, South Street to Ball Road, Moore and Taber Engineers, Addendum dated October 14, 1966.

(6) Desilting Basins Feasibility Report for Orange County Water District, Toups Engineering, Inc., July 1967.

(7) Control and Mitigation of Flood Hazard from Santa Ana River at Burris Sand Pit, Orange County Flood Control District, October 1967.

(8) Soil and Stability Investigation - Orange County Water District Property Adjacent to Burris Sand Pit, Orange County California, Converse, Davis and Associates, July 28, 1969.

(9) Report to Board of Supervisors, Orange County, California, on Interim Repairs - Burris Sand Pit, Woodward-Clyde and Associates, August 20, 1969.

(10) Engineering Investigation of Flooding of Burris Sand Pit, Orange County, California, Bookman and Edmonston Consulting Civil Engineers, August 28, 1969.

(11) Soils Engineering Investigation - Proposed Restoration of Burris Sand Pit West of Santa Ana River Between South Street and Ball Road, Orange County, California, Converse, Davis and Associates, April 17, 1972.

(12) Geotechnical Study for Slope Stabilization and Seepage Control in the Burris Sand Pit, Anaheim, California, Woodward-McNeill and Associates, April 1, 1974.

(13) Geotechnical Study for Slope Stabilization and Seepage Control in the Burris Sand Pit, Anaheim, California, Woodward-McNeill and Associates, Addendum dated April 10, 1974.

(14) Phase I - Preliminary Site Evaluation - SAR Basin Spreading Basin Development, Anaheim, California, Woodward-McNeill and Associates, August 2, 1974.

(15) Plans and Special Provisions for a portion of Burris Pit Slope Stabilization from Ball Road to South Street, Orange County Flood Control District, November 1969.

(16) Letter Report re Burris Sand Pit, Foundation Engineering Co., Inc., November 12, 1974.

(17) Interim Design Report for Buttress Stabilization of Burris Sand Pit, Foundation Engineering Co., Inc., April 3, 1975.

(18) Preliminary East Slope Evaluation-Burris Sand Pit Redevelopment, Anaheim, California, Woodward-Clyde Consultants, May 20, 1975.

6 Phase I - Preliminary Site Evaluation - SAR Spreading Basin Development, Anaheim, California, Woodward-McNeill and Associates, August 2, 1974.

7 Fault Activity and Earthquake Map of Orange County, California, Paul K. Morton, 1973-Plate 3 of Geo-Environmental Maps of Orange County California - Preliminary Report #15, California Division of Mines and Geology, 1973.

8 The OCWD Annual Report, March 19, 1975.

9 Meteorological Factors and Air Quality Regarding the Burris Pit Project, ERA Services, April 30, 1975; contained in EIR on Burris Pit Reclamation Project, Envista, Inc., September 19, 1974.

10 Burris Pit Noise Study, Ultrasystems, Inc., February 1975.

11 Water Pricing Policy of The Metropolitan Water District of Southern California, Statement presented to the Assembly Committee on Water at Hearing in Pasadena on October 2, 1973; by Donald C. Brooks, Administrative Engineer, The Metropolitan Water District of Southern California.

Appendix M-4

1986: Santiago Creek Replenishment Program Pump Station and Pipeline, Initial Study/Traffic Study

SANTIAGO CREEK
REPLENISHMENT PROGRAM
PUMP STATION AND PIPELINE

Initial Study and
Traffic Analysis

Prepared for:

ORANGE COUNTY WATER DISTRICT
10500 Ellis Avenue
P.O. Box 8300
Fountain Valley, CA 92778

Prepared by:

PRC ENGINEERING, INC.
972 Town and Country Road
Orange, CA 92667

JANUARY 1986

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I.
INTRODUCTION

BACKGROUND

The Orange County Water District (OCWD) proposes to construct certain facilities and improvements which would permit diversion of Santa Ana River flows to the Santiago Creek basins. The improvements are needed to increase groundwater replenishment of the Orange County Groundwater Basin. Santa Ana River flows presently lost to the ocean will be diverted to Bond Pit and Blue Diamond Pit where the water will infiltrate into the underlying groundwater basin. This project is part of OCWD's Santiago Creek Replenishment Program.

This document is intended to satisfy the provisions of the California Environmental Quality Act (CEQA) which require that an Initial Study (IS) be prepared to determine whether a proposed project may have a significant effect upon the environment. The District's determination is provided on the final page of the Environmental Checklist Form (beginning page III-1) and is based on the evaluation contained in this document. The District found that although the project could have a significant impact on the environment, mitigation measures can be applied to avoid any significant impact. For this reason, the District will prepare a Negative Declaration.

ORANGE COUNTY WATER DISTRICT

The Orange County Water District (OCWD) was created in 1933 by a special act of the California State Legislature for the purposes of managing the Orange County Groundwater Basin and protecting Orange County's rights to water in the Santa Ana River. Since its creation, OCWD has successfully reduced groundwater overdraft in the Basin and halted seawater intrusion in geologic gaps along the coastal areas of the Basin.

As a major part of its groundwater management program, OCWD maintains an extensive series of groundwater recharge basins in the Forebay area of the Basin. These facilities include several hundred acres of the Santa Ana riverbed between Imperial Highway and Ball Road for ponding and percolating both natural flows of the Santa Ana River and imported waters. OCWD also operates additional recharge areas outside of the river channel, including three deep basins with a combined storage capacity of about 9,000 acre-feet (ac-ft): Warner Basin, Anaheim Lake and Burris Pit. The combined recharge facilities of OCWD can percolate and infiltrate up to an estimated 250,000 ac-ft/yr of replenishment water.

During recent years, the capacity of OCWD's existing facilities have often been exceeded by flows in the Santa Ana River. As a result, significant volumes of primarily storm flows have been lost to the ocean. Since the drought year of 1976-77, losses of Santa Ana River flows to the ocean have exceeded 100,000 ac-ft/yr during three years and have been as high as 315,000 ac-ft in 1979-80. Increasing urbanization within Orange County has resulted in higher demands being placed on water supplies to the area. These higher demands, coupled with rising costs to local water purveyors for imported water, are placing increasing demands upon the groundwater supply within the Basin. As a result, OCWD has initiated the development of additional groundwater replenishment capacity along Santiago Creek to supplement its Santa Ana River replenishment facilities.

The primary goal of the Santiago Creek Replenishment Program is to increase groundwater replenishment of the Orange County Basin by minimizing the loss of excess SAR flows to the ocean by the capture, transport and infiltration of those flows into the Santiago Creek Basins. Other project goals are, when cost-effective, to use the Basins to replenish imported waters, and to provide recreational uses at the Basins that are compatible with groundwater replenishment.

II.
PROJECT DESCRIPTION

The proposed project would involve: 1) improvements at Burris Pit, 2) construction of conveyance facilities to divert Santa Ana River flows from Burris Pit to the Santiago Creek Basins, and 3) improvements at the Santiago Creek Basins.

One of the key improvements at Burris Pit would be construction of a box inlet drop structure to divert Santa Ana River flows directly into Burris Pit. Another improvement would be the construction of an emergency spillway into surrounding developed areas and to increase flexibility of the diversion system.

An earlier initial study discussed an alignment from Main Street eastward onto Katella Avenue and determined that it was undesirable for the pipeline project. An alignment along Collins Avenue was evaluated as an alternative route for the following reasons: (1) the lower elevation would save approximately $100,000 a year in pumping costs; (2) the shorter alignment length would save approximately $250,000 in construction costs; and (3) traffic problems are minimal along Collins as compared to Katella.

Conveyance facilities to divert Santa Ana River flows for replenishment at the Santiago Creek Basins include a pump station at Burris Pit, a 66-inch transmission main, and a concrete energy dissipator at the Santiago Creek Basins. The proposed pipeline alignment is shown in Figure 1. The pump station would be constructed atop the old westerly Santa Ana River levee approximately 1,200 feet north of Ball Road. The transmission main would begin at the pump station and cross the Santa Ana River to join Main Street at its cul-de-sac approximately 1,580 feet north of Taft Avenue. The preliminary alignment continues south along Main Street, then turns eastward onto Collins Avenue. The pipeline continues eastward along Collins Avenue to Prospect Street, where the transmission main will discharge into a concrete energy dissipator in the Santiago Creek Basins. It is estimated that the pipeline will traverse 23,000 feet; of which, 21,100 feet will occur in surface streets with typical utilities, 1,650 feet of open-cut river crossing and 830 feet of jacking at 10 locations including Tustin Avenue and railroad right-of-way.

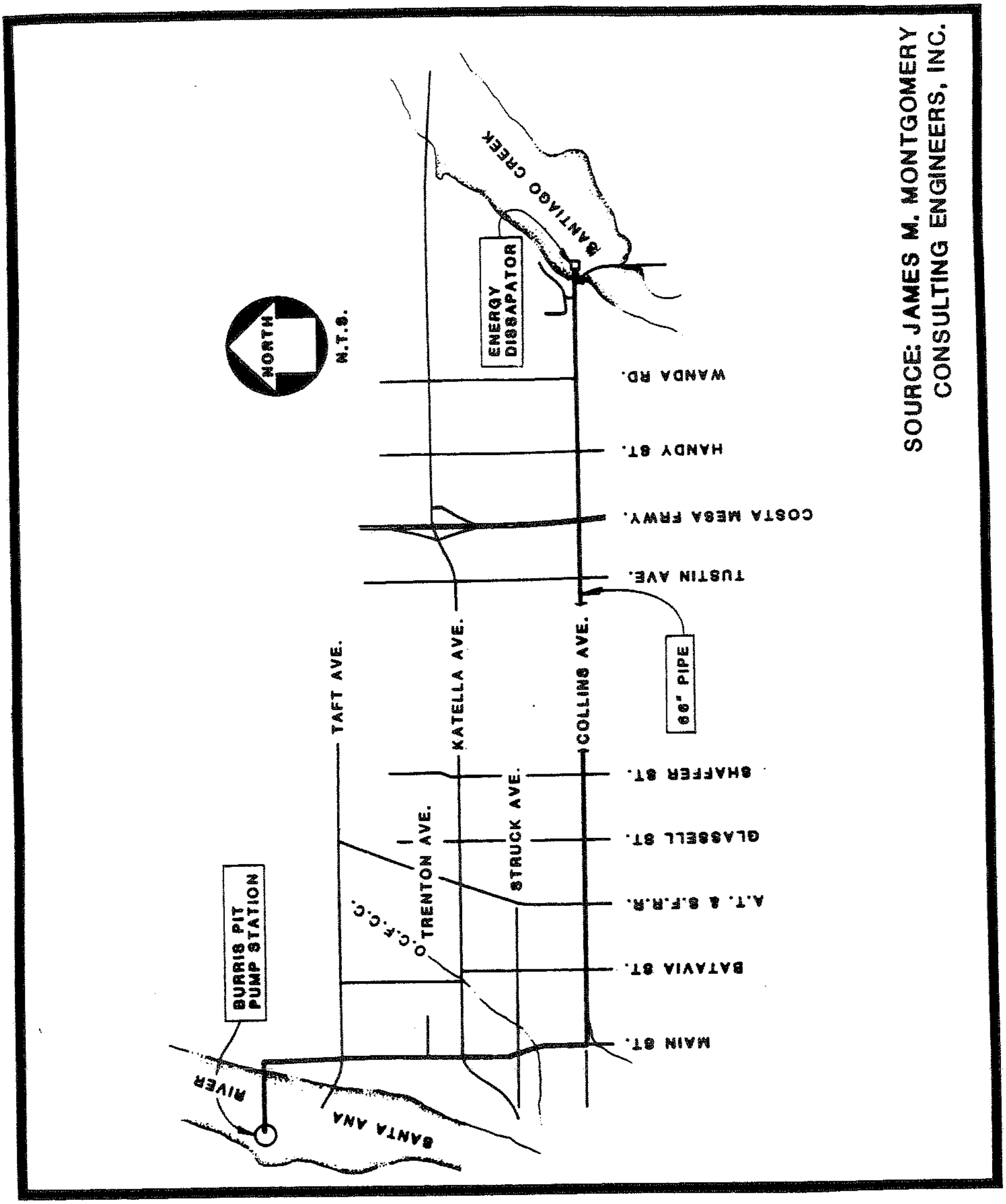

FIGURE 1
PROPOSED PIPELINE ALIGNMENT

Construction of the pipeline is expected to begin in early fall of 1986 and should be completed by winter of 1987-88. The installation of the transmission main is likely to involve the use of two traffic lanes. Since the preliminary plans call for the location of the pipeline underneath paved streets, the removal and replacement of pavement would be necessary. The use of two travel lanes is necessary, as one lane is used for the trench and placement of pipeline and the other lane is used by construction-related vehicles and haul trucks to transport equipment and excess earthen materials.

The construction zone within the right-of-way for the pipeline will include two travel lanes along Main Street and Collins Avenue. The majority of the project pipeline alignment is located within street rights-of-way.

Selected areas and major intersections along the alignment, such as at railroad crossings and under the Newport Freeway, will require jacking under the pavement to avoid conflicts with traffic and/or the closure of traffic lanes. Typically, jacking time is calculated as 7-10 working days per 100 ft, depending on depth of bore, soil content and traffic flows. The ultimate scheduling and time frames are determined by the contractor.

The pre-stressed concrete pipe is estimated to be in 16 to 24 foot long sections. It is estimated that three sections (i.e., maximum of 72 feet) may be worked on at any one time during the day. There are specific plans to phase or stage construction activities to avoid certain intersections during times of heavy holiday shopping traffic (i.e., November through January). As well, there has been a specific request by the Orange Unified School District, whose primary access to its maintenance and operations lot is located at 726 W. Collins Avenue, that construction be done after 4:00 p.m. to avoid any interruptions to their daily operations. (See correspondence in Appendix A).

Temporary construction fencing and warning signs will be installed around the construction site to avoid injuries to pedestrians. Special care and extra safety precautions should be taken to protect children, and warn them of the dangers, as they travel to and from school along the Collins Avenue route. Collins Avenue is heavily travelled by school children. There will be no overnight storage of pipe materials along the roadways as only the amount of piping required for the day's work will be placed on the construction site. There will be some storage of equipment and materials at the Burris Pit and the Santiago Creek areas.

As described in Section I, this report has been submitted to fulfill the requirements of the California Environmental Quality Act (CEQA). The Environmental Checklist Form beginning on the following page is intended to focus on relevant environmental issues. The form has been prepared by the Orange County Water District (OCWD) and detailed explanations of the checked answers are provided in the following section.

III.

ENVIRONMENTAL CHECKLIST FORM

(To Be Completed By Lead Agency)

I. Background

1. Name of Proponent Orange County Water District

2. Address and Phone Number of Proponent 10500 Ellis Avenue, P.O. Box 8300, Fountain Valley, CA 92708

3. Date of Checklist Submitted ______

4. Agency Requiring Checklist ______

5. Name of Proposal, if applicable Santiago Creek Replenishment Program, Pump Station and Pipeline

II. Environmental Impacts

(Explanations of all "yes" and "maybe" answers are required on attached sheets.)

	Yes	Maybe	No
1. Earth. Will the proposal result in:			
a. Unstable earth conditions or in changes in geologic substructures?			X
b. Disruptions, displacements, compaction or overcovering of the soil?	X		
c. Change in topography or ground surface relief features?			X
d. The destruction, covering or modification of any unique geologic or physical features?			X
e. Any increase in wind or water erosion of soils, either on or off the site?			X
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?		X	

		Yes	Maybe	No
	g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?			X
2.	**Air.** Will the proposal result in:			
	a. Substantial air emissions or deterioration of ambient air quality?			X
	b. The creation of objectionable odors?			X
	c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?			X
3.	**Water.** Will the proposal result in:			
	a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters?			X
	b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	X		
	c. Alterations to the course or flow of flood waters?			X
	d. Change in the amount of surface water in any water body?	X		
	e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?			X
	f. Alteration of the direction or rate of flow of ground waters?			X
	g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	X		
	h. Substantial reduction in the amount of water otherwise available for public water supplies?			X
	i. Exposure of people or property to water related hazards such as flooding or tidal waves?			X

	Yes	Maybe	No
4. **Plant Life.** Will the proposal result in:			
a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants)?			X
b. Reduction of the numbers of any unique, rare or endangered species of plants?			X
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?			X
d. Reduction in acreage of any agricultural crop?			X
5. **Animal Life.** Will the proposal result in:			
a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms or insects)?			X
b. Reduction of the numbers of any unique, rare or endangered species of animals?			X
c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?			X
d. Deterioration to existing fish or wildlife habitat?			X
6. **Noise.** Will the proposal result in:			
a. Increases in existing noise levels?		X	
b. Exposure of people to severe noise levels?			X
7. **Light and Glare.** Will the proposal produce new light or glare?			X
8. **Land Use.** Will the proposal result in a substantial alteration of the present or planned land use of an area?			X
9. **Natural Resources.** Will the proposal result in:			
a. Increase in the rate of use of any natural resources?			X

	Yes	Maybe	No
b. Substantial depletion of any nonrenewable natural resource?			X
10. **Risk of Upset. Will the proposal involve:**			
a. **A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?**			X
b. **Possible interference with an emergency response plan or an emergency evacuation plan?**			X
11. **Population.** Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?			X
12. **Housing.** Will the proposal affect existing housing, or create a demand for additional housing?			X
13. **Transportation/Circulation.** Will the proposal result in:			
a. Generation of substantial additional vehicular movement?			X
b. Effects on existing parking facilities, or demand for new parking?		X	
c. Substantial impact upon existing transportation systems?		X	
d. Alterations to present patterns of circulation or movement of people and/or goods?	X		
e. Alterations to waterborne, rail or air traffic?		X	
f. **Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?**	X		
14. **Public Services. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:**			
a. **Fire protection?**		X	
b. **Police protection?**		X	
c. Schools?		X	

	Yes	Maybe	No
d. Parks or other recreational facilities?			X
e. Maintenance of public facilities, including roads?		X	
f. Other governmental services?			X
15. Energy. Will the proposal result in:			
a. Use of substantial amounts of fuel or energy?			X
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?		X	
16. Utilities. Will the proposal result in a need for new systems, or substantial alterations to the following utilities:			
a. Power or natural gas?		X	
b. Communications systems?			X
c. Water?			X
d. Sewer or septic tanks?			X
e. Storm water drainage?			X
f. Solid waste and disposal?			X
17. Human Health. Will the proposal result in:			
a. Creation of any health hazard or potential health hazard (excluding mental health)?			X
b. Exposure of people to potential health hazards?			X
18. Aesthetics. Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view?		X	
19. Recreation. Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities?			X
20. Cultural Resources.			
a. Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?			X

	Yes	Maybe	No
b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?			X
c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?			X
d. Will the proposal restrict existing religious or sacred uses within the potential impact area?			X
21. Mandatory Findings of Significance.			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			X
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)			X
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)			X
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X

III. Discussion of Environmental Evaluation

IV. Determination

(To be completed by the Lead Agency)

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. [ ]

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION WILL BE PREPARED. [XXX]

I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. [ ]

Date ______________________ Signature ______________________

For ______________________

(Note: This is only a suggested form. Public agencies are free to devise their own format for initial studies.)

IV.

ENVIRONMENTAL CONDITIONS AND IMPACTS

This chapter provides an explanation to the "yes" and "maybe" answers as checked on the Environmental Checklist Form. The categories identified as being impacted by the project, as well as others requiring further explanation, are addressed in the following sections.

EARTH

1b: There will be some temporary displacement of earth materials due to the excavation for the placement of the transmission main within the Santa Ana River. However, once the pipeline is installed from Burris Pit to Main Street, the trench is covered and suitably compacted, there will be no long-term impact upon earthen materials or the flow of water within the riverbed.

1f: The pumping of waters from the Santa Ana River to the Basins may result in the transport of sand and sediment through the pipeline. These ultimate earth deposits in the Basins will be minimal and are not expected to have a significant adverse impact.

WATER

3b: The primary purpose of the pump station and pipeline for the Santiago Creek Replenishment Program is to increase groundwater replenishment capabilities by conveying Santa Ana River surface water runoff that would otherwise be lost to the ocean to the Santiago Creek Basins. A historical analysis of the Santa Ana River storm flow patterns indicates that the pump station at the Burris Pit can deliver an average of 24,130 ac-ft/yr of storm flow from the Santa Ana River to the Santiago Creek Basin. This amount represents 42 percent of the average storm flow (i.e., 52,913 ac-ft/yr) as recorded during a 50-year period, between 1933 to 1983. Consequently, downstream flows will be reduced in the Santa Ana River, diminishing storm flows that otherwise would be lost to the ocean. Santa Ana River flows that pass Ball Road generally exceed the capacity of OCWD's existing replenishment basins along the River and the flows do not percolate in the River from Ball Road to the ocean due to the geohydrology of this area.

The percolation capacity of the proposed Blue Diamond and Bond Basins is dependent upon depth of water in the basins. The estimated total percolation rate of the two basins is 100 cubic feet per second (cfs) at a water surface elevation of 280 feet above mean sea level (MSL). At an elevation of 240 feet the estimated percolation rate of the two basins is about 50 cfs.

The increase in groundwater resources is consistent with OCWD's goal to increase groundwater replenishment in the Basin by minimizing lost flows from the Santa Ana River to the ocean.

3d: Water levels in the Santiago Creek Basin are recommended to be kept at a maximum elevation of 240 to 280 feet above MSL, depending on time of year to maximize percolation rates. A change in the amount of surface water will occur in both Bond and Blue Diamond Pits when a lake-like body of water is formed; however, the change in surface water at the Burris Pit is not expected to change appreciably from existing conditions. The frequency of change in surface elevation waters in the Burris Pit will fluctuate more during the rainy season as additional excess flows from the Santa Ana River are collected in the Pit and then pumped out later to the Bond and Blue Diamond Pits.

3g: The proposed Santiago Creek Replenishment program will have a long term beneficial impact on groundwater supplies in Orange County. The proposed project will provide an estimated increase of about 32,000 ac-ft/yr of yield to the groundwater basin. Annual yield increases of local supplies will reduce Orange County's need for imported water by an equivalent amount. This is of critical concern considering MWD's and Orange County's imminent reduction in imported supply from the Colorado River and uncertainties in yield available from the State Water Project.

To assist in groundwater percolation, some waste fill will be excavated from Bond Pit to effectively charge the underlying basin. The existing fill material is not conducive to percolation.

NOISE

6a: Construction Noise

Construction of the trench for pipeline installation will create noise due to the use of earth moving equipment and other construction equipment; however, noise levels will vary depending on the type of equipment, how it is operated and how well it is maintained. The expected range of A-weighted noise levels due to construction equipment is summarized in Table 1. Noise generated during pipeline construction may potentially be annoying to nearby residents. Disturbances will be of an intermittent nature and will cease upon completion of project construction.

TABLE 1. EXPECTED RANGE OF A-WEIGHTED NOISE LEVELS IN dB FOR EARTH MOVING AND CONSTRUCTION EQUIPMENT AT 50 FEET (a)

Equipment	Noise Level
Grader	80-93 dBA
Compactors (Rollers)	73-75
Trucks	82-94
Jack Hammer	75-98
Compressor	68-86
Paver	82-92
Crane	75-95
Auger	75-98
Pavement "Stomper" Breaker	75-98
Pavement Saw-Cutter	68-94

(a) Data Source: U.S. Environmental Protection Agency, (1971); Bureau of National Affairs, (1977); U.S. Department of Transportation (1980).

The short-term noise impacts depend on magnitude, frequency and duration of noise exposure as well as the proximity to noise-sensitive land uses. As described in the project description, the transmission main will be constructed along Main Street and Collins Avenue. Between the intersections of Ball Road/Main Street and Main Street/Collins Avenue, the land uses are industrial and agricultural. Land uses adjacent to the longest segment of the alignment, along Collins Avenue, between Main Street and the Santiago Creek Basin, are comprised of a variety of land use types, a number of which are noise sensitive. Table 2 lists the dominant land uses along specific segments of Collins Avenue.

TABLE 2. COLLINS AVENUE ADJACENT LAND USES

Segment	Land Use
Main St. - Glassell St.	Industrial
Glassell St. - N. Tustin	Single-Family Residential
Tustin-Newport Freeway	Commercial
Newport Freeway - Wanda Road	Yorba Jr. High Handy Elementary Single-Family Residential
Wanda Road - Santiago Creek Basin	Single-Family Residential

As shown in Table 2, noise-sensitive land uses include residential properties along Collins Avenue between the Glassell and Tustin, and Newport Freeway to Santiago Creek Basin. Yorba Junior High School and Handy Elementary are located between the Newport Freeway and Wanda, and should be included as noise sensitive areas. Interior noise values due to construction activity are expected to range between 45 dB(A) and 55 dB(A) at Handy Elementary School. This is a short term construction related impact and not expected to be adversely significant. Yorba Junior High School is set back off Collins Avenue more than 1,000 feet and will not experience a significant increase in interior noise values.

It is recommended that construction equipment be provided with mufflers and construction operating times be restricted to daytime hours (i.e. 7 a.m. - 6 p.m.) in the residential areas. During the short-term construction period, these efforts will reduce the residents' annoyance towards noise.

TRANSPORTATION/CIRCULATION

13b. Effects on Parking

The proposed project will not significantly affect the long term demand for parking along the pipeline route; however, it will generate a limited parking demand to accommodate the employees working on the pipeline installation, or the construction vehicles adjacent to the work area.

On-street parking will also have to be prohibited in the immediate vicinity of the construction zones and adjacent detour areas. This should not result in any significant negative impact because on-street parking along most of the alignment is typically prohibited or, where permitted, is not very heavily utilized.

The project will have an impact on the accessibility of existing parking facilities, but this impact can be largely mitigated by the contractor through proper notification to residents and businesses and proper signing of temporary driveway closures. There are a total of 112 driveways along the proposed pipeline route which will be affected by the pipeline construction. These include 59 driveways to single family residences along the south side of Collins Avenue and 4 driveways to the apartment/condominium complexes on Collins Avenue east of Mallard Street. The remaining 49 driveways are to commercial establishments.

The driveways to the residences along the south side of Collins Avenue provide the sole access to each of these residential units. As such, it will be difficult to ensure continuous access to each of these residences during construction of the pipeline. In order to minimize the level of impact to these residents, the contractor should be required to notify each resident in advance of the time and date during which construction will take place in front of that person's home. The hours during which construction takes place in front of these residences, blocking access to their driveways, should be restricted to between 9 a.m. and 4 p.m. so that residents leaving for work in the morning or returning home in the evening will be able to access their driveways. It appears likely that construction activity could be scheduled to require restricted access to each residence on only one day.

At the apartment/condominium complexes along the south side of Collins Avenue, east of Mallard Street, access to four driveways will also be restricted for approximately one day each. Again, residents of the apartments should be notified in advance of the date and times during which access to their parking areas will be restricted. At two out of the four driveways, a temporary blockage should not cause any significant impact on the residents who normally utilize those driveways because there are alternate driveways available which provide access to the same parking areas. The inconvenience to most of the residents of these apartments, therefore, will be limited to having to use an alternate driveway and circulation route within the apartment complexes to reach their parking facilities. The other two driveways, however, provide exclusive access to residential parking spaces. Residents who normally park at these facilities will not have access to their parking spaces while pipeline construction proceeds along Collins Avenue across the driveways. In order to mitigate the impact on these residents, the contractor should notify them in advance of the driveway blockage and should schedule the construction activities to minimize the amount of time during which the driveway is blocked during midday hours. Residents will be required to park on the street, either along Collins Avenue or on nearby north-south streets, such as Mallard Street, during the time period when access to their driveway is blocked. Alternatively, the OCWD could consider jacking the pipeline across the frontage of these two driveways in order to avoid blocking access for one day; however, the additional expense for this jacking operation does not appear warranted to mitigate the one-day loss of access to the parking spaces.

At the 49 commercial driveways along the pipeline route, access restrictions will also be required, for probably one day each. Forty-two of the commercial properties appear to be accessible by more than one driveway, therefore, the temporary closure of one driveway to the commercial properties along Collins Avenue or Main Street will not eliminate access to these parcels. To minimize business disruptions, the contractor should work closely with each individual business to ensure that adequate notice is provided to the business people so they can notify their employees and/or customers of any upcoming construction activities. The contractor should also work out an appropriate signing program for each business which will advise customers of the alternate access driveway location, particularly if the alternate access route requires utilization of a side street or adjacent business. For example, at the 7-Up bottling plant at Taft Avenue and Main Street, during the time period when the Main Street driveway to the plant is blocked by construction, the contractor should post a clearly visible sign indicating "Driveway Temporarily Closed - Please Enter on Taft Avenue" or words to that effect. The contractor should confer with a representative of each business/shopping center several days in advance of the driveway closures which would affect their properties and develop appropriate wording for the signs to be posted at each closed driveway.

There are seven commercial driveways, three along Main Street and four along Collins Avenue, which provide sole access to commercial or light industrial establishments. The closure of these driveways for one day would eliminate access to the establishments' parking lots. In order to minimize the level of impact to these businesses, the contractor should be required to notify each establishment in advance of the time and date during which construction will take place at their frontage. If possible, the construction activities should be scheduled to occur when the businesses are closed, such as on the weekend or after working hours.

It is anticipated that the construction project will proceed at a pace rapid enough to ensure that no driveway would have to be closed for more than one, or potentially two days. The construction schedule will also be limited to non-peak shopping periods, so that the minor disruption in access to any business caused by this project will not occur during the Christmas shopping season.

In summary, it does not appear that the proposed project will result in any significant impacts on existing parking facilities. Access to some residential parcels may be restricted during the midday for a one day time period, but access to all commercial properties will be maintained at all times. The contractor selected by OCWD should be required to; (1) ensure proper notification of construction activities to all residents and businesses along the pipeline route, (2) develop appropriate signing mechanisms to direct customers/visitors to alternate access driveways when one driveway is closed to their use, and (3) take any other steps necessary to ensure that access is maintained to all commercial establishments at all times.

13c. Impact on Transportation Systems

As described previously in Chapter II of this Initial Study, the proposed 66" pipeline has preliminarily been designed to follow an alignment from the Santa Ana River to the Santiago Creek via the following roadways;

- along the east side of Main Street between Grove Avenue and Collins Avenue, with the pipeline switching to the west side of Main Street north of Taft Avenue and north of Collins Avenue.

- along the south side of Collins Avenue from Main Street to Santiago Creek.

The two roadways mentioned above are the primary elements of the transportation system which will be impacted by the proposed project, as well as the north-south streets which intersect Collins Avenue and the east-west streets which intersect Main Street. The impact of the project on these transportation facilities will be temporary in nature, in that portions of the roadways will be torn up by the trenching operation during construction of the pipeline. The transportation facilities which are temporarily removed during construction will be replaced, in kind, following completion of the project, so there will be no lasting impacts on the transportation system attributable to this project.

The impacts of this project on the transportation system are related to construction impacts only and will be mitigated through the use of appropriate construction area traffic control measures during the period of construction. In the next section of this Initial Study, the impacts of the construction project on traffic circulation are discussed.

13d. Alterations to Circulation Patterns

As construction of the pipeline proceeds along each roadway, portions of the paved roadway which are currently used for traffic circulation and/or parking purposes will be utilized as part of the pipeline construction area and rendered temporarily unusable for traffic circulation purposes. This will require the detouring of vehicles around each construction zone. As described earlier, in areas where trenching will be used, the construction zone will move along the pipeline alignment at the rate of approximately 75 feet per day. The proposed width of the construction area will be approximately 20-24 feet, providing room for the open trench, into which the 66" pipeline sections will be lowered, plus construction vehicles, haul trucks, equipment, and/or employees adjacent to the trench.

The construction zone will displace the equivalent of two traffic lanes, which are in some places devoted to one travel lane and a curb parking lane, a bicycle lane or a bus stop; and in other places to two moving traffic lanes. The loss of two lanes to construction purposes will have different impacts along the different segments of the proposed project, depending upon the type and volume of traffic utilizing the specific lanes in each segment.

The two major types of traffic which will be impacted by the pipeline construction project are (1) transit vehicles and (2) auto or truck traffic. The general impacts of the project on transit vehicles are discussed below, followed by a segment-by-segment discussion of the impacts to overall vehicular traffic circulation.

1. Transit Circulation Impacts

There are a total of eight public transit routes which travel along streets which may be impacted by the proposed project. Seven of these routes are operated by the Orange County Transit District (OCTD) and the eighth is operated by the Southern California Rapid Transit District (SCRTD) on a contract basis for OCTD. The service provided on each of these routes is briefly summarized below:

- SCRTD Line 149 extends from downtown Long Beach to downtown Riverside, via Knott's Berry Farm, Disneyland, and the Mall of Orange. The line travels along Ball Road and Taft Avenue crossing Main Street in the project area five times per day, in each direction, on weekdays at approximately three hour headways (time period between buses).

- OCTD Route 46 also travels along Ball Road and Taft Avenue between Long Beach and the Mall of Orange. Service on Route 46 is provided at approximately half hour headways from about 5:30 a.m. to 8:00 p.m. on weekdays.

- OCTD Route 53/53A extends from the Mall of Orange to the Balboa Penninsula crossing Collins Avenue on Glassell Street (Route 53) or extending along Collins Avenue between Main Street and Cambridge Street (Route 53A). Service is provided at 20-30 minute headways from approximately 6:00 a.m. to 8:00 p.m. on weekdays.

- OCTD Route 59 serving the Brea Mall and South Coast Plaza crosses the project area on Glassell Street at Collins Avenue with service provided at approximately 40 minute headways.

- OCTD Route 50 extends from Cal State Long Beach to the Mall of Orange, crossing Main Street on Katella Avenue. Weekday service on Line 50 is provided at approximately 25 minute headways throughout most of the day, from about 5:30 a.m. to 9:30 p.m.

- OCTD Route 69 connects Cal State Fullerton and downtown Santa Ana, crossing the proposed pipeline on Tustin Avenue. Service is provided at 20-25 minute headways on weekdays.

- OCTD Route 71 also crosses the proposed pipeline on Tustin Avenue traveling in a north-south direction between the Mall of Orange and Newport Beach. Service is provided at half hour headways during peak hours and hourly headways during the midday on weekdays.

- OCTD Route 22 extends from Larwin Square in Tustin to La Habra Fashion Square. It is the only route which affects the project area east of Tustin Avenue. Route 22 enters Collins Avenue from the north on Wanda Road and extends along Collins Avenue to Prospect Street. Service is provided at approximately hourly intervals.

The primary impact of the proposed project on transit vehicle operations will be the potential requirement to temporarily relocate some bus stops while pipeline construction occurs in an area where a bus stop is located. In discussions with OCTD staff, this would not result in a significantly negative impact on the quality of transit service provided to OCTD passengers. The contractor's foreman should contact the OCTD line supervisor on a regular, if not daily, basis to discuss the construction schedule and plan in advance for any temporary bus stop relocations.

Some of the routes which cross the project area currently have "timed check points" at bus stops in the project area. A timed check

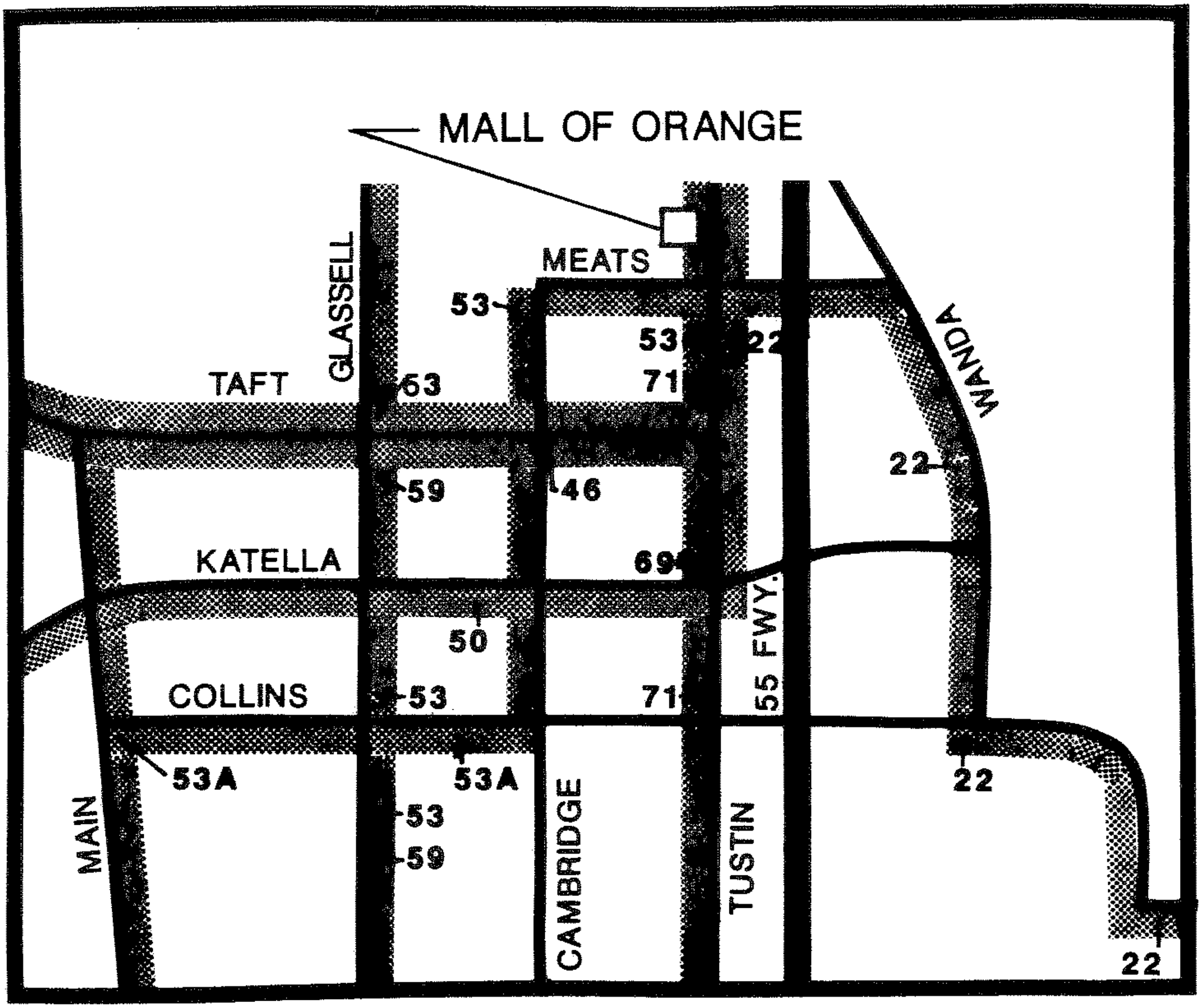

FIGURE 1A
OCTD BUS ROUTES

point is a location where buses pause for a longer-than-normal stop to make sure they are keeping on schedule or to wait for passengers transferring to/from an intersecting bus line. OCTD buses are equipped with radios which allow the bus drivers to alert one another as to persons desiring to transfer between lines, so that connections can be made more efficiently. During the construction period it may be necessary for OCTD to temporarily relocate any timed check points on these routes.

During the time of final preparations for construction of the pipeline, the OCTD should be contacted to determine if there have been any service changes from those described above. Prior to the start of construction, OCTD would then issue a general notice to patrons on the lines which could be impacted by the construction activity notifying them of the construction activity and any changes/impacts which may result in OCTD service. The following telephone number should be listed on the contract documents so that the contractor in the field can reach OCTD staff when advance decisions are required regarding bus stop relocations: 714/999-6510, Attention: Steve Bjornson.

With adequate pre-construction coordination with OCTD staff and frequent meetings during construction between the contractor's foreman and OCTD's representative, Steve Bjornson, the proposed project is not anticipated to have any negative impacts on transit service in the project area which cannot be mitigated through temporary bus stop relocations.

2. <u>Vehicular Circulation Impacts</u>

Figure 2 illustrates (1984) existing average daily traffic (ADT) volumes on the major streets in the vicinity of the proposed project. The ADT on Collins Avenue ranges from 10,770 to 16,730 vehicles per day along the project area. The segment with the highest traffic volume is between Batavia Street and Glassell Street.

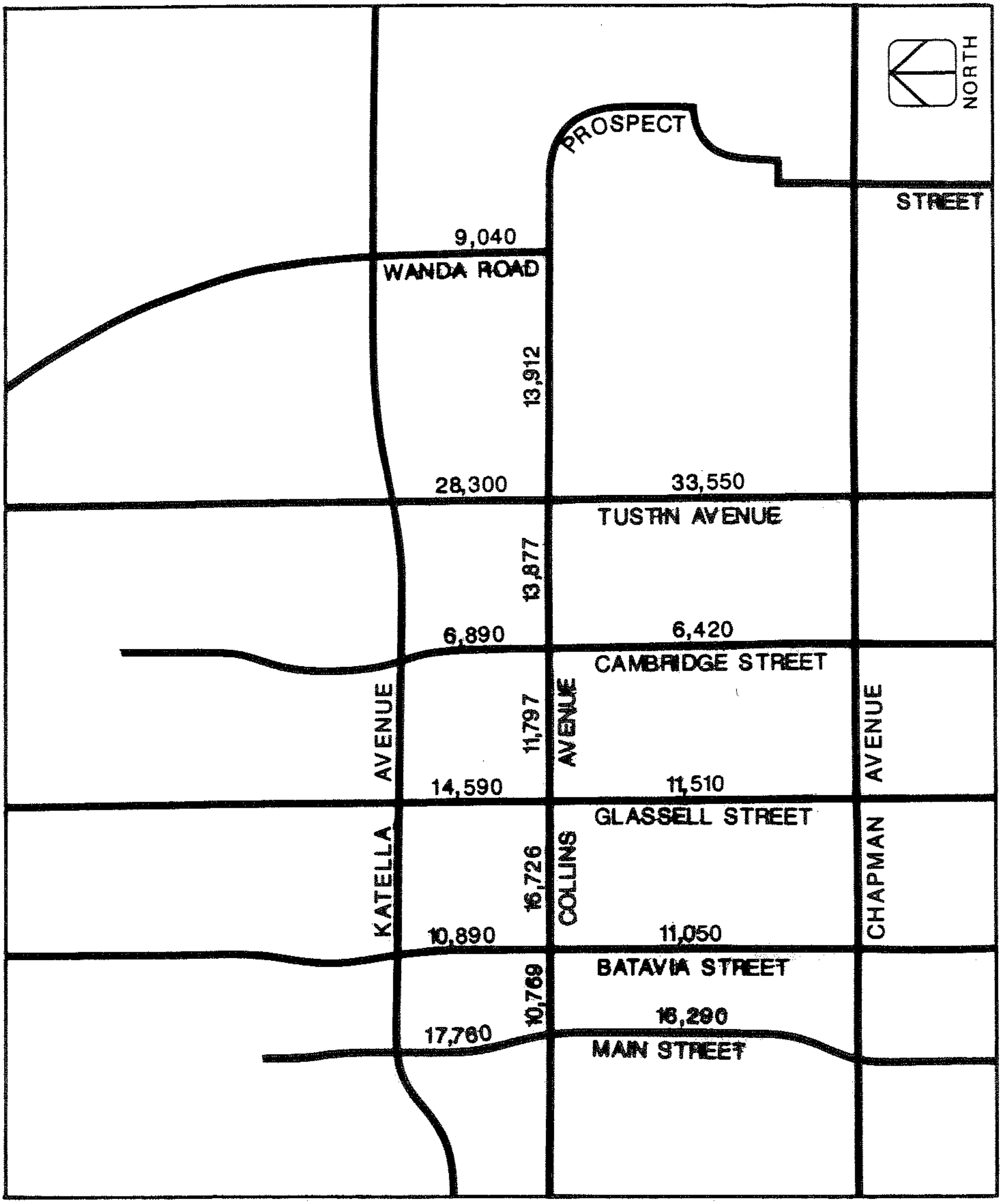

FIGURE 2
AVERAGE DAILY TRAFFIC VOLUMES (1984)

Tustin Avenue is the most heavily traveled north-south arterial, with ADT's of between 28,300 and 33,550 near its intersection with Collins. The other major north south streets which intersect the proposed project area include:

- o Main Street, with ADT's of 17,760 north of Collins and 16,290 south of Collins.

- o Batavia Street, carrying about 10,890 ADT, north of Collins, and 11,050 south of the project area.

- o Glassell Street, with ADT's of 14,590 north of Collins and 11,510 south of Collins.

- o Cambridge Street, utilized by 6,890 vehicles per day, north of Collins, and 6,420 to the south.

- o Wanda Road, which carries 9,040 vehicles per day north of Collins Avenue.

Taft Avenue, at the western end of the pipeline has an existing ADT of about 26,200. The other local streets which intersect the pipeline alignment and do not appear on Figure 2 and are assumed to carry less than 5,000 vehicles per day.

Peak hour data available from the City of Orange indicated that the peak hour traffic volumes along Collins Avenue range from about 1,100 to 1,800 vehicles per hour.

The following paragraphs present the impacts and suggest mitigation measures for each street and roadway segment directly affected by the pipeline construction project.

Main Street - From Grove Avenue to Collins Avenue

The proposed pipeline alignment along Main Street is to be primarily on the east side of the street, switching to the west side north of

Taft Avenue and north of Collins Avenue. This segment of Main Street is four lanes wide with a painted median and curbside parking on each side (see Figure 3). In order to accommodate the pipeline construction, parking would be removed from the east (or west) side of the street. The two northbound (or southbound) lanes of traffic would either be reduced to one lane adjacent to the construction site or maintained as two lanes by using the median as a second travel lane. When the construction activity is occurring at or near the Main Street intersections at Katella, Collins, and Taft, the work should be scheduled to avoid having an open trench near the intersection at night. At the Southern Pacific Railroad crossing, Taft Avenue and Katella Avenue, the pipe will be installed by jacking under the tracks and streets.

<u>Collins Avenue - From Main Street to Tustin Avenue</u> (except between Glassell and Grand)

The proposed pipeline alignment along this segment of Collins Avenue is to be on the south side of the street. Collins Avenue is generally four lanes wide with no median and only limited parking on both sides. There is sufficient width for on-street parking along this segment (see Figure 4). To accommodate construction activities, parking on the south side of the street would be removed and the right side, eastbound travel lane would be obstructed. Eastbound traffic would use one lane; the existing eastbound lane adjacent to the center stripe. In the proximity of a major intersection, it would be advantageous to limit the width of the working area to as narrow of a band as practical, by positioning construction equipment in front of or behind the open trench instead of beside it. Such a strategy would maximize the available width of the intersection approaches as the eastbound approaches are currently striped for two through lanes and a left-turn lane at the major intersections. The major cross streets, Batavia Street, Glassell Street, Cambridge Street, and Tustin Avenue should be crossed by jacking under the streets, although the relatively low traffic volumes on Cambridge Street could be accommodated if one lane in each direction is maintained. A

FIGURE 3

Main Street - From Grove Avenue to Collins Avenue

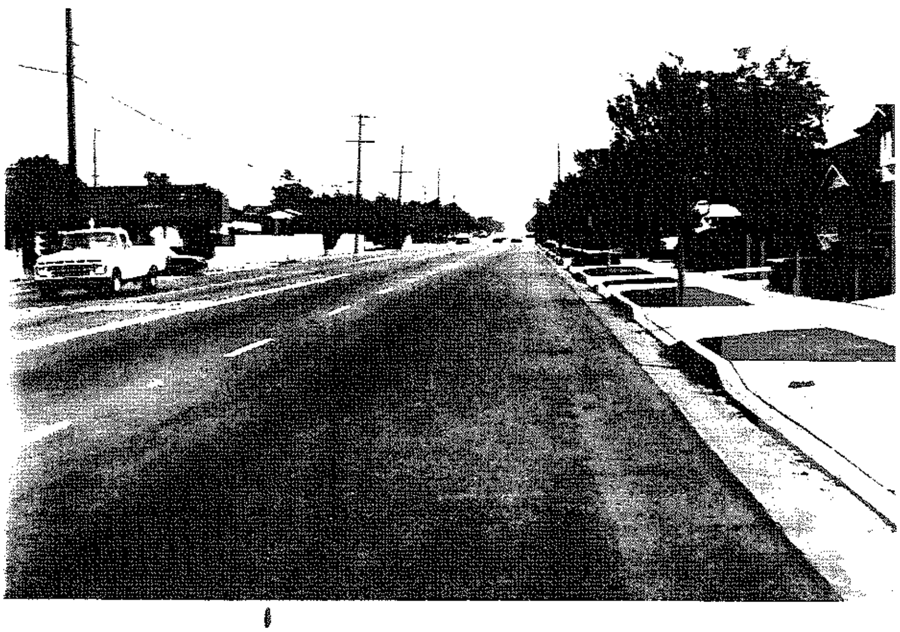

FIGURE 4

Collins Avenue - From Main Street to Tustin Avenue
(except between Glassell and Grand)

properly staged trenching operation across Cambridge Street would eliminate the expense of jacking under the street. At Lynn Drive, which ends in a cul-de-sac south of Collins Avenue, one lane should be kept open at all times to allow for the in and out movement of traffic, controlled by flagmen. The other cross streets could be closed for the one or two day duration of construction activity as they can be accessed from streets other than Collins Avenue.

Collins Avenue - From Glassell Street to Grand Street and from Tustin Avenue to the Newport Freeway

These two segments of Collins Avenue are not as wide as the remainder of Collins Avenue as there is sufficient width for only four travel lanes (two in each direction) with no parking (see Figure 5). The proposed construction activities would occur in the two eastbound lanes located on the south side of the street. Within the limits of the construction zone, traffic flow would be maintained by using the two lanes on the north side of the street and temporarily narrowing the street to two lanes; one eastbound and one westbound lane. It is recommended that the in and out movement of traffic be controlled by flagmen.

Collins Avenue - Near the Newport (Route 55) Freeway

The pipeline alignment diverges from Collins Avenue west of the Newport Freeway and runs parallel to and south of Collins Avenue beneath an existing concrete lined drainage channel. The proposed pipeline will cross Route 55 by jacking under the freeway, follow a drainage channel on the east side of the freeway, and then rejoin the south side of Collins Avenue, west of Milford Street. As the construction activities will occur away from Collins Avenue, there will be no disruption to traffic on Collins Avenue at the Newport Freeway underpass. The pipeline alignment leaves Collins Avenue approximately 400 feet east of Tustin Avenue and rejoins Collins Avenue approximately 200 feet west of Milford Street. There are no traffic impacts on this 1,500 foot segment of Collins Avenue (see Figure 6).

FIGURE 5

Collins Avenue - From Glassell Street to Grand Street and from Tustin Avenue to the Newport freeway

FIGURE 6

Collins Avenue - Near the Newport (route 55) freeway

Collins Avenue - From the Newport Freeway (Route 55) to Kathleen Street

The proposed pipeline alignment along this segment of Collins Avenue is on the south side of the street. Collins Avenue is four lanes wide and has a bike lane on the south side (see Figure 7). The pipeline construction activity would displace the bike lane and one eastbound traffic lane. Eastbound traffic would be accommodated in one lane, the lane adjacent to the center stripe, while westbound traffic would be unaffected.

Collins Avenue - East of Kathleen Street

East of Kathleen Street, Collins Avenue has two westbound lanes and one eastbound lane, with a painted median lane for left turns in either direction. There is also a bike lane on the south side of Collins (see Figure 8). Pipeline construction activities on the south side of the street would disrupt the bike lane and the eastbound traffic lane. Eastbound trafffic flow would be maintained by temporarily using the existing median turning lane as the eastbound travel lane.

The pipeline alignment departs from Collins Avenue and enters the Santiago Creek Basins at the location where Collins Avenue turns south into Prospect Street. The pipeline construction activities will cross the northbound to westbound lanes for a one day time period at this curve in the street and will temporarily disrupt traffic flow. Traffic flow will be maintained by using the median turning lane as a westbound travel lane. It is critical that advance warning of the construction activities and the temporary detour be provided on northbound Prospect Street. It is also critical to ensure that the construction activities are phased so that two travel lanes are provided at all times on Collins Avenue (see Figure 9).

FIGURE 7

Collins Avenue - From the Newport (route 55) freeway to Kathleen Street

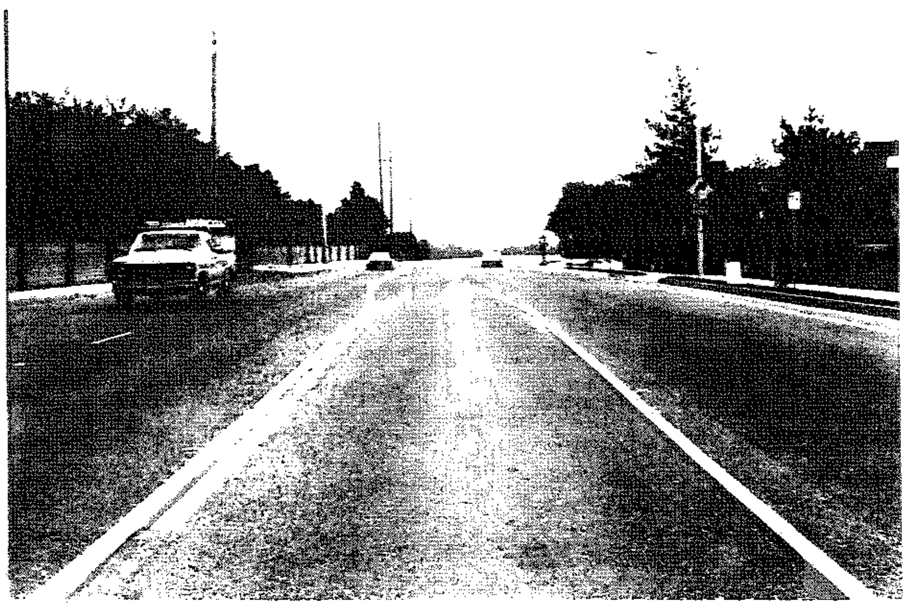

FIGURE 8

Collins Avenue - East of Kathleen Street

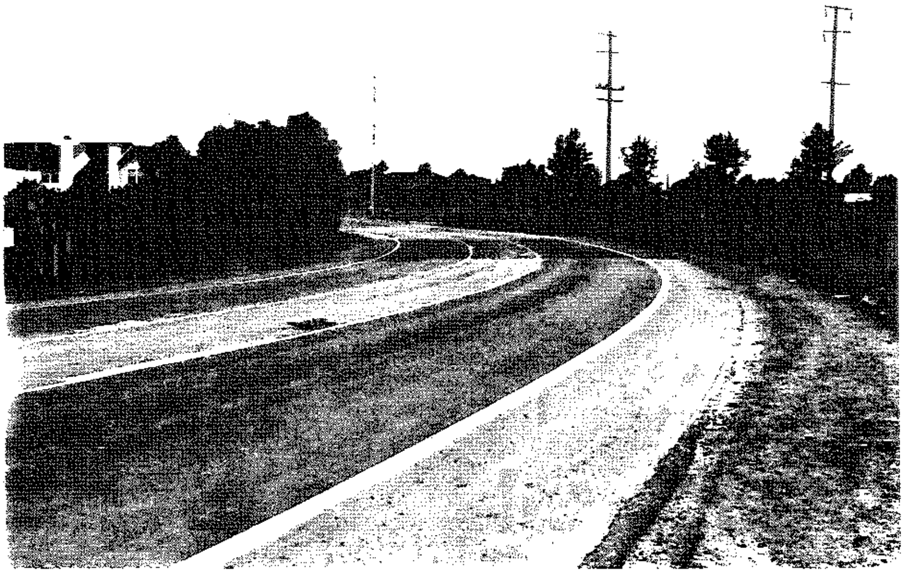

FIGURE 9

Prospect Street going west onto Collins Avenue

3. <u>General Mitigation Measures for All Segments</u>

There are several general mitigation measures which would be appropriate for all segments of the pipeline construction. They are:

- Use of proper informational signing and lighting of the construction area at night.
- Use of barriers and fencing to isolate the open trench during non-working hours and prevent automobile or pedestrian accidents.
- Scheduling of work to avoid peak hours at locations of heavy traffic concentration.
- Scheduling work to minimize interruption to single access driveways.
- Provision of advance notification of construction activity to affected property owners, tenants, emergency service agencies, transit agencies, etc., including some use of media coverage.
- Minimization of the width of the construction area.
- Avoidance of night storage of materials and equipment within the street travelway.

13e: <u>Railroads</u>

Both the Southern Pacific Railroad and the Atchison, Topeka and Santa Fe (AT&SF) Railway Company were contacted to disseminate information about the proposed project and solicit their concerns. The pipeline route crosses the Southern Pacific Railroad equidistantly between Taft Avenue and Katella Avenue on Main Street. The route crosses the AT&SF Railway Company line between Batavia Street and Glassell Street on Collins Avenue.

The Southern Pacific Railroad representative commented that the jacking operation can be performed under rail traffic. However, if performed on a Saturday, the track could be removed, an open cut performed and the track then replaced. The Southern Pacific Railroad Company does request to review the construction plans.

The AT&SF Railway Company has addressed the proposed alignment as follows:

> "The proposed pipeline, being a pressure conduit, will require a casing under our track area. The steel casing pipe must have a minimum wall thickness of at least 0.563 inches and an inside diameter of at least 4 inches greater than the greatest outside diameter of the carrier pipe and in any case, its diameter must be great enough to allow the carrier pipe to be removed subsequently without disturbing the casing or the roadbed. The ends of the casing must extend at least 25 feet (right angle distance) out from the centerline of outside track on each side.
>
> Minimum cover permitted under main line tracks is 5-1/2 feet from the base of rail to the top of the casing pipe.
>
> The jacking of casing can be undertaken without delaying train traffic. The Railway requires the jacking contractor to submit method and equipment for approval. The Railway will furnish an engineering inspector. A license agreement will be necessary and it will provide for insurance and reimbursement of costs incurred to the Railway."

13f: Increase in Traffic Hazards

During the construction activities, there will be a short-term increased potential for accidents to occur involving motor vehicles, bicycles, or pedestrians. Because of the temporary disruption to traffic flow, the removal of lanes, the presence of construction equipment in the street rights-of-way, and the localized increase in traffic congestion, drivers will be presented with unexpected driving conditions and obstacles. This could potentially result in an increased occurrence of automobile accidents. Additionally, since there will be disruptions to bike paths, sidewalks, and pedestrian crossings, pedestrians and bicyclists may enter the street travelway and risk a vehicular-related accident.

PUBLIC SERVICES

14a, b & c:

Construction activity in street rights-of-way will temporarily make access by emergency vehicles somewhat more difficult. For a short period of time during construction, vehicles blocking access may have some difficulty pulling off to the side of the roadway to allow emergency equipment to pass, since construction equipment and trenches will occupy the remainder of the street right-of-way. This is likely to be a problem on those segments of the alignment where only one or two lanes of vehicular traffic will remain open.

A city of Orange fire station is located at Collins Avenue and Wanda. The fire station has two driveway accesses; one for fuel transportation and the other for engine response. The fire department requests that the driveways be blocked one at a time and heavy sheets of steel be placed over the trench. The fire department should also be kept informed of construction schedules and progress (see Figure 10).

Primary access to the Orange Unified School District maintenance and operations lot is located at 726 W. Collins Avenue. The district requests that construction be done after 4:00 p.m. as this facility maintains 80 buses and 164 school district service vehicles from 6:30 a.m. to 4:00 p.m. every day. Vehicles are stored at this location during nighttime hours. There is

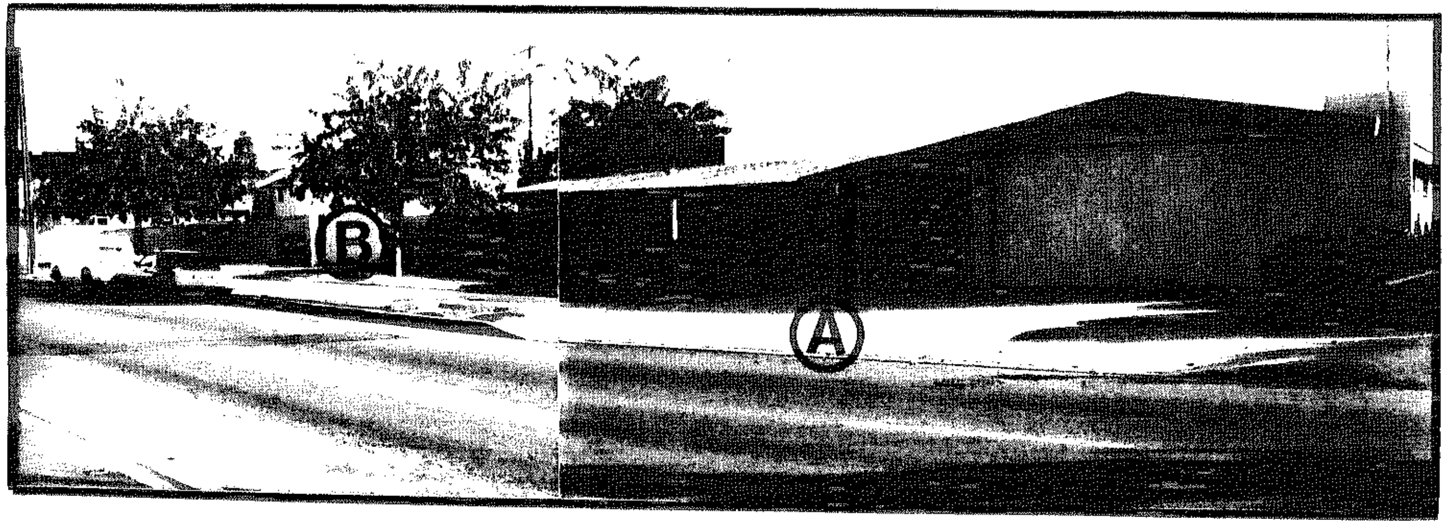

FIGURE 10

The City of Orange fire station at Collins and Wanda

(A) is the driveway for the fire engine runs

(B) is the driveway for fuel transportation and employee parking frequent vehicle access and egress throughout the daytime hours. Jacking at this location is also a consideration so that there will be no disruption to the OUSD daily operations (see Figure 11).

Two schools, Yorba junior high and Handy elementary, are located on Collins Avenue along the proposed pipeline route. A temporary disruption to the schools may result during construction (i.e., traffic congestion within the vicinities); however, no significant adverse impact is anticipated.

14e: After project completion, the OCWD may incur increased manpower needs due to the maintenance requirements of the pump station, pipeline and basins. These additional needs may be filled by existing maintenance crews or by the OCWD hiring additional personnel.

ENERGY

15b: The Burris Pit pump station will use 6,300 hp, with electrical motors, at a rate of 200 cfs, to discharge water into the Santiago Creek Basins. SCE in the City of Anaheim is a primary power source; however, existing sources are available. Construction design specifications will state the exact amount of increased energy demands from this project, but the impact should be minimal.

UTILITIES

16: Information on utilities along and crossing the alignment has been obtained from the city of Orange and from the preliminary drawings prepared by James M. Montgomery, Consulting Engineers, Inc. The alignment follows and crosses several major utility lines as listed on Table 3.

The project does not require relocation of these major facilities; however, during construction, care must be taken to ensure that no disruption of services provided by these facilities occurs.

AESTHETICS

18: The site preparation activities and placement of the 66-inch pipeline between the Santa Ana River and Santiago Creek Basin will have short-term aesthetic impacts along the proposed alignment. The trench, construction equipment, heavy trucks and colored cones have a different aesthetic value than a typical operating arterial. The aesthetic impact will be perceived negatively by some pedestrians, motorists and residents along the proposed route. Others will not consider the activity as particularly offensive and elicit little response at all. The construction activity is short-term and there are no long-term visual impacts associated with alignment since the pipeline will be buried beneath the street or river, depending upon location.

By essentially being a lake-like body of water throughout the year, the Santiago Creek Basins will provide some visual enhancement to the vicinity over the conditions that currently exist at the pits.

Utilization of the Basins for groundwater replenishment purposes will be compatible with the Orange County Environmental Management Agency's concepts of a greenbelt extending along Santiago Creek. The Basins will also be able to accommodate any potential park and recreation facilities planned by the City or County of Orange.

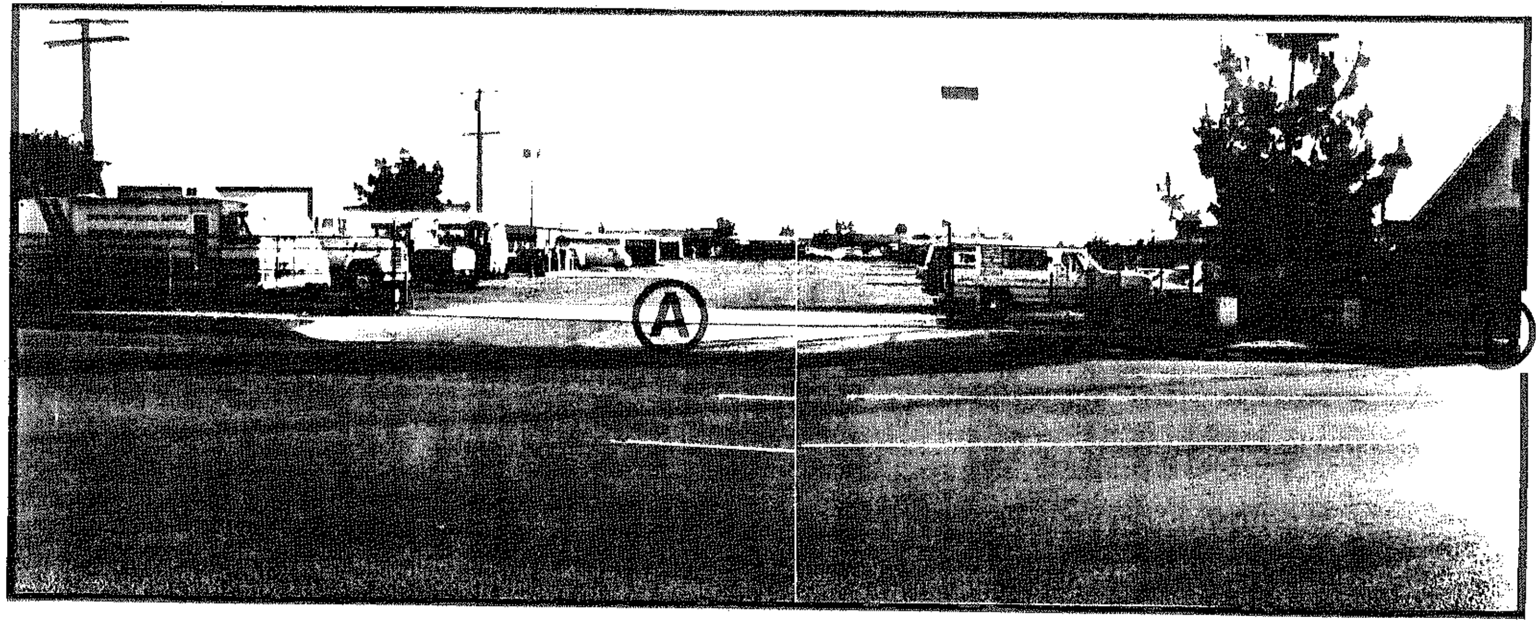

FIGURE 11

The Orange County School District maintenance and operations lot at 726 W. Collins Avenue.

(A)is the main access driveway

(B)is the driveway for employee parking

TABLE 3. MAJOR UTILITY CROSSINGS

Approximate Alignment Location	Utility
Collins at Railroad Crossing	36" Gas
Main & Katella	24" Sewer System
Collins & Batavia	24" Gas
Main & Taft	16" Water
Collins and Cambridge	16" Water
Main & Katella	12" Water
Main & Grove	12" Water
Main & Katella	10" Water
Main & Struck	10" Water
Main, South of Struck	10" Water
Main & Collins	10" Water
Collins & Lemon	10" Water
Main & Grove	8" Sewer System
Main & Taft	8" Sewer System
Main & Struck	8" Sewer System
Collins & Tustin	8" Sewer System
Collins & Batavia	6" Water
Collins & Glassell	6" Water
Collins & Cambridge	6" Water
Collins & Lincoln	6" Water
Collins & Highland	6" Water
Main (between Taft & Katella)	3" Gas & 10" Gas

V.

PERMITS

The required permits, applications, or actions and the appropriate agencies are summarized below.

Agency	Permit/Application or Action
State Water Resources Control Board, Division of Water Rights	Permit to Appropriate Water and Statement of Diversion and Use (Approved 9/84)
Public Utilities Commission	Certificate of public convenience and necessity
Department of Transportation	Encroachment Permit
Southern Pacific Transportation	Encroachment Permit
County of Orange	Encroachment Permit
City of Orange	Encroachment Permit
City of Villa Park	Encroachment Permit
Department of Water Resources, Division of Safety of Dams	Approval of Plans
Department of Fish and Game	Fish and Game Code-Section 1601 Streamcourse Alteration-Necessary Action: Notification Form-To be submitted after other permits are approved. Permit process takes 30 days. Local contacts comment that this action should not be a conflict.
Corps. of Engineers	404 Permit-Necessary Action: Initial Study (e.g. project description, exhibits) to be reviewed by L.A. Corps Regulatory Branch and determination made.
AT&SF Railway	License for insurance to cover construction under the tracks.

VI.

ORGANIZATIONS AND PERSONS CONTACTED

Name	Phone No.
Atchison, Topeka and Santa Fe Railway Company	
A.H. Renne, Assistant General Manager-Engineering	(213) 267-5445
B.J. King	(213) 267-5445
City of Orange	
Sgt. Flanagan, Orange Police Dept., Traffic	(714) 532-0241
Chief Darell Verburg, City Fire Dept.	(714) 532-0377
Jim Reichert, Planning	(714) 532-0434
David Kuan, Traffic	
Gary Johnson, City Engineer	(714) 532-0444
Orange County Transit District	
Steve Bjornson, Supervisor-Stops and Zones	(714) 999-6510
Orange County Water District	
Patricia Lee, Associate Engineer	(714) 963-5661
Public Utilities Commission	
Ray Toohey, Los Angeles	(213) 620-2564
Southern Pacific Transportation Company	
Don Skaff	(213) 629-6494
State of California Department of Transportation (Caltrans)	
Rol Marino, Associate Engineer	
Doc Wong, Project Development	
Orange Unified School District	
Jeff Holstein, Administrator	(714) 997-6378
James Montgomery, Consulting Engineers Inc.	
Robert F. Seeman, Civil Engineer	(714) 261-7210

VII.

INITIAL STUDY PREPARERS

Sylvia M. Salenius	Project Manager Director of Environmental Studies
Michael Benner	Senior Associate Planner PRC Engineering
Richard Garland	Traffic Engineer PRC Engineering
Kathy C. Stevens	Environmental Planner PRC Engineering

APPENDIX A

CORRESPONDENCE RECEIVED DURING PREPARATION OF THE INITIAL STUDY

Orange Unified School District
370 North Glassell Street, Orange, California 92666
Telephone (714) 997-6100

November 21, 1985

PRC Company
972 Town And Country Road
Orange, CA 92667

Attention: Kathy Stevens

SUBJECT: CONSTRUCTION ON COLLINS AVENUE

Dear Kathy:

It has come to my attention, that your company will be performing construction work on Collins Avenue. The Orange Unified School District Maintenance, Operations and Transportation Departments operate out of a central facility at the corner of Collins and Batavia. The main entrance to facility is through the front gates on Collins. There is a narrow supplemental acess on the east side ofthe property at Collins and on the west side of the property at Batavia. The District operates at fleet of 79 buses and 164 service vehicles out of our Maintenance and Transportation facility. The primary hours of operation are 6:30 a.m. until 4:00 p.m. Activity after 4:00 p.m. could be directed through the Batavia gate without any serious problem. However, District operations, including maintenance, custodial service and transportation of students to and from school, could not function, if the Collins gates were closed during the 6:30 a.m. to 4:00 p.m. timeframe. During our phone conversation, you indicated that the work in front of these gates could be done after 4:00 p.m. Please keep me informed relative to timelines on this project. I assume there will be no disruption to Orange Unified School District's operations.

Sincerely,

Jeff K. Holstien

Jeff Holstien
Administrator, Maintenance and Operations

cc: H. C. Tanner
Norm Mock

APPENDIX B

PRELIMINARY DESIGN DRAWINGS OF PIPELINE

Appendix M-5

1991: Initial Study and Negative Declaration for Santa Ana River Rubber Dam and Bypass Project

ORANGE COUNTY WATER DISTRICT

ENVIRONMENTAL ASSESSMENT DOCUMENT INITIAL STUDY AND NEGATIVE DECLARATION FOR SANTA ANA RIVER RUBBER DAM AND BYPASS PROJECT

September 1991

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SANTA ANA RIVER RUBBER DAM AND BYPASS PROJECT

ENVIRONMENTAL ASSESSMENT DOCUMENT

NEGATIVE DECLARATION

SANTA ANA RIVER RUBBER DAM AND BYPASS PROJECT

NEGATIVE DECLARATION

Santa Ana River Rubber Dam and Bypass Project

FINDING

The Orange County Water District (OCWD) finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect on the environment because of mitigation measures that have been addend to the project. The facts supporting this finding are presented in the attached Initial Environmental Study.

PROPONENT - Orange County Water District

PROJECT DESCRIPTION

The proposed Santa Ana River Rubber Dam and Bypass Project entails the construction and operation of three inflatable and deflatable rubber dams and bypass facilities within the Santa Ana River channel. The rubber dams will retain river water so that it can be diverted to the District's off-channel basins for recharge to the underlying aquifers. River water not diverted off-channel will flow around the dam through the bypass structure and re-enter the river channel downstream of the dam and drop structure. During heavy flows the dams will automatically deflate allowing the river to flow unimpeded to the ocean. The proposed project facilities will enable the District to capture and recharge an additional volume up to about 5,000 acre-feet annually to the OCWD groundwater basin during years of normal rainfall. The OCWD basin is the principal source of water to northern Orange County providing about 300,000 acre-feet annually, or about 65% of the total demand.

PROJECT LOCATION

The three proposed Santa Ana River Rubber Dam and By-Pass Project facilities are located within the Santa Ana River channel between the Imperial Highway and Lincoln Avenue crossings. The facilities are located in the City of Anaheim and in unincorporated areas of the County of Orange, all of which locations are in the Orange County Water District (Figure 1). The project area is located on the USGS Orange Quadrangle, within latitudes 33°50' and 33°52' N and longitudes 117°47' and 117°52'W.

SUMMARY OF REASONS IN SUPPORT OF FINDINGS

The project entails minor modifications to existing flood control structures within the Santa Ana River Channel and does not change the existing land use.

MITIGATION MEASURES INCORPORATED INTO THE PROJECT TO AVOID POTENTIALLY SIGNIFICANT EFFECTS

Mitigation measures to reduce construction and operation-related impacts to levels of insignificance are proposed as follows:

- Fugitive dust emissions will be mitigated by watering the construction site. The construction specifications will state that the contractor is responsible for watering the construction area sufficiently to prevent dust in amounts damaging to property, cultivated vegetation, domestic animals, and/or causing a nuisance to persons living in or occupying buildings in the vicinity.

- During the pre-design phase of the project, the District will conduct a geotechnical study, including soil borings, for analysis of specific site conditions. Based on this report, specific recommendations will be made with regard to excavation supports, concrete reinforcements, pipe couplings (if pipes are used), anchoring and piling, as well as trench and other excavation widths, slopes, and depths.

- The construction specifications will state that the contractor is responsible for using low-sulfur fuel (0.05 percent by weight) in construction equipment and for maintaining construction equipment in proper tune.

- The contractor will be required to regularly water the construction site and cover dirt hauled in trucks to mitigate the impacts of construction related dust.

- The construction specifications will state that the contractor is responsible for providing detour routes to allow continued travel on access roads and bike paths along the river levees which may be hampered temporarily by construction activity.

- The contractor will be responsibile for providing detour routes and placing and maintaining all necessary barricades, traffic cones, warning signs, lights and other safety devices in accordance with the requirements of the Manual of Uniform Traffic Control Devices.

- The contractor will be required to adhere to standard Federal and State Occupational Safety and Health Administration (OSHA) regulations.

- The contractor will be required to protect trenches and other excavations during working and non-working hours.

- The District will require in the construction contract documents that a "halt-work" condition be in effect in the event that a historic, prehistoric, or cultural resource finding is made during earth moving operations.

The District's Project Engineer will monitor the project to ensure that the mitigation measures set forth above for the construction period are followed by the District and the Contractor. The District's Operations Manager will monitor the project to ensure that the mitigation measures set forth above for the operations period are followed.

INITIAL STUDY PREPARED BY:

James F. Reilly
Orange County Water District

COPIES OF THE INITIAL STUDY ARE AVAILABLE AT:

Orange County Water District
P.O. Box 8300
10500 Ellis Avenue
Fountain Valley, CA 92728-8300

Orange County Water District Field Headquarters
4060 East La Palma Avenue
Anaheim, CA 92807

FILING DATE:

September 10, 1991

PUBLIC REVIEW PERIOD:

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DATED:

September 10, 1991

DISTRIBUTION:

Advisory Council on Historic Preservation

State Historic Preservation Officer

U.S. Army Corps of Engineers
Environmental Branch
District Engineer

U.S. Fish and Wildlife Service
Division of Ecological Services

Federal Emergency Management Agency

U.S.D.A. Soil Conservation Service
State Conservationist

Governor's Office of Planning Research
Office of Permit Assistance
State Clearinghouse

Orange County Environmental Management Agency

California Regional Water Quality Control Board
Santa Ana Region

City of Anaheim

South Coast Air Quality Management District

INITIAL STUDY

SANTA ANA RIVER RUBBER DAM AND BYPASS PROJECT

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Santa Ana River Rubber Dam and
Bypass Project

PROJECT LOCATION

The three proposed Santa Ana River Rubber Dam and By-Pass Project facilities are located within the Santa Ana River channel between the Imperial Highway and Lincoln Avenue crossings. The facilities are located in the City of Anaheim and in unincorporated areas of the County of Orange, all of which locations are in the Orange County Water District (Figure 1). The project area is located on the USGS Orange Quadrangle, within latitudes 33°50' and 33°52' N and longitudes 117°47' and 117°52'W.

PROJECT DESCRIPTION

Project Objective

The objective of the proposed Santa Ana River Rubber Dam and By-Pass Project is to increase recharge to the groundwater basin by improved control, capture and percolation of significantly more surface flows in the Santa Ana River.

Background

The Orange County Water District (OCWD) groundwater basin supplies about 300,000 acre-feet per year of water to basin users for municipal and irrigation uses. Basin users access the groundwater through some 300 high capacity wells located throughout the Orange County Water District (OCWD). Groundwater supplies are replenished by OCWD through artificial recharge operations conducted along the Santa Ana River, in the vicinity of the proposed project facilities.

The volume of groundwater pumped from the basin through wells has shown an increasing trend over the past years which is expected to continue as the District's population and resultant water demands increase. Furthermore, the surface flow of the Santa Ana river is expected to increase by 60% over the next 25 years due to upstream development and increased runoff. Therefore, in order to meet future demands, it is important that the District take advantage of the increased Santa Ana River flows by expanding the capacity of its recharge operations.

The District owns and operates a groundwater recharge system occupying about 1,200 acres of land within and adjacent to the Santa Ana River channel. Recharge occurs within the river channel and in the District's off-channel basins through artificially enhanced percolation of Santa Ana River water and imported water. Santa Ana River flows are diverted by approximately 6-foot high sand and earthen diversion dikes into a series of off-channel percolation basins. Those flows which are not diverted continue downstream

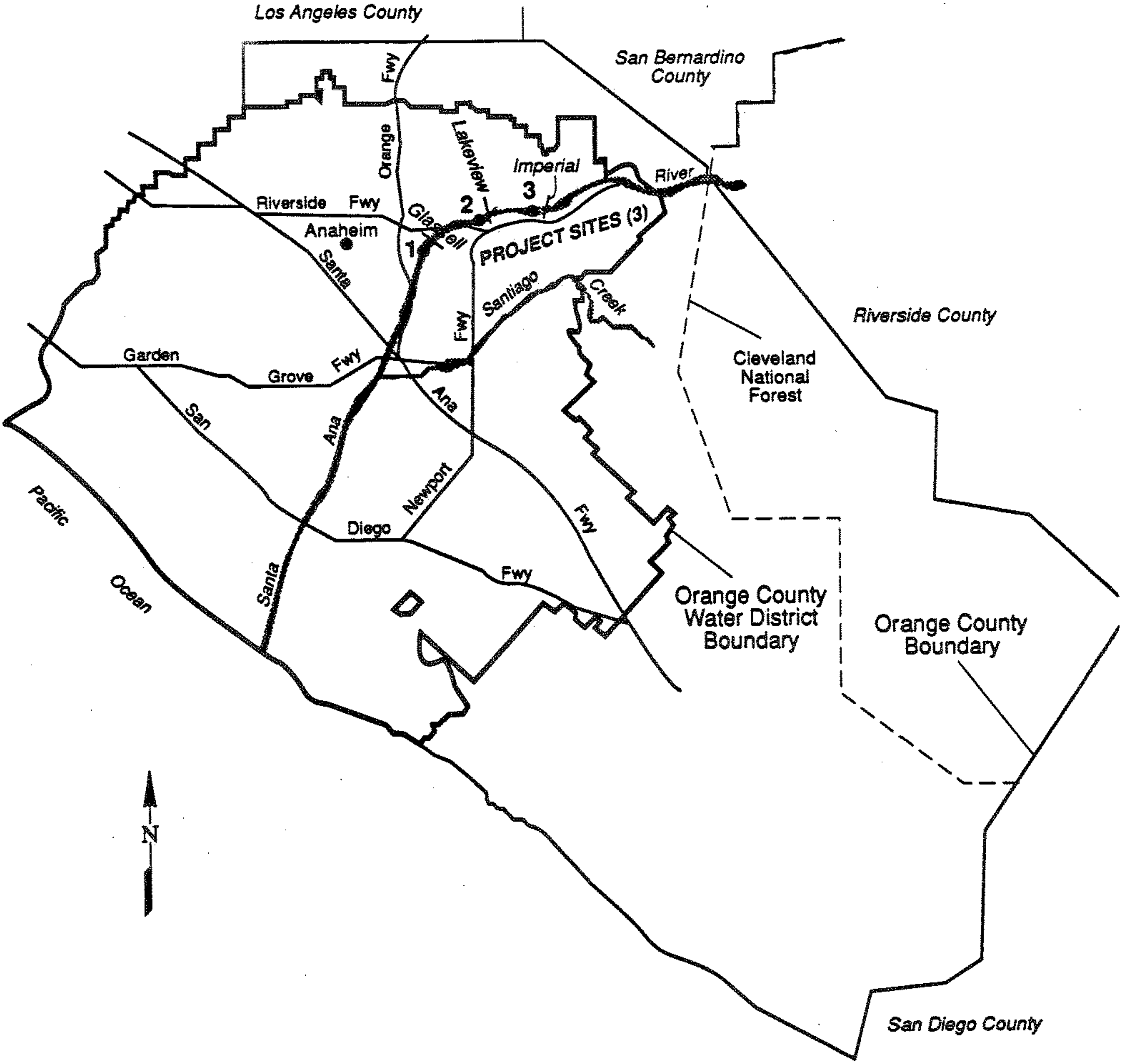


FIGURE 1. REGIONAL LOCATION

following a meandering course caused by temporary sand dikes constructed to lengthen the flow path, thereby enhancing percolation within the river channel. Figure 2 is an aerial photo showing the District's in-channel and off-channel recharge system.

During storms when the Santa Ana River flow rises to rates above 500 cubic feet per second (cfs), the temporary sand dikes within the river channel are washed out, and water flows unimpeded to the ocean. The levees cannot be replaced until the flow subsides below 300 cfs to allow equipment to operate in the riverbed. This process results in a significant loss of water to the ocean.

Project Facilities

The proposed project entails the installation of inflatable and deflatable rubber dams and by-pass facilities within the Santa Ana River channel at three locations (Figure 3) replacing the earthen diversion dikes. The proposed facilities will not alter or impede flows when the river is needed for flood control, nor will the facilities change the water control capabilities that have been used for many years to collect and divert flows for water recharge. The proposed facilities will enable diversion to be restored sooner after heavy storm flows, thus saving more water for recharge. Figure 3 locates the three potential project facilities sites. Each is at or near an existing drop structure within the river channel. Figure 4 shows the configuration of a typical rubber dam and bypass installation at a drop structure.

As shown in Figure 4, each rubber dam will completely cross the river channel. When inflated, the dam will stand approximately 7 feet high. River water retained by the dam will be diverted through a diversion structure to the off-channel spreading system, or will flow around the dam through the bypass structure and re-enter the river channel downstream of the dam and drop structure. Capacities of the proposed facilities are as follows:

CAPACITY (IN CFS) OF PROJECT FACILITIES

LOCATION	DIVERSION	BYPASS
Imperial	500	500
Lakeview	250	250
Carbon Creek	500	500

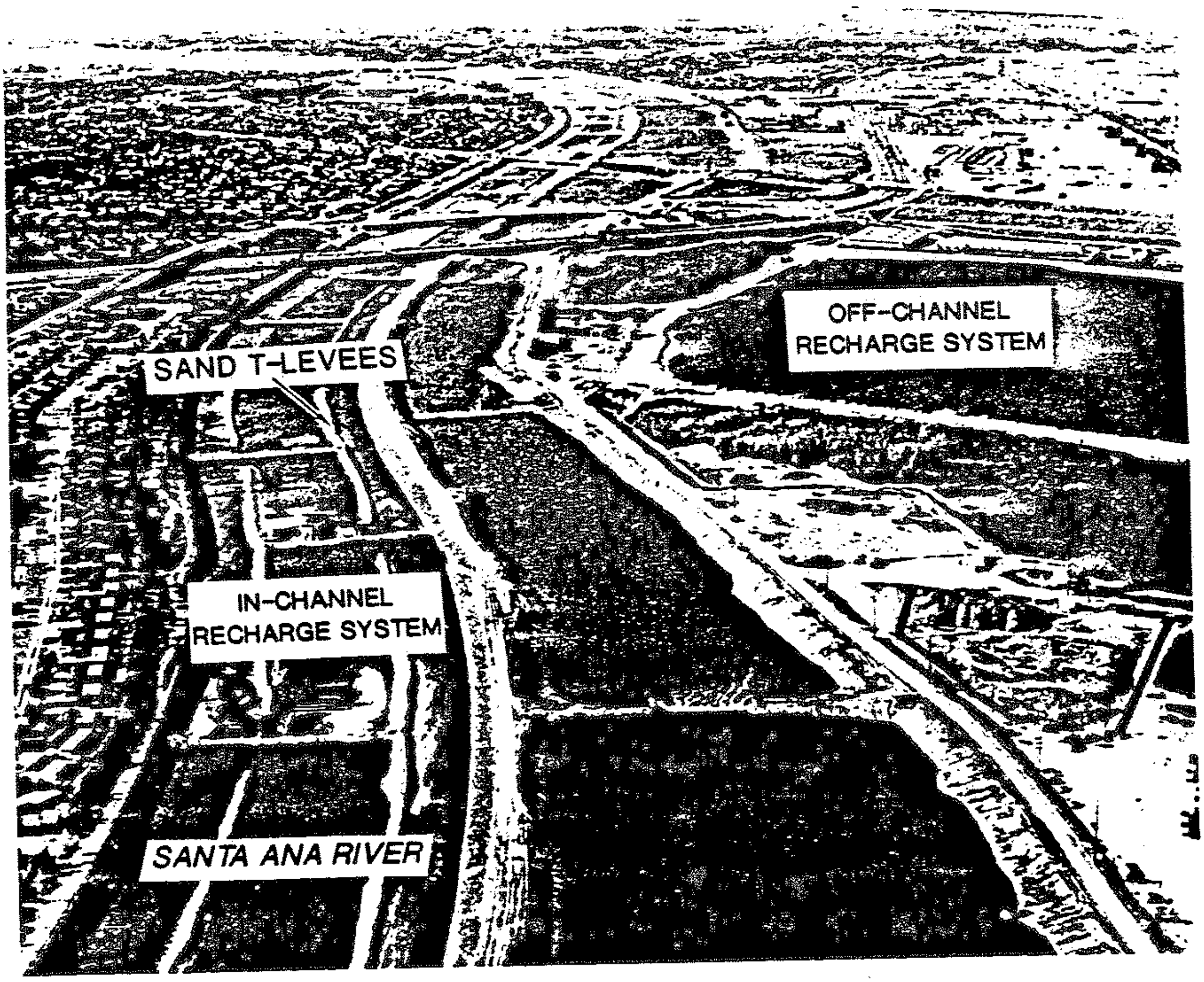


FIGURE 2

AERIAL PHOTOGRAPH
Looking downstream along the Santa Ana River
Orange County Water District's In-channel Recharge System (left)
Off-channel Recharge System (right)

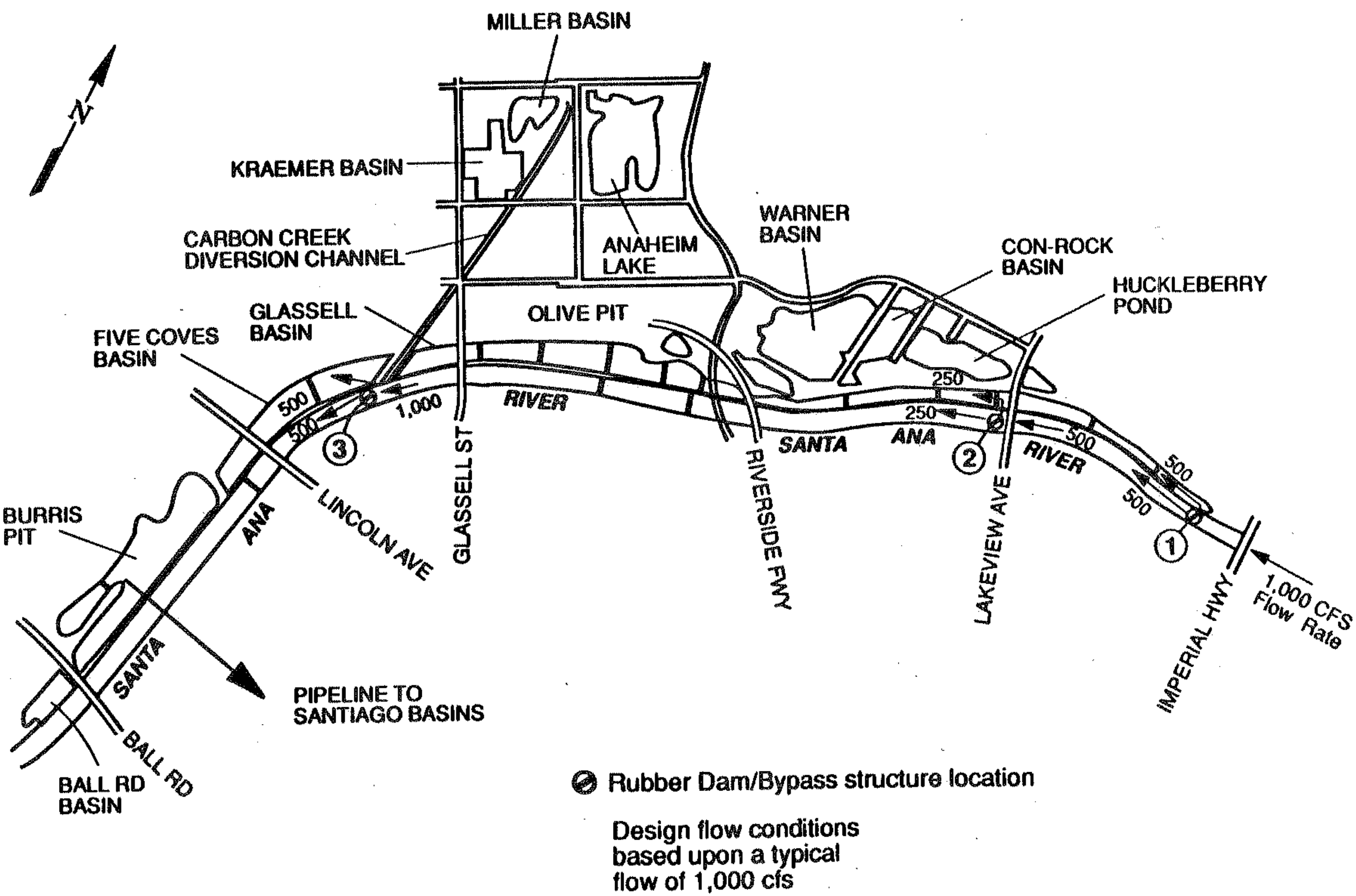


FIGURE 3. LOCATION OF PROPOSED RUBBER DAM AND BYPASS STRUCTURES

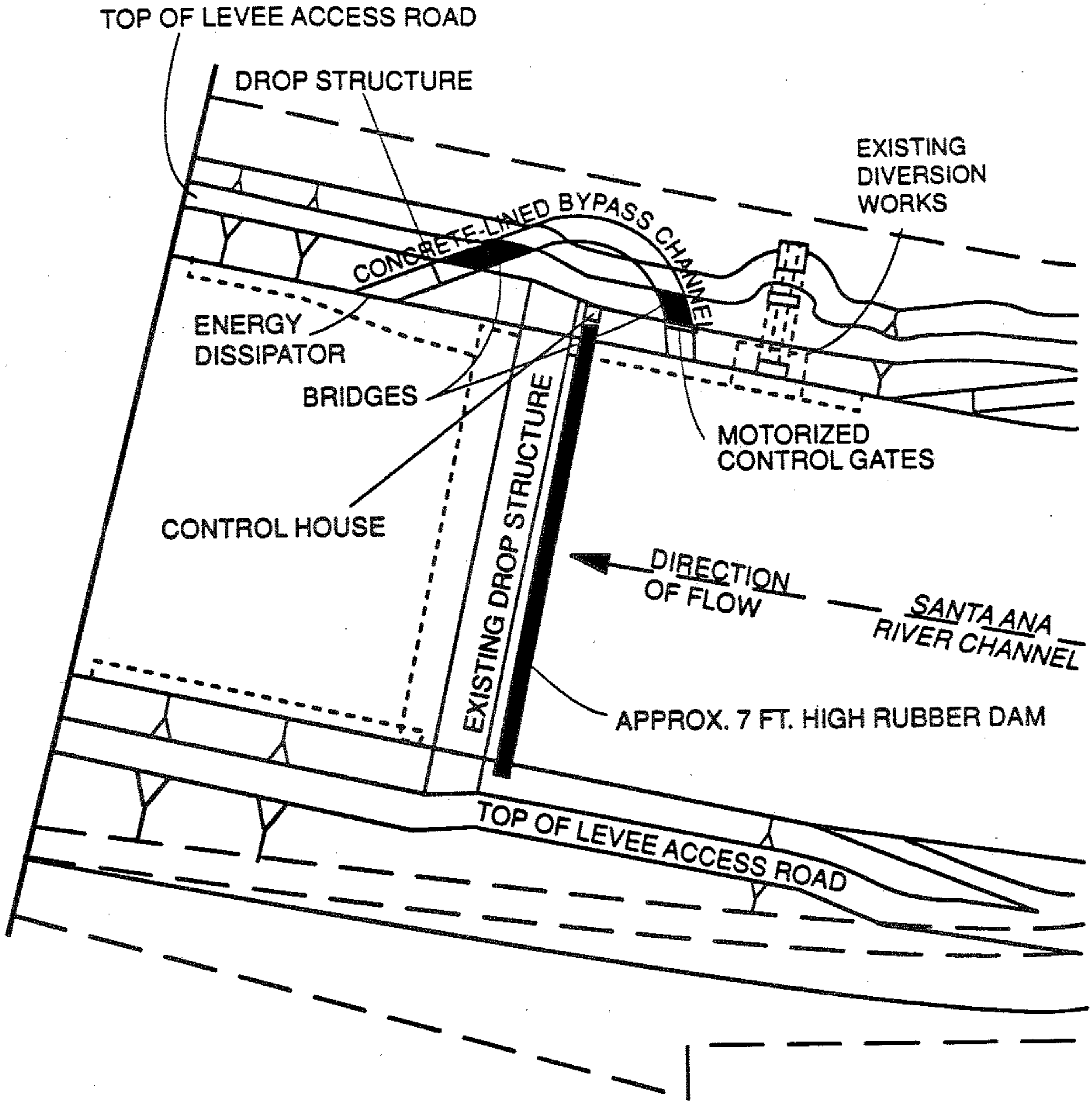


FIGURE 4. PROPOSED RUBBER DAM BYPASS CONFIGURATION

The rubber dams will normally remain in the inflated mode; however, the dams will automatically deflate when the water level behind the dams approaches 7 feet. When the dams are deflated, river flow will be unimpeded. As storm flows subside, the rubber dams will be reinflated so that diversion to recharge basins can resume. During the time that the rubber dams are reinflated, flow down the river channel will be stopped or reduced so that earthmoving equipment could re-enter the river channel to rebuild the sand dikes.

The recharge system currently has the capacity to capture and percolate a maximum of about 220,000 acre-feet per year of Santa Ana River water and imported water. The rubber dams will increase this capacity by an estimated 5,000 acre-feet per year by enabling the District to significantly reduce the loss of storm water to the ocean.

ANALYSIS OF IMPACTS AND MITIGATION MEASURES

This section presents the expected environmental impacts of the proposed project and identifies mitigation measures as appropriate.

The format of the preliminary environmental analysis is the environmental checklist included in CEQA guidelines. The following explains all questions on the checklist.

1. EARTH

Will the proposal result in:

a. Unstable conditions or in changes in geologic substructures? No. The project will not require any excavation of a depth sufficient to alter substructures or create unstable earth conditions.

b. Disruptions, displacements, compaction, or over-covering of the soil? Yes. Construction of the bypass structures will result in excess excavated soil. Some of the displaced soil will be compacted and replaced on-site, but approximately 5,700 cubic yards will remain and require disposal. Removal of the excess soil will be the responsibility of the contractor. For a fee, clean fill is accepted at the Bee Canyon Landfill or for backfill in adjacent construction projects. The impact is not significant.

c. Change in topography or ground surface relief features? No. After the excavated soil is replaced, local topography will be the same as preconstruction conditions.

d. The destruction, covering, or modification of any unique geologic or physical features? No. The rubber dams will be installed within the river channel and the bypass structures will be constructed by excavating into the north river levee. Both the river channel and the levee are man-made improvements for flood control. Therefore, no unique geologic or physical features will be disturbed.

e. Any increase in wind or water erosion of soils, either on or off the site? No. When inflated and diverting water to off-channel basins, the rubber dams will impede the flow of water down the river. The water not diverted off-channel will flow through concrete structures. To control erosion, the flow control structures will be concrete lined with energy dissipators at the tail end discharge. When deflated, the dams will have no effect on the river flow.

During construction, wind erosion potential will increase temporarily due to the increase in exposed soil. Fugitive dust emissions will be mitigated by watering the construction site. The construction specifications will state that the contractor is responsible for watering the construction area sufficiently to prevent dust in amounts damaging to property, cultivated vegetation, domestic animals, causing a nuisance to persons living in or occupying buildings in the vicinity.

f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition, or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet, or lake? Maybe. During normal operation, the rubber dams will be inflated, effectively stopping or impeding the dry weather flow of river water. Dry weather flows carry insignificant quantities of sediments to the ocean. The dams will be deflated during heavy flows, allowing the river water and bed load sediments to flow unimpeded to the ocean.

g. Exposure of people or property to geologic hazards such as earthquake, landslides, mud slides, ground failure or similar hazards? No. The potential instability of the alluvial soils in the project area poses the primary construction constraint associated with local geology and soils. The project area is located near several fault zones and, as such, the project facilities may be subject to seismic shaking and soil liquefaction. During the pre-design phase of the project, a geotechnical study will be completed, including soil borings, for analysis of specific site conditions. Based on this report, specific recommendations will be made with regard to excavation supports, concrete reinforcements, pipe couplings (if pipes are used), anchoring and piling, as well as trench and other excavation widths, slopes, and depths. As mitigated by the recommendations in the pre-design geotechnical study, the impact will not be significant.

2. AIR

Will the proposal result in:

a. Substantial emissions or deterioration in the ambient air quality? Temporary, yes. Project construction will have a short term impact on local air quality from construction equipment emissions. Estimated emissions from construction vehicles and equipment are described in Table 1. Mitigation measures which the District will include in the construction contract documents to minimize the construction related emissions include:

- Use of low-sulfur (0.05 percent by weight) fuel in construction equipment.
- Maintain construction equipment in proper tune.

Emissions from construction activity will be minor and temporary and therefore are not significant.

Fugitive dust may also be created during strong winds, during loading of excavated materials onto trucks, and during unloading of earth material onto a stockpile, and the reverse sequence of operations during back-filling. The contractor will be required to regularly water the construction site and cover dirt hauled in trucks to mitigate the impacts of construction related dust.

b. The creation of objectional odors? Temporary, yes. Construction vehicle emissions may create objectional odors for the short duration of their operation at any specific location. Construction impacts from odors will be temporary and are not considered significant.

c. Significant alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally? No. Discharges to the atmosphere occurring during construction and operation of the project will not be in sufficient volumes to effect air movement, moisture, or temperature.

3. WATER

Will the proposal result in:

a. Changes in currents or the course or direction of water movements, in either marine or fresh water?

b. Changes in absorption rates, drainage patterns, or the rate and amount of surface water runoff?

TABLE 1
ESTIMATED EMISSIONS FROM CONSTRUCTION VEHICLES

Equipment	Use Estimated hours	Carbon Monoxide gm/hr	Carbon Monoxide kg	Hydrocarbons Exhaust gm/hr	Hydrocarbons Exhaust kg	Hyrdocarbons Evaporative gm/hr	Hyrdocarbons Evaporative kg	Hydrocarbons Crankcase gm/hr	Hydrocarbons Crankcase kg
Tracktype Tractor	2909	157	457	55	160	NF		NF	
Wheeled Tractor-diesel	8667	1622	14058	85	737	NF		NF	
Roller-diesel	3418	138	472	31	106	NF		NF	
Miscellaneous-diesel	30157	306	9228	69	2081	NF		NF	
Miscellaneous-gas	19639	7720	151613	254	4988	25	491	51	1002
TOTAL			175827		8072		491		1002

Equipment	Use Estimated hours	Nitrogen Oxides gm/hr	Nitrogen Oxides kg	Sulfur Dioxide gm/hr	Sulfur Dioxide kg	Particulates gm/hr	Particulates kg
Tracktype Tractor	2909	571	1661	62	180	51	148
Wheeled Tractor-diesel	8667	576	4992	41	355	62	537
Roller-diesel	3418	393	1343	31	106	23	79
Miscellaneous-diesel	30157	767	23130	65	1960	63	1900
Miscellaneous-gas	19639	187	3672	11	216	12	236
TOTAL			34799		2818		2900

NF - No Emissions Factor Available

Source: South Coast Air Quality Management District. Air Quality Handbook. 1987.

a.-b. Yes. The rubber dams will divert water from the river channel to the off-channel spreading basins for recharge to the underlying aquifer. The project will cause more river water to be captured and recharged while less will remain in the river and flow to the ocean. The impact on groundwater will be beneficial because more water will be recharged and made available for public supply. The additional incremental volume of flow captured and diverted from flowing to the ocean by this project will have minor and insignificant impact on the ocean.

c. Alterations to the course or flow of flood water? No. The rubber dams will automatically deflate during flood flows and water will flow unimpeded down the river channel.

d. Change in the amount of surface water in any water body? Yes. Flows in the river channel downstream of the proposed project facilities and flows reaching the ocean will be reduced by the incremental amount captured, diverted, and recharged. The impact on the river and ocean resulting from this reduction will be minor and insignificant.

e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen, or turbidity? No. The project will not result in discharge to surface waters.

f. Alteration of the direction or rate of flow of groundwater?

g. Change in the quantity of groundwater, either through direct additions, or withdrawals, or through interception of an aquifer by cuts or excavations?

h. Substantial reduction in the amount of water otherwise available for public water supplies?

f.-h. Yes. The project will increase recharge to the underlying aquifer resulting in a slight hydraulic mounding effect on the groundwater table. This mounding effect will steepen gradients downstream and away from the recharge areas. The impact on groundwater will be beneficial because more water will be recharged and made available for public supply.

i. Exposure of people or property to water-related hazards such as flooding or tidal waves? No. The rubber dams will automatically deflate during flood flows and water will flow unimpeded down the river channel.

j. Change in the quality of groundwater? No. The project will enable increased recharge of the same quality water as has been historically recharged. Current groundwater quality in the project area is already similar to the quality of the river water to be recharged by the project. There will be no impact on groundwater quality.

4. PLANT LIFE

Will the proposal result in:

a. Change in diversity of species, or number of any species of flora (including trees, shrubs, grass, crops, and aquatic plants)? No. The project facilities will be constructed on land which is devoid of permanent vegetation. When the rubber dams are inflated and retaining river flows, the channel will be inundated for longer periods and which destroy vegetation residing on the temporary sand dikes. River channel vegetation is temporary and is frequently cleared out by high heavy flows during the storm season. No significant impacts will result.

b. Reduction of the numbers of any unique, rare, or endangered species of plants? No. No listed sensitive plant species have been identified at the project facilities sites or within the channel area subject to inundation by the rubber dams.

c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species? No. The project will not change the existing habitat. No new species of plants will be introduced nor will any barrier be imposed to the replenishment of existing species.

d. Reduction in acreage of any agricultural crop? No. The proposed project facilities will not cross nor impact any agricultural land.

5. ANIMAL LIFE

Will the proposal result in:

a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, or insects)? No. The project facilities will be constructed on land which is devoid of animal life. Inundation of the river channel caused by retaining water behind the rubber dams may enhance bird life in the river channel.

b. Reduction of the numbers of any unique, rare, or endangered species of animals? No. No listed species have been identified at the proposed project facilities sites or in the area subject to inundation according to an extensive inventory published by the Orange County Flood Control District.

c. Introduction of new species of animals into an area, or result in a barrier to the migration of movement of animals? No. The project will not change the existing habitat. No new species of animals will be introduced nor will any barrier be imposed to the replenishment of existing species.

d. Deterioration to existing fish or wildlife habitat? No. No construction will occur in existing fish or wildlife habitats. Inundation of the river channel caused by retaining water behind the rubber dams may disturb but not permanently impact existing fish or wildlife residing in the river channel.

6. NOISE

Will the proposal result in:

a. Increases in existing noise levels? Yes. Noise levels will be temporarily elevated over the background traffic noise during the construction period. However, there are no sensitive receptors, such as residences, schools, or churches, near the construction areas. Project-related noise impacts during construction are insignificant, localized and temporary.

b. Exposure of people to severe noise levels? No, although noise levels will be temporarily elevated over the background traffic noise during the construction period. However, there are no sensitive receptors, such as residences, schools, or churches, near the construction areas. Project-related noise impacts during construction are insignificant, localized and temporary.

7. LIGHT AND GLARE

Will the proposal produce new light or glare? No. The proposed project facilities will have only minor nighttime lighting for security purposes. The facilities are located in the river area and there are no sensitive receptors, such as residences or hospitals, which could be impacted by the lighting.

8. LAND USE

Will the proposal result in a substantial alteration of the present or planned land use of an area? No. In general, the proposed project facilities will be constructed on land currently and historically used for flood control and groundwater recharge purposes. However, during construction, travel along access roads and bike paths along the river levees may be hampered temporarily. Detour routes will be provided. The impact will be localized and temporary and there will be no land-use impacts due to the project once construction is complete.

9. NATURAL RESOURCES

Will the proposal result in:

a. Increase in the rate of consumption of any natural resources? Yes. Increased electrical power use will result from operating the project facilities. Power will be used to operate inflation devices on the rubber dams and motorized gates on the bypass structures. Because the project facilities will be operated infrequently and the amount of energy consumed will be negligible, the impact is not significant.

b. Substantial depletion of any nonrenewable resource? No. Some nonrenewable fossil fuel will be required for project construction and operation of the project facilities. The amount required, however, is not considered substantial or significant.

10. RISK OF UPSET

Will the proposal result in:

a. A risk of an explosion or the release of hazardous substances (including but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or upset conditions? No. The rubber dams will be lined with a puncture resistant material and will be inflated under pressures no greater than 4 psi. Therefore, no risk of explosion resulting from puncture of the dams exists. No hazardous substances will be stored at or consumed by the project facilities.

b. Possible interference with an emergency response plan or an emergency evacuation plan? No. Construction may obstruct vehicle passage along the roadways of the levees during the time of construction. The contractor will be required to develop a detour plan meeting the approval of the Orange County Flood Control District. The impact of construction activity on police and fire vehicle access will be temporary and insignificant.

11. POPULATION

Will the proposal alter the location, distribution, density or growth rate of the human population of an area? Maybe. The increased availability of groundwater resulting from increased recharge could allow a reduction of importation of water to areas within OCWD. However, because local zoning and implementation of the individual City and County General Plans are the primary forces governing growth, the impact of this project on population is not significant.

12. HOUSING

Will the proposal affect existing, or create a demand for additional housing? The effect of this project on housing is not considered significant, as noted in item 11 above.

13. TRANSPORTATION/CIRCULATION

Will the proposal result in:

a. Generation of additional vehicular movement? Yes. During construction an estimated additional ten vehicles per day will be expected from construction workers commuting to and from the site. This impact is insignificant and temporary.

b. Effects on existing parking facilities or demand for new parking? No. During construction additional parking for about ten vehicles will temporarily be required for the construction workers. Parking space will be available near the project site along the river levees. No significant impact will be created.

c. Substantial impact upon existing transportation systems? No. Because the project facilities will be constructed within and along the river channel and not in public streets or within railroad right-of-ways, there will be no impact on transportation systems. The Santa Ana River is not a navigable waterway.

d. Alterations to present patterns of circulation or movement of people and/or goods? No. The project will have no impact on the movement of people and goods.

e. Alterations to waterborne, rail, or air traffic? No. Railroad tracks, navigated waterways and airports will not be impacted by the proposed project.

f. Increase in traffic hazards to motor vehicles, bicyclists, or pedestrians? Yes. Hazards to vehicles, bikes and pedestrians travelling along the levee or bike paths will increase temporarily during construction. Included in the project contract documents will be conditions setting forth the contractor's responsibility to provide detour routes, place and maintain all necessary barricades, traffic cones, warning signs, lights and other safety devices in accordance with the requirements of the Manual of Uniform Traffic Control Devices. This impact is not significant.

14. PUBLIC SERVICES

Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:

a. Fire Protection?

b. Police Protection?

c. Schools?

a.-c. No. The proposed project will not result in a need for fire or police protection or schools.

d. Parks or other public facilities? No. No parks or other public facilities will be effected by the project.

e. Maintenance of public facilities, including roads? No. Construction impacts on levee and bike paths will be temporary only.

f. Other governmental services? No. Project construction will not affect any other governmental services.

15. ENERGY

Will the proposal result in:

a. Use of substantial amounts of fuel or energy? Maybe. During the construction period, energy, chiefly as gasoline and diesel fuel, will be consumed by construction equipment and vehicles on site, and by workers' commutes to the site. Energy consumption will be unavoidable and irreversible but will not be significant due to its small amount and short-term occurrence.

b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy. No. The electricity required to operate the project facilities is not a substantial or significant increase in energy consumption.

16. UTILITIES

Will the proposal result in a need for new systems, or substantial alterations to the following utilities:

a. Power or natural gas?

b. Communication systems?

c. Water?

d. Sewer and septic tanks?

e. Storm water drainage?

f. Solid waste and disposal?

a.- f. No. The proposed project will not impact any public utilities.

17. HUMAN HEALTH

Will the proposal result in:

a. Creation of any health hazard or potential health hazard (excluding mental health)?

b. Exposure of people to potential health hazard?

a.- b. An average level of safety hazard to construction workers will exist at the construction site during the construction period. Adherence to standard Federal and State Occupational Safety and Health Administration (OSHA) regulations by the contractor will reduce this impact to an insignificant level. Trenches and other excavations will be protected during non-working hours and guarded during working hours.

18. AESTHETICS

Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the significant creation of an aesthetically offensive site open to the public view? Maybe. Construction activities may be evaluated as having a negative aesthetic quality. However, since the construction will take place within and along the river channel, which is generally out of public view, the impact is minimal.

19. RECREATION

Will the proposal result in impacts upon the quality of existing recreational opportunities? Yes. Travel along the levee and bike paths by pedestrians and bicyclists will be hampered temporarily during construction. Included in the project specifications will be conditions indicating the contractor's responsibility to provide detours as well as place and maintain all necessary barricades, traffic cones, warning signs, lights and other safety devices in accordance with the requirements of the Manual of Uniform Traffic Control Devices.

20. CULTURAL RESOURCES

a. Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?

b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?

c. Does the proposal have the potential to cause a physical change which will affect unique ethnic cultural values?

d. Will the proposal restrict existing religious or sacred uses within the potential impact area?

a.- d. No. There are no known cultural, historic, sacred, or archaeological sites which may be impacted by the proposed project. Construction will require excavation within the previously disturbed river channel, and the potential exists for excavation of historic, prehistoric, or cultural resources. However, the District requires in the construction contract documents that a "halt-work" condition be in effect in the event that a finding is made during earth moving operations.

21. MANDATORY FINDINGS OF SIGNIFICANCE

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? No. As mitigated, the proposed project facilities will be located in a river channel and levee. No important resources are anticipated to be eliminated; the areas are already highly disturbed.

b. Does the project have the potential to achieve short-term impact, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future). No. The project will have short-term impacts and long-term environmental benefits in water supply.

c. Does the project have impacts which are individually limited, but cumulatively considerable. (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant). No. The project has no cumulative adverse impacts.

d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? No. The impact on human beings will be beneficial.

III. DETERMINATION

On the basis of this initial evaluation:

___ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

_X_ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described herein have been added to the project. A NEGATIVE DECLARATION will be prepared.

___ I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

William R. Mills
Signature

September 10, 1991
Date

General Manager
Title

Orange County Water District
For

PERMITS AND APPROVALS

The following planning and regulatory agencies will be involved with the approval of the Santa Ana River Rubber Dam and Bypass Project:

Agency	Permit
County of Orange Environmental Management Agency	Encroachment Permit
U.S. Army Corps of Engineers	404 Permit
California Department of Fish and Game	Stream Alteration Agreement 1060

REFERENCES

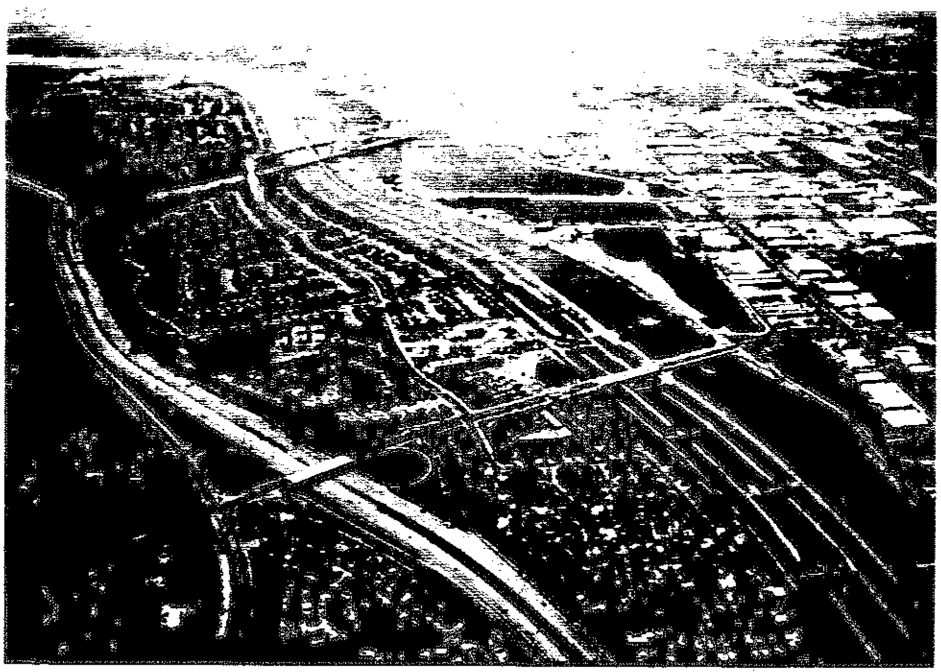
Camp Dresser & McKee, 1991. A Conceptual Study of the Use of Inflatable Rubber Dams to Divert Santa Ana River Flows into the Orange County Water District's Recharge Facilities.

Canter, Larry W., 1977. Environmental Impact Assessment. McGraw-Hill, Inc.

Orange County Water District, 1989. Master Plan for Forebay Recharge Facilities.

Holmes & Narver, 1991. Proposal for Rubber Dam and By-Pass Structures on the Santa Ana River.

OCWD
RECHARGE FACILITIES
SANTA ANA RIVER
1992



Appendix M-6

1992: Prado Dam Operation for Water Conservation Final Report and EIS

Appendix M-6-1

Executive Summary

ESA

SANTA ANA RIVER BASIN

PRADO DAM AND RESERVOIR
ORANGE COUNTY, CALIFORNIA

REVIEW OF PRADO DAM OPERATION FOR WATER CONSERVATION

AND

ENVIRONMENTAL IMPACT STATEMENT

October 1992

Los Angeles District, Corps of Engineers
Planning Division, WRB
P.O. Box 2711
Los Angeles, California 90053

October 1992

REVIEW OF PRADO DAM OPERATION
FOR WATER CONSERVATION

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REVIEW OF PRADO DAM OPERATION
FOR WATER CONSERVATION

EXECUTIVE SUMMARY

At the direction of the Assistant Secretary of the Army (Civil Works) this study was undertaken to determine the feasibility and advisability of re-operating Prado Reservoir to provide seasonal water conservation storage. Following is a review of Prado Dam operation which determined that there would be potential net NED Benefits from such re-operation. This study addressed the potential benefits and costs associated with increasing the debris/buffer pool at Prado Reservoir from 494 feet to form a water conservation pool at elevations 495, 500, and 505 feet NGVD from March 1 through September 30 of each year.

The study examins the potential to modify the operation of Prado Dam under existing conditions and is expected to result in an interim agreement with the Orange County Water District (OCWD) to operate the project for added water conservation. This interim agreement would remain effective until construction of the Santa Ana River Project (SARP) is completed and a new agreement is consumated. The new operation agreement for Prado Dam would be based on the results of the ongoing water conservation study for Seven Oaks and Prado Dams.

The study addressed potential water conservation benefits and social and environmental impacts in the Prado Basin which would be associated with each level of storage. Imported water was not evaluated as part of this study. The hydrologic analysis, to properly simulate flows, removed imported water from the 1950-1955 and 1972-1980 mean daily flows. Any future actions for importing water would have to be analyzed and the impacts assessed on a case-by-case basis. Results and conclusions of the study were:

The current operation of Prado Dam provides substantial incidental water conservation. Based on analysis of recharge records at the OCWD spreading grounds, past recharge has involved capture of approximately 75 percent of Santa Ana River flows.

The amount of additional conservable water capable of being produced by seasonal water conservation operations at Prado Dam increases arithmetically with increasing target elevation of the seasonal pool. Potential increases in water conservation for present and future conditions would be:

Elevation	Present Condition	Future Conditions
495	1,456 AF	2,396 AF
500	3,179 AF	4,102 AF
505	4,634 AF	7,160 AF

Extended seasonal water conservation impoundments at elevation 505 would not have a significant impact on ground water levels beneath the Corona Airport or other facilities above elevation 505 feet.

The geotechnical assessment concluded that no remedial treatment of the embankment or foundation would be required for implementation of the proposed water conservation alternatives.

Operation of the dam for seasonal water conservation would increase the O&M costs incurred by the federal government related to the operation and maintenance of the dam.

Water conservation is expected to lower TDS values. Concentration of metals is not expected to increase downstream. The water conservation pool could act as a buffer by dilution of any short-term change in water quality that may occur.

Seasonal water conservation would increase the probability of extended inundation in the spring, impacting the willow woodland, the nesting of the endangered least Bell's vireo, and its habitat. Required mitigation is assessed and presented in this report.

Impacts to cultural resources would occur for seasonally expanded water conservation pools above 495 feet. The cost of mitigation for these impacts would be approximately $300,000 for elevation 500 feet and $390,000 for elevation 505 feet.

Expansion of the seasonal pool for water conservation to elevation 505 feet will, on average, increase the number of days the pool reaches or exceeds elevation 495 feet by about 20%. This will mean a temporary reduction in petroleum operations involving wells located between the 490′ and 495′ elevation lines (Prado Petroleum Company).

Under leases granted to all parties, the Federal government has the right to change its reservoir regulation schedule for water conservation purposes without compensating the parties for temporary reductions in income which may result from increased duration of inundation.

Based on an assumed value of water at $120 per acre-foot (present marginal cost) for the period 1990-2015 and $370 per acre-foot (future marginal cost) for the period 2015 to 2040, the annual benefits of seasonal impoundment for the 50-year project life were determined to be:

Elevation 495: $245,000
Elevation 500: $474,000
Elevation 505: $755,000

Annual NED costs associated with each of the alternatives considered were determined to be:

Elevation 495: $257,100
Elevation 500: $457,600
Elevation 505: $639,200

Elevations 500 and 505 are justified economically, with the greatest net NED benefits realized if the seasonal water conservation is allowed to be raised to elevation 505:

Elevation	Net NED Benefits	B/C Ratio
495	($12,100)	.95
500	$16,400	1.04
505	$115,800	1.18

The District Engineer recommends implementation of the NED Plan, contingent upon Orange County Water District accomplishment of all requirements necessary to implement the plan at 100% local sponsor cost.

Appendix M-6-2

Biological Opinion (1-6-93-F-7)

United States Department of the Interior

TAKE PRIDE IN AMERICA

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008

February 25, 1993

Colonel Robert VanAntwerp
District Engineer, Los Angeles District
U.S. Army Corps of Engineers
Post Office Box 2711
Los Angeles, CA 90053-2325

Attn: Mr. Alex Watt (Environmental Planning Branch)

Re: Biological Opinion on the Prado Basin Water Conservation Project, Orange County Water District, Riverside and San Bernardino Counties, California (1-6-93-F-7)

This Biological Opinion responds to your request for formal consultation with the Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your request was received by the Service on October 16, 1992. At issue are the impacts of water retention at Prado Basin which may affect a Federally-listed endangered species, the least Bell's vireo (Vireo bellii pusillus; "vireo"). The Orange County Water District (District) proposes that the Corps of Engineers (Corps) modify the operation of the Prado Flood Control Dam for water conservation purposes.

This Biolog cal Opinion was prepared using the following information: 1) Prado Dam Operati n for Water Conservation, U.S. Army Corps of Engineers Draft Environment Impact Statement, October, 1992 (hereinafter referre to as "EIS"), 2) F sh and Wildlife Coordination Act Report dated July, 1990; U.S. Fish and Wil life Service, Fish and Wildlife Enhancement, Laguna Niguel, California, 3) Planning Aid Letter dated July, 1987, regarding Water Conservation n Prado Reservoir; U.S. Fish and Wildlife Service, F sh and Wildlife Enha cement, Laguna Niguel, California 4) upplemental Biological Information, Evaluation of Potential Impacts to the Least Bell's Vireo, Prado Basin Water Co servation Study; December, 1987; Da es and Moore, Santa Barbara, California, 5) Prado Dam Water Conservati Study, Draft Engineering/Hydrology Report; May, 1987; U.S. Army Corps of Engineers, Los Angeles District, 6) the biological literature (s e "Literature Cited and References" below, and 5) other communications wit the Corps and the District (on file).

Biological Opinion

It is the opinion of the Service that the proposed project is not likely to jeopardize the continued existence of the least Bell's vireo. The project area is located entirely within the boundaries of proposed Critical Habitat. Since Critical Habitat has not yet been designated, none would be adversely modified by the proposed project.

Description of the Proposed Action

The Corps and the District propose to modify existing, adopted policy that governs the operation of the Prado Dam in Riverside County near the present city of Corona, California. The dam is presently operated according to the procedures outlined in the Prado Basin Water Control Plan, which was adopted in 1990. At the present time, the dam is operated to prevent flooding of areas along the Santa Ana River downstream from the dam and to minimize the environmental impacts associated with prolonged inundation of sensitive, wetland habitats in the Prado Basin. Although facilitated whenever possible, water conservation therefore is presently achieved on an incidental basis.

Pursuant to the present Water Control Plan, the top of the "debris pool" is maintained between elevations 490 and 494 (feet above sea level) during the winter flood control season (between September 15 and March 15). Water is released up to 2500 cubic feet per second (cfs) if the debris pool is between these two elevations. If the debris pool exceeds 494 feet in elevation (or is expected to rapidly reach elevation 494), however, water is released from the dam at rates up to the maximum, safe rate (approximately 5300 cfs) until the debris pool is once again at or below an elevation of 494 feet. During the "non-flood" season (March-September), water is currently not allowed to rise above elevation 490. Whenever possible, outlet flows are reduced to 600 cfs or less to allow the District to capture discharges in spreading grounds and recharge basins in or adjacent to the Santa Ana River downstream of the project area.

In conjunction with the referenced project, the Corps proposes to limit the rate of water releases from the dam between March 1 and September 30 of each year to maximize the amount of water that is captured, and thus conserved, by the District. The proposed project calls for the eventual, phased conservation of water up to an elevation of 505 from March 1 to September 30 to allow for discharge or outflow rates that are sufficiently small to enable the District to capture all, or nearly all of the water released from the Prado Dam.

The stated purposes of the project are to conserve water and to improve, overall, the quality of water that is stored in underground aquifers in Orange County, California. The District presently is the sole owner of rights to surface waters in the project area. Increased water conservation capabilities would additionally preclude or diminish the need for the District to import water from the Colorado River or elsewhere in the region.

In recognition of potential impacts to the vireo and as a means to help conserve public fish and wildlife resources, the District funded the 1989 and 1990 California State University, Long Beach Foundation vireo monitoring and management programs in the Prado Basin at a total cost of $70,000. In addition, in 1991 the District provided $450,000 to the Nature Conservancy for habitat management and restoration and an additional $450,000 (since reimbursed by the County of Orange) for the ongoing vireo management program. Also in 1991, the District dedicated the 124 acre plot known as PR3 for purposes of habitat creation and restoration. In 1992, the District: 1) contributed another $50,000 for habitat restoration, 2) contributed an additional $50,000 to the vireo management fund now administered by the Nature Conservancy, and 3) removed approximately 40 acres of Arundo donax on District property designated as "PR6".

As part of the proposed project, in recognition of project-related impacts to the vireo and its habitat, the District Corps and the District have additionally agreed to implement the following mitigation measures:

1. The Corps and the Orange County Water District have shall contribute funds necessary to fund habitat creation and ongoing vireo management efforts for the life of the project.

2. The Corps and the Orange County Water District shall create the following acreages of acceptable vireo habitat and wildlife habitat prior to the initiation of water conservation to the prescribed elevation:

WATER CONSERVATION ELEVATION	REQUIRED ACREAGE OF ACCEPTABLE VIREO HABITAT	REQUIRED ACREAGE OF WILDLIFE HABITAT
495	50	86
496	67	109
497	83	133
498	100	156
499	116	180
500	133	203
501	152	218
502	171	233
503	190	248
504	209	263
505	228	278

Effects of Proposed Action On Listed Species

Species Account

The least Bell's vireo is a small, olive-gray migratory songbird that nests and forages almost exclusively in riparian woodland habitats (Garrett and Dunn 1981; Gray and Greaves 1981; Miner 1989). Bell's vireos as a group are highly territorial (Barlow 1962; Fitch 1958; Salata 1983a) and are almost exclusively insectivorous (see, for instance, Chapin 1925 and Miner 1989).

Least Bell's vireo nesting habitat typically consists of well-developed overstories, understories, and low densities of aquatic and herbaceous cover (Zembal 1984; Zembal et al. 1985; Hays 1986; Hays 1989; Salata 1983a; RECON 1988). The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by of sandbar willow (Salix hindsiana), mule fat (Baccharis salicifolia), young individuals of other willow species such as arroyo willow (Salix lasiolepis) or black willow (S. gooddingii) and one or more herbaceous species (Salata 1983a, 1983b; Zembal 1984; Zembal et al. 1985). Significant overstory species include mature arroyo willows and black willows. Occasional cottonwoods (Populus sp.) and western sycamore (Platanus racemosa) occur in some vireo habitats and there additionally may be locally important contributions to the overstory by coast live oak (Quercus agrifolia).

Least Bell's vireos generally begin to arrive from their wintering range in southern Baja California and establish breeding territories by mid-March to late March (Garrett and Dunn, 1981; Salata 1983a, 1983b; Hays 1989; Pike and Hays, 1992). A large majority of breeding vireos apparently depart their breeding grounds by the third week of September and only a very few Bell's vireos are found wintering in California or the United States as a whole (Barlow 1962; Nolan 1960; Ehrlich et al. 1988; Garrett and Dunn 1981; Salata 1983a, 1983b; Pike and Hays 1992).

Although the least Bell's vireo occupies home ranges that typically range in size from 0.5 to 4.5 acres (Regional Environmental Consultants 1988), a few may be as large as 10 acres (J. Greaves, pers. comm.). In general, it appears likely that areas that contain relatively high proportions of degraded habitat have lower productivity (hatching success) than areas that contain high quality riparian woodland (Jones 1985; RECON 1988; Pike and Hays 1992).

Historically described by multiple observers as common to abundant in the appropriate riparian habitats from as far north as Tehama County, California to northern Baja California, Mexico (Grinnell and Storer 1924; Willett 1933; Grinnell and Miller 1944; Wilbur 1980), the least Bell's vireo currently occupies a very small fraction of its former range (Goldwasser et al. 1980; United States Fish and Wildlife Service 1986) and is, at best, a rare and local species.

Widespread habitat losses have fragmented most remaining populations into small, disjunct, widely dispersed subpopulations. The remaining birds are concentrated in San Diego, Santa Barbara and Riverside Counties. The entire known United States population in 1992 consisted of approximately 400 breeding pairs.

The unparalleled decline of this California landbird species (Salata 1986; United States Fish and Wildlife Service 1986) has been attributed, in part, to the combined, perhaps synergistic effects of the widespread and relentless destruction of riparian habitats and brood-parasitism by the brown-headed cowbird (Molothrus ater; Garrett and Dunn 1981). Because of this documented, drastic decline, the least Bell's vireo has been listed as an endangered species by both the State of California and the Federal government.

The least Bell's vireo was officially listed as endangered by the Service on May 2, 1986. Listing of critical habitat is pending at this time. The project area is entirely within proposed critical habitat.

Analysis of Impacts

Although several researchers had previously documented the presence of the Least Bell's Vireo within the Prado Basin and contiguous reaches of the Santa Ana River (see, for instance, Goldwasser 1978), the local status, distribution, and breeding biology of this endangered species remained largely unknown until field studies were conducted by Service biologists in 1983 (Zembal et al. 1985) and 1985 (Zembal 1986) and by California State University, Long Beach Foundation biologists in 1986 (Hays 1986), 1987 (Hays 1987), 1988 (Hays 1988), 1989 (Hays 1989), 1990 (Hays and Corey 1991), 1991 (Pike and Hays 1992), and 1992 (The Nature Conservancy, 1993). Because the Prado Basin vireo population was effectively unmanaged prior to 1986, the data and analysis presented since 1986 cumulatively provide the information necessary to compare the temporal status, distribution, and reproductive productivity of this population.

Over the course of the first year (1986) of the present monitoring and management effort, 19 pairs of vireos were detected in the Prado Basin and contiguous reaches of the Santa Ana River (Hays 1986). During the course of the 1992 field surveys, 99 pairs of least Bell's vireos and an additional 14 territorial males were detected in Prado Basin (the Nature Conservancy 1993). Because over 1000 hours were spent in the field by researchers during the 1992 breeding season, it is thought that few if any vireo pairs were missed in the project area.

Because least Bell's vireo pairs continue to occupy habitat in home ranges that are, in whole or in part, between elevations 490 and 495 (Pike and Hays 1992; the Nature Conservancy 1993), the conservation of water at all proposed project levels could flood occupied vireo habitat and, at the extreme, swamp vireo nests. In fact, 23 of 36 nesting territories were at below elevation 505 during the 1988 breeding season and 23 of 37 were so located during the 1989 nesting season. Given the overall increase of vireo numbers within the Prado Basin from 1989 to 1992, we assume that at least 23 vireo home ranges could be affected during the 1993 breeding season, even if the recent degradation of habitats at lower elevations is considered.

Because the proposed conservation of water will flood occupied or potential vireo habitat after essential habitat constituents have emerged from dormancy, the Service concludes that the habitat eventually will be directly and indirectly impacted by the proposed project up to the target elevation. For a more thorough analyses of the effects of flooding or prolonged inundation on vireo and other riparian or wetland habitats see Zembal et al. (1985), U.S. Fish and Wildlife Service (1990), and Dames and Moore (1987).

In general, flooding of trees can cause "the depletion of oxygen to respiring roots, accumulation of carbon dioxide in the soil, establishment of anaerobic conditions around the roots, and accumulation of toxins (organic acids) in and around the roots" (Dames and Moore 1987: 4-13). Walters et al. (1980) previously observed that Fremont cottonwoods (<u>Populus fremontii</u>) do not tolerate complete submergence during any part of the growing season, yet do often survive partial inundation. Thus, submergence during the growing season (when plants are actively respiring) may be particularly damaging.

The Service has concluded that "the lack of plant species diversity and the sparsity of shrubby understory development below 490 feet in the Prado Basin is attributable to the past frequency, duration, and timing of inundation" (U.S. Fish and Wildlife Service 1990: 19; see also Zembal et al. 1985). Frederickson (1979) had previously concluded that plant species diversity at three Missouri study sites declined greatly as inundation levels became increasingly pronounced.

Vireos no longer breed in now degraded riparian woodlands in the western portion of the South Basin (Pike and Hays 1992, The Nature Conservancy 1993). These woodlands, although suitable (and occupied) as recently as 1989, are now almost entirely devoid of suitable nesting microhabitat. Essential nesting habitat elements in the lower (generally western) portions of the South Basin evidently have been markedly altered and reduced as a result of prolonged inundation. Apparently, the "niche-gestalt" (James 1971) of these areas has been impacted to the extent that the habitats extant no longer have the characteristic vegetational requirements found in habitats that are normally selected, or "preferred" by vireos.

The project may also expose the vireo to a variety of other indirect impacts. These include increased pressure from cowbird parasitism events (due to the anticipated decrease in foliage volume), an increased human presence, increased exposure to non-native, noxious plants and animals, and increased exposure to the deleterious effects of noise generated by, among other sources, local aviation operations. Of these potential impacts, however, it seems likely that cowbird parasitism and increased exposure to noise may be the most important.

Project-induced alterations or reductions of occupied and potential vireo habitat may induce higher rates of cowbird parasitism and, perhaps, nest depredation (see, for instance, RECON [1988], Pike and Hays [1992], and the Nature Conservancy [1993]). Because "female cowbirds find nests by watching other birds and by actively searching for nests" (Van Tyne and Berger, 1976: 527), we assume that nest-finding by cowbirds and predators is facilitated in habitats that have reduced foliage volumes and microhabitat diversities.

Cowbirds apparently have been and are particularly abundant and troublesome within the Prado Basin (see Zembal et al. 1985; United States Fish and Wildlife Service 1986; Salata 1987b; Greaves et al. 1988). The relative abundance of cowbirds within the basin may well be the result of the rather close juxtaposition of host-rich riparian habitats and expansive feeding areas in and around nearby dairies, livestock operations, and agricultural fields (see, for instance, Zembal et al. 1985 and Hays 1987).

The local vireo population has been subjected to cowbird parasitism rates ranging from 100% (Zembal et al. 1985) to an observed low of approximately 16% in 1987, the second year of the current management effort (Hays 1987). Despite 7 years of active management, the cowbird parasitism rate was approximately 30% in 1992 (The Nature Conservancy, 1993).

Nevertheless, given the relevant data presented here and elsewhere (Pitelka and Koestner 1942; Mumford 1952; Barlow 1962; Salata 1983, 1984, 1986, 1987a, 1987b; Jones 1985; United States Fish and Wildlife Service 1986), it seems reasonable to conclude that the Prado Basin population of Least Bell's Vireos would have been subjected to much higher rates of cowbird parasitism and suffered greater rates of reproductive failure in 1986 (Hays 1986), 1987 (Hays 1987), 1988 (Hays 1988), 1989 (Hays 1989), 1990 (Hays and Corey 1991), 1991 (Pike and Hays 1992) and 1992 (The Nature Conservancy, 1993) in the absence of a management program. Similarly, without effective avoidance or mitigation measures, the proposed project could induce increases in parasitism (and nest depredation) rates, and, in turn, lowered vireo recruitment.

In any event, because of the apparent degradation of habitats at relatively low elevations, the center or core of the South Basin population of vireos has moved markedly to the east (and decidedly "up" in elevation; see The Nature Conservancy 1993). As a result, comparatively more vireo pairs are now breeding on or near the outer edges of protected habitats and thus are: 1) in areas where efficient management (e.g., cowbird abatement) is not possible, and 2) in closer proximity to helicopter and fixed-wing aircraft operations at the Corona Municipal Airport. Such operations are, of course, inherently noisy (Gunn and Livingston 1974) and are thus thought to be harmful to vireos within the Prado Basin and elsewhere (see, for instance, RECON 1988 and Pike and Hays 1992).

Many birds have such acute senses of hearing (Dooling 1978; Knudsen 1978; Fay and Feng 1983). Researchers have documented and described the negative effects of noise on avian species and wildlife as a whole. For instance, Fletcher et al. (1971) have reported that few if any of the reported or suggested effects of noise on wildlife would benefit them or increase their chances for survival whereas known, detrimental noise effects may decrease their chances for survival or even lead to their death. In the extreme, the apparent effects of noise can be devastating to wildlife populations. Dubois (1980) reported that some bird species that spend the summer in Paris can no longer breed there because of excessive noise.

Upon reviewing the body of relevant scientific research, the Environmental Protection Agency (Dufour 1980) has identified four major categories of noise effects on wildlife: auditory physiological, nonauditory physiological, behavioral, and masking. Although masking (the interference with the reception of auditory signals because of interfering, environmental noise) and behavioral considerations are of primary concern in this instance, it has been stated and documented that "as studies with humans have shown, noise has other deleterious effects (other than masking) and there is no reason to think that noise would not effect animals in the same way" (Dooling 1987). Woolf et al. (1976) have concluded that prenatal auditory stimulation can affect the development (and, therefore, the physiology) of an avian embryo inside an egg.

Clearly, noise can also affect deleterious changes in the behavior of wild birds. For instance, noise-induced behavioral changes in birds can cause significant declines in reproductive output. Gunn and Livingston (1974) reported that a bird population exposed to helicopter disturbances and human activity suffered (in contrast to the control population) lower hatching and fledging success and increased rates of nest abandonment and the premature disappearance of nestlings. Vireos videotaped on the nest during the 1992 breeding season adjacent to the Corona Airport visibly reacted to the overflight of aircraft in the vicinity.

Of the four EPA categories of noise effects on wildlife (Dufour 1980), however, "masking" may be the most detrimental to small perching birds such as the least Bell's vireo. In essence, "excess sound can interfere with the perception of important, relevant auditory signals" (Miller 1974). And, if "noise masks vireo song for the human (at some given distance) then it probably also significantly masks vireo song for the vireo" (Dooling 1987). Dr. Dooling (1987) continued that "the human almost certainly does better than the vireo in hearing a signal in noise around 2-4 kilohertz (probably about twice as good)".

The life of a vireo may well depend upon its detection of an alarm call given by another vireo (or other source) that warns of the approach of potential predator. Whether or not a vireo receives this vital information depends on such noise parameters as environmental attenuation, signal to noise ratios, and discrimination of the receiver given the background noise. Obviously, when an alarm call is masked by environmental noise, an individual vireo or vireos are may be at increased risk. Scherzinger (1979) has observed that background noise may have negative consequences on predator avoidance by hazel grouse and Shen (1983) further observed that a bird's ability to detect vibration may be crucial for sensing approaching predators, particularly if the birds are sleeping.

Given Dr. Dooling's remarks concerning the relative acuities of human and vireo hearing and the aforementioned dependence of the vireo (and many other bird species) on their sense of hearing, it is reasonable to conclude that unabated, "masking" noise could adversely effect any vireo individual pairs or individuals that are forced to relocate from the project area to habitats closer to the Corona Municipal Airport or other noise sources (e.g., roads, railroads, shooting ranges).

In summary, the Service concludes that project-induced habitat destruction and alteration in the project area and environs and related, potential increases in cowbird parasitism, nest depredation, and noise impacts may adversely affect the least Bell's vireo. However, the Service concludes that the proposed activity would not jeopardize the continued existence of the vireo due to the phased implementation of the project and the substantive nature of the compensation measures that have been, and will be employed to mitigate adverse affects.

Cumulative Impacts

Cumulative effects are those impacts of future State and private actions affecting endangered and threatened species that are reasonably certain to occur in the action area. Future federal actions will be subject to the consultation requirements established in section 7 of the Endangered Species Act (Act), and therefore are not considered cumulative to the proposed action.

The majority of activities anticipated to effect this species within the foreseeable future are local projects with no direct federal involvement.

However, the action areas of several proposed Corps, Bureau of Reclamation, Corps of Engineers, and Environmental Protection Agency projects include the current range of the vireo. It is anticipated that these federal agencies will appropriately mitigate unavoidable impacts to the vireo. Formal or informal consultation with each of these agencies has already begun in this regard.

Other projects could result in significant cumulative effects to the species. However, section 9 of the Act prohibits the unlawful take of the vireo. Therefore, the take prohibition has prompted efforts by the SANDAG (San Diego Area of Governments) to draft habitat conservation plans for at least two drainages in San Diego County that presently accommodate the vireo. A preparation of a draft habitat conservation plan for the Santa Ana River/Prado Basin and environs apparently has been abandoned.

The development of habitat conservation plans is a necessary precursor to obtaining Incidental Take Permits that would allow vireos to be taken outside of the reserves established pursuant to the terms and conditions outlined in an acceptable habitat conservation plan and the implementing agreement pertaining thereto. Thus far, the Service has not approved any such habitat conservation plan and has therefore not issued a Incidental Take Permit for the vireo. In the absence of illegal take, no loss of occupied habitat is anticipated unless and until a permit is issued pursuant to section 10(a) of the Act.

It is noteworthy, however, that the destruction of riparian habitat within the action area of the project will likely continue in the foreseeable future. Some of this habitat apparently could be utilized by least Bell's vireo for nesting and foraging. The Service has documented at least 30 instances where clearing or filling of riparian habitat has occurred in coastal Orange and Riverside Counties within the past 10 years. Because much of vireo habitat is within the jurisdiction of EPA and Corps pursuant to Section 404 of the Clean Water Act, it is expected that some of the losses of vireo habitat attributed to permitted or unpermitted Section 404 activities will be mitigated.

The increase of cowbirds throughout the coastal slope of southern California apparently has been the result of the proliferation of suitable cowbird feeding areas (e.g., golf courses, parks, stables, agricultural operations, and dairies). The Service believes that habitat destruction, cowbird parasitism, and indirect impacts resulting from a variety of projects currently limit the distribution and potential expansion of vireos in the region and California as a whole. Although cowbird management efforts are expanding throughout the action area, a much greater effort is necessary to prevent continuing, significant impacts to the vireo and a variety of other sensitive avian species.

<u>Incidental Take</u>

Section 9 of the Endangered Species Act prohibits the take of listed species without special exemption. Taking is fully defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Under the terms of section 7(b)(4) and 7(0)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take statement. The measures described below are non-discretionary, and must be undertaken by the agency and the project applicant or made a binding condition of any grant or permit, as appropriate.

The Service anticipates that twenty-three pairs of least Bell's vireos may be taken during the life of the project (e.g., harmed) as a result of this proposed action. If, during the course of the action, the amount or extent of the incidental take limit is reached, the Corps shall immediately notify the Service in writing. If the incidental take limit is exceeded, the Corps and the Orange County Water District must cease the activity resulting in take and reinitiate consultation with the Service immediately to avoid further violation of section 9 of the Act. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). The Corps and District should provide an explanation of the causes of the taking.

Reasonable and Prudent Measures

The Service believes that the following Reasonable and Prudent Measures are necessary and appropriate to minimize incidental take.

a. The Corps and the Orange County Water District shall phase the implementation of the project and provide replacement habitat.

b. The Corps and the Orange County Water District shall minimize to the extent possible the killing, harming or harassing of vireos or the disturbance of destruction of critical habitat in conjunction with the operation of the Prado Dam and all other project-related activities.

c. The Corps and the Orange County Water District shall obtain all necessary local, state, and federal permits to implement the project or take the vireo or modify the vireo's habitat. In particular, the Corps and the District must comply with the appropriate provisions of the Migratory Bird Treaty Act (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended). The incidental take authorization in this Biological Opinion is summarily revoked in the absence of any or all such permits.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps and the District are responsible for compliance with the following terms and conditions, which implement the reasonable and prudent measures described above.

1. The Corps and the Orange County Water District shall insure that ongoing vireo monitoring and management activities coordinated by the Nature Conservancy are continued at 1991 and 1992 levels for the life of the project.

2. The Corps and the Orange County Water District shall create the following acreages of acceptable vireo habitat and wildlife habitat prior to the initiation of water conservation to the prescribed elevation:

WATER CONSERVATION ELEVATION	REQUIRED ACREAGE OF ACCEPTABLE VIREO HABITAT	REQUIRED ACREAGE OF WILDLIFE HABITAT
495	50	86
496	67	109
497	83	133
498	100	156
499	116	180
500	133	203
501	152	218
502	171	233
503	190	248
504	209	263
505	228	278

Replacement habitat shall be deemed "acceptable" vireo habitat if: 1) the habitat is occupied by a breeding pair of vireos, or 2) the habitat is occupied by breeding southwestern willow flycatchers (*Empidonax traillii extimus*) or yellow-breasted chats (*Icteria virens*), or 3) the habitat is demonstrated, to the satisfaction of the Corps and Service, to be not (statistically) significantly different in terms of structure and composition from vireo-occupied habitat in the Prado Basin as characterized by Zembal et al. (1985) and Zembal (1986), or 4) Corps and Service biologists unanimously agree that the habitat apparently has the appropriate "niche-gestalt" (James 1971) characteristics and is suitable for occupation by breeding pairs of vireos. Suitable wildlife habitat is defined to be undisturbed wetland or riparian habitat (e.g., willow woodland) that is comprised of native habitat elements and serves as viable habitat for native fish and wildlife resources. Because said wetland or riparian habitats may lack one or more of the requisites of vireo habitat, suitable wildlife habitat may or may not qualify as vireo habitat.

3. The Corps and the District shall, upon request provide to the Service, by means of telephone conversations and written communications, daily, weekly, and cumulative data pertaining to the heights of the elevation pool, inflow and outflow rates, and all other measured parameters pertaining to the operation of the Prado Dam. Such information shall be utilized by the Corps and Service to prevent the unnecessary death of

nesting vireos, to prevent the flooding of active nests, and to accurately assess the extent of habitat damage resulting from implementation of the project.

4. To preclude the destruction of vireo habitat prior to the development of appropriate replacement habitat, the Corps shall employ whatever means as necessary to preclude the elevation pool from exceeding the pool elevation prescribed pursuant to the conditions imposed by Term and Condition #2, above. If the pool elevation should exceed the permitted elevation, then the Corps shall release water from the Prado Dam at the maximum safe rate until the elevation of the pool is at least one foot below the elevation permitted otherwise. At that time, and subsequent to an analysis of impacts, the Corps and Service shall unanimously agree on the adjustment of the release rate and the timing of a resumption of water conservation activities.

5. The Corps the Orange County Water Districts shall obtain wildlife conservation easements for habitat mitigation areas and movement corridors within the Basin. No activities shall be permitted in these areas that would indirectly or directly impact the vireo or vireo habitat. These easements and crossings shall be fully identified and described in a document that is approved by the Service, and by the California Department of Fish and Game pursuant, if applicable, to a Streambed Alteration Agreement or Agreements issued by the Department.

6. The Corps and the District shall not attempt to implement the project at any level if such implementation could disperse crude oil, petroleum products, or any other toxic substance or hazardous material into vireo habitats. To this end, the Corps and District shall implement the project, i.e., allow the conservation pool to increase above elevation 490, if and only if: 1) no crude oil, petroleum products, or any other toxic substance or hazardous material is detected at an elevation that would be inundated by the water in the conservation pool, and 2) current oil extraction and petroleum operations in the Prado Basin meet local, State, and Federal, and industry standards, and 3) oil extraction and petroleum operations in the Prado Basin are fully licensed and permitted by the Bureau of Reclamation, and 4) oil operations on Corps-administered lands within the Prado Basin and oil operators thereon are fully licensed and permitted, and 5) pipelines transporting crude oil or petroleum, or petroleum products on Corps-owned lands are fully licensed and permitted by the Corps.

7. As stipulated above, the Corps and the Orange County Water District shall obtain all necessary local, state, and federal permits to implement the project or take the vireo or modify the vireo's habitat. In particular, the Corps and the District must obtain the necessary permits from the California Department of Fish and Game and comply with the appropriate provisions of the appropriate provisions of the Migratory Bird Treaty Act (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended) and the corollary regulation in the Fish and Game Code. The incidental take authorization in this Biological Opinion is summarily revoked in the absence of any or all such permits.

8. The Corps and the District shall execute and implement all mitigation measures suggested, identified or implied in the EIS to avoid or mitigate impacts to the vireo or its habitat.

9. As the Federal Action agency, the Corps is ultimately responsible for the implementation of all preceding Terms and Conditions.

Disposition of Sick, Injured, or Dead Individuals

The Service's Carlsbad Field Office must be notified within three working days should any listed species be found dead or injured in or adjacent to the project area. Notification must include the date, time, and location of the carcass, cause of death or injury, and any other pertinent information. If necessary, the Service will provide a protocol for the handling of dead or injured, listed animals. In the event that the Corps suspects that a species has been taken in contravention of any federal state, or local law, all relevant information shall be reported within 24 hours to the Service's Carlsbad Field Office at (619) 431-9440 or to the Service Division of Law Enforcement, Torrance, California at (213) 297-0062.

Conservation Recommendations

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as Service suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's 7(a)(1) responsibility for these species.

1. The Corps and Service should analyze and consider the goals and progress of proposed Habitat Conservation Plans to insure consistency with Biological Opinions issued in conjunction with Federal projects or projects that are Federally-funded or permitted. This analysis should be extended to an analysis of the success of proposed avoidance and mitigation measures associated with this project and other projects throughout the range of the vireo.

2. The Corps, with the Service and other Federal agencies and working group or recovery team members, should assess the efficacy of various measures for mitigating project-related direct or indirect impacts to vireos and their habitat. In this regard, giant reed eradication (and subsequent planting of treatment areas with vireo habitat elements could effectively increase the amount of available vireo habitat and help prevent the future and continuing degradation of existing habitat.

3. The Corps could implement some or all of the conservation measures recommended by Hays (1989), Hays and Corey (1991), and Pike and Hays (1992). Specifically, the Corps could, by virtue of its status as a

landowner in the basin and a regulatory authority:
a) Restore and protect all habitats consisting of native plant communities and natural, physical features. During the course of the past seven years, habitat within known Least Bell's Vireo home ranges was destroyed or degraded as a result of livestock grazing, off-road vehicle activity, stream diversions, documented, apparently unauthorized dredge and fill operations, incursions of heavy equipment (including bulldozers, mowing machines, and road graders), and vandalism. It is hoped that recent efforts by the Corps Regulatory Branch to stem these activities and to require appropriate mitigation are continued.

b) Control or remove all noxious, non-native plants and animals from riparian habitats. In particular, it strongly recommended that the current cowbird management program be expanded and continued indefinitely to maximize the reproductive success of the Least Bell's Vireo (and many other avian species) and that invasive, exotic plants such as Giant Reed and Castor Bean be eliminated or controlled to the extent possible. Active funding of Team Arundo would accomplish this objective.

c) Restrict human presence and activities in Least Bell's Vireos home ranges and environs. During the course of the present study, it has become increasingly apparent that Least Bell's Vireos often react strongly to the close approach of humans, particularly when nestling or fledgling young are also present. Moreover, the available data (see, for instance, Salata 1987b) suggest that unnecessary human disturbances may jeopardize vireo nesting success. Predators and cowbirds may both be capable of "homing in" on agitated vireos and subsequently destroy nearby nests. In addition, it is quite evident that much of the Prado Basin continues to be used for illegal hunting and recreational shooting. Spent cartridges and the carcasses of animals that had obviously been shot were found throughout most of the Prado Basin in 1986 and, to lesser extents, 1987 and 1988 and 1989. Obviously, even target shooting in or near habitats occupied by vireos places individual birds (or their breeding attempts) in jeopardy. Moreover, it has been reported that the presence of humans at or near cowbird traps appears to compromise the success of trapping efforts. "No Trespassing" signs near occupied vireo habitats near Temescal Creek and the South Basin locale were apparently responsible for a reduction in the foot and vehicular traffic within wetland habitats at those locales in 1990 but further measures to restrict or curtail unauthorized or blatantly illegal human activities (including illegal hunting and the destruction or theft of traps) appear to be in order throughout the Prado Basin and environs. Finally, it has become increasingly apparent that ambient noise, particularly that caused by low-flying helicopters and fixed-wing aircraft involved in "touch and go" exercises at the Corona Municipal Airport on Federal land, potentially poses a threat to the Least Bell's Vireos (and a large number of other species (see previous discussion under the heading of "Analysis of Impacts")

d) Restrict or prohibit the application or dispersion of crude oil, petroleum, petroleum products, herbicides, pesticides, or other noxious substances within the Prado Basin and environs and conduct or fund routine toxicological surveys of the physical and biotic resources therein. During the course of the recent management efforts, it has been observed that several apparently well-incubated Least Bell's Vireo clutches failed to produce a single viable nestling (see, for instance, Hays, 1989). Entire clutches failed to hatch in three cases and all vireo nestling young failed to survive in two other instances during the early part of the 1988 breeding season. In fact, preliminary investigations by Fish and Wildlife Service personnel have resulted in the discovery of abnormalities in invertebrate specimens that were collected within the Prado Basin that often are attributable to toxic levels of various pollutants (see, for instance, Hays and Corey 1991). At least three spills of crude oil, including the most recent and severe during February of 1992, poses obvious problems and has resulted, at an absolute minimum, in the unmitigated destruction of vireo habitat occupied during the 1992 breeding season. Moreover, preliminary data derived from the toxicological testing of specimen, abandoned eggs from the Prado Basin by the Fish and Wildlife Service have revealed the presence of DDE (a metabolite of DDT) in concentrations that could cause egg-shell thinning (Steven Goodbred, personal communication). Thus, it seems reasonably safe to assume that the bioaccumulation of toxic substances caused or, perhaps, contributed to these observed reproductive failures. Because of the potential toxic effects of all herbicides, pesticides, and noxious chemicals that are used and transported in the Prado Basin on Corps-owned lands, their use should be carefully monitored or controlled to the extent possible to minimize their discharge and bioaccumulation within the Basin. If such monitoring or control measures are not possible, then the revocation or modification of activities or leases appears to be in order.

Conclusion

This concludes formal consultation on the Corps/Orange County Water District Water Conservation Project for the Prado Basin. Pursuant to 50 CFR 402.16, reinitiation of formal consultation is required if the action is significantly modified in a manner not discussed above, if new information becomes available on listed species or impacts to listed species, or if the incidental take limit is met or exceeded. We would appreciate notification of your final decision on this matter. Any questions or comments should be directed to Loren Hays of my staff at (619) 431-9440.

Sincerely,

Richard Zembal

for Jeffrey D. Opdycke
Field Supervisor

Attachment

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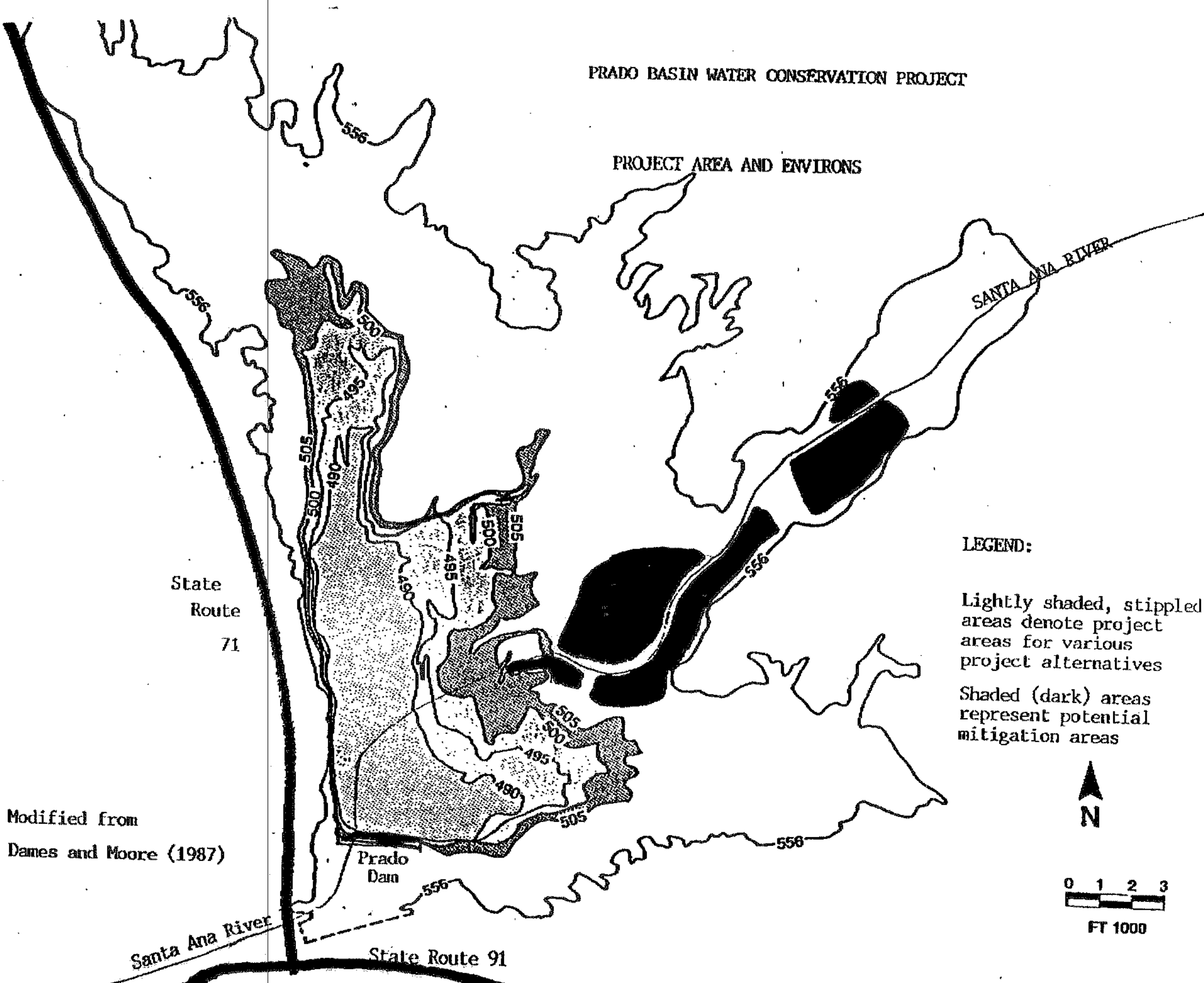
PRADO BASIN WATER CONSERVATION PROJECT

PROJECT AREA AND ENVIRONS



Modified from Dames and Moore (1987)

Appendix M-7

2000: Santiago Creek Recharge Turnout, Negative Declaration

SPC

INITIAL STUDY/NEGATIVE DECLARATION
SANTIAGO CREEK RECHARGE
TURNOUT PROJECT
ORANGE COUNTY, CALIFORNIA

Chambers Group, Inc.

Environmental Services ▪ Biological Resources ▪ Cultural Resources

INITIAL STUDY/NEGATIVE DECLARATION
SANTIAGO CREEK RECHARGE
TURNOUT PROJECT
ORANGE COUNTY, CALIFORNIA

Prepared for:

ORANGE COUNTY WATER DISTRICT
10500 Ellis Avenue
Fountain Valley, California 92708
(714) 378-3200

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

February 2000

NEGATIVE DECLARATION

SANTIAGO CREEK RECHARGE TURNOUT PROJECT

Orange County Water District
10500 Ellis Avenue
Post Office Box 8300
Fountain Valley, CA 92728-8300

FINDING

The Orange County Water District (OCWD) finds that the proposed project would not have a significant adverse effect on the environment. The facts supporting this finding are presented in the attached Environmental Initial Study.

PROJECT PROPONENT

Orange County Water District

PROJECT DESCRIPTION

The proposed project would involve the construction and operation of a turnout from the existing Santiago Pipeline to provide for increased groundwater recharge capabilities in Orange County's groundwater basin. The pipeline turnout would divert up to 15 cubic feet per second (cfs) of water from the existing Santiago Pipeline into Santiago Creek for groundwater recharge. The water would run along the Santiago Creek for approximately two miles, reaching approximately Tustin Avenue, before all water would have percolated into the ground.

Construction of the project would include the placement of rip rap and a concrete splash pad within the Santiago Creek Bed approximately 5 feet north and south of the discharge pipe. The project would also include construction of a small instrument shelter containing a flowmeter console and an electric meter pedestal. The flowmeter would allow OCWD staff to throttle control of the valve regulating the flow of water from the turnout pipe. During operation, OCWD staff would visit the project site approximately once per week for inspection and maintenance.

The project would include implementation of a Groundwater Monitoring Plan during the first two years of project operations in order to evaluate changes in water levels and shallow groundwater quality during recharge operations. The Groundwater Monitoring Plan includes construction of two new groundwater monitoring wells downstream from the proposed pipeline turnout.

PROJECT LOCATION

The project is located on the Santiago Creek bed on OCWD property. The site is located near the Santiago Creek undercrossing at Prospect Street/Collins Avenue. The project site is located approximately 2 miles east of the 55 freeway, north of Prospect Street/Collins Avenue. The project site is in an unincorporated area of Orange County, adjacent to the cities of Villa Park and Orange.

conveys water from the Santa Ana River via the Burris Pit Pump Station as part of the OCWD's Santiago Creek Replenishment Project, the goal of which is to increase OCWD groundwater recharge capabilities. Santa Ana River water is conveyed via the Santiago Pipeline to the Santiago Pits located near Prospect Street/Collins Avenue and Santiago Creek in Orange County. The Santiago Pits are currently used for water recharge. Figure 1 shows the project location.

The proposed project would involve the construction of a pipeline turnout, which would divert water from the Santiago Pipeline into Santiago Creek. Using the proposed turnout, OCWD would divert up to 15 cubic feet per second (cfs) of river water into Santiago Creek for groundwater recharge. The water would run along the Santiago Creek to approximately Tustin Avenue (approximately 2 miles) before all water would have percolated into the ground.

The turnout would consist of a 42-inch diameter tee and pipeline from the existing Santiago Pipeline, concrete encased, with rip rap splash pad and slope protection at the creek bank, and a small instrument shelter located on the bank of the creek. The project would be approximately 62 feet in length from the Santiago Pipeline to the end of the splash pad. Figure 2, Project Detail, shows the components of the project. Figure 3 contains site photographs.

The turnout would be constructed by cutting and removing a section of the existing 66-inch diameter Santiago Pipeline and installing a reducing tee to divert water to the creek. Pipe and fittings would be cement-mortar lined and coated steel. A flanged butterfly valve with electric motor operation would be installed immediately downstream of the tee. A flowmeter would be installed downstream of the control valve inside the pipe. A flap gate would be installed on the discharge pipe to prevent animal access, accumulating debris, and creek flow from entering the pipe.

The project would include a small instrument shelter. The shelter would be located approximately 20 feet south of the turnout, on the east bank of the creek. The shelter would measure approximately 5x5x8 feet and would be located on a 7x7-foot concrete pad. The instrument shelter would contain a flowmeter console and an electric meter pedestal. Control for the butterfly valve would be manual with electric motor operators. The flowmeter would allow OCWD staff to throttle control of the valve. The electric motors for control of the butterfly valves would be located in a small underground vault near the instrument shelter. Motors would run infrequently as needed during valve adjustment. During operation, OCWD staff would visit the project approximately once per week for inspection and maintenance. Most inspection and maintenance activities would take place at the instrument shelter.

Construction would place rip rap within the Santiago Creek bed out approximately 5 feet to the north and south of the concrete encased discharge pipe, and approximately 20 feet west of the discharge pipe. The construction area of impact would extend approximately 50 feet north and south of the discharge pipe and approximately 25 feet west of the centerline of the creek, for movement of equipment. Construction staging and storage would take place on the OCWD property adjacent to the Santiago Creek eastern bank, near Prospect Street/Collins Avenue. Construction is estimated to take two months.

It may not be necessary to operate the project 365 days per year, based on hydrologic and other conditions. Therefore, during operation, the project may be shut down periodically.

A Groundwater Monitoring Plan will be implemented during the first two years of recharge operations. The objectives of the Groundwater Monitoring Plan are to evaluate changes in water levels and shallow groundwater quality during recharge within the creek bed. The Plan will involve measuring water levels and water quality in a series of existing and future monitoring wells along Santiago Creek. Two new monitoring wells (SCS-9 and SCS-10 as noted in the Groundwater Monitoring Plan) are proposed to be constructed along the easternmost boundary of the former Yorba landfill as part of the Groundwater Monitoring Plan. The purpose of these wells is to provide water level and water quality data on the potentially downgradient side of the former landfill, away from Santiago Creek. Nearly all the existing monitoring wells to be used in the Groundwater

ENVIRONMENTAL CHECKLIST

1. Project Title:

Santiago Creek Recharge Turnout

2. Lead Agency Name and Address:

Orange County Water District
10500 Ellis Avenue
Post Office Box 8300
Fountain Valley, CA 92728-8300

3. Contact Person and Phone Number:

Mr. Douglas K. Biglen, P.E., Senior Engineer
Orange County Water District
(714) 378-3307

4. Project Location:

The project is located on the Santiago Creek bed on Orange County Water District property. The site is located near the Santiago Creek undercrossing at Prospect Street/Collins Avenue. The project site is approximately 2 miles east of the 55 freeway, north of Prospect Street/Collins Avenue. The project is in the jurisdiction of the County of Orange.

5. Project Sponsor's Name and Address:

Orange County Water District
10500 Ellis Avenue
Post Office Box 8300
Fountain Valley, CA 92728-8300

6. General Plan Designation:

The project site is designated for "open space" under the County of Orange General Plan.

7. Zoning:

The project site is zoned as Sand and Gravel and Flood Plain Zone.

8. Description of Project:

The proposed project would involve the construction and operation of a turnout from the existing Santiago Pipeline to provide for increased groundwater recharge capabilities in Orange County's groundwater basin. The proposed pipeline turnout would be constructed along a portion of the Orange County Water District's (OCWD) existing Santiago Pipeline. The Santiago Pipeline conveys water from the Santa Ana River via the Burris Pit Pump Station as part of the OCWD's Santiago Creek Replenishment Project, the goal of which is to increase OCWD groundwater recharge capabilities. Santa Ana River water is conveyed via the Santiago Pipeline to the Santiago Pits located near Prospect Street/Collins Avenue and Santiago Creek in Orange County. The Santiago Pits are currently used for water recharge. Figure 1 shows the project location.

The proposed project would involve the construction of a pipeline turnout, which would divert water from the Santiago Pipeline into Santiago Creek. Using the proposed turnout, OCWD would divert up to 15 cubic feet per second (cfs) of river water into Santiago Creek for groundwater recharge. The water would run along the Santiago Creek to approximately Tustin Avenue (approximately 2 miles) before all water would have percolated into the ground.

The turnout would consist of a 42-inch diameter tee and pipeline from the existing Santiago Pipeline, concrete encased, with rip rap splash pad and slope protection at the creek bank, and a small instrument shelter located on the bank of the creek. The project would be approximately 62 feet in length from the Santiago Pipeline to the end of the splash pad. Figure 2, Project Detail, shows the components of the project. Figure 3 contains site photographs.

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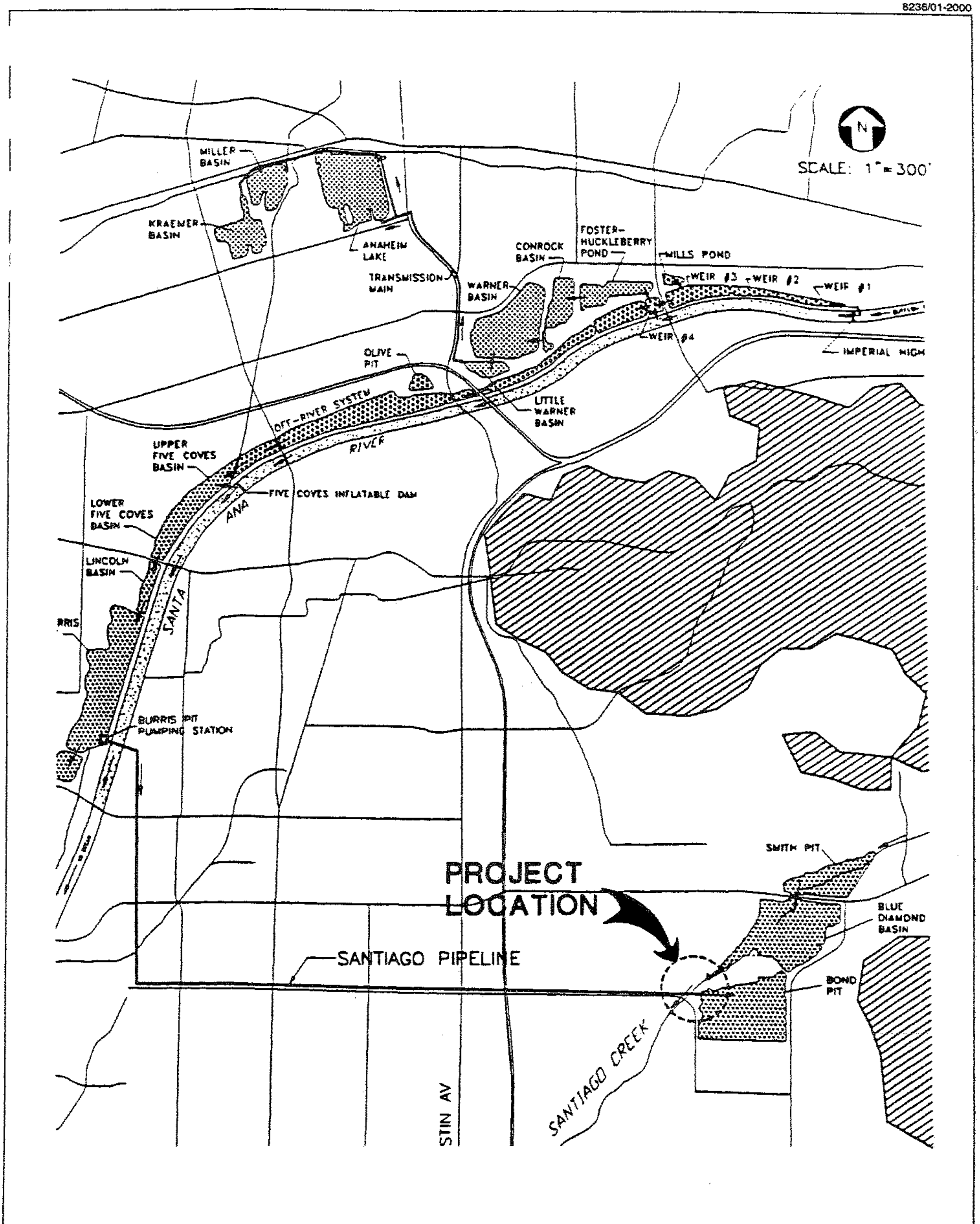

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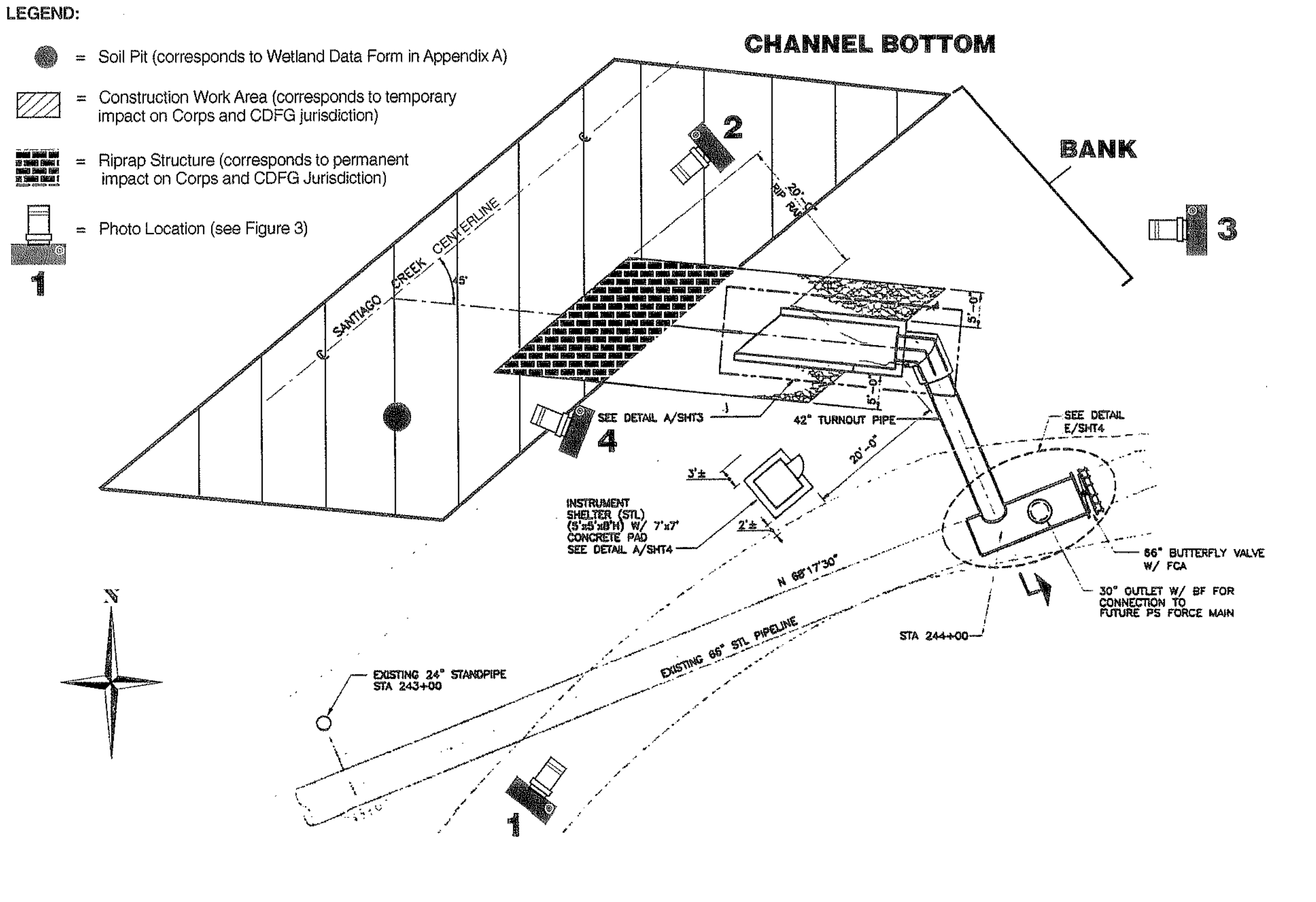
Scale: 1" = 300'

Source: CATHCART • GARCIA • VON LANGEN ENGINEERS

PROJECT LOCATION MAP
Figure 1

8236/12-99



Chambers Group

Scale: 1" = 20'

PROJECT DETAIL
Figure 2

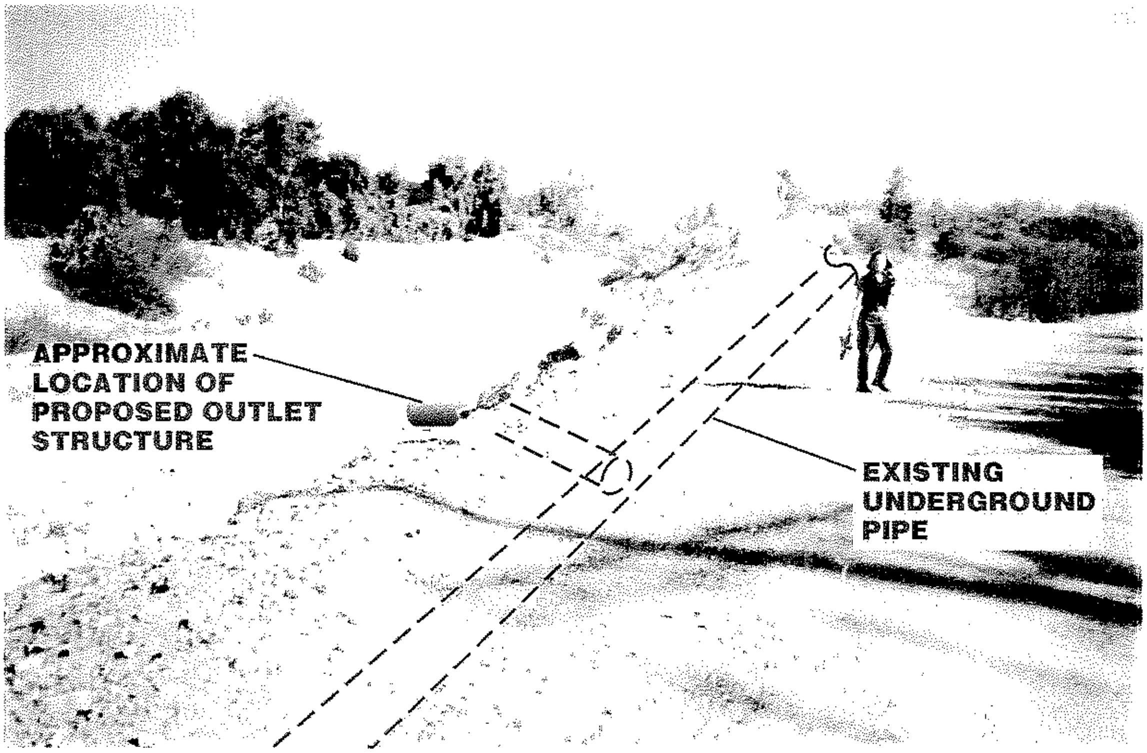


Photo 1. View of Santiago Creek and south bank. Note the approximate location of the proposed outlet structure.

Photo 2. View of the project site located within Santiago Creek. Note the lack of riparian vegetation and the cobble substrate located on the bed of the channel.

8236/11-99

Photo 3. View of the approximate locations of the proposed riprap structure (red pattern) and construction area (blue pattern). The area depicted in red corresponds to permanent impacts and the area depicted in blue corresponds to temporary impacts.

Photo 4. View of channel bed/OHWM at the location of the proposed riprap implacement. Note the few scattered dead mule fat saplings (blue arrows) and the one live mule fat sapling (red arrow).

Chambers Group

SITE PHOTOGRAPHS
Figure 3

Monitoring Plan are located immediately adjacent to the creek. The two new groundwater monitoring wells are proposed to be installed at Yorba Park, located immediately south of Chapman Avenue, east of the 55 freeway, and west of Yorba Street in the City of Orange.

Borings for the proposed new wells would be drilled at a depth of approximately 150 feet below ground surface (bgs) and will be accomplished using hollow-stem augers or a "dual-wall" percussion or rotary casing advancement drilling method. The boreholes will be located outside the estimated areas of buried refuse. The new monitoring wells will be construction of four-inch diameter schedule 40 PVC blank and slotted casing. For additional information on the construction of the new monitoring wells, please refer to Appendix C.

9. Surrounding Land Uses and Setting:

The project is located within an unincorporated portion of Orange County immediately southeast of the City of Villa Park and northeast of the City of Orange. The existing pipeline is set adjacent to a low density residential area within fenced OCWD property. The OCWD property includes the Santiago Pits which are east of the project site, and the Santiago Creek which runs north and south of the project site. Approximately 300 feet south of the project site, the creek crosses under Prospect Street/Collins Avenue. The closest sensitive uses to the project site are the residential homes located in Villa Park along Fernando Circle at a distance of approximately 50 feet north of the construction area.

The two new groundwater monitoring wells are proposed to be located at Yorba Park. The park is located immediately east of the 55 Freeway and south of Chapman Avenue. The area to the north of the park is commercial and includes the St. Joseph Heritage Medical Group and Chapman Medical Center. Commercial retail land uses are located to the immediate east of the Park across Yorba Street fronting on Chapman Avenue. A single family residential area is also located north of Chapman west of Santiago Creek. An apartment lies directly east of the southernmost proposed well across Yorba Street. Single family dwellings also lie across Yorba Street to the southeast of the southernmost well site. An adult education center and child development center are located adjacent to the southern perimeter of the park southwest of the well sites.

10. Other public agencies whose approval is required:

- U.S. Army Corps of Engineers, Nationwide Permit under Section 404 of the Clean Water Act.
- Regional Water Quality Control Board (RWQCB), Santa Ana, Water Quality Certification or Waiver under Section 401 of the Clean Water Act.
- California Department of Fish and Game (CDFG), Streambed Alteration (1601) Agreement.
- The proposed project may be subject to a Flood Control Permit from the County of Orange.

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Hazards/Hazardous Materials	☐ Public Services
☐ Agriculture Resources	☐ Hydrology/Water Quality	☐ Recreation
☐ Air Quality	☐ Land Use and Planning	☐ Transportation/Circulation
☐ Biological Resources	☐ Mineral Resources	☐ Utilities and Service Systems
☐ Cultural Resources	☐ Noise	☐ Mandatory Findings of Significance
☐ Geology and Soils	☐ Population and Housing	

Determination

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. ☑

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared. ☐

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. ☐

I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed. ☐

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. ☐

D. Bigl
Signature

2/1/00
Date

Douglas K. Bigler
Printed Name

Orange County Water District
For

I. AESTHETICS

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Would the project have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑

No scenic vistas in the project area would be affected.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☑

The project would be constructed on the dry Santiago Creek bed, which is nearly clear of vegetation. The surrounding areas are designated as Open Space by the County of Orange. There is no development within the Santiago Creek bed. The creek is surrounded by residential development and open space. Construction of the project would place rip rap within the Santiago Creek bed out approximately five feet to the north and south of the concrete encased discharge pipe, and approximately 20 feet west of the discharge pipe. The project would include a small instrument shelter, which would be located approximately 20 feet south of the turnout, on the east bank of the creek.

There are no designated scenic viewsheds or scenic resources in the vicinity of the project. The project site is not visible from a state scenic highway. There are no scenic resources on the site or within the surrounding area. No impacts would result.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☑	☐

Rip rap and the instrument shelter would be visible from Prospect Street/Collins Avenue and surrounding land uses, however, these would not substantially degrade the visual character of the creek.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☑

No new sources of light or glare are associated with the project.

II. AGRICULTURE RESOURCES

The project site is designated as Open Space. The site is not currently in agricultural use, nor has it been used for agriculture in the past. The site is not located on Prime Farmland (County of Orange, 1984) nor is it under Williamson Act contract. There are no local policies for agricultural resources which apply to the project site.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑

The project site is not designated as Prime Farmland, Unique Farmland or Farmland of Statewide Importance, therefore, the proposed use would not convert such farmland to non-agricultural use.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑

The project site is not zoned for agricultural use. The proposed area is designated as Open Space and is not under a Williamson Act contract. Therefore, the project would not result in a conflict with an agricultural or a Williamson Act contract zoning designation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
c) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☑

This project would install a turnout pipe to the existing Santiago Pipeline. The construction would not result in growth-inducing effects or other offsite changes to the environment, which would result in the conversion of Farmland to non-agricultural use.

III. AIR QUALITY

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Would the project conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑	☐

The project consists of the construction and operation of a 62-foot-long diversion pipeline. Additionally, two groundwater monitoring wells would be constructed south of Chapman Avenue and west of Yorba Street. Other than construction, no emissions are associated with the project. Well monitoring would be conducted twice per year and would require a technician come to the site and obtain water samples. The emissions associated with these two trips per year would be inconsequential. As such, the project does not conflict with or obstruct implementation of the Air Quality Management Plan.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☑	☐

As noted above, the project consists of the construction and operation of a new diversion pipeline and two monitoring wells. Air pollutant emissions would be produced during pipeline construction. The potential for short-term construction impacts is based on the construction effort and its ability to create both gaseous and dust emissions.

Pipeline construction would require both heavy equipment and materials deliveries and their actions would produce combustion pollutants and fugitive dust along any chosen route during project construction. Owing to the relatively small size of the project (i.e., approximately 62 feet of pipeline), for purposes of this analysis, it is anticipated that as many as five pieces of heavy equipment could be used on a daily basis during the construction effort. Based upon the anticipated use, daily emissions were calculated for this equipment mix and are presented in Appendix A.

Well construction would require the use of a single truck-mounted drill rig and one truck to bring in the well materials and remove any soil displaced during the drilling operations. Drilling for the two wells could be accomplished in 2 to 3 days. The emissions associated with the use of this single piece of construction equipment would generate less emissions than the pipeline installation and its attendant emissions would be greatly reduced from that indicated for pipeline installation. As such, these emissions would not exceed the daily threshold values and would not create significant impacts. Furthermore, the area of disturbance would be extremely minor as the actual bore hole would only be about 1 foot in diameter and any dust emissions would be inconsequential.

Construction employee travel would generate mobile emissions due to the use of vehicles. It is estimated that as many as 15 workers would travel to the job site on a daily basis. Additionally, the Air Quality Analysis presented in Appendix A includes the use of five trucks on a daily basis for removal of any cut material and delivery of construction materials. Automobile and truck emissions discussed in Appendix A are projected from a year 2000 model run of the BURDEN7G emissions model distributed by the CARB.

The operation of the pipeline would not generate stationary source emissions. Water which will flow through the pipe will be diverted from an existing pipeline and any emissions associated with pumping this water are very minor and already being produced. Furthermore, the groundwater monitoring well produces no emissions. A technician would visit the site twice a year to obtain water samples. The emissions associated with the vehicle trips to obtain these samples is then inconsequential and the project will not produce significant long-term emissions. As such, the project will not produce nor contribute to any localized CO concentrations at proximate intersection locations.

As shown in Appendix A, all emissions are well within the daily threshold values suggested by the SCAQMD for the determination of significance. Additionally, because the project is relatively small, the construction period is expected to last about 2 months, and SCAQMD quarterly thresholds would not be exceeded.

c)	Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☑	☐

The project does not result in significant quantities of construction emissions nor does it generate long-term emissions. In accordance with SCAQMD methodology, any project which does not result in significant air quality emissions, or can be mitigated to emissions levels that are less significant, does not add to a cumulative air quality impact.

d)	Would the project expose sensitive receptors to substantial pollutant concentrations?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☑	☐

As noted above, criteria pollutants would be less than significant. Additionally, the project would not contribute to any localized CO concentrations. As such, the project would not expose sensitive receptors to substantial pollutant concentrations.

e)	Would the project create objectionable odors affecting a substantial number of people?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☑	☐

Odors are one of the most obvious forms of air pollution to the general public. Odors can present significant problems for both the source and the surrounding community. Although offensive odors seldom cause physical harm, they can cause agitation, anger, and concern to the general public. Most people determine an odor to be offensive (objectionable) if it is sensed longer than the duration of human breath; typically 2 to 5 seconds.

The only potential odors associated with the project are from the occasional "whiff" of diesel associated with the heavy equipment involved in the construction effort. These odors, if perceptible, are common in the environment and would be of very limited duration. As such, any odor impacts would not be considered as significant.

IV. BIOLOGICAL RESOURCES

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a)	Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑

The project is located on the dry Santiago Creek Bed and contains a minimal number of scattered mule fat (*Baccharis salicifolia*) saplings. The site does not serve as a habitat for any native or migratory fish or wildlife species. No other vegetation is present in the proposed site area.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b)	Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑	☐

Santiago Creek at the location of the proposed recharge turnout is an ephemeral stream that contains a dry creek bed with a cobble substrate. The creek appears to have been modified to function as an urbanized channel (note the apparently human modified bed and banks on Figure 3, Photos 1 through 4). Impacts on California Department of Fish and Game (CDFG) jurisdiction associated with the Santiago Creek Recharge Turnout Project total approximately 0.12 acre. Of the 0.12 acre of CDFG jurisdiction, less than 0.01 acre consists of riparian species. Approximately 25 dead mule fat (*Baccharis salicifolia*) saplings and one live mule fat sapling are located within the proposed area of temporary and permanent disturbance. Permanent disturbance associated with the installation of rip rap structure would affect approximately 0.02 acre of CDFG jurisdiction. Temporary disturbance associated with the construction of the rip rap structure would affect approximately 0.10 acre of CDFG jurisdiction. Total impacts on CDFG jurisdiction (i.e., both temporary and permanent) are 0.12 acre, of which less than 0.01 acre consist of riparian species (i.e., mule fat). Impacts are considered less than significant.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
c)	Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☑	☐

Total impacts on Corps jurisdiction associated with the Santiago Creek Recharge Turnout Project total approximately 0.24 acre of waters of the United States, none of which are wetlands. Permanent disturbance associated with the installation of rip rap structure would affect approximately 0.02 acre of Corps jurisdiction. Temporary disturbance associated with the construction of the rip rap structure would affect approximately 0.10 acre of Corps jurisdiction. Impacts are considered less than significant.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

Santiago Creek at the location of the proposed project is an ephemeral stream (i.e., it only contains water during storm events) and the bottom of the channel supports very sparse mule fat (*Baccharis salicifolia*) saplings, most of which were dead on the day of the site visit (November 12, 1999). Therefore, this project would not interfere with migratory fish or wildlife species or established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The project location does not contain biological habitat that is protected by local policies or ordinances. Construction would not result in a conflict with any local policies protecting biological resources.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The construction would not conflict with any provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

V. CULTURAL RESOURCES

A cultural resources records search and literature review were performed for the Santiago Creek Recharge Turnout Project near Villa Park, Orange County, California. The records search and literature review were performed in order to identify any cultural resources potentially eligible for the California Register of Historic Resources that might be affected by the project. A field survey was not performed because the project site was previously graded. The Cultural Resources Report is included herein as Appendix B.

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

No historic archaeological sites have been recorded on or within one mile of the project site. No historic resources are listed on the California State Historic Resources Inventory, the National Register of Historic Places, the California Historical Landmarks, nor the California Points of Historical interest. Eight surveys or other investigations for cultural resources have taken place within one mile of the project area. Four of the previous investigations included the project area.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The records searches show that no prehistoric archaeological sites have been recorded in the project area. One prehistoric site, CA-ORA-89, has been recorded within one mile of the project area. This site was located along the banks of Santiago Creek and consisted of ground stone tools and hammerstones noted during plowing of a citrus orchard. The site was destroyed by development and no longer exists. No archaeological resources that are potentially eligible for the California Register of Historic Resources are present on the property.

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The proposed project was formerly used for mining of sand and gravel and does not contain unique paleontological resources.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

No formal cemetery is located on the property. Although prehistoric human remains are often interred outside of formal cemeteries, they are usually only found in villages and residential bases. Because there is no evidence of an archaeological site on the project site, no impacts on human remains are expected to occur. If suspected human remains are encountered, construction would cease until the proper officials are notified and the project has been cleared to resume construction in the area.

VI. GEOLOGY AND SOILS

Like most regions that border the Pacific Ocean, Orange County is subject to potentially destructive earthquakes. Currently, there are two existing faults that run along the coastal and inland edges of the County (County of Orange 1987), the Newport-Inglewood Fault, and the Whittier Fault. These two faults, however, are not proximate to the proposed site.

The project site is a relatively flat area. It is very unlikely for a landslide to occur.

b) Would the project result in substantial soil erosion or the loss of topsoil?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☑	☐

The site would require a moderate amount of site preparation, which could expose soil to erosion during construction. The proposed use would discharge water into Santiago Creek. The project would utilize rip rap for bank stabilization and would not result in substantial soil erosion or the loss of topsoil in nearby areas. No significant impacts would result.

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The site is not located near any known faults or unstable geologic units. The preparation of the site for construction would not result in onsite or offsite landslides, lateral spreading, liquefaction, or collapse.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The site is not located in an area known for expansive soils.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The proposed turnout would not require water or sewer service, septic tanks, or alternative waste water disposal.

The project site is a relatively flat area. It is very unlikely for a landslide to occur.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b)	Would the project result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐

The site would require a moderate amount of site preparation, which could expose soil to erosion during construction. The proposed use would discharge water into Santiago Creek. The project would utilize rip rap for bank stabilization and would not result in substantial soil erosion or the loss of topsoil in nearby areas. No significant impacts would result.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
c)	Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☑

The site is not located near any known faults or unstable geologic units. The preparation of the site for construction would not result in onsite or offsite landslides, lateral spreading, liquefaction, or collapse.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
d)	Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☑

The site is not located in an area known for expansive soils.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
e)	Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☑

The proposed turnout would not require water or sewer service, septic tanks, or alternative waste water disposal.

VII. HAZARDS AND HAZARDOUS MATERIALS

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☑	☐

Some hazardous materials, such as diesel fuel, would be used at the site during construction. The transport of hazardous materials is regulated by the State and the transport of such materials to the site would be in compliance with all State regulations. These materials would only be present during construction and would be removed upon completion of the project. During construction, the OCWD (or its contractor) will have a Stormwater Pollution Prevention Program (SWPPP) in place which specifies spill prevention and management practices. With prevention and management programs in place, impacts from construction-related spills of hazardous materials are considered less than significant.

During operation, the proposed project would not transport, handle, or use hazardous materials. No significant impacts from the routine transport, use, or disposal of hazardous materials are anticipated.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☑	☐

Some hazardous materials, such as diesel fuel, would be used at the recharge turnout site during construction. These materials would only be present during construction and would be removed upon completion of the project. During construction, OCWD (or its contractor) will have a Stormwater Pollution Prevention Program (SWPPP) in place which specifies spill prevention and management practices. With prevention and management programs in place, impacts from construction-related spills of hazardous materials are considered less than significant. During operation, the proposed project would not transport, handle, or use hazardous materials.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

No existing schools are located within one-quarter mile of the site of the recharge turnout. The new monitoring wells would be located within one-quarter mile of a school. The project would not transport, handle, or use hazardous materials.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The site not on a list of known hazardous materials sites.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The site is not located within an airport land use plan, or within two miles of a public or private airport.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The site is not located within the vicinity of a private airstrip.

g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

Project activity would not alter emergency response or emergency evacuation routes. Roadways would not be blocked during construction or operation.

h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

There are no wildlands near the project location. The construction of this project would not expose people or structures to a significant risk of loss, injury or death from wildland fires.

VIII. HYDROLOGY AND WATER QUALITY

Santiago Creek, at the location of the proposed recharge turnout project, is an ephemeral stream that contains a dry creek bed with a cobble substrate. This creek appears to have been modified to function as an urbanized channel (note the apparently human modified bed and banks on Figure 3, Photos 1 through 4).

The proposed project would involve the construction of a turnout which would divert Santa Ana River water from the existing Santiago Pipeline into Santiago Creek. Using the proposed turnout, OCWD would divert up to 15 cubic feet per second (cfs) of river water into Santiago Creek for groundwater recharge. The water would run along the Santiago Creek bed and percolate into the ground as it flows. It is anticipated that the 15 cfs flow would reach approximately the intersection of Santiago Creek and Tustin Avenue (approximately 2 miles) before all water would have percolated into the ground.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a) Would the project violate any water quality standards or waste discharge requirements?	☐	☐	☑	☐

Changes in groundwater quality may occur in the vicinity of Santiago Creek due to: (1) introduction of recharge water of differing chemistry than ambient groundwater quality; and (2) "flushing" of chemical constituents from the vadose zone beneath the recharge area. The former condition would be considered a long-term change, depending on future chemistry of the recharge water, and the latter condition would be considered a short-term change that would be expected to subside in a matter of weeks or months. In either case, the changes in water quality are expected to be minor and would not violate any water quality standards or discharge requirements.

OCWD evaluated the feasibility of expanding its groundwater basin replenishment capacity by implementing the Santiago Creek Recharge Pilot Project (SCRPP) in 1998, located downstream of the proposed project. This SCRPP was virtually identical to the proposed project except that the pilot program was a temporary project (6 months) established for the expressed purpose of evaluating a permanent groundwater basin replenishment program. This pilot program evaluated, in part, changes in water chemistry that may affect drinking water. As indicated by data collected during the SCRPP, general chemistry changes were noted in two shallow monitoring wells upon the "arrival" of recharge water from Santiago Creek. These changes consisted of a 25 to 50 mg/l increase in chloride concentrations and a 125 to 150 mg/l decrease in bicarbonate concentrations over a 2-month period. Final concentrations of all general chemistry constituents were well within drinking water standards, so no adverse effect was found. All other chemical constituents, including volatile organic compounds and nitrates, were found to remain stable or decrease in concentrations during the duration of the SCRPP.

The potential for short-term flushing of chemicals from the vadose zone has been observed at large-scale recharge projects where large quantities of recharge water were introduced into an area where groundwater levels were typically lower. The rising water table and/or downward movement of recharge water through the vadose zone was found to coincide with increased nitrate concentrations at two production wells down gradient from OCWD's Santiago recharge basins in 1992. These basins went into operation in 1990, and for a 3- to 4-year period, the down gradient wells approached or exceeded drinking water standards for nitrates. However, because historical data indicated that these wells had exceeded the nitrate drinking water standard prior to the Santiago basins going into operation, the impact of OCWD's recharge operations on water quality at these wells was not conclusive. Nevertheless, after approximately 4 years of initiating recharge at the Santiago basins, the nitrates in these wells subsided below the drinking water standard and have been decreasing ever since. Nitrates are now half of the drinking water standard of 10 mg/l.

Because there is no ongoing source of nitrates (e.g., large-scale agricultural fertilizer application), no long-term water quality impact is expected from recharging water through the vadose zone. Furthermore, because no initial increase in nitrates was found during the 6 months of recharging during the SCRPP, the chances of having a short-term increase in nitrates is considered small.

The *Santiago Creek Recharge Pilot Project Groundwater Monitoring Well Installation and Recharge Test Report* (OCWD 1999) investigated the potential interaction between the recharge water and the former La Veta and Yorba Landfills adjacent to the creek. The report concluded that recharging water along Santiago Creek upstream of Hart Park at rates of up to 15 cfs does not cause saturated conditions within the areas of refuse in the former landfills. The report also concluded that groundwater quality degradation does not occur as a result of recharge at rates of up to 15 cfs along Santiago Creek. As a precautionary measure, OCWD has developed a groundwater Monitoring Plan for the Santiago Creek Recharge Project. Appendix C contains the proposed Groundwater Monitoring Plan. If it is determined that recharge operations are causing contaminants to migrate into the groundwater, operation of the Project would cease.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☑

The purpose of the project is to increase the amount of water available to the growing population of Orange County through groundwater recharge. The project would enhance groundwater supplies through groundwater recharge.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
c) Would the project substantially after the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite?	☐	☐	☑	☐

No changes to the pattern of drainage would occur, however, during construction activities there is potential for soil erosion. After construction, the discharge would follow the natural course of the creek and would not result in substantial erosion or siltation onsite or offsite.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?	☐	☐	☑	☐

The proposed project would involve the construction of a turnout which would divert Santa Ana River water from the existing Santiago Pipeline into Santiago Creek. Using the proposed turnout, OCWD would divert up to 15 cubic feet per second (cfs) of river water into Santiago Creek for groundwater recharge. The water would run along the Santiago Creek bed and percolate to the ground as it flows. It is anticipated that the 15 cfs flow would reach approximately the intersection of Santiago Creek and Tustin Avenue (approximately 2 miles) before all water would have percolated into the ground. The discharge would follow the natural course of the creek and would not result in flooding on- or offsite. During periods of high storm flow, the project could be shut down to help control downstream flow.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☑

The discharge of water to Santiago Creek would follow the natural course of the creek and would not result in polluted runoff and would not affect existing stormwater drainage systems.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
f) Would the project otherwise substantially degrade water quality?	☐	☐	☑	☐

The purpose of the project is to increase the amount of water available to the growing population of Orange County through groundwater recharge. Water would come from the Santa Ana River via the existing Santiago Pipeline and would not be contaminated. Changes in groundwater quality may occur in the vicinity of Santiago Creek due to: (1) introduction of recharge water of differing chemistry than ambient groundwater quality; and (2) "flushing" of chemical constituents from the vadose zone beneath the recharge area. The former condition would be considered a long-term change, depending on future chemistry of the recharge water, and the latter condition would be considered a short-term change that would be expected to subside in a matter of weeks or months. In either case, the changes in water quality are expected to be minor and would not substantially degrade water quality. Please refer to response "a," above, for further information.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
g) Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑

No housing would be developed on the project site.

h) Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

No structures would be built in the creek which would impede or redirect flood flows.

i) Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

Hart Park is located approximately 2 miles downstream from the proposed project. At Hart Park, the Santiago Creek bed is used for parking. The proposed 15 cfs flow from the project would run within Santiago Creek to approximately Tustin Avenue before all water would have percolated into the ground. It is not anticipated that the flow would reach Hart Park and would therefore not flow through or flood the existing parking facilities currently within the creek bed. Thus, no exposure of people or structures to flooding is anticipated.

The diversion of water (up to 15 cfs) from the Santa Ana River would not result in the flooding of the creek. The project would not expose people or structures to a risk of loss from flooding. During periods of high storm flow, the project could be shut down.

j) Would the project inundation by seiche, tsunami, or mudflow?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The project would not expose people or structures to inundation by seiche, tsunami, or mudflow.

IX. LAND USE AND PLANNING

The County of Orange General Plan land use designation for the site is Open Space. Open Space is defined as areas of having ecological, cultural, historical, and recreational significance. The site and surrounding properties are zoned Sand and Gravel and Flood Plain Zone.

a) Would the project physically divide an established community?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The project site is designated as Open Space. There are established communities near the project site. However, the project would not divide the established communities as no land use modification would result.

b) Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The project site is located on OCWD property. The property is located within the Sand and Gravel and Flood Plain Zones as designated by the County of Orange. The proposed use would comply with the existing land use plan. The project may be subject to a Flood Control Permit from the County, required for projects in the flood plain zone.

Two new groundwater monitoring wells would be installed as part of the project's Groundwater Monitoring Plan. The wells are proposed to be located at Yorba Park, south of Chapman Avenue and west of Yorba Street in the City of Orange, on City-owned property. OCWD would obtain an encroachment permit and a well construction permit from the City of Orange prior to construction of the wells. The wells would not conflict with any applicable land use plan, policy, or regulation.

c) Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The Orange County General Plan designates the project site as Open Space. The project site is not within any Habitat Conservation Plan or Natural Community Conservation Plan area (County of Orange 1984). Therefore, the project would not result in a conflict with any conservation plans.

X. MINERAL RESOURCES

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The project is not located in an area of known mineral resources, therefore, no impacts on mineral resources of value to the region or the residents of the state are anticipated.

b)	Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☐	☑

The site is not designated as having locally important mineral resources, therefore, no impacts on locally important mineral resources would result.

XI. NOISE

The project consists of the construction and operation of a 62-foot long diversion pipeline to be attached to the existing Santiago Pipeline near the Santiago Pits. At completion, the instrument shelter would be visited once per week for maintenance activities.

The pipeline is set adjacent to a low density residential area. Vacant land lies adjacent to the project site on all sides. The closest sensitive uses to the project site are the residential homes located in Villa Park along Fernando Circle. The nearest home is located at a distance of approximately 250 feet from the terminus of the turnout pipe (this measurement is to the residential building, not the residential property line).

Additionally, two groundwater monitoring wells would be constructed at Yorba Park located south of Chapman Avenue, east of the 55 Freeway, and west of Yorba Street in the City of Orange.

The proposed project site is located within the County of Orange and thus is subject to the General Plan and Noise Ordinance incorporated therein. Because noise from project construction could also impact on the cities of Villa Park and Orange, their applicable ordinances are discussed in Appendix D.

a)	Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☑	☐

Generation of noise associated with the proposed project could occur over the short-term for construction activities to implement the proposed project. Upon the completion of construction, no noise is associated with the operation of the buried pipeline or the two monitoring wells. As such, the project would not result in the long-term violation of either the County nor City standards. Short-term noise impacts are addressed under checklist heading "d," below.

b)	Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☑	☐

Excessive groundborne vibration is typically caused by activities such as blasting used in mining operations, or the use of pile drivers during construction. The project would not require any blasting activities and any earth movement associated with project construction would be minimal and would not require any pile driving. No significant impacts would result from the proposed project.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☑	☐

See a) above.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☑	☐

A temporary increase in noise would occur during project construction. Noise levels associated with construction activities would be higher than the ambient noise levels in the project area today, but would subside once construction of the proposed project is completed.

Two types of noise impacts could occur during the construction phase. First, the transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Even though there could be a relatively high single event noise exposure potential with passing trucks, the increase in noise would be less than 1 dBA when averaged over a 24-hour period, and would therefore have a less than significant impact on noise receptors along the truck routes.

The second type of impact is related to noise generated by onsite construction equipment and local residents could be subject to elevated noise levels due to their operation. Because the project is relatively small, construction activities such as digging, pipeline installation, and burial would probably be carried out simultaneously.

Noise ranges have been found to be similar for various type of construction activities and a generally accepted noise level of 89 dBA as measured at a distance of 50 feet is recommended by the USEPA for construction noise assessments. The nearest residential units are located to the north in the City of Villa Park at a distance of about 250 feet from the end of the turnout pipe. Based on projected construction noise level of 89 dBA as measured at a distance of 50 feet, the noise level at the closest residential units is estimated at 75 dBA.

With respect to groundwater monitoring well installation, the use of a single drilling rig would produce less noise than would be predicted for the heavy equipment used in pipeline installation. However, using a reasonable worst-case assumption, the 89 dBA value is also used for this construction. Based on this value, the apartment complex located across Yorba Street could be subject to construction noise on the order of 83 dBA. Noise at the nearest single family unit, also across Yorba Street, could be approximately 78 dBA. The housing development situated to the north of Chapman and west of Santiago Creek is located in excess of 1,500 feet from the more proximate northern well. At this distance construction noise would be effectively masked by traffic noise generated along both Chapman Avenue and the 55 Freeway and would not be intrusive on these residents.

At a distance of about 175 feet, the nearest classrooms within the education center located to the south could experience construction noise levels of about 78 dBA. Finally, the St. Joseph and Chapman Medical Centers, located at distances of approximately 420 and 350 feet, respectively, from the northem well, could be subject to noise levels of about 71 and 72 dBA. Here again, construction noise would be largely masked by traffic noise generated along both Chapman Avenue and the 55 Freeway. While these noise levels would intrude on these receptors, actual drilling operations would be performed for a very short period; probably less than 3 days.

Noise impacts are reduced to less than significant levels with implementation of the required construction limitations set fort by the City and County of Orange Noise Elements. These measures are required and are therefore not considered mitigation.

As noted above, both the County and City of Orange set limitations on construction proximate to sensitive receptors. The following measures shall be observed for all site construction activities.

1. Site construction shall be restricted to weekdays and Saturdays between the hours of 7:00 a.m. and 7:00 p.m. No construction shall be performed on Sundays or legal holidays. These restrictions shall also be applied to any materials' deliveries.

2. All construction equipment shall be fitted with properly operating mufflers.

3. All stockpiling, staging, and equipment maintenance shall be conducted toward the southeastern portion of the site as far as practicable from local residents.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

The proposed project site is not located within two miles of any public airports.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

There are no private airstrips located in the vicinity of the project

XII. POPULATION AND HOUSING

The project is located within an unincorporated portion of Orange County immediately southeast of the City of Villa Park and northeast of the City of Orange. The pipeline is set adjacent to a low density residential area. The Santiago Creek lies north and south of the proposed site. The closest sensitive uses to the project site are the residential homes located in Villa Park along Fernando Circle. The nearest residential property line is approximately fifty feet from the construction area.

a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

The proposed project would not directly or indirectly induce population growth. The recharge turnout would be unmanned and maintenance would be done by staff who would visit the project approximately once per week. The project would not induce new employment and no new housing or extension of major infrastructure would result.

b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

No displacement of existing housing units would result from implementation of the proposed project.

c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☑

No people would be displaced as a result of the project.

XIII. PUBLIC SERVICES

The project site is located in the County of Orange. Fire and police protection are provided by the County of Orange. The nearest fire station is approximately 1/2 mile west of the project at the intersection of Collins Avenue and Wanda Road.

The closest park is Handy Park, which is approximately 1 mile west of the project site. Villa Park Elementary School is located approximately 1/2 mile north of the project site.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a)	Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: Fire Protection? Police Protection? Schools? Parks? Other public facilities?	☐	☐	☐	☑

Yorba Park and Hart Park are located adjacent to Santiago Creek downstream from the proposed turnout. No formal recreational activities occur in the creek bed at Yorba Park, approximately 1-1/4 mile southwest of the project site. Two new groundwater monitoring wells are proposed to be located at Yorba Park. The wells will not affect recreational activities at the park.

Hart Park is located approximately 2 miles downstream from the project. At Hart Park, the Santiago Creek bed is used for parking. The proposed 15 cfs flow from the project would run within Santiago Creek to approximately Tustin Avenue before all water would have percolated into the ground. It is not anticipated that the flow would reach Hart Park and would therefore not flow through the existing parking facilities currently within the creek bed. Therefore, no impacts to Hart Park or other parks or public facilities are anticipated.

The project would not result in the need for new or physically altered government facilities nor affect response time or other performance objectives.

XIV. RECREATION

The closest park is Handy Park, which is located approximately 1 mile west of the project site. The area in the immediate vicinity of the site does not provide recreational facilities.

Yorba Park and Hart Park are located adjacent to Santiago Creek downstream from the proposed turnout. No formal recreational activities occur in the creek bed at Yorba Park, approximately 1 1/4 mile southwest of the project site. Hart Park is located approximately 2 miles downstream from the project. At Hart Park, the Santiago Creek bed is used for parking.

Two new groundwater monitoring wells are proposed to be located at Yorba Park.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑

The proposed project does not involve residential uses and would not cause a direct increase in the population of the project area. No increase in demand for, or use of, existing parks or recreational facilities would result from the implementation of the proposed project.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b)	Does the project include recreational facilities or require the construction or expansion or recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☑

The proposed project would not include recreational facilities nor require the construction or expansion of recreational facilities that might have an adverse effect on the environment.

XV. TRANSPORTATION/TRAFFIC. Would the project:

Approximately 300 feet south of the project site, the creek crosses under Prospect Street/Collins Avenue. Prospect Street is designated as Commuter Arterial (County of Orange, 1995). Commuter Arterial is defined by the Orange County General Plan as a two-lane undivided, unrestricted access roadway, with a typical right-of-way width of 56 feet and a roadway width from curb to curb of 40 feet. A commuter arterial is provided to accommodate up to approximately 10,000 vehicle trips per day at the level of service "C." The commuter arterial functions primarily as a collector facility.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a)	Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	☑

The proposed project would generate construction-related traffic during the construction phase. It is anticipated that as many as 15 workers would travel to the job site on a daily basis during construction. Additionally, it is estimated that approximately 5 trucks would access the site each day for delivery of construction materials and removal of any cut materials. The project operation would not result in a permanent increase in traffic load or daily trips because project maintenance would only occur once per week.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b)	Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☑

The project would not result in a permanent increase in traffic load or daily trips because the project would only entail weekly maintenance by OCWD staff.

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☒

The proposed project would not affect air traffic patterns.

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☒

The turnout pipe would be installed underground on fenced OCWD property. The project would have no effect on area roadway design nor cause any traffic/transportation hazards.

e) Would the project result in inadequate emergency access?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☒

The construction of this project would not block public access or any public roadways. The project does not propose changes to access in the surrounding area.

f) Would the project result in inadequate parking capacity?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☒

There is adequate parking capacity onsite for the proposed construction and operation activities.

g) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
	☐	☐	☐	☒

The project site is not within alternative transportation zone and does not conflict with adopted transportation policies.

XVI. UTILITIES AND SERVICE SYSTEMS

The proposed project involves the installation of a groundwater recharge turnout on the Santiago Pipeline. The project would require electricity for the electric motor used to operate the valve. An electric meter pedestal is proposed to be located next to the instrument shelter. The project would be unmanned and would not require gas, water, or wastewater services.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
a)	Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☑

There is no wastewater treatment associated with the project.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b)	Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑

The proposed project would not require construction of new or expansion of existing water or wastewater services.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
c)	Would the project require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑

The proposed project would divert water from the Santa Ana River to Santiago Creek via the existing Santiago Pipeline. The discharge of water into Santiago Creek would follow the natural course of the creek and would not affect the existing stormwater drainage system.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
d)	Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☑

Water for restrooms or other onsite use is not required. The project would provide a source of water for recharge by diverting Santa Ana River water into Santiago Creek via the existing Santiago Pipeline.

e)	Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☐	☑

Wastewater treatment is not applicable to the project.

f)	Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☑	☐

If necessary, landfill sources would only be used during the course of construction for construction debris. Waste generated from construction would not be significant in quantity. Upon the completion of the turnout, the project would not generate solid waste.

g)	Would the project comply with federal, state, and local statutes and regulations related to solid waste?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☐	☑

The only waste generated from this project would be that of construction waste, which is classified as Class 3 waste-construction, demolition and fill materials (County of Orange, 1985). The project would comply with federal, state, and local statutes and regulations related to solid waste.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
		☐	☐	☐	☑

The project does not have the potential to degrade the quality of the environment and would not have a significant impact on any fish or wildlife or their habitat. The project site has been examined for historic and prehistoric significance and has been found to contain no important examples of major periods of California history or prehistory.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☑	☐

The project has been found to have less than significant environmental effects. The proposed project would not have impacts that are cumulatively considerable.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☑	☐

The project has been found to have less than significant environmental impacts. Therefore, the project would not cause substantial adverse effects on human beings.

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APPENDIX A

AIR QUALITY ANALYSIS

APPENDIX A
AIR QUALITY ANALYSIS

The project consists of the construction and operation of a new diversion pipeline and two new groundwater monitoring wells and air pollutant emissions would be produced during pipeline construction.

STANDARDS OF SIGNIFICANCE

Thresholds For Construction Emissions

The following significance thresholds for construction emissions have been established by the SCAQMD and are included in their *CEQA Air Quality Handbook (Handbook).* Projects in the South Coast Air Basin with construction-related emissions that exceed any of these emission thresholds could be considered to be significant:

- 2.5 tons per quarter or 75 pounds per day of ROG
- 2.5 tons per quarter or 100 pounds per day of NO_X
- 24.75 tons per quarter or 550 pounds per day of CO
- tons per quarter or 150 pounds per day of PM10
- tons per quarter or 150 pounds per day of SOx

Thresholds For Operational Emissions

Specific criteria for determining whether the potential air quality impacts of a project are significant are set forth in the SCAQMD *Handbook.* The criteria include emissions thresholds, compliance with state and federal air quality standards and conformity with existing State Implementation Plan (SIP) or consistency with the current Air Quality Management Plan (AQMP). The daily operational emissions "significance" thresholds are:

Regional Emissions Thresholds

- 55 pounds per day of ROG
- 55 pounds per day of NO_X
- 550 pounds per day of CO
- 150 pounds per day of PM10
- 150 pounds per day of SOx

Projects in the South Coast Air Basin with operation-related emissions that exceed any of the emission thresholds should be considered to be significant

Local Emission Standards

- California State 1-hour CO standard of 20.0 ppm
- California State 8-hour CO standard of 9.0 ppm

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below state and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a state or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. The SCAQMD defines a measurable amount as 1.0 ppm or more for the 1- hour CO concentration by or 0.45 ppm or more for the 8-hour CO concentrations.

Short-Term Construction Impacts

The potential for short-term impacts is based on the construction effort and its ability to create both gaseous and dust emissions.

Pipeline construction would require both heavy equipment and materials deliveries and their actions would produce combustion pollutants and fugitive dust along any chosen routes during project construction. Owing to the relatively small size of the project (i.e., approximately 62 feet of pipeline), for purposes of this analysis, it is anticipated that as many as five pieces of heavy equipment could be used on a daily basis during the construction effort. As the exact type of equipment to be used during construction will vary with the contractor performing the construction, an average of emissions produced by all heavy earthmoving typically used in construction and presented in *AP-42, A Compilation of Air Pollution Emissions Factors (AP-42)* (USEPA), 1985 was calculated. This includes track and wheel-type tractors, dozers, scrapers, graders, loaders, off-highway trucks, rollers, and miscellaneous equipment. Each piece was assumed to operate for 7 hours during the day (includes 1-hour per day for down time). More pieces may be used, but the actual use of this equipment is not anticipated to exceed 35 hours per day. (Note that this is considered as conservative as it is based on 100 percent load factor and does not consider reduced emissions due to lesser load factors). Based upon the anticipated use, daily emissions were calculated for this equipment mix and are presented in Table 1.

Construction employee travel would generate mobile emissions due to the use of vehicles. It is estimated that as many as 15 workers would travel to the job site on a daily basis. This commute is anticipated to average 12.2 miles round-trip; twice the average trip length projected in the *Handbook* for Orange County home-to-work trips. Additionally, this analysis includes the use of five trucks each traveling 40 miles round trip on a daily basis for removal of any cut material and delivery of construction materials. Automobile and truck emissions are as projected from a year 2000 model run of the BURDEN7G emissions model distributed by the CARB.

In addition to exhaust emissions, the excavation of the trench as well as equipment usage on unpaved surfaces will raise fugitive dust. If it is assumed that about 0.12 acre would be disturbed. In the absence of any dust control measures, PM10 emissions are estimated at 50 pounds per acre per day and the project is estimated to generate about 6 pounds of PM10 per day due to soil disturbance. These emissions are also included in Table 1. Note that all emissions are well within the daily threshold values suggested by the SCAQMD for the determination of significance. Additionally, because the project is relatively small and construction is expected to last only about two months, the SCAQMD quarterly threshold values would not be exceeded.

Table 1
PIPELINE CONSTRUCTION EMISSIONS
(Pounds Per Day)

Pollutant Source	Carbon Monoxide	Nitrogen Oxides	Reactive Organic Gases	Sulfur Oxides	PM10 Particulates
Heavy Equipment [1]	34.6	64.3	5.4	7.2	5.5
Haul Trucks [2]	3.4	5.1	0.5	0.2	0.3
Worker Commuters [3]	3.6	0.4	0.1	0.0	0.0
Dust	---	---	---	---	---
Total Daily Emissions	41.6	69.8	6.0	7.4	11.8
SCAQMD Threshold	550	100	75	150	150
Exceeds Threshold?	No	No	No	No	No

[1] Heavy equipment emissions based on AP-42 (1985) and 35 hours of equipment use on a daily basis.
[2] Based on five heavy diesel trucks traveling 200 miles per day.
[3] Based on 15 automobiles traveling 183 miles per day.

Well construction would require the use of a single truck-mounted drill rig and one truck to bring in the well materials and remove any soil displaced during the drilling operations. Drilling for the two wells could be accomplished in 2 to 3 days. The emissions associated with the use of this single piece of construction equipment would generate less emissions than the pipeline installation and its attendant emissions would be greatly reduced from that indicated for pipeline installation. As such, these emissions would not exceed the daily threshold values and would not create significant impacts. Furthermore, the area of disturbance would be extremely minor as the actual bore hole would only be about 1 foot in diameter and any dust emissions would be inconsequential.

Long-Term Operational Air Quality Impacts

The operation of the pipeline would not generate stationary source emissions. Water which flows through the pipe is diverted from an existing pipeline and any emissions associated with pumping this water are very minor and already being produced. Furthermore, the groundwater monitoring well produces no emissions. A technician would visit the site twice a year to obtain water samples. The emissions associated with the vehicle trips to obtain these samples is then inconsequential and the project will not produce significant long-term emissions. As such, the project will not produce nor contribute to any localized CO concentrations at proximate intersection locations.

APPENDIX B

CULTURAL REPORT

CULTURAL RESOURCES RECORDS SEARCH AND LITERATURE REVIEW REPORT FOR THE SANTIAGO CREEK RECHARGE TURNOUT PROJECT, ORANGE, ORANGE COUNTY, CALIFORNIA

By:

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Prepared For:

ORANGE COUNTY WATER DISTRICT

Prepared By:

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JANUARY 2000

U.S.G.S. 7.5' Orange
less than 0.25 acres

INTRODUCTION

A cultural resources records search and literature review were performed for the Santiago Creek Recharge Turnout Project near Villa Park, Orange County, California. The records search and literature review were performed under contract with the Orange County Water District. The records search and literature review were performed in order to identify any cultural resources potentially eligible for the California Register of Historic Resources that might be affected by the project. A field survey was not performed because the project site was previously graded.

LOCATION AND SETTING

The project site consists of a graded area where Collins Avenue / North Prospect Street crosses Santiago Creek. This small project area is actually in unincorporated Orange County near the city limits of Orange and Villa Park. As shown on the U.S. Geological Survey Orange quad (photo-revised 1981), the project area is situated in the northern part of the unsectioned Santiago de Santa Ana land grant in Township 4 South, Range 9 West of the San Bernardino Base Meridian (Figure 1). The elevation of the project area is approximately 300 feet. No vegetation is present.

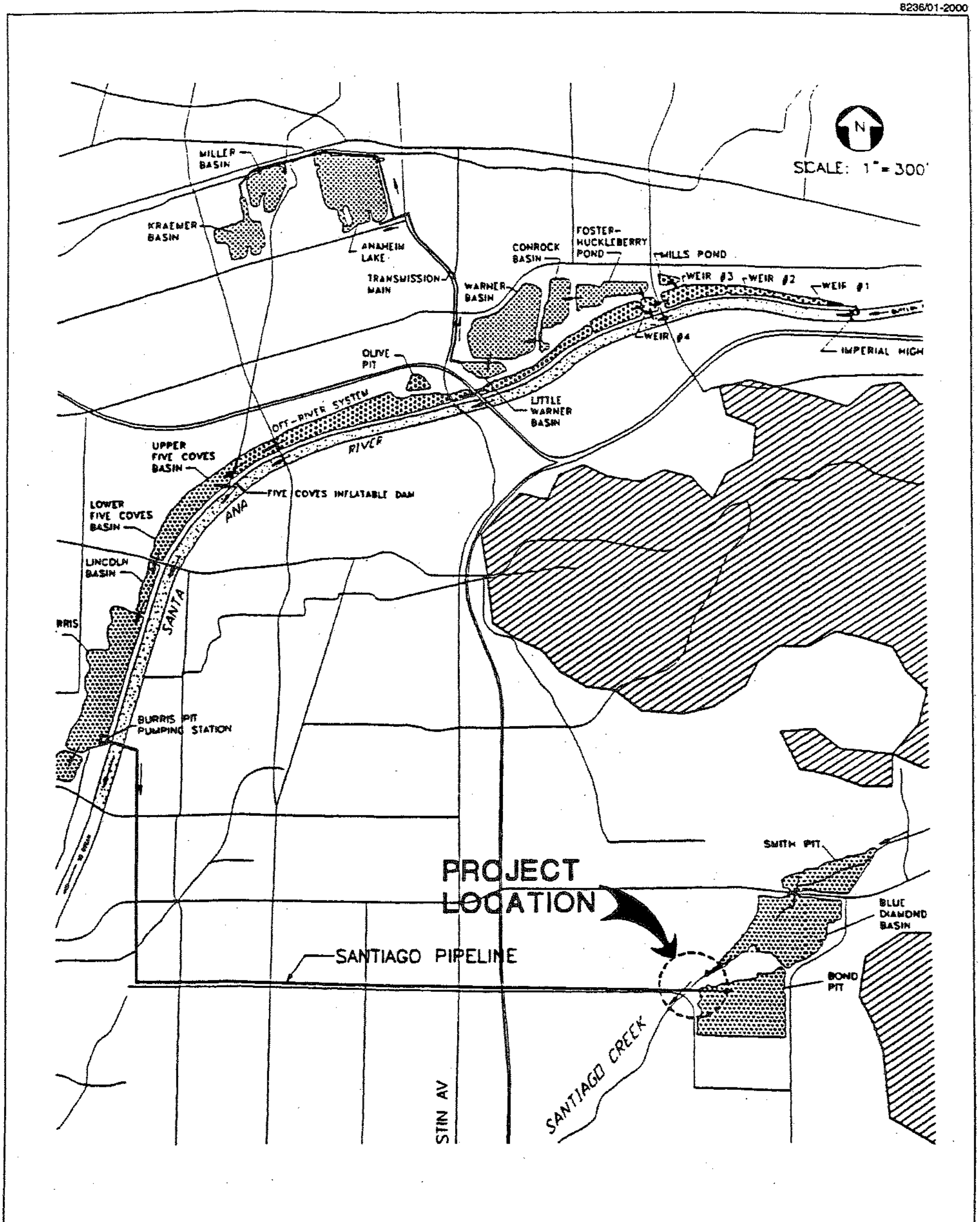
PREHISTORIC BACKGROUND

The project area was part of territory occupied by the Gabrielino and Juaneño Native American groups when the Spanish arrived in A.D. 1769. Gabrielino and Juaneño settlement and subsistence systems may extend back in time to the beginning of the Late Prehistoric Period about A.D. 750. The Gabrielino and Juaneño were semi-sedentary hunters and gatherers. One of the most important food resources for inland groups was acorns gathered from oak groves in canyons, drainages, and foothills. Acorns were ground with a mortar and pestle. Seeds from sage and grasses, goosefoot, and California buckwheat were collected and ground with manos and metates. Protein was supplied by hunting deer, rabbits, and other animals using a bow and arrow as well as various traps and snares. Coastal dwellers collected shellfish and engaged in fishing for bay/estuary, nearshore, and kelp bed species. Dried shellfish and fish were probably exchanged for inland products such as acorns.

The Gabrielino and Juaneño lived in villages of up to 250 people located near permanent water sources and a variety of food resources. The village was the center of a territory from which resources were gathered. Work parties left the village for short periods of time to hunt, fish, and gather plant foods. While away from the village they established temporary camps and resource processing locations. Archaeologically, such locations are indicated by manos and metates for seed processing, bedrock mortars for acorn processing, and lithic scatters indicating manufacturing or maintenance of stone tools (usually made of chert) used in hunting or butchering. Overnight stays in field camps are indicated by fire-affected rock used in hearths.

The period from 1000 B.C. to A.D. 750 is known archaeologically as the Intermediate Period. During this period mortars and pestles appear, indicating the beginning of acorn exploitation. Use of the acorn, a storable high calorie food source, probably allowed greater sedentism, especially in inland areas. Large projectile points indicate that the bow and arrow, characteristic of the Late Prehistoric Period, had not yet been introduced. Hunting was probably conducted using a spear thrower. Settlement patterns during this period are not well known. The semi-sedentary settlement pattern characteristic of the Late Prehistoric Period may have begun during the Intermediate Period, although lower population densities may have meant less territoriality.

The Milling Stone Period (about 6500 B.C. to 1000 B.C.) represents a long period of time characterized by smaller more mobile groups compared to later time periods. These groups probably had a seasonal



Chambers Group

Scale: 1" = 300'
Source: CATHCART • GARCIA • VON LANGEN ENGINEERS

PROJECT LOCATION MAP
Figure 1

round of settlement which included both inland and coastal residential bases. They relied on grass and sage seeds to provide calories and carbohydrates. Although fewer projectile points occur, compared to later periods, faunal data indicate the same animals were hunted. Characteristic inland Milling Stone Period sites are characterized by numerous manos, metates and hammerstones while shell middens are common along the coast. Quartz and rhyolite are more common than chert as the preferred materials for making chipped stone tools.

METHODS

A records search obtained from the South Central Coastal Information Center at the University of California, Los Angeles (Appendix A) provided information on previous archaeological investigations within one half mile of the project area. The records search also documented all previously recorded cultural resources within one mile of the project. A field survey was not performed because the project site is graded.

RESULTS

The records searches show that no prehistoric archaeological sites have been recorded in the project area. One prehistoric site, CA-ORA-89, has been recorded within one mile of the project area. This site was located along the banks of Santiago Creek and consisted of ground stone tools and hammerstones noted during plowing of a citrus orchard. The site was destroyed by development and no longer exists.

No historic archaeological sites have been recorded on or within one mile of the project area. No historic resources are listed on the California State Historic Resources Inventory, the National Register of Historic Places, the California Historical Landmarks, nor the California Points of Historical interest.

Eight surveys or other investigations for cultural resources have taken place within one mile of the project area. Four of these included the project area.

RECOMMENDATIONS

Based on:

1) the results of the records search that showed that the project had been surveyed previously with negative results,

2) the fact that the project site is located on a graded parcel of land,

the proposed project will not affect any potentially eligible cultural resources. However, should any cultural material be discovered during any construction activities conducted at this location, a qualified archaeologist should be contacted immediately for an in-field assessment to prevent effects to potentially eligible cultural resources.

Roger D. Mason, Ph.D., SOPA
Principal Investigator

APPENDIX A

RESULTS OF RECORDS SEARCH

South Central Coastal Information Center
California Historical Resources Information System
UCLA Institute of Archaeology
A163 Fowler Building
Los Angeles, California 90095-1510
(310) 825-1980 / FAX (310) 206-4723 / sccic@ucla.edu

Los Angeles
Orange
Ventura

Richard Shepard
Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, CA 92614

November 8, 1999

RE: Records Search Request for the Orange Quadrangle, 8236-A Santiago Creek Project

Dear Mr. Shepard,

As per your request received on November 8, we have conducted a records search for the above referenced project. This search includes a review of all recorded historic and prehistoric archaeological sites within a one mile radius of the project area as well as a review of all known cultural resource survey and excavation reports. In addition, we have checked our file of historic maps, the National Register of Historic Places, the California State Historic Resources Inventory, the California Points of Historical Interest, and the listing of California Historical Landmarks in the region. The following is a discussion of our findings for the project area.

PREHISTORIC RESOURCES:

One prehistoric site (30-000089) has been identified within a one mile radius of the project area. This prehistoric site is not located within the project area (see enclosed map).

HISTORIC RESOURCES:

No historic archaeological sites have been identified within a one mile radius of the project area.

The California State Historic Resources Inventory lists no properties that have been evaluated for historical significance within a few blocks radius of the project area.

The National Register of Historic Places lists no properties within a one mile radius of the project area.

The listings of the California Historical Landmarks (1990) of the Office of Historic Preservation, California Department of Parks and Recreation, indicate that there are no California Historical Landmarks within a one mile radius of the project area.

The California Points of Historical Interest (1992) identifies no properties within a one mile radius of the project area.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS:

Eight surveys and/or excavations (OR20, OR35, OR214, OR556, OR778, OR801, OR871, and OR903) have been conducted within a one mile radius of the project area. Four of these investigations (OR20, OR35, OR778, and OR801) have been conducted within the project area (see enclosed map and bibliography). Two additional investigations are located within the Orange quadrangle and potentially within the project area. These investigations are not mapped due to insufficient locational information.

Please forward a copy of any reports resulting from this project to our office as soon as possible. Due to the sensitive nature of site location data, we ask that you do not include record search maps in your report. If you have any questions regarding the results presented herein, please feel free to contact our office at (310) 825-1980.

Invoices are mailed approximately two weeks after records searches are completed. This enables your firm to request further information under the same invoice number. Please reference the invoice number listed below when making inquires. Requests made after invoicing will result in the preparation of a separate invoice with a $15.00 handling fee.

Sincerely,

Janette Dinishak

Janette Dinishak
Information Center Staff

Enclosures:

(X) Maps
(X) Bibliography
( ) Site list
( ) HRI
(X) Site records
( ) Survey reports
(X) Confidentiality Form
( ) Invoice # 8170

APPENDIX B

RESUME OF PRINCIPAL INVESTIGATOR

ROGER D. MASON, PH.D.
DIRECTOR OF CULTURAL RESOURCES

Dr. Mason has been professionally involved with cultural resources management in southern California since 1983. Dr. Mason is the author of over 60 reports dealing with cultural resource surveys, evaluations, and mitigation programs in all southern California counties. Section 106 experience includes successful nomination of the San Antonio Terrace Archaeological District on Vandenberg AFB to the NRHP and preparing a Historic Preservation Plan for the District. Dr. Mason was also Principal Investigator for the data recovery and construction monitoring program for the San Joaquin Hills Transportation Corridor, a Section 106 project reviewed by Caltrans. Prior to joining Chambers Group, Dr. Mason was the Principal Investigator for the Newport Coast Archaeological Project in coastal Orange County. This project was the largest privately funded cultural resources mitigation program on the West Coast and involved data recovery excavations at 35 sites. Recently, Dr. Mason was named to the Year 2000 Edition of the Marquis Who's Who in America.

EDUCATION

Ph.D., Anthropology (Archaeology), University of Texas at Austin
B.A., Anthropology, University of Washington

PROFESSIONAL AFFILIATIONS AND CERTIFICATIONS

- Registered Professional Archaeologist, SOPA, Certified in Field Research
- Orange County Certified Archaeologist
- Riverside County Qualified Archaeologist
- American Anthropological Association
- Society for American Archaeology
- Society for California Archaeology
- Pacific Coast Archaeological Society

REPRESENTATIVE PROJECT EXPERIENCE

- **San Joaquin Hills Transportation Corridor Archaeological Data Recovery Program - Sverdrup/ Transportation Corridor Agencies.** Project Archaeologist - Directed data recovery (major archaeological excavation) as mitigation of impacts for six archaeological sites determined eligible by the SHPO prior to construction and for six sites found during monitoring that met the eligibility requirements of the Treatment Plan. Coordinated Native American observer program during field work. Completed six data recovery reports that were reviewed and accepted by Caltrans with little or no revisions.

- **San Joaquin Hills Transportation Corridor Archaeological Monitoring Program - Sverdrup/ Transportation Corridor Agencies.** Project Archaeologist - Directed construction monitoring over a period of 42 months during construction of the 14 mile long tool road. Wrote a Treatment Plan accepted by Caltrans and SHPO that determined whether data recovery would be necessary for sites found during construction. This made it unnecessary to consult with SHPO each time a site was discovered during construction, thereby avoiding construction delays. Evaluated nine sites in accord with the Treatment Plan to determine if data was necessary.

- **Ford Road Archaeological Test Program - Sverdrup/Transportation Corridor Agencies.** Project Archaeologist - Directed Section 106 test program at five archaeological sites that could be impacted by construction of Ford Road. Wrote test report and Request for Determination of Eligibility reviewed and approved by the Corps of Engineers and SHPO for the five sites. Wrote Data Recovery Plan reviewed and approved by the Corps of Engineers and SHPO for the two sites that were determined eligible and that would be impacted by construction.

- **Ford Road Archaeological Data Recovery Plan - Sverdrup/Transportation Corridor Agencies.** Project Archaeologist - Directed data recovery (major archaeological excavation) as mitigation of impacts for two archaeological sites determined eligible by the SHPO prior to construction. Coordinated Native American observer program during field work. Completed data recovery report that was reviewed and accepted by the Corps of Engineers with no revisions.

- **Ford Road Archaeological Construction Monitoring Program - Sverdrup/Transportation Corridor Agencies.** Project Archaeologist - Directed construction monitoring over a period of 27 months during the construction of the road. Directed controlled grading of two archaeological sites after completion of data recovery.

- **Newport Coast Archaeological Project - The Irvine Company.** Principal Investigator - Wrote a research design and carried out data recovery for 32 archaeological sites in this four square mile tract. The project area included the ridges and canyons of the coastal slopes of the San Joaquin Hills and the marine terraces south of Corona Del Mar. This was the largest privately funded archaeological project in the western United States.

- **Historic Property Survey Reports - Various Cities/Caltrans.** Cultural Resources Manager - Was co-author for six Historic Property Survey Reports using Caltrans Section 106 guidelines. These were for Caltrans local assistance street widening projects in various cities in southern California.

- **Del Mar Highlands Estates Data Recovery Program - Pardee Construction.** Principal Investigator - Directed data recovery program at SDI-13,094, a Milling Stone Period site dating to about 5,000 years ago near the San Dieguito River in the City of San Diego. Both randomly placed and block excavation units were used to recover cultural material from the site in general and from three fire-affected rock features (hearths).

- **Oak Park III Data Recovery Program - Pardee Construction.** Principal Investigator - Directed data recovery program at VEN-1020, a Late Period camp in Ventura County used for yucca roasting and hunting. The project included a magnetometer program to locate fire-affected rock features that included roasting pits and hearths. The results were presented in a report that provided information about activities carried out at field camp probably used by people from a nearby village in the Ventureño Inland Chumash area.

- **Vandenberg Air Force Base Cultural Resources Services - National Park Service/Vandenberg Air Force Base.** Principal Investigator - Directed two year cultural resources survey of entire base (90,000 acres) during which over 600 new archaeological sites were recorded.

- **Third Party As-Needed Environmental Impact Report Review for CEQA Compliance - City of Carlsbad.** Task Leader, provided review of draft Environmental Impact Reports (EIRs) for a variety of projects prior to the release of the documents to the public. Environmental documents and supporting technical reports are reviewed for methodology, adequacy of analysis, completeness, and compliance with CEQA, as well as local, state, and federal laws and policies.

PROFESSIONAL EXPERIENCE

1993-	Director of Cultural Resources, Chambers Group, Inc., Irvine, CA. Principal Investigator, San Joaquin Hills Transportation Corridor Archaeological Mitigation Program: Data recovery at 12 sites, plus construction monitoring. Principal Investigator, Vandenberg Air Force Base Open-End Cultural Resources Services Contract: Survey of entire base (90,000 acres; over 600 sites).
1990-1993	Director of Archaeology, The Keith Companies, Costa Mesa, CA. Principal Investigator, Newport Coast Archaeological Project, Orange County, CA: Data recovery at 32 sites, plus construction monitoring.
1988-1990	Managing Archaeologist, The Keith Companies.
1987-1988	Senior Archaeologist, Tetra Tech, Inc., San Bernardino, CA. Principal Investigator and Project Manager of the San Antonio Terrace Archaeological District project, Vandenberg AFB, CA: Historic Preservation Plan for the district and survey, testing, and mitigation of sites to be affected by construction of ICBM test facilities.
1983-1987	Research Director, Project Director, Scientific Resource Surveys, Inc., Huntington Beach, CA. Responsible for research designs, planning of field work, and author and/or editor of all reports produced by SRS during this four-year period. Projects in all southern California counties.
1981-1982	Visiting Assistant Professor, Central Michigan University. Courses: New World Archaeology; Archaeological Method and Theory.
1977-1981	Staff Historical Archaeologist, Cannon Reservoir Human Ecology Project, University of Nebraska (funded by St. Louis District, U.S. Army Corps of Engineers): Archival research on frontier settlement systems in northeast Missouri.
1976-1978	Co-Principal Investigator, Proyecto Coatlan, Morelos-Guerrero Regional Center, Instituto Nacional de Antropologia de Historia (INAH), Morelos, Mexico: Surface collection at an Aztec period provincial center (dissertation research).
1973	Co-Director, Xoxocotlan Surface Collection Project, Monte Alban, Oaxaca, Mexico.
1972	Field Assistant, Valley of Oaxaca Settlement Pattern Project, Monte Alban, Oaxaca, Mexico.

PUBLICATIONS, PAPERS, AND REPORTS

Articles

1998	An Ochre Cogged Stone from Orange County. *Pacific Coast Archaeological Society Quarterly*, 34(1):59-72. (Junior author with H.C. Koerper.)
1998	Weighing Vs. Counting: Measurement Reliability and the California School of Midden Analysis. *American Antiquity* 63:303-324. (Senior author with M.L. Peterson and J.A. Tiffany.)

1997 Middle Holocene Adaptations on the Newport Coast of Orange County. In *Archaeology of the California Coast During the Middle Holocene*, edited by J.M. Erlandson and M.A. Glassow, pp. 35-60. Perspectives in California Archaeology, Volume 4. Institute of Archaeology, University of California, Los Angeles. (Senior author with H.C. Koerper and P.E. Langenwalter.)

1996a Archaeological, Ethnohistoric, and Historic Notes Regarding ORA-58 and Other Sites Along the Lower Santa Ana River Drainage, Costa Mesa. *Pacific Coast Archaeological Society Quarterly* 32(1):1-36. (Junior author with H.C. Koerper, D.E. Earle, and P. Apodaca.)

1996b Two Barbed Stone Spear Points from Coastal Orange County. Pacific Coast *Archaeological Society Quarterly* 32(1):50-64. (Junior author with H.C. Koerper, C. Prior, and R.E. Taylor.)

1996c Arrow Projectile Point Types as Temporal Types: Evidence from Orange County. *Journal of California and Great Basin Anthropology* 18:258-283. (Junior author with H.C. Koerper, A.B. Schroth, and M.L. Peterson.)

1994 Morphological Types and Temporal Projectile Point Types: Evidence from Orange County, California. *Journal of California and Great Basin Anthropology* 16:81-105. (Junior author with H.C. Koerper and A.B. Schroth.)

1986 Summary of Work Carried Out at CA-LAN-43, The Encino Village Site. *Pacific Coast Archaeological Society Quarterly* 22(3):9-17.

1982 Historic Settlement Patterns. In *The Cannon Reservoir Human Ecology Project: An Archaeological Study of Cultural Adaptations in the Southern Prairie Peninsula*, edited by Michael J. O'Brien, Dennis E. Lewarch, and Robert E. Warren, pp. 369-387. Academic Press, New York.

1982 A Regional Chronology of the Early Historic Period. In *The Cannon Reservoir Human Ecology Project, An Archaeological Study of Cultural Adaptations in the Southern Prairie Peninsula*, edited by Michael J. O'Brien, Dennis E. Lewarch, and Robert E. Warren, pp. 131-141. Academic Press, New York.

1982 The Structure of Historic Communities. In *The Cannon Reservoir Human Ecology Project: An Archaeological Study of Cultural Adaptations in the Southern Prairie Peninsula*, edited by Michael J. O'Brien, Dennis E. Lewarch, and Robert E. Warren, pp. 301-334. Academic Press, New York. (Co-author with M. O'Brien and J. Saunders.)

Papers Presented

1998 Demographic Dynamics in Late Holocene Orange County. Paper presented at the Annual Meeting of Society for California Archaeology, San Diego. (Second author with H.C. Koerper.)

1994 Results of the Newport Coast Archaeological Project. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura, California.

1993	The Middle Holocene Period on the Newport Coast, Orange County, California. Paper presented at the Annual Meeting of the Society for California Archaeology, Pacific Grove, California.
1991	Preliminary Results of the Newport Coast Archaeological Project. Presented at the Southern Data Sharing Meeting of the Society for California Archaeology, Los Angeles.
1990	Archaeometry and Archaeological Interpretation in the Newport Coast Archaeological Project. Presented at the 55th Annual Meeting of the Society for American Archaeology, Las Vegas, Nevada.

Cultural Resource Management Reports - Principal Author

1998	Final Technical Report: Phase I, II, and III Archaeological Survey for Cultural Resources Inventory, Vandenberg Air Force Base, Santa Barbara County, California. Prepared for National Park Service, San Francisco, and Vandenberg Air Force Base.
1998	Indexing Program at CA-SDI-5372/H, Del Mar Highlands Estates Project, City of San Diego. Prepared for Pardee Construction, care of Hewitt & McGuire, LLP, Irvine.
1998	Oak Park III; Data Recovery at CA-VEN-1020, Oak Park, Ventura County. Prepared for Pardee Construction, care of Hewitt & McGuire, LLP, Irvine.
1998	Cultural Resources Element. EIR for Cypress Canyon Residential Development Project, Anaheim, California. Prepared for ROX Consulting Group, Tustin, California.
1998	Archaeological Constraints Analysis, El Morro Mobile Home Park Expansion and Improvement. Prepared for El Morro Community Association, Newport Beach, California.
1998	Archaeological Investigations at the Simi Valley Drive-In Theater Property, Simi Valley, California. Prepared for Patriot Homes, Inc., Sherman Oaks, California.
1997	Review of "A Research Design for the Evaluation of Archaeological Sites Within the Hellman Ranch Specific Plan Area." Prepared for the City of Seal Beach.
1997	Review of "Landscape and People of Bolsa Bay, Volume 1: Compendium of Themes and Models, Research Design for Analysis, Bolsa Bay Project." Prepared for the Koll Company.
1997	Addendum to Historic Study Report for Three Sites in the San Joaquin Hills Transportation Corridor, Southern Orange County. Prepared for Caltrans District 12, Santa Ana and Federal Highways Administration, Sacramento.
1997	Draft Technical Report: Phase I, II, and II Archaeological Survey for Cultural Resources Inventory, Vandenberg Air Force Base, Santa Barbara County, California. Prepared for National Park Service, San Francisco, and Vandenberg Air Force Base.
1997	San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-225. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-206. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-689, CA-ORA-736, and CA-ORA-1029. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-1370, and CA-ORA-1432. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 Cultural Resources Survey Report for the Fairmont Estates Project in the City of Yorba Linda, Orange County, California. Prepared for ROX Consulting Group, Inc., Irvine.

1997 Heritage Research Overview and Survey Report for the Motorola Electrical Conduit Installation Project, Cleveland National Forest, Trabuco Ranger District, Orange County, California. Prepared for Harding Lawson Associates, Irvine.

1996 Final Report of Findings: Biological and Cultural Surveys on IRP Sites at the National Training Center at Fort Irwin, San Bernardino County, California. Prepared for U.S. Army Corps of Engineers, Los Angeles District.

1996 Cultural Resources Survey Report for the San Juan Basin Groundwater Management Plan Project, Orange County, California. Prepared for San Juan Basin Authority, San Juan Capistrano.

1996 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-1398, CA-ORA-1431, CA-ORA-1433, CA-ORA-1436, and CA-ORA-1438. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1996 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-125 and CA-ORA-1295. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1996 Review of "A Research Design and Investigation Program for Test Level Evaluations of Archaeological Sites Located on the Hellman Ranch, City of Seal Beach, California." Prepared for City of Seal Beach.

1996 Archaeological Test Program Report for CA-LAN-2310 in the Monarch Hills Project Near the City of Santa Clarita, Los Angeles County, California. Prepared for Pardee Construction, Los Angeles.

1996 Results of Data Recovery at CA-ORA-482 and CA-ORA-106: New Ford Road Project, Irvine, California. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1995 Research Design for Data Recovery at CA-VEN-1020. Prepared for Pardee Construction, Los Angeles.

1995 Archaeological Resources Protection Plan for the Background Study Sampling Areas at Naval Weapons Station, Seal Beach, Orange County, California. Prepared for

International Technology Corporation, Irvine, and Naval Facilities Engineering Command, San Diego.

1995 Archaeological Resources Protection Plan for Installation Restoration Sites 5, 8, 12, 16, 21, 40, 44, and 46 at Naval Weapons Station, Seal Beach, Orange County, California. Prepared for International Technology Corporation, Irvine, and Naval Facilities Engineering Command, San Diego.

1994 Treatment Plan for Archaeological Sites Discovered During Construction of the San Joaquin Hills Transportation Corridor, Orange County, California. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Costa Mesa.

1994 Archaeological Resources Protection Plan for Installation Remediation Sites 4, 8, 9, and SWMU 56, Naval Weapons Station, Seal Beach. Prepared for Accutek Environmental, Inc., Fountain Valley, and U.S. Navy, San Diego.

1994 Newport Coast Archaeological Project: Newport Coast Settlement Systems, Summary and Discussion. Prepared for Coastal Community Builders, Newport Beach. (Senior author with M. Peterson.)

1994 Newport Coast Archaeological Project: Results of Data Recovery from CA-ORA-274 and CA-ORA-670, Orange County, California. Prepared for Coastal Community Builders, Newport Beach.

1993 Data Recovery Plan: Prehistoric Archaeological Sites CA-ORA-106 and CA-ORA-482 within the Area of Potential Effect of the Proposed New Ford Road. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Costa Mesa.

1993 Test Program Results and Request for Determination of Eligibility for the Five Sites in the New Ford Road Alignment, Irvine, California. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Costa Mesa.

1993 Results of Historical Research and Recommendations for the Proposed Federal Building Site in Santa Ana, California. Prepared for National Park Service, Atlanta, and General Services Administration, San Francisco (with J.A. McKenna).

1993 Newport Coast Archaeological Project: Results of Data Recovery from the Pelican Hill Sites, CA-ORA-662 and CA-ORA-1203, Orange County, California. Prepared for Coastal Community Builders, Newport Beach.

1992 Newport Coast Archaeological Project: Results of Data Recovery from the French Flat Complex Sites, CA-ORA-232, CA-ORA-233, CA-ORA-671, CA-ORA-672, and CA-ORA-1205, Orange County, California. Prepared for Coastal Community Builders, Newport Beach.

1992 Newport Coast Archaeological Project: Results of Data Recovery at CA-ORA-667, Orange County, California. Prepared for Coastal Community Builders, Newport Beach.

1992 Newport Coast Archaeological Project: Data Recovery from Sites Impacted by Construction of Pacific Coast Highway (Inland Side) (CA-ORA-246 and CA-ORA-1208). Report prepared for Orange County EMA.

1992 Newport Coast Archaeological Project: Data Recovery at Area 13 of CA-ORA-662 (ICD 13) Impacted by Construction of Lower Loop Road. Report prepared for Orange County EMA.

1992 Newport Coast Archaeological Project: Data Recovery at Three Newport Coast Open Sites (ORA-673, 675, 684). Report prepared for Coastal Community Builders (The Irvine Company).

1992 Newport Coast Archaeological Project: Testing and Data Recovery at the Golf Course Sites (ORA-660, 664, 665, 666, 1229, 1230, 1231, 1232, 1233, and 1234). Report prepared for Coastal Community Builders (The Irvine Company).

1992 Cultural Resources Survey Report for the Lenwood Ranch Project, near Barstow, San Bernardino County, California.

1992 Cultural Resources Survey Report for Shadow Ridge Project near Palm Desert, Riverside County, California.

1992 Cultural Resources Survey Report for the Olinda Project, Brea, Orange County, California.

1991 Newport Coast Archaeological Project: Data Recovery at ORA-683. Report prepared for Coastal Community Builders (The Irvine Company).

1991 Newport Coast Archaeological Project: Data Recovery at the Wishbone Hill Sites (ORA-339, 340, 928, and 929). Report prepared for Coastal Community Builders (The Irvine Company).

1991 Newport Coast Archaeological Project: Data Recovery at the Late Small Rockshelter Sites (ORA-674, 676, 677, 678, 679, 682, 1204, 1206, and 1210). Report prepared for Coastal Community Builders (The Irvine Company).

1991 Newport Coast Archaeological Project: Data Recovery at the Pelican Hill Road Segment B Sites (ORA-221, 1085, and 1295). Report prepared for Orange County EMA and Coastal Community Builders (The Irvine Company).

1991 Newport Coast Archaeological Project: Project Background and Research Design. Prepared for Coastal Community Builders (The Irvine Company).

1991 Prehistoric Cultural Resources Survey Report and Analysis of Impacts for the Ford Road Realignment EIR, Orange County, California.

1991 Cultural Resources Survey Report for the Golden Castle Project, Lake Elsinore, Riverside County, California.

1991 Historic Property Survey Report for the Coachella Valley Water District Reservoir Sites EA/IS (Del Webb) and BLM Land Exchange, Riverside County, California.

1991 Cultural Resources Survey Report, Pepperwood Estates, City of San Juan Capistrano, Orange County, California.

1990 Cultural Resources Survey Report, Soquel Canyon Ranch, Chino Hills, San Bernardino County, California.

1990	Archaeological Test Program at Site SBR-5096 near State Route 71, San Bernardino County, California.
1990	Cultural Resources Report for General Plan Amendment/Zone Change 89-04B in the City of Poway, San Diego County, California.
1990	Cultural Resources Survey-Report, Santiago Canyon Road Alignment Study, Orange County, California.
1990	Archaeological Resources Survey Report for a 55-Acre Parcel of Land, Tentative Tract No. 13801 in Hickey Canyon, Southeast Orange County, California.
1990	Cultural Resources Survey Report of a 7-Acre Parcel in Chatsworth, City of Los Angeles, Los Angeles County, California.
1989	Report on Archaeological Auger Testing on Tract No. 13269 (Central Park No. 8) in the City of Huntington Beach, Orange County, California.
1989	Cultural Resources Survey Report: Marbella Terrace in the City of San Juan Capistrano, Orange County, California.
1989	Cultural Resources Survey Report for Tentative Tract No. 47856 in the City of Palmdale, Los Angeles County, California.
1989	Cultural Resources Survey Report, Tentative Tract No. 34038, Agua Dulce, Los Angeles County, California.
1989	Cultural Resources Survey Report for the Sterling Palmdale Project in Palmdale, Los Angeles County, California.
1989	Cultural Resources Survey Report for the 10-Acre Verdemont Site in San Bernardino County, California.
1989	Cultural Resources Survey Report for the State Route 67/Woodside Avenue Interchange, San Diego County, California.
1989	Cultural Resources Survey Report for the Laguna Heights Project, Riverside County, California.
1989	Cultural Resources Survey Report for the West Lake Elsinore Assessment District, Riverside County, California.
1989	Cultural Resources Survey for the McMillan Ranch Project near Corona, Riverside County, California.
1989	Cultural Resources Survey Report, Temecula Ranch, Aguanga Valley, Riverside County, California.
1989	Archaeological Data Recovery at Site ORA-1214, the Central Park #8 Project in the City of Huntington Beach, Orange County, California. Prepared for the Dahl Company.
1988	Archaeological Resources Survey Report for the Veluzat Property, Tentative Tract No. 45979 near Newhall, Los Angeles County, California.

1988	Historic Preservation Plan: San Antonio Terrace Archaeological District, Vandenberg Air Force Base, California. Prepared for the U.S. Air Force.
1987	Request for Determination of Eligibility: San Antonio Terrace Archaeological District, Vandenberg Air Force Base, California. Prepared for the U.S. Air Force.
1987	Cultural Resources Survey of Proposed Small Intercontinental Ballistic Missile and Peacekeeper Rail Garrison Test Areas, San Antonio Terrace, Vandenberg Air Force Base, California. Prepared for the U.S. Air Force.
1987	Test Plan for National Register Evaluation of Archaeological Sites on the Coyote Canyon Sanitary Landfill Property, Orange County, California. Prepared for the Orange County Waste Management Program.
1987	Research Design and Mitigation Plan for Archaeological Site CA-ORA-226 on the Coyote Canyon Sanitary Landfill Property, Orange County, California. Prepared for the Orange County Waste Management Program.
1987	Document of Eligibility for Archaeological Site CA-ORA-226 on the Coyote Canyon Sanitary Landfill Property, Orange County, California. Prepared for the Orange County Waste Management Program. (Senior author.)
1987	Research Design for Evaluation of Coastal Archaeological Sites in Northern Orange County, California.
1987	Historical Property Survey Report: Highway 74 (Fourth Street) Widening, City of Perris, California. Prepared for the City of Perris and Caltrans. (Co-author.)
1987	Archaeological Investigation of the Northwestern Part of CA-ORA-85, Bolsa Chica Mesa, Orange County, California.
1987	Cultural Resource Survey Reports and Overviews Associated with the Well Field and Weymouth Pipelines.
1987	Cultural Resource Survey Report for the Modification of the Etiwanda Pipeline Alignment.
1986	Historic Property Survey Report: Euclid Avenue Improvement Project, City of Upland, California. Prepared for the City of Upland. (Co-author.)
1986	Archival Research and Remote Sensing Investigations Concerning Reported Cemeteries and Isolated Graves in the Santa Ana River Project Area. Prepared for the Los Angeles District, U.S. Army Corps of Engineers. (Senior author.)
1986	Research Design for Data Recovery: A Mitigation Program for CA-ORA-83: The Cogged Stone Site on Bolsa Chica Mesa, Orange County, California.
1986	Archaeological Evaluation of CA-ORA-83: The Cogged Stone Site on Bolsa Chica Mesa, Orange County, California. (Co-author.)
1986	Amendment to the Historic Property Survey Report: Evaluation of Archaeological Site CA-ORA-368 for National Register of Historic Places Eligibility for the Warner Avenue

	Widening and Reconstruction Project in the City of Huntington Beach, California. Prepared for the City of Huntington Beach.
1986	Historic Property Survey and Evaluation of the Temecula Bridge (56C-165), Riverside County, California. Prepared for the County of Riverside. (Senior author.)
1986	Report on Prehistoric and Historic Investigations at Main Ranch, Riverside County, California.
1986	Phase I Results and Phase II Proposals for Archaeological Assessment of the Meadowlark Airport, Huntington Beach, California.
1985	Results of Test Excavations on Mescalitan Island, Site III, CA-SBR-46. Prepared for Goleta Sanitary District and the State Water Resources Control Board. (Co-author.)
1985	Research Design for Test Excavations on Mescalitan Island, Site III, SBA-46. Prepared for the Goleta Sanitary District and the State Water Resources Control Board.
1985	Final Archaeological Report, Rancho Poquitos Interceptor, Sonora-Standard, California. Prepared for the Tuolumne Regional Water District and the State Water Resources Control Board.
1985	Archaeological Investigations on the Cheroske Property, Mount Laguna, San Diego County, California.
1984	A Historical Study of Stewart Ranch in Riverside County, California. (Senior author.)
1984	Eastern Corridor Alignment Study, Orange County, California. Prepared for the County of Orange. (Senior author.)
1984	Historic Property Survey Report for the Arbor Vitae Street Improvement Project, Inglewood, California. Prepared for the City of Inglewood.
1984	Cultural Resource Survey Report on Wolfskill Ranch, Riverside County, California. (Senior author.)
1984	Loma San Elijo Archaeology, San Diego County, California. (Senior author.)
1983	Evaluation of Prehistoric and Historic Resources, Campo Hills, San Diego County, California.
1983	Historic Property Survey Report: Warner Avenue Widening and Reconstruction Project, City of Huntington Beach, California. Prepared for the City of Huntington Beach. (Co-author.)

APPENDIX C

WATER QUALITY

MEMORANDUM

DATE: December 28, 1999
TO: Paul Brenner/Chambers Group
FROM: Roy Herndon

SUBJECT: **Potential Water Quality Impacts During Recharge Along Santiago Creek**

The purpose of this memo is to summarize potential water quality changes that may occur during initial and long-term recharge operations along Santiago Creek. I understand that this information may be incorporated into the CEQA documents being prepared by Chambers Group for OCWD.

Changes in groundwater quality may occur in the vicinity of Santiago Creek due to: 1) introduction of recharge water of differing chemistry than ambient groundwater quality and 2) "flushing" of chemical constituents from the vadose zone beneath the recharge area. The former condition would be a longer-term change, depending on future chemistry of the recharge water, and the latter condition would be a short-term change that would be expected to subside in a matter of weeks or months. In either case, the changes in water quality are expected to be minor and of no adverse effect to drinking water supplies.

As indicated by data collected during the Santiago Creek Recharge Pilot Project (SCRPP) in 1998, general chemistry changes were noted in two shallow monitoring wells upon the "arrival" of recharge water from Santiago Creek. These changes consisted of a 25 to 50 mg/L increase in chloride concentrations and a 125 to 150 mg/L decrease in bicarbonate concentrations over a two-month period. Final concentrations of all general chemistry constituents were well within drinking water standards, so no adverse effect was found. All other chemical constituents, including volatile organic compounds and nitrates, were found to remain stable or decrease in concentrations during the SCRPP.

Regarding the potential for short-term flushing of chemicals from the vadose zone, this condition has been observed at large-scale recharge projects where large quantities of recharge water were introduced into an area where groundwater levels were typically lower. The rising water table and/or downward movement of recharge water through the vadose zone was found to coincide with increased nitrate concentrations at two production wells downgradient from OCWD's Santiago recharge basins in 1992. These basins went into operation in 1990, and for a three- to four-year period, the downgradient wells approached or exceeded drinking water standards for nitrates. However, because historical data indicated that these wells had exceeded the nitrate drinking water standard prior to the Santiago basins going into operation, the impact of OCWD's recharge operations on water quality at these wells was not conclusive. Nevertheless, after approximately four years of initiating recharge at the Santiago basins, the nitrates in these wells subsided below the drinking water standard and have been decreasing ever since. Nitrates are now half of the drinking water standard of 10 mg/L. Because these wells are screened in relatively shallow aquifers, as compared to other production wells, this is probably an extreme case. In addition, the Santiago basins recharge over 100 cfs and would have a much larger area of hydrologic effect than the 15 cfs estimated to be percolated along the Santiago Creek.

The one-time "flushing" of nitrates from the vadose zone has also been reported by the City of Tucson at its Avra Valley recharge area. Over several weeks, nitrate concentrations, which initially rose, decreased to acceptable levels as recharge water displaced and diluted the finite amount of nitrates bound up in the vadose zone.

Because there is no ongoing source of nitrates (e.g., large-scale agricultural fertilizer application), no long-term water quality impact is expected from recharging water through the vadose zone. In addition, because no initial increase in nitrates was found during the six months of recharging during the SCRPP, the chances of having such a short-term increase is small.

Cc: Steve Conklin
Gwen Sharp
Nira Yamachika

OFFICE MEMORANDUM

DATE: January 18, 2000

TO: Steve Conklin

FROM: Roy Herndon

SUBJECT: **Proposed Santiago Creek Recharge Groundwater Monitoring Plan**

Based on the results of the Santiago Creek Recharge Pilot Project, OCWD staff is proceeding with CEQA documentation for a long-term recharge project along Santiago Creek. The following draft groundwater monitoring plan is proposed to be included as part of the CEQA documentation being prepared by the Chambers Group. Following your review and approval of this plan, I will forward a copy to Paul Brenner of the Chambers Group.

Cc: Gwen Sharp
Nira Yamachika

SANTIAGO CREEK RECHARGE PROJECT
GROUNDWATER MONITORING PLAN

January 2000

The proposed groundwater monitoring plan will consist of measuring water levels and water quality in a series of existing and future monitoring wells along Santiago Creek in the immediate vicinity of the former La Veta and Yorba landfills during the first two years of recharge operations. The objectives of the groundwater monitoring plan are to evaluate changes in water levels and shallow groundwater quality during recharge within the creek bed.

Monitoring Well Network

The proposed monitoring well network will consist of 13 existing monitoring wells or well points and two proposed future monitoring wells, located on Figure 1. These wells are listed below:

Well Name	Screened Interval (feet bgs)
SC-4/MP1	100-110
SC-4/MP2	200-210
SCS-3	31-41
SCS-4	21-31
SCS-5	22-42
SCS-6/1	23-28
SCS-6/2	147-152
SCS-7/1	20-35
SCS-7/2	125-140
SCS-8	108-128
SCS-9 (future)	120-140 (est.)
SCS-10 (future)	120-140 (est.)
IWMD-LVM2	222.5-242.5
IWMD-LVM3	222.5-252.5
IWMD-LVM4	206-246

The three "IWMD" wells are owned by the Orange County Integrated Waste Management Department (IWMD), and site access permission to these wells will need to be granted by IWMD and the respective property owners before these wells can be included in the monitoring plan. The locations of proposed future wells SCS-9 and SCS-10, shown on Figure 1, are approximate and may be adjusted depending on construction and property access constraints.

Monitoring Well Construction

Two new monitoring wells, SCS-9 and SCS-10, are proposed to be constructed along the eastern boundary of the former Yorba landfill as part of the groundwater monitoring plan (see Figure 1). The purpose of these wells is to provide water level and water quality data on the distal (potentially downgradient) side of the former Yorba landfill, away from Santiago Creek. Nearly all of the other monitoring wells are located immediately adjacent to the creek. Borings for the proposed new wells are anticipated to be drilled to a depth of approximately 150 feet below ground surface (bgs) and will be accomplished using hollow-stem augers or a "dual-wall" percussion or rotary casing advancement drilling method. An OCWD geologist or consulting geologist will describe the drill cuttings and lithologic samples at minimum five-foot intervals for each borehole. The boreholes will be located outside the estimated areas of buried refuse.

The new monitoring wells will be constructed of four-inch diameter schedule 40 PVC blank and slotted casing. The slotted casing sections are anticipated to be 10 to 20 feet long and located at the bottom of the casing string at depths of approximately 120 to 140 feet bgs. Slotted intervals will depend on the lithologic conditions encountered at each borehole. Slot width will be 0.020 inch. Gravel pack will be placed around the entire slotted section of each well to approximately five feet above the slotted section. Gravel pack will consist of washed high-silica content sand of appropriate gradation for the selected slot width and lithologic conditions. A minimum two-foot bentonite seal will be placed above the gravel pack. The remainder of the annular space will be filled with bentonite grout slurry to ground surface. The well heads will be completed in locking below-grade vault boxes.

Well development will be accomplished by a combination of swabbing, bailing, air-lifting and submersible pumping.

The estimated time to construct and develop the two monitoring wells is four days.

Water Level Measurements

OCWD staff will use electric sounders or electronic dataloggers and pressure transducers to measure water levels in the monitoring wells on a weekly basis at the beginning of the recharge operations. After the first two months of operation, water level measurements will be made on a monthly basis.

Water Sample Collection

The proposed water sampling frequency and chemical constituent list are based on results of the Santiago Creek Recharge Pilot Program (SCRPP) conducted in 1998. These results were documented in the *Santiago Creek Recharge Pilot Project*

Groundwater Well Installation and Recharge Test Report (OCWD, 1999). OCWD's findings in the report stated that "No inorganic or organic compounds were found to occur above primary MCLs, and no regulated compounds were found to increase in concentration as a result of the recharge activities."

Prior to initiating recharge operations, OCWD will collect one round of groundwater samples from the 15 monitoring well points. Samples will be collected semi-annually (twice per year) thereafter for a two-year period. Based on data collected during the SCRPP in 1998, those well points that are shallower than 50 feet may not contain water and, therefore, may not be able to be sampled.

Water samples will be collected following purging of the wells using electric submersible pumps. The pumps and discharge tubing will be cleaned prior to use in each well. The wells will be purged of at least three well volumes prior to sample collection. In the event a well is purged dry, then it will be allowed to sufficiently recover to enable sample collection. During purging, electrical conductance (EC), pH, temperature, and visual turbidity will be measured and recorded in the field.

Water samples of Santiago Creek, if it is flowing, will be collected with each round of well sampling.

Water samples will be collected in clean sample containers appropriate for the specific analyses to be performed. The sample containers will be labeled, placed in a chilled cooler and delivered to the OCWD state-certified laboratory for chemical analysis. Chain-of-custody forms will be used to document sample possession from the time of collection to acceptance by the laboratory.

Water Sample Analyses

The water samples will be analyzed at the OCWD state-certified laboratory for the following constituents:

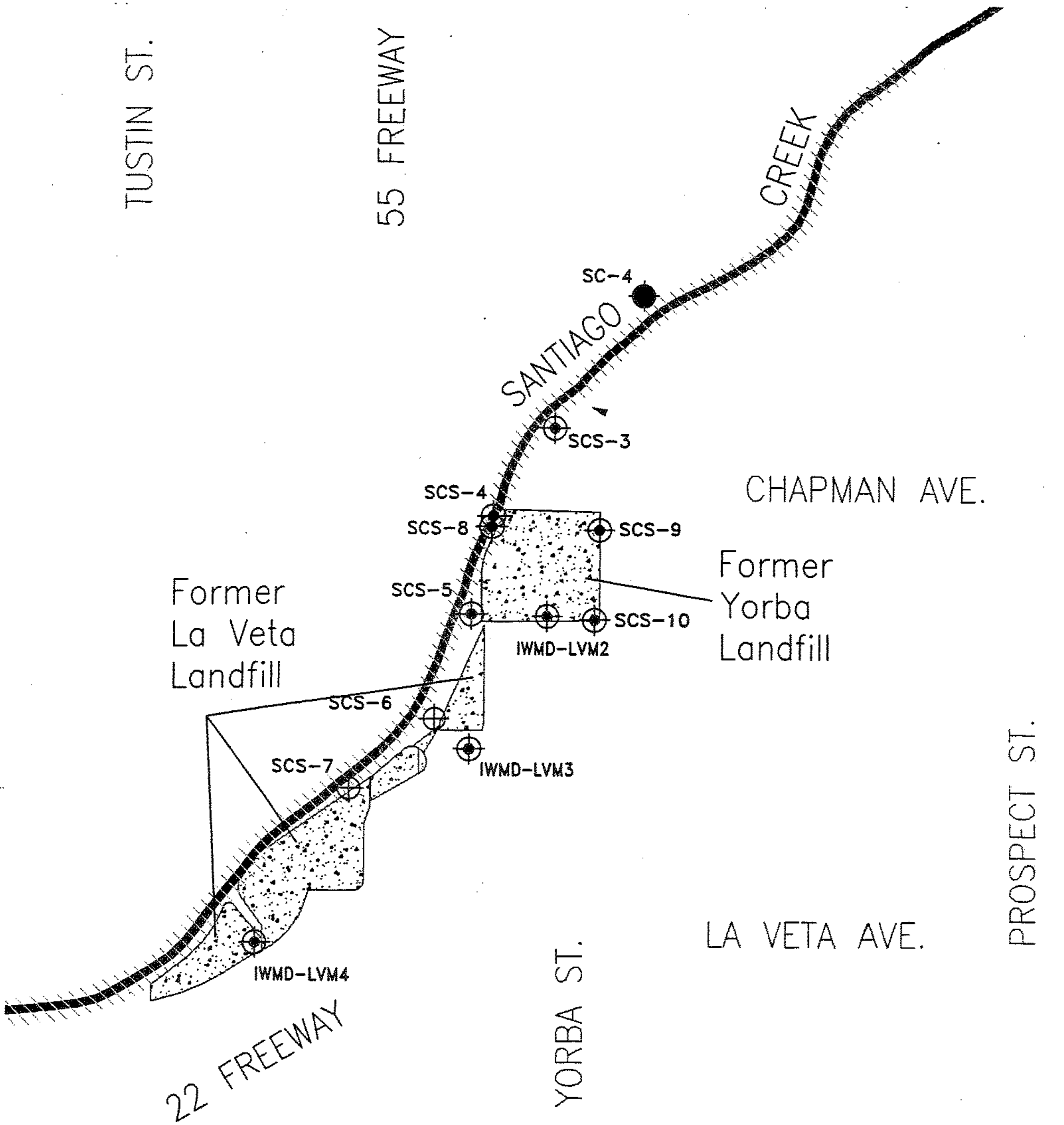
- Ca, Na, K, Mg, Cl, HCO_3, SO_4
- Nitrate
- Total dissolved solids
- EC, pH
- Volatile organic compounds (EPA method 502.2)

Data Reporting

For the first two years of recharge operations, OCWD will prepare an annual report documenting the recharge operations and groundwater monitoring activities and data collected. Specific items to be included in the report are as follows:

- Well location map
- Lithologic logs and well construction details for the two new wells
- Creek discharge duration and estimated flow rates
- Estimated creek bed percolation rates
- Water level hydrographs
- Water sample analytical results

The annual reports will be submitted to the Santa Ana Regional Water Quality Control Board, IWMD, City of Orange, and other interested agencies.



Legend

- Nested Monitoring Well
- Single-Point Monitoring Well
- Westbay Monitoring Well
- Recharge Area

N

SCALE

0 400 800 1200 1600

FEET

FIGURE
MONITORING WELL LOCATIONS

a:\jrd\acad\gs\figure2.dwg

06/21/99

APPENDIX D

NOISE ANALYSIS

APPENDIX D
NOISE ANALYSIS

The project consists of the construction and operation of a 62-foot long diversion pipeline to be attached to the existing Santiago Pipeline near the Santiago Pits. At completion, the instrument shelter would be visited once per week for maintenance activities. Additionally, two groundwater monitoring wells would be constructed at Yorba Park located immediately south of Chapman Avenue, east of the 55 Freeway, and west of Yorba Street in the City of Orange. The groundwater wells would be monitored twice annually requiring that a technician come to the site to obtain the water samples. Thus, any traffic associated with these operations is inconsequential and will not add to the ambient noise.

Characteristics of Sound

Sound is a pressure wave transmitted through the air. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect our ability to hear. Pitch is the number of complete vibrations or cycles per second of a wave that result in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments.

Sound intensity is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve.

For example, 10 decibels are 10 times more intense than one decibel, 20 decibels are 100 times more intense and 30 decibels are 1,000 times more intense. Thirty decibels represent 1,000 as much acoustic energy as 1 decibel. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than zero decibel. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10-decibel increase in sound level is perceived by the human ear as only doubling of the loudness of the sound. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, such as a piece of construction equipment, sound levels decrease approximately 6 decibels for each doubling of distance from the source. If noise is produced by a line source such as highway traffic or railroad operations, the sound decreases 3 decibels for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases 4.5 decibels for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The predominant rating scales for human communities in the State of California are the Equivalent-Continuous Sound Level (Leq) and Community Noise Equivalent Level (CNEL) based on A-weighted decibels (dBA). Leq is the total sound energy of time-varying noise over a sample period. CNEL is the time-varying noise over a 24-hour period, with a weighting factor applied to noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) with a weighting factor of 5 dBA, and from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours) with a weighting factor of 10 dBA. These noise adjustments are added to the noise events occurring during the more sensitive hours. Another noise rating scale of importance when assessing annoyance factor is the maximum noise level, Lmax, which is the highest exponential-time-averaged sound level that occurs during a stated time period.

Another noise metric also widely used is noise standard in terms of percentile noise levels. For example, the L10 noise level represents the noise level exceeded 10 percent of the time during a stated period. The L50 noise level represent the median noise level. Half the time the noise level exceeds this level and half the time it is less than this level. The L90 noise level represents the noise level exceeded 90 percent of the time and is considered the lowest noise level experienced during a monitoring period. It is normally referred to as the background noise level. For a relatively constant noise source, the Leq and L50 are approximately the same.

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 190 dBA will rupture the eardrum and permanently damage the inner ear.

The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying less developed areas.

Characteristics of the Existing Noise Environment in the Project Vicinity

The project is located within the unincorporated portion of Orange County immediately southeast of the city of Villa Park and northeast of the City of Orange. Primary existing noise sources in the project area are transportation facilities and specifically noise generated from vehicles traveling on Prospect Street. The major freeway in the area (i.e., the 55 Freeway) is located at such a distance and is shielded by the intervening terrain and structures such that noise from this route is not readily audible in the ambient background noise at the project site.

The pipeline is set adjacent to a low density residential area. Vacant land lies adjacent to the project site on all sides. The closest sensitive uses to the project site are the residential homes located in Villa Park along Fernando Circle. The nearest home is located at a distance of approximately 250 feet from the terminus of the turnout pipe (this measurement is to the residential building, not the residential property line).

Two proposed groundwater monitoring wells are to be located at Yorba Park. The park is located immediately east of the 55 Freeway and south of Chapman Avenue. The area to the north of the park is commercial and includes the St. Joseph Heritage Medical Group and Chapman Medical Center. Commercial retail land uses are located to the immediate east of the Park across Yorba Street fronting on Chapman Avenue. A single-family residential area is also located north of Chapman west of Santiago Creek. An apartment lies directly east of the southernmost proposed well across Yorba Street. Single family dwellings also lie across Yorba Street to the southeast of the southernmost well site. An adult education center and child development center are located adjacent to the southern perimeter of the park southwest of the well sites.

Of the noted proximate land uses, the residential, educational, and medical uses would be considered as sensitive to noise intrusion. The apartment complex located across Yorba Street from the southernmost well is located at a distance of about 105 feet. The nearest single family unit, also across Yorba Street, is approximately 170 feet from the well site. The housing development located to the north of Chapman and west of Santiago Creek is in excess of 1,500 feet from the more proximate northern well. The nearest classrooms within the education center are situated about 175 feet from the southern well. Finally, the St. Joseph and Chapman Medical Centers are located approximately 420 and 350 feet, respectively, from the northern well.

Applicable Noise Regulations

The proposed project site is located within the County of Orange and thus is subject to the General Plan and noise ordinances incorporated therein. Because noise from project construction could also impact on the cities of Villa Park and Orange, their applicable ordinances are also discussed.

County of Orange

The Noise Element of the County of Orange General Plan has developed noise standards for mobile noise sources. These standards address the impacts of noise from adjacent roadways, John Wayne Airport (JWA) and MCAS El Toro. The County specifies outdoor and indoor noise limits for residential uses, places of worship, educational facilities, hospitals, hotels/motels, commercial, and other land uses. The noise standard for exterior living areas is 65 dBA CNEL. The County prohibits new residential land uses within the 65 dBA CNEL contour from any airport or air station. Non-residential noise-sensitive land uses, such as hospitals, rest homes, convalescent hospitals, places of worship, and schools, will not be permitted within the 65 dBA CNEL area from any source, unless appropriate mitigation measures are included such that the standards contained in the Noise Element and in appropriate State and Federal Codes are met.

The standard Conditions of Approval of the County of Orange require that all residential and non-residential noise-sensitive structures be sound attenuated against the combined impact of all present and projected noise from exterior noise sources (including aircraft and highway noise) to meet the interior noise criteria as specified in the Noise Element and Land Use/Noise Compatibility Manual (which is 45 dBA CNEL interior).

Concerning construction noise, the standard Conditions of Approval require that all construction vehicles or equipment, fixed or mobile, operated within 1,000 feet of a dwelling be equipped with properly operating and maintained mufflers, that all operations comply with Orange County Codified Ordinance Division 6 (Noise Control), and stockpiling and/or vehicle staging areas must be located as far as practicable from dwellings. As specified in the Orange County Codified Ordinance Division 6 (Noise Control), construction activities are generally restricted to between 7:00 a.m. and 8:00 p.m. from Monday through Saturday. No construction activity is permitted on Sundays and federal holidays. Construction noise during the allowed construction time periods is exempted from the noise level provisions in the noise control ordinance.

City of Villa Park

Like the County, the City of Villa Park Noise Element attributes local noise to mobile sources, and most notably, automobiles traveling through the City. The City notes that the 60 dBA CNEL is the level at which planning for future noise sensitive land uses should consider acoustical impacts. Noise sensitive land uses include residences of all types, rest homes, hospitals, places of worship, and schools.

In addition to CNEL noise levels for planning purposes, the City sets a noise standard with allowable exceedance periods for stationary noise sources. For residential land uses the exterior noise standard is 55 dBA between the hours of 7:00 a.m. and 10:00 p.m. and 50 dBA between the hours of 10:00 p.m. and 7:00 a.m. The standard is not to be exceeded for a cumulative period of 30 minutes in any hour. The standard can be exceeded by a level of 5 dBA for a period of up to15 minutes, 10 dBA for a period of up to 5 minutes, and 15 dBA for a period of up to 1 minute. The standard is not to be exceeded by 20 dBA for any period of time.

Construction noise is covered in Section 6.6 of the Municipal Code. Specifically 6-6.7, "Special Provisions.-Generally, Paragraph e" exempts "Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a Federal Holiday."

City of Orange

The City of Orange takes a different approach to its Noise Element. The City has adopted land use compatibility standards recommended by the State Department of Health Services. These include a normally acceptable CNEL of up to 60 dBA for residential low density single family dwellings. Noise levels of up to 70 dBA are conditionally acceptable and development should only be undertaken after a detailed noise reduction program. Development in areas with noise levels between 70 and 75 dBA CNEL are normally unacceptable, while areas with noise levels over 75 dBA are clearly unacceptable for new development.

In addition to CNEL noise levels for planning purposes, the City sets a noise standard with allowable exceedance periods for stationary noise sources. Like the City of Villa Park, residential land uses are subject to an exterior noise standard is 55 dBA between the hours of 7:00 a.m. and 10:00 p.m. and 50 dBA between the hours of 10:00 p.m. and 7:00 a.m. The standard is not to be exceeded for a cumulative period of 30 minutes in any hour. The standard can be exceeded by a level of 5 dBA for a period of up to15 minutes, 10 dBA for a period of up to 5 minutes, and 15 dBA for a period of up to 1 minute. The standard is not to be exceeded by 20 dBA for any period of time.

Construction noise is covered in Title 8, Chapter 8.24, Section 8.24.070 E, of the Municipal Code. The included provisions are identical to those noted for Villa Park above.

Noise Impacts

A temporary increase in noise would occur during project construction. Noise levels associated with construction activities would be higher than the ambient noise levels in the project area today, but would subside once construction of the proposed project is completed.

Two types of noise impacts could occur during the construction phase. First, the transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Even though there could be a relatively high single event noise exposure potential with passing trucks, the increase in noise would be less than 1 dBA when averaged over a 24-hour period, and would therefore have a less than significant impact on noise receptors along the truck routes.

The second type of impact is related to noise generated by onsite construction equipment and local residents could be subject to elevated noise levels due to their operation. Because the project is relatively small, construction activities such as digging, pipeline installation, and burial would probably be carried out simultaneously.

Noise ranges have been found to be similar for various type of construction activities and a generally accepted noise level of 89 dBA as measured at a distance of 50 feet is recommended by the USEPA for construction noise assessments. The nearest residential units are located to the north in the City of Villa Park at a distance of about 250 feet from the end of the turnout pipe. Based on projected construction noise level of 89 dBA as measured at a distance of 50 feet, the noise level at the closest residential units is estimated at 75 dBA.

Noise impacts are reduced to less than significant levels with implementation of the required construction limitations set fort by the Orange County Noise Element. These measures are required and are therefore not considered mitigation.

As noted above, both the County and City of Orange set limitations on construction proximate to sensitive receptors. The following measures shall be observed for all site construction activities.

1. Site construction shall be restricted to weekdays and Saturdays between the hours of 7:00 a.m. and 7:00 p.m. No construction shall be performed on Sundays or legal holidays. These restrictions shall also be applied to any materials' deliveries.

2. All construction equipment shall be fitted with properly operating mufflers.

3. All stockpiling, staging, and equipment maintenance shall be conducted toward the southeastern portion of the site as far as practicable from local residents.

Appendix M-8

2000: River Trails Recharge Basin, Mitigated Negative Declaration

ESA

202291-EIS-0011.PMND

River Trail Recharge Basin
10500 Ellis Avenue
Fountain Valley, California 92708
(714) 378-3225

PROPOSED MITIGATED NEGATIVE DECLARATION

In accordance with California Environmental Quality Act, the Orange County Water District has conducted an Initial Study to determine whether the following project may have a significant adverse effect on the environment, and on the basis of that study hereby finds:

	The proposed project will not have a significant adverse effect on the environment; therefore, it does not require the preparation of an Environmental Impact Report.
X	Although the proposed project could have a significant adverse effect on the environment, there will not be a significant adverse effect in this case because the Mitigation Measures described on the initial study have been added to the project. An Environmental Impact Report is therefore not required.

The Environmental documents which constitute the Initial Study and provide the basis and reasons for this determination are attached and hereby made a part of this document.

PROJECT:

Title: River Trail Recharge Basin

Location: The River Trail site is located on Orange County Water District land in the City of Orange above the east bank of the Santa Ana River across from the Burris Pit Recharge Basins between Taft and Lincoln Avenue

Description: The proposed project is a means to increase recharge into the Orange County Groundwater Basin. It would add an additional 3,500 acre-feet of recharge capacity per year. The proposed basin will have: a perimeter access road; 3:1 side slopes; a depth of 6-10 feet; an area large enough for heavy equipment to turn around; a Basin access ramp; and an area where material removed from the Basin during cleaning can be temporarily stored.The Basin will be filled from the existing Santiago Pipeline and drained as needed, as often as 3-4 times per year.

Project Proponent: Orange County Water District

Address: 10500 Ellis Avenue, Fountain Valley, CA 92708

Contact Person: Craig Miller, P.E. Telephone Number: (714) 378-3225

NOTICE:

This document and supporting attachments are provided for review by the general public. This is an information document about environmental effects only. Supplemental information is on file and may be reviewed in the office listed above. The decision-making body will review this document and potentially many other sources of information before considering the proposed project.

This Proposed Mitigated Negative Declaration may become final unless written comments or an appeal is received by the office listed above by October 10, 2001. If you wish to appeal the appropriateness or adequacy of this document, address your written comments to our finding that the project will not have a significant adverse effect on the environment: (1) identify the environmental effect(s), why they would occur, and why they would be significant, and (2) suggest any mitigation measures which you believe would eliminate or reduce the effect to an acceptable level. Regarding item (1) above, explain the basis for your comments and submit any supporting data or references.

Craig Miller, P.E., Director of Recharge and Wetlands Operations
September 7, 2001

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NOTICE OF AVAILABLITY
AND
NOTICE OF INTENT TO ADOPT A
MITIGATED NEGATIVE DECLARATION
FOR
RIVER TRAIL RECHARGE BASIN

PUBLIC NOTICE OF AVAILABILITY: The Orange County Water District (OCWD) completed the Mitigated Negative Declaration (MND) for the River Trails Recharge Basin project. The MND discusses the potential environmental affects attributable to the subject project. Following are the description of the project, project location, and name/address of the project applicant.

> **Project Description:** The proposed project is the construction of a water recharge basin, as a means to increase recharge into the Orange County Groundwater Basin. It would add an additional 3,500 acre-feet of recharge capacity per year. The proposed basin will have: a perimeter access road; 3:1 side slopes; a depth of 6-10 feet; an area large enough for heavy equipment to turn around; a basin access ramp; and an area where material removed from the basin during cleaning can be temporarily stored. The basin will be filled from the existing Santiago Pipeline and drained as needed, as often as 3-4 times per year.
>
> **Project Location:** The River Trail site is located on OCWD land in the City of Orange above the east bank of the Santa Ana River between Taft and Lincoln Avenues. The site is roughly triangular in shape with a 78-foot northern edge and 260-foot southern edge, encompassing a total area of 7.5 acres. The existing access is to the south end of the property from Main Street on the east. This is the northwest corner of north Main Street, approximately one block north of Taft Avenue at an elevation of approximately 186 feet mean sea level (MSL). Currently, the site is occupied by a horse stable operation that includes stalls, arenas, and residence/office facilities.
>
> **Name and Address of Project Applicant:** Craig Miller, Orange County Water District, 10500 Ellis Avenue, Fountain Valley, CA, 92708.

The MND found all environmental issues to be less than significant after the implementation of mitigation measures. No hazardous materials sites enumerated under Section 65962.5 of the Government Code are present on the project site.

This MND is hereby made available for public review and comment. The public review period for the MND has a duration of 30 days beginning on September 10, 2001 and ending on October 10, 2001. You are invited to submit written comments on the MND to Craig Miller, Director of Recharge and Wetlands Operations, Orange County Water District, 10500 Ellis Avenue, Fountain Valley, California, 92708 by October 10, 2001. Copies of the MND are on file for public review at the Orange County Water District at the above address.

NOTICE OF PUBLIC MEETING: It is further noted that a meeting accepting public testimony on the MND will be held before the OCWD Board of Directors. The public meeting will be focused on the objectivity and adequacy of the MND in discussing potential impacts upon the environment, and ways in which adverse effects might be mitigated. The meeting will begin at 6:00 p.m., or soon thereafter, as the matter may be heard by the OCWD Board of Directors Water District on Wednesday, November 21, 2001 at 10500 Ellis Avenue, Fountain Valley, CA, 92708. Final approval of the MND and consideration of the project will occur at this meeting.

INITIAL STUDY AND ENVIRONMENTAL CHECKLIST

RIVER TRAIL RECHARGE BASIN

LEAD AGENCY:

ORANGE COUNTY WATER DISTRICT
10500 Ellis Avenue
Fountain Valley, CA 92708

PROJECT PROPONENT:

Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

Contact: Craig Miller, P.E.
714-378-3225

ORANGE COUNTY WATER DISTRICT ENVIRONMENTAL TEAM:

Steven R. Conklin, P.E.
Associate General Manager
Engineering and Construction

Craig Miller, P.E.
Director of Recharge and Water Operations

Richard Zembal
Natural Resources Director

September 7, 2001

ENVIRONMENTAL CHECKLIST

I. Project Title:

River Trail Recharge Basin

II. Lead Agency Name and Address:

Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

III. Contact Person and Telephone Number:

Craig Miller	Steve Conklin	Dick Zembal
714-378-3225	714-378-3211	714-378-3213

IV. Project Location:

The River Trail site is located on Orange County Water District land in the City of Orange above the east bank of the Santa Ana River across from the Burris Pit Recharge Basins between Taft and Lincoln Avenues (Figure 1). The site is roughly triangular in shape with a 78-foot northern edge and 260-foot southern edge, encompassing a total area of 7.5 acres (Figure 2). The existing access is to the south end of the property from Main Street on the east. This is the northwest corner of north Main Street, approximately one block north of Taft Avenue at an elevation of approximately 186 feet (MSL). Currently, the site is occupied by a horse stable operation that includes stalls, arenas, and residence/office facilities.

V. Project Sponsor's Name and Address:

ORANGE COUNTY WATER DISTRICT
10500 Ellis Avenue
Fountain Valley, Ca 92708

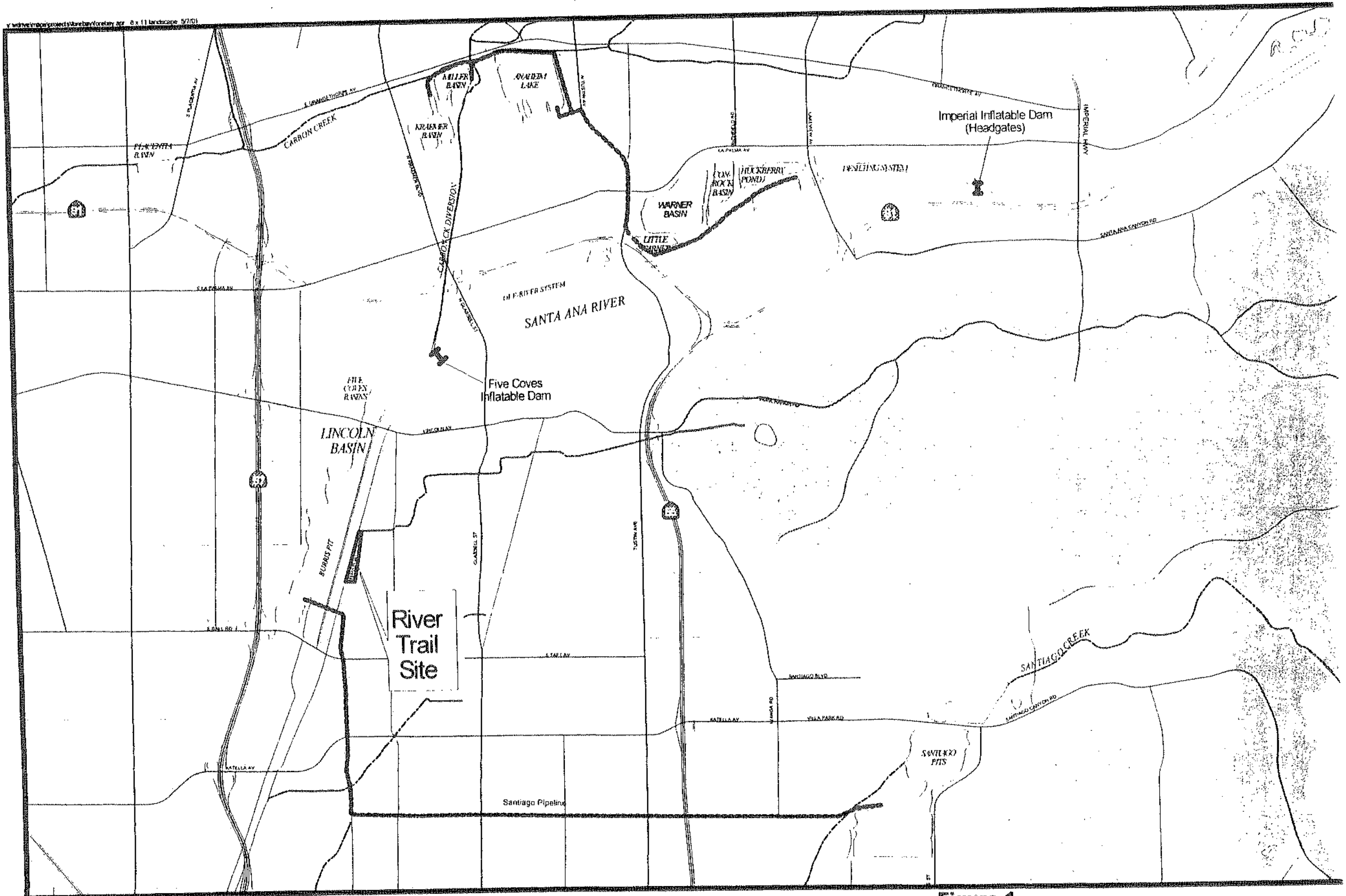
VI. General Plan Designation: R-O

VII. Zoning: Recreation and Open Space

VIII. Description of Project:

The Proposed River Trail Recharge Basin Project is a means to increase recharge into the Orange County Groundwater Basin. The proposed project would allow the OCWD to reuse additional amounts of Santa Ana River water while reducing the purchase of imported supplies from Metropolitan Water District (MWD).

The Orange County Groundwater Basin underlies the north half of the County beneath the lowlands known as the Tustin and Downey Plains. The basin extends 350 square miles between the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Newport-Inglewood Fault to the southwest, and terminating at the County line on the northwest where the aquifer continues into the Central Basin of Los Angeles County. Groundwater demands exceed the natural rate of recharge into the basin. To keep balance in the Basin, the Orange County Water District (OCWD) captures runoff from the Santa Ana River and purchases imported water for recharge. Projected demands indicate that an additional 75,000 acre-feet of recharged water

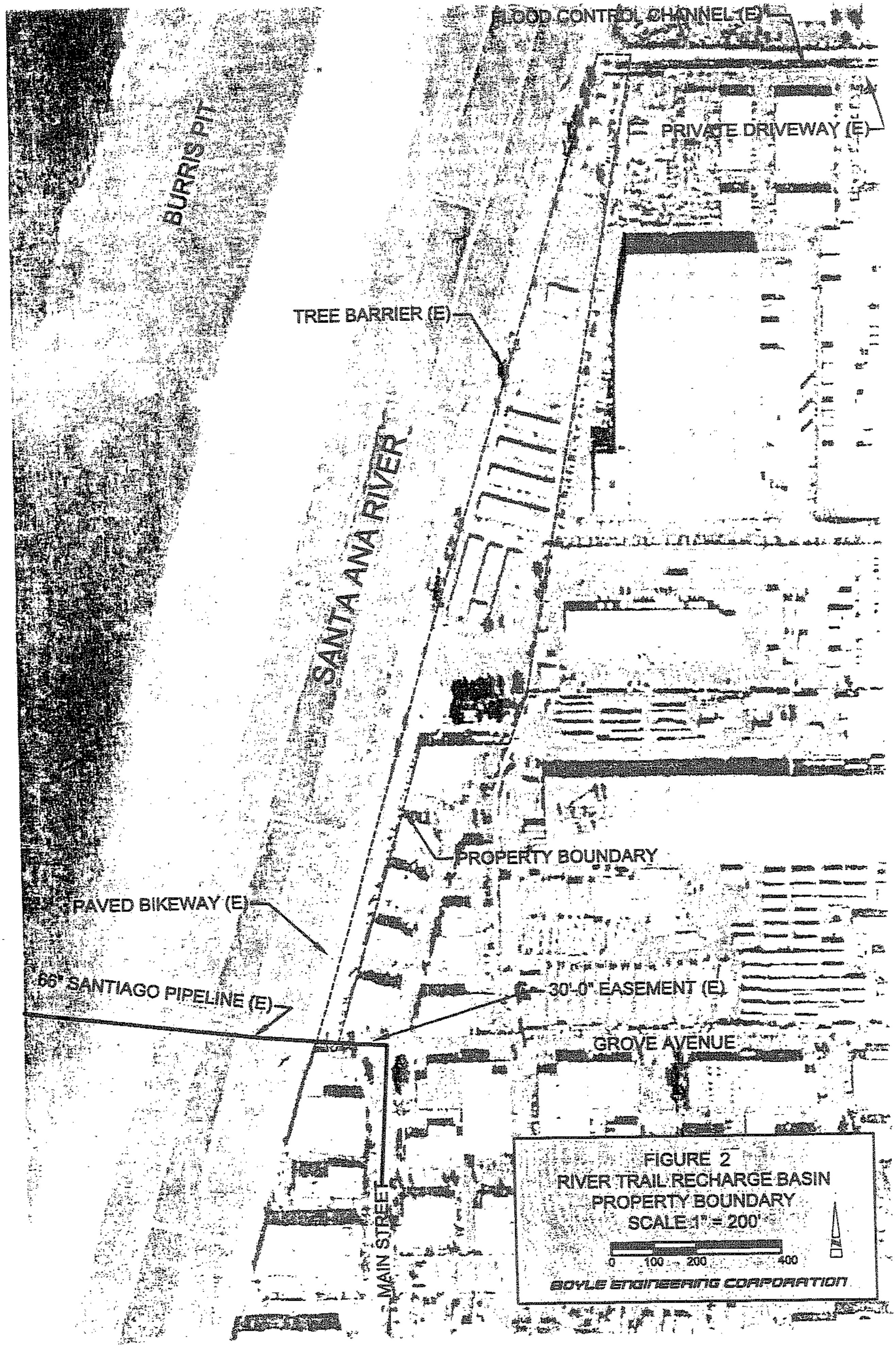


On River Recharge Area
Off River Recharge Area
Deep Basin Recharge Area
Non-Waterbearing Formation
Diversion Pipeline
Inflatable Rubber Dam

Figure 1

RIVER TRAIL SITE

(OCWD FOREBAY RECHARGE FACILITIES)


FLOOD CONTROL CHANNEL (E)
PRIVATE DRIVEWAY (E)
BURRIS PIT
TREE BARRIER (E)
SANTA ANA RIVER
PROPERTY BOUNDARY
PAVED BIKEWAY (E)
66" SANTIAGO PIPELINE (E)
30'-0" EASEMENT (E)
GROVE AVENUE
MAIN STREET
FIGURE 2
RIVER TRAIL RECHARGE BASIN
PROPERTY BOUNDARY
SCALE 1" = 200'
0 100 200 400
BOYLE ENGINEERING CORPORATION

will be needed. The River Trail Recharge Basin would add an additional 3,500 acre-feet of recharge capacity per year.

The proposed Basin will have: a perimeter access road; 3:1 side slopes; a depth of 6 – 10 feet; an area large enough for heavy equipment to turn around; a Basin access ramp; and an area where material removed from the Basin during cleaning can be temporarily stored. The Basin will be enclosed by a fence with up to two gates providing access to the site. The Basin will be filled from the existing Santiago Pipeline and drained as needed, as often as 3 – 4 times per year, to keep percolation rates high. The three monitoring wells that were placed to test percolation rates will be used for monitoring, if possible.

The Basin would be cleaned periodically to remove the clogging layer of silt and biological material that accumulates at the bottom, reducing the percolation rate. The Basin would be drained through an 8-inch gravity drain line into the Fletcher Flood Control Channel to the north. Discharges into the flood control channel would not occur during storm events. The water would then drain into the Santa Ana River recharge system.

The outflow pipeline would consist of approximately 100 feet of 8-inch pipe. Approximately 520 cubic yards of material would be trenched to lay the pipe and then backfilled.

Filling the Basin from the existing Santiago Pipeline would require the installation of approximately 2,250 feet of 24-inch pipe. Trenching and backfill for the inflow pipe would involve approximately 3,250 cubic yards of material.

Digging the Basin would require the removal and disposal of approximately 26,000 cubic yards of unusable fill material; removal of 23,050 cubic yards of excess soil; and grading of approximately 28,150 cubic yards of material. The perimeter road would require another 4,800 cubic yards of grading, 3,600 feet of perimeter fencing, and two gates. The construction of the recharge basin will also include the removal of horse stalls for approximately 200 horses.

IX. Surrounding Land Uses and Setting:

The site is bounded by an industrial complex to the east and south, the Santa Ana River to the west, and the Fletcher Flood Control Channel to the north. The paved Santa Ana River bike trail parallels the western edge of the property, between the site and the river.

X. Other Public Agencies Whose Approvals Are Required:

Agency	**Permit or Approval**
City of Orange Public Works Department	Traffic flow plan approval/grading permit
City of Orange Planning and Zoning Dept.	Land use and plan approval
City of Orange Fire Department	Emergency vehicle access plan approval
Orange County Fire Department	Fire truck access plan approval
County Health Department	Subject to regulations/permit requirements

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Land Use and Planning	☐ Transportation/Circulation	☐ Public Services
☐ Population and Housing	☐ Biological Resources	☐ Utilities and Service Systems
☐ Geological Problems	☐ Energy and Mineral Resources	☐ Aesthetics
☐ Water	☐ Hazards	☐ Cultural Resources
☐ Air Quality	☐ Noise	☐ Recreation
	☐ Mandatory Findings of Significance	

DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project.

Michael E Markus

Signature

September 7,2001

Date

for Craig Miller

Printed Name

Orange County Water District

For

ENVIRONMENTAL IMPACTS:

I. AESTHETICS. *Would the project:*

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒

No Impact. No scenic vistas in the project area would be affected. All facilities proposed would be lower profile than the existing surrounding surface features such as block walls, power transmission poles, buildings, etc.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
b)	Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒

No Impact. There are no designated scenic view sheds or scenic resources in the vicinity of the project. The project site is not visible from a state scenic highway. There are no scenic resources on the site or within the surrounding area. No impacts would result.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒

No Impact. The above grade facilities associated with the project will be minimal compared to those present on the property now. The proposed project will provide a vista of open water most of the time, compared to the existing view of stables. This is highly compatible with the river view.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
d)	Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Less Than Significant Impact. Glare could occur off the pooled water but the area is small and bordered by buildings and berms that should block significant glare when the sun is low.

II. AGRICULTURAL RESOURCES. *Would the project:*

a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. A portion of the project site is designated as Prime Farmland; however, the site is not currently and has not recently been used for agricultural activities. The California Agriculture Land Evaluation and Site Assessment Model was used to determine the agricultural significance of the project site. This assessment model includes various factors such as project size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. Based on the assessment model, the development of the project site as a recharge basin will result in a less than significant impact on agricultural land (see Attachment A).

b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The project site is not zoned for agricultural use and not under a Williamson Act contract. The project would not result in a conflict with an agricultural or Williamson Act contract zoning obligation.

c)	Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use.	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. Since the project site is in an industrial and recreational area, no agricultural use is likely or planned and there would be no conversion of existing farmland to non-agricultural use, therefore, no impact would result.

III. AIR QUALITY.

The proposed project consists of placement of an inflow and outflow pipeline, excavation and grading of the basin, and periodic cleaning of the basin by removal of a thin layer of sediment and regrading. Operational activity emissions would include those associated with the generation of electrical power needed to run inflow pumps, and periodic grading. Because of deregulation of the electric industry, electrical generation emissions could occur anywhere in the western United States. There is no direct linkage between electric consumption and the location of generating emissions. For purposes of analysis, the only project-related air quality impact potential was presumed to derive from construction and maintenance activities for the following:

- Excavations and backfill for the pipelines
- Excavation and grading of the site
- Removal from the site in trucks of excess fill materials
- Basin cleaning and sediment disposal

Standards of Significance

The State CEQA Guidelines define a significant effect on the environment as "a substantial adverse change in the physical condition which exists in the area affected by the proposed project." In order to determine whether or not the proposed project would cause a significant effect on the environment, the impact of the project must be determined by examining the types and levels of emissions generated and their impacts on factors that affect air quality. To accomplish this determination of significance, the SCAQMD has established air pollution thresholds against which a proposed project can be evaluated and assist lead agencies in determining whether or not the proposed project is potentially significant. If the thresholds are exceeded by a proposed project, then it should be considered significant.

While, the final determination of whether or not a project is significant is within the purview of the lead agency pursuant to § 15064(b) of the State CEQA Guidelines, the SCAQMD recommends that the following air pollution thresholds be used by lead agencies in determining whether the proposed project could result in a significant impact. If the lead agency finds that the proposed project has the potential to exceed these air pollution thresholds, the project should be considered significant. Each of these threshold factors is discussed below.

Construction Phase

Separate threshold standards have been recommended for assessing construction-term impacts, which are averaged over a 3-month period to include only actual working days. The following significance thresholds for air quality have been established by the SCAQMD on a daily basis for construction emissions:

- 75 pounds per day for ROG
- 100 pounds per day for NOx
- 550 pounds per day for CO
- 150 pounds per day for PM10
- 150 pounds per day of SOx

The following significance thresholds for air quality have been established by the SCAQMD on a quarterly basis for construction emissions:

- 2.5 tons per quarter of ROG
- 2.5 tons per quarter of NOx
- 24.75 tons per quarter of CO
- 6.75 tons per quarter of PM10
- 6.75 tons per quarter of SOx

During construction, if any of the identified daily or quarterly air pollutant thresholds are exceeded by the proposed project, then the project's air quality impacts may be considered significant.

Operational Phase

Specific criteria air pollutants have been identified by the SCAQMD as pollutants of special regional concern. Based upon this categorization, the following significance thresholds for operational emissions have been established by the SCAQMD for project operations:

- 55 pounds per day of ROG
- 55 pounds per day of NOx
- 550 pounds per day of CO
- 150 pounds per day of PM10
- 150 pounds per day of SOx

Projects within the SCAB with daily operation-related emissions that exceed any of the above emission thresholds may be considered significant.

The SCAQMD indicates in Chapter 6 of the *CEQA Air Quality Handbook* (SCAQMD 1993) (*Handbook)*, that they consider a project to be mitigated to a level of insignificance if its primary effects are mitigated below the thresholds provided above.

a)	Conflict with or obstruct implementation of the applicable air quality plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The air quality plan is based upon growth projections for Orange County for the next two decades. The projection, prepared by the Southern California Association of Governments (SCAG), presume that an adequate water supply would be available to support the projected level of growth. The proposed project does not conflict with the growth projections for Orange County as incorporated into the Regional Air Quality Management Plan.

b)	Violate any air quality standard or contribute to an existing or projected air quality violation?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☒	☐	☐

Less Than Significant Impact. The proposed project will generate short-term and long-term air emissions. Short-term air emission will occur during construction activities and long-term emissions will occur during the operation of the project.

Construction activities will involve clearing, excavation, grading and hauling activities. Construction dust would affect local and regional air quality at various times during construction of the project. The dry, windy climate of the area during the summer months, combined with the silty soils of the region, create a high potential for dust generation. The South Coast Air Quality Management District (SCAQMD) estimates that each acre of soil disturbed creates approximately 26.4 pounds of PM10 per construction workday and each acre of dirt/debris pushed creates approximately 21.8 pounds of PM10 per hour. The project would result in the disturbance of approximately 7.5 acres. As a worst-case scenario, approximately 5 acres of soil would be left disturbed while 2.5 acres would be involved in dirt/debris excavation during an 8-hour day. This activity would result in 132 pounds of PM10 per day from soil left disturbed and 436 pounds of PM10 per day from dirt/debris excavation. This would result in a total of 568 pounds of PM10 per day which exceeds the SCAQMD significance threshold for PM10. To reduce construction-generated dust and PM10 to a less than significant level, the following measure will be implemented.

- During clearing, grading, earth-moving, and excavation operations, the contractor shall control fugitive dust emissions by regular watering, or other dust-preventative measures using the following procedures:

- All material excavated or graded shall be sufficiently watered to prevent excessive amounts of dust. Watering, with complete coverage, shall occur at least twice daily, preferably in the late morning and after work is done for the day.

- All clearing, grading, earth-moving, or excavation activities shall cease during periods of high winds (i.e., greater than 25 miles per hour) or during Stage 1 or Stage 2 episodes).

- All material transported offsite shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.

- During construction, onsite construction vehicle speed shall be limited to 15 miles per hour.

After the implementation of the above measures, fugitive dust emissions would be reduce by approximately 75 percent which would reduce project construction emissions to less than 150 pounds per day. The resulting fugitive dust emissions would be considered less than significant.

Long-term emissions would occur during the cleaning of the basin and sediment removal. These activities would be periodic and would not exceed daily emission standards.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
		☐	☐	☒	☐

Less Than Significant Impact. Cumulative development of the proposed project and related projects would result in long-term cumulative air emissions and could result in short-term cumulative air emissions depending on the timing of construction activities of the proposed project and related projects. The proposed project would not exceed SCAQMD thresholds for pollutants, and therefore, the project's contribution to cumulative air impacts is rendered less than cumulatively considerable in accordance with Section 15064(i) of the CEQA Guidelines.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
d)	Expose sensitive receptors to substantial pollutant concentrations?				
		☐	☐	☐	☒

No Impact. Existing land uses that surround the project site include office and industrial uses to the north, east, and south. West of the project site is the Santa Ana River. Sensitive receptors to air emissions include residents due to exposure of air emissions in outdoor living areas over a period of time. Since there are no residences that are located adjacent to the project site, no impact to sensitive receptors would occur from project short-term and long-term air emissions.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
e)	Create objectionable odors affecting a substantial number of people?				
		☐	☐	☐	☒

No Impact. There are no odors associated with proposed construction activities except possibly for diesel exhaust. Any such odor would be transitory because larger pieces of equipment would be mobile. Daytime ventilation (prevailing breeze) along the river is normally very good. Any semi-fixed (stationary) emissions sources would have a substantial buffer distance from the nearest receiver within which any diesel exhaust would dissipate. Odor impact potential is nominal.

IV. BIOLOGICAL RESOURCES. *Would the project:*

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				
		❑	❑	❑	☒

No Impact. There is no native vegetation on the project site to support sensitive species.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				
		❑	❑	❑	☒

No Impact. There are no riparian or other sensitive natural communities on the project site.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				
		❑	❑	❑	☒

No Impact. The project site is located adjacent to the Santa Ana River and is elevated above the river. The site does not contain riparian vegetation and is not considered a wetland.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				
		❑	❑	❑	☒

No Impact. The project will not interfere with native wildlife species, resident or migratory corridors, or impede the use of nursery sites.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				
		❑	❑	❑	☒

No Impact. The landscaping that would be affected by the project is not protected by local policies or ordinances. The landscaping on site is very minimal.

f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local regional, or state habitat conservation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The project is not located in a habitat conservation plan area.

V. CULTURAL RESOURCES. *Would the project:*

a)	Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. Based on an archaeologic/historic records search as well as a site visit (see Attachment B), no historical resources. Therefore, the construction of the proposed project would not affect archaeologic/historic resources are anticipated. Standard measures to ensure no impacts occur to archaeologic/historic resources include:

1. If buried archaeologic materials are exposed during construction, work must be halted in the near the find until a qualified archaeologist can assess the significance (CEQA Section 15064.5-f and PRC Section 21082).

2. If the finds are deemed significant, the archaeologist should be permitted to record and/or remove the items in a professional manner for further laboratory evaluation (CEQA Section 15064.5-f and PRC Section 21082).

3. If human remains are unearthed during construction, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition (CEQA Section 15064.5-e).

b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. Please refer to discussion above under V a).

c)	Directly or indirectly destroy a unique paleontological resource or site unique geologic feature?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	☒	❑	❑

Less Than Significant With Mitigation Incorporated. Based on a paleontologic records search as well as a site visit, no paleontologic resources were found to occur on the project site. The project site includes a low potential of encountering significant vertebrate fossils in the older alluvium. Even though the site has a low potential for paleontologic resources, vertebrate fossils are known to occur in older alluvium and are considered highly sensitive. Due to the proposed excavation depth of 6 to 10 feet, construction activities could result in significant impacts to paleontologic resources. To reduce these potential impacts to less than significant, the following measures are required.

1. A qualified paleontologist will attend the pregrade meeting and develop a program for monitoring excavations into older alluvium.

2. If a fossil is exposed during construction, work must be halted near the find until the monitor and/or project paleontologist can assess the find and, if deemed significant, remove the resource in a professional manner for further laboratory evaluation.

3. Within 30 days of completion of the monitoring program, the project paleontologist will submit a report documenting results.

d)	Disturb any human remains, including those interred outside of formal cemeteries?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. There is no evidence identified to indicate that human remains were interred at the project site, however excavation would be halted immediately if human remains were detected as identified above under V a).

VI. GEOLOGY AND SOILS. *Would the project:*

a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒

No Impact. There are no Alquist-Priolo Earthquake Fault Zones running through the site per the Official Maps of Earthquake Fault Zones, May 1999. The project does not include any structures for human occupancy or facilities that would be considered essential to sustain life and property during a seismic event. Therefore, exposure of people or structures to potential adverse effects due to ground failure is unlikely.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	ii) Strong seismic ground shaking?	☐	☐	☐	☒

No Impact. The project does not include any structures for human occupancy or facilities that would be considered essential to sustain life and property during a seismic event.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐

Less Than Significant Impact. The project site is located in a liquefaction hazard area, based on the California Department of Conservation's Official Maps of Seismic Hazard Zones Orange Quadrangle (released April 15, 1998). The project does not include any structures for human occupancy or facilities that would be considered essential to sustain life and property during a seismic event. Therefore, exposure of people or structures to potential adverse effects due to ground failure is unlikely.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	iv) Landslides?	☐	☐	☐	☒

No Impact. This part of the City of Orange is characterized by predominately flat terrain, therefore the site is not prone to landslides.

b)	Result in substantial soil erosion or loss of topsoil?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	☒	❑

Less Than Significant Impact. During construction, the site will be cleared and graded, exposing unprotected soils to potential erosion. However, all earthwork and grading will be completed in accordance with local codes and regulations to prevent erosion. When the project is completed, the majority of the site will be protected with gravel, landscaped, or under water.

c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	☒	❑	❑

Less Than Significant Impact With Mitigation Incorporation. The project site is in an area of known past liquefaction. During construction, trenches would be excavated for pipeline installation, which could present an unstable condition and result in collapse of the trench walls. Unsuitable soils may be encountered that may not adequately support proposed roads designed to accommodate construction and maintenance vehicles and equipment. The following mitigation measures would reduce the potentially unstable or unsuitable soil conditions to a less than significant level:

1. The contractor performing the work would be required to provide adequate shoring, bracing and protective equipment to prevent collapse of trench walls in accord with state requirements.

2. A certified materials testing firm would be employed to analyze the existing soils to insure that the access roads are designed to withstand subsidence. Should unstable soils be encountered during construction of the pipelines or site improvements, they would be replaced with suitable material.

d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	☒	❑	❑

Less Than Significant Impact With Mitigation Incorporation. It is possible that the pipelines, roadways or staging areas could be located on expansive soils, which would create risk at the proposed facility. The following mitigation measures would reduce the level of risk to a less than significant level:

3. A geotechnical engineer would perform a soils analysis prior to completion of the design of the facility to identify areas of the project that may have expansive soil conditions. Early identification would allow the facility to be designed with proper foundation and support systems. If expansive soils are encountered in the project area that could affect the future integrity of the facility, the material would be removed and replaced, or conditioned to be adequate for long-term stability of proposed structures.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				
		☐	☐	☐	☒

No impact. The proposed project would not require sewer service, septic tanks, or alternative wastewater disposal.

VII. HAZARDS AND HAZARDOUS MATERIALS. *Would the project:*

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a)	Create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials?				
		☐	☒	☐	☐

Less Than Significant Impact With Mitigation Incorporation. Diesel fuel, a hazardous material would be transported and used at the site during construction and during future maintenance and rehabilitation operations, which would create a hazard to the environment should a spill occur. The following mitigation measures would reduce the hazards to a less than significant level:

5. The transport of hazardous materials is regulated by the State and the transport of such materials to the site would comply with these regulations.

6. During construction and future operations, OCWD would employ best management practices for spill control and prevention. With prevention and management in place, construction and maintenance related spills of hazardous materials are considered less than significant.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				
		☐	☒	☐	☐

Less Than Significant Impact With Mitigation Incorporation. Some hazardous materials, such as diesel fuel, would be transported and used at the site during construction and during future maintenance and rehabilitation operations, which would create a hazard to the environment should a spill occur. The mitigation measures discussed in VII. a) above would reduce the hazards to a less than significant level.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				
		☐	☒	☐	☐

Less Than Significant Impact With Mitigation Incorporation. It is anticipated that the project will transport hazardous materials within one-quarter mile of an existing or proposed school during construction and maintenance of the project. However, the site will be secured and unauthorized access will not be permitted. Mitigation Measures Nos. 5 and 6 will reduce the hazards to a less that significant level.

d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The site is not on a list of known hazardous materials sites.

e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would project result in a safety hazard for people residing or working in the project area?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The site is not located within an airport land use plan, or within two miles of a public or private airport.

f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The site is not located within the vicinity of a private airstrip.

g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. Project activity would not alter emergency response or emergency evacuation routes. Roadways would not be blocked during construction or operation.

h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. There are no wild lands near the project location. The construction of this project would not expose people or structures to a significant risk of loss, injury or death from wild land fires.

VIII. HYDROLOGY AND WATER QUALITY. *Would the project:*

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a)	Violate any water quality standards or waste discharge requirements?				
		☐	☐	☐	☒

No Impact. The project would involve recharging potable water into the existing groundwater aquifers. During construction, development, and future rehabilitation, water would be drained infrequently into the existing storm water collection system. All discharge would comply with OCWD's existing National Pollution Discharge Elimination System (NPDES) permit. No violations of water quality or waste discharges are anticipated to occur.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				
		☐	☐	☐	☒

No Impact. The purpose of this project is to increase the amount of water available to the people of Orange County through groundwater recharge. The project would enhance groundwater supplies through groundwater recharge.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite?				
		☐	☐	☐	☒

No Impact. No existing streams or rivers would be altered. However, during periodic maintenance activities, water would be discharged into an existing channel under an existing National Pollution Discharge Elimination System (NPDES) permit. These discharges would result in no adverse alteration of surface water quality and no impact. No erosion should result, as the system into which the water would eventually be discharged is maintained by OCWD for groundwater recharge.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?				
		☐	☐	☒	☐

Less Than Significant Impact. No existing streams or rivers would be altered. However, during periodic maintenance, water would be discharged from the basin into the Fletcher Flood Control Channel under an existing National Pollution Discharge Elimination System (NPDES) permit. These discharges would result in no adverse alteration of surface water quality and less than significant impact. No erosion should result, as the existing flood control channel handles much larger flows and the water quickly flows into the spreading grounds maintained by OCWD for groundwater recharge.

e)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted water?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. During periodic maintenance activities the basin will be drained into the Fletcher Flood Control Channel to the north under an existing National Pollution Discharge Elimination System (NPDES) permit. However, these discharges would not occur during storm events. Because the quality of the released water will be quite high, no impact to water quality will result.

f)	Otherwise substantially degrade water quality?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The recharge water will be from the river and will be of equal quality to water recharged into the adjacent river bed. Water quality will be maintained.

g)	Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The proposed project does not involve building homes and would not place housing within a flood zone.

h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. No structures would be built which would impede or redirect flood flows.

i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. Part of the City of Orange is located within the historic floodplain of the Santa Ana River and could have previously flooded in a 100-year storm event. However, after the completion of the improvements along the Santa Ana River, the project site is not expected to be flooded during a 100-year storm event. The proposed project would not increase exposure of people or structures to flooding.

j)	Inundation by seiche, tsunami, or mudflow?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The project would not expose people to seiche, tsunami, or mudflow.

IX. LAND USE AND PLANNING. *Would the project:*

a)	Physically divide an established community?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The proposed project is located adjacent to an industrial area on fenced property. The industrial community adjacent to the site will not be divided by the project.

b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The proposed use of this land conforms to existing plans, policies, and regulations adopted for the purposes of avoiding or mitigating environmental effects.

c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. Based upon discussions with City of Orange Planning staff, the project would not conflict with plans or policies adopted. The site is designated for open space and recreation, is already highly degraded, does not contain native habitat, and is not part of a natural community conservation area.

X. MINERAL RESOURCES. *Would the project:*

a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The project site is not located in an area of known mineral resources other than sand and gravel. The site is small and has been subject to past disturbances including the importation of fill material which renders any remaining mineral resources of insignificant value on a regional level. Therefore, no impacts on mineral resources of value to the region or the residents of the state are anticipated.

b)	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The site is not designated as having locally important mineral resources, therefore, no impact would result.

XI. NOISE. *Would the project result in:*

a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. The proposed construction project is scheduled to occur between 7:00 a.m. and 6:00 p.m. on Mondays through Fridays, and between 9:00 a.m. and 6:00 p.m. on Saturdays. There would be no construction activities on Sundays or legal holidays. Construction, repair, remodeling or grading activities that occur between these hours are exempted from the provisions of the City of Orange's Noise Ordinance [Municipal Code Chapter 8.24.070]. Therefore, the project would not result in a violation of the City's noise ordinance standards. Once the construction is completed the only noise associated with the project would occur when water spills into the basin and during maintenance activities. Maintenance operations would occur during the regular workweek, Monday through Friday, between the hours of 7:00 am and 6:00 pm, which complies with the City's Noise Ordinance.

b)	Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. The American National Standards Institute provides recommended ground velocity base-response curves for assessing the significance of the ground vibration that would be produced by the construction activities associated with this project (ANSI S3.29). These curves identify a combined-axis velocity level that ranges from 75 to 84 dB. This corresponds to the approximate threshold of perception for the most sensitive people.

The proposed project would result in a number of construction activities occurring in proximity to an established recreational trail and industrial area. These activities could involve heavy equipment including: front-end loaders, excavators, trucks, a crane, compactors, rollers, a grader, drill rig, air compressor, generator, forklift, 500 hp diesel engine, and a back hoe. The amount of ground vibration that would be experienced in the adjacent industrial area when these equipment items are operating depends to a great extent on the soil conditions at the site. The soils to be excavated consist of fill to a local depth of 3 – 7 feet, poorly-graded sand interspersed with interbeds of gravelly sand to 33 feet, and clay, silt, gravels, clayey gravels, and sands below approximately 35 feet. The prevalence of sand within the excavation zone should dissipate the level of vibration before it reaches people working within the buildings of the industrial area adjacent to the project site. Based on data obtained during previous studies, it is estimated that some of the equipment items (e.g., the backhoes, front-end loaders and drill rigs) may generate vibration velocity levels of up to 90 dB. This exceeds the ANSI guideline for residential properties unless mitigated. Since industrial uses surround the project site, the noise and vibration would be unnoticed in the normal workday activities. For example, Clark's-Orange Auto Dismantling is immediately adjacent to the project area.

c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. The proposed project will involve approximately 3 months of construction activity, emitting noise levels onto the adjacent industrial uses. Maintenance grading and removal of fine materials could occur over several days, several times per year. This would involve an excavator, front-end loader, and a truck. These construction noise sources would not result in a substantial noise increase in the project area. Furthermore, there would be no permanent increase in ambient noise levels.

d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. The proposed construction project would result in noise levels that are probably within existing ambient levels considering the adjacent industrial activities. Construction activities and the associated noise would occur over approximately three months and there would be another one to two weeks of maintenance excavation and grading per year. All future maintenance, repair and rehabilitation activities would be scheduled to occur during the regular work week, Monday through Friday, between the hours of 7:00 am and 6:00 pm.

Constructing the pipelines, access road, and basin could involve such equipment as front-end loaders, excavators, cranes, and trucks. These equipment items generate noise levels as high as 86 dB(A) at a distance of 50' during intense activity. When several equipment items are operating simultaneously, the overall construction noise level can go up to 10 dB higher. For businesses adjacent to the project site, it is anticipated that construction noise would be masked by the ambient noise level of the existing industrial activity.

Although the noise generated during construction and maintenance activities may be experienced as a nuisance to passers-by of the project, the impact is considered to be less than significant because: 1) it is short-term and probably within ambient levels; and 2) it would be limited to regular workdays and hours.

e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. There is no public airport within two miles of the project site.

f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. There is no private airstrip located in the vicinity of the project site.

XII. POPULATION AND HOUSING. *Would the project:*

a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The proposed project would not directly or indirectly induce population growth. The facilities would be unmanned and staff that would visit the project irregularly. The project would not induce new employment. A new maintenance road could be constructed, but only for use by the staff to access the site. No new housing or extension of major infrastructure would result.

b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. There are currently caretaker homes on the project site. These homes are ancillary to the commercial recreational use (horse stable) and not considered permanent housing as part of the City of Orange General Plan. The conversion of the project site to a recharge basin would not result in impacts to permanent housing.

c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. Even though caretakers are located on the project site, these caretakers are ancillary to the commercial recreational use on the site. The project would not displace permanent residents, and therefore, no impacts would occur.

XIII. PUBLIC SERVICES. *Would the project:*

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a)	Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which would cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
	i) Fire protection?	☐	☐	☐	☒

No Impact. The project would not result in the need for new or physically altered government facilities nor affect response time for fire protection.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	ii) Police Protection?				
		☐	☐	☐	☒

No Impact. The project would not result in the need for new or physically altered government facilities nor affect response time for police protection.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	iii) Schools?				
		☐	☐	☐	☒

No Impact. The project would not result in the need for new or physically altered government facilities for schools.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	iv) Parks?				
		☐	☐	☐	☒

No Impact. This project will not affect government-provided park services.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	v) Other public facilities?				
		☐	☐	☐	☒

No Impact. There are no other government-provided facilities, or provided services impacted by the proposed project.

XIV. RECREATION. *Would the project:*

a)	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. The proposed project would displace about 200 horses from the existing stables. The individual horse owners are not likely to move their horses to one existing facility, causing its deterioration because: 1) Each of the individuals affected will have different criteria for a suitable replacement facility in terms of cost, distance and direction from home, etc.; 2) There is no existing local facility able to absorb this number of horses and horse owners; and 3) There are regulations governing animal care that would disallow overcrowding of a facility stabling horses.

b)	Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. No recreational facilities are planned as part of this project.

XV. TRANSPORTATION/TRAFFIC. *Would the project:*

a)	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. During the construction period, there would be a nominal increase in traffic for material deliveries, waste hauling and workers accessing the site for a period of approximately 3 months. Because the work area is remote from public roads, no traffic delays due to construction or maintenance activities are anticipated.

b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☐	☒

No Impact. The project would not result in a permanent increase in traffic load because only OCWD maintenance staff would access the project site on a regular basis.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒

No Impact. The proposed project would not affect air traffic.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒

No Impact. The construction area and recharge basin will be closed to the public and fenced.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
e)	Result in inadequate emergency access?	☐	☐	☐	☒

No Impact. The project does not propose changes to access in the surrounding area.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
f)	Result in inadequate parking capacity?	☐	☐	☐	☒

No Impact. During construction and maintenance, the workers would park on the fenced project site, which has adequate space for parking. No long-term parking is required for the project.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☒	☐

Less Than Significant Impact. Construction and maintenance activities will be visible from the bike trail but will not physically interfere with bicycle traffic.

XVI. UTILITIES AND SERVICE SYSTEMS. *Would the project:*

a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. There is no wastewater treatment associated with the project.

b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The proposed project would not require construction of new or expansion of existing water or wastewater treatment facilities.

c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which would cause significant environmental effects?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	☒	❑

Less Than Significant Impact. A connection will be constructed to the Fletcher Flood Control Channel to drain the recharge basin for maintenance, if necessary. However, the basin would rarely be drained, never during a storm event or time of significant runoff, and the amount of water introduced to the floodway would be nominal compared to the capacity of the system. Irregular, slow discharge of the recharge basin to the recharge facilities in the river will have no effect on the storm drainage system or cause any need for new facilities.

d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new expanded entitlements needed?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. No new water supplies would need to be added or expanded.

e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. No expansion of wastewater treatment is necessary, as the existing facilities that would supply the project have sufficient capacity.

f)	Be served by a landfill with sufficient capacity to accommodate the project's solid waste disposal needs?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. Waste generated from construction would not be significant in quantity. No solid waste would be generated during maintenance of the recharge basin. Excess soil excavated from the site will be reused or sold.

g)	Comply with federal, state and local statutes and regulations related to solid waste?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The only waste generated from this project would be that of construction waste, which is classified as Class 3 waste-construction, demolition and fill materials (County of Orange, 1985). The project would comply with federal state, and local statutes and regulations related to solid waste.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California or prehistory?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	❑	☒

No Impact. The project does not have the potential to degrade the quality of the environment and would not have a significant impact on any fish or wildlife habitat. The project site will be re-examined during excavation for anything of historic or prehistoric significance but no important examples or major periods of California history or prehistory are expected to be represented.

b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of probable future projects)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		❑	❑	☒	❑

Less Than Significant Impact. Since the proposed project is expected to be constructed within the next two years, the following cumulative analysis is based on related projects within the cities of Orange and Anaheim that are in the vicinity of the project site. Office, storage, hotel, and a nursery are currently proposed in the vicinity of the project site. Construction of the proposed recharge basin will contribute to a few cumulative impacts. Following is a discussion of the environmental issues.

The proposed project will not result in impacts to many environmental issues. These issues include aesthetics, long-term air quality, biological resources, archaeological/historic resources, land use and planning, mineral resources, long-term noise, population and housing, public services, long-term traffic, and utilities. Since the project would not affect these environmental components, the project would not contribute environmental impacts to potential cumulative affects.

The proposed project will also result in effects that are less than significant for many environmental issues. These issues include light and glare, agricultural resources, liquefaction, soil erosion, drainage to Fletcher Flood Control Channel, construction noise , and construction traffic. The proposed project is expected to result in minimal glare impacts and the project's potential effect would be rendered less than cumulatively considerable. The proposed project will also result in the loss of land that is currently designated as Prime Farmland; however, based on a detailed review of the soils as well as surrounding farmland, the project's effect is less than significant. In addition, the project's effect is rendered less than cumulatively considerable. Furthermore, the project will be exposed to potential liquefaction and soil erosion. This expected exposure would not increase with the development of the surrounding related projects because these effects are site specific. Therefore, there would be no cumulative effects associated with these issues. Release of water from the site to the Fletcher Flood Control Channel will not occur during storm events under the proposed project; therefore, the project's contribution to potential drainage effects would be rendered less than cumulatively considerable. Finally construction traffic and noise may contribute to cumulative air quality and noise emissions. However, since the related project are not directly adjacent to the project site, construction noise levels would not contribute substantially to cumulative noise levels. Since air quality emissions would not exceed the South Coast Air Quality Management District's thresholds for criteria pollutants, the project effects would not be cumulatively considerable.

The proposed project will also include effects that are less than significant after the implementation of mitigation measures. These effects include short-term air quality, paleontologic resources, geology (i.e., unstable and expansive soils), and hazardous materials. The proposed project may contribute to cumulative short-term construction emissions; however, since the proposed project would not exceed the South Coast Air Quality Management District's thresholds for criteria pollutants, the project's effects would not be cumulatively considerable. The effects associated with paleontologic resources and geology are site specific and no additional effects are added by related projects. Therefore, there would be no cumulative effects associated with these issues. Finally, mitigation measures for hazardous materials are identified to reduce potential significant impacts associated with spills of diesel fuel. The potential effects associated with spills are not expected to substantially contribute to potential cumulative hazardous waste impacts. The project's hazardous waste effects after mitigation would not be cumulatively considerable.

Based on a review of the environmental issues associated with the construction and operation of the proposed recharge basin, the effects would not be cumulatively considerable in accordance with Section 15064(i) of the CEQA Guidelines.

c)	Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		☐	☐	☒	☐

Less Than Significant Impact. The project would not cause substantial adverse effects on human beings in general. The people who currently enjoy the recreation available at this site and use the existing stables would have to move in any event if the lease is permitted to expire. The trade-off in permitting the lease to expire and converting this site to a recharge basin is water filtered through the groundwater basin, eventually serving approximately 3,500 families per year, versus the displacement and dispersal of 200 horses and their owners.

Authority: Public Resources Code Sections 21083 and 21087.
Reference: Public Resources Code Sections 21080(c), 21080.1, 21083, 21083.3, 21093, 21094, 21151; *Sundstrom v. County of Mendocino*, 202 Cal.App.3d 296 (1988); *Leonoff v. Monterey Board of Supervisors*, 222 Cal.App.3d 1337 (1990).

ATTACHMENT A:
CALIFORNIA AGRICULTURAL LESA WORKSHEETS

NOTES

Calculation of the Land Evaluation (LE) Score

Part 1. Land Capability Classification (LCC) Score:

(1) Determine the total acreage of the project.
(2) Determine the soil types within the project area and enter them in **Column A** of the **Land Evaluation Worksheet** provided on page 2-A.
(3) Calculate the total acres of each soil type and enter the amounts in **Column B**.
(4) Divide the acres of each soil type (**Column B**) by the total acreage to determine the proportion of each soil type present. Enter the proportion of each soil type in **Column C**.
(5) Determine the LCC for each soil type from the applicable Soil Survey and enter it in **Column D**.
(6) From the LCC Scoring Table below, determine the point rating corresponding to the LCC for each soil type and enter it in **Column E**.

LCC Scoring Table

LCC Class	I	IIe	IIs,w	IIIe	IIIs,w	IVe	IVs,w	V	VIe,s,w	VIIe,s,w	VIII
Points	100	90	80	70	60	50	40	30	20	10	0

(7) Multiply the proportion of each soil type (**Column C**) by the point score (**Column E**) and enter the resulting scores in **Column F**.
(8) Sum the LCC scores in **Column F**.
(9) Enter the LCC score in box <1> of the **Final LESA Score Sheet** on page 10-A.

Part 2. Storie Index Score:

(1) Determine the Storie Index rating for each soil type and enter it in **Column G**.
(2) Multiply the proportion of each soil type (**Column C**) by the Storie Index rating (**Column G**) and enter the scores in **Column H**.
(3) Sum the Storie Index scores in **Column H** to gain the Storie Index Score.
(4) Enter the Storie Index Score in box <2> of the **Final LESA Score Sheet** on page 10-A.

Land Evaluation Worksheet

Land Capability Classification (LCC) and Storie Index Scores

A Soil Map Unit	B Project Acres	C Proportion of Project Area	D LCC	E LCC Rating	F LCC Score	G Storie Index	H Storie Index Score
IIIs	7.5	1.0		60	60	80	80
Totals	7.5	(Must Sum to 1.0)		***LCC Total Score***	60	***Storie Index Total Score***	80

Site Assessment Worksheet 1.

Project Size Score

	I LCC Class I - II	J LCC Class III	K LCC Class IV - VIII
		7.5	
Total Acres		7.5	
Project Size Scores		0	

Highest Project Size Score 0

NOTES

Calculation of the Site Assessment (SA) Score

Part 1. Project Size Score:.

(1) Using **Site Assessment Worksheet 1** provided on page 2-A, enter the acreage of each soil type from **Column B** in the **Column - I, J or K** - that corresponds to the LCC for that soil. (Note: While the Project Size Score is a component of the Site Assessment calculations, the score sheet is an extension of data collected in the Land Evaluation Worksheet, and is therefore displayed beside it).
(2) Sum **Column I** to determine the total amount of class I and II soils on the project site.
(3) Sum **Column J** to determine the total amount of class III soils on the project site.
(4) Sum **Column K** to determine the total amount of class IV and lower soils on the project site.
(5) Compare the total score for each LCC group in the Project Size Scoring Table below and determine which group receives the highest score.

Project Size Scoring Table

Class I or II		**Class III**		**Class IV or Lower**	
Acreage	Points	Acreage	Points	Acreage	Points
>80	100	>160	100	>320	100
60-79	90	120-159	90	240-319	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10-19	30	40-59	60	40-99	20
10<	0	20-39	30	40<	0
		10-19	10		
		10<	0		

(6) Enter the **Project Size Score** (the highest score from the three LCC categories) in box <3> of the **Final LESA Score Sheet** on page 10-A.

NOTES

Part 2. Water Resource Availability Score:

(1) Determine the type(s) of irrigation present on the project site, including a determination of whether there is dryland agricultural activity as well.

(2) Divide the site into portions according to the type or types of irrigation or dryland cropping that is available in each portion. Enter this information in **Column B** of **Site Assessment Worksheet 2. - Water Resources Availability**.

(3) Determine the proportion of the total site represented for each portion identified, and enter this information in **Column C**.

(4) Using the Water Resources Availability Scoring Table, identify the option that is most applicable for ea portion, based upon the feasibility of irrigation in drought and non-drought years, and whether physical or economic restrictions are likely to exist. Enter the applicable Water Resource Availability Score into **Column D**.

(5) Multiply the Water Resource Availability Score for each portion by the proportion of the project area it represents to determine the weighted score for each portion in **Column E**.

(6) Sum the scores for all portions to determine the project's total Water Resources Availability Score

(7) Enter the Water Resource Availability Score in box <4> of the **Final LESA Score Sheet** on page 10-A.

Site Assessment Worksheet 2. - Water Resources Availability

A	B	C	D	E
Project Portion	Water Source	Proportion of Project Area	Water Availability Score	Weighted Availability Score (C x D)
1	Water District	1.0	100	100
2				
3				
4				
5				
6				
		(Must Sum to 1.0)	***Total Water Resource Score***	100

Water Resource Availability Scoring Table

Option	Non-Drought Years			Drought Years			WATER RESOURCE SCORE
	RESTRICTIONS			RESTRICTIONS			
	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	
1	YES	NO	NO	YES	NO	NO	100
2	YES	NO	NO	YES	NO	YES	95
3	YES	NO	YES	YES	NO	YES	90
4	YES	NO	NO	YES	YES	NO	85
5	YES	NO	NO	YES	YES	YES	80
6	YES	YES	NO	YES	YES	NO	75
7	YES	YES	YES	YES	YES	YES	65
8	YES	NO	NO	NO	– –	– –	50
9	YES	NO	YES	NO	– –	– –	45
10	YES	YES	NO	NO	– –	– –	35
11	YES	YES	YES	NO	– –	– –	30
12	Irrigated production not feasible, but rainfall adequate for dryland production in both drought and non-drought years						25
13	Irrigated production not feasible, but rainfall adequate for dryland production in non-drought years (but not in drought years)						20
14	Neither irrigated nor dryland production feasible						0

NOTES

Part 3. Surrounding Agricultural Land Use Score:

(1) Calculate the project's Zone of Influence (ZOI) as follows:

(a) a rectangle is drawn around the project such that the rectangle is the smallest that can completely encompass the project area.

(b) a second rectangle is then drawn which extends one quarter mile on all sides beyond the first rectangle.

(c) The ZOI includes all parcels that are contained within or are intersected by the second rectangle, less the area of the project itself.

(2) Sum the area of all parcels to determine the total acreage of the ZOI.

(3) Determine which parcels are in agricultural use and sum the areas of these parcels

(4) Divide the area in agriculture found in step (3) by the total area of the ZOI found in step (2) to determine the percent of the ZOI that is in agricultural use.

(5) Determine the Surrounding Agricultural Land Score utilizing the Surrounding Agricultural Land Scoring Table below.

Surrounding Agricultural Land Scoring Table

Percent of ZOI in Agriculture	Surrounding Agricultural Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<19	0

(5) Enter the Surrounding Agricultural Land Score in box <5> of the **Final LESA Score Sheet** on page 10-A.

Site Assessment Worksheet 3.
Surrounding Agricultural Land and Surrounding Protected Resource Land

A	B	C	D	E	F	G
Zone of Influence						
Total Acres	Acres in Agriculture	Acres of Protected Resource Land	Percent in Agriculture (A/B)	Percent Protected Resource Land (A/C)	Surrounding Agricultural Land Score (From Table)	Surrounding Protected Resource Land Score (From Table)
813	26.7	0	3	0	0	0

NOTES

Part 4. Protected Resource Lands Score:

The Protected Resource Lands scoring relies upon the same Zone of Influence information gathered in Part 3, and figures are entered in Site Assessment Worksheet 3, which combines the surrounding agricultural and protected lands calculations.

(1) Use the total area of the ZOI calculated in Part 3. for the Surrounding Agricultural Land Use score.

(2) Sum the area of those parcels within the ZOI that are protected resource lands, as defined in the California Agricultural LESA Guidelines.

(3) Divide the area that is determined to be protected in Step (2) by the total acreage of the ZOI to determine the percentage of the surrounding area that is under resource protection.

(4) Determine the Surrounding Protected Resource Land Score utilizing the Surrounding Protected Resource Land Scoring Table below.

Surrounding Protected Resource Land Scoring Table

Percent of ZOI Protected	Protected Resource Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<20	0

(5) Enter the Protected Resource Land score in box <6> of the **Final LESA Score Sheet** on page 10-A.

NOTES

Final LESA Score Sheet

Calculation of the Final LESA Score:

(1) Multiply each factor score by the factor weight to determine the weighted score and enter in Weighted Factor Scores column.
(2) Sum the weighted factor scores for the LE factors to determine the total LE score for the project.
(3) Sum the weighted factor scores for the SA factors to determine the total SA score for the project.
(4) Sum the total LE and SA scores to determine the Final LESA Score for the project.

	Factor Scores	Factor Weight	Weighted Factor Scores
LE Factors			
Land Capability Classification	<1> 60	0.25	15
Storie Index	<2> 80	0.25	20
LE Subtotal		***0.50***	35
SA Factors			
Project Size	<3> 0	0.15	0
Water Resource Availability	<4> 100	0.15	15
Surrounding Agricultural Land	<5> 0	0.15	0
Protected Resource Land	<6> 0	0.05	0
SA Subtotal		***0.50***	15
		Final LESA Score	50

For further information on the scoring thresholds under the California Agricultural LESA Model, consult Section 4 of the Instruction Manual.

ATTACHMENT B:
CULTURAL STUDY

August 9, 2001

Mr. Steve Conklin
Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

Subject: Results of Paleontologic and Archaeologic Field Surveys for River Trail Recharge Basin Project, Orange, Orange County, California

Dear Mr. Conklin:

Michael Brandman Associates (MBA) has conducted paleontologic and archaeologic field surveys of the proposed River Trail Recharge Basin site in Orange, Orange County, California. The field investigations were performed in accordance with guidelines established by the California Environmental Quality Act (CEQA), and the National Historic Preservation Act as Amended.

Natural Setting

The River Trails Recharge Basin project is located on the east bank of the Santa Ana River in unsectioned T4S, R29W, Orange Quadrangle (USGS 7.5-minute topographic map). Elevation is approximately 180 feet. The natural surface of Recent alluvium has been heavily disturbed by channelization of the river and utilization of the land by River Trails Stables. Surficial deposits are of unknown thickness and overly older (Late Pleistocene, >10,000 years before present) alluvium. These older sediments are potential sources of significant paleontologic resources buried in the Santa Ana River floodplain during the wetter climate that prevailed during the "Ice Age". Similar deposits elsewhere in southern California have yielded remains of terrestrial vertebrate animals that previously inhabited this region, including mammoth, mastodon, camel, horse, ground sloth, sabre-tooth cat, rabbits, rodents, birds, reptiles, and amphibians.

Cultural Setting

At the time of European contact in 1769, the Santa Ana Plain was occupied by the Gabrielino, named by the Spanish for those Native American groups falling under the spiritual jurisdiction of Mission San Gabriel Archangel. The Gabrielino were hunter-gatherers who lived in groups of 50 to 100 persons, termed rancherias. Encampments were located near sources of freshwater.

Gabrielino hunted with bow and arrow for deer, and utilized throwing sticks, snares, traps, and slings for capturing smaller game. They caught aquatic animals with shell fish hooks, bone harpoons, and nets. Seeds were gathered with beaters and baskets. Food resources were stored in baskets, then processed with manos and metates, and mortars and pestles. Plants and meats were cooked in baskets coated with asphaltum, in stone pots, on steatite frying pans, and in earthen ovens.

Records Checks

Paleontology

Prior to the onsite survey, Dr. Sam McLeod of the Los Angeles County Museum of Natural History searched their paleontologic localities database for this investigation. No paleontologic localites have been recorded on or adjacent to the project site. The nearest recorded fossil site in Late Pleistocene alluvium is at a marginally higher elevation near the intersection of Glassell St. and Fletcher Ave. in the City of Orange; it yielded a fossil horse at a depth of 8-10 feet.

Archaeology

On August 2, 2001, and prior to his onsite walkover of the site, Mr. Wayne Bonner, MBA archaeologist, performed the archaeologic/historic records check at the South Central Coast Information Center (SCCIC) located at California State University, Fullerton. His records check included examining the California State Historic Resources Inventory (HRI), the National Register of Historic Places (NRHP), the listing of California Historical Landmarks (CHL), and the California Points of Historic Interest (PHI). In addition, he examined archaeological resource maps and historic topographic maps.

The results of the archaeologic/historic records search indicate that no prehistoric sites have been recorded within a mile radius of the project. Three survey/excavation reports are on file with the SCCIC for the vicinity, but none assessed the project acreage. No NRHP, HRI, CHL, or CPHI properties are situated within a mile of the project.

The 1901 USGS 15-minute Anaheim Sheet indicates the parcel was undeveloped 100 years ago. The 1942 USGS 15-minute Anaheim Sheet shows Taft Avenue and Batavia Street had been graded, but there was no evidence of the horse stables or any roads leading into the equestrian complex. A 1957 Thomas Brothers map similarly does not show any stables or roads into the vicinity other than Taft Avenue and Batavia Street.

Field Surveys

On August 2, 2001, MBA paleontologist Kenneth L. Finger and Mr. Bonner conducted a walkover of the project site to locate cultural resources. Dr. Finger is certified with the County of Orange and is a member of the Society of Vertebrate Paleontologists. Mr. Bonner satisfies the Secretary of the Interior's requirements for a field archaeologist and is certified by the Register of Professional Archaeologists (RPA).

Construction of the concrete channel for the river is likely to have disturbed the flanking project site more than a half century ago. Subsequent utilization of the land for horse boarding and training has heavily disturbed the entire property. Currently, equestrian facilities cover over 80 percent of the property.

No prehistoric features (i.e., fossils, artifacts, or ecofacts) were observed on the grounds. Although some of the stables and wood storage sheds may be more than 50 years old, they do not qualify for National Register listing. Four horse-drawn carts and two four-wheeled buggy wagons were located on the property. These vehicles are more than 50 years old and should be removed prior to any construction activities.

Assessment

Although the potential of encountering significant vertebrate fossils in older alluvium is generally low, such deposits must be considered highly sensitive for these paleontologic resources because of other finds in the region. The site has a low archaeologic sensitivity rating because previous surveys in the area failed to discover any artifacts, ecofacts, or human remains. Thus, we following are the conclusions regarding ground disturbance that will be associated with the proposed construction project:

- 1. It will not adversely affect any known paleontologic resource.
- 2. It could affect significant paleontologic resources buried in the subsurface.
- 3. It will not cause an adverse change in the significance of a recorded historical resource as defined in SS 15064.5 of CEQA.
- 3. It will not cause an substantial adverse change in the significance of a known archaeological resource pursuant to SS 15064.5 of CEQA.
- 4. It will not disturb recorded human remains, including those interred outside of formal cemeteries.

Mitigation Measures

Based upon the forementioned sensitivity ratings and the proposed project parameters, we recommend the following:

Paleontology

1. A qualified paleontologist will attend the pregrade meeting and develop a program for monitoring excavations into older alluvium.

2. If a fossil is exposed during construction, work must be halted near the find until the monitor and/or project paleontologist can assess the find and, if deemed significant, remove the resource in a professional manner for further laboratory evaluation.

3. Within 30 days of completion of the monitoring program, the project paleontologist will submit a report documenting results.

Archaeology

Mitigation Measure CR-4. If buried archaeologic materials are exposed during construction, work must be halted in the near the find until a qualified archaeologist can assess the significance (CEQA Section 15064.5-f and PRC Section 21082).

Mitigation Measure CR-5. If the finds are deemed significant, the archaeologist should be permitted to record and/or remove the items in a professional manner for further laboratory evaluation (CEQA Section 15064.5-f and PRC Section 21082).

Mitigation Measure CR-6. If human remains are unearthed during construction, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition (CEQA Section 15064.5-e).

We at MBA appreciate the opportunity to assist you on this project. If we can be of any further assistance, or if you have any questions concerning this letter, please do not hesitate to contact Ken Finger at (714) 258-8100 ext. 122, or via his e-mail, kfinger@brandman.com.

Sincerely,

MICHAEL BRANDMAN ASSOCIATES

Kenneth L. Finger

Kenneth L. Finger, Ph.D.
Senior Project Scientist/Paleontologist

Wayne H. Bonner

Wayne H. Bonner, M.A.
RPA Archaeologist

KLF/WHB/klf

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Appendix M-9

2002: Santiago Pits Pump Station, Negative Declaration

NEGATIVE DECLARATION

Santiago Pits Pump Station

Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92728-8300

FINDING

Based upon the information contained in the Initial Study, the Orange County Water District (OCWD) finds that the proposed project would not have a significant effect on the environment. The facts supporting this finding are presented in the attached Initial Study and Environmental Checklist.

PROJECT PROPONENT

Orange County Water District

PROJECT DESCRIPTION

The Proposed Santiago Pits Pump Station Project is a means to increase recharge into the Orange County Groundwater Basin. The construction of a pump station within the Santiago Pits will allow periodic draining of the facility. This will allow the Orange County Water District (OCWD) to conduct maintenance activities in the basins to enhance the percolation rates, and effectively increase the ability of the basins to recharge local groundwater supplies.

The Orange County Groundwater Basin underlies the north half of the County beneath the lowlands known as the Tustin and Downey Plains. The basin extends 350 square miles between the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Newport-Inglewood Fault to the southwest, and terminating at the County line on the northwest where the aquifer continues into the Central Basin of Los Angeles County. Groundwater demands exceed the natural rate of recharge into the basin. To keep balance in the Basin, OCWD captures runoff from the Santa Ana River and purchases imported water for recharge. Projected demands indicate that an additional 75,000 acre-feet of recharged water will be needed in the future.

The Prado Dam, a 9,000 acre-feet impoundment in Riverside County operated by the Army Corps of Engineers (ACOE), is a key facility in OCWD's groundwater recharge system management. During the winter storm season, ACOE's goal is to allow impounded water behind the dam to quickly flow down the Santa Ana River so that there will be adequate storage area for following storms. In order to save this water from being lost to the ocean, OCWD must divert, store, and recharge this water. To allow for the diversion and storage of this water, OCWD must keep its basins, ponds, and pits along the Santa Ana River as low as possible by maximizing groundwater recharge. This is accomplished by routine maintenance within the ponds. This maintenance generally involves the cleaning of the basin bottoms to increase percolation rates.

The Santiago Pits are a part of OCWD's recharge basin system. These pits were created by a former commercial aggregate quarrying operation in Santiago Creek. Santiago Pits consists of three excavated gravel pits, all interconnected. Water supplied by OCWD's Burris Pit Pump Station, five miles away, is pumped into the first pit, Bond Pit. Bond Pit overflows into Blue Diamond Pit, and then finally into Smith Pit. Together their combined surface area is 200 acres and the volume is 14,000 acre-feet. Below elevation 226, only Bond Pit can be drained. Because Bond Pit provides nearly one half of the 14,000 acre-feet volume, this is the most important to drain for maintenance activities.

The proposed project would involve the construction and operation of a pump station in Santiago Pits. The pump station would be utilized to drain the Santiago Pits for routine maintenance and would discharge into Santiago Creek or into OCWD's Santiago Pipeline, which carries water back to OCWD's Burris Pit, adjacent to the Samta Ana River. The pump station would be located in the southerly portion of the Santiago Pits, which is Bond Pit. The proposed pump station operates with the following parameters: Approximately 25 cubic feet per second (cfs) will be pumped into the 66-inch diameter Santiago Recharge Pipeline to Burris Pit for storage and recharge, and a maximum of 15 cfs into the adjacent Santiago Creek for recharge.

Located on the northerly bank of the Bond Pit, next to the existing drainage outfall structure, the proposed pump station utilizes submersible pumps with the following capacity: one 15 cfs pump, one 25 cfs pump, and one backup 25 cfs pump. The discharged flow travels approximately 1,300 ft to the existing Santiago Creek pipeline for discharging into the two water routes mentioned above.

Based on the preliminary site and environmental investigations, it has been determined that this pump station can be developed with minimal impact to the environment. Construction is expected to take place in the fall after the nesting period for avian species and prior to the rainy season.

PROJECT LOCATION

Near the Santiago Creek undercrossing at Prospect Street/Collins Avenue in unincorporated Orange County. Figure 1 in the attached Initial Study illustrates the location of the proposed project.

INITIAL STUDY PREPARED BY:

Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708-8300

FILING DATE: **November 21, 2001**

PUBLIC REVIEW PERIOD: November 21 to December 21, 2001

PUBLIC MEETING /HEARING DATE: **If requested**

DISTRIBUTION:

The Draft Initial Study/Negative Declaration for the Santiago Pits Pump Station was distributed to:

California Department of Fish and Game, Region 5
City of Orange
City of Villa Park
City of Santa Ana
County Clerk, County of Orange
County of Orange Planning and Development Services Department
County of Orange Public Facilities and Resources Department
County of Orange Integrated Waste Management Department
Regional Water Quality Control Board, Santa Ana Region
Serrano Water District
U.S. Army Corps of Engineers, Los Angeles District

INITIAL STUDY AND ENVIRONMENTAL CHECKLIST

SANTIAGO PITS PUMP STATION

LEAD AGENCY:

ORANGE COUNTY WATER DISTRICT
10500 Ellis Avenue
Fountain Valley, CA 92708

PROJECT PROPONENT:

Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

Contact: Craig Miller, P.E.
Director of Recharge and Wetland Operations
714-378-3225

ORANGE COUNTY WATER DISTRICT ENVIRONMENTAL TEAM:

Steven R. Conklin, P.E.
Associate General Manager
Engineering and Wetlands Operations

Craig Miller, P.E.
Director of Recharge and Wetland Operations

Richard Zembal
Natural Resources Director

Patrick Tennant
Habitat Restoration Manager

November 20, 2001

SANTIAGO PITS PUMP STATION ENVIRONMENTAL CHECKLIST

1. **Project Title**: Santiago Pits Pump Station

2. **Lead Agency Name and Address**:

   Orange County Water District
   1500 Ellis Avenue
   Post Office Box 8300
   Fountain Valley, CA 92728-8300

3. **Contact Person and Telephone Number:**

   Craig Miller
   714-378-3225

4. **Project Location:** The project is located in Santiago Pits on Orange County Water District property. The site is located near the Santiago Creek undercrossing at Prospect Street/Collins Avenue in unincorporated Orange County, southeast of the City of Villa Park and northeast of the City of Orange, as shown in Figure 1. The project is in the jurisdiction of the County of Orange.

5. **Project Sponsor's Name and Address:**

   ORANGE COUNTY WATER DISTRICT
   10500 Ellis Avenue
   Fountain Valley, CA 92708

6. **General Plan Designation**: The project is designated for "open space" under the County of Orange General Plan.

7. **Zoning**: The project site is zoned "open space" with aggregate resources identified to be in the area.

8. **Description of Project**:

   The Proposed Santiago Pits Pump Station Project is a means to increase recharge into the Orange County Groundwater Basin. The construction of a pump station within the Santiago Pits will allow periodic draining of the facility. This will allow the Orange County Water District (OCWD) to conduct maintenance activities in the basins to enhance the percolation rates, and effectively increase the ability of the basins to recharge local groundwater supplies.

   The Orange County Groundwater Basin underlies the north half of the County beneath the lowlands known as the Tustin and Downey Plains. The basin extends 350 square miles between the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Newport-Inglewood Fault to the southwest, and terminating at the County line on the northwest where the aquifer continues into the Central Basin of Los Angeles County. Groundwater demands exceed the natural rate of recharge into the basin. To keep balance in the Basin, OCWD captures runoff from the Santa Ana River and purchases imported water for recharge. Projected demands indicate that an additional 75,000 acre-feet of recharged water will be needed in the future.

   The Prado Dam, a 9,000 acre-feet impoundment in Riverside County operated by the Army Corps of Engineers (ACOE), is a key facility in OCWD's groundwater recharge system management. During the winter storm season, ACOE's goal is to allow impounded water behind the dam to quickly flow down the Santa Ana River so that there will be adequate storage area for following storms. In order to save this water from being lost to the ocean, OCWD must divert, store, and recharge this water. To allow for the diversion and storage of this water, OCWD must keep its basins, ponds, and pits along the Santa Ana River as low as possible by maximizing groundwater recharge. This is accomplished by routine maintenance within the ponds. This maintenance generally involves the cleaning of the basin bottoms to increase percolation rates.

The Santiago Pits are a part of OCWD's recharge basin system (See Figure 1). These pits were created by a former commercial aggregate quarrying operation in Santiago Creek. Santiago Pits consists of three excavated gravel pits, all interconnected. Water supplied by OCWD's Burris Pit Pump Station, five miles away, is pumped into the first pit, Bond Pit. Bond Pit overflows into Blue Diamond Pit, and then finally into Smith Pit. Together their combined surface area is 200 acres and the volume is 14,000 acre-feet. Below elevation 226, only Bond Pit can be drained. Because Bond Pit provides nearly one half of the 14,000 acre-feet volume, this is the most important to drain for maintenance activities.

The proposed project would involve the construction and operation of a pump station in Santiago Pits. The pump station would be utilized to drain the Santiago Pits for routine maintenance and would discharge into Santiago Creek or into OCWD's Santiago Pipeline, which carries water back to OCWD's Burris Pit, adjacent to the Santa Ana River. The pump station would be located in the southerly portion of the Santiago Pits, which is Bond Pit. The proposed pump station operates with the following parameters: Approximately 25 cubic feet per second (cfs) will be pumped into the 66-inch diameter Santiago Recharge Pipeline to Burris Pit for storage and recharge, and a maximum of 15 cfs into the adjacent Santiago Creek for recharge.

Located on the northerly bank of the Bond Pit, next to the existing drainage outfall structure, the proposed pump station utilizes submersible pumps with the following capacity: one 15 cfs pump, one 25 cfs pump, and one backup 25 cfs pump. The discharged flow travels approximately 1,300 ft to the existing Santiago Creek pipeline for discharging into the two water routes mentioned above. An aerial photograph of the project showing the route of the pipeline and the above-mentioned structures has been included.

Based on the preliminary site and environmental investigations, it has been determined that this pump station can be developed with minimal impact to the environment. Construction is expected to take place in the fall after the nesting period for avian species and prior to the rainy season.

9. **Surrounding Land Uses and Setting**: The project is located within an unincorporated portion of Orange County southeast of the City of Villa Park and northeast of the City of Orange. The project area is located on fenced OCWD property adjacent to a low-density residential area. The OCWD property includes both the Santiago Pits and Santiago Creek in the project area. Approximately 300 feet south of the project area, the creek crosses under Prospect Street/Collins Avenue. Approximately 150 feet north of the project area is a tract of homes located in Villa Park on Fernando Circle.

10. **Other Public Agencies Whose Approvals Are Required**: None

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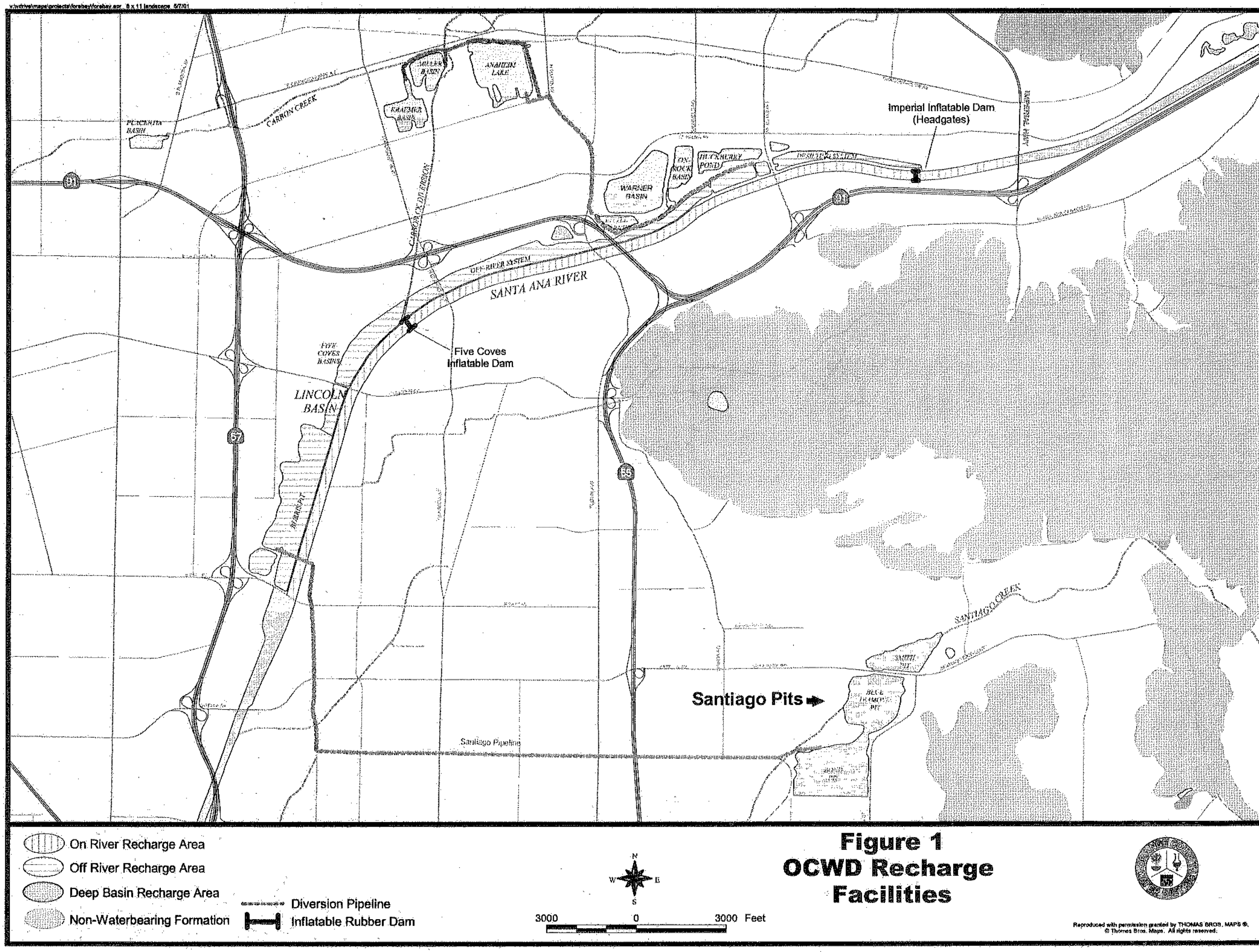

Figure 1
OCWD Recharge Facilities


Mitigation Area
Pump Station Control Building
Pump Station
Santiago Pits Pump Station
Air photos taken in February 2000 by Eagle Aerial. 1 meter per pixel resolution. Features on this graphic are displayed at a planning level only. Distances and locations may be distorted at this scale.
500 0 500 Feet

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

None of the environmental factors are checked below; although a few would be potentially affected by this project, none of the impacts is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- ☐ Aesthetics
- ☐ Agricultural Resources
- ☐ Air Quality
- ☐ Biological Resources
- ☐ Cultural Resources
- ☐ Geology and Soils
- ☐ Hazards and Hazardous Materials
- ☐ Hydrology and Water Quality
- ☐ Land Use and Planning
- ☐ Mineral Resources
- ☐ Noise
- ☐ Population and Housing
- ☐ Public Services
- ☐ Recreation
- ☐ Transportation/Traffic
- ☐ Utilities and Service Systems
- ☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☒ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION would be prepared.

o I find that although the proposed project could have a significant effect on the environment, there would not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION would be prepared.

o I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

o I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

o I find that although the proposed project could have a significant effect on the environment, there WOULD NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project.

Pat Tennant

Signature

November 20, 2001

Date

For Steve Conklin

Printed Name

Orange County Water District

For

ENVIRONMENTAL IMPACTS:

I. AESTHETICS. *Would the project:*

a)	Have a substantial adverse effect on a scenic vista?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. No scenic vistas in the project area would be affected. The pump station will be submerged at the bottom of the basin below the level of the water and the pipeline would be located underground. A Pump Station Control Building will be constructed on the bank near the existing turnout valve. This will be a small building constructed out of concrete slumpstone of a color that will blend with the surroundings. Because of this, it is not expected to have significant impacts on the aesthetics of the area.

b)	Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historical buildings within a state scenic highway?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No trees or rock outcroppings exist in the area. There are no designated scenic views or scenic resources in the vicinity of the project. The site is not visible from a state scenic highway.

c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. The Pump Station Control Building may be visible from Prospect Street/Collins Avenue and surrounding land uses but this would not substantially degrade the aesthetic appearance of the basin or Santiago Creek. But as mentioned above, this will be a small building constructed out of concrete slumpstone of a color that will blend with the surroundings. Thus it is not expected to have significant impacts on the existing visual character.

d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No new source of light or glare would be created so there would be no impact.

II. AGRICULTURAL RESOURCES. *Would the project:*

a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project site is not designated as Prime Farmland, Unique Farmland or Farmland of Statewide Importance, therefore the proposed use would not convert such farmland to non-agricultural use.

b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project site is zoned for open space, not agricultural use, and is not under a Williamson Act contract. The project would not result in a conflict with an agricultural or Williamson Act contract zoning obligation.

c)	Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use.	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No farmland exists on the site.

III. AIR QUALITY.

The proposed project consists of placement of an underground pipeline and the construction of a pump station. Emissions from operational activity would include those associated with the generation of electrical power needed to run the pumps. Because of deregulation of the electric industry, electrical generation emissions could occur anywhere in the western United States. There is no direct linkage between electric consumption and the location of generating emissions. Therefore, the only project-related air quality impact potential was presumed to derive from construction and maintenance activities for excavations and backfill for the pipelines.

Standards of Significance

The State CEQA Guidelines define a significant effect on the environment as "a substantial adverse change in the physical condition which exists in the area affected by the proposed project." In order to determine whether or not the proposed project would cause a significant effect on the environment, the impact of the project must be determined by examining the types and levels of emissions generated and their impacts on factors that affect air quality. To accomplish this determination of significance, the South Coast Air Quality Management District (SCAQMD) has established air pollution thresholds against which a proposed project can be evaluated to assist lead agencies in determining whether or not the proposed project is potentially significant. If the thresholds are exceeded by a proposed project, then it should be considered significant.

While, the final determination of whether or not a project is significant is within the purview of the lead agency pursuant to § 15064(b) of the State CEQA Guidelines, the SCAQMD recommends that the following air pollution thresholds be used by lead agencies in determining whether the proposed project could result in a significant impact. If the lead agency finds that the proposed project has the potential to exceed these air pollution thresholds, the project should be considered significant. Each of these threshold factors is discussed below.

Construction Phase

Separate threshold standards have been recommended for assessing construction-term impacts, which are averaged over a 6-month period to include only actual working days. The following significance thresholds for air quality have been established by the SCAQMD on a daily basis for construction emissions:

- 75 pounds per day for Reactive Organic Gases (ROG)
- 100 pounds per day for Nitrogen Oxides (NOx)
- 550 pounds per day for Carbon Monoxide (CO)
- 150 pounds per day for Particulate Matter 10 µg or less in diameter (PM10)
- 150 pounds per day of Sulfur Oxides (SOx)

The following significance thresholds for air quality have been established by the SCAQMD on a quarterly basis for construction emissions:

- 2.5 tons per quarter of ROG
- 2.5 tons per quarter of NOx
- 24.75 tons per quarter of CO
- 6.75 tons per quarter of PM10
- 6.75 tons per quarter of SOx

During construction, if any of the identified daily or quarterly air pollutant thresholds are exceeded by the proposed project, then the project's air quality impacts may be considered significant.

Operational Phase

Specific criteria air pollutants have been identified by the SCAQMD as pollutants of special regional concern. Based upon this categorization, the following significance thresholds for operational emissions have been established by the SCAQMD for project operations:

- 55 pounds per day of ROG
- 55 pounds per day of NOx
- 550 pounds per day of CO
- 150 pounds per day of PM10
- 150 pounds per day of SOx

Projects within the South Coast Air Basin (SCAB) with daily operation-related emissions that exceed any of the above emission thresholds may be considered significant.

The SCAQMD indicates in Chapter 6 of the *CEQA Air Quality Handbook* (SCAQMD 1993) (*Handbook)* that they consider a project to be mitigated to a level of insignificance if its primary effects are mitigated below the thresholds provided above.

a)	Conflict with or obstruct implementation of the applicable air quality plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No Impact. The air quality plan is based upon growth projections for Orange County for the next two decades. The projection, prepared by the Southern California Association of Governments (SCAG), presume that an adequate water supply would be available to support the projected level of growth. The proposed project does not conflict with the growth projections for Orange County as incorporated into the Regional Air Quality Management Plan.

b)	Violate any air quality standard or contribute to an existing or projected air quality violation?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. The proposed project will generate short-term and long-term air emissions. Short-term air emission will occur during construction activities and long-term emissions will occur during the operation of the project.

Construction activities will involve clearing, excavation, grading and hauling activities. Construction dust would affect local and regional air quality at various times during construction of the project. The dry, windy climate of the area during the summer months, combined with the silty soils of the region, create a high potential for dust generation. SCAQMD estimates that each acre of soil disturbed creates approximately 26.4 pounds of PM10 per construction workday and each acre of dirt/debris pushed creates approximately 21.8 pounds of PM10 per hour. The project would result in the disturbance of approximately 1,300 linear feet of soil. This works out to be about 0.30 acres. This activity would result in 52 pounds of PM10 per day from dirt/debris excavation. This does not exceed the SCAQMD significance threshold for PM10. Additionally, construction of the pump station will be at the bottom of Bond Pit. This pit is approximately 140 feet deep. No dust emissions are expected to rise out of the pit during construction. However, to further reduce potential construction-generated dust and PM10, the following Best Management Practices (BMPs) will be implemented.

- During clearing, grading, earth-moving, and excavation operations for the pipeline, the contractor shall control fugitive dust emissions by regular watering, or other dust-preventative measures using the following procedures:
  - All material excavated or graded shall be sufficiently watered to prevent excessive amounts of dust. Watering, with complete coverage, shall occur at least twice daily, preferably in the late morning and after work is done for the day.
  - All clearing, grading, earth-moving, or excavation activities shall cease during periods of high winds (i.e., greater than 25 miles per hour) or during Stage 1 or Stage 2 episodes.
  - All material transported offsite shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.
  - During construction, onsite construction vehicle speed shall be limited to 15 miles per hour.

After the implementation of the above BMPs, fugitive dust emissions would be reduced well below significant thresholds. The resulting fugitive dust emissions would be considered less than significant.

Long-term emissions may occur during the cleaning of the basin and sediment removal. These activities would be periodic and would not exceed daily emission standards.

c)	Result in a cumulatively considerable net increase of any criteria for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. Based on SCAQMD methodology, any project that does not result in significant air quality emissions, or can be mitigated to emission levels that are less than significant, does not add to a cumulative air quality impact. This project will not result in significant quantities of construction emissions and does not create long-term emissions.

d)	Expose sensitive receptors to substantial pollutant concentrations?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. The project would not expose sensitive receptors to substantial pollutant concentrations.

e)	Create objectionable odors affecting a substantial number of people?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

The two sources of potential odor from this project are from diesel equipment and from the draining of Santiago Pit. Diesel fumes are temporary conditions of the construction activity and are common in the environment, so they would not have a significant impact. Draining the pit may result in the death of non-native fish within the basin. In order to minimize the potential odor effects, OCWD will employ the following BMPs:

- Prior to complete draining of the pits, conduct fish salvage activities. Salvage activities could be conducted by OCWD staff, contractors, or California Department of Fish and Game.
- Un-salvageable fish will be quickly removed from the pits, and buried or transported off-site

Again, since the area is located 140 feet below the banks, odor is not expected to dissipate into the surrounding neighborhood. However, implementing the BMPs listed above will ensure that odor impacts are less than significant.

IV. BIOLOGICAL RESOURCES. *Would the project:*

An assessment of the biological resources was performed. A summary of the assessment is included as Attachment B.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				
		o	o	o	☒

No impact. The Pump Station Control Building and pipeline will be built between the south bank top of Santiago Creek and the edge of Bond Pit. This area is relatively sparse in vegetation. It contains weedy plants and a minimal number of scattered spriggy mule fat (*Baccharis salicifolia*). The stretch between the edge of the pit and the creek bank is about 1,300 feet in length. This is the area that will be excavated for the new pipeline and where temporary pipes will be laid to drain the basin initially. The axis of the pipeline route has been graded repeatedly in the past and is partially paved. Adjacent to the old road on the north side, there is little vegetation. The vegetation that exists there is consistent with areas of disturbance. Approximately 25 feet further north, is an area with mule fat, as well as a mitigation area that was planted with a mixture of coastal sage scrub and wetland elements. Construction activities will be designed to remain in the area adjacent to the road so that no restored or other habitat is impacted. On the south side of the road, there is a dense stand of mule fat that will be avoided, as well. Construction activities within the pit will have no impacts since there is no vegetation within the pit as a result of extended inundation.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				
		o	o	☒	o

Less Than Significant Impact. Although riparian habitat and coastal sage scrub communities exist near the project site, these areas will not be impacted. All construction activities in Santiago Pit will be in previously graded areas adjacent to the existing road. Areas within the creek are void of riparian vegetation, and may fall within California Department of Fish and Game jurisdiction. However, work will not be conducted in the creek.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Have a substantial adverse effect on federally protected wetlands as identified by Section 404 of the Clean water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				
		o	o	o	☒

No impact. The area that exists in the ACOE jurisdiction is located in Santiago Creek and no activity will take place there.

d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. Santiago Creek is an ephemeral stream and is often completely dry. Therefore it does not offer any habitat to native fish. Because of the sparse vegetation in the creek, there would be no impact on migratory wildlife corridors. Coyotes and other small mammals may use the creek as a corridor, however, as mentioned above construction activities will not occur in the creek.

e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. As mentioned above, the project area does not contain biological habitat that is protected by local policies or ordinances and would not conflict with any local policies protecting biological resources.

f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local regional, or state habitat conservation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would not conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan.

V. CULTURAL RESOURCES. *Would the proposal:*

A Cultural Resources Investigation was performed. A summary of the investigation is included as Attachment A.

a)	Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. During February 2000, an Initial Study was conducted on this site for the installation of a turn-out structure. A cultural resource record search was conducted. It was found that there were no historic archaeological sites, no properties of historical significance, or any California Historical Landmarks on or near the site. There was a prehistoric site (30-000089) within a 1-mile radius, but it did not fall within the project area. Eight other surveys were conducted in the area, four of which included the project area and no historical resources were identified.

b)	Cause a substantial adverse change in the significance of an archaeological resource as defined in § 15064.5?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The prehistoric site mentioned above was located along the banks of Santiago Creek and contained ground stone tools and hammerstones. However, this site was destroyed by development and no longer exists.

c)	Directly or indirectly destroy a unique paleontological resource or site unique geologic feature?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The proposed project site was formerly used for mining of sand and gravel and does not contain paleontological resources.

d)	Disturb any human remains, including those interred outside of formal cemeteries?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. Although prehistoric human remains are often found outside of formal cemeteries, they are usually found in association with villages and residential bases. Since none of these were located within the project area, there should be no impact. If suspected human remains were encountered, construction would cease until the proper authorities could be notified.

VI. GEOLOGY AND SOILS. *Would the project:*

a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	o	o	o	☒

No impact. Currently, there are two existing faults that run along the coastal and inland edges of the County, the Newport-Inglewood Fault and the Whittier Fault. The project site is not located near these two faults or any Alquist-Priolo special study fault zones. Additionally, the project does not include structures for human occupancy or facilities that would be considered essential to sustain life, so the project would not expose people or structures to potential substantial adverse effects related to these hazards.

a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	ii) Strong seismic ground shaking?	o	o	o	☒

No impact. The project would not be significantly impacted by strong ground shaking.

a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	iii) Seismic-related ground failure, including liquefaction?	o	o	o	☒

No impact. The project site is not located within a known liquefaction area and it is unlikely for the project to be affected by seismic-related ground failure.

a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	iv) Landslides?	o	o	☒	o

Less than significant impact. The slopes of Bond Pit are generally steep but the Pump Station Control Building will be set back fifty feet from the top of the slope. The soil will be compacted in the area of the building to minimize the chance of landslides into the basin. Additionally, no structures exist on the banks of the pit, so there will be no impacts to other structures.

b)	Would the project result in substantial soil erosion or loss of topsoil?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. The pipeline that will be added will require trenching within the project area. The excavated soil will be used to backfill the trench in which the pipeline was set, so there will be no loss of topsoil. Since the excavation area is currently exposed, un-vegetated soil, there will not be an increase in current erosion rates.

c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The site is not located near any known faults or unstable geologic units. The preparation of the site would not result in onsite or offsite landslides, lateral spreading, liquefaction, or collapse.

d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The site is not located in an area known for expansive soils.

e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The proposed project would not require water or sewer service, septic tanks, or alternative wastewater disposal.

VII. HAZARDS AND HAZARDOUS MATERIALS. *Would the project:*

a)	Create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. Diesel fuel, a hazardous material would be transported and used at the site during construction and during future maintenance, which would create a hazard to the environment should a spill occur. The following BMPs will be in place to ensure that there is no significant impacts to the environment:

- The transport of hazardous materials is regulated by the State and the transport of such materials to the site would comply with these regulations.
- During construction and future operations, OCWD would employ best management practices for spill control and prevention. With prevention and management in place, construction and maintenance related spills of hazardous materials are considered less than significant.

b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. Some hazardous materials, such as diesel fuel, would be transported and used at the site during construction and during future maintenance and rehabilitation operations, which would create a hazard to the environment should a spill occur. The BMPs incorporated into the project, as discussed in a) above would reduce the hazards to a less than significant level.

c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. There are no existing schools located within one-quarter mile of the site.

d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The site is not on a list of known hazardous materials sites.

e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would project result in a safety hazard for people residing or working in the project area?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The site is not located within an airport land use plan, or within two miles of a public or private airport.

f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The site is not located within the vicinity of a private airstrip.

g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. Project activity would not alter emergency response or emergency evacuation routes. Roadways would not be blocked during construction or operation.

h)	Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are intermixed with wild lands?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. There are no wild lands near the project location. The construction of this project would not expose people or structures to a significant risk of loss, injury or death from wild land fires.

VIII. HYDROLOGY AND WATER QUALITY. *Would the project:*

a)	Violate any water quality standards or waste discharge requirements?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The only discharge that will occur is during the draining of Santiago Pit. A temporary pump will be set up to de-water the pit, with discharge into the Santiago Pipeline and thence to Santiago Creek or to Burris Pit. OCWD is currently permitted to discharge up to 15 cfs into Santiago Creek for recharge purposes. The de-watering process will not exceed this volume of water. Since Santiago Pit is filled with native runoff or Santa Ana River water, it is not anticipated that pollutants will enter Santiago Creek. Because the flow will be no different than during recharge operations, there will be no additional impact.

b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. De-watering of Santiago Pit will actually increase the groundwater recharge in Santiago Creek. The purpose of this project is to enhance the ability of the pit to act as a recharge basin. A nearby well exists on the northern-most bank of Santiago Pits. This well is owned by the Serrano Water District, and it may be affected during the dewatering of the pit. This well is not the only source of water for the Serrano Water District, and other alternatives could alleviate potential impacts such as utilizing other wells, lowering of the pump, and increasing the delivery of Metropolitan Water District water in the area.

c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or offsite?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. As mentioned above, the discharge into Santiago Creek will not exceed the volumes currently allowed by OCWD's permit. Although water will be added to the creek, there will not be changes to the drainage patterns that would result in substantial erosion.

d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. There will be no changes to the drainage patterns or alterations of the course of Santiago Creek. The pipeline will tie into the existing pipeline turnout so the banks of the river will not be affected.

e)	Create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted water?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

Less Than Significant Impact. The water discharges into Santiago Creek will be limited to 15 cfs, which is well below the carrying capacity. These discharges will only take place during construction and future recharge activities and will not occur during storm events. Although water will be added to the creek, there will not be changes to the drainage patterns that would result in substantial erosion.

f)	Otherwise substantially degrade water quality?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. The quality of water in the Santiago Pit is comprised of native runoff water from the Santa Ana River and local runoff so it is not expected to degrade water quality in Santiago Creek.

g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No housing is being created.

h)	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No structures would be built which would impede or redirect flood flows.

i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would not expose people or structures to a significant risk of loss, injury, or death involving flooding.

j)	Inundation by seiche, tsunami, or mudflow?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would not expose people to seiche, tsunami, or mudflow.

IX. LAND USE AND PLANNING. *Would the project:*

a)	Physically divide an established community?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. Although there is an established community nearby, it would not be divided because there will be no land use modification. There will be no physical structures built outside OCWD's property.

b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project site is designated as Open Space by the General Plan of the County of Orange and is located on Orange County Water District Property. The property is located within the Open Space designation but has been identified to contain aggregate resources by the County of Orange. The proposed use would comply with the existing land use plan.

c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The Orange County General Plan designates the project as Open Space. The project would not conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan.

X. MINERAL RESOURCES. *Would the project:*

a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project is located in an area of known aggregate resources. In the past, sand and gravel have been mined from the site, creating the large pits. Since the basins are no longer used for mining, they are zoned as open space and used as percolation basins. The proposed project would not affect the current uses.

b)	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The site is identified as being in an area of known aggregate resources, and has had sand and gravel removed in the past. However, it has not been delineated as an area of locally important mineral resources, and is zoned as open space. The proposed project would not affect the current uses.

XI. NOISE. *Would the project result in:*

a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. The proposed construction project is scheduled to occur between 7:00 a.m. and 6:00 p.m. on Mondays through Fridays, and between 9:00 a.m. and 6:00 p.m. on Saturdays. There would be no construction activities on Sundays or legal holidays. Thus, any construction work would fall within normal working hours. Once the construction is completed the only noise associated with the project would occur during maintenance activities. Maintenance operations would occur during the regular workweek, Monday through Friday, between the hours of 7:00 am and 6:00 pm, which complies with the County's Noise Ordinance.

b)	Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. The proposed project will involve approximately six months of temporary construction activity. After construction is complete, maintenance grading and removal of fine materials could occur over several days when necessary. This would involve an excavator, front-end loader, and a truck. Since activities will be conducted within Bond Pit, the 140-foot walls will dampen construction noise and would not result in a substantial noise increase outside of the immediate project area. There would be no permanent increase in ambient noise levels.

c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. Construction activities and the associated noise would occur over approximately six months. All future maintenance, repair and rehabilitation activities would be scheduled to occur during the regular workweek, Monday through Friday, between the hours of 7:00 am and 6:00 pm.

d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	☒	o

Less Than Significant Impact. There will be three sources of temporary or periodic increases in ambient noise levels. The first will be from the transport of workers and equipment into the area. Although these may have high single event noise exposure potential with passing trucks, the increase would be negligible when averaged over a 24-hour period. The second type of impact would be from the temporary pump during the de-watering of the pit. This pump will be a powered by a sound attenuated generator so that there is no significant impact on noise levels. The third source will be noise generated by onsite construction activities. Since activities will be conducted within Bond Pit, the 140-foot walls will dampen construction noise and would not result in a substantial noise increase outside of the immediate project area. Local residents could be subjected to slightly elevated noise levels from these activities.

e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No Impact. There is no public airport within two miles of the project site.

f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No Impact. There is no private airstrip located in the vicinity of the project site.

XII. POPULATION AND HOUSING. *Would the project:*

a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The proposed project would not directly or indirectly induce population growth. The project would not induce new employment. No new housing or extension of major infrastructure would result.

b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No displacement of housing would result from implementation of the proposed project.

c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No people would be displaced as a result of the project.

XIII. PUBLIC SERVICES. *Would the project:*

a)	Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which would cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
	i) Fire protection?	o	o	o	☒

No impact. The project would not result in the need for new or physically altered government facilities nor affect response time for fire protection.

	ii) Police Protection?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would not increase the need for additional police protection.

	iii) Schools?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would not result in the need for new or physically altered government facilities for schools.

	iv) Parks?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact.

	v) Other public facilities?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact.

XIV. RECREATION. *Would the project:*

a)	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would not increase the use of existing parks and recreational facilities.

b)	Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No recreational facilities would be constructed or expanded.

XV. TRANSPORTATION/TRAFFIC. *Would the project:*

a)	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would not result in a permanent increase in traffic load.

b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact.

c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The proposed project would not affect air patterns.

d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project is located in a fenced OCWD property. The project would have no effect on area roadway design or cause traffic/transportation hazards.

e)	Result in inadequate emergency access?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project does not propose changes to access in the surrounding area.

f)	Result in inadequate parking capacity?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. There is adequate parking inside the fenced OCWD property.

g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project site is not within an alternative transportation zone and does not conflict with existing transportation policies.

XVI. UTILITIES AND SERVICE SYSTEMS. *Would the project:*

a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. There is no wastewater treatment associated with the project.

b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The proposed project would not require construction of new or expansion of existing water or wastewater services.

c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which would cause significant environmental effects?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The proposed project would discharge water into Santiago Creek via an existing pipeline. This water would follow the natural course of the creek and would not affect the existing storm water drainage system.

d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new expanded entitlements needed?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. No new water supplies would need to be added or expanded.

e)	Result in a determination by the wastewater treatment provider who serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. Wastewater treatment is not applicable to the project.

f)	Be served by a landfill with sufficient capacity to accommodate the project's solid waste disposal needs?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. During construction, landfills may be utilized for construction debris, but no waste would be generated after the completion of the project.

g)	Comply with federal, state and local statutes and regulations related to solid waste?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project would comply with federal, state, and local statutes and regulations related to solid waste generated during the construction period.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California or prehistory?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact.

b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of probable future projects)?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The proposed project has been found to have less than significant environmental effects. No cumulatively considerable impacts would be realized when viewed in connection with the effects of existing or future proposed projects.

c)	Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
		o	o	o	☒

No impact. The project has been found to have less than significant environmental impacts. Therefore, the project would not cause substantial adverse effects on human beings

ATTACHMENT A

RESULTS OF CULTURAL RESOURCES RECORDS SEARCH

South Central Coastal Information Center
California Historical Resources Information System
UCLA Institute of Archaeology
A163 Fowler Building
Los Angeles, California 90095-1510
(310) 825-1980 / FAX (310) 206-4723 / sccic@ucla.edu

Los Angeles
Orange
Ventura

Richard Shepard
Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, CA 92614

November 8, 1999

RE: Records Search Request for the Orange Quadrangle, 8236-A Santiago Creek Project

Dear Mr. Shepard,

As per your request received on November 8, we have conducted a records search for the above referenced project. This search includes a review of all recorded historic and prehistoric archaeological sites within a one mile radius of the project area as well as a review of all known cultural resource survey and excavation reports. In addition, we have checked our file of historic maps, the National Register of Historic Places, the California State Historic Resources Inventory, the California Points of Historical Interest, and the listing of California Historical Landmarks in the region. The following is a discussion of our findings for the project area.

PREHISTORIC RESOURCES:

One prehistoric site (30-000089) has been identified within a one mile radius of the project area. This prehistoric site is not located within the project area (see enclosed map).

HISTORIC RESOURCES:

No historic archaeological sites have been identified within a one mile radius of the project area.

The California State Historic Resources Inventory lists no properties that have been evaluated for historical significance within a few blocks radius of the project area.

The National Register of Historic Places lists no properties within a one mile radius of the project area.

The listings of the California Historical Landmarks (1990) of the Office of Historic Preservation, California Department of Parks and Recreation, indicate that there are no California Historical Landmarks within a one mile radius of the project area.

The California Points of Historical Interest (1992) identifies no properties within a one mile radius of the project area.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS:

Eight surveys and/or excavations (OR20, OR35, OR214, OR556, OR778, OR801, OR871, and OR903) have been conducted within a one mile radius of the project area. Four of these investigations (OR20, OR35, OR778, and OR801) have been conducted within the project area (see enclosed map and bibliography). Two additional investigations are located within the Orange quadrangle and potentially within the project area. These investigations are not mapped due to insufficient locational information.

Please forward a copy of any reports resulting from this project to our office as soon as possible. Due to the sensitive nature of site location data, we ask that you do not include record search maps in your report. If you have any questions regarding the results presented herein, please feel free to contact our office at (310) 825-1980.

Invoices are mailed approximately two weeks after records searches are completed. This enables your firm to request further information under the same invoice number. Please reference the invoice number listed below when making inquires. Requests made after invoicing will result in the preparation of a separate invoice with a $15.00 handling fee.

Sincerely,

Janette Dinishak

Janette Dinishak
Information Center Staff

Enclosures:

(X) Maps
(X) Bibliography
( ) Site list
( ) HRI
(X) Site records
( ) Survey reports
(X) Confidentiality Form
( ) Invoice # 8170

ATTACHMENT B

BIOLOGICAL RECONAISSANCE
SURVEY

Field Report
Santiago Pits – Initial Inspection
11/06/2001

Listed below are the results of the initial visit to the Santiago Pits proposed construction site. Dick Zembal (OCWD) and William (OCWD) were on site as well. The project site is located in the basins adjacent to Santiago Creek undercrossing at Prospect Street/Collin Avenue in unincorporated Orange County. The project would involve the construction and operation of a pump station in Bond Pit. This station would be utilized to dewater the Santiago Pits for maintenance purposes. The pump station would be constructed within the basin, and a pipeline installed connecting the pump station to an existing turnout valve near Santiago Creek. The purpose of this initial inspection was to determine placement of the pipeline to minimize environmental impacts.

Upon entering the basin off of Prospect Street, there is a paved road that leads to Bond Pit, and ends roughly in-line with where the pump station is proposed to be. In this area, the banks of the pit are steep and contain little vegetation. Distinct steps can be seen in the bank indicating previous water levels. Currently, the basin is less than half full.

Vegetation surveys were conducted in the proposed work area. South of the road is a dense stand of mule fat (*Baccharis salicifolia*). This stand is healthy and offers suitable wildlife habitat. On the north side of the road, there is a strip of soil that has little vegetation. This strip runs adjacent to the road and continues down the bank of the pit. At this point it widens and continues to the edge of the water. The vegetation that is located in this area, is vegetation consistent with disturbed areas, including telegraph weed (*Heterotheca grandiflora*), tocalote (*Centaurea melitensis*), pigweed (*Amaranthus sp.*) and black mustard (*Brassica nigra*). The strip of soil extends approximately twenty-five feet to fifty feet north and then another area of vegetation begins on a plateau. This area is a mitigation area that was planted in fall 1991 and spring 1992. This area included: Goodding's black willow (*Salix gooddingii*), arroyo willow (*Salix*), Fremont's cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), Mexican elderberry (*Sambucus mexicana*), Califorinia wild rose (*Rosa californica*), wild blackberry (*Rubus ursinus*), mugwort (*Artemisia douglasiana*), giant wild rye (*Elymus condensatus*), blue eyed grass (*Sisyrinchium bellum*), purple needlegrass (*Stipa pulcra*), California encelia (*Encelia californica*), deerweed (*Lotus scoparius*), and buckwheat (*Eriogonum fasciculatum*). During the inspection of the site, the following plant species were also seen: saltcedar (*Tamarix ramosissima*), cocklebur (*Xanthium strumarium*), castor bean (*Ricinus communis*), Russian thistle (*Salsola tragus*), fennel (*foeniculum vulgar*), coyote melon (*Cucurbita foetidissima*), and heliotrope (*Heliotropium sp.*).

In addition to vegetation surveys, a quick assessment of wildlife was made. Bird species encountered during the survey are as follows: golden-crowned sparrow, turkey vulture, spotted sandpiper, Anna's hummingbird, northern mockingbird, pied-billed grebe, western grebe, ruddy duck, white-crowned sparrow, mourning dove, house finch, scrub jay, yellow-rumped warbler, American crow, lesser goldfinch, bushtit, black phoebe, common yellowthroat, song sparrow, great egret, house wren, and California quail. Although no mammals were actually seen, California ground squirrels (*Spermophilus beecheyi*) and coyotes (*Canis latrans*) were vocalizing. Scat indicated that red fox (*Vulpes vulpes*) and opossums (*Didelphis virginiana*) were in the area.

In conclusion, the vegetation located within the pipeline path is vegetation that is consistent with disturbed areas, and offers little habitat value. The path of the pipeline construction is limited to this area. Mule fat to the south of the road will be avoided, and native vegetation on the plateau above the project site will not be impacted because it is located up to fifty feet away from the excavation area. Thus, construction of the pipeline will not have significant impacts on the natural resources in the area. The pump station will be constructed within the basin. Because of long-term inundation, much of the bank where construction of the pump station will occur is void of vegetation. Hence, there will be no associated impacts in that area.

Pat Tennant

Habitat Restoration Manager

Appendix M-10

2004: Prado Basin Water Conservation Feasibility Study, Main Report and Draft EIS/EIR

Appendix M-10-1

Syllabus

SYLLABUS

This ***Prado Basin Water Conservation Feasibility Study*** is a cost-shared Feasibility Study conducted by the Corps of Engineers and the Orange County Water District (OCWD) as cost-sharing partners. This report investigates the without- and with-project conditions related to the increased water conservation potential at Prado Dam. The Reconnaissance phase determined that there might be a federal interest in water conservation at Prado Dam, as summarized in the report entitled Prado Basin Water Supply Reconnaissance Report dated July 1996. This report assumes that the authorized modifications to Prado Dam as described in the Phase II General Design Memorandum (GDM) for the Santa Ana River Mainstream Project (SARMP) are in place by 2006.

The purpose of this study is to investigate the feasibility of expanded water supply and conservation opportunities at Prado Dam. The study area is defined as Prado Dam and Reservoir, Santa Ana River downstream of Prado Dam, and the downstream spreading grounds. Prado Dam is located in Riverside County, California near the border with Orange and San Bernardino Counties, California. Prado Dam is constructed at elevation 460 feet (ft) (140.2 m) national geodetic vertical datum (NGVD) at the head of the Santa Ana Canyon at the eastern end of Chino Hills. The extended study area is the watershed for the OCWD service area. OCWD owns all rights, title and interest in any and all waters flowing in the Santa Ana River into Prado Reservoir.

The study analyzes the water demands of the area, water supplies, and the potential for water conservation to meet supply deficiencies for both the existing and future condition. Existing or _base year_ conditions occur in the year 2002, and future conditions occur in the year 2052. The time period from the year 2002 through 2051 is also referred to as the post-construction period. Based on a supply and demand analysis conducted as part of this feasibility study, available normal-year local supplies for the study area currently meet only about 60 percent of demand; and this percentage will decrease as demand increases in the future. Therefore, additional low-cost water supplies will be needed to meet demands. Re-operation of Prado Dam to increase the available flow during the flood and non-flood season would provide this additional local water supply.

The plan formulation process investigated five alternatives, one of them being the without-project condition. The without-project condition represents the condition that would be expected to occur during the project life (50 years, 2004 through 2053) in lieu of project implementation, and it constitutes the basis against which all alternative plans are evaluated. All four with-project alternatives were evaluated individually. Tables S-1, S-2, and S-3 summarize the alternatives.

All alternatives look at conserving water up to different elevations during the flood and non-flood seasons. Water conservation during the flood season, October 1 to February 28, for the five alternatives varied from a maximum Water Surface Elevation (WSE) of 494 ft (150.6 meters [m]) to a maximum WSE of 508 ft (154.8 m). Water conservation during the non-flood season, March 1 to September 30, for the five alternatives varied from a maximum WSE of 505 ft (153.9 m) to a maximum WSE of 508 ft (154.8 m) . Water conservation is currently authorized up to an elevation of 505 ft (153.9 m) NGVD from the beginning of March to the end of September. Releases from Prado that the downstream spreading grounds can accommodate, will lower the WSE while storm inflows will increase it. If the duration between storms is long enough, it is possible to completely drain the conservation pool. Therefore, water conservation up to the given maximum elevations for the alternatives will not result in a permanent lake with a permanent waterline. In addition, if a storm event is forecast, the pool will be evacuated down to the debris pool elevation of 490 feet, as appropriate, inasmuch as flood control is the primary function of the dam. Therefore, re-operation of Prado Dam for increased water conservation will essentially not decrease the level of protection afforded by the dam.

Seven Oaks Dam, of which construction is completed, can also have an impact on Prado Dam and its operation. Seven Oaks Dam is currently operated under an Interim Water Control Plan that will remain in effect until completion of Section 7 consultation with the U.S. Fish & Wildlife Service on the endangered San Bernardino Kangaroo Rat (SBKR). The effect of Seven Oaks Dam on reducing the magnitude of floods downstream of Prado Dam is substantial. Considering this, spillway flow at Prado Dam will occur for an event between a 70 to 95-year frequency under present conditions. By closing the outlets as a spillway flow occurs and limiting the total outflow (spillway plus outlets) to less than 9,200 cubic feet per second (cfs), the level-of-protection can be raised to greater than 100-year frequency under present conditions. By accelerating releases above elevation 494.0 ft (150.6 m) up to the maximum outlet capacity through the two 13.5 ft by 13.5 ft (4.1 m by 4.1 m) outlet conduits, the level-of-protection can be raised to about 120-year frequency under present conditions. The significance of this discussion is that if a forecast is underestimated and the Buffer Pool is not completely evacuated prior to a large event, the outlet gates could be opened to make larger than scheduled flood releases. This would offset the underestimated inflow, recapture the flood control space, and still maintain the established level-of-protection. Once the Phase II GDM modifications are completed, including the outlets and the downstream channel, and assuming Seven Oaks is operated as planned, Prado Dam will provide about 333-year level-of-protection.

As stated earlier, one of the major premises of this study is that modifications to the operating plan for water conservation at Prado Dam will not have any significant impact on flood control, i.e., will essentially not decrease the level-of-protection afforded by the dam. To assure this, the water conservation pool, otherwise known as the buffer pool, must be evacuated prior to a major storm. Evacuation of the buffer pool is based on estimates of inflow to Prado Dam. Reservoir Operation staff at the Los Angeles District determine if an impending storm will bring significant inflow into the reservoir and how much the buffer pool will need to be evacuated to account for the estimated inflow volume. This predicted inflow volume may require the complete evacuation of the buffer pool. However, it does not require the entire buffer pool be evacuated if the predicted inflow amount is less than the volume in the buffer pool. If large inflows are not forecasted, rapid evacuation of the reservoir for flood control purposes is not necessary or desired. This is particularly relevant for water conservation purposes as the end of the flood season approaches.

The flood control release schedule for the current outlets does not maximize outflow through the outlet conduits. The maximum release of 5,000 cfs was established after downstream channel improvements were constructed to address deficiencies in channel performance observed during the 1978, 1980, and 1983 flood events. The Phase II GDM outlets also do not maximize outflow through the outlets. The schedule was developed to maintain relatively low releases out of Prado Dam during small to moderate events. Larger releases (i.e., up to the channel capacity of 30,000 cfs) were reached by slowly increasing releases as the pool elevation rose during times when a significant flood event was actually occurring. Under either scenario (current or future outlets), if the severity of a storm is under-estimated and the Buffer Pool is not evacuated enough, releases from Prado Dam can be accelerated to recover the lost flood control space by opening the outlet gates wider.

To achieve evacuation of the buffer pool for water conservation within 24 hours prior to any flood event, especially for larger alternative pools, would also require adjustments to the gate settings under the current or proposed flood control release schedule. Emergency or critical maintenance, as determined by the Corps' Los Angeles District, may take place any time during the year and may require evacuation of the pool. The buffer pool is only meant for water to be held until it can be released for recharge. There is no intent to maintain a larger permanent pool at the reservoir. Mitigation for damages to the downstream channel caused by evacuation of the buffer pool or damages and impacts to parties located within the reservoir area, are solely the responsibility of the local sponsor, OCWD.

The average annual yield for Prado Dam for without-project conditions is 238,000 acre-feet (AF) (293.4 million cubic meters [m^3]). This is an estimate of the volume of surface water spread in the downstream OCWD spreading grounds. The average volume of water "lost" to the Pacific Ocean is approximately 48,000 AF (60.4 million m^3) per year.

The National Economic Development (NED) Plan is Alternative 2, which has a top of conservation storage during flood season at elevation 498 ft (151.8 m). During the non-flood season, the top of conservation storage would be at elevation 505 ft (153.9 m). The water conservation yield for this alternative is approximately 240,000 AF (296 million m^3) in the year 2004 and approximately 318,000 AF (392.2 million m^3) in the year 2053.

There is no Locally Preferred Plan (LPP), as the Sponsor has decided that the NED Plan is the most viable alternative.

A Draft Environmental Impact Statement (EIS) has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, and the California Environmental Quality Act (CEQA), amended January 1995, and is summarized in this report. The requirements of Section 404(r) of Public Law 92-500, as amended, have been met.

Table S-1. Hydrologic Summary of Alternatives

Alternative	**Water Surface Elevation (feet)**		**Annual Yield Increase Over Without Project Condition, acre-feet**	
	Flood Season	**Non-Flood Season**	**Present Condition**	**Future Condition**
Alternative 1 (Without Project)	494	505	0	0
2	498	505	2,000	4,000
3	500	505	3,000	5,000
4	505	505	4,000	8,000
5	508	508	6,000	10,000

Table S-2. Benefit/Cost Analysis

Alternative	Annual Benefits,	Annual Costs $1,000	Net Benefit,	Benefit/Cost Ratio
2	$612	$140	$472	4.4
3		$1,325	-$475	0.6
4	$1,233	$4,848	-$3,625	0.3
5	$1,699	$5,782	-$4,083	.03

Notes:
(1) Annual costs and benefits are over 50 years and apply to years 2004 through 2053.
(2) Mitigation costs include environmental and cultural mitigation.

Table S-3. Prado Dam Water Conservation Mitigation Costs

Prado Water Conservation Biological Mitigation Costs				
Alternative	**Upstream Cost**	**Downstream Cost**	**Total Cost**	**Annual Cost**
2*			$930,000	$58,000
3	$502,500	$657,000	$1,159,500	$87,000
4	$2,377,500	$1,543,000	$3,920,500	$259,000
5	$11,624,500	$2,664,000	$14,288,500	$905,500

* Cost for Alternative 2 developed through coordination with Fish & Wildlife Service. Costs for other alternatives are estimates and include $14,700 in annual costs for Santa Ana Sucker.

Appendix M-10-2

Biological Opinion
(FWS-WRIV-2102.3)

ESA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

In Reply Refer To:
FWS-WRIV-2102.3

JUL 01 2002

Colonel Richard G. Thompson
District Engineer
U.S. Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Attn: Alex Watt, Environmental Coordinator

Re: Biological Opinion for the Prado Dam Water Conservation and Supply Study, Orange, Riverside, and San Bernardino Counties, California

Dear Colonel Thompson:

This document transmits our biological opinion based on our review of the proposed Prado Dam Water Conservation and Supply Study and its effects on federally threatened and endangered species and their critical habitats, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.). The biological opinion considers the possible effects of the proposed action on the federally endangered least Bell's vireo (*Vireo bellii pusillus*, "vireo") and its designated critical habitat, endangered southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher"), and threatened Santa Ana sucker (*Catostomus santaanae*, "sucker"). Your July 3, 2001, letter requesting the initiation of formal consultation on the revised project was received by us on July 10, 2001.

This biological opinion is based on information provided in the May 2001, *Draft Biological Assessment for the Prado Dam Water Conservation and Supply Study* (Draft BA), site visits, and correspondence, notes and information compiled during the course of our consultation with your agency (Corps) and the project proponent, Orange County Water District (District). This information and other references cited in this biological opinion constitute the best available scientific information on the status and biology of the species considered. The complete administrative record for this consultation is on file at the Carlsbad Fish and Wildlife Service Office (CFWO).

Consultation History

We have consulted informally with the Corps since November 1998 and provided draft and revised draft Fish and Wildlife Coordination Act Reports (dated November 18, 1999, and March

22, 2001, respectively) for use in planning for this project. Meetings attended by the Corps, District and CFWO to discuss the project and measures to offset project-related effects to federally listed species and their habitats were held in 1999 on July 1 and December 12; in 2000 on April 25, August 2, August 9, August 19, October 11, November 21; and in 2001 on January 9 and October 24. Since many of our biological concerns with this water conservation project were related to our concerns with the Santa Ana River Mainstem Project (Mainstem), we encouraged the Corps to postpone consultation on this project until the issuance of the biological opinion on Mainstem. However, the Corps requested initiation of formal consultation, which was begun on July 10, 2001, prior to issuance of the Mainstem biological opinion on December 5, 2001. We requested an extension of formal consultation to allow time for completion of the Mainstem biological opinion and review of requested biological and hydrological information. We provided a draft project description of the proposed action to the Corps and District on January 10, 2002, and held a telephone conference call on Janaury 29, 2002, to discuss the proposed conservation measures outlined in the draft project description. We held a telephone conference call with the District on February 5, 2002, to further discuss proposed conservation measures, and a second draft project description was provided to the Corps and District on February 11, 2002. The District responded to the second draft project description by telephone on February 19, 2002. Formal consultation was extended to Friday, April 19, 2002, by agreement of the Corps via electronic mail on March 27, 2002. We provided our draft biological opinion on Monday, April 22, 2002. We received your response to the draft and request for a final biological opinion on June 26, 2002.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The general area of the Prado Basin is divided by the Riverside and San Bernardino county lines, while the Orange County line is downstream of the Basin. Prado Dam was built just downstream of the confluences of Chino, Mill, and Temescal creeks with the Santa Ana River. The water flow in much of the Santa Ana River is perennial due to inputs of stormwater, urban runoff, and treated wastewater discharge into the river and several tributaries. The area immediately surrounding Prado Basin is a matrix of agriculture, residential and commercial development, and open space.

Prado Dam is a 106-foot-high rolled-earthfill structure with a current crest elevation of 566 feet above mean sea level. Its detached concrete spillway crests at 543 feet. When constructed, the dam provided flood protection for a 100-year flood event. However, with increased urban runoff from the surrounding area and accumulated sediment behind the dam, the flood control capacity of the dam has been reduced. In 1988, the Corps issued a Main Report and Supplemental Environmental Impact Statement of the Phase II General Design Memorandum for the Santa Ana River Mainstem Project (Corps 1988) that outlined construction plans, including increasing the dam height by about 28 feet and spillway height by 20 feet and other improvements to the dam outlet structures and spillway that would improve the dam's capacity to control flooding in a 190-year flood event. The dam and spillway-raising portion of the project has not yet been built, but in Reach 8 downstream of the dam, concrete drop structures and bank protection have been completed.

Water conservation, in addition to flood control, has taken place at Prado Dam since at least the late 1960s. Water conservation retains excess water behind the dam for regulated release that allows the District to percolate the discharge in their downstream spreading basins. Water retention levels and impact minimization measures associated with current water conservation practices were outlined in biological opinions issued by the U.S. Fish and Wildlife Service (Service) in 1993, 1995, and 2000 (Biological Opinion 1-6-93-F-7 dated February 25, 1993, Biological Opinion 1-6-95-F-28 dated April 20, 1995, and Biological Opinion 1-6-99-F-75 dated February 10, 2000). Current agreements permit water to be pooled to an elevation of 494 feet during the flood season (October 1 through the end of February) and to 505 feet during the non-flood season (March 1 to September 30). During the non-flood season, the District must release a flow equal to the maximum recharge capacity of the downstream basins or a running average of 500 cubic feet per second (cfs), whichever is greater. Water must be released at a greater flow rate if the water level exceeds 505 feet, to get the water's elevation back at or below 505 feet as quickly as possible.

Impact minimization measures by the District and Corps for currently implemented water conservation included monetary contributions to establish a conservation fund used to remove the non-native invasive plant *Arundo donax* ("arundo") from the Santa Ana River watershed, the creation of riparian habitat, establishment of a vireo and flycatcher monitoring program, and implementation of brown-headed cowbird (*Molothrus ater*, "cowbird") trapping in Prado Basin. These measures were to offset the anticipated loss of half the function and value to habitat between 494 and 505 feet. In addition, the consultation required that, if vireo or flycatcher nests were imperiled by impounded water up to 505 feet, District personnel would relocate nests to higher elevations to prevent loss of eggs or nestlings. Incidental take for the vireo from the current water conservation project included harm to 90 pairs from alteration to habitat from impounded water. Impacts to the sucker, which was federally listed on April 12, 2000 (65 FR 19686), were not addressed in previous biological opinions.

This opinion addresses the incremental effects from additional water conservation during the flood season for vireo and flycatcher and the full project effects on the sucker. All conservation measures and terms and conditions of previous biological opinions on water conservation (i.e., Biological Opinion 1-6-93-F-7 dated February 25, 1993, Biological Opinion 1-6-95-F-28 dated April 20, 1995, and Biological Opinion 1-6-99-F-75 dated February 10, 2000) remain in effect and are not superceded by this opinion. *

The proposed Prado Dam Water Conservation and Supply Study would implement changes to the current water conservation practices. The Corps examined eight project alternatives that proposed holding water at differing levels depending on time of year and whether Mainstem construction to raise Prado Dam had been completed. The Corps asked CFWO to examine two proposed alternatives; one for operation prior to dam-raising construction and the Corps' National Economic Development (NED) post-construction alternative.

The pre-construction alternative would permit water elevation levels to 498 feet (a 4-foot increase from the current 494 foot level) during the flood season and to 505 feet (the current level) during the non-flood season. This inundation at 498 feet is an annual average increase of 13.8 percent over the current water conservation practice. Water release rates from the dam for 5-year to 50-year floods would be 5,000 cfs, which is the current capacity of the outflow structures. The life of this alternative is anticipated to be 2 to 3 years; that is, until Mainstem construction is completed.

The Corps' NED post-construction alternative would allow a maximum pool level during the flood season of 498 feet and 505 feet during the non-flood season, the same levels as in the pre-construction alternative above. However, water release rates with the upgraded outflow structures in the dam would be 5,000 cfs during a 5-year to 10-year flood; 8,760 cfs during a 25-year flood; and 18,500 cfs during a 50-year flood. Maximum release through the gates will be 30,000 cfs. The life of this alternative is anticipated to be 50 years, once Mainstem construction is completed.

Both of these alternatives would increase inundation at the 498 foot level by an annual average of 13.8 percent (a 4-day increase over the current 29 days of inundation). The acreage between 494 and 498 feet is 219.6 acres, of which one-half of the value and function has been offset under prior water conservation agreements; thus, 109.8 acres may be additionally affected by increased inundation from this project. A 13.8 percent increase in effects to 109.8 acres equates to 15.2 acres of additional inundation effects within the Basin that were not offset through prior water conservation agreements. In addition, 22 acres of riparian habitat will be affected downstream of the Basin through water releases necessitated by the increased elevation. Therefore, a total of 37.2 acres of riparian habitat will be affected by either alternative.

The following conservation measures have been proposed to offset project-related effects to vireo and its critical habitat, flycatcher, and sucker:

1. With concurrence from CFWO, the Corps and/or District will acquire and protect in perpetuity via a conservation easement 37.2 acres within Prado Basin for restoration of riparian habitat prior to implementation of either alternative. This acreage is calculated from 37.2 acres of impact at a 1:1 ratio. The restoration will be done outside of areas that are already mitigation areas. A detailed map that delimits the restoration area will be provided to CFWO. To accomplish restoration of the acquired acreage:

a. Compensation to the Santa Ana River Conservation Trust Fund (SARCTF) for restoration, maintenance, and management in perpetuity of the 37.2 acres will be made in the amount of $25,000 per acre for a total of $930,000. This compensation will be made on or before the time of implementation of the habitat restoration plan. SARCTF will provide a detailed report to CFWO annually on the use of these funds for this restoration area.

b. A detailed habitat restoration plan for the 37.2-acre restoration site will be submitted to CFWO and California Department of Fish and Game (CDFG) for review and concurrence within three months of implementation of either the pre- or post-construction project alternative. The Corps will notify CFWO in writing of the date of implementation of either the pre- or post-construction project alternative and identify the date that the restoration plan will be submitted to CFWO and CDFG. The habitat restoration plan implementation will begin as soon as possible after CFWO and CDFG concurrence on the plan, with restoration activities conducted between September 15 and March 15 of each calendar year unless specifically authorized to do otherwise by CFWO and CDFG.

If it is necessary to conduct weeding or other restoration and/or creation activities outside of this period, then authorizations from CFWO and CDFG will be obtained in advance to preclude the unauthorized take of federally listed species which is increasingly likely as the restored/created habitat matures. The restoration plan must, at a minimum, include the following components: 1) plant material and seed mix; 2) planting and seeding methods; 3) salvage methods for vegetation and topsoil; 4) preparation of sites and implementation of planting; 5) a proposed monitoring and reporting schedule; and 6) remediation measures to be implemented if initial restoration efforts are unsuccessful.

c. The Corps and/or the District will notify CFWO and CDFG via written report when restoration and/or creation efforts in a given area are deemed successful by your agency based on the success criteria in the restoration plan. Each report must include quantitative evidence that the structure and composition of the revegetated area is statistically similar (i.e., not significantly different) to habitat occupied by vireos in the vicinity or other willow woodland habitats with understory as characterized by Zembal *et al.* (1985) and Zembal (1986). If the success criteria have been completely satisfied, then CFWO will concur in writing that restoration and/or creation requirements for that given area have been successfully attained.

d. The Corps and/or the District will ensure that all lands in the designated restoration area are not used for any purpose that would change or otherwise interfere with their value as wildlife habitat or a wildlife corridor (e.g., erect permanent or temporary structures, night lighting, or facilitate the ingress of domestic animals, exotic animals, or non-native plants).

e. The taking and use of cuttings from willow riparian, riparian scrub, marsh, or aquatic habitats will be prohibited except with the prior approval of CFWO and CDFG. Also, all water conveyance infrastructure in restoration areas and adjacent areas will be constructed and operated to avoid the flooding of vireo habitat in the action area. Imported water, including water used for irrigation, will not be allowed to flood or otherwise degrade existing or replacement habitats.

f. The use of rodenticides, herbicides, insecticides, or other chemicals that could potentially harm federally listed species will be prohibited.

2. The Corps and/or District will monitor vireo territories in Prado Basin within the 498 to 505 foot elevation for a 5-year period beginning with implementation of either project alternative. The baseline number of vireo territories within this area will be submitted to CFWO for review and concurrence at the beginning of project implementation. Should the number of vireo nesting territories show a statistically significant ($\alpha \leq 0.05$) decline over the 5-year period within these elevations, then the Corps and/or District will restore and protect in perpetuity an additional 37.2 acres of riparian habitat within Prado Basin and provide funding at a level to adequately implement, monitor, manage and assure success of that restored habitat area.

3. The Corps and District will commit to ongoing vireo and flycatcher population monitoring within the Prado Basin for the life of the project. Termination of monitoring will be subject to mutual agreement by the Corps, District, and CFWO. The District will make available one

existing vireo monitor to aid in population research on the flycatcher. As part of the commitment to population monitoring, historical and current vireo and flycatcher locations in Prado Basin will be digitally mapped. Digital mapping will be done annually for the life of the project. The District will submit an annual work plan for both vireo and flycatcher research to CFWO for review and concurrence.

4. A detailed eradication plan for Prado Basin for the removal of exotic, invasive animals that are competitors or predators on the sucker will be submitted to CFWO for review and concurrence within three months of implementation of either alternative. The plan will include goals and objectives, methods, efficacy assessment, reporting requirements and funding assurances. Funding for this plan's development and implementation will be assured by the Corps and/or District at the level required to achieve the plan's goals and objectives.

STATUS OF THE SPECIES

Least Bell's vireo

The least Bell's vireo is a neotropical, migratory, insectivorous songbird that nests and forages almost exclusively in riparian woodland habitats in California and northern Baja California, Mexico (Garrett and Dunn 1981, Gray and Greaves 1981, Miner 1989, AOU 1998). Vireos generally begin to arrive from their wintering range in southern Baja California and, possibly, mainland Mexico to establish breeding territories by mid- to late-March, though a singing vireo was detected on territory on March 2, 1994 (Garrett and Dunn 1981; Salata 1983a, b; Hays 1989; Pike and Hays 1992; Service, unpublished data). The large majority of the breeding vireos typically depart their breeding grounds by the third week of September, and only a few vireos are found wintering in California or the United States as a whole (Barlow 1962; Nolan 1960; Garrett and Dunn 1981; Ehrlich *et al.* 1988; Salata 1983a, b; Pike and Hays 1992).

Vireo nesting habitat typically consists of riparian woodlands with well-developed overstories, understories, and low densities of aquatic and herbaceous cover (Zembal 1984; Zembal *et al.* 1985; Hays 1986, 1989; Salata 1983a; RECON 1988). The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by sandbar willow (*Salix hindsiana*), mule fat (*Baccharis salicifolia*), young individuals of other willow species, such as arroyo willow (*S. lasiolepis*) or black willow (*S. gooddingii*), and one or more herbaceous species (Salata 1983a, b; Zembal 1984; Zembal *et al.* 1985). Significant overstory species include mature arroyo willows and black willows. Occasional cottonwoods (*Populus* spp.) and western sycamore (*Platanus racemosa*) occur in some vireo habitats, and there additionally may be locally important contributions to the overstory by coast live oak (*Quercus agrifolia*).

Though the vireo occupies home ranges that typically range in size from 0.5 to 4.5 acres (RECON 1988), a few may be as large as 7.5 acres (Service 1998). In general, areas that contain relatively high proportions of degraded habitat have lower productivity (hatching success) than areas that contain high quality riparian woodland (Jones 1985, RECON 1988, Pike and Hays 1992).

The vireo was historically described by multiple observers as common to abundant in the appropriate riparian habitats from as far north as Tehama County, California, to northern Baja California, Mexico (Grinnell and Storer 1924, Willett 1933, Grinnell and Miller 1944, Wilbur 1980). The past, unparalleled decline of this California landbird species (Salata 1986, Service 1986) has been attributed, in part, to the combined, perhaps synergistic effects of the widespread destruction of riparian habitats, habitat fragmentation, and brood-parasitism by cowbirds (Garrett and Dunn 1981).

Reductions in vireo numbers in southern California and the San Joaquin and Sacramento valleys were evident by the 1930s and were "apparently coincident with increase of cowbirds which heavily parasitize this vireo" (Grinnell and Miller 1944). Widespread habitat losses fragmented most remaining populations into small, disjunct, and widely dispersed subpopulations. The historic loss of wetlands (including riparian woodlands) in California has been estimated at 91 percent (Dahl 1990). Much of the potential habitat remaining is infested with alien plants (e.g., arundo) and exotic animals (e.g., cowbirds).

During the past decade, the vireo has begun to recover at several locations (e.g., Prado Basin) within its range due to relatively intensive recovery efforts. Approximately 2,000 vireo territories were detected within California during 2000 (Service, unpublished data). The largest population of vireos continues to be located on Marine Corps Base, Camp Pendleton in San Diego County. In recent years, the populations of vireos at Camp Pendleton and the Prado Basin collectively represented approximately 60 percent of all known territories within California and the United States as a whole.

Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing incidence of nest predation and parasitism (Whitcomb *et al.* 1981, Small and Hunter 1988). Also, vireos are sensitive to many forms of human disturbance including noise, night lighting, and consistent human presence in an area. Excessive noise can cause vireos to abandon an area. Greaves (1989) hypothesized that the lack of breeding vireos in apparently suitable habitat was due to human disturbances (e.g., bulldozers, off-highway vehicles, and hiker travel) and further suggested that buffer zones between natural areas and surrounding degraded and disturbed areas could be used to increase the suitability of some habitat for vireos.

Habitat destruction and brood-parasitism by the cowbird continue to be the primary threats to the survival and recovery of this species. Riparian woodland vegetation containing both canopy and shrub layers, combined with adjacent upland habitats, are essential to the conservation of the vireo. The following activities continue to destroy or degrade habitat for vireos: 1) removal of riparian vegetation; 2) invasion of exotic species (e.g., arundo, cowbird); 3) thinning of riparian growth, especially near ground level; 4) removal or destruction of adjacent upland habitats used for foraging; 5) increases in human-associated or human-induced disturbances; and 6) flood control activities, including dams, channelization, water impoundment or extraction, and water diversion. The draft recovery plan for the vireo identified two major causes of vireo population decline as cowbird-nest parasitism and habitat loss and degradation. Recovery efforts are focused on addressing these two issues.

Because of the documented, drastic decline in abundance and distribution, the vireo was listed as an endangered species by the State of California in 1980. The vireo was listed as a federally endangered species by the Service on May 2, 1986 (51 *Federal Register* 16474). Critical habitat for this species, which includes all riverine and flood plain habitats with appurtenant riparian vegetation in the Prado Basin below the elevation of 543 feet upstream on the Santa Ana River to the Norco Bluffs area and beyond to the vicinity of the Van Buren Boulevard crossing, was designated on February 3, 1994 (59 *Federal Register* 4845).

Southwestern willow flycatcher

The southwestern willow flycatcher is a relatively small, insectivorous songbird that is one of five subspecies of the willow flycatcher (Hubbard 1987, Unitt 1987, Browning 1993). Although previously considered conspecific with the alder flycatcher (*Empidonax alnorum*), the willow flycatcher is distinguishable from that species by morphology (Aldrich 1951), song type, habitat use, structure and placement of nests (Aldrich 1953), eggs (Walkinshaw 1966), ecological separation (Barlow and MacGillivray 1983), and genetic distinctness (Seutin and Simon 1988).

The breeding range of the flycatcher includes southern California, southern Nevada, Arizona, New Mexico, and western Texas (Hubbard 1987, Unitt 1987, Browning 1993). The species may also breed in southwestern Colorado, but nesting records are lacking. Past records of breeding in Mexico are few and confined to extreme northern Baja California and Sonora (Unitt 1987, Howell and Webb 1995). Flycatchers winter in Mexico, Central America, and northern South America (Phillips 1948, Ridgely 1981, AOU 1983, Stiles and Skutch 1989, Ridgely and Tudor 1994, Howell and Webb 1995).

Breeding flycatchers are often present and singing on territories in mid-May (rarely in late April in southern California). Flycatchers are generally gone from breeding grounds in southern California by late August (The Nature Conservancy 1994) and are scarce in the United States after mid-October (Garrett and Dunn 1981).

The flycatcher breeds in riparian habitats along rivers, streams, and other wetland habitats where dense growths of willows (*Salix* spp.), coyote-bush (*Baccharis* spp.), arrowweed (*Pluchea sericea*), buttonbush (*Cephalanthus occidentalis*) [not found in southern California], or other plants of similar structure and configuration are present. The flycatcher nests in thickets of trees and shrubs approximately 13 to 23 feet or more in height with dense foliage from approximately 0 to 13 feet above ground. Overstories are often present in occupied habitats and composed of willows or cottonwoods or, in some portions of the species' range, tamarisks (*Tamarix* spp.) (Phillips 1948; Grinnell and Miller 1944; Whitmore 1977; Hubbard 1987; Unitt 1987; Whitfield 1990; Service 1993, 1995). Nesting flycatchers generally prefer areas with surface water nearby (Bent 1960, Stafford and Valentine 1985, Harris *et al.* 1986).

All three resident subspecies of the willow flycatcher (*E. t. extimus*, *E. t. brewsteri*, and *E. t. adastus*) were once considered widely distributed and common within California wherever suitable habitat existed (Grinnell and Miller 1944). The historic range of *E. t. extimus* in California apparently included all lowland riparian areas of the southern third of the State. Nest and egg collections indicate the bird was a common breeder along the lower Colorado River near

Yuma in 1902 (T. Huels, University of Arizona, *in litt.*). Willett (1933) considered the bird to be a common breeder in coastal southern California. Most recently, Unitt (1987) concluded that *E. t. extimus* was once fairly common in the Los Angeles basin, the San Bernardino/Riverside area, and San Diego County.

Throughout the known range of the flycatcher, occupied riparian habitats have been, and remain, widely separated by vast expanses of relatively arid lands. However, the species has suffered the extensive loss and modification of these cottonwood-willow riparian habitats due to grazing, flood control projects, and other water or land development projects (Klebenow and Oakleaf 1984, Taylor and Littlefield 1986, Unitt 1987, Dahl 1990, Service 1995). Changes in riparian plant communities have resulted in the reduction, degradation, and elimination of nesting habitat for the flycatcher, curtailing the ranges, distributions, and numbers of western subspecies, including *E. t. extimus* (e.g., Klebenow and Oakleaf 1984, Taylor and Littlefield 1986, Unitt 1987, Ehrlich *et al.* 1992).

The species is also impacted by a variety of other factors, including brood parasitism by cowbirds (Unitt 1987; Ehrlich *et al.* 1992; Service 1995). Parasitism rates of flycatcher nests have ranged from 50 to 80 percent in California (Whitfield 1990; M. Whitfield and S. Laymon, unpublished data) to 100 percent in the Grand Canyon in 1993 (Service 1993). Mayfield (1977) concluded that a species or population might be able to survive a 24 percent parasitism rate but that much higher losses "would be alarming." In any case, a composite of all current information indicates continuing declines, poor reproductive performance, and continued threats to most of the extant populations of flycatchers (e.g., Whitfield and Laymon (Kern River Research Center, *in litt.*, 1993); Service 1993, 1995, unpublished data).

Available information suggests that the abundance and distribution of breeding flycatchers in California have declined substantially, such that only small, disjunct nesting groups remain (e.g., Unitt 1987, Service 1995). Status reviews or analyses conducted before the listing of the flycatcher considered extirpation from California to be possible in the foreseeable future (Garrett and Dunn 1981, Harris *et al.* 1986). Unitt (1987) reviewed historical and contemporary records of the flycatcher throughout its range and determined that the species had declined precipitously during the last 50 years. He argued that the flycatcher was faring poorly throughout much of its breeding range and postulated that the "total population of the subspecies is well under 1,000 pairs; I suspect that 500 is more likely" (see also Monson and Phillips 1981, Garrett and Dunn 1981, Service 1995). Despite recent, relatively intensive surveys in much of the historic range of the species, the United States population is now estimated at 900 to 1,100 pairs (Service, unpublished data, 2001). The species is apparently extirpated or exceedingly rare in Mexico (Howell and Webb 1995).

Only six permanent breeding sites for the flycatcher remain in California. Only the populations along the Kern and San Luis Rey rivers contain 20 or more nesting pairs. Despite the virtual elimination of impacts from livestock grazing to the large and important flycatcher population on the south fork of the Kern River (Harris *et al.* 1986, Whitfield 1990), numerical declines in the population levels were observed in 1991 and 1992. Fortunately, increases in nesting success were realized in 1992 and 1993. These increases were attributed to removing cowbird eggs or nestlings found in southwestern willow flycatcher nests and cowbird trapping (Whitfield and

Laymon, Kern River Research Center, *in litt.*, 1993). The Kern River population consisted of 23 pairs in 1999 (U.S. Geological Survey, Biological Resources Division [USGS/BRD], unpublished data). Forty-seven pairs were detected along the upper San Luis Rey River in 1999 where cowbird numbers have also been reduced by trapping (USGS/BRD, unpublished data).

Although four other nesting groups were known in southern California in 1996, all but one of these consisted of four or fewer nesting pairs in recent years (Service, unpublished data). A total of 104 pairs of flycatchers were recorded in California in 1996, and the available data indicate that approximately 100 pairs were present in the state in 1998 (Service, unpublished data). More intensive survey efforts in 1999 resulted in the detection of 160 territories that contained 117 confirmed pairs (Service and USGS/BRD, unpublished data).

The southwestern willow flycatcher was listed as a federally endangered species throughout its range on February 27, 1995 (59 *Federal Register* 10693). Breeding flycatchers are listed as state endangered by California and Arizona. As identified in the draft recovery plan for the southwestern willow flycatcher (Service 2001), the conservation needs of the species include preventing the loss of flycatcher habitat, habitat restoration, cowbird trapping, and research designed to evaluate the efficacy of measures intended to minimize or reduce impacts.

Santa Ana sucker

The Santa Ana sucker is a small, short-lived member of the Catostomidae family that is endemic to the Los Angeles, San Gabriel, and Santa Ana rivers. Historically, the sucker occupied the Los Angeles, San Gabriel, and Santa Ana rivers from near the Pacific Ocean to their uplands (Swift *et al.* 1993). Although the sucker was described as common in the 1970s (Moyle 1976), recent surveys indicate that the species has experienced declines throughout most of its range (Moyle *et al.* 1995, Swift *et al.* 1993) and persists in isolated, remnant populations. Approximately 70 to 80 percent of the sucker's historic range in the Los Angeles, San Gabriel, and Santa Ana rivers has been destroyed or altered to such an extent to make it unsuitable for occupation.

The sucker only occupies portions of Big Tujunga Creek between the Big Tujunga and Hansen dams along the Los Angeles River. Recent surveys indicate that the sucker is relatively rare downstream of the Big Tujunga Dam, including the vicinities of Delta Flat and Wildwood but relatively abundant near Stoneyvale (Wickman 1996).

The sucker is found only in the west, east, and north forks of the San Gabriel River above the Morris Dam. In the west fork, Haglund and Baskin (1992, 1995, 1996) found the sucker from the Cogswell Reservoir to the confluence of the north and west forks. In the east fork, the sucker was observed during surveys by Saiki (2000) and Knowles (1999). The California Department of Fish and Game detected suckers in the north fork just above its confluence with the west fork, sections of the west fork, and one section of the east fork (Deinstadt and Ally 1997). The east fork appeared to have the highest relative abundance, followed by sections of the west and north forks. The population of suckers in the north fork is small, and the population in the west fork appears to be declining.

The sucker occupies reaches of the Santa Ana River between the City of San Bernardino and the vicinity of Anaheim. During 1999 and 2000, the sucker was collected between the Rapid Infiltration and Extraction (RIX) facility in Colton and Prado Dam and was relatively abundant in the upstream portions of this reach (Swift 2001). Baskin and Haglund (2001) detected eight adult and two juvenile suckers downstream of Prado Dam between Weir Canyon Road and the Imperial Highway. Chadwick and Associates (1996) hypothesized that tributaries are the primary source of suckers for the Santa Ana River population because abundances were highest in these areas during their surveys. However, Swift (1999) detected a relatively low abundance of suckers in only four tributaries (i.e., Rialto Drain, Sunnyslope Creek, Evans Lake Drain, and Anza Park Drain).

There is a population of suckers in the Santa Clara River that is thought to be introduced, although this presumption is based on the absence of the species from early collections rather than any documented records of introduction (Bell 1978). Portions of this population have apparently hybridized with the Owens sucker (*Catostomus fumeiventris*; Hubbs *et al.* 1943) and, as a result, this population is not included within the range of the native sucker.
The sucker is fairly general in its habitat requirements, occupying both low-gradient, lowland reaches and high-gradient, mountain streams where water temperatures are less than 22° Celsius. However, the sucker appears to fare best in small to medium streams with higher gradients, clear water, and coarse substrates, such as the East Fork of the San Gabriel River. Flowing water is essential, but flows can range from slight to swift. The sucker can tolerate seasonal turbidity, but Saiki (2000) found that their relative abundance is negatively correlated with turbidity.

The sucker is typically associated with gravel, cobble, and boulder substrates, although it is also found over sand and mud substrates. *Catostomus* spp. produce demersal, adhesive eggs that are thought to be adapted to spawning habitat with boulders, cobble, and gravel rather than shifting sands or mud (Moyle 1976). Saiki (2000) found the sucker to be most common near cobble, boulders, and man-made structures in the San Gabriel River. During sampling in the Santa Ana River, Swift (1999) found that suckers comprised 38 percent of the catch in a habitat dominated by gravel and cobble, but only 2 percent of the catch in a habitat dominated by shifting sands. Conversely, no suckers were present in the Chino Creek, a tributary of the Santa Ana River, where gravel and cobble comprised a majority of the substrates. Water quality may have been reduced at that site, thus accounting for the lack of the sucker (Swift 1998).

The sucker feeds mostly on algae, diatoms, and detritus scraped from rocks and other hard surfaces. Aquatic insects comprise only a small component of their diet (Greenfield *et al.* 1970). They have a relatively short life span of three to four years but reach sexual maturity in one year and have high fecundity. For example, the fecundity of 6 females, ranging in size from 3.1 inches (78 millimeters) to 6.2 inches (158 millimeters), was 4,423 to 16,151 eggs (Greenfield *et al.* 1970). Spawning generally occurs from late March to early July, with the peak occurring in late May and June (Greenfield *et al.* 1970, Swift 2001).

Although little is known about sucker movements, other species in the Catostomidae family are known to be highly vagile and undertake spawning migrations (Tyus and Karp 1990). For example, juveniles of the mountain sucker, *Catostomus platyrhynchus,* swim downstream and then move back upstream to spawn (Moyle 1976). It is not known if the Santa Ana sucker follows this pattern; however, Swift (2000) reported that juveniles detected downstream of River Road in the Santa Ana River were likely the progeny of adults reproducing upstream. These suckers may need to return upstream to spawn.

Information on population dynamics of the sucker is lacking. However, frequent fluctuations between periods of low and high abundance may be characteristic of their populations due to the unpredictable fluvial systems they inhabit. Arid regions of California are subject to considerable environmental variation, particularly in year-to-year precipitation that occurs primarily as winter rains. Unpredictable flood events may contribute to catastrophic decreases in abundance by transporting suckers downstream past barriers to movement that essentially preclude any future contribution to the breeding population. Conversely, unpredictable droughts may contribute to decreases in abundance by stranding suckers in isolated pools where ambient conditions become unsuitable or they can be extirpated by predation. Although the sucker's high intrinsic reproductive rate should enable it to quickly repopulate once environmental conditions become more favorable (Moyle 1976), rapid decreases in abundance render small populations even more susceptible to chance extinctions, especially if unfavorable environmental conditions persist or reoccur before the populations can recover.

Few estimates of age-specific survival rates, age structures, sex ratios, or dispersal rates are available for populations of the sucker. Age classes of suckers in the San Gabriel River were normally distributed between zero and four years old during 1984 and 1994. In 1987 and 1995, however, young-of-the-year were preponderant and older age classes were lacking (Haglund and Baskin 1995, 1996). Density estimates in the Santa Ana River during winter of 1999 and 2000 were 0.02 to 1 fish per meter (Swift 2001). Density estimates in the San Gabriel River during 1997 were 0.03 to 0.13 fish per meter (Hernandez 1997).

Threats that may have contributed to the decrease in the status of the sucker include the following: 1) direct loss of suckers due to water diversions; 2) competition and predation from introduced non-native competitors and predators; 3) loss of connectivity; and 4) destruction and degradation of habitat through urbanization, channelization and other flood control structures, water diversion and withdrawal, suction dredging, reductions in water quality, and other activities (65 *Federal Register* 19686).

The construction of flood control and water diversion structures associated with urbanization has resulted in conversion of sucker habitat to unsuitable concrete-lined storm drains in the lower-most reaches of the Los Angeles, San Gabriel, and Santa Ana rivers (Moyle *et al.* 1995) and a substantial loss of habitat in the upper portions of these rivers and their tributaries. These structures have also contributed to the dewatering of extensive reaches of these rivers and their tributaries, thereby eliminating additional habitat for the sucker. For example, the Big Tujunga Creek Dam has eliminated flows along most of the Big Tujunga Creek during late summer and autumn of dry years. During these periods, the sucker is restricted to an approximate one mile stretch of the creek.

Historically, the Los Angeles, San Gabriel, and Santa Ana rivers flowed perennially throughout their length (McGlashan 1930). However, the withdrawal of ground and surface water has de-watered extensive portions of these rivers that now remain dry during non-flood periods, unless the discharge of treated wastewater effluent sustain flows (e.g., Santa-Ana River downstream of the RIX facility). For example, surface flows along the Santa Ana River upstream of the City of Riverside have long been diverted to provide water for communities in western San Bernardino and Riverside counties. Although records from the 1940s (Anonymous 2000) indicate that the sucker was once a common resident in this reach, no suckers have been detected within the upper Santa Ana River in recent years (Jones & Stokes Associates 1997).

Remaining habitat for sucker is often degraded by a variety of factors, including sedimentation, ephemeral water flow, reduced water quality, and the presence of invasive species. Degraded habitat conditions may contribute to reduced growth, fecundity, and survival of suckers due to loss of prey items, reduction in foraging efficiency, and lack of nursery areas (Gibson 1994). High turbidity is strongly correlated with lower relative abundance of suckers, possibly due to a reduction in the availability of prey (e.g., loss of light for algal photosynthesis) and/or the inability of suckers to detect prey items in turbid waters (Saiki 2000).

Most of the existing flow in the lower Santa Ana River during the summer months is derived from treated wastewater discharged into the stream channel, primarily from the RIX treatment facility in Colton. Flows from this facility are reduced or terminated periodically when malfunctions cause reductions in discharge quality that exceed standards required by the State Regional Water Quality Control Board. The temporary reduction or termination of flows significantly reduce the amount of habitat available to suckers and could potentially strand them in dewatered sections of the stream. Also, because much of the Santa Ana River is maintained through treated water, contaminants within the treated water may adversely affect the sucker. Saiki (2000) reported that suckers inhabiting the Santa Ana River had significantly higher concentrations of dichlorodiphenyltrichloroethylene (DDT) and trans-Nonachlor than those in the San Gabriel River. Conversely, concentrations of arsenic and mercury were significantly higher in suckers inhabiting the San Gabriel River. However, all of these concentrations were lower than those found in a variety of freshwater species throughout the United States (Saiki 2000).

Recreational activities have contributed to the degradation of habitat for the sucker via erosion of stream banks, destruction of vegetation, and release of untreated human waste and other refuse. Off-highway vehicle activity may physically increase erosion and sedimentation and alter channel morphology. In addition, recreational suction dredging occurs in all counties occupied by the sucker. Suction dredging removes all substrates smaller than the diameter of the intake nozzle and deposits them as large, unstable piles just downstream from the dredge. As a result, suction dredging can locally increase turbidity, change channel topography, and decrease the abundance of aquatic insects (Harvey and Lisle 1998). Also, suction dredging appears to have significant negative effects to the early life stages (i.e., eggs, larvae, fry) that could pass through a suction dredge and be killed or injured (Harvey and Lisle 1998). For example, Griffith and Andrews (1981) found mortality rates of up to 100 percent for eggs and fry of cutthroat trout (*Oncorhynchus clarki*) and rainbow trout (*O. mykiss*) that passed through a suction dredge.

The introduction of exotic species may eliminate or reduce the abundance and distribution of native species via predation, competition, and ecosystem alteration (Moyle and Light 1996). Infestations of the invasive arundo have degraded extensive areas of habitat for the sucker by forming monotypic stands of marsh and slow-moving aquatic habitats. Although arundo may provide cover and a possible source of food for the sucker, its overall effects are likely more detrimental than beneficial (Baskin and Haglund 1999).

Moyle and Yoshiyama (1992) concluded that introduced brown trout (*Salmo trutta*) contributed to the extirpation of the sucker from the upper Santa Ana River in the San Bernardino Mountains. In addition, flood control and water diversion structures have contributed to conditions that are favorable to many predators and competitors of the sucker, including the common carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanella*) and tilapia (*Oreochromis mossambicus*). Saiki (2000) reported that the relative abundance of the sucker was negatively correlated with the relative abundances of common carp and largemouth bass. Hence, the ponding of water (e.g., settling ponds, inundation pools for dams) essentially creates areas that are unsuitable for the sucker and serve as population sinks.

Flood control and water diversion structures on the Los Angeles, San Gabriel, and Santa Ana rivers have also reduced the status of the sucker by imposing barriers that preclude or impede movements within populations. Within the Santa Ana River, the sucker population is bisected by Prado Dam, which effectively blocks the movement of fish upstream. Hence, adults, larvae or juveniles that move downstream of Prado Dam are lost from the upstream portion of the breeding population. Hansen Dam on Big Tujunga Creek and the San Gabriel River Dam may contribute to similar effects. Smaller barriers such as gauging stations, culverts and drop structures also impede movements of suckers along each of these rivers. For example, suckers washed downstream of the Weir Canyon drop structure along the Santa Ana River during high flows are effectively removed from the breeding population. The importance of upstream migration for the sucker is not known at this time. However, it is apparent that spawning is rare below Prado Dam and appears to be concentrated between Mission Boulevard and Rialto Drain, well upstream of Prado Dam. Therefore, providing upstream passage to the sucker may be important to improving reproduction for this species.

All remaining populations of the sucker are at risk due to their small size. Most of the lowland river habitats have been destroyed, and the remaining populations of the sucker are low in numbers, with the exception of the population in the San Gabriel River. Although the sucker is, in places, locally common in what remains of their native range, the total population size of any one of these remaining populations is still relatively small. Small populations have a higher probability of extinction than larger populations because their low abundance renders them susceptible to stochastic (random, naturally occurring) events such as inbreeding, the loss of genetic variation, demographic problems like skewed variability in age and sex ratios, and catastrophes such as floods, droughts, or disease epidemics (Lande 1988, Saccheri *et al.* 1998).

Another factor that renders populations of the sucker vulnerable to stochastic events is isolation, which often acts in concert with small population size to increase the probability of extinction for populations. Altered fluvial processes and impediments to movement have fragmented the historic range of the sucker such that remaining reaches of occupied habitat now function independently of each other. Isolated populations are more susceptible to extirpation by accidental or natural catastrophes because their recolonization has been precluded. Hence, the containing 44 pairs at select areas within the remainder of the Santa Ana River Watershed. Data for the 2000 breeding season in Prado Basin indicated the presence at least 357 territorial male vireos, 281 of which were paired (Pike and Hays 2000). Of the 336 territorial male vireos detected in the area in 1999, 224 were paired (Pike and Hays 1999). By contrast, 270 pairs were recorded in 1998, 195 pairs were detected in 1996, and 164 pairs were located in 1995 (Pike and Hays 1998). The reason for the decrease in the number of breeding pairs from 1998 to 1999 remains unknown.

A minimum of 714 known fledged young was detected within the Prado Basin study area during the 2001 breeding season, which was a 10 percent increase over the 1999 total of 649 (Pike *et al.* 2001). Nesting success in recent years has been relatively high; the data for 1999 (57 percent) and 2000 (71 percent) both exceeded the figures for 1997 (50 percent) and 1998 (41 percent) Pike and Hays 1999, 2000). By contrast, the average number of fledglings per breeding pair from 1999 to 2001 (2.2) remained well below the average (3.1) for the breeding seasons from 1988 to 1991. In recent years significantly fewer pairs have renested after successfully fledging young on their first attempt (Pike and Hays 1999, 2000; Pike *et al.* 2001).

The primary threats to the vireo in the Prado Basin area are habitat loss and degradation and nest parasitism by cowbirds. Recovery objectives and current range-wide management efforts are focused on addressing these two issues (Service 1998). For example, 2,785 cowbirds were trapped and removed from habitats for the vireo and flycatcher within the Prado Basin area during 2001, 2,587 cowbirds were removed in 2000, and 2,300 cowbirds were removed in 1999. Nest parasitism was at 13 percent in 2001, while in 2000 the rate had decreased to an all-time low of 8 percent (Pike and Hays 2000), likely due to the cowbird trapping efforts in riparian habitat and at adjacent cattle farms; parasitism rates had been as high at 39 percent in 1986 and 57 percent in 1993.

Vireo researchers at Prado Basin area have detected several apparently well-incubated clutches of vireos that failed to produce a single viable nestling (Hays 1989). Entire clutches failed to hatch in three cases, and all vireo nestling young failed to survive in two other instances during the early part of the 1988 breeding season. In 1994, four full clutches failed to hatch; one apparently infertile female is thought to be responsible for two of these clutches.

In 1997, a vireo nestling with a deformed upper mandible was observed (Pike and Hays 2000). Such abnormalities are often the expressed result of exposure to environmental contaminants. Abnormalities that often are attributable to toxic levels of various pollutants were detected in invertebrate specimens collected within the Prado Basin. Specifically, crayfish (*Procambius clarkii*) with abnormal appendages have been found, and several Chinese river clam (*Corbicula fluminea*) specimens exhibited shell ring patterns that indicated irregular growth (Service, unpublished data). Also, several age classes of Chinese river clams appeared to be missing from the aquatic habitats that were surveyed. This phenomenon may be the result of episodic, lethal exposures to toxic substances. Most importantly, preliminary data derived from the toxicological testing of abandoned vireo eggs from the Prado Basin have revealed the presence of dichlorodiphenylethylene (DDE), a metabolite of DDT, in concentrations that could cause eggshell thinning (Service, unpublished data).

extirpation of remnant populations during local catastrophes will continue to become more probable as development and barriers further constrict remaining populations.

The sucker was listed as a federally threatened species on April 12, 2000 (65 *Federal Register* 19686). Critical habitat was not designated at that time because the biological needs of the sucker were not sufficiently known to identify areas essential for conservation. The sucker is designated a "species of special concern" by the State of California.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the action area. Included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation and the effects of State and private actions which are contemporaneous with the consultation in progress.

The action area encompasses areas that would either be directly or indirectly affected by the proposed action, and not merely the immediate area involved in the action. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area as determined by our agency. We have described the action area in this consultation to include the Prado Flood Control Basin upstream of the dam and Reach 9 of the Santa Ana River downstream of the dam. Because our action area is a biological determination that must incorporate direct, indirect, and interrelated/interdependent effects to listed species and their habitats, our action area may differ from the scope of analysis used by your agency under the National Environmental Policy Act.

Least Bell's vireo

The vireo population in the Prado Basin and contiguous reaches of the Santa Ana River and Mill and Chino creeks has been actively studied and managed since 1986. Annual monitoring is conducted to estimate abundance and distribution, breeding chronology, reproductive success, and nest site preferences. Also, cowbirds present in vireo home ranges were routinely monitored, and modified Australian crow traps were deployed throughout the basin and the adjacent Santa Ana River in an attempt to control this brood-parasitic species.

Vireos nesting in the Prado Basin area demonstrate a strong preference for nesting and foraging in willows and mule fat (The Nature Conservancy 1997, Pike and Hays 2000). Fifty-four percent of all nests in 1997 for which data were available ($n = 239$) were placed in various willow species, while 40 percent were found in mule fat (The Nature Conservancy 1997).

Surveys indicate that the vireo population in the Prado Basin area has increased significantly from approximately 164 pairs in 1995 to a minimum of 336 pairs during the 2001 breeding season. This population continues to be the second largest overall and the largest north of San Diego County. Preliminary data from the 2001 breeding season suggest that there were a minimum of 444 vireo territories that contained approximately 336 mated pairs within the Prado Basin study area (Pike *et al.* 2001). Hoffman (2001) reported a total of 61 additional territories

The draft recovery plan for the vireo (Service 1998) calls for the protection and management of riparian and adjacent upland habitat in each identified population/metapopulation site (including the Santa Ana River) and a reduction of threats to the extent that: 1) the species no longer needs significant human intervention to survive; or 2) if human intervention is necessary, "... perpetual endowments are secured for cowbird trapping and exotic plant (*Arundo*) control in riparian habitat occupied by least Bell's vireos."

Critical habitat for the vireo includes all riverine and flood plain habitats with appropriate riparian vegetation in the Prado Basin below the elevation of 543 feet and upstream along the Santa Ana River through the Norco Bluffs area to the vicinity of the Van Buren Boulevard crossing. The action area contains a minimum of 3,500 acres of riparian habitats supporting the primary constituent elements of critical habitat. This critical habitat functions as a core area for vireos that is essential for the conservation of this species. Activities that could adversely affect these primary constituent elements include removal of riparian vegetation, thinning of riparian growth, especially near ground level, the invasion of exotic species (e.g., arundo), removal or destruction of adjacent upland habitats used by vireos for foraging, and flood control activities, including dams, channelization, water impoundment or extraction, and water diversion.

Southwestern willow flycatcher

The Prado Basin population is one of only six permanent southwestern willow flycatcher breeding sites that now exist in California. In 2001, the first flycatcher of the breeding season at the Prado Basin was detected on May 3 and the last (two juveniles) were noted on August 28 (Pike *et al.* 2001). Seven flycatcher home ranges were detected during the 2001 breeding season. Pike *et al.* (2001) indicate that three of the territorial birds paired and nested. A total of three young were fledged from two nests, the third nest was unsuccessful. Only one pair of flycatchers was detected during the 2000 breeding season; apparently only two young were fledged in the Prado Basin at that time (Pike and Hays 2000). By contrast, five flycatcher home ranges were detected within the Prado Basin during the 1999 breeding season. Pairs were eventually found in three of these home ranges; two of the three pairs produced a total of five fledglings (Pike and Hays 1999).

Flycatchers in the Prado Basin virtually always nest near surface water or saturated soil (The Nature Conservancy 1994). All known territories have been situated in relatively close proximity to water-filled creeks or channels. Nests have been placed as low as two feet above ground level. Of the five flycatcher nests found in 1996, two were placed in arroyo willow, one was found in a red willow (*Salix laevigata*), one was placed in a sandbar willow, and one was placed in a tamarisk. Both nests discovered during the 1997 season were in arroyo willows. In 2001, two nests were in arroyo willow and one in tamarisk.

Although flycatcher home ranges have been detected throughout much of the surveyed portions of the Prado Basin, successful breeding prior to 1996 had been detected only in North Basin and West Basin (Chino Creek). From 1996 to 1998 and again in 2000 and 2001, however, the only successful breeding occurred in the South Basin. No flycatcher home ranges have been detected in Reach 9 of the Santa Ana River (Service, unpublished data). Although trapping and removal of cowbirds have reduced nest parasitism and increased reproductive success of vireos in the

Prado Basin, similar results have not been seen for the flycatcher. The lack of a demonstrated relationship may reflect the low abundance of flycatchers in the area or that some other factor(s) are limiting the population.

While the unauthorized destruction of habitat within the action area has largely been curtailed, it has not completely ceased. During 1998, 1999, and 2000, property lessees of the Corps apparently mowed or cleared more than three acres of riparian habitat suitable for the vireo and flycatcher within the basin adjacent to Chino Creek. In addition, operations and maintenance work completed for the Corps in late 1998 resulted in the clearing of less than one acre of riparian habitat suitable for the vireo and flycatcher. Also, during autumn of 1999 approximately two acres of vireo habitat was destroyed or degraded in conjunction with the construction of roads, apparently on District property, in the western portion of the Basin. Most recently, seven ponds in the lower basin were created without apparent authorization. Staff in the Corps' Operations and Regulatory branches are currently working with CFWO to address these issues.

The primary threats to flycatcher within the action area essentially are the same as those identified affecting the vireo. The draft recovery plan for the flycatcher (Service 2001) calls for a minimum of 50 territories within the designated Santa Ana management unit and protection from identified threats to assure maintenance of the population over time.

Santa Ana sucker

The sucker has lost approximately 70 percent of its native range in the Santa Ana River; the portions of the Santa Ana River occupied by the sucker constitute approximately 60 percent of the entire remaining native range of the species. In the mid-1980s, Fisher (1999) reported observing numerous suckers at Imperial Highway. In Reach 9, researchers caught five suckers in 1991, one sucker in 1996, and five suckers in 1998 (Chadwick and Associates 1996, Swift 1998). The area downstream of the first drop structure downstream of Prado Dam contained appropriate habitat for sucker, including rocky to gravelly substrate, slow to moderate flowing water, and a mean depth of about 20 inches (Swift 1998). Thus, the relatively low density of suckers is apparently not due to a lack of habitat. In recent surveys, ten adult suckers were caught between Weir Canyon Road and Imperial Highway (Baskin and Haglund 2001).

Between the Hamner Avenue crossing of the Santa Ana River and Prado Dam, researchers caught 3 suckers in 1991, 76 in 1997, 22 in 1998, 5 in 1999, and 3 in 2000 (Chadwick and Associates 1996; Swift 1997, 1998, 1999, 2001). All 76 suckers caught in the Norco Bluffs area in 1997 were between 0.8 to 2.8 inches in length. Therefore, Swift (1997) hypothesized that this area was a nursery for the sucker. However, the substrate was mostly shifting sand and provided low food resources. Additionally, the presence of invasive competitors such as fathead minnow may limit the availability of diatoms and epiphytic green algae to the sucker. The fish caught in this area during other years were adults or the length information was not provided. It appears that this area may provide appropriate habitat to the sucker in some years.

The causes of sucker decline in the proposed project area are attributed to habitat degradation and destruction, increase in invasive species and loss of connectivity in recent years. Habitat quality and quantity have been reduced by increased turbidity and sedimentation upstream of the Prado

Dam and the construction and maintenance of flood control structures. Increased turbidity reduces the available light needed for photosynthetic processes for algae and visibility for prey searching. Sedimentation reduces available spawning habitat and food sources by covering favorable cobble and gravel substrate. The installation of hard bank stabilization structures along various areas of the Santa Ana River has also contributed to losses of habitat. These hard bank stabilization structures reduce habitat quality and quantity by reducing bank vegetation and increasing flow, thus encouraging the removal of larger-sized substrate. Habitat quality is further reduced by bank stabilization structures that remove pool-riffle complexes.

The status of the sucker in the action area has likely been adversely affected by increased predation and competition from invasive species. Banks stabilization structures, the Prado Dam reservoir, and the construction of wetlands have provided excellent habitat for invasive predatory and competitive species such as largemouth bass, channel catfish, carp, bluegill, green sunfish and mosquitofish (*Gambusia affinis*). Swift (2001) reported that carp and channel catfish were most common downstream of the Prado Dam, and green sunfish and largemouth bass rarely strayed from deep pools and slow-moving aquatic habitats. However, Baskin (2001) hypothesized that large numbers of mosquitofish observed in the mouth of the Sunnyslope Creek may be preying on recently spawned larval suckers.

As suckers are washed downriver, they are unable to return upstream due to the presence of several barriers. Four existing drop structures are present downstream of Prado Dam that probably prevent suckers from passing upstream due to their height and design. Additionally, Prado Dam almost certainly impedes passage, especially during low flows in the dry season, and during high flows and subsequent ponding upstream of the dam during flood seasons. Upstream of Prado Dam, the diversion at River Road provides another barrier. This diversion is a 12 to 36-inch earthen dam that diverts 70 percent of the water to wetlands managed by the Orange County Water District. The remaining water is diverted through culverts beneath the dam to the main river channel. Upstream of the culverts, water is ponded and provides habitat for exotic predators and competitors. Suckers are likely not able to swim upstream through the fast flowing water exiting the culverts and, should they succeed, then they must pass through ponds. The importance of upstream migration has been demonstrated for several species of lake suckers, including the cui-ui sucker (*Chasmistes cujus*), Sacramento sucker (*Catostomus occidentalis*), and Modoc sucker (*Catostomus microps*) (Moyle 1976; S. Reid, Service, Klamath Falls, OR, personal communication to L. Caskey, CFWO, April 2001). Where fish passage has been constructed for the lake suckers, fish locks have been successful in passing 150,000 to 700,000 suckers per day (B. Mefford, Bureau of Reclamation, Denver, CO, personal communication to L. Caskey, CFWO, March 2001).

The relatively low density of suckers downstream of Prado Dam may be due to several factors, including a lack of recruitment due to the small amount of suitable spawning habitat, relatively high density of exotic predators, and loss of habitat from the installation of flood control features (e.g., drop structures, bank stabilization, and low flow channels).

Because the status of the sucker is precarious and declining, long-term conservation depends on the implementation of the following conservation measures: 1) protection of remaining populations to ensure that they are independently viable with stable or increasing abundance and recruitment; 2) maintenance or restoration of adequate perennial flows necessary to support and create viable habitat in each river and tributary occupied by the sucker, including reaches that are currently dewatered; 3) maintenance or restoration of connectivity of habitat in each river and tributary occupied by the sucker, including the removal or modification of existing barriers to movement; 4) maintenance of water quality suitable for the sucker; and 5) removal of exotic species that degrade habitat and/or reduce the status of the sucker through predation or competition.

Habitats that are currently degraded could be improved in a number of ways. Naturally sinuous river channels should be encouraged throughout the historic range of the sucker, and ponded water should be reduced to a minimum and/or managed in such a way as to discourage entry by the sucker. In addition, water management plans and/or legal agreements should be developed to maintain adequate perennial flows in all rivers, particularly in the Santa Ana River where RIX facility shutdowns could strand the sucker in shallow pools. Furthermore, restoring flow to dry reaches with appropriate substrate could provide adequate habitat to support the reintroduction of suckers. In addition to flow, turbidity should be reduced through appropriate dam modifications, and the scope and intensity of recreational activities that adversely affect the sucker and its habitat should be limited. Habitat for sucker may also be improved by adding coarse material and boulders to the substrate. In areas where other listed species are not present, nursery habitats should be created and maintained by clearing emergent non-native vegetation and, if necessary, modifying stream banks to create shallow stream bank areas. Once habitat is created, it should be protected from human-induced high flows (e.g., dam releases) that could scour gravel and cobble substrate. One possible measure that could dissipate these high velocity flows is the installation of relief channels. Relief channels are constructed to divert high flows away from the main channel. An example of a relief channel is at the confluence of Sespe Creek and Santa Clara River. This relief channel appears to support a population of suckers, arroyo chubs and sticklebacks (Baskin and Haglund 1999).

An exotic species program should be implemented to remove vegetation such as arundo and competitors and predators of the sucker such as green sunfish, largemouth bass, carp, and channel catfish. Such a program would improve habitat for the sucker by reducing the amount of slow moving or standing water created by large stands of arundo and by decreasing the presence of exotic fish. Removal of invasive fish species is usually completed by chemical or mechanical means such as the use of seines, nets, and traps. Mechanical means would be the most effective and least harmful to the native fish species in the Santa Ana River.

Barriers that preclude or impede the movements of suckers should be removed or modified (e.g., installation of fish passage structures) so that individuals are no longer lost to the breeding population and can colonize currently unoccupied areas. Several types of fish passage are available including fish locks, vertical slot structures, and fish rock passageways. Vertical slot structures have been successful for the cui-ui sucker in the Truckee River, and natural fish passageways are being constructed for the Modoc sucker in a Pit River tributary (S. Reid, Service, personal communication to L. Caskey, CFWO, April 2001). The darting speed of small suckers is estimated to be 4 body lengths per second (e.g., a 6-inch-long sucker would have darting speed of 2 feet per second) (S. Reid, Service, personal communication to L. Caskey, CFWO, April 2001). However, the swimming speed and affinities of the sucker and other similar species should be examined more closely so that appropriate passageways can be constructed.

Because few specifics are known about the life history strategies, population dynamics, and habitat affinities of the sucker, research and monitoring should be initiated immediately. The Santa Ana Sucker Discussion Team has funded initial studies of the distribution, habitat affinities, and potential effects of contaminants, turbidity, and exotic species on the sucker population in the Santa Ana River. Additional studies should be funded to investigate additional areas and variables. Also, goals should be clearly defined for all measures implementing conservation needs, and the success of conservation efforts must be assessed through quantitative and qualitative monitoring.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by or result from the proposed action, and are later in time, but are still reasonably certain to occur.

Activities associated with, or resulting from, the proposed action could adversely affect the vireo and its critical habitat, flycatcher, and/or sucker in the following manner: 1) increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat; 2) increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges; 3) increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species; and 4) effects to sucker from water conservation structures and diversions. Each of these categories of adverse effects are discussed in detail in the following sections.

Effects to sucker

<u>Increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat:</u> Impounding water and creating a larger reservoir behind Prado Dam would have adverse affects on the sucker. Approximately 2.2 to 4.8 acres of river habitat would be lost, at least temporarily, to impounded water (Table 8, draft BA). As flowing water reaches the conservation pool, its velocity drops and suspended sediment settles out; fines that settle create unsuitable bottom habitat for sucker. Freshwater aquatic habitat consisting of pooled, non-flowing water decreases the extent of natural stream habitat for sucker. Pooled, standing water has increased stagnation, accumulation of nutrients, eutrophication, elevated temperature, and decreased dissolved oxygen, which are conditions unsuitable for native fish.

While specific river enhancements to benefit sucker are not proposed as part of the conservation measures of this project, some habitat restoration for the sucker is being addressed through implementation of conservation measures under the Mainstem consultation. In addition, the District is a member of the Santa Ana Sucker Discussion Team (Sucker Team), which is developing a conservation program that will identify scientific study needs and species management options and work to implement a suite of activities, including habitat enhancement, to benefit the sucker.

Increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges from the dam: Scour of the downstream channel will contribute to the degradation of habitat for sucker. Suckers depend on gravel substrate because they scrape algae off of rocks for food and use these types of substrate for spawning. Although it is not known if suckers spawn in Reach 9, they have been detected in that area. It is reasonably certain that discharges in the range of 5,000 to 10,000 cfs will mobilize gravels, alter the river substrate, and decrease the availability of spawning habitat and food resources for the sucker downstream of Prado Dam. This substrate is unlikely to be replaced at a rate commensurate with its loss due to the barrier to gravel transport imposed by the dam. The loss of any spawning habitat downstream of the Prado Dam could limit reproduction by the sucker because there is little possibility for these fish to return to upstream spawning sites due to the barrier imposed by the dam. Even an infrequent, high-rate discharge event that reduces available spawning or larval habitat and, thereby, contributes to a decrease in recruitment could decrease the status of the species for years due to persistent effects (i.e., time lags) on local population dynamics.

Impacts to sucker from the increased flow and frequency include sweeping suckers from areas where there is great constriction and no refugia past Weir Canyon Bridge into Reach 8 and beyond of the Santa Ana River, loss of spawning habitat, and loss of food resources. Since there are no known spawning locations between Prado Dam and Weir Canyon Bridge, it is difficult to assess impacts to reproduction. Survival could be significantly reduced for any existing sucker population as food resources would be anticipated to decrease. Additionally, any suckers swept past the drop structure downstream of Weir Canyon Bridge would be moved to habitats that are less conducive to their survival. For example, between Weir Canyon Bridge and Imperial Highway Bridge, there is less canopy and refugia, and the river is highly fragmented by three drop structures. After Imperial Highway Bridge, water flow is extremely reduced, and little or no canopy and habitat, including appropriate substrate, exists. Therefore, it is likely any suckers swept below Weir Canyon would be lost to the known sucker populations.

Increased discharge rates may wash suckers past Weir Canyon, where they would not be able to return upstream past the several existing drop structures. These suckers would be lost to any breeding population downstream of Prado Dam because there is no known spawning habitat downstream of Weir Canyon. No specific measures under this proposed water conservation project are being proposed to address effects to sucker from being passed downstream in high flows; however under the Mainstem consultation, the Corps will design and implement an efficient, cost effective trap and haul program in coordination with the Service, CDFG and other experts. This program should reduce the number of suckers that would be permanently lost from the breeding population. In addition, the Sucker Team is working to initiate an intensive study of the species' status and distribution downstream of Prado Dam.

Increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species: Increasing the water conservation pool will increase habitat for exotic animal species such as bass, carp, green sunfish, bullfrog, and crayfish, all of which are competitors with or predators on native fish, such as the sucker. The conservation measure proposed by this project to develop and implement an effective exotic animal species control program within the Basin will reduce the negative effects that these species have on sucker and other native fish.

Effects to sucker from water conservation structures and diversions: Under current water conservation practices, approximately 50 percent of the river is diverted into a channel just downstream of the River Road bridge for delivery to water quality ponds (polishing ponds). That diversion channel has good quality habitat and sucker have been found in it. However, in its current configuration, the diversion channel does not allow sucker to pass back into the main river, and the outflow of the diversion ends at the polishing ponds. The polishing ponds are areas of still water that contain species which are predators and/or competitors of the sucker. It is unlikely that sucker survive if they pass into the polishing ponds. In addition, the main river channel has culverts near the diversion channel that have a significant drop, preventing sucker that pass through the culvert from being able to move back upstream. Sucker that pass through the culverts there are effectively removed from any upstream breeding population. Conservation measures to be implemented under the Mainstem project include providing for year-round, bidirectional passage of suckers in both the main river channel and the diversion channel.

Effects to vireo and flycatcher

Increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat: Our agency voiced concerns about increased inundation effects not only due to higher levels of water conservation but also due to the ability of the dam to hold water more frequently and at a higher level once the new dam outlet gates are installed during Mainstem. With and without the Mainstem project inundation levels and durations were compared to determine if that project would result in prolonged inundation of vireo critical habitat or an increased potential for flooding of vireo nests following rare late spring storms. Your agency has maintained that the Mainstem project would not cause significant increases in inundation elevations or dwell times within habitat for vireos behind the dam due to the increased discharge capacity of the outlet works (Corps 2001a). Also, your staff has indicated that the dam will continue to be operated primarily for flood control purposes and that during late winter water will not be held longer or at higher elevations behind the dam in anticipation of water control activities up to 505 feet elevation following March 1. In addition, your agency maintains that any increases in inundation under future conditions will be the result of parameters (e.g., sedimentation and watershed development) not related to Mainstem or increased water conservation.

While we agree that the increased discharge capacity of the reconstructed dam could, under certain circumstances, reduce both the elevation and dwell time of water pooled behind the dam, it is evident that the inundation of wetland, riparian and upland habitats up to an elevation of 566 feet will be enabled by Mainstem, and therefore, the dwell time of impounded waters at all elevations, including those for water conservation, could be increased. As an example, the current water control manual (Corps 1994) provides for a range of release rates at all elevations from the debris pool to the elevation of the spillway (and above). Given that a stated objective of the manual is to accommodate water conservation whenever possible, the much larger post-Mainstem potential reservoir pool, and resulting decreased flood risk associated with storing water at higher elevations, it is reasonable to conclude that Mainstem will induce incremental damage to habitats occupied by the vireo and, possibly, the flycatcher, at the current winter water conservation 494 foot elevation and that same type of incremental damage will take place at the higher proposed water conservation level of 498 feet. The increased storage of water during the later winter could result in the degradation of riparian habitat and the understory that vireos require for nesting.

Although the effects of inundation on riparian habitat are relatively difficult to quantify, water conservation efforts may result in the following effects: 1) vegetation mortality that reduces the areal extent of willow riparian habitat; 2) reduction in species diversity, as plants intolerant of inundation are reduced within the basin; and 3) structural changes within the habitat, especially a loss of shrubby understory. Persistent water will have an effect out some distance beyond its immediate edge due to soil saturation, capillary action, and microclimate alteration. In some areas, only the most inundation tolerant plants would persist, potentially expanding the existing monotypic black willow forest to a higher contour level, with concomitant shifts of other vegetation communities also to higher contours or resulting in their direct loss. These losses or changes to the plant community depend on a variety factors including the elevational gradient, soil type, and current plant community. The border of much of Prado Basin has a steep elevational gradient; therefore, plant community changes in these areas will be more abrupt, while within the Basin and riverbed, changes would occur over a wider area where the elevation change is more gradual.

The primary effects to the vireo and flycatcher include a reduction in the carrying capacity of the area due to decreased availability of habitat and a reduction in recruitment due to decreased foraging and nesting locations. Since monitoring for the vireo began, there has been a shift in the distribution of vireo nesting territories from lower elevations in the southern basin to more eastern and higher elevation areas due to habitat changes, particularly the loss of shrubby understory, from current water conservation practices (Biological Opinion 1-6-95-F-28 dated April 20, 1995). This shift has moved a large portion of the breeding population nearer to the Corona Airport, increasing the number of vireos subject to potentially adverse noise effects and closer to dairies, agricultural and ruderal habitats, which could subject breeding vireos to increased nest parasitism by cowbirds.

We anticipate that the increased pooling of water during winter months when Prado Dam is operated for flood control (October 1 to February 28) is not likely to directly threaten individual vireos or flycatchers because these species are typically not present in the project area during this time period. Vireos typically arrive in the Prado Basin and southern California from their wintering grounds in mid- to late March, with territory establishment and nesting taking place from March through late July (Pike and Hays 1999). Dispersal of fledglings and mature adults typically occurs in August and September. Flycatchers typically arrive in the Prado Basin later than vireos and leave earlier. As a result, vireos and flycatchers are only rarely detected in the Basin during October 1 to March 15 (Pike and Hays 1999). The biological opinion for the current water conservation activities anticipated the harm of 90 pairs of vireos or 180 individual vireos over the life of the project due to the periodic, temporary flooding, destruction or degradation of occupied habitat; no harm was anticipated for flycatchers. Since the proposed project's water conservation elevation of 505 feet during summer months is the same as the current water conservation activities, all measures outlined in previous formal consultations for avoidance and minimization to vireo and flycatcher nests and young, including any necessary relocation of nests subject to flooding to a higher elevation, will continue to be implemented by the Corps and/or District for the life of the project. In addition, one conservation measure to be implemented with this proposed project would create at least 37.2 acres of riparian habitat that, over time, would become suitable for occupation by the vireo and, potentially, the flycatcher. This created area would provide nesting area for vireos that may be displaced by the increased water conservation activities between 494 and 498 feet and for the general vireo population, that has grown substantially.

Increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges from the dam: The upsizing of the dam outlet works from Mainstem will increase the capacity for discharges from 5,000 cfs to 8,760 cfs for a 25-year flood, from 5,000 cfs to 18,500 cfs for a 50-year flood, and from 22,200 cfs to 30,000 cfs for a 100-year flood (Corps 2001a, b). Your agency maintains that significant damage to riparian habitat downstream from the dam would occur only rarely because sustained discharges exceeding 10,000 cfs would be rare. However, the draft BA (page 33) states that a release of 7,400 cfs with velocities from 4 to 14 feet per second can cause considerable scouring of the channel. Your agency estimates that 22 acres of downstream habitat will be affected by discharges due to water conservation activities.

Scour of the downstream channel will contribute to the degradation of habitat for vireo. Release at high rates erodes soil, removes vegetation, moves cobble, rock and boulders, and can cause armoring of the channel. High rates of discharge can be a significant factor in causing streambank erosion resulting in loss of riparian vegetation. Water released from Prado Dam, while containing a load of suspended fines, in nearly free of coarser sediments. Thus, the natural dynamics of deposition replacing sediment scoured by large flow rates are highly altered. Vegetation would be unable or take longer to reestablish in areas scoured of soil. The loss of vegetation due to higher velocity flows facilitated by the upsized outlet structures will reduce the extent of suitable overstory and understory riparian downstream of the dam that vireos depend upon for nesting and foraging.

The Habitat Management Plan prepared for these public lands has not been completed or adopted. However, the Corps and District have agreed to finalize the proposed plan or equivalent within one year of the initiation of Mainstem construction in coordination with our agency and, subsequently, obtain approval from our agency and implement the plan immediately thereafter to appropriately conserve listed species within Reach 9 of the River. The local sponsors have indicated that, under any circumstances, the approved Habitat Management Plan will be implemented in full upon the conclusion of construction in the Santa Ana River Canyon (County of Orange 2001). In the interim local sponsors have committed to maintain open space that is under their direct control in a manner that is consistent with the intent of the Habitat Management Plan (County of Orange 2001). We anticipate that the purchase and management of the Santa Ana River flood plain and other habitat restoration measures within the action area will be implemented over time to moderate any damage incurred by higher release flows.

<u>Increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species</u>: Any project-related creation and maintenance of conditions that favor exotic plants and animals could decrease the status of the vireo and flycatcher. The increase and spread of alien plants such as arundo is continuing in the Santa Ana River watershed, including the Prado Basin. Undisturbed areas vegetated with native species are much more resistant to invasion by this and other alien plants. The alteration of the landscape within the project area and associated establishment and dispersal of select non-native plants likely will impact, and could overwhelm, native habitats in the project area. Invasive exotic plants could be established in riparian habitat impacted by activities associated with the project. Stands of arundo, castor bean (*Ricinus communis*), and other invasive, noxious non-native plants provide little habitat for the vireo and flycatcher. The vast majority of vireo nests within the Prado Basin and elsewhere have been placed in native trees and shrubs (Pike and Hays 2000).

The disturbance or removal of existing riparian can result in the creation of cowbird foraging habitat or increase cowbird parasitism events due to the fragmentation of nesting habitat (Askins 2000). Cowbirds prefer feeding in open areas such as those created by human alterations of the landscape (Garrett and Dunn 1981). There is a relatively high density of cowbirds in the Prado Basin and contiguous reaches of the Santa Ana River, possibly due to the rather close juxtaposition of host-rich riparian habitats and expansive feeding areas in and around nearby dairies, livestock operations, urban, and agricultural fields (Zembal *et al.* 1985, Hays 1987, Lowther 1993, Pike and Hays 1999).

Because the rate of parasitism of vireo nests in the Prado Basin was as high as 100 percent prior to the inception of current management efforts (Zembal *et al.* 1985), any project-related feature that creates conditions favorable to cowbirds in the project area would likely decrease the reproductive success of vireos in the absence of management. However, the cowbird trapping and removal efforts that are part of ongoing efforts by the District should effectively reduce the incidence of parasitism to the vireo or flycatcher in the Prado Basin, based on the results of several recent publications that demonstrated the efficacy of cowbird trapping programs at increasing the reproductive success for the vireo (Kus 1999, Whitfield and Sogge 1999, Whitfield *et al.* 1999, Pike and Hays 2000, Powell and Steidl 2000).

Effects to designated critical habitat for vireo

Within Prado Basin,15.2 acres of designated vireo critical habitat will be affected by increased inundation. Inundation effects include vegetation mortality that reduces the areal extent of willow riparian habitat and structural changes within the habitat, especially a loss of shrubby understory. These effects to vireo critical habitat will be offset by the creation of 37.2 acres of riparian habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

We are unaware of any future, non-Federal actions that are reasonably certain to occur within the action area that could adversely affect the vireo and its critical habitat, flycatcher, or sucker.

CONCLUSION

Measures to offset effects to vireo and flycatcher from prior water conservation projects include species monitoring and reporting, cowbird trapping, and habitat restoration. Measures to offset effects to sucker from the Mainstem project include habitat restoration and continued development and implementation of a sucker management plan. After reviewing the current status of the vireo and its critical habitat, flycatcher, and sucker, the environmental baseline for the action area, effects of the proposed action including conservation measures, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the vireo, flycatcher, or sucker or adversely modify critical habitat for the vireo. Our conclusion is based on the following findings:

1. Adequate conservation measures have been implemented from prior consultations to minimize project-related effects during non-flood season at elevations between 498 and 505 feet, and adequate conservation measures will be implemented for project-related effects during flood season between 494 and 498 feet, thus maintaining the baseline of habitat, abundance, and distribution for the vireo and flycatcher within the project action area;

2. Implementation of the proposed habitat creation efforts, plus remedial measures if necessary, will ensure that habitat function for the vireo and flycatcher is maintained within the action area;

3. Adequate conservation measures will be implemented for project-related effects to the sucker, thus maintaining the baseline of habitat, abundance and distribution of sucker within the project action area; and,

4. Implementation of the proposed exotic predator/competitor eradication plan will ensure that project-related effects to sucker are minimized.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the Corps or the District in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Corps (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

We anticipate no additional incidental take of vireo from this proposed project over that assessed in Biological Opinion 1-6-99-75 for prior water conservation activities that are still in effect during the life of this project, that is, the harm of 90 pairs of vireos or 180 individual vireos over the life of the project due to the periodic, temporary flooding, destruction or degradation of occupied habitat.

We anticipate no incidental take of flycatchers.

We anticipate incidental take of an unquantifiable number of suckers in the form of harm due to loss of breeding habitat downstream of Prado Dam and inundation effects to 2.2 to 4.8 acres of stream habitat behind the dam in the reservoir pool.

EFFECT OF TAKE

In the accompanying biological opinion, we determined that the level of anticipated take is not likely to result in jeopardy to the vireo, flycatcher and/or sucker, or adverse modification of vireo critical habitat.

REASONABLE AND PRUDENT MEASURES

The Corps shall implement the following reasonable and prudent measure.

1. Your agency or the District will ensure that adverse effects to the vireo, flycatcher and sucker resulting from the implementation of the proposed action are minimized to the maximum extent practicable.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, your agency and/or the project proponents and their agents must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1.1 The Corps and the District shall implement the project minimization measures for vireo, flycatcher and sucker as described in the section entitled "Description of the Proposed Action."

1.2 The Corps, District, or their agents shall obtain all necessary local, State, and Federal permits to implement the project. In particular, the Corps and District must obtain any necessary permits from California Department of Fish and Game. The incidental take authorization in this biological opinion is not in effect in the absence of any or all such permits.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. Your agency must immediately provide an explanation of the causes of the taking and review with this office the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend your agency consider implementing the following recommendations to further the conservation of the vireo, flycatcher, and sucker:

1. A long-term plan for restoring sucker habitat within the Santa Ana River, including Reach 8, should be developed and implemented to address the creation of stream meanders, pool-riffle complexes, upstream and downstream fish passage throughout the reach, reestablishment of riparian vegetation, and other conservation needs. Your agency should regularly participate in the monthly meetings of the Santa Ana Sucker Discussion Team.

2. The installation of low-flow rock passageways, vertical slot structures, fish locks, or other similar methods that provide fish passage through or around drop structures in the Santa Ana River should be developed and implemented. The velocity of flow in which the sucker can maintain direction and movement should be investigated so that appropriate

fish passage systems could be established at each of the drop structures between Prado Dam and Imperial Highway.

3. Conduct an annual assessment of the effects of inundation (e.g., dwell time and elevation) to the vireo, sucker, and their habitats for the life of the dam. This assessment should include baseline information such as the distribution and elevation of all vireo nests during each monitoring season for which data has been collected (i.e., approximately the past 16 years).

4. To the extent practicable, remove all invasive/exotic biota from riparian habitats in the Prado Basin. The existing cowbird management program should be continued and expanded to maximize the reproductive success of the vireo, flycatcher, and other sensitive avian species. Also, the control of invasive, exotic plants such as arundo and castor bean must continue if riparian habitats are to provide the elements necessary to accommodate the vireo, flycatcher, and a large variety of other sensitive animal taxa over time.

5. A sediment transport study should be developed and implemented in cooperation with other local, State, and Federal agencies. The sediment transport study should incorporate historical and current data and evaluate the effectiveness of the Santa Ana River as a sediment transport system. The study should address the excess sedimentation that occurs upstream of Prado Dam and the sediment deficit downstream of Prado Dam. The results of this study would be used to develop measures that would attempt to return the Santa Ana River to a fully functioning sediment transport system.

REINITIATION NOTICE

This concludes formal consultation on the proposed action as specified in your request for formal consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. Any questions or comments should be directed to Jill Terp of my staff at (760) 431-9440.

Sincerely,

Karen A. Evans

Karen A. Evans
Assistant Field Supervisor

cc: Orange County Water District, C. Miller and D. Zembal

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