CHAPTER 6

PROJECT ALTERNATIVES ANALYSIS

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INTRODUCTION

The primary goal of the LWRP 2020 Plan is to identify the necessary wastewater treatment and effluent management facilities to meet the needs of the District No. 14 service area through the year 2020 in an environmentally sound and cost effective manner.

In this chapter, a wide range of conceptual wastewater treatment alternatives were first identified and evaluated. Those that satisfied the planning objectives were deemed to be feasible wastewater treatment alternatives. The feasible alternatives were then evaluated and compared using a specific set of screening criteria that resulted in identification of the recommended wastewater treatment alternative. The first-level evaluation process using the planning objectives was then repeated for a wide range of conceptual effluent management alternatives. Those that satisfied the planning objectives were deemed to be feasible effluent management alternatives.

The recommended wastewater treatment alternative and the feasible effluent management alternatives were combined into a set of final project alternatives. These project alternatives were then evaluated and ranked using a set of qualitative and quantitative criteria. The final project alternative with the highest combined qualitative and quantitative ranking, as well as the one most compatible with comments received during the public review period for the Draft LWRP 2020 Plan EIR, was identified as the recommended project. This evaluation process is illustrated in Figure 6-1.

Public Comments

Public comments received were thoroughly evaluated and considered in developing project alternatives as well as ultimately identifying the recommended project for the LWRP 2020 Plan.

In addition to written comments received since the NOP was issued on December 6, 2002, District No. 14 held a scoping meeting at Lancaster City Hall on January 9, 2003, to accept comments on the proposed project alternatives. Following publication of the Draft LWRP 2020 Plan EIR on September 30, 2003, a public hearing was held at Lancaster City Hall on October 29, 2003, to receive oral and/or written comments on the scope of the analyses and content of the Draft LWRP 2020 Plan EIR. An additional meeting was held at Lancaster City Hall on November 20, 2003, to receive input from property owners within a proposed project site east of the LWRP.

Some of the major comments received from the public are summarized below:

- Some expressed a strong desire to have tertiary wastewater treatment and were willing to pay for this increased level of service;
- Some expressed a desire that the Antelope Valley receive the same level of wastewater treatment as the rest of the Districts' service areas;
- Some expressed opposition to the use of EAFB property for the construction of any effluent management facilities;
- Members of various environmental groups and the general public urged District No. 14 to preserve, protect, and enhance the ecological habitat of Piute Ponds, to replace any wetlands that may be eliminated, and, if possible, to construct additional wetlands;
- Some expressed strong opposition to the construction of effluent management facilities within a 15-square-mile study area approximately eight miles east of the LWRP;
- Some expressed strong opposition to the construction of effluent management facilities within a 1.5-square-mile study area immediately south of the LWRP;

- Some expressed concern about the impact to groundwater quality as a result of operation of effluent management facilities;
- Some expressed concern about the impact to public health as a result of operation of effluent management facilities; and
- Some requested that a thorough economic analysis of the project alternatives being considered should be included in the LWRP 2020 Plan.

PLANNING OBJECTIVES

The objectives of the LWRP 2020 Plan, as previously stated, are as follows:

- Provide wastewater treatment and effluent management capacity adequate to meet the needs of District No. 14 through the year 2020 in an environmentally sound and cost effective manner;
- Eliminate unauthorized effluent-induced overflows from Piute Ponds to Rosamond Dry Lake in the most expeditious manner possible and in consideration of the RWQCB-LR compliance date of August 25, 2005, in order to avoid any threatened nuisance condition as determined by EAFB;
- Ensure recycled water of sufficient quality and quantity is available to satisfy emerging municipal reuse needs; and
- Comply with the requirements to maintain Piute Ponds.

The four planning objectives constitute the minimum requirements that a conceptual wastewater treatment alternative or effluent management alternative had to meet in order to be further developed and evaluated as a feasible alternative. The planning objectives are discussed in the following section.

Accommodation of the Projected Wastewater Flows

The recommended project must provide the necessary wastewater treatment and effluent management facilities to manage the future wastewater flow in the District No. 14 planning area. Future wastewater flow was estimated by using the most recent SCAG population forecast from SCAG 2001 and projections of residential, commercial, industrial, and contract flow rates through the planning period. As indicated in Chapter 5, the recommended project must ultimately provide wastewater management for a population of approximately 252,000 in 2020. This population and the associated industrial development, as well as contracted flow rates, are expected to generate approximately 26 mgd of wastewater that must be managed by the LWRP, which currently has a design capacity of 16 mgd.

Elimination of Unauthorized Effluent-Induced Overflows

Effluent-induced overflows from Piute Ponds to Rosamond Dry Lake that are not authorized by EAFB and create a threatened nuisance condition are in violation of the WDRs (General Requirements and Prohibitions I.E.2 and I.E.3) for the LWRP issued by the RWQCB-LR in September 2002.

The lead time required to bring new facilities into service is an important consideration. Planning, design, land acquisition, permitting, construction, and facility start-up all require a significant amount of time. The project schedule of the recommended project must provide sufficient time for all of these activities in order to allow construction and start-up of facilities, and/or negotiation of effluent management arrangements, that would eliminate unauthorized effluent-induced overflows from Piute Ponds to Rosamond Dry Lake.

Supply of Recycled Water for Municipal Reuse

The City of Lancaster, in planning for future growth, has recognized the importance of recycled water as a

Development and Evaluation of Alternatives

SANITATION DISTRICTS OF LOS ANGELES COUNTY

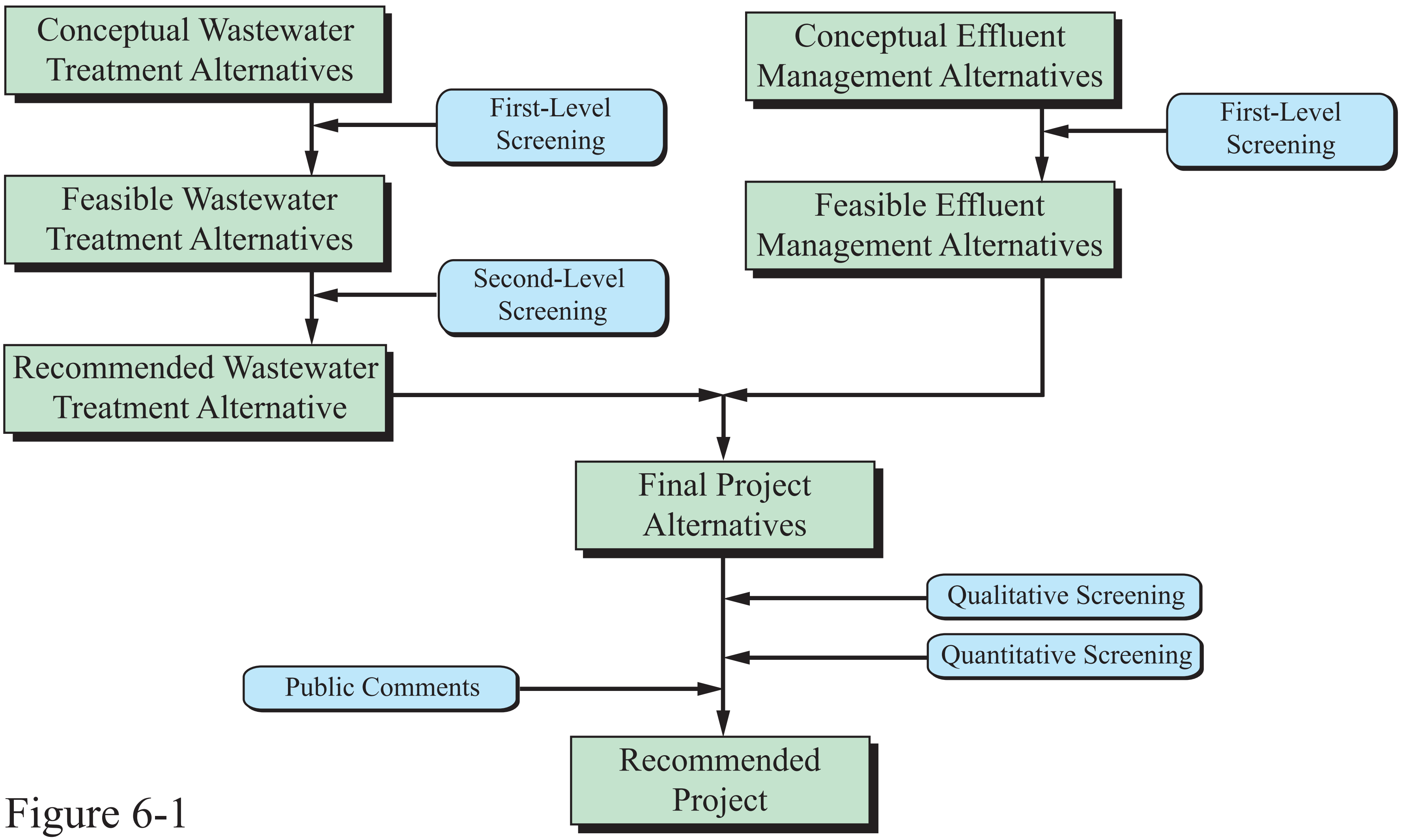

Figure 6-1

resource. As such, the City of Lancaster has resolved to implement a reuse project, designated the Regional Reclaimed Water Distribution System, which will use up to 1.5 mgd of recycled water in place of potable water for landscape irrigation and industrial purposes.

District No. 14 is committed to providing recycled water to the City of Lancaster to satisfy its initial proposed demand. In addition, District No. 14 is committed to meet future recycled water demands by the City of Lancaster or any other entities. In order to comply with the water quality standards in Title 22 of the CCR for the use of recycled water for landscape irrigation and industrial purposes, the wastewater must undergo tertiary treatment. Thus, the recommended project must provide for the expansion of the existing tertiary treatment capacity at the LWRP. It should be noted that in addition to municipal landscape irrigation and industrial applications, tertiary-treated effluent can be used at unrestricted contact recreational impoundments (e.g., Apollo Park) and sprinkler irrigated on golf courses, among other uses.

Maintenance of Piute Ponds

Piute Ponds was created when C-Dike was built in 1961 across Amargosa Creek to impound LWRP effluent that would otherwise flow onto Rosamond Dry Lake. In 2002, approximately two-thirds of the effluent produced by the LWRP was discharged to Piute Ponds, which is an effluent-dominated water body.

District No. 14 is obligated to maintain Piute Ponds under a three-party LOA with DFG and EAFB. Specifically, this LOA, dated May 6, 1981, requires District No. 14 to discharge effluent from the LWRP to Piute Ponds at a rate sufficient to maintain a minimum of 200 wetted acres of habitat.

Neither the ponds nor the extensive marsh-type habitat would exist if it were not for the discharge of effluent from the LWRP. Accordingly, the aquatic and riparian ecosystems at Piute Ponds exist as a result of, rather than in spite of, the discharge of effluent to the ponds. District No. 14 plans to maintain Piute Ponds at its current area of approximately 400 acres.

The RWQCB-LR, through WDRs, regulates the quality of the effluent discharged to surface waters such as Piute Ponds. In September 2002, the RWQCB-LR issued revised WDRs for the LWRP that stipulate additional water quality objectives, such as ammonia and residual chlorine, which are included in the current Basin Plan. Previous WDRs, which were adopted prior to the implementation of the current Basin Plan, did not regulate these parameters. District No. 14 will plan, design, and construct wastewater treatment facilities necessary to meet the appropriate water quality objectives for effluent discharge to Piute Ponds.

PROJECT COMPONENTS

Based on the previous discussion, three components of the LWRP 2020 Plan recommended project are known at this point:

- Construction of additional facilities to provide a sufficient quantity and quality of tertiary-treated effluent to meet the existing and future demand of municipal reuse projects, such as Apollo Park and that of the City of Lancaster, respectively;
- Regulation of effluent discharge to Piute Ponds to maintain its marsh-type habitat and comply with the water quality objectives in the WDRs; and
- Continuation of agricultural reuse operations, to the extent practicable, at existing sites.

These three components are discussed in detail in Chapter 7. The alternatives analysis discussion that follows resulted in the identification of the two other major components of the LWRP 2020 Plan recommended project:

- Wastewater treatment facilities; and
- Effluent management facilities.

Wastewater conveyance facilities (trunk sewers, manholes, pump stations, etc.) are routinely evaluated by District No. 14 and are thus not discussed in the LWRP 2020 Plan, which is a long-term plan that addresses the wastewater treatment and effluent management needs of District No. 14 through the year 2020. In March 2003, District No. 14 completed the *Rosamond Outfall and Trunk "F" Sewer Facilities Plan*, which identified current conditions in the wastewater conveyance system and recommended sewer relief and replacement projects. CEQA requirements are satisfied on a project-by-project basis for sewer construction and/or rehabilitation projects.

The existing methods of handling biosolids at the LWRP (digestion tanks, drying beds, etc.) will require expansion due to the projected increase in wastewater flow. These facilities are an integral component of the LWRP 2020 Plan recommended project.

ANALYSIS OF WASTEWATER TREATMENT ALTERNATIVES

The wastewater treatment capacity of the LWRP must be expanded by 10 mgd, from 16 mgd to a total of 26 mgd, in order to accommodate the wastewater flow expected by the year 2020. This expansion will involve construction of additional primary, secondary, and tertiary treatment facilities.

The existing method of primary treatment at the LWRP is the industry-wide standard for wastewater treatment facilities. Therefore, expansion of the primary treatment capacity at the LWRP from 16 mgd to 26 mgd will be via construction of additional grit channels, sedimentation tanks, and ancillary facilities.

The existing method of secondary treatment at the LWRP is via oxidation ponds. However, there are a number of alternative secondary treatment methods that can be utilized at the LWRP. The primary objective of this section is to identify the most suitable secondary wastewater treatment alternative for expansion of the LWRP.

Tertiary treatment (which, for purposes of this document, includes disinfection) will follow each method of secondary treatment. Thus, the evaluation that follows was based on secondary and tertiary treatment facilities. The type of tertiary treatment following secondary treatment was based on the most commonly used, industry-wide standard. For example, tertiary treatment following CAS secondary treatment would involve filtration and disinfection via chlorination.

The conceptual wastewater treatment alternatives that were evaluated are as follows:

- Oxidation Pond/Tertiary Treatment;
- Conventional Activated Sludge/Tertiary Treatment;
- Oxidation Ditch/Tertiary Treatment; and
- Membrane Bioreactor/Disinfection Treatment.

These alternatives were first screened against the four planning objectives and then against a more specific set of criteria. This systematic process resulted in identification of the recommended wastewater treatment alternative.

Description and First-Level Screening of Conceptual Wastewater Treatment Alternatives

Oxidation Pond/Tertiary Treatment

Oxidation pond treatment is commonly used where large land areas are available and it is desirable to minimize electrical energy consumption and sludge production. Ten six-foot-deep oxidation ponds with a total surface area of 270 acres currently exist at the LWRP. Eight of the oxidation ponds, which are approximately 30 acres each, are utilized for secondary wastewater treatment. The two remaining ponds, which are approximately 15 acres each, are utilized for flow equalization. Four of the eight 30-acre treatment ponds are mechanically aerated to aid the biological activity that leads to the breakdown of organic material. Following treatment in the aerated ponds, wastewater is conveyed to the four remaining 30-acre, non-aerated ponds, which are referred to as "polishing" ponds. Seasonally, a portion of the secondary-treated effluent undergoes further treatment at the AVTTP to remove residual algal material in order to provide water suitable for reuse (i.e., tertiary effluent) at Apollo Park. The tertiary-treatment process at the AVVTP includes flocculation, sedimentation, filtration, phosphorus removal, and disinfection via chlorination.

Implementation of this alternative would involve construction of a 10-mgd oxidation pond facility adjacent to the existing oxidation ponds, which would increase the secondary wastewater treatment capacity of the LWRP from 16 mgd to 26 mgd, and expansion of the 0.6-mgd tertiary treatment capacity of the AVTTP to 10 mgd. Approximately 200 acres of land adjacent to the LWRP would have to be acquired to implement this alternative.

This wastewater treatment alternative satisfies, or does not conflict with, any of the four planning objectives. Therefore, it was further developed as a feasible wastewater treatment alternative.

Conventional Activated Sludge/Tertiary Treatment

Conventional activated sludge (CAS) is the most commonly used method of secondary wastewater treatment in the United States. This treatment technique utilizes a series of tanks that are aerated by diffusers and contain bacteria that feed on the organic material in the incoming wastewater. The mixture of wastewater and bacteria (activated sludge) then flows into tanks where the activated sludge is settled out. A portion of the activated sludge is returned to the aeration tanks to continue the biological process, while the treated wastewater flows out of the settling tanks. Due to a net accumulation of sludge from this process, periodically, a percentage of the sludge must be removed, or "wasted," from the settling tanks and treated in the biosolids handling facilities. The CAS process would be operated in a "nitrification-denitrification" (NDN) mode to increase nitrogen removal from the wastewater. Following CAS treatment, wastewater would undergo tertiary treatment via filtration and disinfection.

Implementation of this alternative would involve construction of a 10-mgd CAS/tertiary treatment facility adjacent to the existing oxidation ponds. This would increase the secondary wastewater treatment capacity of the LWRP from 16 mgd to 26 mgd. Under this alternative, the AVTTP would be decommissioned and replaced by the proposed 10-mgd-capacity tertiary treatment facility. Approximately five acres of land adjacent to the LWRP would have to be acquired to implement this alternative.

This wastewater treatment alternative satisfies, or does not conflict with, any of the four planning objectives. Therefore, it was further developed as a feasible wastewater treatment alternative.

Oxidation Ditch/Tertiary Treatment

Oxidation ditch treatment occurs in an annular or oval-shaped channel that is equipped with mechanical aeration devices. Wastewater circulates in the ditch and is aerated. The detention time of the wastewater and biosolids accumulated are greater than in the CAS method. Accumulated sludge is removed, or "wasted," periodically from the process for treatment by the biosolids handling facilities. This process would be operated in NDN mode to maximize nitrogen removal from the wastewater. Following oxidation ditch treatment, wastewater would undergo tertiary treatment via filtration and disinfection.

Implementation of this alternative would involve construction of a 10-mgd oxidation ditch/tertiary treatment facility adjacent to the existing oxidation ponds. This would increase the secondary wastewater treatment capacity of the LWRP from 16 mgd to 26 mgd. Under this alternative, the AVTTP would be decommissioned and replaced by the proposed 10-mgd-capacity tertiary treatment facility. Approximately five acres of land adjacent to the LWRP would have to be acquired to implement this alternative.

Table 6-1
Summary of the First-Level Screening of Conceptual Wastewater Treatment Alternatives

CONCEPTUAL WASTEWATER TREATMENT ALTERNATIVES	ACCOMMODATES PROJECTED WASTEWATER FLOWS	ENSURES RECYCLED WATER AVAILABLE FOR EMERGING MUNICIPAL REUSE	MAINTAINS PIUTE PONDS	FEASIBLE WASTEWATER TREATMENT ALTERNATIVE
Oxidation Pond/Tertiary Treatment	✓	✓	✓	Yes
CAS/Tertiary Treatment	✓	✓	✓	Yes
Oxidation Ditch/Tertiary Treatment	✓	✓	✓	Yes
MBR/Disinfection Treatment	✓	✓	✓	Yes

This wastewater treatment alternative satisfies, or does not conflict with, any of the four planning objectives. Therefore, it was further developed as a feasible wastewater treatment alternative.

Membrane Bioreactor/Disinfection Treatment

This secondary treatment process involves the use of aeration tanks that have submerged membranes, which separate solids from the wastewater. Accumulated sludge is removed, or "wasted," periodically from the process for treatment by the biosolids handling facilities. With membrane bioreactor (MBR) treatment, primary treatment may not be necessary and the filtration step of tertiary treatment is achieved within the secondary treatment step. Thus, there is no need for dedicated primary treatment or filtration facilities. However, MBR treatment is a relatively new wastewater treatment technology and its use in the United States in large-scale applications has been limited.

Implementation of this alternative would involve construction of a 10-mgd MBR treatment facility adjacent to the existing oxidation ponds. This would increase the secondary wastewater treatment capacity of the LWRP to 26 mgd. Under this alternative, the AVTTP would be decommissioned and replaced by the filtration process within the proposed MBR facility. In addition, 10 mgd of disinfection facilities would have to be provided. Approximately three acres of land adjacent to the LWRP would have to be acquired to implement this alternative.

This wastewater treatment alternative satisfies, or does not conflict with, any of the four planning objectives. Therefore, it was further developed as a feasible wastewater treatment alternative.

Identification of Feasible Wastewater Treatment Alternatives

The results of the first-level screening of conceptual wastewater treatment alternatives is summarized in Table 6-1. The far right column of the table indicates that all four alternatives satisfy, or do not conflict with, the four planning objectives. Therefore, all four were further screened as feasible wastewater treatment alternatives.

Second-Level Screening of Feasible Wastewater Treatment Alternatives

In order to identify the recommended wastewater treatment alternative, the feasible alternatives were evaluated and compared according to a set of specific criteria. Comparisons were based on a 10-mgd expansion for each alternative. The following screening criteria were used:

- Cost Effectiveness (Capital and O&M);
- Environmental Impact;
- Operational Considerations; and
- Effluent Quality.

Cost Effectiveness (Capital and O&M)

Preliminary analyses were conducted to estimate the cost effectiveness of each wastewater treatment alternative based on 10 mgd of capital and O&M costs. These analyses indicate that the total annual capital and O&M cost of oxidation pond/tertiary, CAS/tertiary, and oxidation ditch/tertiary treatment are comparable (within three percent), while MBR/disinfection treatment is approximately 30 percent more expensive.

Although CAS/tertiary treatment or oxidation ditch/tertiary treatment would be more expensive from the standpoint of O&M, oxidation pond/tertiary treatment would require acquisition of approximately 200 acres of land adjacent to the LWRP and would be more expensive than CAS/tertiary or oxidation ditch/tertiary treatment to construct due to the earthwork and grading costs associated with construction of oxidation pond berms and floors. These trade-offs account for the relative similarity in total annual cost between oxidation pond/tertiary, CAS/tertiary, and oxidation ditch/tertiary treatment. Conversely, MBR/disinfection treatment would be more expensive to construct, operate, and maintain than any of the other three alternatives, and thus, would be relatively more expensive in terms of total annual cost.

Environmental Impact

The impact to certain environmental resources (e.g., biological, cultural, etc.) is proportional to the amount of land that would need to be acquired in order to implement each wastewater treatment alternative. As mentioned previously, a 10-mgd oxidation pond/tertiary treatment facility would require acquisition of approximately 200 acres of land adjacent to the LWRP, while a 10-mgd facility for each of the other three wastewater treatment alternatives would require acquisition of up to five acres. Therefore, the overall environmental impact of oxidation pond/tertiary treatment would be greater than that of any of the other three alternatives.

Operational Considerations

The Districts have extensive experience and many employees trained in the operation and maintenance of oxidation pond/tertiary and CAS/tertiary treatment facilities. Conversely, the Districts do not have any experience operating oxidation ditch/tertiary or MBR/disinfection treatment facilities.

Effluent Quality

Operational data from Districts' wastewater treatment plants, as well as research studies that the Districts have commissioned, indicate that the effluent quality of CAS/tertiary, oxidation ditch/tertiary, or MBR/disinfection treatment would be adequate to meet more stringent Piute Ponds discharge standards, such as for ammonia, prescribed in the WDRs for the LWRP. On the other hand, severe winter weather conditions in the Antelope Valley decrease the efficiency of oxidation pond treatment, which has large, exposed surface areas. This drop in efficiency, especially with regard to ammonia removal, could make it more difficult to meet future discharge standards for Piute Ponds.

Identification of Recommended Wastewater Treatment Alternative

Table 6-2 summarizes the results of the second-level screening of the feasible wastewater treatment alternatives. Examination of this table indicates that trade-offs between the alternatives occur under all of the criteria. The relative ratings were totaled under each alternative in order to determine the one with the highest relative rating. Based on this method, CAS/tertiary treatment was identified to be the highest ranked of the four wastewater treatment alternatives. Thus, CAS/tertiary treatment is the recommended wastewater treatment alternative.

ANALYSIS OF EFFLUENT MANAGEMENT ALTERNATIVES

An evaluation and screening process similar to that used to identify the feasible wastewater treatment alternatives

Table 6-2
Summary of the Second-Level Screening of Feasible Wastewater Treatment Alternatives[a]

FEASIBLE WASTEWATER TREATMENT ALTERNATIVES	COST EFFECTIVENESS (capital and O&M)	ENVIRONMENTAL IMPACT (based on land required)	OPERATIONAL CONSIDERATIONS	EFFLUENT QUALITY	OVERALL RATING
Oxidation Pond/Tertiary Treatment	+	–	+	0	1+
CAS/Tertiary Treatment	+	+	+	+	4+
Oxidation Ditch/Tertiary Treatment	+	+	–	+	2+
MBR/Disinfection Treatment	–	+	–	+	0

(a) Comparative ratings are Superior (+), Neutral (0), and Inferior (–).

was conducted to determine the feasible effluent management alternatives.

Due to the seasonal fluctuation in evaporation rates and recycled water demand, the effluent management capacity of the LWRP varies. During the summer months, the existing effluent utilization sites (Piute Ponds, the Impoundment Areas, Apollo Park, Nebeker Ranch, and evaporation from the LWRP facilities) can handle approximately 16.3 mgd of effluent. This effluent management capacity is sufficient to handle the 2002 average daily wastewater flow of 12.8 mgd treated at the LWRP. However, during the winter months, those same sites can accommodate substantially less effluent (as low as 1.6 mgd in January). The effluent management capacity of the LWRP during the winter months is inadequate to manage the average daily flow treated at the LWRP. Thus, excess effluent from the LWRP is discharged to Piute Ponds during the winter months. This results in effluent-induced overflows onto Rosamond Dry Lake. Therefore, the effluent management capacity of the LWRP must be expanded to 26 mgd in such a way that the seasonal fluctuations in capacity are taken into consideration. The conceptual effluent management alternatives that were evaluated are as follows:

- Discharge to the Los Angeles Aqueduct;
- Groundwater Recharge;
- Discharge to Evaporation Ponds;
- Agricultural Reuse and Storage Reservoirs;
- Agricultural Reuse/Land Application;
- Municipal Reuse and Storage Reservoirs;
- Discharge to Constructed Wetlands; and
- Seasonal Discharge to Rosamond Dry Lake.

These alternatives were evaluated in terms of their compatibility with the four planning objectives in order to identify the feasible effluent management alternatives.

Under all of the effluent management alternatives, recycled water would continue to be delivered to Piute Ponds, the Impoundment Areas, and Apollo Park. It is anticipated that the existing agricultural reuse operations at Nebeker Ranch could continue, either via a short-term renewal of the existing recycled water reuse contract or acquisition of the facility. If the Nebeker Ranch reuse operation is discontinued, District No. 14 will have to establish an equivalent agricultural reuse operation at a new location. Finally, tertiary-treated recycled water would be made available to the City of Lancaster, and any other entities, for municipal reuse projects.

Description and First-Level Screening of Conceptual Effluent Management Alternatives

Discharge to the Los Angeles Aqueduct

Under this effluent management alternative, all the recycled water from the LWRP would be discharged to the Los Angeles Aqueduct, which is located approximately 20 miles west of the LWRP. The existing storage reservoirs would be utilized as back-up to provide operational and maintenance flexibility for the aqueduct discharge operations.

The major facilities required to implement this alternative would include a pump station at the LWRP and a 20-mile pipeline. The LWRP wastewater treatment facilities would have to be upgraded and expanded to a level of treatment above tertiary, such as microfiltration and reverse osmosis, in order to produce the effluent quality necessary for this alternative.

Discharge to the Los Angeles Aqueduct, while feasible in concept, is likely to trigger significant public opposition and controversy. Discharge of recycled water directly to the Los Angeles Aqueduct is expected to be more controversial than recent groundwater recharge projects using recycled water, which have generated extensive opposition. The public opposition and the various regulatory approvals required to discharge recycled water directly into a drinking water source would likely delay, and may even prevent, implementation of this alternative. Due to the controversial nature of this alternative, it would not be possible to implement it in the foreseeable future.

In addition, discharge to the Los Angeles Aqueduct would effectively export a potential water supply source out of the Antelope Valley, which would not be desirable considering the limited water sources available in the valley. Furthermore, the users of the aqueduct would become dependent on the recycled water potentially restricting future diversion of recycled water from the aqueduct to satisfy emerging municipal reuse projects in the Antelope Valley. Therefore, this alternative was not developed as a feasible effluent management alternative.

Groundwater Recharge

Recycled water may be used for groundwater recharge by either surface spreading or direct injection.

- *Recharge via Surface Spreading*

Under this variation of the *Groundwater Recharge* alternative, recycled water from the LWRP would be discharged to surface spreading basins for infiltration into subsurface aquifers. The existing storage reservoirs would be utilized as back-up to provide operational and maintenance flexibility for the recharge operations.

Successful groundwater recharge via surface spreading depends on locating the spreading basins where the soil conditions are conducive to infiltration. The AVWRS identified several potential sites for spreading basins. These sites, which are located in the southern portion of the Antelope Valley, approximately 15 to 20 miles from the LWRP, would have to be acquired and/or set aside for use as spreading basins. Implementation of this alternative would require construction of a pump station, pipelines, and other associated facilities to deliver recycled water to the spreading basins. At a minimum, the recycled water would have to be treated to a tertiary level.

It is likely that DHS would not allow tertiary effluent to comprise more than 20 percent of the total volume of water recharged for a new groundwater recharge project, thereby requiring substantial amounts of dilution water to implement this alternative. Therefore, this alternative would be subject to capacity limitations and would require coordination with Antelope Valley water purveyors, such as LACWD No. 40. Several of the issues that would need to be resolved before implementing this option are listed below.

1. Size requirements and locations for spreading basins;
2. Amount of recycled water that could be spread;
3. Sources and cost of dilution water;

4. Length of time to implement, which includes the time to perform field investigations and pilot studies, acquire land, and negotiate agreements with water purveyors, and the uncertainty of obtaining permits; and

5. Ownership of the groundwater supply created as a result of a recharge project.

- *Recharge via Direct Injection*

Under this variation of the *Groundwater Recharge* alternative, recycled water from the LWRP would be directly injected into subsurface aquifers. The existing storage reservoirs would be utilized as back-up to provide operational and maintenance flexibility for the recharge operations.

The location of injection facilities for groundwater recharge depends on the existence of appropriate subsurface soil conditions. Soils at these locations must be conducive to the acceptance and storage of water from injection wells. In order to implement this alternative, injection well sites would have to be identified, wells would have to be constructed (if existing wells could not be used), and distribution pipelines would have to be constructed to deliver recycled water to these facilities. Since, injection wells require higher water quality to operate, especially in terms of suspended solids, than spreading basins, the recycled water would have to undergo a level of treatment higher than that required for recharge via spreading basins such as tertiary treatment followed by microfiltration and reverse osmosis. This level of treatment would also require disposal of a highly-concentrated brine stream, which is a by-product of microfiltration and reverse osmosis treatment.

DHS guidelines limit the ratio of recycled water injected to groundwater extracted for municipal water supply to 50 percent, require at least 12 months retention in the basin prior to withdrawal at a domestic supply well, and mandate a minimum horizontal distance of 2,000 feet between the point of injection and the point of withdrawal at a domestic supply well. These guidelines would limit the amount of recycled water managed in this manner. As with surface spreading, implementation of this alternative would require coordination with local water purveyors in order to meet guidelines specifying the maximum ratio of recycled water to groundwater. Several of the issues that would need to be resolved before implementing this option are as follows:

1. Identification of the number and locations of wells with acceptable soil conditions for direct injection into groundwater;
2. Higher level of treatment required and feasibility of developing an acceptable method for handling and disposal of brine;
3. Amount of water that could be injected;
4. Sources and cost of dilution water;
5. Length of time to implement, which includes the time to perform field investigations and pilot studies, acquire land, and negotiate agreements with water purveyors, and the uncertainty of obtaining permits; and
6. Ownership of the groundwater supply created as a result of an injection project.

Due to the aforementioned uncertainties, such as capacity limitations and coordination with water purveyors, District No. 14 would not be able to implement either variation of the *Groundwater Recharge* alternative in the foreseeable future. Therefore, this alternative was not developed as a feasible effluent management alternative.

Discharge to Evaporation Ponds

Under this effluent management alternative, recycled water from the LWRP would be discharged to shallow, constructed ponds where the recycled water would evaporate. The existing storage reservoirs would be utilized as back-up to provide operational and maintenance flexibility for the evaporation ponds.

The evaporation ponds would be designed to retain recycled water during the winter months, when effluent discharges to the ponds greatly exceed evaporation rates. This water would evaporate during the summer months, when evaporation rates exceed discharges to the ponds. Additionally, the evaporation ponds would be designed to be completely dry for some period of time during the fall to minimize growth of vegetation. The area and depth of the ponds would be determined by balancing effluent discharge rates to the ponds with expected evaporation rates. In general, the ponds would have a maximum water depth of approximately two feet and an extensive total wetted surface area.

Conceptually, this alternative would accommodate the wastewater management needs of District No. 14 through the year 2020, it would ensure the availability of sufficient quantities of recycled water for emerging municipal reuse needs, and would provide for the maintenance of Piute Ponds. However, it would not be possible to implement this alternative in time to comply with the WDRs for the LWRP, due to the excavation, grading, backfill, and compaction work that would be required to construct evaporation pond berms and floors. Therefore, this alternative was not developed as a feasible effluent management alternative.

Agricultural Reuse and Storage Reservoirs

This effluent management alternative would involve development of additional agricultural reuse operations and construction of additional storage reservoirs. During the winter months, when recycled water reuse demand is low, excess effluent would be discharged to the storage reservoirs. During the summer months, when demand for recycled water is high, effluent impounded in the reservoirs, as well as effluent produced at the LWRP at that time, would be utilized by agricultural operations.

The main difference between storage reservoirs and the evaporation ponds described previously is that reservoirs would hold surplus recycled water during the winter months for reuse during the subsequent summer months, whereas evaporation ponds would hold the recycled water for evaporation during the summer months. Due to their smaller surface area and greater depth, storage reservoirs limit evaporation. Therefore, storage reservoirs would support a maximum number of reuse applications. In addition, the total excavation, grading, backfill, and compaction work that would be required to construct storage reservoirs would be less than that for the evaporation ponds under the *Discharge to Evaporation Ponds* alternative.

This alternative conceptually satisfies the objectives of the LWRP 2020 Plan by providing for the management of the expected wastewater flows through the planning period. It would eliminate unauthorized effluent-induced overflows from Piute Ponds to Rosamond Dry Lake. In addition, this alternative would ensure recycled water is available to satisfy emerging municipal reuse demands and would provide for the maintenance of Piute Ponds.

Agricultural Reuse/Land Application

Under this effluent management alternative, recycled water produced by the LWRP would be managed via agricultural operations with no additional storage reservoirs. District No. 14 would manage effluent during the winter months via land application of recycled water. During the summer months, the land would be managed as an agricultural reuse operation. The existing storage reservoirs would be utilized as back-up to provide operational and maintenance flexibility for the agricultural reuse and land application operations.

The distinction between the two types of agricultural operations is in the irrigation rate. Land application would be conducted in conjunction with cultivation of a crop, however, recycled water would, at times, be applied on the land at a rate higher than the water demand of the crops being cultivated. This practice would result in infiltration of recycled water. During the summer months, when evaporation rates and crop demand for water is high, the amount of recycled water applied would not exceed the demand of the crops being cultivated. In addition, during the summer months, the quantity of recycled water available would be insufficient to irrigate all of the agricultural land. Therefore, District No. 14 would have to augment the recycled water supply with groundwater, or a portion of the agricultural land would have to be fallowed.

The RWQCB-LR has indicated that obtaining a permit for the agricultural operations proposed under this alternative would be difficult and would require District No. 14 to conduct various studies and submit detailed reports demonstrating that this operation would not adversely impact groundwater resources. Nevertheless, this alternative conceptually satisfies the objectives of the LWRP 2020 Plan by providing for the management of the expected wastewater flows through the planning period. This alternative would eliminate unauthorized effluent-induced overflows from Piute Ponds to Rosamond Dry Lake. In addition, this alternative would ensure recycled water is available to satisfy emerging municipal reuse demands and would provide for the maintenance of Piute Ponds.

Municipal Reuse and Storage Reservoirs

This alternative would involve effluent management via reuse of all the recycled water produced by the LWRP within the District No. 14 service area primarily for municipal uses such as landscape irrigation. Since demand for recycled water is seasonal, construction of additional storage reservoirs would also be required for winter effluent management.

There are several reasons why municipal reuse by itself is not a viable effluent management alternative for all the recycled water produced at the LWRP. The absence at this time of sufficient recycled water demand and the infrastructure for its distribution within the District No. 14 service area makes it impossible to implement a municipal reuse project in the foreseeable future that could manage all of the LWRP effluent. Furthermore, the implementation of such an alternative would require a significant increase in local water purveyor participation and cooperation. Hence, it would not be possible to implement this alternative in time to comply with the WDRs for the LWRP. Therefore, this alternative was not developed as a feasible effluent management alternative.

Discharge to Constructed Wetlands

Under this effluent management alternative, District No. 14 would construct wetlands into which recycled water from the LWRP would be discharged year-round. The existing storage reservoirs would be utilized as back-up to provide operational and maintenance flexibility for the wetlands operation.

Although adequate in terms of effluent management capacity, this alternative is not feasible in that the wetlands created via year-round discharge would become dependent on the effluent discharged to them. As municipal reuse demand increases over the course of the planning period, recycled water could not be diverted from the wetlands due to their dependency on water. Furthermore, the seasonal variation in evapor-ation rates would result in a wetlands' footprint that would be significantly larger in the winter (due to low evaporation rates) than during the summer (due to high evaporation rates). During the summer months, effluent from the LWRP would not be sufficient to sustain the wetlands' footprint created during the winter months. Therefore, District No. 14 would have to augment the recycled water supply with groundwater. In addition, since such constructed wetlands would be the terminus in terms of effluent management, there would be a gradual buildup of salts in the wetlands that would jeopardize the viability of the habitat. For these reasons, and since this alternative would not ensure that recycled water would be available to

Table 6-3
Summary of the First-Level Screening of Conceptual Effluent Management Alternatives

CONCEPTUAL EFFLUENT MANAGEMENT ALTERNATIVES	ACCOMMODATES PROJECTED WASTEWATER FLOWS	ELIMINATES UNAUTHORIZED OVERFLOWS PER WDRs	ENSURES RECYCLED WATER AVAILABLE FOR EMERGING MUNICIPAL REUSE	MAINTAINS PIUTE PONDS	FEASIBLE EFFLUENT MANAGEMENT ALTERNATIVE
Discharge to the Los Angeles Aqueduct	✓			✓	No
Groundwater Recharge			✓	✓	No
Discharge to Evaporation Ponds	✓		✓	✓	No
Agricultural Reuse and Storage Reservoirs	✓	✓	✓	✓	Yes
Agricultural Reuse/Land Application	✓	✓	✓	✓	Yes
Municipal Reuse and Storage Reservoirs			✓	✓	No
Discharge to Constructed Wetlands	✓	✓		✓	No
Seasonal Discharge to Rosamond Dry Lake	✓		✓	✓	No

satisfy emerging municipal reuse needs, *Discharge to Constructed Wetlands* was not developed as a feasible effluent management alternative.

Seasonal Discharge to Rosamond Dry Lake

Under this alternative, District No. 14 would obtain long-term authorization from EAFB to annually discharge recycled water to Rosamond Dry Lake for a specific period of time during the winter months (e.g., November through March). The LWRP effluent conveyance ditch to Piute Ponds would be expanded to accommodate increased effluent discharge to Rosamond Dry Lake via Piute Ponds.

Additional agricultural reuse operations would also be required to manage the increased effluent flows during the summer months. During the winter months, effluent that could not be managed by the existing storage reservoirs, Nebeker Ranch, the Impoundment Areas, Apollo Park, and the City of Lancaster's proposed municipal reuse project would be discharged to Rosamond Dry Lake. As wastewater flows to the LWRP would increase, the volume of effluent discharged to Rosamond Dry Lake would also increase.

Although this alternative would maintain Piute Ponds, accommodate projected wastewater flows, and ensure that tertiary-treated effluent would be available to satisfy emerging municipal reuse needs, to date, EAFB has been clear that it would not authorize a long-term plan involving annual effluent discharge to Rosamond Dry Lake. Therefore, this alternative was not developed as a feasible effluent management alternative.

Identification of Feasible Effluent Management Alternatives

The results of the first-level screening of conceptual effluent management alternatives are summarized in Table 6-3. The far right column of the table indicates that two of the eight conceptual effluent management alternatives meet all four planning objectives. Thus, *Agricultural Reuse and Storage Reservoirs* and *Agricultural Reuse/Land Application* are the two feasible effluent management alternatives.

ANALYSIS OF FINAL PROJECT ALTERNATIVES

The final project alternatives created by combining the recommended wastewater treatment alternative from Table 6-2 with each of the two feasible effluent management alternatives from Table 6-3 are as follows:

- 10 mgd CAS/Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs; and
- 10 mgd CAS/Tertiary Treatment and Agricultural Reuse/Land Application.

The size of the CAS/tertiary treatment facility is based on the previously-stated need for a 10-mgd expansion of the LWRP capacity from the current 16 mgd to 26 mgd. However, in response to public comments received, a variation of the recommended wastewater treatment alternative that would involve construction of a 26-mgd CAS/tertiary treatment facility was also evaluated. This option provides 10 mgd of CAS secondary treatment and tertiary treatment for the required expansion and an additional 16 mgd of CAS/tertiary treatment to replace the existing oxidation pond secondary treatment. Combining this variation of the recommended wastewater treatment alternative with the two feasible effluent management alternatives from Table 6-3 resulted in two additional final project alternatives. CEQA requires that a *No Project* alternative also be considered. Therefore, the five final project alternatives are:

- No Project;
- 10 mgd CAS/Tertiary Treatment (maintains the existing 16-mgd oxidation ponds), Agricultural Reuse, and Storage Reservoirs;
- 26 mgd CAS/Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs;
- 10 mgd CAS/Tertiary Treatment (maintains the existing 16-mgd oxidation ponds) and Agricultural Reuse/Land Application; and
- 26 mgd CAS/Tertiary Treatment and Agricultural Reuse/Land Application.

Although not indicated in their titles, all of the final project alternatives, except the *No Project* alternative, would provide for the expansion from 16 mgd to 26 mgd of existing methods of primary wastewater treatment and biosolids handling at the LWRP. In addition, sufficient quantities of recycled water would continue to be discharged to Piute Ponds (to make up for evaporative losses), the Impoundment Areas (in accordance with the 1991 MOA), and Apollo Park. Under any final project alternative, except the *No Project* alternative, District No. 14 would provide tertiary-treated recycled water to the City of Lancaster, and any other entities, for municipal reuse projects. Finally, District No. 14 anticipates that the Nebeker Ranch reuse operation would continue under any of the final project alternatives. In an effort to maintain this existing agricultural reuse operation, District No. 14 has offered Nebeker Ranch a short-term extension of the existing recycled water reuse contract. District No. 14 is also negotiating to acquire Nebeker Ranch, which would secure 680 acres of the agricultural land necessary under any of the final project alternatives, except the *No Project* alternative.

Description of Final Project Alternatives

No Project

CEQA requires lead agencies to consider a *No Project* alternative as a baseline when evaluating alternatives for which an EIR must be prepared. Under the *No Project* alternative, no new facilities would be constructed at the LWRP; the LWRP capacity would be limited to 16 mgd. Based on current wastewater flow projections, this capacity is expected to be reached in approximately 2007-08. Once the capacity would be reached, new development project proponents would not be allowed to discharge to the District No. 14 sewerage system and would instead need to develop alternate plans for the conveyance and treatment of their wastewater.

Furthermore, without additional effluent management facilities, effluent-induced overflows from Piute Ponds to Rosamond Dry Lake would increase in volume as the wastewater flow to the LWRP would increase in response to the growing population in the District No. 14 service area. Effluent-induced overflows that are not authorized by EAFB and create a threatened nuisance condition are in violation of the WDRs for the LWRP. For these reasons, the *No Project* alternative was not developed as a feasible project alternative and was dropped from further consideration.

In order to facilitate future discussion, the remaining four final project alternatives will now be referred to as Alternatives 1, 2, 3, and 4, respectively.

Alternative 1: 10 mgd CAS/Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs

Under this alternative, the existing LWRP wastewater treatment facilities would be expanded from 16 mgd to 26 mgd by constructing a 10-mgd CAS/tertiary treatment facility. The proposed treatment facility expansion would require acquisition of approximately five acres of land adjacent to the LWRP.

Effluent would be managed via irrigated agricultural reuse operations and storage reservoirs. Approximately 5,270 acres of land would have to be acquired for construction of effluent management facilities adequate through the year 2020. Of that total, approximately 4,170 acres would be required for agricultural reuse operations, and the remaining 1,100 acres would be required for construction of storage reservoirs. Approximately 3,420 of the 4,170 acres required for agricultural reuse operations would be actual farmed area and approximately 550 of the 1,100 acres required for storage reservoirs would be actual wetted surface area. The remaining land would be used to construct berms, service roads, drainage channels, and buffer for the storage reservoirs, and to construct service roads and support facilities for the agricultural reuse operations. It should be noted that if municipal reuse demand does not materialize, then District No. 14 may have to acquire approximately 800 additional acres of land for agricultural reuse operations in order to manage the surplus recycled water.

Agricultural reuse operations would be developed by acquiring land, constructing a pump station and recycled water pipeline to the designated sites, and leasing the land to qualified farming entities. The farming entities, which would be selected following a competitive bidding process, would cultivate appropriate crops utilizing recycled water from the LWRP. District No. 14 could also enter into recycled water reuse contracts with local farming entities interested in using recycled water on land that they own. The WDRs for the LWRP require District No. 14 to manage all effluent in an appropriate manner at all times or else be subject to fines. Reliance on reuse contracts with farming entities irrigating crops on their property does not provide District No. 14 with the assurance that adequate and cost-effective effluent management capacity will be available at all times into the future. Purchase of land for agricultural operations ensures that District No. 14 can meet its legal obligations under the WDRs for appropriate effluent management at all times.

Under extreme weather conditions, rainfall plus irrigation water provided by District No. 14 may exceed the crop water demand. Construction of retention basins at the agricultural sites might be necessary to provide operational flexibility for the farming entities.

Due to the seasonal variation in recycled water demand, which is high during the summer months and low during the winter months, additional effluent storage reservoirs would be constructed in a configuration roughly identical to that of the existing storage reservoirs at the LWRP. Effluent from the LWRP would be stored during the winter months for reuse by agricultural operations during the summer months. The storage reservoirs would be built as rectangular and/or trapezoidal modules with a water depth of approximately 20 feet. Three feet of freeboard would be allowed to prevent over-topping of the berms by wind-induced waves. The top of the reservoir berms would be approximately 20 feet above grade. A high density polyethylene geomembrane (i.e., synthetic liner) would be constructed on the floors of the storage reservoirs in order to minimize recycled water infiltration.

The approximate location of the facilities for Alternative 1 is shown in Figure 6-2. The precise location of the actual agricultural operations would be determined during the land acquisition process, which is based on a number of considerations, including fair market value and soil suitability for farming.

Alternative 2: 26 mgd CAS/Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs

This alternative is similar to Alternative 1 except that District No. 14 would construct a 26-mgd CAS/tertiary treatment facility. The existing 16-mgd-capacity oxidation ponds would be replaced by 16 mgd of CAS/ tertiary treatment. In addition, the necessary 10-mgd expansion of the LWRP to 26 mgd would also be provided via CAS/tertiary treatment. The proposed treatment facility expansion would require acquisition of approximately 15 acres of land adjacent to the LWRP.

Although the effluent management components of this alternative are similar to Alternative 1, the acreage requirements vary slightly. This is primarily due to the fact that recycled water that would otherwise evaporate from the 270 acres of oxidation ponds during treatment would now have to be handled by the effluent management facilities. This is because the existing oxidation pond secondary treatment would be replaced by CAS secondary treatment, which experiences minimal evaporative losses.

Approximately 5,400 acres of land would have to be acquired for construction of effluent management facilities adequate through the year 2020. Of that total, approximately 4,650 acres would be required for agricultural reuse operations (versus 4,170 under Alternative 1) while the remaining 750 acres would be required for construction of storage reservoirs. Once the CAS secondary treatment facilities would be operational, the oxidation ponds would be emptied, cleaned, repaired as necessary, and used for effluent storage. Therefore, the storage reservoir acreage requirement of this alternative is less than that of Alternative 1. Approximately 3,800 of the 4,650 acres required for agricultural reuse operations would be actual farmed area and approximately 400 of the 750 acres required for storage reservoirs would be actual wetted surface area.

Agricultural reuse operations would be developed by acquiring land, constructing a pump station and recycled water pipeline to the designated sites, and leasing the land to qualified farming entities. The farming entities, which would be selected following a competitive bidding process, would cultivate appropriate crops utilizing recycled water from the LWRP. District No. 14 could also enter into recycled water reuse contracts with local farming entities interested in using recycled water on land that they own. The WDRs for the LWRP require District No. 14 to manage all effluent in an appropriate manner at all times or else be subject to fines. Reliance on reuse contracts with farming entities irrigating crops on their property does not provide District No. 14 with the assurance that adequate and cost-effective effluent management capacity will be available at all times into the future. Purchase of land for agricultural operations ensures that District No. 14 can meet its legal obligations under the WDRs for appropriate effluent management at all times.

The storage reservoirs would be built as rectangular and/or trapezoidal modules with a water depth of approximately 20 feet. Three feet of freeboard would be allowed to prevent over-topping of the berms by wind-induced waves. The top of the reservoir berms would be approximately 20 feet above grade. Native soils with a low permeability would be excavated and recompacted to construct the floors of the storage reservoirs in order to minimize tertiary-treated effluent infiltration. The method of reservoir floor construction differs between Alternatives 1 and 2 due to the quality of effluent that would be stored. Under Alternative 1, the effluent stored would be a 16:10 (16 mgd to 10 mgd) ratio of secondary-treated oxidation pond effluent to tertiary-treated effluent, while under Alternative 2 the effluent stored would be completely tertiary-treated.

Overall, the total land required under this alternative for effluent management facilities (5,400 acres) is comparable to that of Alternative 1 (5,270). The approximate location of the facilities under Alternative 2 is shown in Figure 6-3. The precise location of the actual agricultural operations would be determined during the land acquisition process,

Alternative 1: 10 mgd CAS/Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs

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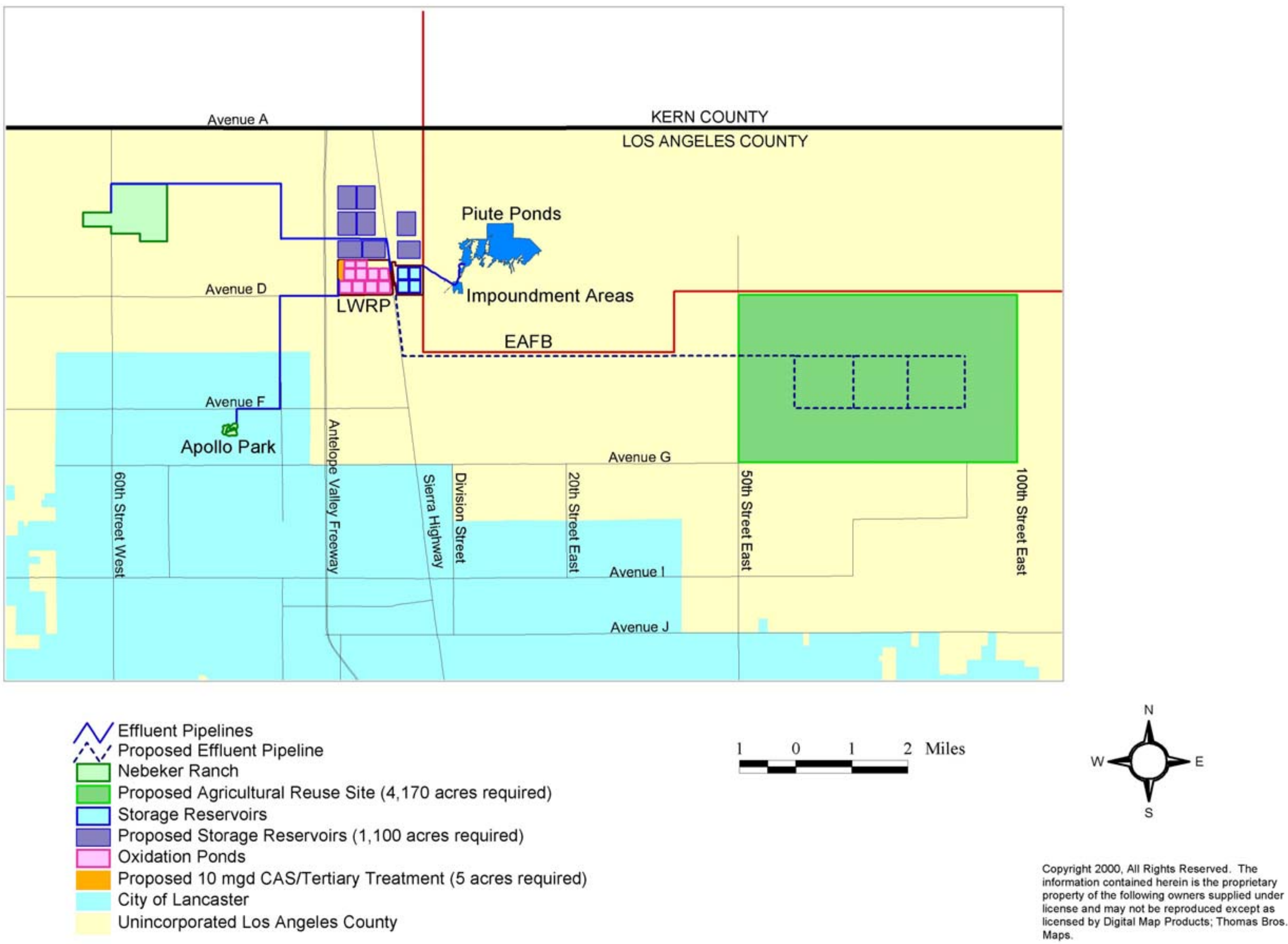

Figure 6-2

Alternative 2: 26 mgd CAS/Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs

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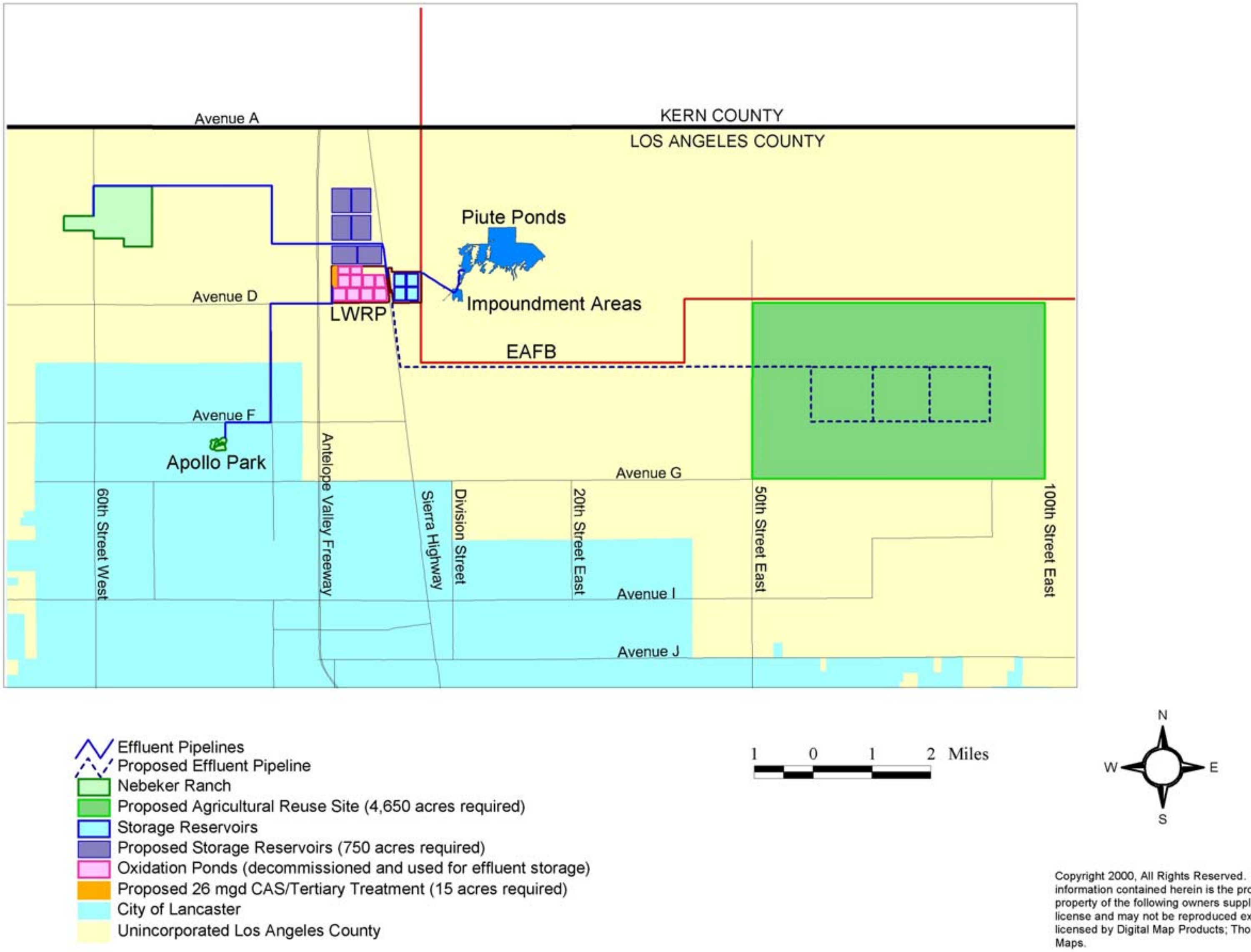

Figure 6-3

which is based on a number of considerations, including fair market value and soil suitability for farming.

Alternative 3: 10 mgd CAS/Tertiary Treatment and Agricultural Reuse/Land Application

Under this alternative, the existing LWRP wastewater treatment facilities would be expanded from 16 mgd to 26 mgd by constructing a 10-mgd CAS/tertiary treatment facility. The proposed treatment facility expansion would require acquisition of approximately five acres of land adjacent to the LWRP.

Effluent would be managed by agricultural operations, which would be operated as recycled water reuse during the summer months and land application during the winter months. Approximately 13,880 acres of land would have to be acquired for construction of effluent management facilities adequate through the year 2020. Approximately 11,100 of the 13,880 acres required would be actual farmed area. The remaining land would be used to construct service roads and agricultural support facilities. The agricultural acreage requirement under this alternative is governed by the crop irrigation demand during the winter months, which is very low. Therefore, the acreage requirement of this alternative is much larger than that of Alternative 1 or 2.

Agricultural operations would be developed by acquiring land, constructing a pump station and recycled water pipeline to the designated sites, and leasing the land to qualified farming entities. The farming entities, which would be selected following a competitive bidding process, would cultivate appropriate crops utilizing recycled water from the LWRP. Acquiring land for agricultural operations, rather than leasing, would provide District No. 14 with the certainty of a long-term effluent management solution that complies with regulatory requirements. Nevertheless, District No. 14 may enter into recycled water reuse contracts with local farming entities interested in using recycled water on land that they own. Construction of retention basins at the agricultural sites might be necessary to provide operational flexibility for the farming entity. The existing 500-million-gallon-capacity storage reservoirs at the LWRP would be available as back-up, which would provide operational flexibility to District No. 14.

During the winter months, District No. 14 would supply irrigation water to the agricultural sites in amounts exceeding the crop water demand. This operational procedure, which would result in infiltration of recycled water, would allow for the winter management of effluent without the construction of additional effluent storage reservoirs. During the summer months there would be an insufficient quantity of recycled water to satisfy the crop water demand of all the agricultural land. Therefore, District No. 14 would have to augment the recycled water supply with groundwater, or a portion of the agricultural land would have to be fallowed. In order to obtain approval from the RWQCB-LR for the effluent management operations proposed under this alternative, District No. 14 would have to conduct various studies and submit detailed reports demonstrating that these operations would not adversely impact groundwater resources. It should be noted that if municipal reuse demand does not materialize, then District No. 14 would have to apply recycled water on agricultural land at higher than anticipated rates in order to manage the surplus recycled water.

The approximate location of the facilities for Alternative 3 is shown in Figure 6-4. The precise location of the actual agricultural operations would be determined during the land acquisition process, which is based on a number of considerations, including fair market value and soil suitability for farming.

Alternative 4: 26 mgd CAS/Tertiary Treatment and Agricultural Reuse/Land Application

This alternative is similar to Alternative 3 except that District No. 14 would construct a 26-mgd CAS/tertiary

Table 6-4
Acreage Required for Components of the Final Project Alternatives

PROJECT COMPONENT	ALTERNATIVE 1 (acres)	ALTERNATIVE 2 (acres)	ALTERNATIVE 3 (acres)	ALTERNATIVE 4 (acres)
Wastewater Treatment and Biosolids Handling	5	15	5	15
Agricultural Reuse	4,170[a]	4,650[a]	13,880[a]	13,940[a]
Land Application	—	—		
Storage Reservoirs	1,100	750	—	—
TOTAL ACREAGE REQUIRED	**5,275**	**5,415**	**13,885**	**13,955**

(a) Acquisition of Nebeker Ranch would secure 680 acres of the amount indicated.

treatment facility. The existing 16-mgd-capacity oxidation ponds would be replaced by 16 mgd of CAS/tertiary treatment. In addition, the necessary 10-mgd expansion of the LWRP to 26 mgd would also be provided via CAS/tertiary treatment. The proposed treatment facility expansion would require acquisition of approximately 15 acres of land adjacent to the LWRP.

As under Alternative 2, replacement of the existing oxidation pond secondary treatment with CAS/tertiary treatment would eliminate the incidental evaporative loss of water. Thus, some additional agricultural land would be necessary to manage the extra effluent relative to Alternative 3. Approximately 13,940 acres of land would have to be acquired for construction of effluent management facilities adequate through the year 2020. Approximately 11,150 of the 13,940 acres required would be actual farmed area. The remaining land would be used to construct service roads and agricultural support facilities. The decommissioned oxidation ponds, as well as the existing 500-million-gallon-capacity storage reservoirs, would be available as back-up, which would provide operational flexibility to District No. 14.

The approximate location of the facilities for Alternative 4 is shown in Figure 6-5. The precise location of the actual agricultural operations would be determined during the land acquisition process, which is based on a number of considerations, including fair market value and soil suitability for farming. The acreage requirement of each component of the four final project alternatives is summarized in Table 6-4.

Screening of Final Project Alternatives

The final project alternatives were first evaluated and ranked based on the results of a comparison utilizing the following set of qualitative screening criteria:

- Environmental Impact;
- Operational Considerations; and
- Optimization of Recycled Water Reuse.

The alternatives were then evaluated and ranked based on the following quantitative screening criterion:

- Project Cost.

The qualitative and quantitative ranking of each final project alternative was compared to that of the others. The alternative that provided the highest combined qualitative and quantitative ranking, as well as the one most compatible with comments received during the public review period for the Draft LWRP 2020 Plan EIR, was identified as the recommended project of the LWRP 2020 Plan.

Environmental Impact

The environmental impact of each final project alternative has been analyzed in detail by the environmental consultant for District No. 14, Environmental Science Associates, and is described in

Alternative 3: 10 mgd CAS/Tertiary Treatment and Agricultural Reuse/Land Application

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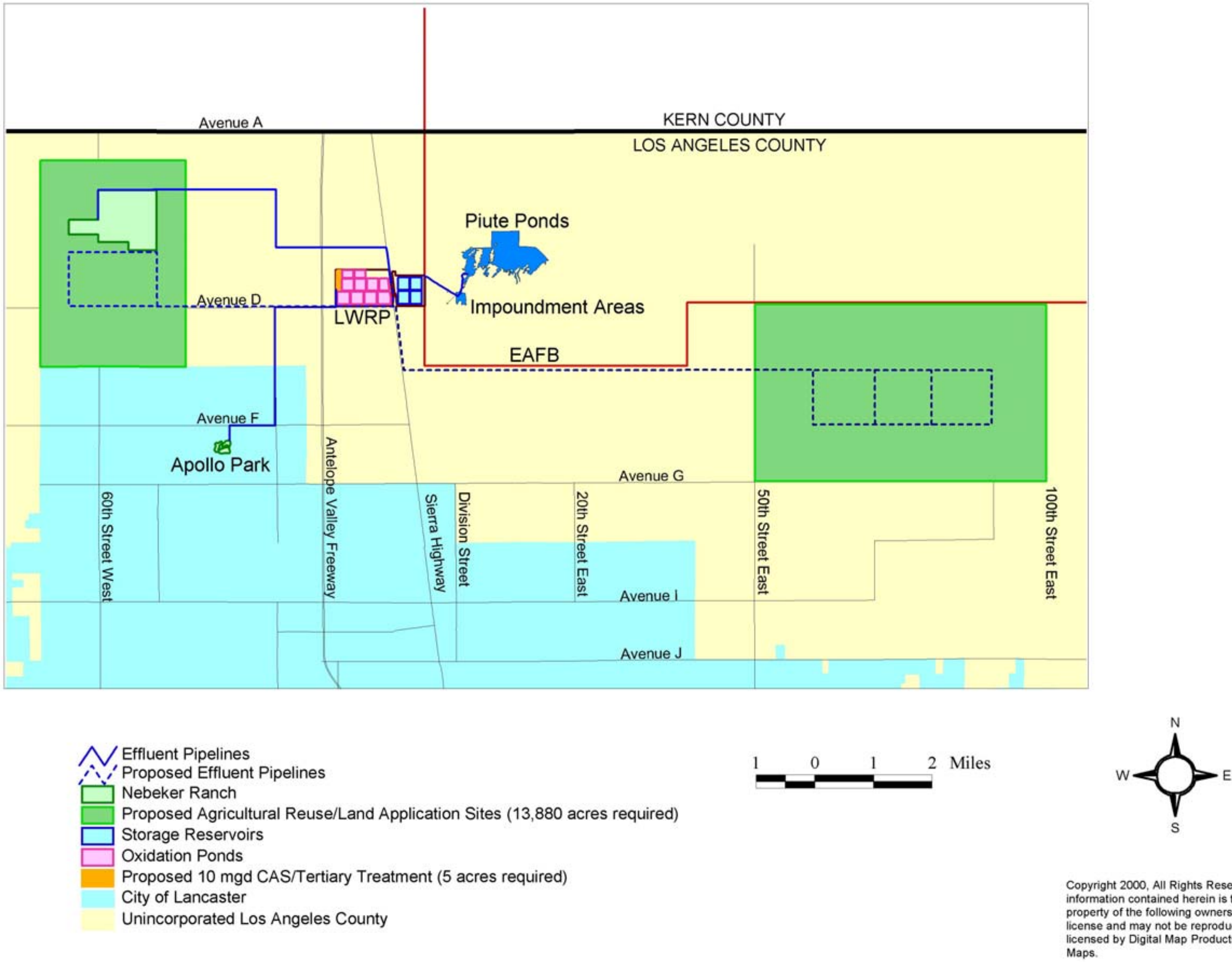

Figure 6-4

Alternative 4: 26 mgd CAS/Tertiary Treatment and Agricultural Reuse/Land Application

SANITATION DISTRICTS OF LOS ANGELES COUNTY

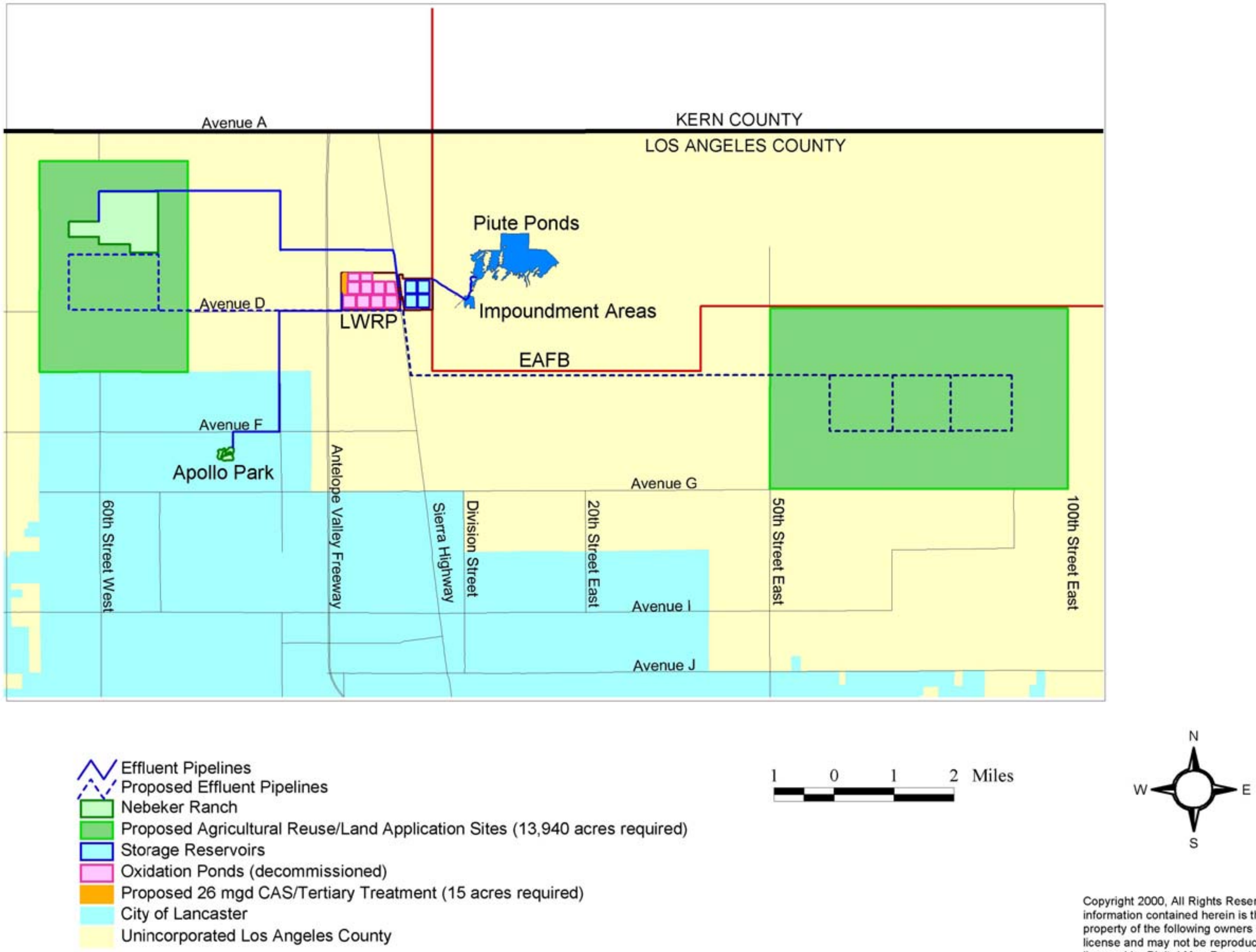

Figure 6-5

the Final LWRP 2020 Plan EIR. The primary areas of concern with respect to environmental impact are biological resources, cultural resources, visual resources, and groundwater resources.

- *Biological Resources*

  Implementation of any of the project alternatives may impact endangered or threatened plant and wildlife species either directly or indirectly by the potential destruction of suitable or sensitive habitat.

  Construction of wastewater treatment and effluent management facilities would require approximately 5,275 acres of land for Alternative 1 and 5,415 acres of land for Alternative 2. These two alternatives would involve construction of storage reservoirs to the north of the LWRP, which is considered to be relatively high quality *alkali mariposa lily* habitat. Conversely, Alternatives 3 and 4 do not involve construction of storage reservoirs, but rather development of an extensive area for agricultural operations. Alternatives 3 and 4 would require acquisition of approximately 13,880 acres and 13,940 acres of land, respectively, for agricultural operations. These acreage requirements are more than double that of Alternative 1 or 2. Although District No. 14 would seek to minimize impact to biological resources by acquiring land that has been recently disturbed (e.g., farmed), it is likely that implementation of the agricultural operations under Alternatives 3 and 4 would result in a greater impact to biological resources than the agricultural operations under Alternatives 1 and 2 due to the extensive area required. Nevertheless, due to the trade-off in potential impact under Alternatives 1 and 2 (*alkali mariposa lily* in proposed storage reservoir area) and Alternatives 3 and 4 (extent of land required for agricultural operations), the project alternatives are deemed to be relatively similar with respect to impacts on biological resources.

- *Cultural Resources*

  Archaeological and paleontological resources are suspected to exist throughout the footprints of the project alternatives. Potential prehistoric sites such as burial sites, isolated artifacts, and temporary encampments could be encountered during construction of any alternative. No historic resources would be impacted by the project. The potential for encountering cultural resources during implementation of any alternative is high due to the known archaeological sites in the general vicinity of the footprint of each alternative. Overall, the larger land requirement of Alternatives 3 and 4 correlates to an increased potential for impacts to cultural resources relative to Alternatives 1 and 2.

- *Visual Resources*

  The significance of the impact to visual resources depends on the duration and distance of affected view points, the existing visual character of the site, and the aesthetic aspects of the development. Negative aesthetic attributes of site development may include alteration of landforms, view obstruction, light and glare, and introduction of elements that are inconsistent with the existing surroundings.

  There are no designated scenic highways or vista points in close proximity to the project footprints. The nearest designated visual resource is the Lamont/Odet Caltrans Vista Point, which is located approximately 15 miles south of the LWRP. The project footprints are not visible from this vantage point due to the great distance.

  Although implementation of Alternatives 1 and 2, which involve construction of storage reservoirs with berms that would be approximately 20 feet above grade, could affect the view of the landscape from residences and roadways, the areas surrounding the proposed storage reservoir locations are predominantly vacant land and open space. However, long-range views from Sierra Highway and SR-14, which are near the proposed storage reservoirs, might be obstructed by the reservoir berms. On the other hand, implementation of Alternative 3 or 4, neither of which involves construction of additional storage reservoirs, might be considered to be more aesthetically pleasing than the large expanses of storage reservoirs proposed under Alternatives 1 and 2. Therefore, Alternatives 3 and 4 are deemed to be slightly superior to Alternatives 1 and 2 with respect to impact on visual resources.

- *Groundwater Resources*

  Impacts on groundwater resources could occur as a result of recycled water infiltration from (1) storage reservoirs, (2) agricultural reuse operations, and (3) land application operations.

  Infiltration of recycled water through the bottom of the storage reservoirs proposed under Alternative 1 would be negligible due to the method of construction of the reservoir floors. Under Alternative 1, a high density polyethylene geomembrane (i.e., synthetic liner) would be constructed on the floors of the storage reservoirs. Under Alternative 2, native soils with a low permeability would be excavated and recompacted to construct the floors of the storage reservoirs. While not as effective as a synthetic liner, the compacted native soil floors of the storage reservoirs under Alternative 2 would impede infiltration of the tertiary-treated effluent to the groundwater. Alternatives 1 and 2 are different in terms of storage reservoir floor construction due to the quality of effluent that would be stored. Under Alternative 1, the effluent stored would be a 16:10 (16 mgd to 10 mgd) ratio of secondary-treated oxidation pond effluent to tertiary-treated effluent, while the effluent stored as part of Alternative 2 would be completely tertiary-treated. Tertiary-treated effluent is suitable for groundwater recharge projects via surface spreading. In addition, nitrate concentrations in tertiary-treated effluent would meet limits for potable water supplies.

  Infiltration resulting from the agricultural reuse operations proposed under all four alternatives would not be significant due to utilization of defined irrigation rates for the crops being cultivated. This practice would ensure that the crops cultivated only receive as much water as necessary, thereby minimizing the recycled water traveling beyond the root zone.

  Conversely, the recycled water land application operations proposed under Alternatives 3 and 4 would not adhere to the water demand of the crops being irrigated during the winter months. Meeting the water demand of the crop would not be the primary objective under this effluent management operation. Recycled water application during the winter months would exceed the water demand of the crop, resulting in infiltration of recycled water.

Overall, Alternatives 3 and 4 are deemed to be inferior to Alternatives 1 and 2 with respect to environmental impact. This is due in large part to the fact that there is potential for impact to groundwater resources under Alternatives 3 and 4, which involve management of recycled water via land application operations. The RWQCB-LR has indicated that obtaining a permit for the agricultural operations proposed under Alternatives 3 and 4 would be difficult and would require District No. 14 to conduct various studies and submit detailed reports. Additionally, the larger overall land requirement of Alternatives 3 and 4 correlates to an increased potential for biological and cultural resource impacts in comparison to Alternatives 1 and 2.

Operational Considerations

Operational considerations were qualitatively evaluated in terms of the wastewater treatment and effluent management facilities proposed under each final project alternative.

- *Alternative 1*

  This alternative proposes construction of a 10-mgd CAS/tertiary treatment facility as an expansion to the existing 16-mgd oxidation pond facilities. The Districts have extensive experience and many employees trained in the operation and maintenance of oxidation pond treatment and CAS/tertiary treatment facilities.

  With respect to effluent management facilities, this alternative, which proposes agricultural reuse and storage reservoirs, would be familiar and relatively easy to operate. For over a decade, District No. 14 has managed a large portion of the effluent from the LWRP by utilizing four, 40-acre storage reservoirs and by conveying recycled water to Nebeker Ranch, a 680-acre privately-owned agricultural reuse operation where alfalfa is cultivated. Overall, Alternative 1 is considered to be equal to Alternative 2, but superior to Alternatives 3 and 4 due to the Districts' familiarity in operating both types of wastewater treatment facilities and the familiarity in managing effluent via agricultural reuse operations and storage reservoirs.

- *Alternative 2*

  This alternative proposes construction of a 26-mgd CAS/tertiary treatment facility, which would provide for the necessary 10-mgd expansion as well as replace the existing 16-mgd oxidation pond facilities. As stated previously, the Districts have extensive experience and many employees trained in the operation and maintenance of CAS/tertiary treatment facilities. And like Alternative 1, District No. 14 has extensive experience managing effluent via agricultural reuse and storage reservoirs. District No. 14 has managed a large portion of the effluent from the LWRP by utilizing four, 40-acre storage reservoirs and by conveying recycled water to Nebeker Ranch. Overall, Alternative 2 is considered to be equal to Alternative 1, but superior to Alternatives 3 and 4 due to the Districts' familiarity in operating CAS/tertiary treatment facilities and the familiarity in managing effluent via agricultural reuse operations and storage reservoirs.

- *Alternative 3*

  As under Alternatives 1 and 2, the Districts have extensive experience and many employees trained in operation and maintenance of the oxidation pond treatment and CAS/tertiary treatment facilities proposed by Alternative 3.

  With respect to effluent management, this alternative is less favorable than Alternatives 1 and 2 in that without storage reservoirs, nearly all the plant effluent would have to be conveyed year-round to agricultural sites. This lack of operational flexibility would make this alternative's effluent management technique less desirable than those of Alternatives 1 and 2, which involve construction of effluent storage reservoirs adjacent to the LWRP. Overall, Alternative 3 is considered to be neutral due to the trade-off between the familiarity in operating the proposed wastewater treatment facilities and the relatively challenging method of effluent management.

- *Alternative 4*

  As under Alternatives 1, 2, and 3, the Districts have extensive experience and many employees trained in operation and maintenance of the CAS/tertiary treatment facilities proposed in Alternative 4. And, as under Alternative 3, this alternative proposes effluent management via a process with relatively less operational flexibility than Alternatives 1 and 2. Overall, Alternative 4 is considered to be neutral due to the trade-off between the familiarity in operating the proposed wastewater treatment facilities and the relatively challenging method of effluent management.

Optimization of Recycled Water Reuse

The project alternatives were compared according to their ability to encourage future recycled water reuse projects (based on the proposed level of wastewater treatment) and the extent to which they maximize recycled water reuse (based on the proposed method of effluent management). A higher level of treatment would potentially encourage more reuse projects because tertiary-treated effluent has a much larger range of DHS-approved uses than secondary-treated effluent. The proposed method of effluent management should be such that recycled water is not committed to facilities that do not promote reuse.

Under Alternatives 1 and 3, 10 mgd of CAS/tertiary treatment would be provided to augment the existing 16-mgd oxidation pond secondary-treatment capacity. However, under Alternatives 2 and 4, not only would 10 mgd of CAS/tertiary treatment be provided, but the existing 16-mgd oxidation pond secondary treatment capacity would be replaced by CAS/tertiary treatment. Thus, Alternatives 2 and 4 are relatively superior to Alternatives 1 and 3 because each would provide 26 mgd of CAS/tertiary treatment, thereby making more higher-quality recycled water available for a variety of reuse applications.

With respect to effluent management facilities, the four alternatives propose two distinct methods. Under Alternatives 1 and 2, effluent would be managed via agricultural reuse operations and storage reservoirs, while under Alternatives 3 and 4 effluent would be managed via agricultural reuse and land application. Although the acreage required under Alternatives 3 and 4 is greater than that under Alternatives 1 and 2, the total number of acres of reuse operations that can be supported under Alternatives 1 and 2 is greater than that of Alternatives 3 and 4. This is due to the fact that the storage reservoirs under Alternatives 1 and 2 would effectively increase the supply of recycled water available during the summer, when demand for recycled water is high, by impounding recycled water not utilized during the winter months. Conversely, under Alternatives 3 and 4, effluent produced during the winter months would be land applied.

In summary, Alternative 2 is relatively superior to the other alternatives, Alternatives 1 and 4 are neutral based on the trade-off in proposed wastewater treatment and effluent management facilities, and Alternative 3 is the least desirable in that its proposed wastewater treatment and effluent management facilities are relatively inferior to the other alternatives in terms of optimization of recycled water reuse.

Summary of Qualitative Screening of Final Project Alternatives

The results of the qualitative screening of the final project alternatives are summarized in Table 6-5. The rating of an alternative relative to the others across a criterion is indicated by zero, plus, or minus. The overall qualitative ranking was based on the summed rating of each alternative under the three qualitative criteria discussed. Based on this analysis, Alternative 2 is deemed to be superior to the other alternatives in terms of the qualitative criteria discussed.

Project Cost

Project cost is a function of the total capital cost and the annual O&M cost. For comparison purposes, each alternative's total capital cost, which is comprised of up-front costs such as facilities construction, land, land acquisition services, relocation expenses, and contingency for mitigation, was amortized over 20 years at 6.625 percent in order to determine the equivalent annual cost. Although interest rates may vary, the quantitative analysis ranking would not change as a result of a reasonable fluctuation in the interest rate. O&M, which was estimated in terms of annual cost, was added to the equivalent annual capital cost to determine each alternative's total annual cost. The project alternatives were then ranked in terms of their total annual cost.

Table 6-5
Summary of the Qualitative Screening and Ranking of Final Project Alternatives[a]

QUALITATIVE CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Environmental Impact	+	+	–	–
Operational Considerations	+	+	0	0
Optimization of Recycled Water Reuse	0	+	–	0
Total Score	2+	3+	2–	1–
QUALITATIVE RANKING	**2**	**1**	**4**	**3**

(a) Comparative ratings are Superior (+), Neutral (0), and Inferior (–).

- *Facilities Construction*

  The estimated costs of constructing the major facilities under each alternative are shown in Table 6-6. The facilities construction costs, in 2003 dollars, include 10 percent for design.

- *Land*

  The fair market value of land and improvements within the footprints of the four project alternatives cannot be determined with any certainty without an appraisal of the individual parcels involved. In the fall of 2003, District No. 14 hired an appraisal firm to determine the fair market value of property within the project area of the alternatives.

  Based on the appraisal results, the average fair market value of land and improvements within the proposed agricultural site east of the LWRP (see Figure 6-2) was estimated to be approximately $6,300 per acre. Due to a prevalence of smaller parcels within the proposed agricultural site west of the LWRP (required under Alternatives 3 and 4), it is expected that the fair market value of property within this area would be higher than $6,300 per acre. However, for purposes of this comparison, the land required for agricultural operations under all four project alternatives was assumed to be approximately $6,300 per acre. The average fair market value of unimproved land within the proposed storage reservoir site north of the LWRP required under Alternatives 1 and 2, as well as the area adjacent to the LWRP required for wastewater treatment facilities under all alternatives, was estimated to be approximately $5,000 per acre. The estimated cost of land for each alternative is shown in Table 6-6.

- *Land Acquisition Services*

  In order to effectively and efficiently manage the process of acquiring land, District No. 14 has hired an appraisal firm, a title company, and a firm specializing in property acquisition. The estimated cost of these services for each alternative is shown in Table 6-6.

- *Relocation Expenses*

  District No. 14 has estimated the cost of relocating the owners of homes and businesses that could potentially be impacted by the implementation of each project alternative. Such relocation assistance is required by law. The estimated relocation expense for each alternative is shown in Table 6-6.

- *Contingency for Mitigation*

  Contingency for mitigating the implementation of an alternative is based on the total number of acres of land required under that alternative multiplied by an estimated per acre mitigation cost. It should be noted that the mitigation cost can vary significantly depending upon the location of the land being developed. The estimated cost of contingency for mitigation for each alternative is shown in Table 6-6.

- *Annual O&M*

  The annual O&M cost includes the operational and maintenance cost from the existing and proposed wastewater treatment, effluent management, and biosolids handling facilities, plus chemical and pumping costs at 26 mgd, the expected wastewater flow in the year 2020. The estimated annual O&M cost, in 2003 dollars, for each alternative is shown in Table 6-7.

Summary of Quantitative Screening of Final Project Alternatives

Construction of synthetic liners for storage reservoirs is the major capital cost component of Alternative 1; while under Alternative 2, the major capital cost component is the 26-mgd CAS/tertiary treatment facility. The difference in total capital cost between these two alternatives is less than four percent. This is due to the trade-off in cost between the synthetic liners proposed under Alternative 1 and the cost of the 26-mgd CAS/tertiary treatment facility proposed under Alternative 2. Since all of the effluent produced under Alternative 2 would be tertiary-treated, construction of synthetic liners for the storage reservoirs under Alternative 2 would not be required. Alternatives 3 and 4 are significantly more expensive than Alternatives 1 and 2 due to the added costs associated with acquiring nearly three times as much land.

In Table 6-7, the final project alternatives are ranked in terms of their total annual cost, which is the sum of the annualized capital cost (amortized over 20 years at 6.625 percent) and the annual O&M cost. According to Table 6-7, Alternative 1 has the lowest total annual cost, Alternative 4 has the highest total annual cost, and Alternatives 2 and 3 are in between with nearly equivalent total annual costs. Although Alternative 3 has a higher annualized capital cost than Alternative 2, its annual O&M cost is lower than that of Alternative 2 because it involves the operation and maintenance of the existing 16-mgd oxidation pond treatment facility and a 10-mgd CAS/tertiary treatment facility, rather than a 26-mgd CAS/tertiary treatment facility. This trade-off in cost results in Alternatives 2 and 3 being nearly equivalent in terms of total annual cost.

Table 6-6
Capital Cost Comparison of Final Project Alternatives[a]

QUANTITATIVE CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Facilities Construction[b]				
Preliminary Treatment	$4,926,000	$4,926,000	$4,926,000	$4,926,000
Primary Treatment	$6,027,000	$6,027,000	$6,027,000	$6,027,000
Secondary (CAS) Treatment	$12,038,000	$31,299,000	$12,038,000	$31,299,000
Tertiary Treatment	$8,946,000	$22,031,000	$8,946,000	$22,031,000
Biosolids Handling	$10,277,000	$13,932,000	$10,277,000	$13,932,000
Storage Reservoirs	$27,377,000	$20,533,000	—	—
Native Soil Liner for Reservoirs	$4,648,000	$3,486,000	—	—
Synthetic Liner for Reservoirs	$24,015,000	—	—	—
Agricultural Operations	$33,750,000	$34,758,000	$46,290,000	$46,345,000
Miscellaneous[c]	$8,153,000	$8,153,000	$5,130,000	$5,130,000
Land Acquisition				
Land	$31,754,000	$32,934,000	$88,331,000	$88,758,000
Land Acquisition Services	$5,075,000	$5,075,000	$10,150,000	$10,150,000
Relocation Expenses	$4,808,000	$5,361,000	$16,011,000	$16,059,000
Contingency for Mitigation	$11,104,000	$11,399,000	$29,217,000	$29,344,000
TOTAL CAPITAL COST	**$192,898,000**	**$199,914,000**	**$237,343,000**	**$274,001,000**

(a) 2003 dollars.
(b) Includes 10 percent for design.
(c) Includes oxidation pond effluent treatment, laboratory building, roads and culverts for storage reservoirs, and plant monitoring wells.

Table 6-7
Summary of the Quantitative Screening and Ranking of Final Project Alternatives[a]

QUANTITATIVE CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Total Capital Cost	$192,898,000	$199,914,000	$237,343,000	$274,001,000
Annualized Capital Cost[b]	$17,681,000	$18,324,000	$21,755,000	$25,115,000
Annual O&M Cost[c]	$6,337,000	$9,090,000	$6,435,000	$9,168,000
Total Annual Cost	$24,018,000	$27,414,000	$28,190,000	$34,283,000
QUANTITATIVE RANKING	**1**	**2**	**3**	**4**

(a) 2003 dollars.
(b) Amortized at 6.625 percent annual interest rate for 20 years.
(c) Annual O&M cost based on 26 mgd.

Table 6-8
Qualitative and Quantitative Rankings of Final Project Alternatives

	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Qualitative Ranking (from Table 6-5)	2	1	4	3
Quantitative Ranking (from Table 6-7)	1	2	3	4
OVERALL RANKING	**1**	**1**	**3**	**3**

IDENTIFICATION OF RECOMMENDED PROJECT

The qualitative and quantitative ranking of the final project alternatives is summarized in Table 6-8.

Examination of this table indicates that Alternative 1 ranks first in terms of quantitative criteria and second in terms of qualitative criteria. In contrast, Alternative 2 ranks first in terms of qualitative criteria and second in terms of quantitative criteria. Thus, Alternatives 1 and 2 are deemed to be equivalent according to this evaluation process. Alternatives 3 and 4 rank either third or fourth in terms of qualitative and quantitative criteria. Thus, Alternatives 3 and 4 were deemed to be inferior to Alternatives 1 and 2.

Public Comments on the Draft LWRP 2020 Plan EIR

Since Alternatives 1 and 2 were found to be equally suitable in terms of the qualitative and quantitative criteria analyzed, the final criterion that was considered in selecting the recommended project for the LWRP 2020 Plan was based on the comments received during the public review period for the Draft LWRP 2020 Plan EIR.

District No. 14 published the Draft LWRP 2020 Plan EIR on September 30, 2003, with Alternative 1 as the recommended project due to the fact that it is the most cost-effective alternative evaluated. As required by CEQA, a public review period of 45 days was provided during which interested agencies and members of the public submitted comments on the scope and analysis provided in the Draft LWRP 2020 Plan EIR.

A public hearing was held at Lancaster City Hall on October 29, 2003, to receive oral and/or written comments from the public on the Draft LWRP 2020 Plan EIR. The purpose, date, and time of the public hearing were advertised in the *Antelope Valley Press*. In addition, approximately 4,300 notices were mailed to property owners of record in or near the general project area.

One of the major comments submitted at the public hearing and throughout the public review period was in reference to the level of treatment that would be provided for the wastewater. Commentors urged District No. 14 to provide a tertiary level of treatment for all the wastewater processed at the LWRP (i.e., Alternative 2). This comment was driven by concerns regarding the protection of public health as a result of not having full tertiary treatment under Alternatives 1 and 3, as well as concerns regarding the protection of groundwater quality as a result of the agricultural land application operations under Alternatives 3 and 4.

The majority of individuals who submitted this general comment are residents and/or property owners within the site east of the LWRP where District No. 14 is proposing to implement agricultural reuse operations. However, these facilities would be constructed for the benefit of, and paid for by, the District No. 14 sewerage system users, who reside southwest of the proposed agricultural site.

Notwithstanding the fact that Alternative 1, which represents the recommended project in the Draft LWRP 2020 Plan EIR, is a cost-effective project alternative that would meet or exceed all regulatory requirements for the protection of public health and groundwater quality, based on the number and scope of public comments received in support of full tertiary treatment, Alternative 2 (*26 mgd CAS/Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs*) was selected as the recommended project of the LWRP 2020 Plan. The final ranking of Alternatives 1 and 2 based on public comments received is summarized in Table 6-9.

Table 6-9
Identification of the Recommended Project

	ALTERNATIVE 1	ALTERNATIVE 2
Overall Ranking (from Table 6-8)	1	1
Ranking Based on Public Comments	2	1
FINAL RANKING	**2**	**1**

According to Table 6-6, the difference in total capital cost between Alternatives 1 and 2 is less than four percent (or, approximately $7,000,000). In terms of total annual cost amortized over a 20-year period, Alternative 2 is approximately 14 percent more expensive than Alternative 1 (see Table 6-7). This is primarily due to the additional O&M cost required to operate a 26-mgd CAS/tertiary treatment facility under Alternative 2 versus operating the existing 16-mgd-capacity oxidation ponds and a 10-mgd CAS/tertiary treatment facility under Alternative 1.

It should be noted that implementation of a hybrid project alternative, created by combining Alternatives 1 and 2, would also meet or exceed all regulatory and LWRP 2020 Plan objectives. This hybrid alternative would involve construction of a 26-mgd CAS secondary treatment facility, a 10-mgd tertiary treatment facility, and effluent management via agricultural reuse operations and storage reservoirs. The total capital cost of this hybrid alternative would be approximately $189,000,000 (or, $17,324,000 per year when amortized over 20 years at 6.625 percent) and the projected annual O&M cost at 26 mgd would be $8,898,000. Thus, the total annual cost of the hybrid alternative would be $26,222,000.

As expected, this hybrid alternative is more expensive than Alternative 1, but only four percent less expensive than Alternative 2 in terms of total annual cost. This analysis suggests that the incremental cost of providing full tertiary treatment under Alternative 2, (versus just 10 mgd of tertiary treatment under the hybrid alternative) is justifiable when considering that full tertiary treatment increases public acceptance of the proposed project, increases recycled water reuse opportunities, and helps alleviate concerns regarding public health.