CHAPTER 6

ANALYSIS OF PROJECT ALTERNATIVES

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6.1 INTRODUCTION

The purpose of this facilities plan is to identify the most practical and cost-effective means to provide full secondary treatment to all JOS wastewater flows and to provide wastewater conveyance, treatment, and disposal/reclamation services to the JOS service area through the year 2010. This chapter will present the development and evaluation of project alternatives within the framework of the regulatory requirements, existing conditions, and anticipated future conditions which were established in previous chapters. Alternatives development and evaluation will take the form of a four step process as illustrated in Figure 6.1-1. Project alternatives will be developed as concepts initially and then refined to a set of specific preliminary project alternatives. The set of preliminary project alternatives will then be progressively reduced to a smaller set of feasible project alternatives and an even smaller set of final project alternatives. Screening criteria and analyses of project alternatives will become progressively more specific and more detailed at each step of this process. Ultimately, the facilities plan will identify the preferred project alternative which best meets project objectives.

6.2 PLANNING OBJECTIVES

The objectives of the JOS 2010 Master Facilities Plan are to:

- Provide full secondary treatment for all flows, as required by a Consent Decree between the Districts, the United States, the State of California, the Natural Resources Defense Council, and Heal the Bay, and

- Provide wastewater conveyance, treatment, and reclamation/disposal facilities to meet service area needs through the year 2010 in a cost-effective and environmentally sound manner.

6.3 PLANNING CONCEPTS AND CONSTRAINTS

There are a number of factors which define facilities needs and/or constrain development and evaluation of project alternatives. These factors, which have been discussed in previous chapters of this report, include legal constraints, projected wastewater flows and characteristics, and uncertainty in planning projections.

6.3.1 LEGAL REQUIREMENTS

The selected plan must comply with a variety of rules and regulations. With respect to water quality, the selected plan must comply with policies set forth in the Federal Water Pollution Control Act and its amendments, the California State Water Quality Act (Porter Cologne), and specific water quality control plans such as the California Ocean Plan, and the Los Angeles Region Basin plan. With regard to air quality, the selected plan must comply with the federal Clean Air Act and Clean Air Act Amendments, the California Clean Air Act and with the requirements of the South Coast Air Quality Management District. The selected plan must also comply with the federal Endangered Species Act, the California Endangered Species Act, and the California Fish and Game Code with respect to biological resources, and the National Historic Preservation Act with respect to historical resources. In addition, the Districts are under federal court order to provide full secondary treatment to all JOS wastewater by December 31, 2002.

6.3.2 PROJECTED WASTEWATER FLOWS AND CHARACTERISTICS

Projections presented in Chapter 5 indicate that the selected plan must provide service to approximately 5.2 million people by the year 2010. In 2010, JOS facilities must have the ability to convey, provide at least full secondary treatment to, and safely manage effluent produced from approximately 628 mgd of wastewater. In addition, year 2010 JOS facilities must also be capable of processing and safely managing approximately 575 dry tons per day (dtpd) of biosolids.

6.3.3 COPING WITH UNCERTAINTY

Some degree of uncertainty will always be associated with planning projections. The wastewater flow projections of Chapter 5, around which this plan is developed, are based on projected population growth, industrial output growth, and wastewater generation rates. To the extent that these projections are uncertain, wastewater flow projections are also uncertain. Previous planning efforts, such as the 1977 JOS Facilities Plan, have been based on population projections which significantly underestimated growth. As a result, these plans have failed to identify capacity necessary to meet the actual needs of the service area throughout the planning period. In such cases, the actual implementation of the selected plan must be accelerated. For example, facilities identified in the 1977 JOS Facilities Plan which were intended to be sufficient through the year 2000 were built out and were operating at capacity by the early 1980s. Current SCAG planning projections, on the other hand, predict significant growth in the JOS service area. This facilities plan and the proposed phasing of construction of the facilities which are identified in it are based on these projections. If such growth does not materialize, the construction of proposed facilities will be postponed until such facilities are imminently necessary. In summary, facilities identified in this facilities plan will be service phased according to the actual demand for the facilities. The Plan will also be sensitive to wastewater generation rates. Wastewater flow projections included in Chapter 5 attempt to account for some degree of water conservation, but additional conservation could reduce actual wastewater generation rates thereby causing actual JOS wastewater flows to fall short of projected flows. Once more, proposed facilities will be service phased according to actual demand in order to avoid unnecessary construction of excess system capacity. On the other hand, less conservation could result in underestimation of actual wastewater flows which would require acceleration of proposed project elements.

6.4 CONCEPTUAL PROJECT ALTERNATIVES

The alternatives development process involves identification, screening, examination and reevaluation of alternatives to identify viable alternatives from which the best plan which is consistent with planning objectives, concepts and constraints may be identified. The planning process began with a set of conceptual project alternatives which are intended to represent the universe of alternatives available to the Districts to provide wastewater treatment services to the JOS population. Conceptual alternatives are, as their name implies, system-level concepts. Each concept embodies a strategy to meet planning objectives, and conceptual alternatives are generally not mutually exclusive. The set of conceptual alternatives may be divided into three categories: wastewater treatment concepts, solids processing concepts, and biosolids management concepts.

6.4.1 WASTEWATER TREATMENT

Six conceptual alternatives to provide wastewater treatment were identified. These alternatives are summarized in the paragraphs which follow.

Conventional Expansion

In the conventional expansion conceptual alternative, the JOS would be upgraded to provide full secondary treatment and expanded to accommodate expected growth through the expansion of existing facilities on their existing sites utilizing existing treatment processes. The JWPCP, for example, would employ the pure oxygen activated sludge process to provide full secondary treatment, and any expansions at the WRPs would employ tertiary treatment including a conventional air activated sludge process and gravity filtration. Effluent management would, similarly, not change in nature. All effluent from the JWPCP would be discharged to the Pacific Ocean through existing and/or new ocean outfalls. All reclaimed water from WRPs would either be reused according to Title 22 Guidelines or discharged to a local watercourse which empties to the Pacific Ocean.

Process Modification

In this conceptual alternative, the JOS would be upgraded to provide full secondary treatment and expanded to accommodate projected growth through the expansion of existing facilities onto their existing sites, but new treatment processes would be used at some of these sites. Specifically, WRPs, which would still provide tertiary treatment, would be expanded utilizing the pure oxygen activated sludge process as opposed to the currently employed conventional air activated sludge process. If feasible, the concept of converting existing air activated sludge facilities to pure oxygen activated sludge facilities could possibly increase the site capacities of JOS WRPs. This could, therefore, possibly increase the buildout capacity of the JOS since the pure oxygen activated sludge process is more space efficient than the conventional air activated sludge process. Effluent management would not be changed. All effluent from the JWPCP would be discharged to the Pacific Ocean via existing and/or new ocean outfalls. All reclaimed water from WRPs would be reused according to Title 22 Guidelines or discharged to local watercourses which flow to the Pacific Ocean.

New Water Reclamation Plants

Under this conceptual alternative, the JOS would be upgraded to provide full secondary treatment and would be expanded to accommodate projected growth, but some portion of the system expansion would take place at a new WRP. The Districts have previously considered construction of a new WRP on the west side of the JOS. A west side WRP, which would intercept high quality wastewater from residential neighborhoods and provide tertiary treatment, would reduce the quantity of flow which must be treated at the JWPCP and would provide an additional water supply resource to southwest Los Angeles County. Effluent management would not be altered as JWPCP effluent would be discharged to the Pacific Ocean through existing and/or new ocean outfalls, and reclaimed water produced at WRPs would be reused in accordance with Title 22 Guidelines and/or discharged to local watercourses which flow to the Pacific Ocean.

New Interceptors

Under this conceptual alternative, new interceptor sewers would be constructed to redistribute flows amongst the JOS treatment plants. JOS interceptors generally route higher quality wastewaters to WRPs for reclamation or lower quality wastewaters around the WRPs to the JWPCP for treatment and ocean disposal. As in other alternatives, the JOS would be upgraded to provide full secondary treatment and would be expanded to accommodate expected growth. New interceptors were considered for two reasons. First, new interceptors could be required if the volume of wastewater generated within a treatment plant's service area exceeds the site capacity of that plant. Second, new interceptors might be used to increase the amount of flow that may be routed to WRPs located in regions of high water reuse potential. Effluent management would not be altered from the present strategy. Effluent from the JWPCP would be discharged to the Pacific Ocean via existing or new ocean outfalls, and reclaimed water from the WRPs would either be reused according to Title 22 Guidelines or discharged to local watercourses which flow to the Pacific Ocean.

JWPCP Water Reclamation

This conceptual alternative calls for the construction of advanced treatment facilities at the JWPCP which would produce an effluent suitable for reuse. The JWPCP is located in a highly industrialized area. Many of the industries in this region could use reclaimed water as process water and/or cooling water if the quality of the reclaimed water is sufficient.

Conversion of the entire JWPCP to advanced treatment would be unnecessary at this time, but it has been suggested that an appropriately sized advanced treatment facility could be constructed on the existing JWPCP site. Reclaimed water produced by the JWPCP advanced treatment facility would be reused and/or discharged to the Pacific Ocean as necessary. Secondary effluent from the JWPCP would be discharged to the Pacific Ocean through existing and/or new ocean outfalls, and reclaimed water produced at WRPs would be reused and/or discharged to local watercourses which flow to the Pacific Ocean.

6.4.2 SOLIDS PROCESSING

Solids processing refers to the treatment of sewage solids which remain after wastewater treatment and includes anaerobic digestion and dewatering. After these solids have been treated to a form which can be reused they are referred to as "biosolids." Three conceptual alternatives for solids processing have been identified. These alternatives are summarized in the paragraphs which follow.

Centralized Solids Processing at the JWPCP

This alternative represents the continuation of existing solids processing strategies in the JOS. All solids generated within the JOS would be processed at the JWPCP. Solids removed at WRPs would be returned to the JOS sewer system and transported to the JWPCP for removal and processing. Existing solids processing facilities are centralized at the JWPCP, and all new solids processing facilities would also be constructed at the JWPCP.

Centralized Solids Processing at a New Site

This alternative proposes to continue centralized solids processing but to move solids processing operations away from the JWPCP. Solids removed at the WRPs would be returned to the JOS sewer system and would be transported to the JWPCP. Thus, all JOS solids would ultimately be removed from the system at the JWPCP and routed to a dedicated solids sewer which would convey the solids to a dedicated solids processing facility. Solids processing facilities at the JWPCP would ultimately be abandoned and demolished.

Decentralized Solids Processing

This alternative proposes that solids processing facilities would be constructed, operated, and maintained at more than one site within the JOS. Specifically, solids processing facilities would be constructed at the WRPs such that solids removed from the system at the WRPs may be processed at the respective WRPs. Solids processing facilities would continue to be maintained at the JWPCP but would be less extensive than those required to continue centralized solids processing at the JWPCP.

6.4.3 BIOSOLIDS MANAGEMENT

Biosolids management refers to the beneficial use of and/or disposal of processed sewage solids (biosolids). Between 1974 and 1980, the Districts participated in the Los Angeles/Orange County Metropolitan Sludge Management Program (LA/OMA) Study with the City of Los Angeles, the Orange County Sanitation Districts, the EPA, and the State Water Resources Control Board (SWRCB). The six-year LA/OMA Study exhaustively examined all aspects of solids processing and disposal/reuse and identified a recommended biosolids management program for each participating local agency. This facilities plan will not seek to reevaluate biosolids management methods that, according to constraints identified in the LA/OMA Study, could not be implemented.

According to the LA/OMA Study, the recommended biosolids management program for the JOS included solids processing via anaerobic digestion and mechanical dewatering followed by a combination of three biosolids management methods: dehydration and combustion followed by landfilling of resultant ash, advanced windrow composting at the JWPCP with subsequent reuse of composted biosolids as a soil amendment, and codisposal of digested, dewatered biosolids in a municipal landfill. The Districts' current biosolids management program for the JOS is, conceptually, consistent with the recommendation of the LA/OMA Study to the extent that it utilizes both composting with subsequent reuse and codisposal in a landfill. Deviations from the recommended LA/OMA Study include the following: the JWPCP composting operation was moved to a remote location for private operation in 1991 in response to odor complaints from JWPCP neighbors, the dehydration and combustion facility is not being used, and two additional offsite composting operations and a direct land application operation have been added to the biosolids management program.

This document will address the management of biosolids through the continuation of existing methods and a limited range of new alternatives. Since this entails a broad range of both existing and evolving biosolids management options and a wide range of geographic areas, this document is intended to provide the framework for a general assessment of categories of options rather than address individual projects at a site specific level. Overall, the Districts' biosolids management program will continue to employ multiple reuse and/or disposal options to assure total reliability while complying with all applicable regulations.

6.5 SCREENING OF CONCEPTUAL PROJECT ALTERNATIVES

The conceptual project alternatives were analyzed in order to develop a set of planning concepts on which subsequent project alternatives were based. The planning concepts formed the foundation of this facilities plan.

6.5.1 SCREENING CRITERIA

Conceptual project alternatives were evaluated based on the following screening criteria.

Preplanning Analyses

The Districts conducted a number of analyses addressing planning issues and concepts at the beginning of the planning process. The following topics were analyzed by Districts' staff possessing expertise in the appropriate areas.

Demographics and Flow Projections,
Alternative Treatment Processes and Treatment Plant Site Layouts,
The JOS Conveyance (Sewer) System,
Inflow and Infiltration,
Water Reclamation and Reuse,
Water Conservation,
Air Quality and Permitting,
Water Quality and Permitting,
Operational Considerations,
Biosolids Management,
Marine Discharges and the Consent Decree,
Land Use, and
Environmental Documentation Requirements

JOS Wastewater Flow Projections

As described in Chapter 5, the Districts, with the assistance of CH2M Hill and Thomas Brothers, used a GIS to generate wastewater flow projections for the JOS service area and for JOS drainage areas. JOS drainage areas are defined by the configuration of the JOS sewer system and the location of JOS treatment plants. Each drainage area generally flows to one or more of the JOS treatment facilities. Minimum and/or maximum wastewater flows may, therefore, be estimated for any JOS treatment plant at any time in the planning period.

Treatment Plant Site Capacities

The Districts have a finite area of land at each of the treatment plant sites. The Districts have master planned each site for a buildout capacity (assuming standard designs are used). This buildout capacity, or site capacity, represents the largest facility which may be constructed at a site without acquiring new land or drastically changing treatment plant design.

Previous Planning Documents

Previous planning documents have examined some of the conceptual alternatives included in this plan. The 1977 JOS Facilities Plan and the LA/OMA Study, for example, both addressed JOS solids processing. Where applicable, and when relevant, the findings of previous planning efforts have been incorporated into the review of conceptual project alternatives.

Institutional Feasibility

Institutional feasibility refers to the Districts' ability to independently effect the implementation of some project, and the difficulty or feasibility of developing a project which is not wholly within the Districts' control.

6.5.2 CONCEPTUAL PROJECT ALTERNATIVES ELIMINATED

The conceptual project alternatives were evaluated against the above screening criteria in order to eliminate alternatives which are not practical and/or are not reasonable at this time. Conceptual project alternatives which were eliminated and the rationale for their elimination are summarized in Table 6.5-1.

The screening of conceptual project alternatives is described in more detail in the paragraphs which follow.

Process Modification

Expansion of the JOS through process modification was examined in the preplanning analyses of alternative treatment processes and treatment plant site capacities. The feasibility of expanding WRPs via conversion to the pure oxygen activated sludge process was examined in this analysis. According to the analysis, the concept of system expansion via process modification should be eliminated because existing WRP facilities are not capable of accommodating a pure oxygen activated sludge process without extensive and expensive

Table 6.5-1
SCREENING OF CONCEPTUAL PROJECT ALTERNATIVES

Alternatives Eliminated	Rationale for Elimination
Process Modification	Inconsistent with Existing Facility Design, Cost, Uncertainty Regarding Effluent Quality
New WRPs	Flow Projections: Not Necessary in Planning Period
New Interceptors	Flow Projections: Not Necessary in Planning Period
JWPCP Water Reclamation	Influent Wastewater Quality, Not Necessary in Planning Period, Cost
Decentralized Solids Processing	Previous Planning Documents: Cost, Duplication of Facilities
Centralized Solids Processing: New Site	Previous Planning Documents: Cost, Duplication of Facilities

retrofit modifications. Such modifications might require demolition of and/or abandonment of functioning secondary treatment facilities which in some cases have not yet been fully amortized. In addition, high levels of colloidal suspended solids associated with pure oxygen activated sludge effluent could present a problem at the upstream WRPs where effluent turbidity is limited to two turbidity units (NTUs). To reduce effluent turbidity, high doses of coagulants could be required which would reduce filter run times. Reduced filter run times would create concerns about effluent quality, and would increase operation and maintenance costs associated with filter operation.

New WRPs

The concept of system expansion by construction of new WRPs during this planning period was eliminated from further consideration because the JOS flow projections indicated that new WRPs are not necessary during the planning period, and because present trends in water reuse stress construction of reclaimed water distribution systems rather than satellite water reclamation plants. The site capacities of existing facilities are sufficient to allow plant expansions necessary to accommodate expected flows, and the construction of extensive networks of reclaimed water distribution systems has mitigated the need to locate water reclamation plants near potential reclaimed water users. It is presently more cost effective to build large distribution systems than to build relatively small satellite WRPs to serve local reuse markets. Confining the system expansion to existing sites also simplifies land acquisition and land use questions. In general, it was concluded that new WRPs need not be considered in this facilities plan because, as noted, they are not needed at this time and because construction at new sites would most likely generate more adverse environmental and social impacts than would expansion of existing facilities.

New Interceptors

The concept of constructing new interceptors in order to modify JOS drainage areas was also eliminated because JOS flow projections indicate that such interceptors are not necessary during the planning period and because unnecessary interceptor construction may serve a short term purpose but be wasteful in the long term. Relief of existing interceptors will, however, be considered. Site capacities of the existing JOS treatment plants are sufficient to accommodate the quantity of wastewater that will be tributary to them during the planning period. Construction of new interceptors to divert flow to one treatment plant which would be expanded in favor of another facility could be wasteful since development of wastewater flow in the area tributary to the plant to which flow is diverted may eventually render the new interceptor obsolete. Flows routed to a treatment plant via an interceptor will slowly be replaced by flows which are generated within the plant's drainage area. Diversions through the interceptor may, therefore, slowly be reduced unless additional site capacity is secured either at, or upstream of, the plant to which the interceptor diverts flow.

JWPCP Water Reclamation

Despite the existence of a relatively large potential market for reclaimed water around the JWPCP, the concept of providing advanced treatment at the JWPCP such that JWPCP effluent could be reused was rejected for several reasons. The JOS has developed around the concept of diverting flow having relatively high mineral content (from industrial wastes) around the WRPs and to the JWPCP for treatment and subsequent ocean disposal. JWPCP influent is, therefore, high in TDS. JWPCP influent and effluent also contains relatively high concentrations of ammonia. Because of its high TDS and ammonia levels, JWPCP influent would require a substantial degree of treatment, including nitrification and denitrification and demineralization through a process such as reverse osmosis, to produce an effluent suitable for reuse. Given these requirements, it is apparent that water reclamation at the JWPCP would be much more expensive than water reclamation at the WRPs. Analysis has indicated that the additional cost (capital and operation and maintenance) required to produce usable reclaimed water at the JWPCP would be on the order of $830/acre foot. It would, therefore, be more cost effective to construct a distribution system to deliver reclaimed water from one or more of the WRPs to the JWPCP region. The West Basin Municipal Water Districts' West Basin Water Reclamation Program, which will deliver reclaimed water derived from the City of Los Angeles' Hyperion Treatment Plant effluent, will in fact serve the region surrounding the JWPCP. Thus, there is no immediate need to pursue water reclamation at the JWPCP.

Decentralized Solids Processing

Decentralized solids processing was eliminated for the same reasons that it was rejected in the 1977 JOS Facilities Plan. Decentralized solids processing would require duplication of facilities and personnel which would not be conducive to efficient solids processing. In addition, the WRP sites have not been planned to accommodate solids processing facilities, and construction of such facilities at these sites would reduce the treatment plants' site capacities, thereby creating a need to identify and acquire new sites for new treatment plants in the near future. Environmentally, decentralized solids processing is expected to be less desirable than centralized solids processing since environmental impacts associated with solids processing facilities would need to be controlled and mitigated at multiple locations under the decentralized solids processing alternative.

Centralized Solids Processing — New Site

The concept of continuing centralized solids processing at a new location (other than JWPCP) has been eliminated for similar reasons. This alternative would require construction of a dedicated solids processing facility and a dedicated solids pipeline to transport solids from the JWPCP to the new facility. If all solids are to be treated at the new facility, solids processing facilities which are presently in use, and may not be fully amortized, would eventually be abandoned and/or demolished. The new facility would require additional Districts' personnel and would, therefore, incrementally increase administrative costs. In addition, removal of solids processing from the JWPCP would eliminate the JWPCP's ability to generate the majority of the power which it uses. Finally, construction of a new dedicated solids processing facility would require identification of and acquisition of a site for the facility. Site acquisition activities would be exceedingly difficult and would, therefore, increase project costs and create logistical problems. Increased costs associated with the construction and operation of a dedicated solids processing facility apart from the JWPCP may be justified only to the extent that the new site is superior to the JWPCP. Through the implementation of substantial control and mitigation measures, the JWPCP has developed into a very good location for centralized solids processing facilities. Thus, moving solids processing to a new site cannot be justified.

6.6 PLANNING CONCEPTS

Based on the screening of conceptual project alternatives, a set of discrete planning concepts on which specific project alternatives will be based was developed. Planning concepts for the 2010 JOS Master Facilities Plan are identified below.

6.6.1. WASTEWATER TREATMENT — CONVENTIONAL EXPANSION

The JOS will be expanded by expansion of existing facilities on existing sites utilizing existing treatment processes. Secondary treatment facilities at the JWPCP will employ the pure oxygen activated sludge process, and expansions of WRP facilities will provide tertiary treatment by the conventional air activated sludge process and filtration. According to wastewater flow projections and identified treatment plant site capacities, the JOS may be expanded to accommodate projected year 2010 wastewater flows in this manner.

6.6.2 SOLIDS PROCESSING — CENTRALIZED AT THE JWPCP

Centralized processing of solids produced in the JOS will continue at the JWPCP. All additional solids processing facilities necessary for projected quantities of solids that the JOS will produce in the year 2010 at full secondary treatment will be constructed at the JWPCP. The rationale for centralized solids processing is presented in the 1977 JOS Facilities Plan and in the LA/OMA Study. According to these studies, centralized solids processing is economically and environmentally superior. Centralization of solids processing facilities allows the Districts to achieve economies of scale in solids processing operations by avoiding duplication of personnel and facilities at decentralized processing sites. Environmentally, centralized solids processing is preferable because it centralizes negative environmental impacts associated with solids processing facilities and allows more complete and efficient mitigation of these impacts. In addition, centralization of solids processing facilities allows the Districts to operate a large power generation facility which operates on digester gas and provides most of the energy necessary to operate the JWPCP.

6.6.3 BIOSOLIDS MANAGEMENT — DIVERSIFIED MANAGEMENT PROGRAM

The Districts' biosolids management program will continue to have multiple objectives. The primary objective will be to utilize multiple biosolids reuse and disposal options to ensure total reliability while maintaining compliance with all applicable regulations. An additional objective is to maintain an aggressive industrial waste source control program to ensure that biosolids produced are of high quality which will allow the Districts to employ a wide range of biosolids management options. The program will also strive to maximize resource recovery where possible and minimize adverse environmental impacts.

Existing biosolids management options include composting and reuse as a soil amendment, direct land application, and landfill codisposal with municipal solid waste. These options will continue to be implemented as necessary to accommodate increased volumes of biosolids generated within the JOS. A limited range of new offsite biosolids management alternatives will also be considered and existing and new onsite demonstration facilities will continue to be operated.

A subsequent biosolids management plan may be prepared at a later date to consider biosolids management options which may be developed after this plan is completed. This subsequent plan would consider onsite biosolids management alternatives which are substantially different than those covered in this document. A subsequent biosolids management plan may also consider alternative methods to transport biosolids to offsite reuse and/or disposal sites.

6.7 PRELIMINARY PROJECT ALTERNATIVES

6.7.1 SYSTEM CONSTRAINTS

Given the planning concepts outlined in the previous section, the next step was to identify a set of preliminary project alternatives. Preliminary project alternatives were based on the following constraints.

Site Capacities

The site capacity, as defined on page 6-11 of this report, of each JOS treatment facility is indicated below in Table 6.7-1.

Table 6.7-1
JOS TREATMENT PLANT SITE CAPACITIES

Facility	Site Capacity
JWPCP	450 mgd*
SJCWRP	125 mgd
WNWRP	80 mgd
LCWRP	125 mgd
LBWRP	50 mgd
PWRP	30 mgd

* *450 mgd is the maximum capacity under the current design and planning assumptions. The actual site capacity of the JWPCP is, however, greater than 450 mgd.*

Treatment Plant Incremental Expansions

With the exception of the PWRP, the JOS treatment facilities have been master planned such that they may be expanded in discrete increments or modules. Modular expansions of the JWPCP secondary treatment facilities are most efficiently constructed and operated in 50 mgd modules. Modular expansions of the WRPs (excepting the PWRP) are generally planned in 12.5 mgd increments. Proposed upgrades and/or expansions of the JWPCP wastewater treatment facilities will, therefore, be planned in 50 mgd increments and proposed expansions of WRP facilities will be planned in 12.5 mgd increments unless existing conditions dictate otherwise.

The maximum site capacity of the PWRP site is 30 mgd based on construction of conventional unit processes to provide an additional 7 mgd capacity (20 mgd total capacity) and flow equalization facilities which would allow the plant to accommodate an additional 10 mgd of flow (total plant capacity = 30 mgd). The construction of conventional treatment facilities alone would allow the site to accommodate only a 25 mgd plant. This would constitute an inefficient use of space at the site. It would, furthermore, not be feasible to build flow equalization facilities which would accommodate less than 30 mgd at the site. Thus, the PWRP may feasibly be expanded to either a 20 or 30 mgd facility.

Flow Projections

Flow projections indicate that in the year 2010, JOS wastewater flow will be approximately 628 mgd. The current permitted capacity of JOS facilities is approximately 576 mgd. JOS facilities must, therefore, be expanded by at least 52.5 mgd in order to accommodate expected growth in the JOS. In addition, since neither new treatment plants nor new interceptors will be constructed, minimum and/or maximum flows tributary to JOS treatment facilities may be identified based on flow projections for JOS drainage areas (see Appendix A-6.7). Flow projections indicate that in 2010:

The minimum flow tributary to the JWPCP will be 349 mgd*
The maximum flow tributary to the LBWRP will be 27 mgd
The maximum flow tributary to the LCWRP will be 124 mgd*
The maximum flow tributary to the WNWRP will be 86 mgd
The maximum flow tributary to the SJCWRP will be 127 mgd
The maximum flow tributary to the PWRP will be 22 mgd

* *Note that the minimum flow tributary to the JWPCP includes contracted flow from Chino Basin which may be diverted to the LCWRP if necessary.*

Since new interceptors will not be constructed we may also deduce the following about JOS project alternatives for the 2010 plan:

The combined capacity of the SJCWRP and the WNWRP should not exceed the total wastewater flow generated in areas tributary to them (areas 2, 3, and 5) plus any flow generated in the area tributary to the PWRP (area 1) that cannot be treated at the PWRP (see Figure 5.2-2). Accordingly, the combined capacity of the SJCWRP and the WNWRP should not exceed 177 mgd plus any flow which cannot be treated at the PWRP.

The combined capacity of the SJCWRP, the WNWRP, and the LCWRP should not exceed the total wastewater flow generated in areas tributary to them (areas 2, 3, 5, 7, and 8) plus any flow which cannot be treated at the PWRP. Accordingly, the combined capacity of the SJCWRP, the WNWRP, and the LCWRP should not exceed 230 mgd plus any flow which cannot be treated at the PWRP.

6.7.2 DEVELOPMENT OF ALTERNATIVES

Given the system constraints listed above, a set of preliminary project alternatives was developed.

Flow Splits

The most critical planning question in the JOS concerns the division of flow, the flow split, between the JWPCP and the JOS WRPs. Based on the system constraints, there are three feasible flow split alternatives.

First, the capacity of the JWPCP may be minimized. According to the flow projections and based on construction of secondary treatment facilities in 50 mgd modules, the minimum capacity of the JWPCP is 350 mgd. To accommodate projected year 2010 JOS wastewater flows of 628 mgd, the aggregate capacity of the WRPs will have to be expanded to approximately 280 mgd. Conversely, this flow split may be viewed as maximization of the capacity of the inland WRPs, and it will therefore, be deemed the maximize inland treatment flow split.

Second, the volume of wastewater treated at the JWPCP may be maximized. According to the JOS flow projection, the year 2010 JOS wastewater flow will be 628 mgd. Because the current combined capacity of the JOS WRPs is approximately 190 mgd, and since JWPCP facilities will be constructed in 50 mgd capacity modules, the maximum capacity of the JWPCP required to treat year 2010 JOS wastewater flows is 450 mgd. Since this flow split alternative maximizes the quantity of wastewater treated at the JWPCP, which may also be described as the Districts' coastal treatment facility, this flow split will be deemed the maximize coastal treatment flow split.

The third feasible flow split represents a compromise between the emphasize inland treatment and emphasize coastal treatment flow split alternatives. It will, therefore, be known as the balanced treatment flow split because it divides the expansion of system capacity between the coastal (JWPCP) and inland (WRPs) treatment facilities. The balanced treatment flow split calls for 400 mgd capacity at the JWPCP, which represents a rerating of existing JWPCP facilities which will increase the permitted capacity of the JWPCP; and for 228 mgd capacity at the inland WRPs, which requires that the combined capacity of these facilities be expanded by 37.5 mgd.

Feasibility of WRP Expansions

According to the flow projections and given the expansion increments of the JOS WRPs, it is feasible to expand all of the WRPs except the LBWRP. It is not practical to expand the LBWRP since the maximum flow tributary to the plant in 2010 will be only 27 mgd, the current capacity of the plant is 25 mgd, and the minimum modular expansion of the facility is 12.5 mgd. If constructed, much of the expanded capacity would not be used by 2010.

According to JOS flow projections, the PWRP may or may not be expanded. The present capacity of the PWRP is 13 mgd and the projected year 2010 wastewater flow tributary to the PWRP will be 22 mgd. If the PWRP is not expanded, 9 mgd of wastewater must bypass the plant. Wastewater which bypasses the PWRP may be treated at either the SJCWRP or the JWPCP. Since this bypassed wastewater is expected to be of high quality which is suitable for reclamation, it would be treated at the SJCWRP. According to the JOS flow projections, the SJCWRP has sufficient site capacity to accommodate PWRP flows. Since the incremental cost of expansion at the SJCWRP is significantly less than that at the PWRP, it initially appears that the PWRP should not be expanded.

There are, however, two factors which might justify expansion of the PWRP. First, if the PWRP is not expanded, flows which bypass the PWRP must be routed to the SJCWRP via the District 21 Outfall Trunk Sewer. The addition of up to 9 mgd of flow to this sewer might require that a relief sewer be constructed which would not have been required if the PWRP had been expanded. This would tend to increase the cost of not expanding the PWRP. Second, there is a strong demand for reclaimed water in the region surrounding the PWRP. Based on planning studies for water reclamation projects, demands for reclaimed water from potential users which have been identified in this region will at times exceed the quantity of reclaimed water that the PWRP can currently supply.

Preliminary project alternatives will, therefore, be developed under two conditions: 1) assuming that the PWRP will be expanded to a 25 mgd facility (the design capacity of this facility would actually be 30 mgd because it would not be practical to build a facility with a 25 mgd design capacity and 2) assuming that the PWRP will not be expanded.

Development of Preliminary Project Alternatives

Preliminary project alternatives were developed systematically by identifying all feasible combinations of JOS treatment plant expansions capable of providing at least 628 mgd treatment capacity. For the emphasize coastal treatment flow split under which the JWPCP would be expanded to 450 mgd, it would not be necessary to expand any other JOS facilities. For the emphasize inland treatment and balanced treatment flow splits, however, project alternatives were developed first under the assumption that the PWRP would be expanded and then under the assumption that the PWRP would not be expanded. For each of these conditions all possible variations of the JOS configuration were considered. Since the LBWRP will not be expanded, there are three JOS facilities, the SJCWRP, the WNWRP, and the LCWRP, which may be expanded to accept any flow not accommodated by expansions of the JWPCP or the PWRP. These will be deemed the "expansion facilities." There are seven possible permutations of each flow split given the status of the PWRP. Infeasible alternatives were eliminated based on the constraints outlined earlier in this chapter. In addition, it was assumed that alternatives which involved expansions of two of the "expansion facilities" would be ruled out when both of the proposed expansions occur at facilities which could individually be expanded to accommodate year 2010 JOS flows. Similarly, it was assumed that alternatives which involve expansions of all three of the "expansion facilities" would be ruled out when expansions of two of these facilities could accommodate 2010 JOS flows.

The development of specific preliminary project alternatives is shown in Table 6.7-2. Based on this analysis, 14 practical preliminary project alternatives were identified. These 14 alternatives are listed in Table 6.7-3. The No Project Alternative, which must be considered in accordance with the California Environmental Quality Act (CEQA), is included as Alternative D.

Table 6.7-2
DEVELOPMENT OF PRELIMINARY PROJECT ALTERNATIVES

Alternative	JWPCP Capacity	PWRP Capacity	Other Expansions	Practical	Reason Not Practical
A	450	13	None	Y	
B – 1a	400	25	SJCWRP	Y	
B – 2a			WNWRP	Y	
B – 3a			LCWRP	Y	
B – 4a			SJCWRP WNWRP	N	No need to expand both SJCWRP and WNWRP
B – 5a			SJCWRP LCWRP	N	No need to expand both SJCWRP and WNWRP
B – 6a			WNWRP LCWRP	N	No need to expand both WNWRP and LCWRP
B – 7a			SJCWRP WNWRP LCWRP	N	No need to expand all three WRPs
B – 1b	400	13	SJCWRP	N	Insufficient site capacity
B – 2b			WNWRP	Y	
B – 3b			LCWRP	Y	
B – 4b			SJCWRP WNWRP	Y	
B – 5b			SJCWRP LCWRP	Y	
B – 6b			WNWRP LCWRP	N	No need to expand both WNWRP and LCWRP
B – 7b			SJCWRP WNWRP LCWRP	N	No need to expand all three WRPs
C – 1a	350	25	SJCWRP	N	Insufficient site capacity and insufficient flow availability
C – 2a			WNWRP	N	Insufficient site capacity
C – 3a			LCWRP	Y	
C – 4a			SJCWRP WNWRP	N	Insufficient flow availability at SJCWRP and WNWRP
C – 5a			SJCWRP LCWRP	Y	
C – 6a			WNWRP LCWRP	Y	
C – 7a			SJCWRP WNWRP LCWRP	N	No reason to expand all three WRPs
C – 1b	350	13	SJCWRP	N	Insufficient site capacity and insufficient flow availability
C – 2b			WNWRP	N	Insufficient site capacity and insufficient flow availability
C – 3b			LCWRP	Y	
C – 4b			SJCWRP WNWRP	N	Insufficient flow availability
C – 5b			SJCWRP LCWRP	Y	
C – 6b			WNWRP LCWRP	Y	
C – 7b			SJCWRP WNWRP LCWRP	N	No need to expand all three WRPs

Table 6.7-3
SUMMARY OF PRELIMINARY PROJECT ALTERNATIVES

TREATMENT PLANT	PLANT CAPACITY BY ALTERNATIVE (mgd)														
	A	B–1a	B–2a	B–3a	B–2b	B–3b	B–4b	B–5b	C–3a	C–5a	C–6a	C–3b	C–5b	C–6b	D
JWPCP	450	400	400	400	400	400	400	400	350	350	350	350	350	350	385
PWRP	13	25	25	25	13	13	13	13	25	25	25	13	13	13	13
LBWRP	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
SJCWRP	100	125	100	100	100	100	125	125	100	125	100	100	125	100	100
WNWRP	15	15	40	15	52.5	15	27.5	15	15	15	65	15	15	80	15
LCWRP	37.5	37.5	37.5	62.5	37.5	75	37.5	50	112.5	87.5	62.5	125	100	62.5	37.5
Total Treatment Capacity	640.5	627.5	627.5	627.5	628	628	628	628	627.5	627.5	627.5	628	628	630.5	575.5
Total Secondary Treatment Capacity	640.5	627.5	627.5	627.5	628	628	628	628	627.5	627.5	627.5	628	628	630.5	390.7

NOTE *:Construction of new facilities shown in bold*

: Project alternatives assume that expansions to SJCWRP, WNWRP & LCWRP are in 12.5 mgd increments (except one 15 mgd expansion permitted @ WNWRP).

: Project alternatives assume no new treatment plants or interceptors.

: alternative A—_ = 450/190 flow split

: alternative B—_ = 400/230 flow split

: alternative C—_ = 350/280 flow split

: alternative D—_ = No Project

:subalternatives _–1_ involve expansion of SJCWRP only

:subalternatives _–2_ involve expansion of WNWRP only

:subalternatives _–3_ involve expansion of LCWRP only

:subalternatives _–4_ involve expansion of SJCWRP and WNWRP only

:subalternatives _–5_ involve expansion of SJCWRP and LCWRP only

:subalternatives _–6_ involve expansion of WNWRP and LCWRP only

:variations _–_a assume PWRP at 25 mgd

:variations _–_b assume PWRP at 13 mgd

6.8 SCREENING OF PRELIMINARY PROJECT ALTERNATIVES

6.8.1 SCREENING CRITERIA

Preliminary project alternatives were evaluated in order to develop a shorter list of feasible project alternatives. Screening criteria for preliminary project alternatives are described below.

Conveyance System Impacts

When analyzing conveyance system impacts, the differential sewer relief requirements of the various project alternatives were of interest. The purpose of this analysis was, basically, to identify the tradeoffs between upstream WRP expansions and necessary sewer relief projects. The analysis, therefore, focused on the major Joint Outfall (JO) trunk sewers which interconnect JOS treatment facilities, such as the JO "B" and JO "H" Trunk Sewers downstream of the WNWRP and the SJCWRP and the District 21 Outfall downstream of the PWRP, and the major JO interceptors and other trunk sewers which convey flow directly to JOS WRPs, including the SJCWRP Interceptor, the LCWRP Interceptor, and the JO "B" Trunk Sewer upstream of the WNWRP. In addition, the impacts of the planning alternatives on the JWPCP effluent tunnels and outfalls were considered.

The impacts of the projected JOS wastewater flows on the JO sewers noted above for each of the preliminary project alternatives were assessed. Impact analyses were based on the flow projections for the JOS drainage areas, measured flows, design capacities, and previously observed flow in these sewers. General conclusions reached during this analysis for projected 2010 wastewater flows are listed below.

a. If the PWRP is not expanded and flow which bypasses the PWRP is routed to the SJCWRP, the District 21 Outfall will require relief. This sewer will, however, require relief in the near future even if the PWRP is expanded, but the length and diameter of the relief sewer will be greater if the PWRP is not expanded. Expansion of the PWRP would, therefore, provide limited benefits with respect to the JOS conveyance system.

b. The JO "B" Trunk Sewer upstream of the WNWRP will require relief under all preliminary project alternatives.

c. The JWPCP effluent tunnels and outfalls will require relief if the JWPCP is expanded to 450 mgd.

d. The SJCWRP Interceptor will not require relief under any of the preliminary project alternatives except those which call for an expansion of the PWRP and a 25 mgd expansion of the SJCWRP. If the PWRP is not expanded, 127 mgd will be tributary to the SJCWRP in 2010.

e. The LCWRP Interceptor must be relieved if the LCWRP is expanded beyond 87.5 mgd.

f. If neither the SJCWRP, the WNWRP, nor the PWRP are expanded, the JO "B" and/or the JO "H" Trunk Sewers will require relief downstream of the WNWRP and the SJCWRP and upstream of the LCWRP Interceptor.

g. If the SJCWRP, the WNWRP, the LCWRP and/or the PWRP are not expanded by at least 12.5 mgd, the JO "B" and/or JO "H" Trunk Sewers will require relief downstream of the LCWRP Interceptor.

h. Solids removed at the WNWRP have historically been discharged to the JO "B" Trunk Sewer, and may be transported to the LCWRP via the LCWRP Interceptor. If the WNWRP is expanded, the LCWRP is expanded beyond 50 mgd, and solids continue to be discharged to the JO "B" Trunk Sewer, influent solids loadings to the LCWRP could dramatically increase. A sewer which would route solids removed at the WNWRP around the LCWRP would, therefore, have to be constructed if the WNWRP is expanded and the LCWRP is expanded beyond 50 mgd.

The differential impacts of each of the preliminary project alternatives on the JOS conveyance system are listed in Table 6.8-1.

As stated in the Districts' previous facilities plans, the *1963 Plan for Water Reuse* and the *1977 JOS Facilities Plan*, the Districts would generally like to provide expansions of upstream WRPs in lieu of relief of the downstream sewer system when feasible. Large sewer relief projects increase project costs and generate additional adverse environmental impacts during the construction process. WRPs, on the other hand, provide substantial benefits in the form of increased water supplies by providing water reclamation and reuse opportunities.

Table 6.8-1
IMPACTS OF PRELIMINARY PROJECT ALTERNATIVES
ON JOS CONVEYANCE SYSTEM

Alternative	Conveyance System Impacts
A	▪ Relief of JO "B" and/or JO "H" required downstream of the WNWRP and SJCWRP and upstream of the LCWRP Interceptor. ▪ Relief of JO "B" and/or JO "H" required downstream of the LCWRP Interceptor. ▪ Construction of new ocean outfall and effluent tunnel required.
B-1a	▪ Relief of SJCWRP Interceptor required.
B-2a	▪ None identified.
B-3a	▪ None identified.
B-2b	▪ None identified.
B-3b	▪ Relief of JO "B" and/or JO "H" required downstream of the WNWRP and the SJCWRP and upstream of the LCWRP Interceptor.
B-4b	▪ None identified.
B-5b	▪ None identified.
C-3a	▪ Relief of LCWRP Interceptor required.
C-5a	▪ None identified.
C-6a	▪ Construction of WNWRP solids diversion sewer required.
C-3b	▪ Relief of JO "B" and/or JO "H" required downstream of WNWRP and SJCWRP and upstream of LCWRP Interceptor. ▪ Relief of the LCWRP Interceptor required.
C-5b	▪ Relief of the LCWRP Interceptor required.
C-6b	▪ Construction of WNWRP solids diversion sewer required.

Unit Cost Comparisons

To evaluate preliminary project alternatives, incremental construction costs (cost per mgd capacity) for various expansions being considered at JOS WRPs were developed and compared. Approximate incremental construction costs for JOS WRPs are given in Table 6.8-2.

Refined Flow Projections

JOS flow projections were fine tuned to more accurately reflect actual wastewater flow within the JOS. JOS drainage areas were modified to reflect flows from some regions which are diverted to the JWPCP because of relatively high industrial waste concentrations. These modifications did not have a significant effect on the JOS flow projections, and therefore, had no real effect on the screening of preliminary project alternatives.

Table 6.8-2
INCREMENTAL CONSTRUCTION COSTS FOR JOS TREATMENT FACILITIES

Facility	Expanded Capacity (mgd)	Unit Expansion Cost ($M/mgd)
SJCWRP	125	1.18
WNWRP	27.5	2.40
	52.5	1.63
	80	1.68
LCWRP	50	1.31
	62.5	1.28
	75.0	1.19
	100	1.20
PWRP	20	2.09
	30	1.78

Operational Constraints

The preliminary project alternatives were screened in order to identify any operational concerns surrounding the preliminary project alternatives. It was determined that alternatives which called for more than 100 mgd capacity at the LCWRP are not desirable for several reasons. First, this would concentrate a large quantity of flow at a single treatment plant thereby creating imbalance in the JOS. The JOS becomes "imbalanced" when the capacity of either the WNWRP, the SJCWRP East, the SJCWRP West, or the LCWRP is expanded to a level much greater than that of the other listed WRPs. It was determined that the capacity of JOS facilities should be balanced to the extent possible due to operational considerations. Second, the presently identified distribution systems for reclaimed water are developing in the vicinity of the SJCWRP, the WNWRP and the PWRP rather than the LCWRP. Reclaimed water from the LCWRP would, therefore, have to be pumped back to the regions in which it would be reused. Third, the influent quality at the LCWRP has generally been lower than that at other JOS WRPs. As a result, reclaimed water from the LCWRP has generally been of lower quality than that from other JOS WRPs.

6.8.2 PRELIMINARY PROJECT ALTERNATIVES ELIMINATED

Based on the preliminary project screening process, several project alternatives were eliminated in order to develop a shorter list of feasible project alternatives. Project alternatives which were eliminated at this stage, and the rationale for their elimination are given in the following paragraphs.

Project Alternatives Which Include an Expansion of the PWRP

All project alternatives which included an expansion of the PWRP were eliminated because they are not cost effective. The incremental construction cost of expanding the PWRP to 30 mgd is approximately $1.78 million/mgd (M/mgd). Since the effective capacity of this facility during the planning period would actually be significantly less than 30 mgd, the effective incremental cost of this expansion would actually be significantly greater than $1.78 M/mgd. By comparison, the incremental construction cost of expanding the SJCWRP, the facility at which flow which cannot be treated at the PWRP would be treated, is only $1.18 M/mgd. In addition, the conveyance system analysis indicated that expansion of the PWRP would not eliminate the need to relieve the District 21 Outfall. The SJCWRP would also be able to serve potential users of reclaimed water in the vicinity of the PWRP following completion of presently planned reclaimed water distribution systems. Accordingly, preliminary project alternatives B-1a, B-2a, B-3a, C-3a, C-4a, and C-6a were eliminated from further consideration.

Project Alternatives Which Include a Large Expansion of the LCWRP

Project alternatives which required an expansion of the LCWRP beyond 100 mgd were eliminated based on conveyance system impacts and operational constraints. The concentration of this amount of capacity at the LCWRP could create operational problems with respect to system reliability. These alternatives would also not provide optimal water reclamation opportunities due to the dislocation of potential supplies of reclaimed water and the identified demands for such, and due to possible degradation of the quality of reclaimed water supplies. As noted in Section 5.1 of this report, the LCWRP produces lower quality reclaimed water than other JOS WRPs because LCWRP influent has relatively high TDS concentrations. In addition, expansion of the LCWRP beyond 87.5 mgd would require relief of the LCWRP Interceptor. Additional sewer construction would increase project costs and environmental impacts. Accordingly, preliminary project alternatives C-3a and C-3b were eliminated.

6.9 FEASIBLE PROJECT ALTERNATIVES

Based on the preliminary project alternative screening process, a set of feasible project alternatives was developed. The list of 14 (15 including the No Project Alternative) preliminary project alternatives was pared to a list of 7 (8 including the No Project Alternative) feasible project alternatives. Feasible project alternatives are described in Table 6.9-1 (note that the "a/b" designation has been removed from the alternatives since all alternatives now involve no expansion of the PWRP). The feasible project alternatives were formally presented to the public in the Notice of Preparation for the JOS 2010 Master Facilities Plan EIR.

Table 6.9-1
SUMMARY OF FEASIBLE PROJECT ALTERNATIVES

Alternative	Subalternative	Conveyance Facilities	Plant Capacities (mgd)					
			JWPCP	SJCWRP	WNWRP	LCWRP	LBWRP	PWRP
Emphasize Coastal Treatment	A	a,c,f,g	450	100	15	37.5	25	13
Balanced Treatment	B–2	a	400	100	52.5	37.5	25	13
	B–3	a,f	400	100	15	75	25	13
	B–4	a	400	125	27.5	37.5	25	13
	B–5	a	400	125	15	50	25	13
Emphasize Inland Treatment	C–5	a,e	350	125	15	100	25	13
	C–6	a,h	350	100	80	62.5	25	13
No Project	D	—	385	100	15	37.5	25	13

NOTES: Construction of new facilities shown in bold.
All solids will be processed at the JWPCP.
The Districts will manage biosolids through a combination of land application, composting, landfilling, and other reuses.

Conveyance Facilities —
a: Slightly longer, larger District 21 Outfall Relief Sewer required.
c: Effluent disposal facilities (tunnels and/or outfalls) will require relief.
e: The Los Coyotes WRP Interceptor must be relieved to divert sufficient flow to the Los Coyotes WRP.
f: JO "B" & JO "H" will require relief between the San Jose Creek and Whittier Narrows WRPs and the Los Coyotes WRP Interceptor.
g: JO "B" and/or JO "H" will require relief between the Los Coyotes Interceptor and the JWPCP.
h: Construction of a Whittier Narrows WRP biosolids sewer diversion to route solids around the Los Coyotes WRP.

6.10 SCREENING OF FEASIBLE PROJECT ALTERNATIVES

6.10.1 SCREENING CRITERIA

Feasible project alternatives were evaluated in order to develop a list of final project alternatives which will be analyzed in greater detail in both this facilities plan and the program environmental impact report. Screening criteria for the feasible project alternatives are described below.

Conveyance System Impacts

The impacts of the feasible project alternatives on the conveyance system were previously assessed during the screening of preliminary project alternatives and are summarized in Table 6.9-1. Conveyance system impacts were given further consideration during the screening of feasible project alternatives.

Minimization of Impacts on Wetlands

Wetlands or potential wetlands and/or riparian habitat have been identified at the JWPCP and WNWRP sites. A portion of the Bixby Slough, located at the northwest corner of the existing JWPCP site, has been recognized as a wetland habitat. The Los Angeles County Department of Public Works previously agreed to maintain this wetland area as a condition of construction of the Wilmington Drain. At the WNWRP, habitat to the west of the facility has been identified as riparian scrub and possible wetland habitat. The Districts intend to minimize and/or avoid impacts of this project on wetland and/or riparian habitat.

According to RWQCB requirements, wastewater treatment facilities must be protected from a 100-year flood, the maximum flood which is expected to occur once every 100-years on average. Because the WNWRP is located in the Whittier Narrows Flood Control Basin, special construction techniques would be required to protect proposed WNWRP facilities from a 100-year flood. WNWRP facilities would either have to be surrounded by a dike capable of withstanding and withholding a 100-year flood, or would have to be constructed on fill such that all facilities would be sufficiently elevated above the level of the 100-year flood. Preliminary analyses indicated that construction of WNWRP facilities on fill is the more practical of the two alternatives. Because areas to the west of the existing WNWRP facilities have been identified as potential wetlands, and because the Districts would like to avoid the impacts that construction on fill would have on these wetlands unless absolutely necessary, it was decided that the proposed construction at the WNWRP site would be limited to the eastern portion of the site. As a result, the site capacity of the area which is being considered for expansion is only 37.5 mgd and the site capacity of the WNWRP is, therefore, assumed to be 52.5 mgd during this planning horizon.

Ocean Outfalls and Effluent Tunnels

The Districts will not build a new ocean outfall and/or effluent tunnels as part of this facilities plan. Preliminary analysis of system alternatives indicated that it is possible to avoid construction of these facilities during the planning period. The Districts wish to avoid construction of such facilities for economic and environmental reasons. Construction of an additional six mile long, large bore effluent tunnel and an additional outfall which would be at least 120 inches in diameter and two miles in length would significantly increase the capital cost of the project to the extent that the cost of any project alternative which includes these facilities would not compare favorably with that of other project alternatives which do not require a new tunnel and/or ocean outfall. In addition, there is concern that outfall construction would disturb, reexpose, and/or resuspend contaminated sediments in the vicinity of the existing outfalls. From the 1930s through the early 1970s the Montrose Chemical Plant discharged wastewater containing DDT to the Districts' sewer system. DDT which was not removed at the JWPCP was discharged with the plant effluent to the Pacific Ocean via the Districts' ocean outfalls. Due to its chemical properties, DDT tends to sorb to suspended solid matter, especially organic matter, and eventually settle to the bottom when introduced to the water column. DDT is also a highly persistent compound which is very resistant to biodegradation. As a result, DDT which was introduced to the ocean over 20 years ago through the Districts' ocean outfalls persists in the sediments surrounding the outfalls. The Districts' ocean outfalls are, therefore, located in the midst of an extensive field of contaminated sediments. This field of contaminated sediments is partially buried under a layer of relatively clean sediments which has substantially capped the contaminated sediment field. Construction of a new ocean outfall in this area would most probably breach the layer of clean sediments thereby reexposing and resuspending the contaminated sediments beneath.

Cost Effectiveness

Feasible project alternatives were compared based on their relative cost.

Public Input

The Districts conducted a public outreach program regarding the JOS 2010 Master Facilities Plan which consisted of three public workshops, two focus groups, and a scoping meeting. An agency scoping meeting, which was attended by representatives of the SWRCB, the RWQCB, the Army Corps of Engineers, the Water Replenishment District of Southern California, the SCAQMD, the Los Angeles County Health Department, and the Los Angeles County Department of Regional Planning was held on February 17, 1994. Focus group meetings were held with representatives of the JWPCP Citizens' Advisory Committee (CAC) (a group of concerned neighbors of the JWPCP) on February 15, 1994, and with representatives of several key environmental interest groups on March 22, 1994. Public workshops, to which the general public were invited, were held in the evenings (between 7:00 and 9:30 p.m.) on March 22, 1994 at the Carson Community Center, on March 29, 1994 at the Districts' Joint Administration Office located near Whittier, and on March 31, 1994 at Progress Plaza Hall in Paramount. Public input received at these meetings and workshops was considered when paring the list of feasible project alternatives to a list of final project alternatives. Public input received during the public outreach program is summarized below.

- There was widespread interest from the public, from environmental interest groups, and from public agencies in promoting additional reclamation and reuse of water.

- There was general interest in the promotion of water conservation efforts.

- Members of the CAC expressed concerns over potential dust and odor emissions during construction and operation of any proposed JWPCP facilities.

- Members of the CAC felt that the expansion of JWPCP facilities should be minimized.

- Members of the CAC expressed concerns over possible increases in the use of hazardous materials at the JWPCP.

- Representatives of an environmental interest group felt that the Districts must continue to construct necessary sewer relief and rehabilitation projects to prevent spills of raw sewage. According to this group, protection of nearshore waters via prevention of sewer overflows and/or sewer failures should take precedence over provision of full secondary treatment at the JWPCP.

- The Army Corps of Engineers stated that any construction of WNWRP facilities in the Whittier Narrows flood control basin must not interfere with its operative mission of flood control.

- Representatives of the City of Cerritos expressed their opposition to any plan which would encroach on the driving range and/or the golf course located adjacent to the LCWRP.

- There was a general consensus that identification of the recommended project should not be based solely on cost minimization.

- Environmental enhancement should be used to aesthetically improve Districts' facilities.

- A neighbor of the SJCWRP expressed concerns about potential odors from an expanded SJCWRP.

6.10.2 FEASIBLE PROJECT ALTERNATIVES ELIMINATED

Several of the previously identified feasible project alternatives were eliminated during the screening process in order to develop a list of final project alternatives which will be described and evaluated in greater detail in the remaining sections of this chapter. Feasible project alternatives which were eliminated from further consideration and the rationale for their elimination are presented in the paragraphs which follow.

Emphasize Coastal Treatment: Alternative A

The emphasize coastal treatment alternative, which called for no expansion of JOS WRPs and an expansion of the JWPCP to 450 mgd, was eliminated from further consideration at this stage. During screening of the feasible project alternatives, several disadvantages of this alternative were identified. First, as noted previously, expansion of the JWPCP to 450 mgd would require construction of a new ocean outfall and a new effluent tunnel. As noted above, the Districts wish to avoid construction of these facilities as a part of this facilities plan. Second, the emphasize coastal treatment alternative is not consistent with public input received during the public outreach program. This alternative is not consistent with the public's general desire to increase water reclamation and reuse, and with the CAC's desire to minimize expansion of the JWPCP. Third, this alternative would require extensive sewer relief of the JO "B" and/or JO "H" Trunk Sewers which may be avoided by expanding upstream WRPs.

Given the aforementioned problems associated with the emphasize coastal treatment alternative, the ultimate rejection of this alternative is based on the conclusion that this alternative is inconsistent with the needs of the JOS during this planning period. According to JOS flow projections, there is no need to expand the JWPCP beyond 400 mgd prior to 2010. This conclusion will not necessarily be valid at system flows greater than those projected for the year 2010. As the JOS continues to grow beyond current projections and as wastewater generated within the JWPCP's tributary area increases, it may become necessary to expand the JWPCP beyond 400 mgd.

Balanced Treatment: Alternative B-5

Alternative B-5, which called for a 25 mgd expansion of the SJCWRP and a 12.5 mgd expansion of the WNWRP along with 400 mgd capacity at the JWPCP, was eliminated from further review because a 12.5 mgd expansion of the WNWRP is not cost effective. According to Districts' estimates, the incremental construction cost for a 12.5 mgd expansion of the WNWRP is approximately $2.40 M/mgd. By comparison, the incremental construction cost for a 37.5 mgd expansion of the WNWRP is estimated at $1.63 M/mgd. Based on the comparison of these incremental construction costs for the WNWRP, it is apparent that a large expansion of the WNWRP is more cost effective on a facility specific basis than a small expansion of this facility. Alternative B-5, which called for a 12.5 mgd expansion at the WNWRP, was, therefore, eliminated from further consideration. High startup and fixed costs associated with any expansion of the WNWRP led to the rejection of Alternative B-5.

Emphasize Inland Treatment

Based on the revision of the WNWRP site capacity from 80 to 52.5 mgd, it is apparent that Alternative C-6, which calls for 80 mgd at the WNWRP, is no longer feasible. It is, however, possible to modify this alternative such that it becomes feasible by shifting a portion of the proposed expansion of system capacity from the WNWRP to the LCWRP. The Modified Alternative C-6 now calls for 350 mgd secondary treatment capacity at the JWPCP, a 37.5 mgd expansion at the WNWRP (WNWRP planned 2010 capacity = 52.5 mgd), and a 50 mgd capacity expansion at the LCWRP (LCWRP planned 2010 capacity = 87.5 mgd). Given these expansions, the 2010 capacity of the JOS would be 628 mgd.

Further evaluation of the emphasize inland treatment alternatives (Alternative C-5 and the Modified Alternative C-6) indicated that there are problems associated with both of these alternatives. First, both of the proposed projects would impact the driving range adjacent to the LCWRP. Second, both call for a relatively large capacity LCWRP. A relatively large concentration of capacity at this location is not desirable at this time due to operational considerations. In addition, implementation of Alternative C-5 would require relief of the LCWRP Interceptor. The required expansion of the LCWRP Interceptor may not be compatible with long-range development of the JOS and would increase project costs and environmental impacts.

Given the problems associated with both Alternatives C-5 and C-6, implementation of Alternative C-7, which was initially screened out during the development of preliminary project alternatives, was reconsidered. Alternatives C-5, C-7, and the modified C-6 were carefully compared by Districts' staff and it was determined that Alternative C-7, which was only slightly more costly than the other alternatives, was the best of the emphasize inland treatment alternatives and would be considered in the set of final project alternatives. Alternatives C-5 and the modified C-6 were eliminated from further consideration.

Alternative C-7 calls for 350 mgd of secondary treatment capacity at the JWPCP, a 25 mgd expansion at the SJCWRP (2010 planned capacity = 125 mgd), a 37.5 mgd expansion of the WNWRP (2010 planned capacity = 52.5 mgd), and a 25 mgd expansion at the LCWRP (2010 planned capacity = 62.5 mgd). Given the 350/280 mgd JWPCP/WRP flow split, this alternative minimizes impacts to the driving range adjacent to the LCWRP, provides maximum operational flexibility and reliability by balancing WRP capacities, and avoids construction of unnecessary sewers.

6.11 FINAL PROJECT ALTERNATIVES — SUMMARY

Following screening of the feasible project alternatives, a set of four final project alternatives was identified. The process by which final project alternatives were developed from preliminary project alternatives, which was the subject of previous sections of this chapter, is summarized in Table 6.11-1. Final project alternatives will be analyzed in detail in order to identify the preferred project alternative which will best serve the needs of the JOS. Final project alternatives are summarized in Table 6.11-2. The No Project or Do Nothing alternative, which must be considered according to the CEQA statutes, has also been described in Table 6.11-2. To allow ease of reference in subsequent sections of this chapter, the designation of the final alternatives have been altered as follows: in Table 6.11-2, Alternative 1 was previously designated as Alternative B-5, Alternative 2 was previously designated as Alternative B-3, Alternative 3 was previously designated as Alternative B-2, and Alternative 4 was previously designated as Alternative C-7.

Table 6.11-1

DEVELOPMENT OF PROJECT ALTERNATIVES FOR DETAILED EVALUATION

PRELIMINARY PROJECT ALTERNATIVES

Emphasize Coastal

- JWPCP 450

Balanced

- JWPCP 400 / P 25 / SJC 125
- JWPCP 400 / P 25 / WN 40
- JWPCP 400 / P 25 / LC 62.5
- JWPCP 400 / WN 52.5
- JWPCP 400 / LC 75
- JWPCP 400 / SJC 125 / WN 27.5
- JWPCP 400 / SJC 125 / LC 50

Emphasize Inland

- JWPCP 350 / P 25 / LC 112.5
- JWPCP 350 / P 25 / SJC 125 / LC 87.5
- JWPCP 350 / P 25 / WN 65 / LC 62.5
- JWPCP 350 / LC 125
- JWPCP 350 / SJC 125 / LC 100
- JWPCP 350 / WN 80 / LC 62.5

SCREENING CRITERIA

- Conveyance System Impacts
- Cost Effectiveness
- Refined Flow Projections
- Operational Constraints

FEASIBLE PROJECT ALTERNATIVES (NOP)

Emphasize Coastal

- JWPCP 450

Balanced

- JWPCP 400 / WN 52.5
- JWPCP 400 / LC 75
- JWPCP 400 / SJC 125 / WN 27.5
- JWPCP 400 / SJC 125 / LC 50

Emphasize Inland

- JWPCP 350 / SJC 125 / LC 100
- JWPCP 350 / WN 80 / LC 62.5

SCREENING CRITERIA

- Public Input
- Cost Effectiveness
- Minimize Environmental Impacts
- Conveyance and Outfall System Impacts

PROJECT ALTERNATIVES FOR DETAILED EVALUATION

Balanced

- #1 JWPCP 400 / SJC 125 / LC 50
- #2 JWPCP 400 / LC 75
- #3 JWPCP 400 / WN 52.5

Emphasize Inland

- #4 JWPCP 350 / SJC 125 / WN 52.5 / LC 62.5

JWPCP	=	*Joint Water Pollution Control Plant*	*WN*	=	*Whittier Narrows Water Reclamation Plant*
P	=	*Pomona Water Reclamation Plant*	*LC*	=	*Los Coyotes Water Reclamation Plant*
SJC	=	*San Jose Creek Water Reclamation Plant*	*NOP*	=	*The "Notice of Preparation" included these alternatives*

Figures shown are the resulting capacities of treatment plants in million gallons per day and are only indicated for facilities for which an expansion or a rerating of capacity is proposed.

Table 6.11-2

SUMMARY OF FINAL PROJECT ALTERNATIVES

Alternative	1	2	3	4	No Project
Wastewater Treatment					
Treatment Capacity (mgd)					
JWPCP	400	400	400	350	385
SJCWRP	125	100	100	125	100
WNWRP	15	15	52.5	52.5	15
LCWRP	50	75	37.5	62.5	37.5
LBWRP	25	25	25	25	25
PWRP	13	13	13	13	13
JOS	628	628	628	628	575.5
Level of Treatment					
JWPCP	Full Secondary	Full Secondary	Full Secondary	Full Secondary	Partial Secondary
WRP	Tertiary	Tertiary	Tertiary	Tertiary	Tertiary
Biosolids Processing					
Concept	——— Centralized at JWPCP ———				
Digestion Capacity (ft^3)	14,500,000	14,500,000	14,500,000	14,500,000	10,900,000
Biosolids Management					
Concept	– Continuation of Present Diversified Biosolids Management Strategy –				

6.12 FINAL PROJECT ALTERNATIVES — DETAILED DESCRIPTION

6.12.1 NO PROJECT ALTERNATIVE

The CEQA statutes require that the No Project or Do Nothing Alternative be considered along with other project alternatives during the planning process. Given the No Project Alternative, the existing JOS wastewater treatment and biosolids processing and management facilities would not be upgraded or expanded but would, rather, be operated and maintained at their current capacities. The present permitted capacity of and level of treatment provided by each of the JOS wastewater treatment facilities is summarized in Table 6.12-1.

Table 6.12-1
PRESENT STATE OF JOS WASTEWATER TREATMENT FACILITIES

Facility	Permitted Capacity (mgd)	Level of Treatment
JWPCP	385	Partial Secondary
SJCWRP	100	Tertiary
WNWRP	15	Tertiary
LCWRP	37.5	Tertiary
PWRP	13	Tertiary
LBWRP	25	Tertiary
JOS	575.5	—
JOS Secondary Treatment Capacity	390.5	—

Existing JOS solids processing facilities, which include digestion and dewatering facilities, are presently centralized at the JWPCP. If additional secondary treatment facilities are not constructed at the JWPCP, existing solids processing facilities can accommodate solids generated by up to 576 mgd of JOS wastewater flow.

According to JOS flow projections, existing JOS wastewater treatment facilities, with a combined capacity of approximately 576 mgd, can accommodate projected JOS wastewater flows through approximately the year 2004. Once JOS wastewater flows increase beyond 576 mgd, however, wastewater tributary to the JOS treatment facilities may receive inadequate treatment as plant flows begin to exceed design capacities and as detention times in treatment processes are reduced as a result. According to solids production projections, existing solids processing facilities are, likewise, not capable of processing solids generated within the JOS through the year 2010. As detention times in solids processing facilities fall in response to increased solids generation, the quality of processed biosolids will fall. Degradation of the quality of processed biosolids would ultimately reduce biosolids management options thereby compromising the Districts' biosolids management plan. Eventually, as JOS wastewater flows and/or biosolids production begin to exceed the design capacities of JOS facilities, connections to the JOS would have to be restricted. The No Project Alternative would also fail to comply with the Consent Decree which requires that all JOS wastewater receive full secondary treatment prior to December 31, 2002. Substantial fines would be levied against the Districts for failing to comply with the Consent Decree requirements. This alternative was, therefore, eliminated from further consideration.

6.12.2 PROJECT ELEMENTS COMMON TO ALL FINAL PROJECT ALTERNATIVES

Solids Processing Facilities

Centralized processing of solids will continue at the JWPCP. Solids processing at the JWPCP currently includes digestion in circular and/or rectangular digesters and dewatering via centrifugation. Solids processing facilities at the JWPCP will be expanded as follows to accommodate projected JOS wastewater flows and associated solids loadings.

In order to process the additional primary and secondary solids expected as a result of full secondary treatment at the JWPCP and as a result of increased waste flows in the Joint Outfall System, a major expansion of the solids processing facilities (digestion and dewatering) will be necessary. Additional solids digestion capacity will be required to maintain detention times in the anaerobic digestion process in order to ensure stable process operation and to meet requirements for disposal or reuse of biosolids. Older rectangular digesters will be abandoned and replaced with new circular digesters because of structural and mechanical deterioration as well as inferior process performance.

The expansion of digester capacity will be accomplished in two phases. The first phase will include the construction of seven additional circular digesters with 500,000 cubic feet of capacity each in the area north of the railroad tracks bounded by Figueroa Street on the east and the Bixby Slough wetlands on the west and north. This area is currently leased to Sunrise Nursery and is used to grow container plants for commercial sale. Digester capacity constructed during this phase of the expansion will be sufficient to treat all additional solids produced by full secondary treatment and all additional JOS solids expected prior to completion of the second phase expansion. The new digesters will be connected to the existing digester system with a gallery and roadway which will pass under the railroad tracks. An additional digested solids pump station will also be added south of the railroad tracks to handle digested solids draw off from the group of digesters in this area. Storm water runoff from this area of the JWPCP will be collected in a new storm drain pump station which will also be located south of the railroad tracks and will be pumped to the Wilmington Drain or returned to the plant in accordance with the existing storm water management plan. An additional digester cleaning station will also be constructed in this area. The proposed cleaning station will handle the increase in digester capacity in this portion of the plant site in order to avoid potential problems associated with pumping digester cleanings to the existing cleaning station at the south end of the plant. The proposed cleaning station will provide odor control which is superior to that provided by the existing facility. An additional boiler will be added to the existing boiler house, which currently houses four boilers, to provide additional back-up heating for the proposed digesters.

The first phase expansion also includes three additional standby flares which will be added to the existing north flare station to accommodate increased digester gas flows. The south flare station will be relocated, and the existing flares at this station will be replaced with larger capacity, advanced design flares which will improve reliability. The increased capacity of the north and south flare stations will allow the existing middle flare station to be abandoned. The proposed modifications to the flaring stations will provide flare capacity for the JWPCP throughout the planning period.

The second phase of the proposed digester capacity expansion includes construction of six new circular digesters which will replace the rectangular digesters and will provide additional digester capacity which will be sufficient through the year 2010. Since this construction will occur in a congested area of the plant, design and construction for this phase are expected to be more difficult than that for the first phase of the expansion. The relocation of the existing Digested Solids Pump Station No. 1, the conversion of existing Digester Z to a digested solids storage wetwell, and the abandonment of the existing wetwell (the current wetwell is a conversion of one of the oldest rectangular digesters) are included in the second phase work. These modifications will yield a net increase in storage volume which will improve dewatering operation and efficiency. In addition, the existing digester cleanings station will be modified to simplify its operation, improve odor control, and to simplify handling of collected solids. The existing propane station will be relocated to make room for the sixth digester and a new storm drain pump station will be added to accommodate additional drainage requirements. Pipe galleries will be constructed to provide for improved maintenance and future flexibility.

Proposed solids dewatering facilities will provide dewatering capacity through 2005. Currently, solids which are not captured in the dewatering centrifuges are removed from the centrate in polishing tanks (converted primary sedimentation tanks) and mixed with digested solids for recycle to the dewatering facility where they are eventually captured. Since the centrate solids captured in the converted primary tanks are dilute, this recycle of solids substantially increases the digested solids flow which must be dewatered. The proposed centrate treatment system will consist of combined flotation/settling tanks constructed adjacent to the existing dewatering facilities. Centrate solids will be captured and thickened by dissolved air flotation and dewatered in two scroll centrifuges. This will free existing scroll centrifuges for digested solids dewatering. Additional scroll centrifuges which are being purchased (outside of the scope of the JOS Master Facilities Plan) will be installed along with the two centrate dewatering centrifuges in the existing solids dewatering building and will provide necessary dewatering capacity. Advanced centrifuge technology will continue to be evaluated which may include operation of promising centrifuge technology in existing dewatering buildings.

By 2003, much of the existing dewatering equipment will be more than 20 years old and will require replacement. It is anticipated that by this time, the cost of hauling biosolids will favor advanced solids centrifugal dewatering technology that produces drier biosolids. A new dewatering facility will be constructed shortly after startup of the full secondary treatment facility. Delaying the construction until this time will allow the Districts to fully utilize existing equipment, allow current dewatering technology to improve further and allow the Districts to study the long term reliability of the new technology prior to its full implementation. A completely new building is planned for the advanced dewatering equipment to minimize start-up problems and to allow for selection and installation of the most economic dewatering equipment without problems associated with existing space constraints. These facilities will provide dewatering capacity through the year 2010. Odor control facilities will be provided for this new building.

Additional interim improvements to solids processing facilities include replacement and upgrading of ventilation and odor control for the existing centrifuge buildings and expansion of the existing polymer storage and mixing facilities to accommodate increased solids flows. Existing digested solids screens and screenings processing and storage facilities will be expanded and relocated west of Centrifuge Building No. 1. Operation of the nine existing screens, which are presently located in Centrifuge Building No. 1, has caused corrosion of this structure and there is, furthermore, no room for expansion in this building. Relocation of screening facilities to a building specifically designed for this process will provide room for five additional screens, will improve odor control, and will alleviate existing corrosion problems. Relocation of the screenings press and storage building will simplify conveyance of screenings to the facility and will improve access for removal of the pressed screenings for ultimate disposal.

Storage capacity for the additional biosolids will be provided by increasing the effective storage capacity of the existing silos. There are currently 18 biosolids storage silos at the JWPCP, but only 12 may be used to store biosolids prior to removal from the site. The six remaining silos were intended to be used for the dehydration and combustion facility. In order to make use of these silos, a third truck loading station is proposed which will utilize the existing belt conveyor system. Construction of this station will make all 18 silos available for biosolids storage. In addition to the truck loading station, improvements to the silo odor control system are proposed to reduce odors and to improve the maintenance environment in the spaces above and below the silos.

The footprint of proposed solids processing facilities is illustrated in Figure 6.12-1, and preliminary design criteria for proposed JOS solids processing facilities are summarized in Table 6.12-2.

Table 6.12-2
PRELIMINARY DESIGN CRITERIA FOR PROPOSED JOS SOLIDS PROCESSING FACILITIES
YEAR 2010

Process		Process	
Digestion		Centrate Treatment	
Primary Solids Flow [mgd]	4.6	Centrate Flow [gpm]	4,800
Primary Solids [ton/day]	620	Centrate Solids Loading [ton/day]	96
Thickened WAS Flow [mgd]	1.20	Dissolved Air Flotation Tanks	3
Thickened WAS [ton/day]	275	Overflow Rate [gpm/ft²]	4.7
Total Digester Capacity [ft³]	14,500,000	Thickened Centrate Flow [gpm]	400
Number of Digesters	29	Thickened Centrate Solids Concentration [%]	4.0
Capacity per Digester [ft³]	500,000	Polymer Dose [lb/ton]	5
Detention Time (1 O/S) [days]	18		
Temperature [°F]	95	Polymer Facility	
Loading Rate [lb VSS/Ft³-day]	0.095	Concentrated Polymer Storage Volume [gal]	166,000
VSS Destruction [%]	48	Number of Tanks	7
Gas Production [MM SCFD]	10.6	Storage Capacity [days]	4.40
		Polymer Mixing Tank Volume [gal]	63,200
Digestion Cleaning		Number of Tanks	4
Number of Stations	2	Polymer Use Tanks Volume [gal]	15,000
Number of Screens	10	Number of Tanks	6
Capacity per Screen [gpm]	300	Polymer Flow to Centrifuges [gpm]	370
Number of Vortex Classifiers	2		
Capacity per Classifier [gpm]	1,500	Biosolids Storage	
		Number of Storage Silos	18
Dewatering		Capacity per Silo [tons]	510
Digested Solids Flow [gpm]	4,100	Days of Storage	3.8
Rotary Screens		Truck Loading Stations	3
Number	14	Loading Rate per Station [ton/hr]	175
Flow Rate per Screen [gpm]	300		
Thickened Centrate Flow [gpm]	400		
Total Feed Rate to Centrifuges [gpm]	4,500		
Centrifuges			
Number of Centrifuges	26		
Feed Rate [gpm]	250		
Polymer Dose [lb/ton]	15		

JWPCP Power Generation Facilities

Increased solids production and subsequent anaerobic digestion will result in the production of increased quantities of digester gas. To fully utilize this gas, energy generation facilities will be expanded. Two additional gas turbines operating off digester gas and connected to generators will be constructed to produce electric power. It will be necessary to upgrade electrical switch gear and substations to handle the increased power generating capacity as well as the increased demand for power by the plant. Exhaust heat from the turbines will be recovered in low pressure steam boilers which are expected to become the primary source of low pressure steam for heating digesters. These expanded facilities are expected to meet the increased energy demands of full secondary treatment, thereby allowing the plant to produce most of the energy that it will consume.

The footprint of proposed power generation facilities is illustrated in Figure 6.12-1, and preliminary design criteria for proposed JWPCP power generation facilities are given in Table 6.12-3.

Table 6.12-3
PRELIMINARY DESIGN CRITERIA FOR PROPOSED JWPCP POWER GENERATION FACILITIES
YEAR 2010

Process		Process	
Digester Gas Production [MMSCFD]	10.6	Waste Heat Recovery Boilers	
Digester Gas Usage		Number	3-dual
Power Generation	95.40%		pressure
Other	4.60%		2-single
Digester Steam Requirement [lb/hr]	25,000-62,000		pressure
Gross Power Generation [MW]	25.9	Gross Steam Production per Boiler	
Parasitic Power Demand [MW]	2.9		
Net Power Produced [MW]	23.0	Low Pressure [lb/hr]	3 @ 8,000
Gas Turbines			2 @ 35,000
Number	5	High Pressure [lb/hr]	2 @ 23,000
Fuel Gas Flow per Turbine [scfm]	3 @ 2,380		
	2 @ 2,760	Steam Turbine	
Fuel Heat Input per Turbine [MMBTU/hr]	3 @ 82.7	Number	1
	2 @ 93.3	Steam Flow [lb/hr]	62,000
Power Production per Turbine [MW]	3 @ 7.0	Power Production [MW]	4.0
	2 @ 8.0		

Support Facilities at the JWPCP

There are a number of other proposed support facilities at the JWPCP which are common to all final project alternatives. These include the following:

- Expansion of existing laboratory facilities to provide additional storage and laboratory space for additional sample analysis and for increased air quality monitoring.

- Construction of a washwater filtration facility to remove solids which cause plugging of valves and heat exchangers where this water is typically used and to improve disinfection. The existing washwater system will be expanded.

- Replacement and expansion of change rooms, research offices and operator training classrooms adjacent to the existing primary treatment control center.

The footprint of proposed support facilities at the JWPCP is illustrated in Figure 6.12-1, and preliminary design criteria for modifications to the JWPCP washwater system are given in Table 6.12-4.

Table 6.12-4
PRELIMINARY DESIGN CRITERIA FOR PROPOSED JWPCP WASHWATER SYSTEM
YEAR 2010

Process		Process	
Filtration System		*Disinfection System*	
Washwater Flow [mgd]	6	Contact Tanks	
Filter Type	Deep Bed	Number	3
	Anthracite	Capacity per Tank [ft^3]	6,400
		Length [ft]	40
Number	4	Width [ft]	16
Length [ft]	15	Depth [ft]	10
Width [ft]	15	Contact Time	
Media Depth [ft]	6	@ 800 gpm [min]	180
Surface Loading Rate [gpm/ft^2]	6.20	@ 1,600 gpm [min]	90
		@ 3,300 gpm [min]	45
		Pumping System	
		Number of Pump Stations	1
		Pumps [gpm]	3 @ 500
			2 @ 1,000

Subsurface Investigation and Mitigation at JWPCP

Expansion of secondary treatment facilities and site operations at the JWPCP will occur in areas which were formerly used as solids drying beds or lagoons (see Figure 6.12-2). Use of these lagoons was discontinued in the 1960s, at which time they were covered with soil and/or asphalt. Since then, these areas have been used for ancillary surface operations. Tests conducted to date on buried solids at JWPCP have revealed localized concentrations of hazardous levels of DDT and its isomers, occurrences of some heavy metals, and low levels of hydrocarbons. In addition, several rag pits have been identified within the former lagoon area. These rag pits had been used for burial of rags and other waste screenings from the JWPCP bar screens. These pits may contain methane and possibly volatile organic compounds resulting from the decay of the rags and organic matter .

The Districts previously conducted three subsurface investigations of solids encountered during the construction of digesters, inlet works modifications, and a building to contain chlorine tank cars. In these locations, deposits of solids containing DDT were found in approximately 70 percent of the areas sampled. However, laboratory testing of these deposits revealed that 64 percent of all the samples containing DDT were at levels less than 1 ppm DDT, the criteria for disposal as hazardous waste within the State of California. Approximately 35 percent of the samples containing DDT had levels between 1 ppm and 100 ppm, and only 1 percent (one sample) had a level above 100 ppm. Laboratory testing for metals indicated occurrence of lead and chromium exceeding the state criteria for hazardous waste disposal for approximately 30 percent of the samples analyzed. In all cases, the heaviest concentrations of DDT and metals occurred in shallow, isolated pods within five feet of the ground surface.

Subsurface Investigation

The construction of the proposed facilities will require subgrade preparation for facility foundations as well as the removal of any contaminated soils and unsuitable foundation materials that may be present in the solids deposits. To characterize the extent and nature of subsurface contamination and unsuitable foundation materials in expansion areas of the JWPCP, the Districts have hired a consultant to conduct the necessary field investigation. Results from the field investigation will also be used to recommend mitigation and/or remediation of any adverse chemical and physical conditions for construction purposes, and provide regulatory approval of such mitigation. The following provides a general discussion and overview of the proposed scope of work for the subsurface investigation.

Data and Regulatory Review

The consultant will review existing geologic, geotechnical, geophysical and hydrogeologic reports relating to JWPCP and surrounding sites. A detailed assessment of applicable regulatory criteria will be conducted to ensure that all field investigation, laboratory testing and report preparation will be performed in compliance with appropriate regulations and guidelines.

Soil Sampling and Analysis

Test borings will be drilled throughout JWPCP expansion areas. Discrete soil samples at various depths will be obtained from borings for environmental and geotechnical analyses. Analytical methods will include EPA 7000 for selected metals, EPA 8080 for DDT, pesticides, and PCBs, EPA 418.1 for total petroleum hydrocarbons, EPA 8010/8020 for volatile organic compounds, and EPA 8270 for semi-volatile organic compounds. Geotechnical analyses will include testing for determination of grain size, density and moisture, Atterberg limits, consolidation potential, shear strength, expansion potential, corrosivity, and resistance values. Approximately 25 boreholes will be drilled for environmental analyses, 25 boreholes drilled for geotechnical analyses and 20 boreholes drilled for combined environmental and geotechnical analyses. All borings will be logged for lithologic information.

If groundwater is encountered in any boreholes, samples will be obtained for laboratory analyses. Groundwater analysis methodology is discussed in the following section.

Groundwater Sampling and Analysis

Six groundwater observation/monitoring wells will be installed at JWPCP to test and monitor existing aquifer conditions. Analytical methods performed on groundwater samples obtained from the wells will include EPA 200 for selected metals, EPA 8015 modified for total petroleum hydrocarbons, EPA 601 for aromatic volatile organic compounds, EPA 602 for halogenated volatile organic compounds, EPA 335 for cyanide, and EPA 1010 for flashpoint values. Aquifer testing will be performed to determine the hydraulic characteristics of the underlying local aquifer.

Following completion of initial groundwater analyses and aquifer testing, the groundwater monitoring system will be designed and installed, and a groundwater Monitoring and Response Program will be prepared for regulatory review and approval.

Geologic Modeling

Geologic, hydrologic, geotechnical and environmental data from soil and groundwater sampling and analyses and borehole logging will be collected and compiled on an electronic database. The data will also be used to perform geologic modeling of subsurface conditions. Modeling output will provide geologic cross-sections of the JWPCP site and estimate the volume of subsurface materials in expansion construction areas. Modeling will also provide volumetric estimates of contaminated and hazardous soils and solids, and unsuitable foundation materials.

Report of Investigation Results and Proposed Mitigation Action Plan

A final report will be prepared which will provide an assessment of subsurface conditions relative to the extent of contaminated soil and solids, and discuss conceptual foundation and shoring design considerations for later site construction. The final report will also provide a conceptual mitigation action plan which will establish protocols for excavation methods and sequences, excavated materials storage and handling, transport and disposal, and verification of removal of hazardous and unsuitable foundation materials.

Regulatory Oversight

Regulatory approval for closure of any site investigation and remediation program will involve the RWQCB. The RWQCB has claimed lead agency status for site mitigation under NPDES jurisdiction, and has notified the Department of Toxic Substances Control (DTSC) of their intent. DTSC has tacitly agreed to this decision.

It is also possible that DTSC may review these procedures at some point in the future. If this happens, their review would likely be made from the standpoint that the RWQCB has claimed lead agency status and that RWQCB oversight for the project included elements which were directed to meet all applicable state requirements. Therefore, careful documentation of all technical methodologies, quality control procedures, health and safety measures, and the recording of all site-specific RWQCB direction and approvals for the project will be maintained. Since both agencies are a part of the CAL-EPA, such precautions should meet the intent of requirements and restrictions put forth by all applicable state agencies for subsurface investigations. Section 3.3.4 provides a discussion of various state regulations and guidelines that are relevant to the JWPCP subsurface investigation.

Biosolids Management Plan

Description and Goals

Biosolids produced at the JWPCP are consistently of high quality. The U.S. EPA has adopted rules for biosolids use and disposal (40 CFR Part 503) which establish pollutant limits, operational standards for pathogen and vector attraction reduction, and site management practices. Each use or disposal method has its own set of requirements which are designed to protect public health and the environment at the same level of risk. For example, "Class B" pathogen reduction requirements combined with site restrictions are considered sufficient for bulk application of biosolids to agricultural land, but "Class A" pathogen reduction requirements must be achieved for biosolids products which will be distributed to the public in bags. At the JWPCP, "Class B" pathogen reduction is consistently achieved through anaerobic digestion and by meeting fecal coliform geometric mean density limitations. Anaerobic digestion consistently achieves greater than 38 percent volatile solids reduction, thus, vector attraction reduction (VAR) requirements are met. As shown in Appendix A-6.12-1, concentrations of regulated metals in biosolids produced at the JWPCP, with the occasional exception of selenium, consistently meet EPA limits for unrestricted use. JOS biosolids may, therefore, generally be utilized for land application without limits for metals. Biosolids which are composted and subsequently used in products which are distributed to the public consistently meet EPA standards for unrestricted use. In addition, as shown in Appendix A-6.12-1, JOS biosolids meet California Title 22 requirements for soluble metals and are, therefore, non-hazardous. The high quality of JOS biosolids opens all land based biosolids reuse and/or disposal alternatives to the Districts. Compost produced from JOS biosolids, furthermore, meets the requirements for the EPA's "exceptional quality" designation.

The objective of the biosolids management plan is to ensure that the Districts can responsibly manage biosolids generated by wastewater treatment facilities, including the upgrade of the JOS to full secondary treatment, through the year 2010. The biosolids management plan will use onsite demonstration facilities at the JWPCP and separately permitted offsite facilities operated either by private contractors or by the Districts. JOS biosolids will be managed through the continuation of existing methods and through implementation of a limited range of new alternatives. Since this includes a broad range of both existing and evolving options and geographic areas, this document will provide the framework for a generic assessment of categories of options rather than addressing individual projects at a site-specific level.

New offsite projects will require some level of CEQA and/or NEPA documentation. These environmental assessments may be initiated by the site-specific contractor in conjunction with a lead agency other than the Districts, or as an alternative, the Districts might choose to develop a site and conduct the appropriate environmental assessment. Site-specific environmental review may tier off the EIR prepared for this facilities plan.

It is anticipated that the Districts will seek proposals from contractors to manage a substantial portion of JOS biosolids, maintain the existing long term contract with Kellogg Supply Co. (at least through its current term), and continue to utilize codisposal of biosolids with municipal solid waste (MSW) at the Puente Hills Landfill. Transportation of biosolids to offsite facilities will be accomplished via truck hauling. There are also a number of sites under development for codisposal or land application of biosolids which are planned for access by rail haul. The Districts will evaluate these options at a project specific level if they become available in the future.

A subsequent biosolids management plan may be prepared at a later date. This subsequent plan would consider onsite alternatives and any offsite operations that are substantially different than those covered in this plan which may develop after this plan is completed. It could also consider other modes of transportation to offsite facilities.

The Districts' biosolids management plan has multiple objectives. The primary objective is to utilize multiple biosolids reuse and disposal options to ensure 100 percent reliability while maintaining compliance with all applicable regulations. Additional objectives are to maintain an aggressive industrial waste source control program that will ensure high biosolids quality and will allow a wide range of disposal and reuse alternatives to be employed, to maximize resource recovery where possible, and to minimize environmental impacts.

The principles by which the program will be managed include the following:

1. Recognize Beneficial Reuse

   Options that reuse or recover the resource value of biosolids will be recognized in light of the environmental benefits associated with such practices. Resource recovery will, however, be balanced against other environmental impacts (e.g. hauling distance) and other factors which contribute to the primary objective of reliability.

2. Evaluate Cost

   Maintaining cost effectiveness is an important goal in serving the public. Cost will be balanced against environmental factors and other principles described here; thus the lowest cost options may not necessarily be selected.

3. Consider Cross-Media Impacts

Options will be evaluated in the context of cross-media environmental impacts (air, water, land). In evaluating alternatives, the Districts will seek to avoid transferring impacts away from one media at the expense of greater impacts to another.

4. Maintain Diversity

Multiple, diverse biosolids management options will be employed. This will provide many significant advantages in the face of changing political, regulatory and business conditions. Variety will be pursued in several different ways including:

a. diversity among practices which are regulated in different ways.

b. diversity among locations with different factors related to public acceptance.

c. diversity among contractors to foster competitive prices.

5. Consider Capacity Flexibility

Options with the ability to increase capacity in the short term will allow for program adjustments in the event of an unforeseen loss of capacity in other contracts. Capacity flexibility will allow an increased quantity of biosolids to be diverted to a particular option based on a predetermined site capacity which is reflected in flexibility written into the contract.

6. Recognize All-Weather Operation

Options with the ability to operate through all weather conditions, and especially to expand in the wet weather season, are favored. Biosolids storage will continue to be provided onsite at the JWPCP to provide capacity for day-to-day fluctuations and limited relief for contractors' down time. Existing facilities provide 6,120 wet tons or four days of storage capacity at existing biosolids production rates. Through modifications to existing facilities, storage will be increased by 3,060 wet tons by 2002 for a total capacity of 9,180 wet tons.

7. Consider Location

Local control and local responsibility are desirable. The following is a hierarchy of the desirability of site locations: 1) within Districts, 2) within Los Angeles County, 3) within southern California 4) in-state 5) out-of-state, 6) out-of-country. At this time, out-of-country sites will not be considered.

Biosolids Management Options

Biosolids disposal and reuse options, including incineration, pasteurization, land application, lagooning, and landfill codisposal, were thoroughly reviewed under the LA/OMA Project. Findings were published in the April 1977 document entitled "Sludge Processing and Disposal, A State of the Art Review." Little has changed since 1977 with respect to this general information. This plan will not, therefore, reevaluate those options which, due to obvious constraints identified in the LA/OMA study, cannot be implemented under this plan.

High technology options, such as incineration and pasteurization, are generally capital intensive and require long periods of time for design and construction. Because of existing regulatory uncertainty, these options are generally higher risk projects in terms of successful implementation. Low technology options such as lagoons, on the other hand, are extremely land intensive and cannot reasonably accommodate the quantities of biosolids produced by the JOS.

It is expected that options evaluated for incorporation into the biosolids management program will include direct land application, composting, use as alternative daily landfill cover, and continuing codisposal with MSW. It is also possible that biosolids might be used in the manufacture of construction materials or non-compost fertilizers in the event that appropriate technologies develop in the near future. These options are described below, in terms of advantages, regulatory requirements, and availability.

1. Land Application

The use of biosolids, in agriculture, horticulture, silviculture or other land applications where a plant benefit is derived, is desirable for several reasons. The added organic material provides increased pore space which facilitates root growth and water and air entry in clay soils and increases water holding capacity and provides chemical sites for nutrient exchange and adsorption in sandy soils. Additionally, biosolids can supply a certain amount of plant nutrients and micronutrients and can aid in reducing reliance on chemical fertilizers, pesticides and herbicides.

a. Direct Land Application

Biosolids are applied directly to land in this option, typically in an agricultural setting where nitrogen is the limiting constituent. Application rates are determined based on the agronomic needs of the crop being cultivated, and site life is generally based on the metals concentrations of the applied biosolids. Biosolids can either be sub-surface injected or surface applied and disced into the land.

Compliance with the EPA Part 503 standards is required for all land application programs. Other requirements may also be imposed by state and local agencies.

b. Composting

Biosolids may be composted with other materials or alone depending on their final intended use. The composted product can be used on agricultural land, in horticulture, or bagged for home use. The composting process further reduces pathogens and further stabilizes organic material with respect to odors and vector attraction potential.

Compliance with the EPA Part 503 standards is required for reuse of biosolids via composting. The California Integrated Waste Management Board (CIWMB) is also developing regulations for composting facilities which are expected to be adopted in 1995. Other requirements may also be imposed by state and local agencies.

2. Chemical Treatment and Use as Alternative Daily Landfill Cover (ADC)

Biosolids may be mixed with alkaline and acid materials, ashes, etc. to produce a soil like material which is suitable for use as daily cover at solid waste landfills. This application reduces the need to import and use natural soils for cover and recycles a potential component of the solid waste stream. In California, a demonstration program under the guidance of the CIWMB is required to demonstrate the adequacy of ADC. In Los Angeles County alone, over 9,000 cubic yards of soil are utilized for daily cover each day at the eight operating sanitary landfills available to the Sanitation Districts. According to California law, 25 percent of this cover may be derived from biosolids based alternative cover. This equates to 1,000 - 2,000 wet tons per day of biosolids, depending on the process used to produce the ADC. This type of biosolids application is considered landfilling under some regulations. Biosolids used in this manner may, therefore, be required to meet the requirements described below for landfilling.

3. Landfill Codisposal with Municipal Solid Waste

The Districts utilize their own landfill for disposal of a portion of JOS biosolids. The Puente Hills Landfill, which is permitted to accept 72,000 tons of solid waste per week, is a lined landfill site with a leachate collection system. Landfill gas is recovered and utilized for energy generation. The proximity of the Puente Hills Landfill to the JWPCP makes the site attractive for biosolids disposal in terms of reduced air emissions from transportation and reduced hauling costs. Per EPA

Part 503 (which was copromulgated under the Clean Water Act and RCRA), publicly owned treatment works are required to demonstrate that biosolids going to codisposal with MSW are non-hazardous and pass the Paint Filter Test for free liquids. In addition, the landfill is required to comply with all Subtitle D requirements.

As an emergency backup, a 2,400 acre sanitary landfill in Carbon County, Utah is permitted to accept biosolids for disposal. This facility was permitted in 1992 and has capacity for approximately 190 million cubic yards of material. This landfill is projected to have sufficient capacity for 30-40 years of development.

4. Other

There are other options that may be available for use at some point in the future. These options are not currently as common as those options previously discussed, but as more emphasis is placed on recycling and pollution prevention, many industries are expected to refine their technologies to incorporate non-virgin materials as feed stocks. Examples of industrial uses of biosolids include additives in the manufacture of cement, brick, and aggregate and the development of non-compost soil amendments or fertilizer materials. The opportunity for incorporation of these uses into the Districts biosolids management program will depend on the success that industries have in developing appropriate technologies.

Screening and Selection of Alternative Reuse or Disposal Sites

The Districts will begin under the assumption that all sites which are properly permitted have addressed and thoroughly controlled or mitigated all site-specific impacts. Regulatory agencies responsible for oversight of a particular biosolids management activity will be considered the expert authority with respect to impact mitigation. The Districts will not pursue an independent evaluation of site specific impacts unless there is information which warrants such. Impacts associated with biosolids management options and the regulatory agencies responsible for oversight of projects located in California are listed in Appendix A-6.12-2. The Districts will use information about site specific impacts to screen alternatives as described below.

Proposals will be considered only if the project has or will have, before beginning operation, obtained all required local, state, and federal permits and has complied with CEQA or NEPA requirements, as necessary. These items will be confirmed, but the Districts will not normally substitute its own judgement for that of appropriate responsible agencies. The Districts will evaluate alternatives on the basis of broader objectives. These will include factors such as reliability, flexibility, degree of reuse, and cost, as well as the transportation impacts associated with each location. Consideration will be given to the overall environmental aspects of the various alternatives in establishing broad goals for a diverse biosolids management program.

To ensure that proposals considered for integration into the Districts' Biosolids Management Program comply with all existing regulations and to ensure the selection of credible, responsible contractors, the Districts will require the submittal of the following information in all proposals for offsite management of biosolids:

1. CEQA Documents

   Contractors shall demonstrate compliance with all CEQA or NEPA requirements for the subject project through either a negative declaration or finding of no significant impact, or an EIR or EIS, as necessary. Areas to be evaluated in the environmental document include: hydrology, water quality, public health, geologic hazards and soils, botanical resources, wildlife resources, the aquatic environment, land use, population, employment and housing, public services and facilities, energy and chemicals, aesthetics, cultural resources, transportation, air quality, and noise.

2. Permits/Authorizations

   Contractors shall obtain and demonstrate compliance with all required local, state and federal permits and authorizations to transport, process and reuse or dispose of JOS biosolids. Contractors shall demonstrate a familiarity with such permits and authorizations. A list of areas that will be addressed by permit and the California agencies responsible for issuing those permits is given below:

Water	Regional Water Quality Control Board
Air	Air Quality Management/Pollution Control District
Solid Waste	California Integrated Waste Management Board
Land Use	Local Planning Agency

   If biosolids will be transported out-of-state for processing, reuse, or disposal, a permit from the equivalent agency of that state shall be required. In addition, compliance with all new laws/regulations or changes to existing laws/regulations during the term of the contract will be required.

   Contractors must also demonstrate compliance with EPA Part 503. This rule contains self implementing regulations for land application, surface disposal, and incineration of biosolids, which may or may not require a permit. The Contractor shall comply with the applicable aspects of these regulations and make a determination on whether a permit application must be submitted.

3. Scope of Services

Contractors shall describe in detail all services to be performed under the contract and demonstrate their ability to provide such services including compliance with all applicable laws and regulations. Contractors shall discuss the management of other materials that will be mixed with biosolids or processed or disposed of at the same site as biosolids. The contract will require that LACSD biosolids shall not be processed or disposed of with any hazardous materials or mixed with compounds that will react to form hazardous materials.

4. Monitoring

Contractors shall demonstrate their ability to conduct all monitoring required by all applicable permits and any other monitoring that is deemed necessary.

5. Record Keeping/Reporting

Contractors shall demonstrate record keeping and materials tracking ability, provide a list of items for which records will be kept including a schedule for reporting required items to the appropriate regulatory agencies and the Districts, and specify the time period for which files will be maintained.

6. Spill Response Plan

Contractors shall provide a spill response plan that provides explicit directions for communication, cleanup, notification and follow-up reporting with regard to transportation and onsite operations.

7. System Redundancy

Contractors shall demonstrate the degree of project redundancy in the event of an operational upset, equipment failure, etc. with respect to transportation, processing and disposal and reuse. This shall include information on equipment, sites, personnel, etc.

8. Company History/Experience

Contractors shall provide information on company ownership and corporate officials and detailed descriptions of all relevant company experience within the last ten years and must provide references.

9. Personnel

   Contractors shall provide an organizational chart for the subject project which includes all key personnel, projected employees and/or positions, and their relevant experience and responsibilities.

10. Safety Record

   Contractors shall provide a detailed history of their safety record over the last ten years. The history shall refer to hauling as well as other operations and disposal and reuse practices.

11. Public Acceptance/Participation

   Contractors shall describe forums used or intended to be used to disseminate information to and/or solicit input from the host community regarding the subject processing, reuse, or disposal facility.

12. Markets

   Contractors shall demonstrate that sufficient markets exist for the utilization of all products that are produced. A maximum of two years will be allowed for storage of material.

Final Selection of Alternative Reuse or Disposal Sites

The final selection of alternatives will be based on an evaluation of how well each alternative meets the screening criteria, and how it contributes to the Districts' overall biosolids management program objectives. Thus, proposals will be evaluated both individually and with respect to the manner in which they complement other biosolids management alternatives already being employed or under consideration in accordance with the principles described earlier.

Contract Management

To ensure proper management of programs once selected, awarded and implemented, the Districts will independently evaluate compliance with the following criteria.

1. Permits/Authorizations

   The Districts shall confirm and review all permits and/or authorizations required to commence and/or to continue operation.

2. Monitoring/Record Keeping/Reporting

The Districts shall receive periodic reports which demonstrate compliance with all required permits and/or authorizations. The reports shall include, at a minimum, a description of all processing and reuse activities conducted during the reporting period including required site management practices, qualities and sources of biosolids utilized, quantities of products produced (if applicable), location of ultimate use (if applicable), farming schedule (if applicable), analytical results, and compliance certifications.

3. Inspections

The Districts shall conduct periodic inspections of all reuse sites and produce a summary report of such inspections. The inspections shall include an observation of biosolids processing and reuse activities. The inspector shall evaluate, at a minimum: odor generation, dust control, evidence of vectors, working conditions, record completeness, processing completeness, material handling activities and overall site management.

4. Material Analysis

The Districts shall randomly collect samples of biosolids products produced offsite and analyze products for those constituents for which standards have been developed and any other constituents of interest to the Districts.

5. Meetings

The Districts shall meet with individual contractors periodically to be briefed on the status of the contractor's operations including market development activities (if applicable).

6.12.3 BALANCED TREATMENT ALTERNATIVES

JWPCP Wastewater Treatment Facilities

Proposed JWPCP wastewater treatment facilities are identical for all of the balanced treatment alternatives, Alternatives 1, 2, and 3. Balanced treatment alternatives call for 400 mgd of secondary treatment capacity at the JWPCP. Necessary modifications to JWPCP solids processing facilities (digestion and dewatering), power generation facilities, and other support facilities which are common to all of the project alternatives were previously identified in Section 6.12.2 of this chapter. Additional modifications to the JWPCP required for the balanced treatment alternatives include modifications and upgrades to headworks facilities, centrate treatment facilities, and expansion of secondary treatment facilities to provide full secondary treatment for the 400 mgd plant capacity.

Proposed improvements to the inlet works include changes in the handling of material collected on the bar screens and modifications to the grit chambers and grit handling facilities. Rags and other large and/or fibrous materials collected on the bar screens are currently routed through grinders and reintroduced into the influent flow upstream of the bar screens. In this manner, screenings are reduced in size until they will pass through the bar screens for treatment with the remainder of the influent solids. Unfortunately, size reduction of rags and other fibrous materials results in long strings of material which pass through the bar screens but create "ragging" problems elsewhere in the plant and contribute to scum build-up in the digesters. Proposed improvements call for the removal of material collected on the bar screens, dewatering of this material in a two-stage pressing process, temporary storage of this material in enclosed roll-off containers, and ultimately hauling of this material to a landfill for disposal. The proposed system is expected to reduce operation and maintenance costs by eliminating maintenance-intensive grinders, reducing ragging problems in solids handling facilities in the plant and reducing the rate of scum layer formation in the digesters.

Proposed improvements to the grit chambers include changes to internal baffling and mixing to improve grit removal performance and, most importantly, redesign of the grit conveying, dewatering and storage system to improve reliability, remove additional water from grit, simplify handling of dewatered grit and provide improved odor control. The Redler chains presently used to dewater and convey grit collected in hoppers in the bottoms of Grit Chambers 1-4 to overhead truck loading hoppers will be replaced with a more reliable and easier to maintain pumped grit system. The existing grit pumping system in Grit Chambers 5-6 will remain. The existing grit storage hoppers for Grit Chambers 1-4 and the grit dewatering and storage facilities for Grit Chambers 5-6 which are currently located at the Digester Cleaning Station on the south end of the plant will be replaced with state-of-the-art grit dewatering systems located by each pair of grit chambers. These systems will include vortex classifiers followed by traveling drainage/conveyance belts which will empty into enclosed roll-off bins such that grit may be hauled to the landfill for disposal. One classifier/conveyor system will be provided for each grit chamber. Enclosure and odor control will be provided at each grit dewatering and storage location.

The remainder of the primary treatment area will remain in its current state with the exception of odor control improvements. Proposed improvements to odor control facilities include: 1) modification or replacement of existing tank and channel covers with new covers which will simplify maintenance and improve cover sealing 2) centralized odor control for the inlet works and primary sedimentation tank influent channels to increase reliability and reduce maintenance costs, and 3) odor control facilities for the skimming collection systems.

Expansion of secondary treatment facilities is planned to provide secondary treatment capacity for the entire plant flow. Facilities to be expanded, added or modified include secondary influent pumps, secondary reactors and clarifiers, cryogenic oxygen generation facilities, waste activated sludge thickening facilities, odor control facilities, secondary effluent pumping, effluent pH control, and effluent chlorination.

The capacity of the secondary influent pump station will be increased through the addition of additional digester gas driven pumps. The preliminary design criteria may change depending on future studies to determine the best method to handle peak storm flows. Air emissions control equipment on the existing engines will also be upgraded through the installation of catalytic converters on engine exhausts. The existing primary effluent pumps will be maintained to provide emergency standby pumping capacity in the event of total loss of power at the plant (total loss would include loss of Edison power and standby power). Without emergency standby pumping capacity, it would be necessary to discharge undisinfected primary effluent to the Wilmington Drain in the event of total loss of power in order to prevent flooding of the primary treatment portion of the plant. With the provision of emergency standby pumping capacity, it will be possible to discharge chlorinated primary effluent through the ocean outfall system in the event of total power failure.

Secondary treatment facilities will be expanded by the addition of four 50 mgd treatment modules. Each module will consist of a mixed four stage pure oxygen biological reactor followed by 26 rectangular final clarifiers. Mixed liquor channels leading from the reactors to the clarifiers will be covered to minimize emissions to the atmosphere. Pure oxygen will be provided via the construction of two additional 150 ton/day cryogenic plants on the existing cryogenic plant site. Two additional air compressors, which will be required by the cryogenic plants, will be housed in the existing compressor building and cold boxes and separation towers will be built within the existing cryogenic plant site or, alternately, directly south of the existing cryogenic plant site. Site selection will be based on several factors, including construction sequencing, continuous plant operation, and safety concerns during construction. These factors will require extensive analysis before a final decision can be reached.

The existing reactors and clarifiers will also be modified. Reactor surface aerators will be replaced with resized units designed to provide optimal mixing and oxygen transfer based on the results of pilot work which will be performed prior to design. Submerged surfaces of final clarifiers may be coated to eliminate corrosion of concrete probably caused by the low pH of mixed liquor from the biological reactors.

To handle the increased waste activated sludge solids generated by the expanded secondary plant, the existing dissolved air flotation facility (DAF) will be expanded by the addition of six additional flotation thickening tanks and associated equipment. Odor control will be provided for the new secondary influent channels, and the existing DAF odor control facility will be expanded for the additional flotation tanks.

Final effluent from the secondary treatment plant has a low pH (<7.0) and will, therefore, be corrosive to the concrete effluent tunnel and outfall system. This is currently not a problem since secondary effluent is combined with higher pH primary effluent before it enters the effluent tunnel and outfall system. To eliminate the potential for corrosion in the effluent tunnels and outfalls following implementation of full secondary treatment, the pH of the secondary effluent will be raised above the corrosive level through the addition of lime slurry to plant effluent before the secondary effluent pump station (SEPS). This will be accomplished by slaking lime at a facility adjacent to the site of the existing chlorination station (north of the RR tracks) and pumping the resulting lime slurry to the application point just upstream of SEPS and/or at an application point in the secondary influent channel. Water used to slake the lime will be secondary effluent washwater which has been lime-softened to remove excess calcium carbonate which would otherwise result in scaling in the lime slurry lines. Water softening will also be performed adjacent to the existing chlorination station. Dry lime delivery will use existing rail sidings and unloading equipment, and lime storage will utilize existing lime storage silos which store lime used in the chlorination process. The pipeline constructed to convey the lime slurry will also function as a back-up to the existing calcium hypochlorite pipeline which is used for chlorination.

The SEPS will be expanded with the addition of electrically powered variable speed pumps to permit disposal of the increased secondary effluent flow to the ocean. The preliminary design criteria may change depending on future studies to determine the best method to handle peak storm flows.

The footprint of proposed JWPCP wastewater treatment facilities is shown in Figure 6.12-3. Preliminary design criteria for proposed JWPCP wastewater treatment facilities are given in Table 6.12-5.

Table 6.12-5
PRELIMINARY DESIGN CRITERIA FOR PROPOSED JWPCP WASTEWATER TREATMENT FACILITIES: 400 MGD YEAR 2010

Process	
Plant Flow	
Average [mgd]	400
Peak Sanitary [mgd]	540
Peak Storm [mgd]	630
Influent Wastewater Characteristics	
Suspended Solids [mg/L]	530
Suspended Solids [lbs/day]	1,760,000
BOD [mg/L]	425
BOD [lbs/day]	1,420,000
Influent	
Number of Pumps	9
Capacity per Pump [mgd]	5 @ 57.6 4 @ 78.0
Capacity of Gravity Sewers [mgd]	265
Bar Screens	
Number	9
Aerated Grit Chamber	
Number	6
Average Detention Time [min]	5
Primary Sedimentation Tanks	
Number	52
Average Overflow Rate [gpd/ft²]	1,250-1,690
Average Detention Time [hrs]	1.3
Solids Removal [%]	70
Secondary Influent	
Suspended Solids Concentration [mg/L]	160
COD Concentration [mg/L]	460
Number of Pumps	5
Capacity per Pump [mgd]	135
Biological Reactors	
Number of 50 mgd Trains	8
Average Daily Flow per Train [mgd]	50
Peak Daily Flow per Train [mgd]	67.5
Average Detention Time (w/ R) [hrs]	1.8
Average Detention Time [hrs]	2.5
Oxygen Generation	
Number of Cryogenic Plants	4
Oxygen Capacity per Plant [ton/day]	150
Oxygen Purity [%]	98
Number of Liquid Oxygen Storage Tanks	3
Capacity per Tank [ton]	215

Process	
Final Sedimentation Tanks	
14 Foot Deep Tanks	
Number	104
Average Overflow Rate [gpd/ft²]	550
Average Detention Time (w/ 40% R) [hrs]	3.3
16 Foot Deep Tanks	
Number	104
Average Overflow Rate [gpd/ft²]	550
Average Detention Time (w/ 40% R) [hrs]	3.7
Chlorination	
Average Flow [mgd]	400
Average Dose [mg/L]	10
Maximum Dose [mg/L]	17
Chlorine Use	
Average Flow @ Average Dose [lb/day]	33,000
Average Flow @ Max Dose [lb/day]	57,000
WAS Thickening	
Flow [gpm]	5,600
Solids Load [tons/day]	275
Number Air Flotation Tanks	10
Average Overflow Rate [gpm/sf]	1.2
Secondary Effluent	
Suspended Solids Concentration [mg/L]	25
BOD Concentration [mg/L]	25
Number of Pumps	5
Capacity per Pump [mgd]	135
Ocean Outfalls	
No. 1	Not in Service
No. 2	
Inside Diameter [inches]	72
Total Length [ft]	7,048
Diffuser Length [ft]	648
Capacity [mgd]	106
No. 3	
Inside Diameter [inches]	90
Total Length [ft]	10,300
Diffuser Length [ft]	2,400
Capacity [mgd]	175
No. 4	
Inside Diameter [inches]	120
Total Length [ft]	11,880
Diffuser Length [ft]	4,440
Capacity [mgd]	349

Proposed Expansions of Water Reclamation Plants

Proposed expansions of the upstream water reclamation plants (WRP's) are similar in many ways. Tertiary treatment will be provided in all cases. Processes will consist of primary sedimentation; biological treatment, including aeration and final sedimentation; effluent coagulation and filtration; and chlorination followed by dechlorination. In some cases, the necessary tankage and/or equipment already exists at the plant site. This is delineated in the description of specific WRP expansions for each alternative.

In general, the WRP expansions will include the following:

1. Influent pumps will pump the incoming wastewater through the primary, secondary, and tertiary treatment processes, exclusive of the disinfection process.

2. Primary sedimentation tanks will remove suspended solids from the raw wastewater. The tanks will be rectangular in shape and will be equipped with surface-type effluent launders. Sludge will be collected off of the bottom of each tank with a chain-driven flight system. The flights will move the sludge to a hopper at the inlet end of each tank. From there, the sludge will be removed and returned to the sewer for processing at the JWPCP. Scum collectors will also be provided for each tank. The clarifiers will be completely covered for odor control.

3. Aeration tanks will provide biological stabilization of primary effluent. The tanks will be configured in four pass aeration modules. Each module will have a capacity of 12.5 mgd. Step feed gates will provide for tapered feed of primary effluent. Aeration and mixing will be provided by a fine bubble diffused aeration system using ceramic disks in a total floor coverage configuration.

4. Centrifugal process air compressors will provide air for the biological stabilization process.

5. Final sedimentation tanks will separate biological suspended solids from aeration system effluent. Each tank will be rectangular in shape and will be equipped with surface-type effluent launders. Sludge will be collected off of the tank bottom with a chain-driven flight system and will be moved to a hopper at the effluent end of each tank. From there, the sludge will flow by gravity to a return sludge wetwell. The sedimentation tanks will also be equipped with floating skimmers to improve secondary effluent quality.

6. Return sludge pumps will pump the biological sludge from the return sludge wetwell to the head end of the aeration system for reuse. A portion of the sludge will be wasted to the sewer for subsequent treatment at the JWPCP.

7. Effluent filters will remove suspended solids from secondary effluent prior to disinfection. Filters improve the reliability of the disinfection process by removing clusters of bacterial organisms that can be relatively tolerant to disinfection. The proposed filters will hold a six-foot bed of 1.1 mm anthracite (deep bed monomedia) and will be backwashed with a high rate pumping system.

8. Waste filter backwash recovery tanks will either equalize the waste filter backwash flow prior to treatment or will separate the backwash solids from the waste filter backwash flow stream. Any solids removed will be returned to the sewer for subsequent treatment at the JWPCP. Effluent from the backwash recovery process will be treated through the WRP's treatment facilities.

9. Filter effluent/backwash pumps will pump filtered effluent flow through the disinfection process and/or will provide flow for the filter backwash process.

10. Chlorine contact tanks will provide contact time for disinfection. The combination of chlorine dosage and contact time has a direct effect on bacterial and viral kills achieved. The chlorine contact tanks will be covered to control the growth of algae in the effluent.

11. Chemical systems will be used in conjunction with the above processes. The proposed chemical systems consist of the following: ferric chloride, for use as a coagulant in the primary sedimentation process; polymer, to serve as a coagulant aid in the primary sedimentation process and as a coagulant aid in the final sedimentation process; alum, to serve as a flocculent in the effluent filtration process; chlorine or sodium hypochlorite, for use as a disinfectant in the disinfection process; and sulfur dioxide or sodium bisulfite, for use as a dechlorinating agent in the dechlorination process. Containment will be provided for all chemical stations.

12. Ancillary systems, including washwater pumping, will support plant operation.

13. Buildings will accommodate the control room and laboratory, influent pumps, and process air compressors.

14. Roadways will provide access to facilities within the plant.

Alternative 1

Alternative 1 calls for 400 mgd of secondary treatment capacity at the JWPCP accompanied by a 25 mgd expansion of the SJCWRP and a 12.5 mgd expansion of the LCWRP. This would provide a 2010 planned capacity of 628 mgd in the JOS. JOS treatment facilities proposed under Alternative 1 are conceptually illustrated in Figure 6.12-4.

San Jose Creek Water Reclamation Plant — 25 mgd Expansion

The SJCWRP would be expanded from its existing capacity of 100 mgd to its site capacity of 125 mgd. A layout showing the proposed SJCWRP facilities is shown in Figure 6.12-5. Associated preliminary design criteria are shown in Table 6.12-6.

The SJCWRP is located on property adjacent to the intersection of the Pomona and San Gabriel River Freeways near the City of Whittier. The existing plant consists of Stages I, and II or SJCWRP East (62.5 mgd capacity), located on property northeast of the freeway intersection and Stage III, or SJCWRP West (37.5 mgd capacity), located on property northwest of the freeway intersection. The proposed plant expansion would be built adjacent to Stage III and would be part of SJCWRP West. For all practical purposes, SJCWRP East and SJCWRP West operate and would continue to operate as separate plants.

The proposed expansion at the SJCWRP would not require additional buildings, chemical stations, process air compressors or a waste filter backwash recovery tank. These facilities were provided during the previous Stage III construction.

The waste filter backwash recovery tank for this plant would continue to operate in a flow equalization mode. Subsequent treatment of the waste filter backwash flow would be provided by plant facilities.

The plant would continue to use existing chlorine and sulfur dioxide facilities for disinfection and dechlorination, respectively. These facilities provide complete containment.

Table 6.12-6
PRELIMINARY DESIGN CRITERIA FOR PROPOSED SJCWRP FACILITIES: 125 MGD

Process	East	West
Plant Flows		
Average [mgd]	62.5	62.5
Peak Sanitary [mgd]	90.0	100.0
Peak Storm [mgd]	125	125
Equalized Waste Filter Backwash (mgd)*	3.2	3.9
*Influent Wastewater Characteristics - Annual Mean***		
Suspended Solids [mg/L]	296	280
Suspended Solids [lbs/day]	154,371	146,026
BOD [mg/L]	271	235
BOD [lbs/ day]	141,333	122,558
Influent Pumps		
Number	4	4
Capacity Per Pump [mgd]	4 @ 40	4 @ 40
Primary Sedimentation Tanks		
Number	8	9
Length [ft]	300	300
Width [ft]	20	20
Sidewater Depth [ft]	12	12
Average Overflow Rate [gpd/ft^2]	1,302	1,157
Peak Sanitary Overflow Rate [gpd/ft^2]	1,875	1,852
Average Detention Time [hrs]	1.65	1.86
Peak Sanitary Detention Time [hrs]	1.15	1.16
Aeration Tanks		
Number	20	20
Length [ft]	225	225
Width [ft]	30	30
Sidewater Depth [ft]	15	15
Average Aeration Time (w/ 33% R) [hrs]	4.36	4.17
Average Aeration Time [hrs]	5.82	5.48
Process Air Compressors		
Number	5	3
Capacity Per Compressor [scfm]	3 @ 44,000 2 @ 20,000	3 @ 40,100

Process	East	West
Final Sedimentation Tanks		
Number	30	30
Length [ft]	150	150
Width [ft]	20	20
Sidewater Depth [ft]	10	10
Average Overflow Rate [gpd/ft^2]	730	737
Peak Sanitary Overflow Rate [gpd/ft^2]	1,036	1,154
Average Detention Time (w/ 33% R) (hrs)	1.87	1.85
Peak Sanitary Detention Time (w/ 33% R) (hrs)	1.31	1.18
Filters		
Number	20	24
Length [ft]	37.33	37.33
Width [ft]	16	16
Average Surface Loading Rate [gpm/ft^2]	3.82	3.22
Peak Sanitary Surface Loading Rate [w/1 o/s] [gpm/ft^2]	5.70	5.25
Filter Effluent/Backwash Pumps		
Number	5	5
Capacity Per Pump [mgd]	2 @ 32.9 1 @ 31.7 2 @ 28.5	3 @ 33.1 2 @ 28
Filter Waste Backwash Recovery Tanks		
Number	1	1
Effective Volume [gal]	136,925	138,700
Chlorine Contact Tanks		
Number	4	6
Length [ft]	625	300
Width [ft]	13	26.92
Sidewater Depth [ft]	16.00	15.00
Average Detention Time [hrs]	1.49	2.09
Peak Sanitary Detention Time [hrs]	1.04	1.30

* *Affects loading rates on processes downstream of the aeration tanks for SJCWRP East and downstream of primary sedimentation tanks for SJCWRP West.*

** *Based on 1993 SJCWRP 1993 operational data and design plant flow of 125 mgd*

Los Coyotes Water Reclamation Plant — 12.5 mgd Expansion

The LCWRP would be expanded from its existing capacity of 37.5 mgd to a capacity of 50 mgd. A layout showing the existing and proposed LCWRP facilities is shown in Figure 6.12-6. Associated preliminary design criteria are shown in Table 6.12-7.

The LCWRP is located in the City of Cerritos on property northwest of the intersection of the Artesia and San Gabriel River Freeways. The existing plant consists of Stages I and II (37.5 mgd capacity). Most of the proposed plant expansion would be built between Stage I and the Artesia Freeway. The proposed facilities would operate in conjunction with the existing plant.

The proposed expansion at the LCWRP would not require additional buildings, chemical stations, influent pumps, process air compressors, waste filter backwash recovery tanks or chlorine contact tanks. These items were provided during previous construction at the plant.

The plant would continue to use existing chlorine and sulfur dioxide facilities for disinfection and dechlorination, respectively. These facilities provide complete containment.

Because the chlorine contact times for this proposed expansion are somewhat shorter than previously used at the plant, the Districts would undertake a study to demonstrate that all disinfection requirements can be met consistently.

A covered gallery would be required immediately south of the proposed aeration and final sedimentation tanks near the Artesia Freeway. A roadway would be built on top of the gallery to provide access to this portion of the plant. Since all proposed facilities would be constructed to the south of the existing facilities, neither the golf course nor the driving range adjacent to the LCWRP would be impacted.

Table 6.12-7
PRELIMINARY DESIGN CRITERIA FOR PROPOSED LCWRP FACILITIES: 50 MGD

Process		Process	
Plant Flows		*Final Sedimentation Tanks*	
Average [mgd]	50.0	Number	24
Peak Sanitary [mgd]	80.0	Length [ft]	150
Peak Storm [mgd]	120.0	Width [ft]	20
Equalized Waste Filter Backwash (mgd)*	2.4	Sidewater Depth [ft]	10
		Average Overflow Rate [gpd/ft^2]	728
*Influent Wastewater Characteristics - Annual Mean***		Peak Sanitary Overflow Rate [gpd/ft^2]	1,145
Suspended Solids [mg/L]	449	Average Detention Time [w/ 33% R] [hrs]	1.87
Suspended Solids [lbs/day]	187,331	Peak Sanitary Detention Time [w/ 33% R] [hrs]	1.19
BOD [mg/L]	325		
BOD [lbs/day]	135,596	*Filters*	
		Number	18
Influent Pumps		Length [ft]	37.33
Number	6	Width [ft]	16
Capacity Per Pump [mgd]	2 @ 17	Average Surface Loading Rate [gpm/ft^2]	3.39
	4 @ 42	Peak Sanitary Surface Loading Rate	
Primary Sedimentation Tanks		[w/1 o/s] [gpm/ft^2]	5.64
Number	6		
Length [ft]	300	*Filter Effluent/Backwash Pumps*	
Width [ft]	20	Number	5
Sidewater Depth [ft]	12	Capacity Per Pump [mgd]	2 @ 43
Average Overflow Rate [gpd/ft^2]	1,389		2 @ 30
Peak Sanitary Overflow Rate [gpd/ft^2]	2,222		1 @ 20
Average Detention Rate [hrs]	1.55	*Filter Waste Backwash Recovery Tanks*	
Peak Sanitary Detention Time [hrs]	0.97	Number	1
		Effective Volume [gal]	137,000
Aeration Tanks			
Number	16	*Chlorine Contact Tanks*	
Length [ft]	225	Number	2
Width [ft]	30	Length [ft]	800
Sidewater Depth [ft]	15	Width [ft]	26.92
Average Aeration Time (w/ 33% R) [hrs]	4.36	Sidewater Depth [ft]	13
Average Aeration Time [hrs]	5.82	Average Detention Time [hrs]	2.00
		Peak Sanitary Detention Time [hrs]	1.25
Process Air Compressors			
Number	5		
Capacity Per Compressor [scfm]	3 @ 20,000		
	2 @ 60,000		

* *Affects loading rates on processes downstream of primary sedimentation tanks.*
** *Based on 1993 LCWRP operational data and design plant flow of 50 mgd*

Tentative Phasing of Alternative 1 Facilities

As noted in Section 6.3.3 of this chapter, proposed facilities will be service phased. Facilities will be constructed when actual wastewater flows justify system expansion. The phasing of proposed facilities may, however, be tentatively identified based on wastewater flow projections. For Alternative 1, JWPCP facilities would be constructed first and would come on line on or before December 31, 2002 as required by the Consent Decree. The SJCWRP expansion would follow the completion of JWPCP facilities and the LCWRP expansion would follow the SJCWRP expansion. Based on JOS flow projections, the SJCWRP would have to come on-line in the year 2006 and the LCWRP expansion would have to come on-line in 2008. Design and construction of proposed SJCWRP facilities would begin in 2002 and 2004 respectively, and design and construction of proposed LCWRP facilities would begin in 2004 and 2006 respectively. The tentative phasing of Alternative 1 facilities is illustrated in Figure 6.12-7. If wastewater flows develop more quickly than the flow projections indicate, the implementation of proposed facilities would be accelerated. If, on the other hand, wastewater flows develop more slowly than flow projections indicate, the implementation of proposed facilities would be delayed.

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Alternative 2

Alternative 2 calls for 400 mgd of secondary treatment capacity at the JWPCP accompanied by a 37.5 mgd expansion of the LCWRP. This would provide a 2010 planned capacity of 628 mgd in the JOS. JOS treatment facilities proposed under Alternative 2 are conceptually illustrated in Figure 6.12-8.

Los Coyotes Water Reclamation Plant — 37.5 mgd Expansion

The LCWRP would be expanded from its existing capacity of 37.5 mgd to a capacity of 75 mgd. A layout showing the existing and proposed LCWRP facilities is shown in Figure 6.12-9. Associated preliminary design criteria are shown in Table 6.12-8.

The LCWRP is located in the City of Cerritos on property northwest of the intersection of the Artesia and San Gabriel River Freeways. The existing plant consists of Stages I and II (37.5 mgd capacity). The proposed plant expansion would be built adjacent and to the north of the existing plant. The proposed facilities would operate in conjunction with the existing plant.

The proposed expansion at the LCWRP would not require additional chemical stations, influent pumps, process air compressors, or a waste filter backwash recovery tank. These items were provided during previous construction at the plant.

Construction of the proposed aeration and final sedimentation tanks would require the closure of the existing driving range located on Districts' property.

The plant would continue to use existing chlorine and sulfur dioxide facilities for disinfection and dechlorination, respectively. These facilities provide complete containment.

Additional interim chlorine contact tanks would be built immediately to the north of the proposed aeration and final sedimentation tanks. Chlorine contact tanks would be constructed such that they could be converted to aeration and final sedimentation tanks during a future expansion of the plant. Proposed chlorination facilities would provide complete containment.

A storage yard and maintenance building would be required near the southeast boundary of the plant. The facilities would replace those that would have to be demolished in order to construct the filters.

A covered gallery would be built north of the existing aeration and final sedimentation tank gallery. A roadway would be built on top of the proposed gallery for plant access. An additional covered gallery would be built north of the proposed chlorine contact tanks, and a roadway would be built on top of the gallery for plant access.

Sewer Construction

As noted previously, implementation of Alternative 2 would require relief of the JO "B" and/or JO "H" Trunk Sewers downstream of the SJCWRP and the WNWRP and upstream of the LCWRP Interceptor. These parallel sewers must be relieved in order to allow them to carry flow which would bypass the SJCWRP and WNWRP and be conveyed to the LCWRP and/or the JWPCP for treatment. This relief sewer would require approximately 10 miles of large diameter sewer and would roughly parallel the existing JO "B" and JO "H" Trunk Sewers.

Tentative Phasing of Alternative 2 Facilities

As noted in Section 6.3.3 of this chapter, proposed facilities will be service phased. Facilities will be constructed only when actual wastewater flows indicate that the system needs to be expanded. The phasing of proposed facilities may, however, be tentatively identified based on projected wastewater flows. For Alternative 2, JWPCP facilities would be constructed first and would be on-line on or before December 31, 2002 as required by the Consent Decree. Based on flow projections, the LCWRP expansion would have to come on-line in 2006. Design and construction of the LCWRP expansion would begin in 2001 and 2003 respectively. The tentative phasing of facilities proposed in Alternative 2 is illustrated in Figure 6.12-10. If wastewater flows develop more quickly than flow projections indicate, the implementation of proposed facilities would be accelerated. If, on the other hand, wastewater flows develop more slowly than flow projections indicate, the implementation of proposed facilities would be delayed.

Table 6.12-8
PRELIMINARY DESIGN CRITERIA FOR PROPOSED LCWRP FACILITIES: 75 MGD

Process		Process	
Plant Flows		*Final Sedimentation Tanks*	
Average [mgd]	75.0	Number	36
Peak Sanitary [mgd]	120.0	Length [ft]	150
Peak Storm [mgd]	150.0	Width [ft]	20
Equalized Waste Filter Backwash (mgd)*	3.8	Sidewater Depth [ft]	10
		Average Overflow Rate [gpd/ft^2]	729
*Influent Wastewater Characteristics - Annual Mean***		Peak Sanitary Overflow Rate [gpd/ft^2]	1,146
Suspended Solids [mg/L]	449	Average Detention Time (w/ 33% R) [hrs]	1.87
Suspended Solids [lbs/day]	280,996	Peak Sanitary Detention Time (w/ 33% R) [hrs]	1.18
BOD [mg/L]	325		
BOD [lbs/day]	203,394	*Filters*	
		Number	28
Influent Pumps		Length [ft]	37.33
Number	6	Width [ft]	16
Capacity Per Pump [mgd]	2 @ 17	Average Surface Loading Rate [gpm/ft^2]	3.27
	4 @ 42	Peak Sanitary Surface Loading Rate [w/1 o/s] [gpm/ft^2]	5.33
Primary Sedimentation Tanks		*Filter Effluent/Backwash Pumps*	
Number	10	Number	
Length [ft]	300	Capacity Per Pump [mgd]	5
Width [ft]	20		3 @ 43
Sidewater Depth [ft]	12		2 @ 30
Average Overflow Rate [gpd/ft^2]	1,250	*Filter Waste Backwash Recovery Tanks*	
Peak Sanitary Overflow Rate [gpd/ft^2]	2,000	Number	1
Average Detention Time [hrs]	1.72	Effective Volume [gal]	137,000
Peak Sanitary Detention Time [hrs]	1.08		
		Chlorine Contact Tanks	
Aeration Tanks		Number	2
Number	24	Length [ft]	800
Length [ft]	225	Width [ft]	26.92
Width [ft]	30	Sidewater Depth [ft]	13
Sidewater Depth [ft]	15	Number	4
Average Aeration Time (w/ 33% R) [hrs]	4.36	Length [ft]	225
Average Aeration Time [hrs]	5.82	Width [ft]	30
		Sidewater Depth [ft]	15
Process Air Compressors		Number	6
Number	5	Length [ft]	150
Capacity Per Compressor [scfm]	3 @ 20,000	Width [ft]	20
	2 @ 60,000	Sidewater Depth [ft]	10
		Average Detention Time [hrs]	2.74
		Peak Sanitary Detention Time [hrs]	1.71

* *Affects loading rates on processes downstream of primary sedimentation tanks.*

** *Based on 1993 LCWRP operational data and design plant flow of 75 mgd*

Alternative 3

Alternative 3 calls for 400 mgd of secondary treatment capacity at the JWPCP accompanied by a 37.5 mgd expansion of the WNWRP. This would provide a 2010 planned capacity of 628 mgd in the JOS. JOS facilities proposed under Alternative 3 are conceptually illustrated in Figure 6.12-11.

Whittier Narrows Water Reclamation Plant — 37.5 mgd Expansion

The WNWRP would be expanded from its existing capacity of 15 mgd to a capacity of 52.5 mgd. A layout showing the existing and proposed WNWRP facilities is shown in Figure 6.12-12. Associated preliminary design criteria are shown in Table 6.12-9.

The WNWRP is located near the City of South El Monte. It is situated northwest of the intersection of San Gabriel Boulevard and Rosemead Boulevard. The proposed facilities would be built on property between Rosemead Boulevard and the existing plant. Because the Whittier Narrows area is part of a flood plain, the plant expansion would be built on 6-10 feet of imported fill. Construction on fill and the use of elevated structures would ensure that the proposed facilities would be operational in the event of a 100-year flood. Due to existing site constraints, the existing and proposed facilities would operate as two separate plants.

The waste filter backwash recovery tank for this plant would operate in a solids removal mode and would be the same size as the proposed final sedimentation tanks. The recovery tank would also operate as a final sedimentation tank. Effluent from the recovery tank would be sent to the effluent filters for further processing.

The plant would utilize sodium hypochlorite and sodium bisulfite facilities for disinfection and dechlorination, respectively. These facilities would provide complete containment in the event of a liquid chemical spill.

Tentative Phasing of Alternative 3 Facilities

As noted in Section 6.3.3 of this chapter, proposed facilities will be service phased. Facilities will be constructed only when actual wastewater flows indicate that the system needs to be expanded. The phasing of proposed facilities may, however, be tentatively identified based on projected wastewater flows. For Alternative 3, JWPCP facilities would be constructed first and would be on-line on or before December 31, 2002 as required by the Consent Decree. Based on flow projections, the WNWRP expansion would have to come on-line in 2006. Design and construction of the WNWRP expansion would begin in 2001 and 2003 respectively. The tentative phasing of facilities proposed in Alternative 3 is illustrated in Figure 6.12-13. If wastewater flows develop more quickly than flow projections indicate, the implementation of proposed facilities would be accelerated. If, on the other hand, wastewater flows develop more slowly than flow projections indicate, the implementation of proposed facilities would be delayed.

Table 6.12-9
PRELIMINARY DESIGN CRITERIA FOR PROPOSED WNWRP FACILITIES: 52.5 MGD

Process	Existing	Expansion	Process	Existing	Expansion
Plant Flows			*Final Sedimentation Tanks*		
Average [mgd]	15.0	37.5	Number	5	17
Peak Sanitary [mgd]	20.0	60.0	Length [ft]	150	150
Peak Storm [mgd]	24.0	75.0	Width [ft]	20	20
Equalized Waste Filter Backwash (mgd)*	0.8	2.5	Sidewater Depth [ft]	10	10
			Average Overflow Rate [gpd/ft^2]	1,000	735
*Influent Wastewater Characteristics - Annual Mean***			Peak Sanitary Overflow Rate [gpd/ft^2]	1,333	1,176
Suspended Solids [mg/L]	250	250	Average Detention Time		
Suspended Solids [lbs/day]	31,291	57,367	[w/ 33% R] [hrs]	1.35	1.75
BOD [mg/L]	216	216	Peak Sanitary Detention Time		
BOD [lbs/day]	27,036	67,589	[w/ 33% R] [hrs]	1.01	1.11
Influent Pumps			*Filters*		
Number	2	4	Number	6	18
Capacity Per Pump [mgd]	2 @ 24	4 @ 25	Length [ft]	32	32
			Width [ft]	16	16
Primary Sedimentation Tanks			Average Surface Loading Rate	3.58	3.01
Number	2	7	[gpm/ft^2]		
Length [ft]	300	225	Peak Sanitary Surface Loading Rate		
Width [ft]	20	20	[w/1 o/s] [gpm/ft^2]	5.65	4.99
Sidewater Depth [ft]	12	12			
Average Overflow Rate [gpd/ft^2]	1,250	1,190	*Filter Effluent/Backwash Pumps*		
Peak Sanitary Overflow Rate [gpd/ ft^2]	1,667	1,905	Number	3	4
Average Detention Time [hrs]	1.72	1.81	Capacity Per Pump [mgd]	3 @ 12.5	4 @ 26
Peak Sanitary Detention Time [hrs]	1.29	1.13			
			Filter Waste Backwash Recovery Tanks		
Aeration Tanks			Number	1	1
Number	3	12	Effective Volume [gal]	224,400	224,400
Length [ft]	300	225			
Width [ft]	30	30	*Chlorine Contact Tanks*		
Sidewater Depth [ft]	15	15	Number	2	4
Average Aeration Time (w/ 33% R) [hrs]	3.64	4.36	Length [ft]	131	350
Average Aeration Time [hrs]	4.85	5.82	Width [ft]	42.25	25
			Sidewater Depth [ft]	15	15
Process Air Compressors			Average Detention Time [hrs]	1.99	2.51
Number	3	3	Peak Sanitary Detention Time [hrs]	1.49	1.57
Capacity Per Compressor [scfm]	2 @ 12,000 1 @ 5,500	3 @ 26,900			

* *Affects loading rates on processes downstream of final sedimentation tanks.*

** *Based on 1993 WNWRP operational data and design flow.*

6.12.4 EMPHASIZE INLAND TREATMENT ALTERNATIVE

JWPCP Wastewater Treatment Facilities

The emphasize inland treatment alternative, Alternative 4, calls for 350 mgd of secondary treatment capacity at the JWPCP. Necessary modifications to JWPCP solids processing facilities (digestion and dewatering), power generation facilities, and other support facilities which are common to all final project alternatives, are identified in Section 6.12.2 of this chapter. Additional modifications to the JWPCP required under the emphasize inland treatment alternative include modifications and upgrades to headworks facilities and expansion of secondary treatment facilities to provide full secondary treatment for the 350 mgd plant capacity.

Proposed facilities at the JWPCP for the 350 mgd option are identical to those described for the 400 mgd option with the exception of the construction of one less 50 mgd secondary treatment module and associated odor control facilities. Existing and proposed primary treatment facilities are presently sized for 400 mgd of ultimate flow. Pumping of secondary influent and effluent will be unchanged because the unit sizing of the pumps was established by the original secondary treatment design. The safety margin for peak flows would, however, be greater for the 350 mgd design than for the 400 mgd design. Cryogenic plant capacity is also expected to remain the same because modular sizing of this facility is established by the original secondary design. Primary solids would actually be increased in the 350 mgd option because more solids would be contributed to the primary influent from upstream treatment (upstream treatment capacity would be 50 mgd greater if Alternative 4 were implemented since the overall JOS flow is the same for all alternatives). The increased primary solids in the 350 mgd option would be offset by decreased secondary solids production at the JWPCP. Since secondary solids are flotation thickened to a higher concentration than primary solids, the net impact would be slightly increased wet sludge flows in the 350 mgd option. The overall impact on solids processing facilities would be negligible. The only major impact would be on the number of secondary treatment modules described above.

The footprint of proposed JWPCP wastewater treatment facilities under the emphasize inland treatment alternative is illustrated in Figure 6.12-14. Preliminary design criteria for proposed JWPCP facilities are given in Table 6.12-10.

Table 6.12-10
PRELIMINARY DESIGN CRITERIA FOR PROPOSED JWPCP WASTEWATER TREATMENT FACILITIES: 350 MGD

Process		Process	
Plant Flow		*Final Sedimentation Tanks*	
Average [mgd]	350	14 Foot Deep Tanks	
Peak Sanitary [mgd]	475	Number	104
Peak Storm [mgd]	600	Average Overflow Rate [gpd/ft²]	550
		Average Detention Time (w/ 40% R) [hrs]	3.3
*Influent Wastewater Characteristics - Annual Mean**		16 Foot Deep Tanks	
Suspended Solids [mg/L]	615	Number	78
Suspended Solids [lbs/day]	1,800,000	Average Overflow Rate [gpd/ft²]	550
BOD [mg/L]	475	Average Detention Time (w/ 40% R) [hrs]	3.7
BOD [lbs/day]	1,390,000		
		Chlorination	
Influent		Average Flow [mgd]	350
Number of Pumps	9	Average Dose [mg/L]	10
Capacity Per Pump [mgd]	5 @ 57.6	Maximum Dose [mg/L]	17
	4 @ 78.0	Chlorine Use	
Capacity Gravity Sewer [mgd]	265	Average Flow @ Average Dose [lb/day]	29,000
		Average Flow @ Max Dose [lb/day]	50,000
Bar Screens			
Number	9	*WAS Thickening*	
		Flow [gpm]	4,900
Aerated Grit Chamber		Solids Load [tons/day]	260
Number	6	Number Air Flotation Tanks	10
Detention Time [min]	6	Average Overflow Rate [gpm/sf]	1.1
Primary Sedimentation Tanks		*Secondary Effluent*	
Number	52	Suspended Solids Concentration [mg/L]	25
Average Overflow Rate [gpd/ft²]	1,090-1,480	BOD Concentration [mg/L]	25
Detention Time [hr.]	1.5	Number of Pumps	5
Solids Removal [%]	70	Capacity per Pump [mgd]	135
Biological Reactors		*Ocean Outfalls*	
Number of 50 mgd Trains	7	No. 1	Not in Service
Average Daily Flow per Train [mgd]	50	No. 2	
Peak Daily Flow per Train [mgd]	67.9	Inside Diameter [inches]	72
Average Detention Time (w/40% R) [hrs]	1.8	Total Length [ft]	7,048
Average Detention Time [hrs]	2.5	Diffuser Length [ft]	648
		Capacity [mgd]	106
Secondary Influent		No. 3	
Suspended Solids Concentration [mg/L]	185	Inside Diameter [inches]	90
BOD Concentration [mg/L]	530	Total Length [ft]	10,300
Number of Pumps	5	Diffuser Length [ft]	2,400
Capacity per Pump [mgd]	135	Capacity [mgd]	175
		No. 4	
Oxygen Generation		Inside Diameter [inches]	120
Number of Cryogenic Plants	4	Total Length [ft]	11,880
Oxygen Capacity per Plant [ton/day]	150	Diffuser Length [ft]	4,440
Oxygen Purity [%]	98	Capacity [mgd]	349
Number of Liquid Oxygen Storage Tanks	3		
Capacity per Tank [tons]	215		

Proposed Expansions of Water Reclamation Plants

Facilities which are typically associated with proposed expansions of upstream WRPs were previously described in Section 3 of this Chapter.

Alternative 4

Alternative 4 calls for 350 mgd of secondary treatment capacity at the JWPCP accompanied by a 25 mgd expansion of the SJCWRP, a 37.5 mgd expansion of the WNWRP, and a 25 mgd expansion of the LCWRP. This would provide a year 2010 planned capacity of 628 mgd in the JOS. JOS treatment facilities proposed under Alternative 4 are conceptually illustrated in Figure 6.12-15.

San Jose Creek Water Reclamation Plant — 25 mgd Expansion

The proposed 25 mgd expansion of the SJCWRP was previously described in Section 6.12.3 of this chapter as part of Alternative 1. The expanded SJCWRP footprint is illustrated in Figure 6.12-5 and preliminary design criteria for the expanded SJCWRP are given in Table 6.12-6.

Whittier Narrows Water Reclamation Plant — 37.5 mgd Expansion

The proposed 37.5 mgd expansion of the WNWRP was previously described in Section 6.12.3 of this chapter as part of Alternative 3. The expanded WNWRP footprint is illustrated in Figure 6.12-12 and preliminary design criteria for the expanded WNWRP are given in Table 6.12-9.

Los Coyotes Water Reclamation Plant — 25 mgd Expansion

The LCWRP would be expanded from its existing capacity of 37.5 mgd to a capacity of 62.5 mgd. A layout showing existing and proposed LCWRP facilities is shown in Figure 6.12-16. Associated preliminary design criteria are shown in Table 6.12-11.

The LCWRP is located in the City of Cerritos on property northwest of the intersection of the Artesia and San Gabriel River Freeways. The existing plant consists of Stages I and II (37.5 mgd capacity). The proposed plant expansion would be built adjacent and to the north of the existing plant. The proposed plant facilities would operate in conjunction with the existing plant.

The proposed expansion at the LCWRP would not require additional buildings, chemical stations, influent pumps, process air compressors, or a waste filter backwash recovery tank. These items were provided during previous construction at the plant.

Construction of the proposed aeration tanks and final sedimentation tanks would require closure of the existing driving range located on Districts' property.

The plant would continue to use existing chlorine and sulfur dioxide facilities for disinfection and dechlorination, respectively. These facilities provide complete containment.

Additional interim chlorine contact tanks which would be required would be built immediately to the north of the proposed aeration and final sedimentation tanks. Chlorine contact tanks would be designed and constructed in a manner such that they could be converted to aeration and sedimentation tanks during a future expansion of the plant. Proposed chlorination facilities would provide complete containment.

A covered gallery would be built to the north of the existing aeration and final sedimentation tank gallery. A roadway would be built on top of the proposed gallery for plant access. An open gallery would be built north of the proposed aeration and final sedimentation tanks, and a roadway would be built north of the proposed chlorine contact tanks for plant access.

Table 6.12-11
PRELIMINARY DESIGN CRITERIA FOR PROPOSED LCWRP FACILITIES: 62.5 MGD

Process	
Plant Flows	
Average [mgd]	62.5
Peak Sanitary [mgd]	100.0
Peak Storm [mgd]	125.0
Equalized Waste Filter Backwash (mgd)*	3.2
*Influent Wastewater Characteristics - Annual Mean***	
Suspended Solids [mg/L]	449
Suspended Solids [lbs/day]	234,163
BOD [mg/L]	325
BOD [lbs/day]	169,495
Influent Pumps	
Number	6
Capacity Per Pump [mgd]	2 @ 17 4 @ 42
Primary Sedimentation Tanks	
Number	8
Length [ft]	300
Width [ft]	20
Sidewater Depth [ft]	12
Average Overflow Rate [gpd/ft]	1,302
Peak Sanitary Overflow Rate [gpd/ft^2]	2,083
Average Detention Rate [hrs]	1.65
Peak Sanitary Detention Time [hrs]	1.03
Aeration Tanks	
Number	20
Length [ft]	225
Width [ft]	30
Sidewater Depth [ft]	15
Average Aeration Time (w/ 33% R) [hrs]	4.36
Average Aeration Time [hrs]	5.82
Process Air Compressors	
Number	5
Capacity Per Compressor [scfm]	3 @ 20,000 2 @ 60,000

Process	
Final Sedimentation Tanks	
Number	30
Length [ft]	150
Width [ft]	20
Sidewater Depth [ft]	10
Average Overflow Rate [gpd/ft^2]	730
Peak Sanitary Overflow Rate [gpd/ft^2]	1,147
Average Detention Time [w/ 33% R] [hrs]	1.87
Peak Sanitary Detention Time [w/ 33% R] [hrs]	1.18
Filters	
Number	24
Length [ft]	37.33
Width [ft]	16
Average Surface Loading Rate [gpm/ft^2]	3.18
Peak Sanitary Surface Loading Rate [w/1 o/s] [gpm/ft^2]	5.22
Filter Effluent/Backwash Pumps	
Number	5
Capacity Per Pump [mgd]	3 @ 43 2 @ 30
Filter Waste Backwash Recovery Tanks	
Number	1
Effective Volume [gal]	137,000
Chlorine Contact Tanks	
Number	2
Length [ft]	800
Width [ft]	26.92
Sidewater Depth [ft]	13
Number	2
Length [ft]	225
Width [ft]	30
Sidewater Depth [ft]	15
Number	3
Length [ft]	150
Width [ft]	20
Sidewater Depth [ft]	10
Average Detention Time [hrs]	2.44
Peak Sanitary Detention Time [hrs]	1.53

* *Affects loading rates on processes downstream of the primary sedimentation tanks.*

** *Based on 1993 LCWRP operational data and design plant flow of 62.5 mgd.*

Sewer Construction

As noted previously, the expansion of the WNWRP coupled with an expansion of the LCWRP to 62.5 mgd would require that the LCWRP Interceptor divert flow from JO "B" Trunk Sewer which would contain high concentrations of solids removed at the WNWRP. Since this would cause operational problems at the LCWRP, a WNWRP solids diversion sewer must be constructed. This dedicated solids sewer would convey solids removed at the WNWRP to a trunk sewer which flows directly to the JWPCP. This would require approximately a two mile long sewer which would be placed in an alignment parallel to the existing JO "B" Trunk Sewer between the WNWRP and the juncture of the JO "B" and JO "H" Trunk Sewers near Whittier Boulevard.

Tentative Phasing of Alternative 4 Facilities

As noted in Section 6.3.3 of this chapter, proposed facilities will be service phased. Facilities will be constructed when increases in actual wastewater flows indicate that the JOS needs to be expanded. The phasing of proposed facilities may, however, be tentatively identified based on wastewater flow projections. For Alternative 4, JWPCP facilities would be constructed first and would be fully operational on or before December 31, 2002 as required by the Consent Decree. The WNWRP expansion would come on-line during the same year as the JWPCP full secondary treatment facilities, and would be followed by the SJCWRP expansion and then the LCWRP expansion. The WNWRP expansion would be on-line in 2002, the SJCWRP expansion would to be on-line in 2005, and the LCWRP expansion would be on-line in 2007. Design and construction of these facilities would tentatively be scheduled to begin as follows: 1997 and 1999 respectively for the WNWRP, 2001 and 2003 respectively for the SJCWRP, and 2002 and 2005 respectively for the LCWRP. Tentative phasing of facilities proposed in Alternative 4 is illustrated in Figure 6.12-17. If wastewater flows develop more rapidly than flow projections indicate, the implementation of proposed facilities would be accelerated. If , on the other hand, wastewater flows develop more slowly than flow projections indicate, the implementation of proposed facilities would be delayed.

The actual sequencing of WRP expansions in Alternative 4, WNWRP then SJCWRP then LCWRP, was based on a number of factors. The Districts would like to construct the SJCWRP expansion first but flow projections indicate that year 2002 (the date the first planned WRP expansion would come on-line) flows tributary to the SJCWRP would not be sufficient to justify this expansion unless the SJCWRP Interceptor is relieved. Based on flow projections, the maximum year 2002 flow at the SJCWRP is expected to be only 119 mgd while the plant capacity would be 125 mgd. Since the system would ideally be operating at capacity in the year 2002 with 125 mgd of flow at the SJCWRP, this implies that in 2002, other JOS facilities would have to process approximately 6 mgd more flow than their cumulative design capacities unless the phasing of expansion projects was accelerated. Year 2005 (the date that the second planned WRP expansion would come on-line) flows tributary to the SJCWRP would, however, be sufficient to justify expansion of the SJCWRP second. It is also not desirable to expand the LCWRP first because this would impact the driving range adjacent to the LCWRP in 1999. If the driving range must be impacted, the Districts would like to delay necessary impacts as long as possible. In addition, the planned LCWRP expansion is only 25 mgd as opposed to the planned 37.5 mgd expansion of the WNWRP. Implementation of only a 25 mgd WRP expansion in 2002 would accelerate the planned phasing of the second, and possibly the third WRP expansions.

6.13 ANALYSIS OF FINAL PROJECT ALTERNATIVES

In order to identify the preferred project alternative from the set of final project alternatives, the final project alternatives will be evaluated and compared based on the following:

- The ability of each alternative to meet identified project needs,
- The cost effectiveness of each of the alternatives,
- The technical feasibility of each of the alternatives,
- The environmental impacts of each of the alternatives, and
- The public comments on or public acceptance of each of the alternatives.

6.13.1 MEETING PROJECT NEEDS

A set of project needs for the JOS 2010 Master Facilities Plan was developed based on the previously identified project objectives. In order to achieve project objectives, each of the project needs listed below must be satisfied.

- Provide wastewater treatment capacity within the JOS to accommodate anticipated growth through the year 2010.
- Provide full secondary treatment to all JOS wastewater flows by December 31, 2002.
- Provide wastewater conveyance capacity necessary to transport year 2010 projected wastewater flows to JOS treatment facilities.
- Provide plant peaking capacity sufficient to accommodate peak sanitary flows.
- Provide hydraulic capacity in wastewater treatment and effluent management facilities capable of safely managing peak storm flows.
- Provide solids processing facilities (digestion and dewatering) necessary to process projected solids production in the year 2010.
- Provide biosolids management capacity necessary for year 2010 projected biosolids production.

- Provide water reclamation facilities capable of satisfying demands for reclaimed water identified in the Regional Wastewater Reclamation and Reuse Operations Coordination Study in which the District participated.

- Provide a system compatible with long range (beyond 2010) growth and needs of the JOS.

The ability of each of the final project alternatives to satisfy each of these project needs is evaluated below.

Provide wastewater treatment capacity within the JOS to accommodate anticipated growth through the year 2010.

In order to accommodate expected growth within the JOS, wastewater treatment facilities must provide at least 628 mgd capacity by 2010 and system expansions should be phased to accommodate increasing wastewater flows as they develop. All of the four final project alternatives can serve expected growth within the JOS equally well. Figures 6.12-7, 6.12-10, 6.12-13, and 6.12-17 illustrate the ability of Alternatives 1 through 4 respectively to accommodate expected growth by appropriate expansions of JOS facilities. Table 6.13-1, which is based on JOS flow projections (see Figure 5.2-2) illustrates the ability of the four final project alternatives to accommodate projected JOS wastewater flows in 2010 at the system level and at the treatment plant level. Table 6.13-1 indicates that each of the final project alternatives would provide wastewater treatment facilities which are consistent with year 2010 projected wastewater flows.

Provide full secondary treatment to all JOS wastewater flows by December 31, 2002.

In order to comply with the Consent Decree, the Districts must provide full secondary treatment to all JOS wastewater flows on or before December 31, 2002. All of the final project alternatives are consistent with this Consent Decree requirement. The ability of each of the final alternatives to provide full secondary treatment to JOS wastewater prior to the Consent Decree deadline is illustrated in Figures 6.12-7, 6.12-10, 6.12-13, and 6.12-17.

Provide wastewater conveyance system capacity necessary to transport year 2010 projected wastewater flows to JOS treatment facilities.

This Facilities Plan is not intended to be a master plan for wastewater conveyance facilities. In order to ensure that JOS sewers can accommodate increasing wastewater flows, the Districts will continue their existing sewer monitoring and planning program to identify necessary sewer relief and/or rehabilitation projects. Joint Outfall trunk sewers are inspected by the Districts' Sewer Maintenance Section on a rotating basis approximately once every two years. During these inspections, the level of flow, the condition of the sewer, and several chemical parameters are recorded.

Table 6.13-1
JOINT OUTFALL SYSTEM ALTERNATIVES SHOWING TREATMENT PLANT FLOWS FROM DIFFERENT DRAINAGE AREAS

ALTERNATIVES — TREATMENT PLANT FLOW BY DRAINAGE AREAS

#1

	PWRP	LBWRP		JWPCP							SJCWRP			WNWRP		LCWRP	
Drainage areas	1	9	10	11	CB	10	6	12&13	8	5	1	2	3	3	5	8	7
Sub flows (mgd)	13	6	19	338	8	2	1	2	3	46	9	86	30	12	3	19	31
Total flow (mgd)	13	25		400							125			15		50	

#2

	PWRP	LBWRP		JWPCP							SJCWRP			WNWRP		LCWRP		
Drainage areas	1	9	10	11	CB	10	6	12&13	2	5	1	2	3	3	5	8	5	7
Sub flows (mgd)	13	6	19	338	8	2	1	2	27	22	9	59	32	10	5	22	22	31
Total flow (mgd)	13	25		400							100			15		75		

#3

	PWRP	LBWRP		JWPCP								SJCWRP			WNWRP		LCWRP	
Drainage areas	1	9	10	11	CB	10	6	12&13	2	8	5	1	2	3	3	5	8	7
Sub flows (mgd)	13	6	19	338	8	2	1	2	27	15.5	6.5	9	59	32	10	42.5	6.5	31
Total flow (mgd)	13	25		400								100			52.5		37.5	

#4

	PWRP	LBWRP		JWPCP					SJCWRP			WNWRP		LCWRP		
Drainage areas	1	9	10	11	CB	10	6	12&13	1	2	3	3	5	5	7	8
Sub flows (mgd)	13	6	19	338	8	2	1	2	9	86	30	12	40.5	8.5	31	22
Total flow (mgd)	13	25		350					125			52.5		61.5		

No Project

	PWRP	LBWRP	JWPCP	SJCWRP	WNWRP	LCWRP
Total flow (mgd)	13	25	385	100	15	37.5

DA	Tot. Flow
1	22
2	86
3	42
5	49
6	1
7	31
8	22
9	6
10	21
11	338
12	1
13	1
CB	8

DA: Drainage Areas

CB: Chino Basin

Following an inspection, the Sewer Maintenance Section assigns a relief priority rating for each section of a trunk sewer which will require relief within the next five years. The relief priority is based on the following factors: the level of flow observed in the most recent inspection of the sewer, the historical trend of the level of flow in the sewer, and the existence or absence of a wet weather inflow or infiltration problem. The Sewer Maintenance Section's findings are then sent to the Districts' Sewer Design Section which is responsible for design and scheduling of relief projects.

Sewer rehabilitation projects are identified in a manner similar to that by which relief projects are identified. As stated, the Districts Sewer Maintenance Section routinely monitors chemical parameters such as pH and hydrogen sulfide gas concentrations in sewers. These two chemical parameters are perhaps the most important indicators of the potential for structural decay inside of sewers. Based on the results of chemical monitoring, visual inspections are performed for sewers with high decay potential. Based on the findings of these visual inspections, the Sewer Maintenance Section identifies sewers in need of imminent rehabilitation and reports its findings to the Districts' Sewer Design Section which is responsible for design and scheduling of sewer rehabilitation projects.

Project alternatives may, however, be evaluated and compared based on their ability to provide excess capacity in sewers which interconnect the WRPs and the JWPCP. With respect to this parameter, Alternative 4 provides the most excess capacity, but Alternative 3 also provides excess capacity. Alternatives 1 and 2 would clearly be inferior to Alternatives 3 and 4, but both would still provide excess capacity in the sewer system. Alternative 2 would actually require relief of sewers which interconnect the WRPs, but excess capacity would be provided by the required relief sewer.

As stated, the Districts will continue the existing sewer monitoring and planning program described above in order to ensure that adequate wastewater conveyance facilities are provided to accommodate increasing wastewater flows. Sewer relief and rehabilitation projects will be identified as described above and will be constructed to ensure system integrity.

Provide sufficient plant peaking capacity to accommodate peak sanitary flows.

JOS treatment facilities must be designed to provide adequate treatment to peak sanitary flows. Peak sanitary flow refers to the normal peak in the diurnal variation in wastewater flow tributary to a wastewater treatment facility. Peak sanitary flow is typically expressed in terms of a peak sanitary to average flow ratio based on dry weather flows. Dry weather peak and average sanitary flows and the resultant peak sanitary to average flow ratios which were actually recorded at JOS treatment plants in 1993 are given in Table 6.13-2. Peak sanitary and average design flows and the resultant peak sanitary to average flow design ratios are given in Table 6.13-3. Comparison of recorded peak sanitary to average flow ratios in Table 6.13-2 to the peak sanitary to average flow ratios for which proposed JOS treatment facilities would be designed (in Table 6.13-3) indicates that, with the exception of the WNWRP, the SJCWRP East, and the PWRP, peak sanitary to average flow design ratios exceed recorded peak sanitary to average flow ratios.

As noted, recorded peak sanitary to average flow ratios at the WNWRP, the SJCWRP East, and the PWRP are slightly greater than the ratio for which existing and proposed facilities have been designed. At the SJCWRP East, however, actual peak sanitary flows did not exceed peak sanitary design flows. Inspection of data in Tables 6.13-2 and 6.13-3 indicates that actual peak sanitary flows did exceed peak sanitary design flows at the PWRP and WNWRP facilities in 1993. It should be noted, however, that Districts' facilities are designed with sufficient redundancy and capacity to treat peak sanitary flows that somewhat exceed their peak sanitary design capacity without causing effluent violations. As a result, the PWRP and WNWRP were able to accommodate and provide adequate treatment to these flows and did not violate discharge permit limitations. In addition, the need to accept and treat peak sanitary flows in excess of peak sanitary design at JOS facilities is mitigated by the interconnection of JOS treatment facilities. Peak flows which could potentially cause a problem at any of the JOS WRPs may be bypassed to another facility for treatment if necessary.

Table 6.13-2
PEAK SANITARY TO AVERAGE FLOW RATIOS AT JOS TREATMENT PLANTS; 1993

Facility	Dry Weather Peak Sanitary Flow (mgd)	Dry Weather Average Flow (mgd)	Peak Sanitary to Average Flow Ratio
JWPCP	425.0	325.3	1.31
SJCWRP East	78.0	53.1	1.48
SJCWRP West	37.0	26.5	1.41
WNWRP	20.5	13.3	1.50
LCWRP	39.0	29.6	1.34
LBWRP	22.0	16.1	1.36
PWRP	20.5	13.3	1.50

Table 6.13-3
PEAK SANITARY TO AVERAGE FLOW DESIGN RATIOS

Facility	Average Design Capacity (mgd)	Peak Sanitary Design Capacity (mgd)	Peak Sanitary to Average Flow Design Ratio
JWPCP	350	469	1.34
	400	540	1.34
SJCWRP East	62.5	90	1.44
SJCWRP West	37.5	55	1.47
	62.5	100	1.60
WNWRP	15	20	1.33
	52.5	80	1.50
LCWRP	37.5	60	1.60
	50	80	1.60
	62.5	100	1.60
	75	120	1.60
LBWRP	25	34	1.36
PWRP	13	19	1.46

Provide hydraulic capacity in wastewater treatment and effluent management facilities capable of safely managing peak storm flows.

JOS wastewater treatment and effluent management facilities must provide sufficient hydraulic capacity to safely manage peak storm flows. Failure to provide sufficient hydraulic capacity in treatment facilities and effluent management facilities would cause raw sewage to back up in sewers tributary to treatment plants or within the treatment plants themselves during rainstorms thereby resulting in spills of untreated wastewater from treatment plants and sewers. Peak storm flow capacities for proposed JOS treatment facilities are given in Table 6.13-4.

Table 6.13-4
PEAK STORM CAPACITY OF PROPOSED JOS FACILITIES

Facility	Average Flow Capacity (mgd)	Peak Storm Capacity (mgd)
JWPCP	350 400	600 630*
LBWRP	25	60
LCWRP	37.5 50.0 62.5 75.0	75 120 125 150
SJCWRP	100 125	200 250
WNWRP	15 52.5	24 99
PWRP	13	26

** The peak storm capacity of the JWPCP is limited by the capacity of the JWPCP effluent tunnel/outfall system which has been identified as 630 mgd at a 7-foot high tide.*

As a system, the JOS must be designed to accommodate the instantaneous system peak flow during a storm event. The instantaneous system peak flow refers to the maximum value of the sum of the flows experienced at JOS treatment plants at the same time. Data in Table 5.2-4 indicate that the peak storm to average flow ratio which the JOS has experienced has approached 2.0 (1.96 in January 1992) in the last 10 years. As noted in the text, however, peak storm flows in this table represent the sum of the maximum peak flows at JOS treatment plants recorded during the storm event. Because rainstorms are not uniform over the entire JOS service area and because the time of concentration (the time it takes the peak flow to reach the tributary treatment facility) varies widely for each JOS drainage area, maximum peak flows at JOS treatment plants generally occur at different times at different facilities. Peak storm flow data in Table 5.2-4 do not, therefore, represent the instantaneous peak storm flow which the JOS must accommodate.

Based on observed flows and expected trends in JOS development, the expected year 2010 system peak storm to average flow ratio for the JOS is approximately 1.7 to 1. This 1.7 to 1 ratio is not expected to apply uniformly to the entire JOS service area. Rather, the peak storm to average flow ratio is expected to vary in different drainage areas, and the aggregate peak storm to average flow ratio for the JOS is expected to be approximately 1.7 to 1.

Peak storm flows are largely a result of inflow to the sewer system. Inflow to the sewer system in any drainage area is primarily a function of the number of miles of sewer exposed to inflow in that drainage area, and secondarily, a function of the amount of rainfall in that drainage area. Because the annual rainfall in the JOS increases as one travels from the coast in the "lower" portions of the JOS to the foothills of the San Gabriel Mountains in the "upper" portions of the JOS, peak storm to sanitary flow ratios are generally expected to decrease from north to south in the JOS. In addition, the peak storm to average flow ratio is expected to be significantly lower in the largest JOS drainage area (Area 11 in Figure 5.2-2), which is tributary to the JWPCP compared to that for other drainage areas for the following reasons. This drainage area is significantly larger than, and is more densely developed than other drainage areas. Because it is larger, the time of concentration is longer, thus, the duration of the inflow hydrograph will be longer and the peak of the hydrograph will not be as severe. The density of development in this area indicates that the ratio of the number of miles of sewer to the average sanitary flow is lower in this area than in other areas. Since inflow in an area which determines the storm peak is a function of the miles of sewers in that area, the volume of inflow per unit sanitary flow will also be lower in Area 11 than in other areas. Thus, the peak storm to average flow ratio will be significantly lower in Area 11 than in other drainage areas. JOS flow monitoring data supports the above theory. Since expected growth in the JOS is generally expected to reflect densification of existing development rather than new development, and as such there should be relatively little new sewer construction to support this growth, peak storm to average flow ratios should fall throughout the JOS. The following peak storm to average flow ratios and peak storm flows (Table 6.13-5) will be assumed for JOS drainage areas and the resulting peak storm to average flow ratio for the entire JOS is approximately 1.72 to 1.

Table 6.13-5
PEAK STORM TO AVERAGE FLOW RATIOS FOR JOS DRAINAGE AREAS

Drainage Area	Average Flow (mgd)	Peaking Factor	Peak Flow (mgd)
1	22.0	2.0	44
2	86.0	2.0	172
3	42.0	1.9	80
5	49.0	1.8	88
6	1.0	1.8	2
7	31.0	1.8	56
8	22.0	1.8	40
9	6.0	1.8	11
10	21.0	1.8	38
11	338.0	1.6	541
12	1.0	1.8	2
13	1.0	1.8	2
CB*	7.6	1.0	8
TOTAL	**627.6**	**1.72**	**1084**

* *CB = Chino Basin contracted flow*

Based on the information given above in Table 6.13-5 and in Appendix A-6.7, minimum and/or maximum peak storm flows tributary to JOS treatment plants may be identified for each of the project alternatives.

Alternative 1

JWPCP: Drainage Areas 6, 11, 12, 13 and CB flow directly to the JWPCP; thus, the JWPCP must, at minimum, accommodate peak storm flows generated in these areas. The minimum JWPCP peak storm flow is, therefore, 555 mgd. The JWPCP must treat and discharge all influent it receives.

LBWRP: The maximum flow tributary to the LBWRP is 27 mgd (all flow from Drainage Areas 9 and 10). The maximum LBWRP peak storm flow is, therefore, 49 mgd. Peak storm flows which the LBWRP cannot accommodate may be bypassed to the JWPCP for treatment.

PWRP: The maximum flow tributary to the PWRP is 22 mgd (all flow from Drainage Area 1). The maximum PWRP peak storm flow is, therefore, 44 mgd. Peak storm flows which the PWRP cannot accommodate may be bypassed to the SJCWRP and/or the JWPCP for treatment.

SJCWRP: Under storm flow conditions, the SJCWRP will receive all flow which cannot be treated at the PWRP, the maximum amount of flow the SJCWRP Interceptor can deliver, and the peak storm flow from Drainage Area 2. Since 18 mgd (44-26) must bypass the PWRP, the peak capacity of the SJCWRP Interceptor is 45 mgd and the peak storm flow from Drainage Area 2 is 172 mgd, the maximum SJCWRP peak storm flow is approximately 235 mgd. Peak storm flows which cannot be treated at the SJCWRP may be bypassed to the LCWRP and/or the JWPCP for treatment.

WNWRP: Under storm flow conditions, peak flows from Drainage Areas 3 and 5 less SJCWRP Interceptor flows to the SJCWRP (45 mgd) will be tributary to the WNWRP. Peak flows from Drainage Areas 3 and 5 are 80 and 88 mgd respectively. The maximum peak storm flow tributary to the WNWRP is, therefore, approximately 123 mgd. Peak flows which the WNWRP cannot accommodate may be bypassed to the LCWRP and/or the JWPCP for treatment.

LCWRP: During storm flow conditions, the LCWRP may receive any flow which bypasses the WNWRP and peak storm flows generated in Drainage Areas 7 and 8. Flows which bypass the SJCWRP may also be diverted to the LCWRP but are generally routed around the LCWRP because they are mixed with industrial waste flow from the Chino Basin. Flow from Drainage Area 8 and flow which bypasses the WNWRP and/or the SJCWRP and are diverted to the LCWRP are conveyed to the LCWRP via the LCWRP Interceptor. Given Alternative 1, 98 mgd (123-25) of flow must bypass the WNWRP via JO "B", and peak flows from Drainage Areas 7 and 8 are 56 and 40 mgd, respectively. Since the peak capacity of the LCWRP Interceptor is only 82 mgd, the maximum peak storm flow tributary to the LCWRP is 138 mgd. Peak storm flows which cannot be treated at the LCWRP and JO "B" flows which cannot be diverted to the LCWRP must be bypassed to the JWPCP for treatment.

Alternative 2

Minimum and maximum peak storm flows tributary to all JOS treatment facilities are identical to those identified for Alternative 1.

Alternative 3

JWPCP, LBWRP, PWRP, SJCWRP and **WNWRP:** Minimum and maximum peak storm flows for these JOS treatment facilities are identical to those identified for Alternative 1.

LCWRP: Under storm flow conditions, the LCWRP may receive any flow which bypasses the WNWRP and peak storm flows generated in Drainage Areas 7 and 8. Flows which bypass the SJCWRP may also be diverted to the LCWRP but are generally routed around the LCWRP because they are mixed with industrial waste flow from the Chino Basin. Flow from Drainage Area 8 and flow which bypasses the SJCWRP and/or the WNWRP and are diverted to the LCWRP are conveyed to the LCWRP via the LCWRP interceptor which has peak capacity of 82 mgd. Given Alternative 3, 35 mgd (235-200) must bypass the SJCWRP via JO "H", 24 mgd (123-99) must bypass the WNWRP via JO "B", and peak flows from

Drainage Areas 7 and 8 are 56 and 40 mgd, respectively. Since the peak capacity of the LCWRP Interceptor is 82 mgd the maximum peak storm flow tributary to the LCWRP is 138 mgd. Peak storm flows which cannot be treated at the LCWRP, and JO "B" and JO "H" flows which cannot be diverted to the LCWRP must be conveyed to the JWPCP for treatment.

Alternative 4

JWPCP, LBWRP, PWRP, SJCWRP, and **WNWRP:** Minimum and maximum peak storm flows tributary to these facilities are identical to those identified for Alternative 1.

LCWRP: Under storm flow conditions, the LCWRP may receive any flow which bypasses the WNWRP and peak storm flows generated in Drainage Areas 7 and 8. Flows which bypass the SJCWRP may also be diverted to the LCWRP but are, instead, generally routed around the LCWRP because they are mixed with industrial waste flows from the Chino Basin. Flow from Drainage Area 8 and flow which bypasses the SJCWRP and/or the WNWRP and is diverted to the LCWRP is conveyed to the LCWRP via the LCWRP Interceptor which has a peak capacity of 82 mgd. Given Alternative 3, 24 mgd (123-99) must bypass the WNWRP via JO "B", and peak flows from Drainage Areas 7 and 8 are 56 and 40 mgd respectively. The maximum peak storm flow tributary to the LCWRP is, therefore, 120 mgd. Peak storm flows which cannot be treated at the LCWRP, and JO "B" flows which cannot be diverted to the LCWRP must be conveyed to the JWPCP for treatment.

Maximum peak storm flows for each of the JOS WRPs under each proposed alternative are summarized in Table 6.13-6 below.

Table 6.13-6
MAXIMUM PEAK STORM FLOWS TRIBUTARY TO JOS WRPS

Alternative No.	LBWRP (mgd)	PWRP (mgd)	SJCWRP (mgd)	WNWRP (mgd)	LCWRP (mgd)
1	49	44	235	123	138
2	49	44	235	123	138
3	49	44	235	123	138
4	49	44	235	123	120

The ability of the facilities identified in each of the final alternatives to accommodate expected system peak flows is assessed in Tables 6.13-7 through 6.13-10. It is assumed that WRPs will accept the maximum amount of flow possible and the ability of each alternative to accommodate system peak flows will be assessed by the ability of the JWPCP to accommodate the balance of JOS peak flows.

Table 6.13-7
ALTERNATIVE 1: ABILITY TO ACCOMMODATE PEAK STORM FLOWS

Facility	Maximum Peak Storm Flow (mgd)	Peak Flow Capacity (mgd)	Peak Flow Treated (mgd)
PWRP	44	26	26
SJCWRP	235	250	235
WNWRP	123	24	24
LCWRP	138	120	120
LBWRP	49	60	49
JWPCP	—	630	628

Table 6.13-8
ALTERNATIVE 2: ABILITY TO ACCOMMODATE PEAK STORM FLOWS

Facility	Maximum Peak Storm Flow (mgd)	Peak Flow Capacity (mgd)	Peak Flow Treated (mgd)
PWRP	44	26	26
SJCWRP	235	200	200
WNWRP	123	24	24
LCWRP	138	150	138
LBWRP	49	60	49
JWPCP	—	630	645

Table 6.13-9
ALTERNATIVE 3: ABILITY TO ACCOMMODATE PEAK STORM FLOWS

Facility	Maximum Peak Storm Flow (mgd)	Peak Flow Capacity (mgd)	Peak Flow Treated (mgd)
PWRP	44	26	26
SJCWRP	235	200	200
WNWRP	123	99	99
LCWRP	138	75	75
LBWRP	49	60	49
JWPCP	—	630	633

Table 6.13-10
ALTERNATIVE 4: ABILITY TO ACCOMMODATE PEAK STORM FLOWS

Facility	Maximum Peak Storm Flow (mgd)	Peak Flow Capacity (mgd)	Peak Flow Treated (mgd)
PWRP	44	26	26
SJCWRP	235	250	235
WNWRP	123	99	99
LCWRP	120	125	120
LBWRP	49	60	49
JWPCP	—	600	555

Based on this analysis, it is apparent that proposed Alternatives 1 and 4 are capable of accommodating JOS peak storm flows, but Alternative 4 provides the largest margin of safety at the JWPCP. Proposed Alternatives 2 and 3 are not capable of accommodating expected JOS peak storm flows.

It should be noted that the identified peak storm capacities of the Districts' WRPs are based on conservative design procedures. As a result, these facilities are generally capable of treating flows in excess of identified peak storm capacities and have routinely done so without violating operating permits. In addition, for all alternatives, allowing the SJCWRP and/or the LCWRP Interceptors to surcharge during storm events would allow these sewers to divert more flow away from the JWPCP thereby increasing peak flows tributary to the SJCWRP and/or the LCWRP which would improve the system's ability to effectively manage peak storm flows.

Provide solids processing facilities necessary to process projected solids generation through the year 2010.

Proposed solids processing facilities are identical for all of the final project alternatives. The year 2010 planned digester capacity is 14,500,000 cubic feet (ft^3), and with one tank out of service, the hydraulic detention time is 18 days. The design temperature of 95°F and the design volatile suspended solids (VSS) loading rate of 0.095 lbs VSS/ft^3/day are well within the accepted standard design practice. The expected VSS destruction of 48% is well above the minimum required per federal regulations for the Districts' biosolids management program.

Digested solids flows are expected to total 4,100 gpm on average and 5,100 gpm at maximum. Proposed dewatering facilities, which have been identified in Table 6.12-2, have sufficient capacity to accommodate expected digested solids flows.

In summary, solids processing facilities identified for all of the final project alternatives (which are in fact identical) are all capable of satisfying the need to provide sufficient solids processing facilities.

Provide biosolids management capacity necessary for projected year 2010 biosolids generation.

Biosolids management facilities are also identical for all final project alternatives. The Districts' biosolids management program for the year 2010 is described in detail in Section 6.12.2 of this chapter. Biosolids management alternatives identified in the biosolids management plan are capable of providing sound biosolids management though the year 2010.

Provide water reclamation facilities capable of satisfying demands for reclaimed water identified in the Coordination Study prepared by the Central Basin MWD in conjunction with several local water purveyors and the Districts.

There are a number of reclaimed water projects which are presently under construction or are planned to be implemented in the near future. These projects have generally been planned by and are being constructed by water purveyors (typically MWD member agencies) which provide potable water to the area that the reclaimed water projects will serve. Each project is generally composed of a reclaimed water distribution pipeline or network. Existing and planned reclaimed water projects are illustrated in Figure 6.13-1. The JOS WRPs presently supply, and/or will supply reclaimed water to several of the existing and/or planned projects. In order to coordinate supplies of and demands for reclaimed water produced at the Districts' Pomona, San Jose Creek, Los Coyotes, and Whittier Narrows WRPs which serve multiple reuse projects, the Districts participated in the Regional Wastewater Reclamation and Reuse Operation Coordination Study (Coordination Study) which was prepared under the direction of the Central Basin Municipal Water District. The Coordination Study identified the demands for reclaimed water from each of the above WRPs following implementation of all of the currently planned reclamation projects. It is the Districts' intention to provide facilities capable of meeting demands for reclaimed water identified in the Coordination Study to the extent feasible.

Demands for reclaimed water through the year 2020 from the JOS WRPs which have been identified in the Coordination Study are identified in Table 6.13-11. Data in this table indicate that there is an excess supply of reclaimed water at the LCWRP even at the present plant capacity of 37.5 mgd. This finding is corroborated in the Coordination Study which forecasts a minimum monthly surplus of approximately 17 mgd on average at the LCWRP and which suggests that excess reclaimed water from the LCWRP could be diverted to other areas for reuse. The Coordination Study and the table also indicate that the existing WNWRP and SJCWRP cannot successfully supply all identified users of reclaimed water from these plants. Based on planned reclaimed water use from the WNWRP and the SJCWRP, the Coordination Study projects a maximum monthly deficit of approximately 23 mgd. The Coordination Study and Table 6.13-11 also indicate that the PWRP cannot supply identified demands for reclaimed water from the plant. The Coordination Study projects a maximum monthly deficit of approximately 11.5 mgd in reclaimed water supply. Monthly deficits projected in the Coordination Study for the PWRP and the WNWRP and SJCWRP and the total (all three plants) monthly deficits are given in Table 6.13-12.

In order to supply identified demands for reclaimed water, the Coordination Study recommends that the Districts make the following changes to the JOS if feasible. First, the capacity of the PWRP should be expanded from 13 to 16 mgd via the addition of flow equalization facilities. Second, either the SJCWRP or the WNWRP should be expanded by 25 mgd and/or a pumpback facility should be constructed to deliver water from the LCWRP to reuse projects which would otherwise be served by either the SJCWRP or the WNWRP.

All of the proposed project alternatives are capable of supplying demands for reclaimed water identified in the Coordination Study. The expansion of the PWRP which was suggested as part of the Coordination Study has been found to be infeasible, but the expansion of reclaimed water distribution systems tributary to the SJCWRP and/or the WNWRP toward the PWRP will enable these systems to serve the demands for reclaimed water which have been identified around the PWRP. Alternatives 1, 2 and 3 provide an additional 37.5 mgd of WRP capacity at the LCWRP, the WNWRP, and/or the SJCWRP. By contrast the maximum monthly deficit from the SJCWRP, WNWRP, and PWRP identified in Table 6.13-12 is only 29.5 mgd. In order to meet the identified demands for reclaimed water, a small pumpback facility for reclaimed water from the LCWRP would be required for Alternative 1, which provides only 25 mgd additional reclamation capacity at SJCWRP. A large pumpback facility would be required for Alternative 2, which provides all additional reclamation capacity at the LCWRP. No pumpback facility would be required for Alternative 3, which provides 37.5 mgd additional reclamation capacity at the WNWRP, or for Alternative 4, which provides 62.5 mgd additional reclamation capacity at the SJCWRP and the WNWRP.

Table 6.13-11
2020 DEMANDS FOR RECLAIMED WATER
IDENTIFIED IN COORDINATION STUDY

Facility	Existing Capacity (mgd)	Identified Demand (mgd)
LCWRP	37.5	13.0
PWRP	13.0	18.0
SJCWRP	100.0	129.0
WNWRP	15.0	
TOTAL	**165.5**	**160**

Table 6.13-12
PROJECTED RECLAIMED WATER SUPPLY DEFICITS FOR 2020
BASED ON DEMANDS IDENTIFIED IN COORDINATION STUDY

Month	PWRP (mgd)	WNWRP/SJCWRP (mgd)	Total (mgd)
JUL	11.5	18.1	29.5
AUG	10.5	16.0	26.4
SEP	9.8	16.2	26.0
OCT	6.3	21.6	27.9
NOV	4.5	17.6	22.1
DEC	0.7	17.2	18.0
JAN	-0.2	16.3	16.1
FEB	-0.1	17.2	17.2
MAR	1.0	22.7	23.7
APR	4.3	18.3	22.6
MAY	6.8	21.0	27.9
JUN	11.3	16.3	27.6

Provide a system compatible with long range growth and needs of the JOS.

With respect to long range growth, it is important to identify a system which will be compatible with the next logical expansion of the system. None of the four project alternatives are incompatible with the long range development of the JOS, but not all of the projects are equal in their ability to accommodate long range growth. Alternative 2, for example, requires a relief sewer which may not be compatible with long range growth. Subsequent expansions of the SJCWRP and/or the WNWRP and the development of additional wastewater flow within the area tributary to the LCWRP may render the required relief sewer obsolete. Alternative 4 presents a problem for the long range development of the JOS. The Districts would like to use the JWPCP as the "balancing plant" in the JOS. As such, influent to the JWPCP would never be allowed to completely reach the plant's design capacity before one of the upstream WRPs is expanded. In this manner, excess treatment capacity would be maintained at the JWPCP to allow the Districts a margin of safety to ensure that all JOS wastewater receives adequate treatment while system expansions are being planned and implemented. It would also allow the Districts to build WRP expansions where wastewater flows have already developed rather than relying on projections to plan expansions. Alternative 4 calls for 350 mgd of capacity at the JWPCP. The JOS flow projections indicate that the minimum wastewater flow tributary to the JWPCP in 2010 is 349 mgd. Thus, it would be impossible to utilize the JWPCP as the "balancing plant" if Alternative 4 is chosen. On the other hand, based on the information presented in Section 2.5 of this report, it is apparent that the demand for reclaimed water will increase dramatically in the near future. Planning documents prepared by state and regional water agencies identify a need for an almost three-fold increase in the use of reclaimed water within the MWD service area (of which the JOS is a part) over the next 15 years. To this extent, Alternative 4, which would provide 50 mgd more reclaimed water than Alternatives 1, 2 or 3, would be relatively more compatible with the projected long range reclaimed water needs in the JOS service area.

6.13.2 COST

The Districts have prepared cost estimates for each of the proposed projects based on historic construction, design, and operation and maintenance (O&M) costs for similar facilities. Estimated project costs, in 1994 dollars, for each of the project alternatives are presented in Table 6.13-13. Estimated project costs have been converted to an equivalent annual cost, assuming that proposed facilities are amortized over 20 years, to allow comparison of project alternatives.

Table 6.13-13
COMPARISON OF EQUIVALENT ANNUAL COSTS FOR
JOS MASTER FACILITIES PLAN ALTERNATIVES

	Construction Costs $	Engineering Cost Construction and Design $	Total $	Annual O&M	Equivalent Annual Cost
ALTERNATIVE NO. 1:					
JWPCP (200 mgd Secondary)	$170,700,000	$34,100,000	$204,800,000	$9,600,000	$30,500,000
San Jose Creek WRP (25 mgd Expn.)	29,400,000	5,900,000	35,300,000	2,800,000	6,400,000
Los Coyotes WRP (12.5 mgd Expn.)	16,400,000	3,300,000	19,700,000	1,400,000	3,400,000
TOTAL	**216,500,000**	**43,300,000**	**259,800,000**	**13,800,000**	**40,300,000**
ALTERNATIVE NO. 2:					
JWPCP (200 mgd Secondary)	$170,700,000	$34,100,000	$204,800,000	$9,600,000	$30,500,000
Los Coyotes WRP (37.5 mgd Expn.)	44,700,000	8,900,000	53,600,000	4,200,000	9,700,000
Sewer Relief	17,000,000	3,400,000	20,400,000	400,000	2,500,000
TOTAL	**232,400,000**	**46,400,000**	**278,800,000**	**14,200,000**	**42,600,000**
ALTERNATIVE NO. 3:					
JWPCP (200 mgd Secondary)	$170,700,000	$34,100,000	$204,800,000	$9,600,000	$30,500,000
Whittier Narrows WRP (37.5 mgd Expn.)	61,800,000	12,400,000	74,200,000	4,800,000	12,300,000
TOTAL	**232,500,000**	**46,500,000**	**279,000,000**	**14,400,000**	**42,800,000**
ALTERNATIVE NO. 4:					
JWPCP (150 mgd Secondary)	$143,000,000	$28,600,000	$171,600,000	$5,900,000	$23,400,000
San Jose Creek WRP (25 mgd Expn.)	29,400,000	5,900,000	35,300,000	2,800,000	6,400,000
Whittier Narrows WRP (37.5 mgd Expn.)	61,800,000	12,400,000	74,200,000	4,800,000	12,300,000
Los Coyotes WRP (25 mgd Expn.)	32,100,000	6,400,000	38,500,000	2,800,000	6,800,000
Sludge Line	3,500,000	700,000	4,200,000	100,000	500,000
TOTAL	**269,800,000**	**54,000,000**	**323,800,000**	**16,400,000**	**49,400,000**
COMMON ELEMENT					
JWPCP (Solids Processing)	$164,000,000	$32,800,000	$196,800,000	$14,800,000	$34,800,000

6.13.3 TECHNICAL ANALYSIS

Design, Construction, and Scheduling

Alternatives 1 and 2, which involve no expansion of the WNWRP, would be relatively easy to design and construct. Proposed expansions at the SJCWRP and the LCWRP employ standard Districts' WRP design, and preliminary site layout and design work have already been done for these expansions. In addition, many of the facilities necessary for proposed expansions to the SJCWRP and LCWRP have been provided during previous expansions at these plants.

Alternatives 3 and 4 each involve an expansion of the WNWRP and, therefore, would be more difficult to design and construct. As noted previously, the WNWRP would be constructed on 6 to 10-feet of imported fill. Proposed WNWRP facilities would, therefore, require unique and possibly innovative design. Provisions would have to be made during the construction process to replace reservoir capacity lost to construction of WNWRP facilities. In addition, the proposed expansion of the WNWRP would conceptually represent a new WRP rather than an expansion of the existing facility. In contrast to the proposed expansions to the SJCWRP and the LCWRP, the proposed expansion to the WNWRP could not utilize facilities already in place at the existing treatment plant. Thus, more construction would be required to expand the WNWRP than to expand the SJCWRP and/or the LCWRP by the same capacity. The WNWRP is also subject to liquefaction during a strong earthquake. Removal and recompaction of existing soil may be necessary prior to construction.

With respect to project scheduling, Alternatives 1 and 2 would be the easiest to implement, Alternative 3 would be more difficult to implement and Alternative 4 would be the most difficult to implement. As noted above, Alternatives 1 and 2 employ Districts' standard designs and, as illustrated in Figures 6.12-7 and 6.12-10, proposed scheduling of these alternatives does not require simultaneous design or construction of facilities. The proposed schedule for Alternative 3 is more troublesome than that for Alternative 1 and 2 simply because the WNWRP expansion is included in this alternative. As noted, the proposed WNWRP expansion would require a unique design. Following completion of JWPCP design work in 1998, the Districts' Treatment Plant Design Section would have only a limited amount of time to devote to WNWRP design. In addition, it is generally believed that it would take longer to complete environmental documentation for and to receive necessary permits and approvals for a WNWRP expansion than for an expansion of either the SJCWRP or the LCWRP. The proposed schedule for Alternative 4 will be the most difficult to implement because it will include all of the same complications as Alternative 3 plus additional complications. First, Alternative 4 requires that the WNWRP expansion be completed by 2002 as opposed to 2006. Design of the proposed WNWRP facilities would, therefore, have to begin in 1996 and proceed in parallel with design for JWPCP facilities. Perhaps the most obvious complication inherent in Alternative 4 is simply the number of expansion and/or upgrade projects identified in the schedule. Alternative 4 calls for four separate projects; construction of full secondary treatment facilities at the JWPCP and three separate WRP expansions, which must all be completed within a six-year period.

System Operation

With respect to system operation and the operation of individual JOS facilities, Alternative 1 and 2 are not expected to present any special problems. There is concern, however, that Alternatives 3 and 4 could create operational problems. These concerns once more focus on the proposed expansion of the WNWRP. As noted, the expanded WNWRP would operate as two separate but adjacent treatment plants. The resulting duplication of facilities and/or of staff which would be required for relatively small facilities would obviously be inefficient from an operational standpoint.

System Reliability and Flexibility

System reliability and flexibility are, to a degree, complementary goals. System reliability refers to the ability of the system to consistently provide sufficient treatment of JOS wastewater thereby ensuring that public health is protected. System flexibility refers to the ability to move flows between different facilities. System flexibility creates system reliability in the JOS by allowing wastewater flows to be diverted to alternate treatment facilities. To maintain reliability in the JOS, the capacities of the LCWRP, the WNWRP, the SJCWRP East, and the SJCWRP West facilities should be balanced to the extent possible. In addition, excess sewer capacity should be maintained between the SJCWRP/WNWRP facilities and the LCWRP and between the LCWRP and the JWPCP. In this manner it will be possible to shift flows between the larger JOS treatment facilities to accommodate construction and/or operational considerations at the treatment facilities.

Based on these criteria, it is apparent that Alternative 4 offers the most operational reliability and flexibility since WRP capacities are balanced quite evenly between the WNWRP, the LCWRP, the SJCWRP East, and the SJCWRP West. In addition, Alternative 4 provides maximal excess capacity in sewers above the LCWRP and above the JWPCP which would allow flow bypasses. Alternatives 1 and 3 also provide good system reliability and flexibility. Alternative 3 provides slightly more bypass capacity in sewers than Alternative 1 and balances WRP capacities relatively well among the SJCWRP East, SJCWRP West, LCWRP, and WNWRP facilities. Alternative 1 on the other hand balances WRP capacities between the SJCWRP East, SJCWRP West, and LCWRP facilities and maintains the WNWRP as a small facility which may be shut down or bypassed with little net effect on system operation. Alternative 2 provides the lowest degree of system flexibility and reliability. As noted elsewhere in this report, Alternative 2 concentrates a relatively large amount of flow at the LCWRP. Only the SJCWRP East facility would be close to the same size as the expanded LCWRP facility. It would, therefore, be difficult for the JOS to absorb the LCWRP flow if necessary.

6.13.4 ENVIRONMENTAL IMPACTS

Table 6.13-14, which is a summary comparison of the environmental impacts of each of the project alternatives, is based on the environmental impact report (EIR) for the JOS 2010 Master Facilities Plan which was prepared by the environmental consulting firm of Jones and Stokes Associates. A description of the environmental impacts of and a comparison of these impacts for each of the project alternatives is included in the Executive Summary of the Program EIR. Table 6.13-14 indicates that the environmental impacts of each of the four project alternatives are roughly identical. Unique impacts or impacts which are not common for all project alternatives include: adverse impacts to recreational opportunities resulting from loss of the driving range adjacent to the LCWRP in Alternatives 2 and 4, adverse hydrologic impacts resulting from loss of flood control capacity due to construction of WNWRP facilities in the Whittier Narrows flood control basin for Alternatives 3 and 4, and beneficial impacts to the water supply for Alternative 4 which provides 50 mgd of additional reclaimed water in 2010.

In general, however, Table 6.13-14 indicates that the majority of environmental impacts which will occur do not vary from alternative to alternative, but the location at which the impacts would occur and/or the number of locations at which these impacts would occur vary between the project alternatives. Construction and operation impacts would generally be localized around the JOS treatment facilities which are being expanded with the exception of impacts of necessary sewer relief projects identified in previous sections. Alternatives 2 and 4 require construction of sewers which would not be required for Alternative 1. The construction of sewers will generally increase the area subject to construction impacts for any project alternative. Because Alternative 1 does not require construction of sewers, will not impact recreational opportunities at the driving range adjacent to the LCWRP, and will not impact Whittier Narrows flood control facilities, it is marginally superior to other project alternatives with respect to environmental impacts.

Table 6.13-14
COMPARISON OF ENVIRONMENTAL IMPACTS:
JOS 2010 MASTER FACILITIES PLAN

Type of Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Construction				
JWPCP	–[1]	–[1]	–[1]	–[1]
SJCWRP	–[1]			–[1]
LCWRP	–[1]	–[1,2]		–[1,2]
WNWRP			–[1,3]	–[1,3]
Relief Sewers		–[1]		–[1]
Operations/Effluent Disposal or Reuse				
JWPCP	–[4]	–[4]	–[4]	–[4]
SJCWRP	–[4]			–[4]/+[5]
LCWRP	–[4]	–[4]		–[4]/+[5]
WNWRP			–[4]	–[4]/+[5]
Biosolids Management	No differences among alternatives			
Growth-Related	No differences among alternatives			

– = adverse impact
+ = beneficial impact
[1] *Typical construction impacts are traffic disruption, air quality (particulates), noise, and water quality (contaminants in runoff). Most can be mitigated.*
[2] *Loss of a driving range is a significant unavoidable impact of Alternatives 2 and 4.*
[3] *Loss of flood control capacity is a significant hydrologic impact that can be mitigated.*
[4] *Typical operations impacts are traffic, air quality, odor, noise, visual aesthetics, and energy use. Most can be mitigated.*
[5] *Alternative 4 would make available 50 mgd of additional reclaimed wastewater for reuse; this water supply impact is considered beneficial.*

6.13.5 PUBLIC INPUT/PUBLIC ACCEPTABILITY

Public input gathered during the public outreach program is summarized in Section 10 of this chapter. A more detailed discussion of public input is included in the EIR for the Facilities Plan. It is anticipated that all of the final project alternatives would generally be acceptable to the public. Alternatives 2 and 4 are, however, inconsistent with the City of Cerritos' desire to maintain the driving range adjacent to the LCWRP. It is anticipated that those who use this driving range would also oppose such projects, but this group is small in comparison to the entire JOS population. The Districts accordingly recognize that the needs of the JOS population must be balanced against the desires of a relatively small, special interest when considering project alternatives which involve expansion of the LCWRP. With respect to comments received from the JWPCP CAC, all of the project alternatives are consistent with the CAC's general comments. The Districts recognize that the specific concerns of the CAC must be balanced against the needs of the entire JOS population when weighing project alternatives. Lastly, there was general support for increased reclamation and reuse of wastewater from those who participated in the public outreach program. All of the final project alternatives provide increased water reclamation capacity, but it is recognized that Alternative 4 provides maximum water reclamation capacity.

Public information meetings and public hearings on the Draft 2010 Plan and PEIR were held in the months of December 1994 and January 1995, respectively. In addition, written comments were received during the public review period. Public input received on the draft documents did not alter the conclusion regarding the preferred project alternative. (See Chapter 8 and Appendix A-8 for more information on public input received on the draft documents.)

6.13.6 IDENTIFICATION OF PREFERRED PROJECT ALTERNATIVE

The comparison of project alternatives based on the above criteria is qualitatively summarized in Table 6.13-15. Examination of this table indicates that trade offs between project alternatives occur under the following areas: meeting project needs; conveyance capacity, peak storm capacity, water reclamation and long range compatibility; cost effectiveness; engineering; and environmental impacts. These criteria have been shown in bold to facilitate comparison between alternatives. Comparing alternatives across these criteria, it is apparent that Alternative 1 is the best of the four proposed alternatives. As such, Alternative 1 is the preferred project alternative.

Table 6.13-15
COMPARISON OF PROJECT ALTERNATIVES

Comparison	Alternative 1	Alternative 2	Alternative 3	Alternative 4
MEETING PROJECT NEEDS:				
■ Treatment Capacity	+	+	+	+
■ Full Secondary	+	+	+	+
■ Conveyance Capacity	0	0	+	+
■ Peak Sanitary Capacity	+	+	+	+
■ Peak Storm Capacity	0	—	—	+
■ Biosolids Processing Capacity	+	+	+	+
■ Biosolids Management Capacity	+	+	+	+
■ Water Reclamation Capacity	0	—	0	+
■ Long Range Compatibility	0	0	+	0
COST EFFECTIVENESS	+	0	0	—
ENGINEERING ANALYSIS				
■ Design Construction & Scheduling	+	+	0	—
■ System Operation	+	+	—	—
■ System Reliability & Flexibility	0	—	0	+
ENVIRONMENTAL IMPACTS	+	—	0	0
PUBLIC INPUT	+	+	+	+

+ = Superior *0 = Neutral* *— = Inferior*