CHAPTER 2

EXISTING AND PROJECTED PLANNING AREA CHARACTERISTICS

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CHAPTER 2 EXISTING AND PROJECTED PLANNING AREA CHARACTERISTICS

2.1 DESCRIPTION OF THE PLANNING AREA

2.1.1 GEOGRAPHY AND TOPOGRAPHY

The JOS provides services to communities within the San Gabriel Valley, the Los Angeles coastal plain, and the surrounding mountains and foothills. Geographically, the JOS service area is bounded by the San Gabriel Mountains to the north, the Verdugo Mountains to the west, the Pacific Ocean to the west and south, Orange and San Bernardino Counties, and the Puente and San Jose hills to the east. Major geographic and topographic features of the JOS service area are shown in Figure 2.1-1. Within this area, the Los Angeles and San Gabriel rivers and the Rio Hondo flow southward into the San Pedro Bay due to the southward topographic gradient. The Districts utilize this topography by using gravity flow throughout the JOS service area.

The most significant topographic features within the JOS service area are the San Gabriel Valley and the Coastal Plain. The San Gabriel Valley occupies the northeastern portion of the JOS service area. This broad, triangular piedmont plain descends southward from the San Gabriel Mountains at a slope of roughly 65-feet per mile and covers an area of approximately 170 square miles. The San Gabriel Valley is separated from the Coastal Plain to the south by northwest trending highlands including the Puente, Merced, and Repetto hills. The Whittier Narrows, a key hydrologic reference point which is an outlet for the Rio Hondo and the San Gabriel River, lies at the gap between the Puente and Merced hills.

The Coastal Plain is an alluviated, low-relief lowland that occupies the area southwest of the Whittier Narrows. The Coastal Plain extends to the Pacific Ocean in all directions, except where interrupted by a few local highlands such as the Baldwin, Dominguez, and Palos Verdes hills. The Los Angeles and San Gabriel rivers and Rio Hondo flow generally southward through the Coastal Plain to the Pacific Ocean within engineered drainage channels.

2.1.2 GEOLOGY

This section describes the regional geologic characteristics, the regional seismicity, and potential geologic hazards within the JOS service area.

Regional Geologic Characteristics

The JOS service area occupies an area within two geomorphic provinces: the Peninsular Ranges geomorphic province and the Transverse Ranges geomorphic province. The Peninsular Ranges geomorphic province extends southward from roughly the southern base of the Santa Monica Mountains and the foothills of the San Gabriel Mountains into Baja California, and as such includes the southern portion of the JOS service area. The

Transverse Ranges geomorphic province trends east-west along the northern border of the Peninsular Ranges geomorphic province and includes the northern portion of the JOS service area. The Coastal Plain lies within the Peninsular Ranges geomorphic province, while the San Gabriel Valley lies within the transition zone separating these two geomorphic provinces. Figure 2.1-2 shows the regional geology of the JOS service area.

The Central Plain portion of the JOS service area is characterized by the geologic features of the Peninsular Ranges geomorphic province. This region is typified by a succession of northwest-trending highlands and intervening valleys. This regional configuration of parallel highland areas is the direct result of on-going crustal wrenching along a series of northwest trending, predominantly right-lateral strike slip fault zones such as the Palos Verdes, Newport-Inglewood, and Whittier-Elsinore faults. The geologic units directly underlying the JOS Central Plain service area are comprised primarily of very young alluvial and shallow marine sediments that were shed from local highlands. These recent deposits are underlain by a thick sequence of middle to upper Cenozoic age marine sedimentary and volcanic rock units, such as the Monterey, Topanga, Puente, and Fernando formations, that are locally exposed in the low relief highlands. This sedimentary sequence overlies a metamorphic basement complex of possible Jurassic age.

The portion of the JOS service area that occupies the San Gabriel Valley is characterized by geologic features of the Transverse Ranges geomorphic province. The east-west trending San Gabriel Mountains that form the northern boundary of the Valley are the result of crustal thickening along predominantly left-lateral strike slip and reverse faults which bound and transect this geomorphic province. The San Gabriel Valley floor is primarily comprised of recent alluvial fan and stream alluvium deposits derived from the surrounding mountains and hills. These recent deposits are underlain by a thick sequence of late Cretaceous to Pleistocene age marine and nonmarine sedimentary rock units that are locally intruded by middle Miocene age volcanic rocks. The sedimentary sequence overlies the basement complex which ranges from Miocene age plutonic rocks in the eastern portion of the San Gabriel Valley to Precambrian age plutonic rocks in the northern San Gabriel Valley.

Regional Seismicity

The JOS service area is located in a seismically active region. Seismic Risk Zones have been developed based on the known distribution of historic earthquake events, evidence of past earthquakes, proximity to earthquake areas and active faults, and frequency of earthquakes in a given area. These zones are generally classified using either the CDMG Maximum Expected Earthquake Intensity Map or Uniform Building Code Seismic Risk Map of the United States. Because of the number of active faults in Los Angeles County and Southern California, the JOS service area is located in the highest risk zone defined by both the CDMG and UBC standards (Zones III and IV, respectively). Listed in Table 2.1-1 are the active faults located within the JOS service area and the maximum probable earthquake expected to occur along each fault in any given one hundred year period:

Table 2.1-1
ACTIVE FAULTS IN THE JOS SERVICE AREA

FAULT NAME	MAXIMUM PROBABLE EARTHQUAKE
Chino Fault	5.5
Cucamonga Fault	6.25
Elysian Park Seismic Zone	5.75
Newport-Inglewood Fault Zone	5.75
Palos Verdes Fault	6.75
Raymond Fault	4.0
San Gabriel Fault	5.75
Sierra Madre - San Fernando Fault	6.0
Verdugo Fault	4.5
Whittier-Elsinore Fault	6.0

In addition to these faults, active faults within a 100 km radius of a particular site or area (for example, the San Andreas or San Jacinto faults) have the potential for generating large earthquakes which could impact the JOS service area. Therefore, seismic risk zoning laws consider these faults as well. Active and potentially active faults in the JOS service area are shown in Figure 2.1-3.

Geologic Hazards

The potential for injury within population centers and damage to structures during earthquakes can result from surface rupture along an active fault, ground shaking from a nearby or distant earthquake, or surface settlement/liquefaction of soils. These hazards and their potential effects are described below.

Surface Rupture and Faulting

The hazard of surface rupture is generally limited to land immediately adjacent to an active fault. The CDMG defines an active fault as one which has experienced surface displacement within approximately the past 11,000 years (defined, geologically, as the Holocene epoch). The Alquist-Priolo Special Studies Zone Act of 1972 requires that special geologic studies be conducted to locate and assess the activity level of any fault within a potential development site. The intention of the law is to minimize damage from fault rupture by avoiding certain types of construction across an active fault. The law requires that some structures, such as private dwellings, be set back at least 50-feet from the mapped trace of an active fault. The active faults listed above cross portions of the JOS service area and surface rupture along any of these faults may locally impact the JOS. None of the JOS treatment plants, however, are located astride or within 50-feet of the mapped surface trace of an active fault.

Ground Shaking

Earthquake-induced ground shaking is a common phenomenon throughout the JOS service area. In the past decade, the Los Angeles region has experience numerous moderate to large earthquakes, such as the October 1, 1987, M = 5.9 Whittier Narrows earthquake and the January 17, 1994, M = 6.7 Northridge earthquake (M refers to the Richter scale magnitude of the earthquake). These, among other seismic events, have produced damaging ground shaking.

The energy released during an earthquake is commonly presented in terms of its Richter scale magnitude. The actual ground acceleration experienced at a particular site during an earthquake may be measured in terms of a fraction or multiple of the normal gravitational acceleration (g). A qualitative assessment of the ground shaking intensity may be presented using the Modified Mercalli intensity scale, which assigns the Roman numerals I through XII to an area based on observed earthquake damage and personal sensation of the ground shaking intensity.

Damaging ground shaking can occur at long distances from the earthquake epicenter depending on several factors including:

- Earthquake magnitude (i.e., a measure of the total energy released during the fault rupture),
- Epicentral distance (i.e., the source to site distance),
- Subsurface geologic conditions between the source and the site, and
- Subsurface geologic conditions at the site.

The United States Geological Survey and California Institute of Technology operate hundreds of ground motion accelerometers throughout Southern California. Data from these recording stations are publicly available. Using existing ground acceleration data from nearby recording stations seated on similar geologic materials, the expected ground response to a seismic event within the JOS service area can be determined. Designs for future JOS facilities will continue to accommodate the anticipated ground accelerations at a given site to minimize damage to structures during future earthquake events.

Liquefaction

Liquefaction in soils and sediments occurs when granular material is transformed from a solid state to a liquid state as a result of loss of grain to grain contact and increase in interpore pressure generated during earthquake shaking. Earthquake-induced liquefaction occurs most often in areas underlain by unconsolidated, saturated sediments.

The JOS service area covers a large expanse of low-lying alluvial (unconsolidated granular sediment) filled basin area. Within this area there are areas that are particularly susceptible to liquefaction. In particular, those areas that adjoin rivers or river channels or areas that are near the shore have a higher potential for liquefaction because those areas are typically composed of unconsolidated granular sediments and characterized by high water table levels.

Although portions of the JOS service area are susceptible to liquefaction, there have been no reported incidents of damage to the system due to liquefying soils. In the event that future systems are constructed over sediments with a high potential for liquefaction, mitigating solutions, such as hydrostatic pressure relief drains, support columns, soil removal, or other options will be implemented.

2.1.3 HYDROLOGY

The major hydrologic features in the JOS service area are the Los Angeles River Basin, the San Gabriel River Basin, and the Los Angeles Coastal Plain, as identified in the *Water Quality Control Plan for the Los Angeles River Basin.*

Precipitation in the Los Angeles area is characterized by intermittent but regular rainfall during winter months, with 85 percent of the annual precipitation occurring between November and March. Rainfall during summer months is usually negligible. Precipitation as snow is common in higher elevations of the upper watersheds of the San Gabriel Mountains. Monthly precipitation totals are quite variable but annual precipitation usually averages 10 to 20 inches. Annual precipitation typically is highest in the mountains and higher inland areas. Figure 2.1-4 is a hyetograph which shows the expected annual rainfall throughout the JOS service area.

Surface Waters

Major rivers of the region include the Los Angeles River, San Gabriel River, and Rio Hondo. The major creeks include the San Jose and Coyote Creeks. Other water bodies near or tributary to these streams are Big Dalton Wash, Puddingstone Wash and Reservoir, Legg Lake, and the Morris, Cogswell, Santa Fe and San Gabriel Reservoirs. These water bodies are shown in Figure 2.1-5.

The San Gabriel River is the largest river (in flow and length) within the JOS service area. A map showing the San Gabriel River and its tidal prism is presented in Figure 2.1-6. The river is regulated by a series of dams that reduce seasonal flow variations for flood protection and provide maximum conservation of water supplies. During the dry season, surface flow is short-lived as surface waters percolate rapidly into alluvial aquifers in unlined portions of the river. During most of the year, river flow south of the Whittier Narrows Dam is primarily composed of reclaimed water from JOS WRPs, urban and nonpoint source runoff, and industrial discharges.

The flow of the San Gabriel River below the Whittier Narrows varies depending on the volume of stormwater runoff and of discharges of reclaimed water from JOS WRPs. The main channel is 80 to 120-feet wide and contains a trapezoidal low flow channel which is approximately two-feet deep and ten- feet wide. The low flow channel is designed to route dry weather flows quickly downstream. Existing discharges to the San Gabriel River from the SJCWRP and the LCWRP regularly exceed the capacity of the low flow channel in the concrete-lined portion of the river. The low flow channel capacity is approximately 93 mgd, but is as low as 67 mgd in two limited stretches where hydraulic jumps occur.

The San Gabriel River tidal prism is a 4.5 mile reach of the river which begins below the river's confluence with Coyote Creek and terminates at Seal Beach. The tidal prism is divided into two reaches by large saline discharges from the Alamitos and Haynes power plants, which draw cooling water from the Alamitos Bay. The dominant hydrologic feature of the tidal prism is the discharge of cooling water to the San Gabriel River between Seventh Street and Westminster Avenue.

A 1.5 mile reach of the river upstream of the power plant discharges has been designated the "critical reach" because it is directly influenced by upstream freshwater discharges, especially treatment plant effluent. Reclaimed water discharged to the river provides freshwater flow for biota in this area and dilutes incoming tidal flows. Salinity in the critical reach reflects the mixing of freshwater flows with saline tidal waters and power plant discharges. Lower density freshwaters float on saltwater and form a mixing zone. The depth of the mixing zone varies with tidal ebb and flow. South of Seventh Street the river is totally saline. In general, discharges of reclaimed water have very little hydrologic influence on the tidal prism.

Groundwater

The major groundwater basins in the project area include the Central Basin, the West Coast Basin, the Main San Gabriel Basin, the Raymond Basin, the Claremont Heights Basin, the Live Oak Basin, the Spadra Basin, and the Pomona Basin (MWD 1993). Groundwater is a significant source of water supply for some areas of the basin and the replenishment of coastal plain aquifers is vital to maintain the utility of these supplies. Imported water and reclaimed water are used to reduce water quality problems associated with groundwater overdraft and subsequent seawater intrusion. Figure 2.1-7 is a groundwater contour map of the JOS service area.

Just south of the Whittier Narrows Dam, reclaimed water, stormwater, and imported water are diverted to spreading grounds in unlined portions of the San Gabriel River. South of this area, aquifers are confined and cannot receive surface percolation, and the San Gabriel River is lined with concrete for flood control purposes. Between 1990 and 1993, reclaimed water comprised approximately 30 percent of the total annual recharge of the Central and

West Basins, most of which occurred in the percolation basins south of the Whittier Narrows area. A more extensive discussion of groundwater and other water resources is provided in Section 2.5.

Reclaimed Water Use

The five JOS WRPs which produce reclaimed water are the SJCWRP, LCWRP, WNWRP, LBWRP and the PWRP. Studies of these WRPs have recently been conducted to evaluate the present and future operating conditions for reclaimed water production and use. The five WRPs currently produce a total of 148 mgd (165,000 acre-feet) of reclaimed water, and approximately 50 percent of this total, or 74 mgd is reused. Approximately 80 percent of reclaimed water use is for groundwater recharge. Virtually all reclaimed water produced at the PWRP and the WNWRP is reused. Most of the reclaimed water produced at the PWRP is used for industrial and irrigation applications and the remainder is used for groundwater recharge. Reclaimed water produced at WNWRP is almost entirely used for groundwater recharge. Reclaimed water produced at the SJCWRP, the LCWRP and the LBWRP is underutilized with average reuse rates of 67.5 percent, 9.8 percent, and 15.6 percent, respectively.

2.1.4 SOILS

There is one main group of soils which predominates in the JOS service area. This group includes 17 soil associations and is termed the alluvial fans, plains and terraces group.

Soil Associations

A soil association is a landscape that has a distinctive proportional composition of soils. Normally, a soil association consists of one or more major soil types and at least one minor soil type. Figure 2.1-8, which is based on information from the Los Angeles Area Soil Survey (USSCS 1969), is a general soil map which shows the soil associations of the JOS service area. Table 2.1-2 indicates the general properties of these soil associations including the soil type, depth, slope, erosion potential, and shrink-swell potential.

Expansive Soils

Expansive soils are a common cause of damage to building foundations, roads and other infrastructure. Expansive soils are generally composed of clays that swell under wet conditions and shrink under dry conditions. Damage to structures, such as cracking of foundations, may be caused by differential soil movements and/or several alternating periods of shrink and swell. In the JOS service area, three soil associations include soils that are known to be highly expansive: Cropley, Ramona-Placentia, and Diablo-Altamont.

Table 2.1-2
GENERAL PHYSICAL PROPERTIES OF SOILS IN THE JOS SERVICE AREA

JOS Facility	Association Number	Soil Association	Soil Type	Depth (inches)	Slope (%)	Erosion Potential	Shrink-Swell Potential
	10	Oceano	Sand	60	2-5	Moderate-high	Low
	11	Marina-Garey	Sand and sandy loam	60	2-15	High	Low
Whittier Narrows WRP	13	Netz-Cortina	Fine sand and fine sandy loam	60	0-5	Low-moderate	Low
Los Coyotes WRP and San Jose Creek WRP	14	Hanford	Sandy loam	60	2-5	Low	Low
Los Coyotes WRP	15	Yolo	Silty loam	60	0	Low	Moderate
	16	Mocho-Sorrento	Silty loam	60	2-9	Low-moderate	Moderate
	17	Cropley	Clay	60	0	Low	High
Whittier Narrows WRP	20	Chino (with inclusions of the Foster and Grangeville Associations)	Clay loam	60	0	Low	Moderate
JWPCP	21	Ramona-Placentia	Sandy loam	18-60	2-5	Low-moderate	High
	22	Ramona-Placentia	Sandy loam	18-60	5-9	Moderate	High
	23	Ramona-Placentia	Sandy loam	9-60	9-15	High	High
	32	Vista-Amargosa	Sandy loam	14-38	30-50	High	Low
	33	Oak Glen-Gorman	Sandy loam	60	9-30	Moderate-high	Low
	34	Diablo-Altamont	Clay	22-51	2-9	Low	High
	35	Altamont-Diablo	Clay	20-39	9-30	High	High
	36	Altamont-Diablo	Clay	20-39	30-50	High	High
	37	San Andreas-San Benito	Sandy loam and clay loam	24-48	30-75	High	Low-moderate

Source: U.S. Soil Conservation Service 1969.

Erosive Soils

Erosion is a natural and ongoing process that transports materials from a position of high energy or elevation to a position of lower energy or elevation. Generally, when exposed to identical wind and water conditions, a loose soil will erode at a faster rate than will a clay soil.

Areas that are the most susceptible to erosion include steep, unvegetated slopes with erosive soils. Soil associations in the JOS service area that have a moderate to high erosion potential include: Oceano, Marina-Garey, steeper slope Ramona-Placentia, Oak Glenn-Gorman, steeper slope Diablo-Altamont, and San Andreas-San Benito.

2.2 ENVIRONMENTAL SETTING

2.2.1 BOTANICAL AND WILDLIFE RESOURCES

The JOS service area is situated in a region where the landscape has been heavily altered and is dominated by structures, pavement, non-native plantings, and lawns. Natural habitats are restricted primarily to steep hills, the nearest being the Puente Hills east of the SJCWRP; the wetlands adjacent to the JWPCP and the WNWRP; and the hills surrounding the PWRP. The SJCWRP is located adjacent to the confluence of San Jose Creek and the San Gabriel River, and the WNWRP is located adjacent to the Rio Hondo, a major tributary of the Los Angeles River. The extent of riparian vegetation in these river systems is greatly restricted by channelization and channel lining. Riparian habitat which remains is mainly characterized by non-native plant species.

Rare, threatened, or endangered plants and animals are protected in California by legislation and through actions of interest groups. These include the Federal and California Endangered Species Acts, the California Native Plant Protection Act, the California Environmental Quality Act (CEQA), the California Native Plant Society, and the California Department of Fish and Game (DFG). Plants or animals that come under the protection of any one of the above are referred to as "special-status" plants or animals. Special-status plants and animals that may potentially occur in areas of the JOS that could be affected by the 2010 Master Facilities Plan are listed in Tables 2.2-1 and 2.2-2, respectively.

Special-status biological communities are habitats that are considered important because of their high species diversity, high productivity, unusual nature, limited distribution, declining status, or combination of these qualities. Local, state and federal agencies have recognized that these habitats are important. The Department of Fish and Game's Natural Diversity Database maintains a list of rare natural communities. The U.S. Fish and Wildlife Service (USFWS) considers certain habitats, such as wetland and riparian communities, as important to wildlife. In addition, the U.S. Army Corps of Engineers (Corps) and the EPA consider wetland habitats to be important to water quality and wildlife. Habitats in the project area that meet the special-status biological community criteria include riparian forest (near the JWPCP), riparian scrub (near the JWPCP) and freshwater marsh (near the JWPCP and the WNWRP).

2.2.2 AESTHETICS

The regional landscape of Los Angeles County is densely urbanized. Natural landscape features are generally subordinate to the area's urban character. The County General Plan (1993) states: "The County of Los Angeles has a rich and diverse natural environment whose beauty has attracted people and, with them, new development." The urban character of the Los Angeles area is recognized as an important feature that distinguishes it from other large metropolitan areas. Distinguishing elements include its extensive freeway system and a great variety of ornamental vegetation (Los Angeles County 1993).

Table 2.2-1

SPECIAL-STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING AT JOS FACILITIES PROPOSED FOR EXPANSION

Species		Listing Status*		Habitat	Occurrence at Project Facilities Proposed for Expansion
Common Name	Scientific Name	Federal	State		
Least Bell's vireo	*Vireo bellii pusillus*	E	E	Riparian	Observed at Whittier Narrows Wildlife Sanctuary, less than 2 miles upstream of the Whittier Narrows WRP. Potential habitat exists at the Whittier Narrows WRP, but no potential habitat exists in the proposed expansion area.
Light-footed clapper rail	*Rallus longirostris levipes*	E	E	Salt marsh	No records; no suitable habitat.
California least tern	*Sterna antillarum browni*	E	E	Coastal beaches, open water	No records; no suitable habitat.
California brown pelican	*Pelecanus occidentalis californicus*	E	E	Shallow, open water (brackish and salt)	No records; no suitable habitat.
American peregrine falcon	*Falco peregrinus anatum*	E	E	Freshwater and saltwater marsh, beaches for foraging; cliffs for nesting	No records; no suitable habitat.
Pacific pocket mouse	*Perognathus longimembris pacificus*	E	SSC	Grassland and scrublands with fine alluvial soils near the ocean; sometimes dry, rocky, and gravelly sites	No records; no suitable habitat.
Palos Verdes blue	*Glaucopsyche lygdamus palosverdesensis*	E	--	Seaward side of Palos Verdes Hills; loco weed is a host plant	No records; no suitable habitat.
California black rail	*Laterallus jamaicensis coturniculus*	C2	E	Brackish and freshwater marsh	No records; no suitable habitat.
Western snowy plover	*Charadrius alexandrinus nivosus*	T	SSC	Beaches and mudflats	No records; no suitable habitat.
California gnatcatcher	*Polioptila californica*	T	SSC	Coastal sage scrub, cactus scrub	No records; no suitable habitat.
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	--	E	Riparian forests	One record in 1912, along San Gabriel River near Artesia. Extirpated from this region; no suitable habitat at project facilities.
Belding's savannah sparrow	*Passerculus sandwichensis beldingi*	C2	E	Coastal marshes	No records; no suitable habitat.
Southwestern pond turtle	*Clemmys marmorata pallida*	C1	SSC	Freshwater ponds and steams and adjacent land	No records; no suitable habitat.

Table 2.2-1
SPECIAL–STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING AT JOS FACILITIES PROPOSED FOR EXPANSION (Continued)

Species		Listing Status[a]		Habitat	Occurrence at Project Facilities Proposed for Expansion
Common Name	Scientific Name	Federal	State		
San Diego horned lizard	*Phrynosoma coronatum blainvillei*	C2	SSC	Open scrub and grassland	No records; no suitable habitat.
California horned lark	*Eremophila alpestris actia*	C2	SSC	Open scrub and grassland	No records; no suitable habitat.
Coastal cactus wren	*Campylorhynchus brunneicapillus*	C2	SSC	Grasslands	No records; no suitable habitat.
Loggerhead shrike	*Lanius ludovicuanus*	C2	SSC	Grasslands and savannas	No records; no suitable habitat.
Los Angeles pocket mouse	*Perognathus longimembris brevinasus*	C2	SSC	Lower elevation grasslands and coastal sage scrub with sandy soils	No records; no suitable habitat.
Elegant tern	*Sterna elegans*	C2	SSC	Beaches and open water	No records; no suitable habitat.
Tricolored blackbird	*Agelaius tricolor*	C2	SSC	Emergent wetlands, blackberry thickets along wetlands, and grasslands	No records; no suitable habitat.
Wandering skipper	*Pseudocopaeodes eunus eunus*	C2	--	Areas with saltgrass	No records; no suitable habitat.
Saltmarsh skipper	*Panoquina errans*	C2	--	Salt marshes, including saltgrass habitats	No records; no suitable habitat.
Sandy beach tiger beetle	*Cicindela hirticollis gravida*	C2	--	Areas adjacent to nonbrackish water	No records; no suitable habitat.
Coastal rosy boa	*Lichanura trivirgata rosafusca*	C2	--	Rocky scrub	No records; no suitable habitat.
Burrowing owl	*Speotyto cunicularia*	--	SSC	Grasslands, agricultural fields	No records; no suitable habitat.
Tiger beetle	*Cicindela gabbii*	--	--	Estuaries and mudflats along the coast	No records; no suitable habitat.
Frost's tiger beetle	*Cicindela senilis frosti*	--	--	Marine shoreline and salt marsh	No records; no suitable habitat.

[a] *Status explanations*

Federal

E = *listed as endangered under the federal Endangered Species Act.*

T = *listed as threatened under the federal Endangered Species Act.*

C1 = *Category 1 candidate for federal listing. Category 1 includes species for which USFWS has on file enough substantial information on biological vulnerability and threat to support proposals to list them.*

C2 = *Category 2 candidate for federal listing. Category 2 includes species for which USFWS has some biological information indicating that listing may be appropriate but for which further biological research and field study are usually needed to clarify the most appropriate status. Category 2 species are not necessarily less rare, threatened, or endangered than Category 1 species or listed species; the distinction relates to the amount of data available and is therefore administrative, not biological.*

-- = *no designation.*

State

E = *listed as endangered under the California Endangered Species Act.*

SSC = *species of special concern.*

-- = *no designation.*

Table 2.2-2

SPECIAL-STATUS PLANT SPECIES POTENTIALLY OCCURRING AT JOS FACILITIES PROPOSED FOR EXPANSION

Species		Listing Status*			
Common Name	Scientific Name	Federal	State	CNPS	Habitat
Marsh sandwort	*Arenaria paludicola*	E	E	1B	Freshwater marsh
Nevin's barberry	*Berberis nevinii*	C1	E	1B	Riparian scrub, chaparral, coastal scrub, oak woodland
Scalloped moonwort	*Botrychium crenulatum*	C2	--	1B	Freshwater marsh, wet meadow, bog, conifer forest
Round-leaved boykinia	*Boykinia rotundifolia*	--	--	4	Riparian woodland, chaparral
Los Angeles sunflower	*Helianthus nuttallii ssp. parishii*	C1*	--	1A	Freshwater and salt marsh
Southern tarplant	*Hemizonia parryi ssp. australis*	--	--	1B	Wet meadow, vernal pool, salt marsh margin
Lemon lily	*Lilium parryi*	C2	--	1B	Riparian forest, wet meadows, conifer forest
Davidson's bush mallow	*Malacothamnus davidsonii*	C2	--	1B	Riparian woodland, chaparral, coastal scrub
Mud nama	*Nama stenocarpum*	--	--	2	Freshwater marsh
Fish's milkwort	*Polygala cornuta ssp. fishiae*	--	--	4	Riparian woodland, chaparral, oak woodland
Parish's gooseberry	*Ribes divaricatum ssp. parishii*	C2	--	1B	Riparian woodland
Gambel watercress	*Rorippa gambellii*	E	T	1B	Freshwater and brackish marsh

Note: Potential occurrence based on known range and habitat preference. Habitats in the affected areas potentially supporting special-status plant species are freshwater marsh and riparian scrub, woodland, and forest.

**Status explanations*

Federal

E = listed as endangered under the federal Endangered Species Act.

C1 = Category 1 candidate for federal listing. Category 1 includes species for which USFWS has on file enough substantial information on biological vulnerability and threat to support proposals to list them. Species that are possibly extinct are indicated with an asterisk (*).

C2 = Category 2 candidate for federal listing. Category 2 includes species for which USFWS has some biological information indicating that listing may be appropriate but for which further biological research and field study are usually needed to clarify the most appropriate status. Species that are possibly extinct are indicated with an asterisk (*). Category 2 species are not necessarily less rare, threatened, or endangered than Category 1 species or listed species; the distinction relates to the amount of data available and is therefore administrative, not biological.

-- = no designation.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

-- = no designation.

California Native Plant Society

1A = List 1A species: presumed extinct in California.

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

4 = List 4 species: plants of limited distribution.

The regional landscape consists of a broad coastal plain bordered by forested mountains to the north and the Pacific Ocean to the south and west. The coastal plain, which is mostly urbanized, slopes gently to the south and is punctuated by low hills and bluffs. Several important rivers and tributary streams flow generally from north to south from the mountains across the coastal plain. Coastal salt marshes occur in small areas along the coast and are aesthetically important because of their high visibility and scarcity in the region. Views of the San Gabriel Mountains to the north can be dramatic and vivid from the coastal plain, especially in winter when the mountains are snow-capped and the air is clear. Poor air quality due to smog, fog and haze often limits the extent and quality of views throughout the region.

Most rivers, streams and drainages in the urbanized coastal plain are contained in concrete-lined channels. Streamside or other naturally-occurring vegetation is scarce in the region, but where it does exist, it is an important visual element in the regional landscape. Views of streamside and other naturally-occurring vegetation in the coastal plain are often vivid. Most existing vegetation in the coastal plain is urban landscaping.

Many diverse land uses are mixed throughout the JOS region, which provide little aesthetic unity or cohesiveness. Numerous high-voltage power lines and freeways are highly visible linear elements in the generally level and open coastal plain. These elements generally criss-cross the landscape, reducing any strong sense of design order or cohesiveness in the regional landscape. Freeways are dominant visual elements in the region; they are also one of the most important vantages for viewing the area for both residents and visitors. Other streets and roads also are important locations for viewing the landscape of the region.

2.2.3 ARCHAEOLOGICAL AND HISTORICAL (CULTURAL) RESOURCES

This section is divided into four subsections. In the first three, the prehistory, ethnographic background and historic setting of the region are discussed. The fourth subsection addresses cultural resources in the vicinity of the four plants at which construction could occur as a part of this plan.

Prehistory

A synthesis of the southern coastal region prehistory, including the Los Angeles County area, has been developed which describes rough, chronologically-defined horizons in terms of changes in technology, subsistence, and settlement patterns.

Horizon I, or the Early Man Horizon, began at the first appearance of people in the region (approximately 11,000 years ago) and continued until about 5000 B.C. Although little is known about these people, it is generally thought that they were primarily semi-nomadic hunters.

Horizon II, also known as the Millingstone Horizon, began around 5000 B.C. and continued until about 1500 B.C. The Millingstone Horizon is characterized by widespread use of millingstones (manos and metates), core tools and a few projectile points or bone and shell artifacts. This horizon appears to represent a diversification of subsistence activities and a more sedentary settlement pattern. Archaeological evidence suggests that hunting became less important, while reliance on collecting shellfish and vegetal resources increased.

Horizon III, the Intermediate Horizon, began around 1500 B.C. and continued until about A.D. 600-800. Horizon III is defined by a shift from the use of millingstones to greater use of the mortar and pestle, which may indicate a greater reliance on acorns as a food source. Projectile points become more abundant, and together with faunal remains, point to increased utilization of both land and sea mammals.

Horizon IV, the Late Horizon, which began around A.D. 600-800 and terminated with the arrival of Europeans, is characterized by dense populations, diversified hunting and gathering subsistence strategies including intensive fishing and sea mammal hunting, extensive trade networks, use of bow and arrow, and a general cultural elaboration.

Ethnographic Background

When the Spanish first visited the coastal areas of Southern California, the inhabitants of the Los Angeles area were called Gabrielino by the Spanish. Gabrielino territory included the watersheds of the San Gabriel, Santa Ana, and Los Angeles rivers, portions of the Santa Monica and Santa Ana Mountains, the Los Angeles Basin, the coast from Aliso Creek to Topanga Creek, and the San Clemente, San Nicolas, and Santa Catalina islands. Because the Gabrielino culture disintegrated soon after contact with Europeans, little is known of their way of life.

The Gabrielino had an elaborately developed material culture. Technological and artistic items included shells set in asphaltum, carvings, paintings, an extensive steatite industry, baskets, and a wide range of stone, shell and bone objects of both utilitarian and decorative functions.

Gabrielino subsistence was based on a varied hunting and gathering strategy which included large and small land mammals, sea mammals, river and ocean fish, and a variety of plant resources. Deep sea fishing was accomplished from boats of wooden planks tied together and sealed with asphaltum. Sea mammals were taken with harpoons, spears and clubs. River fishing was undertaken with the use of line and hook, nets, basket traps, spears, and poisons. Land mammals were killed with bow and arrow, trapped, clubbed or taken with the use of deadfalls.

The Gabrielino were apparently first contacted by Europeans in 1542 when Spanish explorer Juan Cabrillo entered the area. Following other Spanish visits to the region, colonization began in 1769 and resulted in the establishment of the Mission San Fernando and the Mission San Gabriel. Due to the effects of mission life and introduced diseases, the Gabrielino population and culture were greatly diminished, and by the middle 1800's, most surviving Gabrielino were wage laborers. A smallpox epidemic which began in 1860 nearly eliminated the remaining Gabrielino.

Historic Setting

Although the southern coastal region of California had been inhabited by Native Americans for millennia, it was not until 1542 that California became known to Europeans. Although the San Diego area was the original center of Spanish settlement, explorers such as Gaspar de Portola entered the Los Angeles basin by 1769 in search of the best route to Monterey where a mission was to be established. The Mission San Gabriel was established in 1771 near one of the spots where Portola camped.

In the years following the establishment of Mission Vieja, several homesteads with adobe structures were erected throughout the area, and in 1781 El Pueblo de Nuestra Señora la Reina de Los Angeles was founded. Los Angeles grew and became the center of the settlements of the Spanish aristocracy. The surrounding land throughout the Los Angeles Basin was divided into numerous Spanish and Mexican land grant ranchos. Many of the ranchos were later subdivided or portions of them were sold, and these often grew into thriving communities that exist to the present.

The establishment of numerous industries (most notably the oil, agriculture, and entertainment industries) in the Los Angeles region in the late nineteenth and early twentieth centuries fueled the growth of the greater Los Angeles area into a major metropolis.

Local Archaeological and Historic Resources

Joint Water Pollution Control Plant

Archaeological studies which have been conducted at the JWPCP have yielded no significant cultural resources and have concluded that the majority of the area consists of recent fill and imported material. Overall, few surveys have been completed in the general area (within a four mile radius) of the JWPCP facility, and those that have been conducted were small. There are no sites within one mile of the JWPCP that are listed on the National Register of Historic Places or as California historical landmarks or points of interest.

There are a few known sites of cultural significance, however. The Poggi homesite, dating to the 1870's, is known to have existed about 1/4 mile west of the JWPCP and some structures may have existed within the JWPCP area, but have since been destroyed. The nearest existing site is located approximately 3/4 mile to the northeast of the JWPCP, and has been characterized as a prehistoric village with burials, shells, and artifacts. Several other prehistoric sites have been recorded approximately one mile to the southeast of the JWPCP, in the vicinity of Harbor Lake.

Los Coyotes Water Reclamation Plant

No sites listed on the National Register of Historic Places are located within one mile of the LCWRP. No California historical landmarks or points of interest are located within one mile of the facility.

San Jose Creek Water Reclamation Plant

No cultural resources have been recorded within one mile of the SJCWRP facility. This includes properties listed on the National Register of Historic Places and California historical landmarks and points of interest.

Whittier Narrows Water Reclamation Plant

The WNWRP is located within the Army Corps of Engineers Whittier Narrows Archaeological District (Cultural Resources Archival Study, Whittier Narrows Archaeological District, 1979). Although, no cultural resources have been recorded at the WNWRP site, there are at least three recorded sites within 1/4 mile of the plant. These sites include a historic adobe structure, a dump with prehistoric artifacts, and a site with prehistoric ceramic shards and historic metal fragments. Several other prehistoric and historic sites have been recorded within a one mile radius of the WNWRP facility. No National Register of Historic Places sites are found within one mile of the plant, but the original site of the Mission Vieja (California Historic Landmark No. 161) is located within 1/4 mile of the plant.

2.2.4 RECEIVING WATERS

Effluent and reclaimed water from the six JOS wastewater treatment plants is discharged into several different bodies of water, including rivers and groundwater basins, or is directly reused for irrigation, recreational, and industrial uses. Treated effluent is discharged to the following bodies of water, which are shown in Figure 2.1-5:

- The Pacific Ocean: Receives effluent directly from the JWPCP. All effluent from the upstream water reclamation plants that is not reused eventually flows to the ocean.

- The San Gabriel River: Receives reclaimed water directly from three of the five JOS WRPs, and indirectly from the other two WRPs. The SJCWRP discharges reclaimed water into both lined and unlined portions of the river for both reuse and disposal purposes. The WNWRP discharges reclaimed water into the unlined portion of the river for reuse, and finally, the LCWRP discharges all reclaimed water that is not directly reused into the river for disposal. The San Gabriel River indirectly receives reclaimed water from the LBWRP and the PWRP which is discharged to Coyote Creek and San Jose Creek, respectively. Both of these creeks are tributary to the San Gabriel River.

- San Jose Creek: The PWRP discharges reclaimed water into the San Jose Creek for groundwater recharge. The creek then flows to its confluence with the San Gabriel River near the interchange of the Pomona and San Gabriel River Freeways. Reclaimed water from SJCWRP is also discharged into the unlined San Jose Creek for recharge and conveyance to the Rio Hondo or San Gabriel Spreading Grounds.

- Coyote Creek: Coyote Creek receives reclaimed water from the LBWRP that is not reused. The LBWRP reclaimed water then flows almost immediately into the lined San Gabriel River, which conveys the reclaimed water to the ocean.

- Rio Hondo: Reclaimed water from the WNWRP is discharged into the Rio Hondo, and flows to the Rio Hondo Spreading Grounds, where it is used for groundwater recharge. Occasionally (during storms), reclaimed water reaches the lined portion of the river, which flows to the Los Angeles River, and eventually to the ocean.

- Central Groundwater Basin: Recharge of the Central Groundwater Basin constitutes the majority of water reuse in the JOS. The basin is recharged through the Rio Hondo and San Gabriel Coastal Basin Spreading Grounds, with reclaimed water from the SJCWRP, the PWRP, and the WNWRP. The Rio Hondo Coastal Basin Spreading Grounds is owned by the Los Angeles County Department of Public Works (LACDPW), while the San Gabriel Coastal Basin Spreading Grounds is owned by the LACDPW and the U.S. Army Corps of Engineers. Both spreading grounds are operated by the LACDPW. They are operated on a battery cycle. The time it takes to fill a battery is dependent upon the inflow, the size of the battery, and the percolation rate. Once a battery is full, the water is switched to another battery to disrupt the breeding cycle of vectors, to allow the battery to rejuvenate, and to restore the percolation rate. San Gabriel Coastal Basin Spreading Grounds has an inflow capacity of 350 cfs (226 mgd) and Rio Hondo Coastal Basin Spreading Grounds has an inflow capacity of 2,000 cfs (1,293 mgd).

2.3 POPULATION AND ECONOMY

This section provides a socioeconomic profile of the existing population, housing, employment, and economy of the JOS service area and Los Angeles County. This section does not address projected growth for each JOS treatment plant drainage area, which will be discussed in Section 5.2. The analysis presented in this section is based on information provided by the U.S. Census, the Southern California Association of Governments (SCAG), California Department of Finance (DOF), and the California Economic Development Department (EDD).

2.3.1 POPULATION

The population of Los Angeles County more than doubled between 1950 and 1990. In 1950, approximately 4.2 million people resided in Los Angeles County and by 1990, the population had grown to approximately 8.9 million.[1] This represents an increase of 4.7 million residents over 40 years or a growth of approximately 1.9 percent per year. In the last decade (1980-1990), the population of the County grew by 1.4 million or 1.7 percent growth per year. Based on DOF data, approximately two-thirds of this growth may be attributed to natural increase (births minus deaths) and the remaining one-third to net migration (domestic and international).[2] As a result of the recent economic recession in Southern California, however, net in-migration has dropped significantly. Between 1990 and 1993, more people left Los Angeles County than entered, resulting in a net out-migration of over 100,000 residents. Despite this out-migration, the population of the County has continued to grow. This continued growth between 1990 and 1993 indicates the significance of natural increase in population to the County.

The JOS service area includes approximately one-fifth of the County land area and one-half of the 1990 total population (4.5 million). The population within the JOS service area increased from approximately 3.6 million people in 1980 to 4.5 million in 1990, an increase of 2.3 percent per year. Table 2.3-1 presents the population growth and characteristics of the County and the JOS service area.

As the JOS service area population has grown, the characteristics of the population have also changed. In 1990, 40.2 percent of the JOS population was Hispanic, 36.2 percent was Non-Hispanic White (White), 10.8 percent was Non-Hispanic Black (Black), and 12.8 percent was Non-Hispanic Asian and other (Asian/other). By comparison, in the entire County the White population represented the largest segment of population at 41.0 percent. According to DOF projections, the Hispanic population is anticipated to represent over half (52.0 percent) of the total population of

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1 *Recent estimates of undocumented aliens for the State of California is 1.44 million people. Although the 1990 Census tried to include all residents, including undocumented aliens, the 1990 population of 8.9 million is assumed by the census to be under-counted by an estimated 430,000 people.*

2 *California Department of Finance, Report E-6, June 1991 and January 1994.*

Los Angeles County by the year 2010;[3] the projected White, Asian/Other and Black populations, expressed as percentages of the total County population, are respectively 27.6, 11.7 and 8.7.

Table 2.3-1
TOTAL POPULATION IN 1990

	LA County	JOS Service Area
Total Population	8,863,200	4,456,300
Difference, 1980-1990	1,385,700	779,000
% Growth	18.5%	21.2%
Ethnicity/Racial[1]		
Hispanic	37.3%	40.2%
White	41.0%	36.2%
Black	10.7%	10.8%
Asian/Other	11.0%	12.8%
Age Distribution		
4 and Under	8.2%	8.6%
5-17	18.0%	19.5%
18-64	64.1%	62.7%
65 and Over	9.7%	9.2%

Source: 1990 U.S. Census
[1]White, Black and Asian/other represents Non-Hispanic populations.

2.3.2 HOUSING

In 1990, there were over 1.5 million dwelling units in the JOS service area. Table 2.3-2 presents the total housing for the JOS service area for 1990. Approximately 64.4 percent of these were single-family units and 35.6 percent were multi-family units. By comparison, the composition of the county-wide housing stock is 48.6 percent single-family units and 51.4 percent multi-family units. Vacancy rates are defined as the percentage of unoccupied units in the total available housing stock. Low vacancy rates indicate that the housing market is constrained. Generally, a vacancy rate of five to six percent indicates a well-functioning and healthy housing market. A JOS service area vacancy rate (shown in Table 2.3-2) of 4.4 percent, therefore, would indicate a relatively small housing shortage. Countywide, however, the vacancy rate for 1990 was 5.5 percent. Since 1990, however, the recession has changed the housing market around to where vacancy rates have increased due to the out-migration and the presence of more than one family per dwelling unit.

Since 1990, the conditions of the housing market have changed dramatically as a result of the recession. A combination of out-migration and increasing household sizes have led to decreased demand for housing while speculative building fueled by the excess demand for housing in the late

[3] *California Department of Finance, Population Projections by Race/ethnicity for California and its Counties 1990-2040, 93P-1, April 1993.*

1980s has increased the supply of housing. As a result, vacancy rates are significantly higher in 1994 than they were in 1990.

Between 1980 and 1990, the number of households in the JOS service area increased by 15.2 percent while the population grew by 21.2 percent. This pattern of growth resulted in an increase in the household size (persons per household) from 2.93 in 1980 to 3.08 in 1990. By comparison, average household size in Los Angeles County was 2.96 in 1990. The upward swing in household size may be attributable to a number of factors including the inability of housing stock growth to keep pace with the population growth during the late 1980s, socioeconomic factors such as housing affordability, and as mentioned previously, multiple families residing in the same home.

The existing housing stock within the JOS service area is relatively old. In 1990, less than one-half (47.4 percent) of the housing stock was built after 1960. By comparison, 49.3 percent of the countywide housing stock was built after 1960. This could largely be due to the new developments in the Antelope and Santa Clarita Valleys.

Table 2.3-2
TOTAL HOUSING IN 1990

	LA County	JOS Service Area
Total Housing	3,163,300	1,512,200
Households	2,994,300	1,445,800
Household Size	2.96	3.08
Housing Type		
Single Units	48.6%	64.4%
Multiple Unit	51.4%	35.6%
Vacancy Rate	5.5%	4.4%
Housing Built After 1960	49.3%	47.4%

Source: 1990 U.S. Census

2.3.3 ECONOMY AND EMPLOYMENT

With an estimated Gross Regional Product (GRP) of approximately $322 billion, the Southern California region (six-county SCAG region which includes the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura) is considered one of the major centers of economic production in the world. The GRP of the Southern California economy would rank 12th in the world, just behind Spain and just ahead of India. Los Angeles County alone represents over two-thirds of Southern California's economy.

The SCAG region accounted for approximately one-half of the employment growth and one-half of the economic activity in California during the 1980s. Key features of the regional economy include:[4]

[4] *Southern California Association of Governments, SCAG State of the Region Report, June 1994.*

- A large, diversified and skilled labor force that is the nation's largest regional labor market;
- A large domestic market (i.e., regional population and consumer base) and access to both regional and national markets;
- The state's largest port and airport system, located within reach of fast-growing markets in Mexico and the Pacific Rim;
- A rapidly growing financial services sector serving both domestic and international financial markets;
- A group of high-tech complexes built around the region's educational institutions, skilled labor force, and venture capital industry;
- One of the largest and most diverse manufacturing group of complexes in the nation; and
- A diversity of locations for living and working, which has enabled the region to absorb substantial population and job market growth in urbanizing areas.

Employment is one of the major indicators of the region's economic health. In 1990, there were approximately 7.1 million jobs in the SCAG region, approximately two-thirds of which were located in Los Angeles County. Between 1980 and 1990, employment growth in the SCAG region averaged three percent annually, but as a result of the recent economic recession, employment has declined by four percent per year during both 1991 and 1992.

According to SCAG's 1990 employment estimates, approximately 2.1 million jobs were located in the JOS service area. This represents 45.0 percent of the approximately 4.6 million jobs in Los Angeles County. Approximately 50 percent of the County population resides within the JOS service area. Thus, the 1990 jobs to housing ratio for the JOS service area was 1.38 as compared to 1.46 for the entire County (2.1/1.5 ≈1.38 jobs for every housing unit in the service area; 1.5 million housing units are shown in Table 2.3-2).

Employment opportunities within the JOS service area are concentrated among three major industrial sectors. As indicated in Table 2.3-3, the major industries which provide employment within the JOS service area are: service (31.8 percent); manufacturing (23.4 percent); and retail trade (15.6 percent). When compared to Los Angeles County, the JOS service area has a higher proportion of manufacturing jobs (23.4 percent vs. 19.1 percent) and a lower proportion of service jobs (31.8 percent vs. 35.9 percent).

Table 2.3-3
TOTAL EMPLOYMENT IN 1990

	LA County	JOS Service Area
Total Employment	4,615,700	2,079,450
Industry as % of Total Employment:		
Agriculture	0.3%	0.3%
Mining	0.2%	0.3%
Construction	3.9%	4.0%
Manufacturing	19.1%	23.4%
Utilities	4.9%	5.0%
Wholesale Trade	7.0%	7.8%
Retail Trade	15.7%	15.6%
FIRE[2]	6.8%	5.3%
Service	35.9%	31.8%
Government	6.3%	6.6%

Source: Southern California Association of Governments, Employment Estimates, 1990, and the Districts Personnel Information System, March, 1994.

[2]FIRE represent finance, insurance and real estate.

2.4 LAND USE

The term "Land Use" describes the categories of development that currently exist or have been designated for future development in an area. These categories are broad and provide a general classification of the existing or future development, such as residential, commercial, industrial, or agricultural. Responsibility to determine an area's land use designation falls under the jurisdiction of its local municipal authority. Hence, land use designations may vary in description and specificity for each jurisdiction. Within a given land use, zoning provides a specific description of the uses allowed for a land parcel or small area. Zoning is also used to create standards for various developments, such as development density, floor area ratios, building height restrictions or buffer zones, to provide development compatibility with other surrounding developments. In the event that an existing or proposed development does not fall within the permitted land use for the area, conditional use permits or variances can be issued by the local authority for developments in situations where hardship has been determined to exist.

2.4.1 JOS REGIONAL LAND USE SETTING

Existing Land Use

Slightly less than 20 percent of the JOS service area is still undeveloped. Most of this vacant land is concentrated in the northern inland portion of the JOS service area (San Gabriel Valley), and becomes less prevalent in areas closer to the coast.

Developed land use in the JOS service area is predominately single-family residential, which comprises almost one half of the total land area. Multi-family residential, commercial, and industrial land uses each account for less than ten percent of the total land area. Commercial uses are most prevalent in the northern coastal areas, while industrial uses are most prevalent in the southern coastal and inland areas. Areas developed for open space uses, such as parks, golf courses, and flood control, are relatively evenly distributed throughout the JOS service area.

Agricultural land use is found throughout Los Angeles County and approximately totals 275,000 acres, or 26 percent of the total land area of the County. However, the largest concentrations of agricultural lands are found in outlying areas in the northeastern portions of the County outside the JOS service area (SCAG 1993).

Planned Land Use

Single-family residential land uses will continue to predominate developed land uses, encompassing nearly 50 percent of the land area. A larger proportion of single-family residential development will occur in the northern inland region of the JOS than elsewhere.

Slight increases in the proportionate area of multi-family residential and industrial development are planned, while the proportion of land area devoted to commercial uses will remain generally constant; each of these three land use categories individually will still remain below ten percent of the total JOS service area. Much of the existing vacant land will be developed for open space use, which reflects a threefold increase in planned open space area. Open space area will be concentrated in the northern inland portions of the JOS service area, which is consistent with the current concentrations of existing vacant land (SCAG 1993).

2.4.2 LOCAL LAND USE SETTING—JWPCP

Existing Land Use

The majority of the JWPCP property lies within the City of Carson. Actual plant facilities are located on land bordered by the Harbor Freeway on the west, Sepulveda Boulevard on the north, Main Street and an oil refinery to the east, and Lomita Boulevard on the south. A buffer property lies north of Sepulveda Boulevard, between the facility and a residential area, and another buffer zone lies south of Lomita Boulevard, in the City of Los Angeles, again between the facility and a residential area. Total plant property is 310.06 acres, with approximately 43 acres of the site presently leased by the Districts to a bedding plant nursery.

Because of the differences in land use designations between jurisdictions, the land use designations for the JWPCP site and vicinity depicted in Figure 2.4-1 are generalized. The following general descriptions of the designations represent a combination of individual jurisdictions' land use subcategories.

Industrial

Industrial uses include small- to large-sized industrial developments that should be buffered from residential or commercial areas.

Commercial

Commercial uses include neighborhood and highway oriented commercial centers and smaller neighborhood shopping complexes.

Residential

Residential uses include single- and multiple-family residences and other compatible uses.

Public/Quasi-Public

Public/quasi-public uses include a broad array of civic/governmental, institutional and utility uses. These uses generally include parks, public buildings, public open space, and utility transmission corridors.

Parkway

This City of Carson designation denotes areas where sidewalks are not required for development. However, in place of a sidewalk, a parkway is required. A parkway consists of a landscaped corridor which is the same width as a sidewalk with a permanent irrigation system.

The site on which the JWPCP facilities are located is zoned MH (Manufacturing, Heavy) (City of Carson 1990). Uses generally allowed in MH zones include the full range of industrial uses that are acceptable in the community with provisions for controlling any adverse effects on the more sensitive areas of the City of Carson. Wastewater treatment is consistent with this zoning (City of Carson 1993). General zoning designated for other JWPCP property, which is being used as buffer areas includes R or RA (Residential or Residential-Agricultural) and C (Commercial). Table 2.4-1 provides specific zoning and land usage for all JWPCP parcels, identified by Assessors Parcel Number (APN). Figure 2.4-2 provides zoning designations for the JWPCP site and vicinity.

The following land uses surround the facility site:

North

The JWPCP facility site is bounded by Sepulveda Boulevard on the north. A small neighborhood commercial center is located at the southwest corner of the Sepulveda Boulevard and Figueroa Street intersection. At the southeast corner of this intersection is land leased by the Districts to Kellogg Supply Company for processing and bagging of compost. Across Sepulveda Boulevard from Kellogg Supply Company is Carriage Crest Park, a neighborhood park. The area east of the park bordering Sepulveda Boulevard to its intersection with Main Street is owned by the Districts and maintained as a buffer zone between the facility and residential areas. This area is currently leased to a bedding plant nursery. Northeast of the Sepulveda Boulevard and Main Street intersection is a vacant supermarket. Zoning designations north of the JWPCP facility site include:

- RA (Residential-Agricultural), which allows residential uses together with compatible crop cultivation and related agricultural activities;

Table 2.4-1
ZONING AND LAND USAGE FOR JWPCP PARCELS

Parcel Group	APN	Zoning	Land Use Permit[1]	Existing Leases
1	7330-007-906, 7330-008-902	RA	granted (buffer)	Sunrise Growers
2	7330-009-900 through 904, 7330-009-911	RA	"	"
3	7330-009-905 through 910	CG-D	"	"
4	7406-026-911	MH	granted (heavy manufact.)	Sunrise Growers[2]
5	7406-026-912	MH	"	Kellogg Supply[2] Company
6	7406-026-913	MH	"	Sunrise Growers[2]
7	7414-001-900	R1-1-0	granted (buffer)	Margate Construction
8	7414-001-901	R1-1-0	"	None
9	7414-002-903	R1-1-0	"	Wilmington Chamber of Commerce
10	7414-002-904	R1-1-0	"	Brea Oil
11	7414-022-902	R1-1-0	"	Wilmington Boys Club

[1] *Zone approval was granted by the LA County Planning Commission for the JWPCP and prior to the purchase of additional property for the JWPCP. City of Carson incorporated after JWPCP began operating, and subsequently "grandfathered" existing land uses into their city general plan. Operation areas were zoned as heavy manufacturing and buffer areas were zoned as residential, agricultural, or open space.*

[2] *A portion of these parcels are leased.*

- RS (Residential, Single-family), which allows single-family detached residences and other compatible uses;
- CG-D (Commercial, General-Design Overlay Review), which allows establishment of all types of commercial development not grouped in commercial centers; and
- OS (Open Space), which allows expansion and protection of outdoor recreation areas, natural resource areas, ecological preserves and land subject to natural hazards (City of Carson 1990, 1993).

East

The eastern boundary of the JWPCP site is formed by Main Street and the property boundary of an inactive oil refinery. Vacant office space and vacant industrial uses border the JWPCP site north of the Atchison, Topeka, and Santa Fe (AT&SF) railroad and east

of Main Street. South of the AT&SF railroad and west of Main Street, the inactive oil refinery borders the JWPCP site boundary. East of Main Street are offices, a warehouse, and a market. Southeast of the Main Street/Lomita Boulevard intersection are strip commercial and residential uses and the Wilmington Junior High School. Zoning designations east of the JWPCP facility site include:

- CN (Commercial, Neighborhood Center), which allows convenience and retail shopping facilities serving surrounding neighborhoods;
- MH, which is described above; and
- ML-D (Manufacturing, Light-Design Overlay Review), which allows specific light industrial uses and warehousing.

South

As it crosses into the City of Los Angeles, Main Street becomes Wilmington Boulevard, and is bordered by strip commercial uses. West of Wilmington Boulevard and south of Lomita Boulevard are predominately single-family residences. However, immediately east of Figueroa Street at its intersection with Lomita Boulevard is the Wilmington Athletic Complex, which features several playing fields. Immediately south of the Wilmington Athletic Complex is the Wilmington Boys and Girls Club. These parcels are owned by the Districts and are used as buffer zones. Land uses further south include a rental storage facility and an apartment complex, which abut Pacific Coast Highway (SR-1).

West of Figueroa Street is a triangular area formed by Figueroa Street, Lomita Boulevard, and the Harbor Freeway (I-110). Land uses in this area are dominated by oil wells, but also include a construction company office building. This area, excluding the office building site, is owned by the Districts and maintained as a buffer area.

South of Lomita Boulevard and west of I-110 is an area of mixed land uses. Immediately west of I-110 are mobile homes and apartments. These developments are bordered by the Wilmington Drain and Wildlife Corridor, which extends north-south. West of this waterway and fronting on SR-1 are a muffler repair shop, dentist office, car dealership, auto parts store, and gas station. The gas station abuts the west side of Vermont Avenue. North of these uses is a parking lot and the Gateway Christian School. North of the school is a church, which abuts Vermont Avenue. Apartments border the church to the north and east. North of these uses and south of Lomita Boulevard is an area of light industrial/commercial uses. Two of the specific uses in this area include a fertilizer mixing business and an automobile body shop.

Zoning designations south of the JWPCP facility site include:

- R1-1 (One-Family Zone), which allows single-family residences and compatible uses. (This designation is also modified to indicate a restriction to Height District 1.);
- R1-1-O (One-Family Zone), which is generally described above. (The last designation denotes that this is an Oil Drilling District.);
- R2-1-O (Two-Family Zone), which allows multiple family dwellings and compatible uses in addition to the uses in the R1 zone;
- RD1.5 (Restricted Density Multiple Dwelling Zone), which allows multiple family and single-family dwellings and compatible uses with certain restrictions on density and yard sizes;
- RD2 (Restricted Density Multiple Dwelling Zone), which is similar to RD1.5, but allows slightly higher densities of dwelling units;
- C2-1, C2-1-O (Commercial Zone), which allows low-intensity commercial uses;
- M1 (Limited Industrial Zone), which allows low-intensity industrial uses in addition to the uses allowed in the C2 zone;
- P-1-O (Automobile Parking Zone), which allows parking lots and parking buildings if located out of view of neighboring uses (City of Los Angeles 1993).

West

The western boundary of the JWPCP site is formed by I-110. Immediately west of I-110 and north of Lomita Boulevard is the Wilmington Drain and Wildlife Corridor. Farther west, mobile homes and residential land uses abut the western boundary of Vermont Avenue. Offices lie adjacent to Vermont Avenue where it passes under the AT&SF railroad. North of the AT&SF railroad and immediately west of I-110 are oil wells and offices/commercial uses. Single-family residential uses predominate west of Vermont Avenue. Zoning designations west of the JWPCP facility site include:

- C2, C3, C4 (Neighborhood Business Zone), which allows certain neighborhood-serving businesses; and
- M2 (Heavy Manufacturing Zone), which allows medium- to high-intensity industrial uses (County of Los Angeles 1994);
- R1-1, which is described above.

Planned Land Uses

The JWPCP site is located in the southwest corner of the City of Carson. It is bounded on the west by unincorporated Los Angeles County and on the south by the City of Los Angeles. The following general plans are relevant to future development at the site and in the local area:

Los Angeles County General Plan

The Los Angeles County General Plan, which guides development in unincorporated Los Angeles County is composed of ten elements. The planning policies for the general plan are contained in a policy document, while the background information is presented in several background reports. Programs designed to implement the planning policies are contained in implementation documents. Several maps graphically augment the information contained in the general plan (County of Los Angeles 1994).

Wilmington-Harbor City District Plan

This document is the relevant community planning document for that portion of the City of Los Angeles located south of the JWPCP site. The plan is divided into eight program areas that are intended to guide development in the Wilmington-Harbor City District, which is generally bounded by the City of Lomita to the west, the City of Carson to the north, the City of Long Beach to the east, and the San Pedro and Port of Los Angeles areas on the south. The plan identifies a population of 73,600 (City of Los Angeles 1993).

City of Carson General Plan

The City of Carson General Plan guides development in the City of Carson and consists of 14 elements contained in five separate volumes. Additional background information from the prior update of the general plan is contained in five volumes. Planning information is also presented on four separate maps. The general plan identifies a projected population of 88,000 by the year 2000 (City of Carson 1982).

2.4.3 LOCAL LAND USE SETTING—SJCWRP

Existing Land Uses

The SJCWRP site is located in unincorporated Los Angeles County, north of the Pomona Freeway and south of San Jose Creek, with Stages I and II (SJCWRP East) between the San Gabriel River Freeway (I-605) and Workman Mill Road, and Stage III (SJCWRP West) between the freeway and the San Gabriel River. A City of Los Angeles DWP and a State of California property runs the length of property between the river and the SJCWRP West

property. Any future SJCWRP expansion (Stage IV) will be located adjacent to the existing Stage III facility. The total site area is 51.21 acres.

Land use for the site is designated for Low-Density Residential (LDR) and Industrial (I) uses. Land use designations for the SJCWRP site and vicinity are depicted in Figure 2.4-3. The SJCWRP site is zoned RA-7500 (Residential Agricultural Zone). This zoning category generally allows residential facilities for six or fewer persons, group homes, small day care homes, and crops. The designation is followed by a restriction on lot size (7,500 square feet per unit). Wastewater treatment is allowed in this zone following the granting of a conditional use permit (County of Los Angeles 1994). Table 2.4-2 provides specific zoning and land usage for all SJCWRP parcels. Figure 2.4-4 provides zoning designations for the SJCWRP site and vicinity.

Table 2.4-2
ZONING AND LAND USAGE FOR SJCWRP PARCELS

Parcel Group	APN	Zoning	Land Use Permit	Existing Leases
1	8115-004-906	RA-7500	Zone Exception Case # 8692-(1)	None
2	8115-001-904, 8115-001-906	RA-7500	Zone Exception Case # 8692-(1)	None

The following land uses surround the SJCWRP site:

North

The San Jose Creek extends west across the northern boundary of the SJCWRP site and merges with the San Gabriel River, which flows southwest past the SJCWRP site. I-605 extends northeast, bisecting the SJCWRP site.

South of the San Gabriel River is a strip of Los Angeles Department of Water and Power property. North of the waterways are residential uses and the California Country Club golf course. Land use designations north of the SJCWRP site include Open Space (O-S) and LDR. Zoning designations north of the SJCWRP site include:

- A1 (Light Agriculture Zone), which generally permits low-intensity agriculture, including the raising of various livestock; and

- O-S (Open Space Zone), which generally allows most undeveloped uses including recreation, low-intensity agriculture, and oil and gas drilling (County of Los Angeles 1994).

East

The San Jose Creek and Workman Mill Road form the northeast and southeast boundaries of the SJCWRP site, respectively. Land use in this area includes a restaurant and residential developments. Land use designations east of the SJCWRP site include O-S, LDR, and High-Density Residential (HDR). Zoning designations east of the SJCWRP site include:

- A1-20,000 (Light Agriculture Zone), which allows identical uses to A1 above, but with a parcel-size restriction of 20,000 square feet;
- C (Commercial Zone), which allows general commercial use;
- R1-7,200 (Single-Family Residence Zone), which allows single-family residences, group homes, and day care homes with a 7,200 square-foot lot size;
- R1-10,000 (Single-Family Residence Zone), which allows the same uses as R1-7,200 except with a 10,000 square-foot lot size;
- R3 (Limited Multiple Residence Zone), which allows the same uses as R1-7,200 and R1-10,000 and townhomes and two-family residences; and
- O-S (Open Space Zone), which is described above (County of Los Angeles 1994).

South

The Pomona Freeway (SR-60), which travels generally east to west, forms the southwest boundary of the SJCWRP site. South of this freeway, land uses include pockets of commercial area, low-density residential, and industrial land uses. Land use designations south of the SJCWRP site include LDR and HDR. Zoning designations south of the SJCWRP site include:

- RA-6,000 (Residential Agricultural Zone), which is identical to RA-7,500 above, but with a 6,000 square-foot lot size;
- RA-7,500 (Residential Agricultural Zone), which is described above;
- R3 (Limited Multiple Residence Zone), which is described above;
- R3-15U (Limited Multiple Residence Zone), which is identical to R3 above, but has a restriction of 15 dwelling units per acre;

- C1 (Restricted Business Zone), which allows light- and moderate-intensity commercial uses;

- C2 (Neighborhood Commercial Zone), which is described above under the description of the zoning designations surrounding the JWPCP site; and

- M (Industrial Zone), which allows general industrial uses (County of Los Angeles 1994).

West

West of the San Gabriel River levee, is a narrow strip of open space within the river's floodplain. West of the San Gabriel River are low-density residential land uses. Land use designations west of the SJCWRP site include LDR and O-S (County of Los Angeles 1993). Zoning designations west of the SJCWRP site include:

- R1-7,500 (Single-Family Residence Zone), which is described above;

- C2 (Neighborhood Commercial Zone), which is described above; and

- O-S (Open Space Zone), which is described above.

Planned Land Uses

The Los Angeles County General Plan is the only general plan considered to be relevant and has been described previously.

2.4.4 LOCAL LAND USE SETTING—LCWRP

Existing Land Use

The LCWRP is located in the City of Cerritos (Cerritos) on a 34.41-acre site which was acquired to be developed as a wastewater treatment plant in phases. In 1975, approximately 17.5 acres of LCWRP property, which was not required for the plant purposes at that time, was leased by the Districts to Cerritos. The lease agreement allowed Cerritos to develop the property for open space landscaping and park and recreational uses until such time as the land is required for plant expansion. Cerritos currently operates the Ironwood Nine Golf Course and Driving Range on the leased property. Under the terms of the lease agreement, the portion of land which has been developed as the driving range is leased at no cost to Cerritos until the property is required by the Districts for expansion of the LCWRP. The portion of the land which has been developed as the golf course is leased at no cost to Cerritos for a period of 20 years, or until such time that any federal, state or other

governmental agency or any of the laws or regulations of these agencies, or the Districts' Board determines that the public health, safety and welfare require the use of all or any portion of the golf course land for additional wastewater treatment and disposal facilities.

The site is bordered to the east and south by the San Gabriel River Freeway (I-605) and the Artesia Freeway (SR-91), respectively, to the north by a Southern California Edison property (immediately north of the leased golf course area), and to the west by the San Gabriel River, with a Southern California Edison right-of-way and an L.A. County Flood Control property running the length of the property between the river and the plant (this Edison right-of-way area is also part of the golf course). In addition, there are easements for underground gas and electric utility lines which run east to west across two sections of the northern leased property. Another easement for an underground gas line runs along the southern and southeastern property boundaries.

The LCWRP site land use is designated for Open Space (Special) uses (OSS) and for Open Space Sanitation Utility (OSSU) by Cerritos. Land use designations for the LCWRP site and vicinity are depicted in Figure 2.4-5. The site zoning is designated by Cerritos as OS (Open Space Zone), which permits outdoor recreational and educational uses, utility easements, and other compatible and comparable uses including water renovation (WRPs) and sewage conveyance facilities (City of Cerritos 1990, 1994). Table 2.4-3 provides specific zoning and land usage for all LCWRP parcels. Figure 2.4-6 provides zoning designations for the LCWRP site and vicinity.

Table 2.4-3
ZONING AND LAND USAGE FOR LCWRP PARCELS

Parcel Group	APN	Zoning[1]	Land Use Permit	Existing Leases
1	7106-004-903	OS (M-industrial)	Precise Plan #66-4 Precise Plan #72-22	City of Cerritos—Golf Course[2] (Driving Range)
2	7106-005-907, 7106-005-908	OS (M-Industrial)	Precise Plan #66-4 Precise Plan #72-22	City of Cerritos—Golf Course

[1] *APN records indicate land is zoned open space, but City of Cerritos land use permits provide industrial zoning.*
[2] *Only a portion of this parcel is leased.*

The following land uses surround the project site:

North

The lands immediately north of the LCWRP site (golf course and driving range) are designated and zoned for OS (Open Space Zone), which is described above. Industrial land uses lie farther north of the LCWRP site to Alondra Boulevard. Most of the area north of the LCWRP site is designated for Light Industrial uses (LI) (City of Cerritos 1990). Zoning designations north of the LCWRP include:

- M (Industrial Zone), which allows a variety of industrial uses with a conditional use permit; and

- OS (Open Space Zone), which is described above (City of Cerritos 1990, 1994).

East

The I-605 abuts the eastern boundary of the LCWRP site. East of the freeway are Low-Density Residential (LDR) uses and Cerritos Junior College. Several land use designations apply to areas east of I-605. These include LDR, Regional Commercial (RC), and Open Space Neighborhood Park (OSNP). Zoning designations east of the LCWRP include:

- RS-6500 (Single-Family Residential Zone), which allows single-family dwellings, mobile homes, and other compatible uses; and

- OS (Open Space Zone), which is described above (City of Cerritos 1990, 1994).

South

The Artesia Freeway (SR-91) abuts the southern boundary of the LCWRP site. Other land uses south of SR-91 include open space owned by the Los Angeles County Flood Control District, and a Southern Pacific Railway Company owned industrial area. Artesia Boulevard borders these uses to the south. South of Artesia Boulevard is the Valley Christian Junior High and High School. An easement for an underground natural gas pipeline extends along the southern and southeastern property boundaries. Land use designations south of the LCWRP site include Open Space Flood Control Utility (OSF) and Open Space Edison Utility (OSEU), Railroad (RR), and LI (City of Cerritos 1987). Zoning designations south of the LCWRP site include:

- A (Agricultural Zone), which allows a variety of agricultural uses depending on the size of the parcel;

- M (Industrial Zone), which is described above;

- OS (Open Space Zone), which is described above; and

- RS-6500 (Single-Family Residential Zone), which is described above (City of Cerritos 1990, 1994).

West

A channelized section of the San Gabriel River is located to the west of the golf course and the LCWRP site. City of Cerritos land use designations west of the LCWRP site include OSF and OSEU. The City of Cerritos land west of the LCWRP site is zoned OS, which is described above (City of Cerritos 1990, 1994).

Planned Land Uses

The City of Cerritos General Plan was the only general plan considered relevant for the purposes of future land use. The City of Cerritos General Plan guides development in the City of Cerritos. The plan divides planning policies and programs into 15 elements. The plan notes that the Cerritos population increased by approximately 233 percent from 1970 to 1980. However, it also states that by 1985, approximately 95 percent of the land area in Cerritos was devoted to developed uses. Because of the lack of land available for development in Cerritos, future population growth probably will be low. Existing land uses are not anticipated to change (City of Cerritos 1987).

2.4.5 LOCAL LAND USE SETTING—WNWRP

Existing Land Use

The WNWRP site is located in unincorporated Los Angeles County, just south of the Whittier Narrows Recreation Area and north of San Gabriel Boulevard, between the Rio Hondo channel on the west and Rosemead Boulevard on the east. The WNWRP site is within the Whittier Narrows Flood Control Basin, which constrains any new development. The Whittier Narrows Flood Control Basin is owned by the U.S. Government and operated by the Army Corps of Engineers (Corps). The site is leased to the Districts until December 19, 2020. The total site area is 27.15 acres. Approximately 16 acres of the site currently not used by the Districts is leased by the Corps to F.L. Norman's Nursery. This lease is subject to cancellation if the Districts require use of the leased land. Active and abandoned oil wells are scattered throughout the Districts' leased land and surrounding areas to the west, south, and southeast.

The WNWRP site and the properties surrounding it are designated for Open Space (O-S) land uses. Land use designations for the WNWRP site and vicinity are depicted in Figure 2.4-7. The WNWRP site area is also located near areas designated as Special Management Areas and as Significant Ecological Areas (County of Los Angeles 1994). The WNWRP and the properties surrounding it are zoned for O-S (Open Space) and A (Agricultural) uses, which are described previously. Table 2.4-4 provides specific zoning and land usage for all WNWRP parcels. Figure 2.4-8 provides zoning designations for the WNWRP site and vicinity.

Table 2.4-4
ZONING AND LAND USAGE FOR WNWRP PARCELS

Parcel Group	APN	Zoning	Land Use Permit	Existing Leases
1	5271-009-900	O-S	Zone Exception Case # 5893-(1)	Container Nursery[1]
2	5271-009-902	O-S	Zone Exception Case # 5893-(1)	None

[1] *Only a portion of this parcel is leased to the container nursery.*

The following land uses surround the WNWRP site:

North

A Southern California Edison easement, which extends east-west, abuts the northern boundary of the WNWRP site. This area is included in the Corps' lease to Norman's Nursery. North of the nursery is an area that is generally reserved for recreational uses and features a shooting range area. All recreational areas are leased by the Corps to the Los Angeles County Department of Parks and Recreation (LADPR). Legg Lake Creek, which flows westward into the Rio Hondo, lies immediately north of the WNWRP site. Farther north is another Southern California Edison easement, which extends east-west.

East

Rosemead Boulevard abuts the eastern boundary of the WNWRP site. Immediately east of this roadway is an area temporarily leased for agricultural purposes. Farther east is a recreation area dominated by Herbert Legg Lake.

South

The area immediately south of the WNWRP between the facility and San Gabriel Boulevard, which runs west from Rosemead Boulevard, is an area of open space which is used for seasonal recreation activities. South of San Gabriel Boulevard is the Rio Hondo Channel and the Corp's operational area which is exclusively used for flood control purposes. The southern part of this area is leased to the Los Angeles County Department of Public Works, and is used for storage of water to be released to downstream spreading grounds for ground water recharge.

West

Immediately west of the WNWRP site is the Rio Hondo Channel. Beyond this waterway, is an open space area bounded by San Gabriel Boulevard, which turns northwest. West of San Gabriel Boulevard is a hillside residential area.

Planned Land Uses

The following general plans are relevant to future development at the site and in the local area:

- The Los Angeles County General Plan

  This plan is described previously.

- Recreational Master Plan for Whittier Narrows Flood Control Reservoir

  This plan, developed by LADPR and approved by the Corps in 1973, identifies existing and planned recreational land uses within the Whittier Narrows Flood Control Reservoir. This plan is currently being updated by the LADPR and is under review by the Corps. Although there are no plans for expansions of existing recreational areas, the plan does include some improvement and active recreational development of existing unimproved recreational areas.

2.4.6 LOCAL LAND USE SETTING—LBWRP

Existing Plant Property

The LBWRP is located in the City of Long Beach, immediately north of the confluence of the San Gabriel River and Coyote Creek. The site is bordered by the San Gabriel River on its western side, by Coyote Creek, which runs southwesterly until joining with the San Gabriel River, on its eastern side, and by City of Long Beach property on its northern side. There is a narrow strip of plant property running from the plant north to Willow Street along Coyote Creek which is used for the plant access road. Also, a small section of land near the southern tip of the site property has been granted to the City of Long Beach. In addition, easements for electrical lines and a flood control access road exist along the Coyote Creek boundary, and there is a City of Long Beach pipeline easement located in the southernmost section of the plant property. The total site area is 17.01 acres.

The LBWRP site and surrounding land use is designated by the City of Long Beach as Open Space and Park (OS/P). Land use for the LBWRP site and vicinity is depicted in Figure 2.4-9. Typical land uses permitted include agriculture, golf courses, beaches, flood control channels and basins, rivers, utility rights-of-way, public parks, oil islands, local marine areas, inland bodies of water, off-street bike routes, estuaries and lagoons, and supporting uses. The site zoning is designated by Long Beach for P (park use), but is permitted as industrial to allow the LBWRP to operate (City of Long Beach, 1989, 1990). Table 2.4-5 provides specific zoning and land usage for all LBWRP parcels. Figure 2.4-10 provides zoning designations for the LBWRP site and vicinity.

Table 2.4-5
ZONING AND LAND USAGE FOR LBWRP PARCELS

Parcel Group	APN	Zoning	Land Use Permit	Existing Leases
1	7235-004-911, 7235-004-912	P park	Zone Case s-134-68	None

The following land uses surround the LBWRP site:

North

To the north of the LBWRP site is El Dorado Park. Land use is designated as OS/P. The park area is zoned P with the exception of an area which is zoned I(H) (institutional with a horse overlay).

West

To the immediate west of the LBWRP is the San Gabriel River channel. On the west and northwest side of the channel are additional El Dorado Park areas. To the southwest is residential area. The land use designation for the park and river areas is OS/P. Land use for the residential area is designated for single-family home use. Zoning designations west of the LBWRP site include:

- P (Park Zone), which is described previously;
- PR (Public Right-of-way), which allows river/flood control channels; and
- R-N-1 (Single Family Residential Zone), which allows single family residences.

East and South

Coyote Creek, which runs southwesterly, can be considered an approximate east-west border between Orange and Los Angeles Counties for this general area. Although there is an area of Los Angeles County which lies between the official county border and Coyote Creek, this area is used by Southern California Edison and the Orange County Flood Control District. Land use designation for the area within Los Angeles County/City of Long Beach is OS/P and is zoned PR, which is previously described.

Planned Land Use

The City of Long Beach General Plan was the only plan considered relevant for the purposes of future land use. However, due to existing development, land uses at the LBWRP site and

in the surrounding park and residential areas are expected to remain the same (City of Long Beach, 1990).

2.4.7 LOCAL LAND USE SETTING—PWRP

Existing Plant Property

The PWRP is located in the City of Pomona. The site, which is bordered to the south by Humane Society property at the intersection of Humane Way and Mission Boulevard, runs northward between Humane Way on the east and Elephant Hill on the west, then turns westward and is bordered on the north by San Jose Creek, with the Union Pacific Railroad running the length of the property between the creek and the plant property, and on the south and on the west by Elephant Hill. The total site area is 14.00 acres. Approximately 0.2 acres of land adjacent to the Humane Society property is leased to Humane Society for use as a parking lot. In addition, there are easements for an electric utility line along the northern property boundary and a flood control structure along the eastern property boundary.

The PWRP site and vicinity land uses include Open Space (O), Industrial and Business Park (I), and Residential (R) uses. Land use for the PWRP site and vicinity are depicted in Figure 2.4-11. The site zoning is designated as O (Open Space), which allows unrestricted use, including wastewater treatment (City of Pomona, 1993). Table 2.4-6 provides specific zoning and land usage for all PWRP parcels. Figure 2.4-12 provides, zoning designations for the PWRP site and vicinity.

Table 2.4-6
ZONING AND LAND USAGE FOR PWRP PARCELS

Parcel Group	APN	Zoning	Land Use Permit	Existing Leases
1	8707-020-905	O	not required	Humane Society[1] (parking lot)
2	8707-020-906	O	not required	None

[1] *Only a portion of this parcel leased.*

The following land uses surround the PWRP site:

North

To the immediate north of the PWRP site are the railroad and San Jose Creek. North of the creek are industrial and residential use areas. Land use is designated for industrial and residential uses and include the following zoning designations:

- M-1 (Light Industrial Zone);
- M-2 (General Industrial Zone); and
- O (Open Space Zone); and
- R-1 (Single Family Residential).

East

The area to the east of the PWRP site has been developed as industrial. Land use for this area is designated as industrial and is zoned as M-2.

South

Additional Open Space and residential areas are located to the south of PWRP with corresponding land use designations. Zoning designations include:

- O (Open Space Zone); and
- R-1 (Single Family Residential)

West

To the west of the PWRP site is Elephant Hill. Although presently undeveloped, land use for this area has been designated for residential purposes and is zoned for Planned Residential Development (PRD).

Planned Land Use

The City of Pomona General Plan was the only plan considered relevant for the purposes of future land use. However, due to existing development, land use at the PWRP and in the surrounding industrial, residential, and open space areas is expected to remain the same (City of Pomona, 1993).

2.5 WATER RESOURCES

Water has played a central role in accommodating development in the Los Angeles metropolitan area including the JOS service area. Throughout the history of the region, major efforts have been made to supply a growing population and industrial base with adequate amounts of water. Early in the twentieth century, when it became apparent that local water supplies were not sufficient to support continued development of the Los Angeles region, the City of Los Angeles began to import water from the Owens Valley in Northern California. Later, MWD diverted water from the Colorado River. More recently, the State of California began delivering water from the Sacramento-San Joaquin Delta in Northern California. Extensive water supply infrastructure including aqueducts, pumping plants, storage reservoirs, and treatment plants have been constructed to deliver water from these regions, and additional water supply infrastructure is planned to improve the reliability of Southern California's imported water supplies. Despite the efforts to date, the effects of the recent droughts and projections of continued growth in the region indicate that the water supply will continue to be a critical issue in Southern California and in the JOS planning area in the future.

2.5.1 THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

The Metropolitan Water District of Southern California (MWD) is a public agency and quasi-municipal corporation which was organized in 1928 following the adoption of the Metropolitan Water District Act by the California Legislature in 1927. The MWD was originally formed with the expressed intent to build and operate an aqueduct which would import water to Southern California from the Colorado River. Imported water from the Colorado River was intended to supplement local water supplies in the original 13 MWD member cities. The 242-mile Colorado River Aqueduct was completed in 1941, and deliveries of Colorado River water to Southern California began that year.

In 1951, the California Legislature authorized the State Department of Water Resources to construct the Feather River Project, now known as the State Water Project (SWP), to transfer surplus water from Northern California to water short regions in Central and Southern California. In 1972, the MWD began distributing water supplies provided by the SWP to meet supplemental demands for water in its service area.

In summary, MWD presently imports water from two sources: the Colorado River via the Colorado River Aqueduct and Northern California via the SWP and the California Aqueduct. The major aqueducts which import water to the MWD service area are shown in Figure 2.5-1.

MWD provides imported water to supplement local water supplies to more than 15 million residents on the coastal plain of Southern California. Southern California has a highly diversified economy with a value of goods and services produced of approximately 400 billion dollars per year. This economy is dependent on MWD's ability to supply over 55 percent of the water used in Southern California. MWD's 5,154 square-mile service area extends from Ventura to the international

boundary with Mexico and includes portions of the six counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura. MWD's mission is to provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way. The MWD develops, stores, and distributes water at wholesale prices to its 27 member agencies (see Figure 2.5-2) which either directly or indirectly provide retail water services. MWD member agencies deliver a combination of local groundwater, local surface water, reclaimed water, and imported water to their customers. Some member agencies depend heavily, even entirely, on MWD supplies while others utilize MWD supplies less extensively to supplement local water supplies.

2.5.2 RELATIONSHIP BETWEEN THE JOS AND THE MWD

As noted in the introduction, the JOS service area presently includes 72 cities and unincorporated communities within Los Angeles County. Sixty-eight of the 72 cities and virtually all of the unincorporated communities within the JOS are served either directly or indirectly by the MWD via an MWD member agency. The MWD supplies approximately two-thirds of the water used within its service area, but the JOS municipalities rely even more heavily on MWD. MWD member agencies which serve the JOS service area (the Central Basin MWD, the Foothill MWD, the Three Valleys MWD, the Upper San Gabriel MWD, the West Basin MWD, and the cities of Compton, Long Beach, Pasadena, San Marino and Torrance) obtain approximately three quarters of their water supplies from the MWD. The remainder of JOS water supplies are composed largely of groundwater. The major groundwater basins from which JOS water supplies are obtained have been adjudicated and are presently fully utilized. Maximum withdrawals are set for each aquifer by local agencies or by court appointed watermasters such that the long range productivity of the aquifers is protected. Local surface waters and reclaimed water provide a relatively small portion of the regional water supply. In general, local water supplies, with the exception of reclaimed water, are fully developed and are expected to remain relatively stable in the future. Since the JOS service area is almost entirely within MWD's service area and MWD incorporates both local and imported water into its water resources planning, an analysis of MWD water resources would be representative of water resources available to the JOS service area.

2.5.3 PROJECTED WATER DEMAND

The MWD has employed the MWD MAIN model to develop projections of urban water demands in its service area. The MWD MAIN model is an econometric model which projects long-term water demands based on economic, demographic, and climatic variables. Year 2010 water demand projections were developed based on SCAG and San Diego Association of Governments (SANDAG) population, household, and employment projections developed under the Growth Management Element of the RCP and assumed climatic conditions. These projections also account for water conservation realized via implementation of identified Best Management Practices (BMPs) and the effects of anticipated increases in the price of water which are expected to reduce per capita water consumption.

The State Water Conservation Coalition, a group of urban water agencies, environmental groups, and other public interest groups, has developed a set of standardized water conservation practices known as the BMPs. Under the BMP Program, participating agencies voluntarily commit to make good faith efforts to implement and/or develop and implement water conservation measures. The MWD has committed to the implementation of 16 BMPs (see Table 2.5-1) over the next ten years. Water conservation efforts are expected to conserve approximately 770,000 acre feet per year (AFY) of water by the year 2010 which represents approximately 13 percent of the projected preconservation demand.

Table 2.5-1
BEST MANAGEMENT PRACTICES ADOPTED BY THE MWD

1. Interior and exterior water audits and incentive programs for single-family residential, multi-family residential, and governmental/institutional customers.
2. Plumbing new and retrofit:
   - A. Enforcement of requirement for ultra-low flush toilets in all new construction beginning January 1, 1992;
   - B. Support of state and federal legislation prohibiting sale of toilets using more than 1.6 gallons per flush; and
   - C. Plumbing retrofit.
3. Distribution system water audits, leak detection and repair.
4. Metering with commodity rates for all new connections and retrofit of existing connections.
5. Large landscape water audits and incentives.
6. Landscape water conservation requirements for new and existing commercial, industrial, institutional, governmental, and multifamily developments.
7. Public information.
8. School education.
9. Commercial and industrial water conservation.
10. New commercial and industrial water use review.
11. Conservation pricing.
12. Landscape water conservation for new and existing single-family houses.
13. Water waste prohibition.
14. Water conservation coordinator.
15. Financial incentives.
16. Ultra-low-flush toilet replacement.

Source: MWD, 1993

MWD projections indicate that regional water demands will increase between 1990 and 2010, but will increase at a rate slower than the rate at which the population is expected to grow. The population of the MWD service area is expected to increase by approximately 30 percent from 14.9

to 19.5 million by the year 2010 but water demands are expected to increase by only 15 percent. With implementation of water conservation through the BMPs and after accounting for expected decreases in agricultural water demand, regional water demands under average year conditions are projected to increase from their 1990 level of 3.9 million acre feet per year (MAFY) to 4.5 MAFY in 2010. In addition, regional water demands are expected to be 4.84 MAFY in 2010 during dry year conditions. Projected regional water demands and the effect of water conservation under average year conditions are illustrated in Figure 2.5-3.

2.5.4 THE WATER SUPPLY — EXISTING WATER SUPPLY

Water supplies available to the MWD service area are obtained from both local and imported sources. Local groundwater, surface water, and reclaimed water supply approximately 35 percent of the area's current water needs. Imported supplies from the City of Los Angeles' Los Angeles Aqueduct, MWD's Colorado River Aqueduct, and MWD's entitlement to SWP water provide the remaining 65 percent of the regional needs on average.

Local Water Supplies

Groundwater

Groundwater supplies account for about 90 percent of local water supplies. These supplies are found in many groundwater basins throughout MWD's service area, and safe yields in some basins exceed 100,000 AFY (Table 2.5-2). Locations of the major groundwater basins are shown in Figure 2.5-4. Groundwater is collected through natural percolation of rainfall and stream runoff into groundwater basins. In addition, runoff in certain areas is retained in flood control reservoirs constructed in major drainage areas and released into spreading basins or ponds for additional percolation into groundwater basins. Additional replenishment is achieved through artificial recharge with imported water supplies and reclaimed water. Groundwater is pumped to meet local needs.

Table 2.5-2
DEPENDABLE LOCAL GROUNDWATER SUPPLIES*
IN MWD'S SERVICE AREA (IN THOUSANDS AFY)

Groundwater Basin	Sustainable Yield
Ventura County	20
Upper Los Angeles River Area	100
Raymond	30
Main San Gabriel & Puente	180
Claremont Heights, Live Oak, Pomona & Spadra	20
Santa Monica, Central & West Coast	220
Orange County	110
Eastern & Western Riverside County (including imports from San Bernardino Basin)	200
Chino	140
Coastal San Diego County	30
TOTAL	1050

* *The yields of groundwater basins includes some surface water recharge.*
Source: MWD, 1993

Most of the groundwater basins in MWD's service area are managed by either local agencies, such as the Orange County Water District for the Orange County Basin or by court-appointed watermasters. Adjudicated basins in MWD's service area include the Raymond Basin, the Central Basin, the West Coast Basin, the Main San Gabriel Basin, the Upper Los Angeles River System, and the Chino Basin. These basins are managed in such a way that extractions are limited, and/or replenishment is provided using MWD imported water supplies when the safe yield of the basin or other groundwater management criteria are being exceeded.

In general, basin management plans include protection from seawater intrusion, water quality deterioration, and excessive lowering of water levels, and provide a hedge against water shortages. The dependable natural groundwater supplies (i.e., safe yield) in the region are approximately 1.0 MAFY. The replenishment of basins with reclaimed water provides additional groundwater supplies. The region's groundwater basins are a key asset for the development of water management plans in the future.

The existing and projected quality of groundwater supplies is of great concern to MWD. Recently, trace amounts of organic chemicals have been found in some Southern California groundwater basins. Figure 2.5-4 shows the current estimated loss in production due to mineral and organic water quality problems. Currently, approximately 74,000 AFY of potential groundwater production is lost because of high mineral concentrations (primarily nitrates and total dissolved solids). Organics in groundwater have resulted in additional losses in production, currently estimated at approximately 6,500 AFY.

Some basins, such as the San Gabriel and San Fernando Basins, have organic contaminant levels above current drinking water standards in 50 percent of all wells tested. While many of these wells have been returned to production through blending or other means, their continued use in the future may be jeopardized by more stringent state and federal standards for organic compounds. The potential for adoption of more stringent federal and state water quality standards and the potential for movement of these constituents within groundwater basins raises uncertainties as to the future availability of a portion of local groundwater supplies. Loss of local production capacity due to groundwater quality problems may, however, be viewed as a temporary problem because the value of the resource to Southern California is too great to allow its abandonment. Current planning studies assume that these water quality problems will not affect the long-term availability of groundwater, as efforts are being undertaken to develop treatment and management approaches to reclaim these impacted water supplies and maintain their availability in the future.

Surface Water

Local surface-water resources consist of runoff captured in storage reservoirs held for later direct use and of some direct diversions from streams into local water systems. There are

currently 18 major reservoirs which are owned and operated by local water agencies (Figure 2.5-5). These reservoirs provide a storage capacity of 817,000 acre feet (AF). The firm annual yield of these local surface supplies is about 100,000 AFY. The actual yield varies widely between wet and dry years, and most reservoirs are operated with minimal carry-over storage.

Reclaimed Water

Reclaimed water has been used in the JOS and MWD service area for over three decades. Water reclamation and reuse involves 1) recapture and/or treatment of wastewater, degraded or contaminated groundwater, or other nonpotable water for beneficial uses, 2) transportation of this water to the place of use, and 3) the actual use of the water.

Water reclamation and reuse is an integral part of Southern California's water supplies. Locally, water reclamation projects are integrated into a complex regional water supply system which optimizes the use of imported and local supplies. Water reclamation and reuse projects in Southern California have gone beyond traditional irrigation purposes to encompass groundwater recharge and industrial applications. Industrial applications include power plant cooling water and process water for paper plants. The largest use of reclaimed water in Southern California is groundwater recharge which is also the most efficient use of reclaimed water since it allows large amounts of reclaimed water to be used at a relatively low cost. Groundwater recharge is accomplished either by injection of reclaimed water into seawater intrusion barriers or by percolation of reclaimed water in spreading basins for eventual reuse in potable systems. Direct reuse of reclaimed water is primarily for irrigation. Golf courses, cemeteries, school yards, parks, street medians, and freeway landscaping in Southern California are irrigated with reclaimed water. The MWD projects that approximately 0.4 MAFY of reclaimed water will be reused by 2010.

Imported Water Supplies

Since local water supplies currently provide only about 35 percent of the service area water needs, the balance must be made up by imported sources. Most MWD member agencies and retail water suppliers depend on imported water for at least a portion of their water supply.

Los Angeles Aqueducts

The City of Los Angeles imports water from the Owens Valley and Mono Basin through the Los Angeles Aqueducts (see Figure 2.5-1). The original Los Angeles Aqueduct was completed in 1913 and imported water from the Owens Valley. In 1940, this aqueduct was extended to Mono Basin. A second Los Angeles Aqueduct, which parallels the original aqueduct, was completed in 1970.

The aqueducts have historically supplied an average of about 450,000 AFY, consisting of 360,000 AFY from surface-water and groundwater supplies in the Owens Valley and 90,000 AFY from surface supplies in the Mono Basin. As a result of litigation, the City of Los Angeles' Department of Water and Power recently agreed to a permanent reduction in the volume of water it is allowed to divert from the Mono Basin. As such, average year supplies from the Los Angeles Aqueduct have been reduced to 370,000 AFY. During droughts, Los Angeles Aqueduct deliveries can be considerably lower. During severe droughts, deliveries may be reduced to 120,000 AFY.

Colorado River Aqueduct

The Colorado River originates in the Rocky Mountains and flows through five states and the Republic of Mexico to the Gulf of California. Rights to Colorado River water are divided amongst the states in the upper and lower Colorado River Basin and the Republic of Mexico. Colorado River water is used for agricultural, municipal, and industrial purposes. California first began using water from the Colorado River in 1855 and deliveries of Colorado River water to Southern California coastal plain began in the early 1940's following the completion of the Colorado River Aqueduct. MWD has delivery contracts with the U.S. Department of the Interior for 1.212 MAFY of Colorado River water, and for an additional 180,000 AFY of surplus water. The capacity of MWD's Colorado River Aqueduct is 1,800 cubic feet per second or 1.3 MAFY. In 1964, however, a U.S. Supreme Court decree handed down in Arizona v. California significantly reduced California's dependable supply of Colorado River water. MWD's dependable supply was subsequently reduced to less than 550,000 AFY with the commencement of Colorado River water deliveries by the Central Arizona Project (CAP). The volume of MWD's dependable supplies of Colorado River water is affected by use of water by holders of present perfected rights to Colorado River water such as Indian reservations and towns located along the Colorado River, estimated to be 30,000 AFY, and by conveyance losses along the Colorado River Aqueduct, which are estimated at 10,000 AFY. In April 1994, the U.S. Fish and Wildlife Service (Service) designated approximately two thousand overlapping miles of critical habitat along the Colorado River and some of its tributaries in an effort to permit four endangered fish species native to the rivers to survive and recover. While the Service has stated that it did not foresee changes in current hydrological operations of the Lower Colorado River, it remains to be determined whether efforts to recover these species could impact MWD's Colorado River supplies. In 1994, MWD diverted approximately 1.3 million acre feet (MAF) of Colorado River water. Since the CAP began operations in 1985, MWD has been able to continue diverting Colorado River water as needed to meet a portion of its service area's demands and storage objectives. This has been accomplished through the use of surplus and unused water and the execution of agreements to:

- Deliver Colorado River water in advance to Coachella Valley Water District and Desert Water Agency

- Implement a water conservation program with Imperial Irrigation District
- Implement a test land-fallowing program with Palo Verde Irrigation District
- Implement a demonstration program to store unused Colorado River water in central Arizona with the Central Arizona Water Conservation District (CAWCD).

Deliveries of Colorado River water to MWD by the United States Bureau of Reclamation could, however, be reduced in the future.

Given existing constraints and programs, the year 2010 average year water supply from the Colorado River Aqueduct is expected to be approximately 620,000 AFY. MWD may be able to import additional water from the Colorado River during any given year but such diversions are subject to hydrological conditions in the Colorado River Basin and demands for Colorado River water by other users. MWD is negotiating arrangements with other water agencies and the U.S. Department of the Interior to increase its dependable supplies of Colorado River water.

State Water Project (SWP)

MWD first received deliveries of State Water Project (SWP) supplies in 1972. MWD has contracted for the delivery of approximately 2.01 MAFY of SWP water, or about 48 percent of the total contracted entitlement. Contractor requests for SWP entitlement have been increasing, and in 1994, they reached 3.85 MAF. While this level of request significantly exceeds the dependable yield from existing SWP facilities, the SWP has been able to meet all contractor's requests for entitlement water except during the drought periods in 1977, 1990 through 1992, and 1994. In addition, surplus water has been delivered to contractors in many years. SWP deliveries to MWD reached a high in 1990 of 1.4 MAF. The only years when MWD received less SWP water than it needed were 1991 and 1992, with a SWP delivery in 1991 of 381,000 acre-feet (AF).

The quantity of SWP water available for delivery is controlled both by hydrology and operational considerations. In the past, SWP operations in the Sacramento-San Joaquin Delta (Delta) were governed by standards established under the State Water Resources Control Board's 1978 Water Rights Decision 1485 (D-1485). D-1485 required compliance with water quality standards and flow requirements for the Delta and assigned responsibility to meet these standards exclusively to the SWP and Central Valley Project.

Currently, the SWP is being operated in accordance with the December 1994 consensus agreement on Bay/Delta standards. This agreement has resulted in a reduction in SWP supplies in order to provide added environmental protections for the Delta.

2.5.5 THE WATER SUPPLY – ADDITIONAL WATER SUPPLIES TO MEET 2010 DEMANDS

The MWD has initiated a number of water supply programs in order to meet projected year 2010 water demands. Water supply programs which are intended to expand existing water supplies are listed below.

Groundwater Recovery Program

The MWD and its member agencies have developed the Groundwater Recovery Program to reclaim groundwater supplies which have been lost to mineral or chemical contamination and to prevent additional contamination. This program is expected to recover 200,000 AFY of contaminated groundwater. Approximately 100,000 AFY of the annual groundwater production will be untapped local yield or new supplies, while the remaining amount will require replenishment by imported water supplies or reclaimed water to prevent groundwater basin overdraft.

Wastewater Reclamation

MWD has determined that providing financial assistance toward the implementation of reclamation projects would be a regional benefit to its entire service area as reclaimed water could augment local water supplies and increase reliability. In 1982, MWD instituted the Local Projects Program (LPP) as a means by which it could participate with local agencies in expanding local water supplies through reclamation. The LPP provides a contribution of $154 per AF to qualifying projects based on the amount of reclaimed water delivered and used by a project in a particular year. The LPP is expected to yield an additional 200,000 AFY of water by the year 2000.

Colorado River Programs

The MWD is continuing its efforts to obtain additional Colorado River supplies. Both short- and long-range supplies are being pursued on intermittent and dependable bases, as appropriate. A number of the major programs which are being considered by the MWD are described below. These programs are expected to increase average and dry year supplies from the Colorado River by approximately 0.45 MAFY.

Surplus and Unused Water

Studies by the Bureau of Reclamation indicate that, over a period of time, surplus Colorado River water could be made available to MWD in the future in certain years. MWD has diverted available surplus water, water apportioned to but unused by Arizona and Nevada, and unused Colorado River water apportioned to California for use by other agencies for

agricultural purposes. Currently, the availability of surplus water and water apportioned to but unused by Arizona and Nevada is determined on a year-to-year basis by the Secretary of the Interior based on a recommendation by the Commissioner of Reclamation. The amount of unused agricultural priority water available to MWD varies from year to year and is dependent upon agricultural economics, type of crops grown and acreage irrigated. Therefore, surplus and unused water are considered to be intermittent supplies due to the uncertainties associated with the determination of their availability to MWD.

All American Canal and Coachella Canal Lining

Title II of Public Law 100-675 authorized the Secretary of the Interior to line 65 miles of the All American Canal and the Coachella Canal. The projects are to be constructed with 100 percent non-federal funding. Constructing a 23-mile concrete-lined canal parallel to the existing earthen All American Canal could conserve 67,700 AF of Colorado River water annually. Constructing a 33-mile concrete-lined canal in the existing cross section of the Coachella Canal could conserve 25,700 AF of Colorado River water annually. MWD is proposing to provide the funding for implementation of the All American Canal Lining Project in exchange for use of the conserved water. MWD would be reimbursed if another entity with a higher-priority right were to use the conserved water.

Interstate Underground Storage of Unused Colorado River Water

MWD and the CAWCD executed an Agreement for a Demonstration Project on Underground Storage of Colorado River Water (Agreement) in October 1992. Under the Agreement, 100,000 AF of Colorado River water has been released from Lake Mead, conveyed through the Central Arizona Project's Hayden-Rhodes Aqueduct, and stored underground in Central Arizona. MWD and the Southern Nevada Water Authority (SNWA) paid the costs of storing the water, while CAWCD is responsible for costs of recovery of the water. There are two potential uses of the stored water. CAWCD could use the water during shortages declared by the Secretary of the Interior. Alternatively, MWD and SNWA could exchange this water for CAWCD's Colorado River water subsequent to a surplus occurring or a release for flood control purposes from Lake Mead. MWD and CAWCD have executed an Amendatory Agreement to the Agreement that increases the total amount of water which may be stored from 100,000 AF to 300,000 AF and extends the time for storage activities from December 31, 1996 to December 31, 2000. MWD and CAWCD are seeking the approval of the Amendatory Agreement from a number of agencies, including the States of Arizona and Nevada, and the Bureau of Reclamation, by May 1995.

Phase II Water Conservation Program with Imperial Irrigation District

Under a Phase II Water Conservation Program with the Imperial Irrigation District, the MWD would provide funding to construct a regulatory reservoir and a spill-interceptor canal, to line irrigation canals with concrete, and to further improve management of irrigation water on farms. Such a program could conserve 150,000 AFY. Water conserved by this program will be made available to the MWD.

Land Fallowing Programs

Under these programs, MWD would pay lessees/landowners in the Palo Verde and/or Imperial Valleys who irrigate crops with Colorado River water to leave land fallow in exchange for use of the water saved.

Colorado River Basin Regional Water Supply Solution

Representatives of water agencies, the Colorado River Basin States, and the Bureau of Reclamation are working to reach consensus on a number of components which would improve water management in the Colorado River Basin. A major element of this effort is to ensure adequate dependable supplies, in particular for urban users of Colorado River water in Arizona, California, and Nevada. The consensus, which could take the form of regulations for administering entitlements, may include provisions for banking conserved and non-Colorado River system water, interstate water leases, guidelines for surplus and shortage declarations, and wheeling non-Colorado River system water.

State Water Project Programs

Due to many complex issues, the facilities needed to increase the yield of the SWP have not been constructed. MWD's Integrated Resources Planning (IRP) process identifies interim South Delta facilities, acoustic fish barriers, and a Delta water transfer facility as additional SWP facilities to be included in the Preferred Resource Mix. In addition, the California Department of Water Resources (DWR) is working on developing other water management programs which will increase the SWP yield. The following describes these facilities and programs which are needed to increase SWP water supplies:

Acoustic Fish Barriers

Acoustic fish barriers have been installed on a trial basis along the Sacramento River at the Delta Cross Channel and at Georgianna Slough. If proven to be effective, acoustic barriers will reduce SWP impacts to certain fish species and improve SWP operation and flexibility.

Bulletin-160-93, Level 1 Options

In 1994, DWR issued the update to the California Water Plan, Bulletin 160-93. This bulletin listed several SWP programs, referred to as Level 1 options, that have undergone extensive investigation and environmental analysis and are judged to have a higher likelihood of being implemented by 2020. The following potential SWP programs were listed as Level 1 options:

- Interim South Delta Water Management Program:

  The preferred alternative for the Interim South Delta Program consists of an additional SWP intake structure at Clifton Court Forebay, limited dredging in south Delta channels, and four South Delta channel flow-control structures. These facilities are intended to allow the SWP to increase its export pumping capacity, provide increased operational flexibility, reduce fishery impacts and improve water levels and circulation for local agricultural diverters.

- Long-term Delta Solution:

  In 1992, Governor Wilson delivered a water policy statement that established a Bay Delta Oversight Council to guide the planning and environmental documentation process for implementation of a long-term Delta solution. In 1994, federal regulatory agencies joined the State of California in this effort by forming a coalition, known as "CalFed." Members of CalFed signed a Framework Agreement that outlined a joint state/federal process to develop a long-term solution. It is anticipated that this process will take three to four years to identify solutions and carry out the California Environmental Quality Act/National Environmental Policy Act process.

- Kern Water Bank:

  The Kern Water Bank consists of local and State-owned groundwater storage programs in Kern county. DWR has estimated that, in total, approximately 2 million AF could be stored in these programs. Planning for Kern Water Bank has slowed to accommodate the long-term Delta solution process.

- Los Banos Grandes Reservoir:

  This proposed 1.75 million AF surface reservoir, located near and functioning similarly to San Luis Reservoir, would provide additional SWP storage and yield south of the Delta. The schedule for this project has also slowed to accommodate the long-term Delta solution process.

Proposed SWP Water Supply Planning Strategy

In late 1994, DWR began a scoping process to develop a SWP Future Water Supply Program. This process is focusing on identifying new strategies to develop SWP water supplies during the next 30 years through interim, short-term (next 10 years) and long-term measures. The strategies will include both traditional and "non-traditional" options to develop the necessary supplies in a timely manner. DWR has indicated that they intend to gain broad-based support for this program through public and regulatory agency participation programs. DWR plans to have a report outlining details for implementing the SWP Future Water supply Planning Strategy by Spring 1996.

Groundwater Management Programs

Improved groundwater management programs are expected to improve MWD service reliability by increasing dry year water supplies. Conjunctive use of surface water and groundwater basins has been practiced in Southern California for almost 40 years. Conjunctive use programs allow for overdraft of groundwater basins during dry years and subsequent replenishment and/or storage of excess surface water (runoff and imported water) during wet years. The MWD, in cooperation with member agencies, plans to expand conjunctive use projects in the Chino, San Jacinto, and San Gabriel groundwater basins.

Surface Water Management

MWD service reliability will also benefit from improved surface water management. Design and land acquisition are presently underway for the Domenigoni Valley Reservoir in western Riverside County. This project will maximize groundwater storage by regulating flows for conjunctive use programs, provide an emergency water supply, provide a water supply during periods of drought, be used to meet seasonal peak demands, and improve the operating reliability of the MWD's distribution system.

2.5.6 TOTAL YEAR 2010 WATER SUPPLIES

Year 2010 existing and potential water supplies for average and drought conditions are summarized in Table 2.5-3 below.

Table 2.5-3
EXISTING AND POTENTIAL WATER SUPPLY FOR THE MWD SERVICE AREA FOR THE YEAR 2010 (MAFY)[1]

	Average Year Supply	Dry Year Supply
Existing Supplies		
Local Production	1.05	1.05
Reclaimed Water	0.40	0.40
Los Angeles Aqueducts	0.37	0.12
Colorado River	0.62	0.62
State Water Project[2]	1.54	1.14
Total	**3.98**	**3.33**
Potential Supplies		
Additional Colorado River	0.45	0.45
Additional State Water Project[2]	0.40	0.40
Reclaimed Water	0.27	0.27
Groundwater Recovery	0.11	0.20
Total	**1.23**	**1.32**
TOTAL SUPPLIES	**5.21**	**4.65**

Source: MWD, 1993

[1] *Metropolitan is currently engaged in the IRP process and all supplies and programs are being reevaluated.*

[2] *These supply estimates were developed based on D-1485 operating constraints. SWP supplies will be reduced as a result of the December 1994 consensus agreement on Bay/Delta standards.*

2.5.7 PROJECTED WATER SUPPLY AND DEMAND BALANCE

Projected water supply and demand balances for the MWD service area in the year 2010 are shown in Figures 2.5-6 and 2.5-7. Under average year conditions, assuming full implementation of BMPs, the consumptive water demand within the MWD service area is projected at 4.54 MAFY in 2010. Given existing supplies of 3.98 MAFY, the MWD service area could potentially experience a shortage of up to 0.56 MAFY under average year conditions. Potential supplies identified in Table 2.5-3 will provide an additional 1.23 MAFY of water, thereby increasing available year 2010 water supplies to 5.21 MAFY. Surplus water will be stored in surface reservoirs and/or groundwater basins for use in drier years.

Under critically dry year conditions, assuming full implementations of BMPs, consumptive water demand in the MWD service area is projected at 4.84 MAFY. During dry year conditions, such as those experienced during 1991, existing water supplies can provide only 3.33 MAFY resulting in a shortage of approximately 1.51 MAFY. Potential supplies identified in Table 2.5-3 can provide an additional 1.32 MAFY of water during dry years, thereby reducing the projected shortage to 0.19 MAFY. MWD has recognized that it is too expensive to plan for no shortages during extreme drought conditions, such as those represented here by dry year conditions, and has therefore, adopted a reliability goal which allows a ten percent reduction in water demand beyond BMPs once every 50-years. As illustrated in Figure 2.5-7, projected shortages during dry years will be offset via water rationing measures.

In summary, given implementation of demand management programs identified in the BMPs (Best Management Practices) and supply augmentation programs and projects identified above, water resources will be sufficient to accommodate anticipated growth during the planning period. Although growth is not expected to be limited by water availability, there will be increasing emphasis on water conservation and reuse.

2.5.8 MWD WATER RESOURCE PLANNING

MWD and its member agencies are currently engaged in an Integrated Resources Planning (IRP) process. The primary objective of the IRP process is to develop efficient and reliable water supply plans utilizing mixes of local and imported resources as well as demand management options. Water demand projections used in the IRP analysis are consistent with SCAG's 1994 Regional Comprehensive Plan. One of the most important strengths of the IRP process is that it is an open, participatory decision-making process. Participants in the IRP process include Metropolitan, its member agencies, other water supply agencies, water resources agencies, local government, and representatives from the business, agricultural, and environmental communities. All water resources programs are being evaluated in the IRP process. One of the key products of the IRP process is a regional resource management plan that will include specific goals and implementation strategies for each water supply resource and demand management option. The resource management plan is scheduled for completion in mid-1995.

2.6 AIR QUALITY

2.6.1 INTRODUCTION

This Section describes the existing regional air quality setting in addition to the background on Districts' air quality control activities. The regional setting will be described for the South Coast Air Basin (SCAB), which is regulated by the South Coast Air Quality Management District (SCAQMD), since the JOS service area lies totally within that basin. The regional setting contains background information on the effects of topography, climate, and meteorology on air quality. It also describes the SCAB and its regional air quality conditions, standards, and recent monitored air quality levels in the study area.

2.6.2 REGIONAL SETTING

The SCAB covers an area of approximately 6,600 square-miles and includes all of Orange County and the metropolitan areas of Los Angeles, San Bernardino, and Riverside Counties, as shown in Figure 2.6-1. It is bounded on the northwest by Ventura County and on the south by San Diego County. The northern boundary runs roughly along the Angeles National Forest north of the ridge lines of the San Gabriel and San Bernardino Mountains. The eastern border runs north-south through the San Bernardino and San Jacinto Mountains. The Banning Pass area is excluded from the air basin. The western boundary is the entire shoreline of Los Angeles and Orange Counties.

The JOS service area lies totally in the SCAB. The JWPCP and the inland WRPs included in the Facilities Plan are located in the SCAB. Therefore, the discussion of the regional air quality setting focuses on the SCAB.

Climate and Meteorological Conditions in the South Coast Air Basin

The SCAB lies within the semipermanent high pressure zone of the eastern Pacific Ocean. This region is characterized by warm, dry summers and mild winters with moderate rainfall which are typical in coastal zones along the western shores of continents at lower latitudes.

SCAB's climate and topography are conducive to the formation and transport of photochemical pollutants throughout the region. Prevailing daily winds in the region are westerly, with a nighttime return flow. This pattern is broken only five to ten days a year when strong northeasterly winds, commonly known as Santa Ana winds, sweep down from the desert. Wind speeds in desert areas are generally much higher than those in the coastal plains.

Airborne/atmospheric emissions are roughly constant throughout the year, but concentrations of photochemical pollutants, such as ozone, are greatest between the late spring and early

fall when the photochemical reactions which generate these pollutants are greatest as a result of higher sunlight intensity and longer daylight hours. In addition, the SCAB climate is conducive to the formation of strong atmospheric inversion layers during these same months. An atmospheric inversion layer, which forms when cooler, denser air is trapped by warmer lighter air, effectively traps pollutants close to the ground. The visible photochemical smog which is characteristic of the SCAB forms when pollutants become trapped by an atmospheric inversion layer. The highest concentrations of photochemical pollutants in the United States occur in the SCAB.

The highest concentrations of carbon monoxide (CO) in the SCAB occur during winter months. CO is largely a byproduct of the incomplete combustion of fossil fuels. CO emissions increase during winter months when temperatures are generally lower because internal combustion engines are less efficient at lower operating temperatures. The highest concentrations of CO in the SCAB occur in the vicinity of heavily-traveled and/or congested roadways (SCAG 1993).

Existing Air Quality in the South Coast Air Basin

Over the last decade and a half the air quality in SCAB has improved significantly. However, of the National Ambient Air Quality Standards (NAAQS) established for the six criteria pollutants (ozone, lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, and fine particulate matter [PM_{10}]), the SCAB is only in compliance with the sulfur dioxide and lead standards and is, therefore, designated as a nonattainment area for federal and state standards for ozone, PM_{10}, CO, and NO_2. Table 2.6-1 presents the federal and state standards and a summary of air quality monitoring in the SCAB for these four pollutants. The following sections will discuss only those pollutants for which the SCAB is not in attainment.

Existing State and Federal Air Quality Standards

Both the State of California and the federal government have established ambient air quality standards for various pollutants. For some pollutants, separate standards have been set for different time periods. Most standards have been set to protect public health, although for some pollutants, standards have been based on other values, such as protection of crops, protection of materials, or avoidance of nuisance conditions.

Ozone

State and federal ozone standards are based on a one-hour average (see Table 2.6-1). In order to achieve attainment with state and federal ozone standards, the state one-hour ozone standard of 0.09 parts per million (ppm) may not be exceeded over any one-hour period during any year, and the federal one-hour ozone standard of 0.12 ppm may not be exceeded more than three times over any three-year period.

Table 2.6-1
SUMMARY OF 1992 MONITORING DATA FOR CRITERIA POLLUTANTS IN THE SOUTH COAST AIR BASIN

	Air Quality Standards		Maximum Monitored Concentration		Number of Days Standard Exceeded	
	Federal	State	Concentration	Time Period	Federal	State
Ozone (O_3)	0.12 ppm (1 hour)	0.09 ppm (1 hour)	0.30 ppm	1 hour	118	164
Carbon monoxide (CO)	9.0 ppm (8 hours)	9.0 ppm (8 hours)	18.8 ppm	8 hours	31	36
	35 ppm (1 hour)	20 ppm (1 hour)	28 ppm	1 hour	none	5
Fine particulate matter (PM_{10})	150 $\mu g/m^3$ (24 hours)	50 $\mu g/m^3$ (24 hours)	649 $\mu g/m^3$	24 hours	3	66
Nitrogen dioxide (NO_2)	0.053 ppm (annual average)	0.25 ppm (1 hour)	0.0507 ppm	annual average	none	1
			0.30 ppm	1 hour		

Note: *ppm = parts per million*
$\mu g/m^3$ = micrograms per cubic meter
Definition of exceedances of national and state standards differ. Please see the text for an explanation of the different definitions.

Source: South Coast Air Quality Management District 1993.

Carbon Monoxide

State and federal CO standards have been set for both one-hour and eight-hour averages (see Table 2.6-1). The state and federal one-hour CO standards are 20 ppm and 35 ppm, respectively, and the state and federal eight-hour CO standards are both 9 ppm. In order to achieve attainment with state and federal CO standards, state standards may not be exceeded during any year and federal standards may not be exceeded more than once in any year.

Particulate Matter

Both the federal and state air quality standards for particulate matter have recently been revised to apply only to PM_{10}. State and federal PM_{10} standards have been set for 24-hour and annual averaging times. The state 24-hour PM_{10} standard equals 50 micrograms per cubic meter ($\mu g/m^3$) and the federal 24-hour standard is 150 $\mu g/m^3$. The state annual PM_{10} standard is 30 $\mu g/m^3$ on an annual geometric mean, whereas the federal annual PM_{10} standard equals 50 $\mu g/m^3$ on an annual arithmetic mean. Federal and state 24-hour PM_{10} standards are not to be exceeded more than one day per year, and both annual standards are not to be exceeded.

Nitrogen Dioxide

State and federal nitrogen dioxide (NO_2) standards have been set for different averaging times. The federal NO_2 standard is 0.053 ppm on an annual average basis, while the state standard is 0.25 ppm for a one-hour period. Both state and federal NO_2 standards may not be exceeded at any time in order to achieve attainment.

Health Effects of Criteria Pollutants

Ozone

Ozone is a public health concern because it is a respiratory irritant that also increases susceptibility to respiratory infections. Ozone causes substantial damage to leaf tissues of crops and natural vegetation and damages many materials by acting as a chemical oxidizing agent.

Carbon Monoxide

CO levels are a public health concern because CO combines readily with hemoglobin and, thus, reduces the amount of oxygen that can be transported in the blood stream. Relatively low concentrations of CO can significantly affect the amount of oxygen in the blood stream because CO binds to hemoglobin 220-245 times more strongly than

oxygen. Both the cardiovascular system and the central nervous system can be affected when 25-40 percent of the hemoglobin in the blood stream is bound to CO rather than to oxygen. State and federal ambient air quality standards for CO have been set at levels intended to keep CO from combining with more than 15 percent of the blood's hemoglobin.

Particulate Matter

Health concerns associated with suspended particles focus on those particles small enough to reach the lungs when inhaled. Few particles larger than ten microns in diameter reach the lungs. Consequently, both the federal and state air quality standards for particulate matter have recently been revised to apply only to small inhalable particles less than ten microns in diameter (designated as PM_{10}).

Nitrogen Dioxide

NO_2 is a byproduct of fuel combustion. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts quickly to form NO_2, creating the mixture of NO and NO_2 generally called nitrogen oxides (NO_x). NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, only NO_2 is potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in children (two-three years old) has been observed at concentrations below 0.3 ppm. NO_2 absorbs blue light; the result is a brownish red cast to the atmosphere and reduced visibility. NO_2 also contributes to the formation of PM_{10}.

Monitoring Data Summary

As mentioned previously, Table 2.6-1 presents a summary of air quality monitoring data in the SCAB for the four criteria pollutants for which the SCAB has been designated as a nonattainment area. The data presented in Table 2.6-1 show maximum monitored concentrations of criteria pollutants in the SCAB and the number of days that national and state air quality standards were exceeded in 1992 (SCAQMD 1993).

Ozone

Both federal and state ozone standards are commonly exceeded in the SCAB. In 1992, federal and state ozone standards were exceeded 118 and 164 days respectively in the SCAB.

Carbon Monoxide

Both federal and state eight-hour CO standards were exceeded a substantial number of days in the SCAB. In 1992, federal and state eight-hour CO standards were exceeded 31 and 36 days, respectively, in the SCAB. The state one-hour CO standard is exceeded infrequently (five days in 1992) and the one-hour national CO standard was not exceeded in 1992.

Particulate Matter

The state PM_{10} standard was exceeded a substantial number of days in the SCAB (66 days in 1992). The federal PM_{10} standard is exceeded infrequently (three days in 1992).

Nitrogen Dioxide

The state NO_2 standard is exceeded infrequently (one day in 1992); the federal NO_2 standard was not exceeded in 1992.

Existing Regional Emissions Inventory

Table 2.6-2 presents an inventory of 1990 air pollutant emissions in Los Angeles County. Emissions types shown in Table 2.6-2 are: reactive organic gases (ROG), CO, NO_x, SO_x, and PM_{10}. ROG is a class of gaseous chemical compounds which contain the element carbon, excluding non reactive compounds, which contribute to the formation of photochemical oxidants such as ozone.

As shown in Table 2.6-2, ROG and SO_x emissions from mobile sources are slightly greater than from stationary sources in the SCAB. Mobile sources emit substantially more CO and NO_x than stationary sources. Conversely, stationary sources emit substantially more PM10 than mobile sources.

2.6.3 BACKGROUND ON DISTRICTS' AIR QUALITY CONTROL TECHNOLOGY

The Districts have had a history of establishing best available control technology for wastewater treatment applications. While many technologies were developed with the intent of complying with local regulatory rules, a significant number of the resultant technologies went beyond regulatory rule requirements and were established as best available control technology or, under federal terminology, lowest achievable emission rate technology. These include the following:

- Recirculation of process air from the front end of primary treatment facilities through process air compressors and into the aeration tanks of the activated sludge systems. This technique has been shown to be extremely cost-effective and a very effective biological means of reducing odorous and volatile organic compounds.

Table 2.6-2
1990 INVENTORY OF CRITERIA POLLUTANT EMISSIONS
LOS ANGELES COUNTY PORTION OF SOUTH COAST AIR BASIN

Major Source Category	Reactive Organic Gases (ROG)		Nitrogen Oxides (NO_x)		Carbon Monoxide (CO)		Sulfur Oxides (SO_x)		Particulate Matter (PM_{10})	
	Tons per day	Percent of Total	Tons per Day	Percent of Total	Tons per Day	Percent of Total	Tons per Day	Percent of Total	Tons per Day	Percent of Total
Stationary Sources:										
Fuel combustion	11	1.2	150	19.0	63	1.6	15	17.0	12	2.3
Waste burning	1.0	0.1	1.8	0.2	4.2	0.1	0.2	0.2	0.8	0.2
Solvent use	280	30.4	0.1	0.0	—	0.0	—	0.0	0.4	0.1
Petroleum process, storage & transfer	75	8.2	4.8	0.6	3.3	0.1	12	13.6	2.5	0.5
Industrial processes	26	2.8	4.7	0.6	0.6	0.0	4.0	4.5	24	4.5
Miscellaneous processes	21.3	2.3	2.7	0.3	76.5	1.9	0.3	0.3	440.3	83.1
Subtotal	420	45.7	160	20.3	150	3.8	32	36.4	480	90.6
Mobil Sources:										
On-road vehicles	420	45.7	370	46.8	2,900	72.5	18	20.5	31	5.8
Other mobile sources	82	8.9	250	31.6	890	22.3	38	43.2	14	2.6
Subtotal	500	54.3	620	78.5	3,800	95.0	56	63.6	46	8.7
Total of all sources	**920**	**100.0**	**790**	**100.0**	**4,000**	**100.0**	**88**	**100.0**	**530**	**100.0**

Note: *— = indicates a value rounded to less than 0.1 ton per day.*
The source document rounds to two significant digits, resulting in substantial round. Values in this table are as shown in the source document.

Source: *California Air Resources Board 1993.*

- Clean-up of digester gas into useable commercial fuels for vehicles: In the early 1980's, the digester gas was cleaned up using counter current water scrubbing techniques which removed carbon dioxide and hydrogen sulfide and enhanced significantly the methane content of the remaining gas to the point that it became directly useable in natural gas fueled vehicles. The Districts built the first large-scale combined cycle power plant which was among the highest efficiency cogeneration systems because of its innovative use of process waste heat.

- Patented internal combustion engine control systems for the reduction of NO_x by air recirculation systems coupled with spark advance controls: The Districts were the first to explore the use of catalyst on digester gas. This resulted in effective selective catalytic reduction systems using ammonia.

- Voluntary activated carbon change out program: Since 1991, this program, based on benzene breakthrough, has been implemented to prevent organic emissions from the carbon absorbers at the primary treatment processes of the JWPCP from impacting neighborhood receptors. The Districts also developed and subsequently patented an innovative design for a high flow scrubber. By introducing flow into activated carbon along an annular path, as opposed to an axial flow, scrubbers of substantially greater capacity can be constructed within the same footprint as the conventional designs.

The future of wastewater treatment and reclamation from an air quality perspective is inextricably tied to air quality regulations. The Federal Clean Air Act will cause the wastewater industry to expend substantially more resources in terms of permitting their facilities, installing federally mandated control equipment for conventional pollutants, and utilizing different work practice standards or toxics control technologies for controlling toxic air contaminants. Greater expenditures in new control technology, and of staff effort and monies on monitoring and enforcement also is in the future.

2.7 ENERGY CONSUMPTION

Much of this section is based on the Regional Comprehensive Plan (RCP) which was developed by SCAG. California derives its energy from the widest range of sources in the country. In addition to conventional fossil fuel sources (oil, coal and natural gas), Californians also utilize wind, geothermal, hydroelectric, solar and nuclear energy. Despite this diversity, the state, and especially Los Angeles County, remains heavily dependent on oil due to its transportation demand. In addition, most of the electricity generating facilities in California are driven by fossil fuels. This causes two concerns; first, the predominant energy uses are tied to supplies of energy resources which are diminishing, and second, the large amount of fossil fuel combustion required to support energy demands creates risks to both the local environment and public health.

The three main forms of energy consumption in Southern California are electricity, petroleum products (mainly for transportation), and natural gas (primarily for heating). Figure 2.7-1 summarizes both current (1990) usage of all three forms of energy consumption, and projections for consumption of each in the years 2000 and 2010. Below, current and future usage of these three forms in the JOS service area is briefly discussed.

JOS Energy Consumption

Electricity Consumption

Two utilities deliver most of the electricity consumed in the JOS service area, Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP). Some industrial consumers generate additional electricity through cogeneration.

In 1993, SCE sold approximately 32,411 giga-watt hours (GWhr) of electricity and LADWP sold 21,132 GWhr of electricity to customers in Los Angeles County (one GWhr is equal to one million kilowatt hours). Customers in the LADWP service area and smaller utilities in Los Angeles County generated an additional 6,078 GWhr in 1993. This represents a total of 59,621 GWhr of electricity consumed in Los Angeles County in 1993.

In 2010, SCE expects to sell 53,802 GWhr of electricity and LADWP expects to sell 29,055 GWhr of electricity to customers in Los Angeles County. LADWP expects customers in their service area to generate 1,651 GWhr in 2010, and smaller utilities are expected to generate approximately 4,844 GWhr in 2010. This represents a total of 89,352 GWhr of electricity which is expected to be consumed in Los Angeles County in 2010.

Natural Gas

The main supplier of natural gas in the JOS service area is the Southern California Gas Company (SCGC). In 1993, SCGC sold approximately 4.9 billion therms of natural gas to

customers in the JOS service area (one therm is equal to 100,000 BTU, or 100 cubic feet of natural gas). SCGC expects to sell 6.5 billion therms of natural gas to JOS customers in the year 2010.

Petroleum Products

Consumption of petroleum products in Southern California is expected to remain relatively constant at approximately 25 million gallons per day until the year 2000. Between 2000 and 2010, this will increase to approximately 26.4 million gallons per day.