City of Riverside

WASTEWATER COLLECTION AND TREATMENT FACILITIES INTEGRATED MASTER PLAN

VOLUME 7: RECLAMATION AND REUSE
CHAPTER 1: RECLAMATION AND REUSE

FINAL
February 2008

carollo
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City of Riverside

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RECLAMATION AND REUSE

1.1 PURPOSE

The purpose of the reclamation and reuse volume is to review the information in the existing City of Riverside (City) Recycled Water Phase I Feasibility Study and Citywide Master Plan (Parsons, September 2003), present an update to the existing Master Plan regarding the planned recycled water pump station, and develop costs for the planned pump station that can be used in the overall Capital Improvement Plan (CIP) for the Integrated Master Plan. An order of magnitude dollar-per-acre-foot cost is also presented, but is only applicable to the costs (capital and Operations and Maintenance (O&M)) for the pump station, and not the full cost to deliver recycled water.

1.2 CONCLUSIONS AND RECOMMENDATIONS

- None of the information from the 2003 Master Plan is used in this volume of the Integrated Master Plan. This is due to the fact that the focus of the 2003 Master Plan was the customers and the distribution system in the City, and not the wastewater treatment plant facilities, which is the focus of this integrated plan.
- A dollar-per-acre-foot cost for installation and O&M of a new recycled water pump station was developed for this volume of the Integrated Master Plan. This cost ranges from approximately $106/acre-foot in 2007 to approximately $177/acre-foot in 2025.

1.3 BACKGROUND

In the fall of 2003, the City of Riverside Recycled Water Phase I Feasibility Study and Citywide Master Plan (Parsons, September 2003) was developed. This master plan includes eight chapters which cover a variety of topics including regulations, recycled water quality and quantity, a market analysis, layouts for various Citywide reuse systems, costs, potential funding sources, and recommendations. City staff agreed that the 2003 report was fairly recent and therefore a new reuse market assessment was not undertaken. The 2003 Master Plan is included in Appendix A for reference.

There are currently three recycled water pump stations at the Regional Water Quality Control Plant (RWQCP). The main pump station is located adjacent to Chlorine Contact Basin (CCB) 1. This pump station supplies recycled water to the Van Buren Golf Course. It is also the source for on-site uses (i.e. utility water) for the RWQCP. The on-site uses are described in Volume 4, Chapter 11 - Plant Utilities and Support Facilities. A second pump station is located adjacent to CCB 3. This pump station supplies recycled water to the Urban Forest. The third pump station is located adjacent to the RWQCP outfall. It supplies water to the Toro Manufacturing Facility.

A new recycled water pump station is planned to be added at the end of CCB 2. This pump station will replace the first and second recycled water pump stations that are described above. The sizing of this pump station was developed using customer demand information provided by the City. The 2003 report was not used for demand information as the City staff has newer information on the expected customers.

1.4 EXISTING MASTER PLAN REPORT CONTENT SUMMARY

The 2003 Master Plan report covers a variety of planned projects and conditions as they were existing when the report was developed. However, as times change, so do conditions, and plans get revised. The following paragraphs describe some changed conditions to the 2003 report along with our understanding of the information to be used in this integrated plan.

Chapter 2, Recycled Water Regulations, lists some regulations and documents which have since been updated and revised. For example, the chapter refers to the 1992 U.S. EPA Guidelines for water recycling. The 2004 U.S. EPA Guidelines for Water Reuse updates the 1992 Guidelines by incorporating information on water reuse that has been developed since the 1992 document was issued. The draft water recycling and groundwater recharge regulations referenced are also outdated and the latest versions can be found electronically at http://www.dhs.ca.gov/ps/ddwem/publications/waterrecycling/index.htm. The Basin Plan referenced is also outdated and can be found electronically at http://www.swrcb.ca.gov/rwqcb8/html/basin_plan.html.

Chapter 3 of the reuse master plan summarizes the RWQCP water quality and quantity. These topics are being updated under other sections of this integrated plan. A process flow schematic is shown in the 2003 plan as Figure 3.1. This is slightly outdated as CCB 2 is shown on the diagram but is not in service at this time. CCB 2 is planned to be used to produce and store tertiary recycled water with the new planned pumps to be installed at the effluent end of the basin.

Chapter 4 of the reuse master plan discusses the current uses of recycled water including the Van Buren Golf Course, the Urban Forest, and the Toro Manufacturing Facility. This chapter also discusses the allowable uses under Title 22 and the customer market survey. Since the 2003 Master Plan was completed, these uses have been revised considerably. The uses considered at this time, and planned through 2025, include the Van Buren Golf Course, landscaping along Van Buren Boulevard, the Toro Manufacturing Facility, a proposed new golf course, and on-site uses such as for process demands and the power plant that is adjacent to the RWQCP. The assumed demands that will be used for this Integrated Master Plan, for both on-site and off-site uses, are shown in Section 1.4, Planned Recycled Water Pump Station Demands, of this chapter of the Integrated Master Plan.

Chapter 5 discusses the Citywide recycled water system, distribution system, hydraulic modeling, and distribution system costs. As mentioned above, only those demands identified in Section 1.4 of this volume of the Integrated Master Plan are currently being considered.

Chapter 6 details some options to a Phase I water recycling program and the various corresponding costs associated with each option.

Chapter 7 identifies potential funding sources. The funding sources include state and State Revolving Fund (SRF) grants/loans, the Bureau of Reclamation, General Obligation (GO) bonds, revenue bonds, and Certificates of Participation (COPs). Most of the funding sources listed are still available for planning or construction grants and/or loans, but may have slight changes to their programs. These should be considered closer to the time a loan or grant is needed. Also, Proposition 84 was recently passed in November 2006 and could be considered but its intricacies are not defined as of this time.

Chapter 8 briefly outlines the Citywide Phase I project and its implementation guidelines and recommendations.

1.5 PLANNED RECYCLED WATER PUMP STATION DEMANDS

A new recycled water pump station is planned to be constructed at the discharge end of CCB 2. The pump station will be used to supply the on-site and off-site demands for recycled water. The recycled water pump station demands and customers are summarized in Table 1.1. The average day demands were used to calculate the average cost per acre-foot while the peak hour demands were used to determine the pump size required. RWQCP staff supplied the customers and their corresponding demands. It is assumed that this is the demand to be supplied through the year 2025.

Table 1.1 Recycled Water Pump Station Demands
Wastewater Collection and Treatment Facilities Integrated Master Plan
City of Riverside

Description	Demand Quantity			
	Avg Day gpm	Avg Day ac-ft/yr	Peak Hr gpm	Peak Hr ac-ft/yr
Off-Site Demand				
Van Buren Golf Course				
Landscaping Along Van Buren Blvd				
Toro Manufacturing Company				
Proposed Golf Course				
Subtotal	64	103	1,733	2,796

Table 1.1 Recycled Water Pump Station Demands Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside					
		Demand Quantity			
Description		Avg Day gpm	Avg Day ac-ft/yr	Peak Hr gpm	Peak Hr ac-ft/yr
On-Site Demand(1)					
On-Site Processes(2)					
	Subtotal	2,610	4,211	2,750	4,437
	Total	**2,674**	**4,314**	**4,483**	**7,232**

Notes:
(1) Average day demand was assumed as the continuous demands provided by staff. Peak hour demand includes the intermittent demands.
(2) On-site processes include belt filter press wash water, pump seal water, alum dilution, chlorine injectors, scum sprays, wash down hydrants (1-inch and 3-inch), power plant, miscellaneous, and future gravity belt thickeners wash water.

1.5.1 Recycled Water Pump Station Design Considerations

The recycled water pump station design assumptions are summarized in Table 1.2. It was requested by RWQCP staff that the design include a cover over CCB 2 to help reduce chlorine demand and prevent wind-born trash from entering the basin. This cover can be made of concrete, aluminum, or fiberglass, but concrete is assumed for this evaluation. The pumps are assumed to be vertical turbine pumps, with a total of three provided, two duty and one standby. A Variable Frequency Drive (VFD) is assumed with each pump for operating efficiency. It is also assumed that some minor basin modifications will be required to assure even flow distribution to the pumps to achieve an optimum operating environment. A total head was assumed which considered the elevation of the RWQCP in relation to the elevation of the customers at the intersection of Van Buren Street and Arlington Street, while also maintaining adequate pressure to 'pop' the customer's sprinkler heads.

Table 1.2 Recycled Water Pump Station Design Assumptions Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside	
Description	**Value**
Recycled Water Peak Hour Demand	4,483 gpm
Wastewater Treatment Plant Elevation	700 feet
Elevation at Intersection of Van Buren and Arlington	730 feet
Total Head	120 feet
Horsepower	200 hp total

Table 1.2 Recycled Water Pump Station Design Assumptions Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside	
Description	**Value**
Pump Type	Vertical turbine
Pump Location	End of CCB 2
No. of Pumps	3 total (2 duty and 1 standby)

1.5.2 Recycled Water Pump Station Costs

Costs were developed for the recycled water pump station. These costs will be used in Volume 10, Capital Improvement Plan and Overall Implementation Schedule. Recycled water pump station cost assumptions are contained in Table 1.3. Many of the cost assumptions are from this Integrated Master Plan, Volume 2, Chapter 4 - Basis of Cost Estimates. However, some costs are also from RWQCP staff.

Table 1.3 Recycled Water Pump Station Cost Assumptions Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside	
Description	**Value**
Power Cost	$0.09/kW-hr
Inflation Rate (Years 1-5)	6 percent
Inflation Rate (after Year 5)	4 percent
Life-Cycle Period	19 years
Annual Labor Rate Increase	3 percent
Annual Labor Effort	365 hrs/yr
Labor Cost	$50/hr
Discount Rate to Annualize Cash Flows	6 percent
Estimated Pump Station Capital Cost(1)	$900,000

Notes:
(1) Pump Station capital cost includes three pumps (two duty and one stand by), three VFDs, electrical, Instrumentation/Controls (I&C), minor basin modifications, installation, 500 feet of 12-inch diameter pipe, and a concrete basin cover.

Table 1.4 summarizes the total project cost for the recycled water pump station. This cost uses the direct cost mark-up percentages provided in Volume 2, Chapter 4 - Basis of Cost Estimates. The pump station capital cost is assumed to include three pumps (two duty and one standby) each with a VFD, electrical and I&C, minor basin modifications, installation of the pumps and equipment, a concrete basin cover, and 500 feet of 12-inch diameter piping. The added piping is assumed since the pump station is being relocated from CCB 3 to CCB 2.

Table 1.4 Recycled Water Pump Station Estimated Project Cost Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside		
Description		**Value**
Total Estimated Direct Costs[(1)]		$900,000
Contingency @ 30%		270,000
	Subtotal	1,170,000
General Conditions @ 10%		117,000
	Subtotal	1,287,000
General Control Overhead/Profit @ 15%		193,050
	Subtotal	1,480,050
Bid Market Allowance @ 15%		222,008
	Subtotal	1,702,058
Engineering, Legal, Administrative @ 30%		510,617
Sales Tax @ 50% of Capital Cost X 7.75%		34,875
Total Project Cost		**$2,247,550**

Notes:
(1) Assumes and ENRCCI of 8570, August 2006, LA area. Cost includes three pumps, VFDs, electrical, I&C, 500 feet of 12-inch diameter pipe, and basin cover and modifications. No building or structure is assumed.

Table 1.5 summarizes the power costs, calculated horsepower, kilowatt-hours, and cost per kilowatt-hour.

Table 1.5 Recycled Water Pump Station Power Cost Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside	
Description	**Value**
Average Annual Flow	2,674 gpm (2 duty + 1 standby)
Cost of Power	$0.09/kW-Hr[(1)]
TDH	120 feet
Pump Efficiency	75 percent
HP	108[(2)]
kW	81[(3)]

Table 1.5 Recycled Water Pump Station Power Cost Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside	
Description	**Value**
kW Hrs	706,040[4]
Annual Power Cost	**$63,544**

Notes:
(1) Data provided by City.
(2) Based on formula: HP = (gpm x TDH)/(3,960 x pump efficiency).
(3) Based on formula: kW = (HP x 0.746).
(4) Based on formula: kW-hrs = (kW x 24 x 365). Year-round operation is assumed.

Table 1.6 summarizes the O&M costs and the dollar-per-acre-foot cost for years 2007 through 2025. The dollar-per-acre-foot cost developed for this Integrated Master Plan only includes the costs associated with the new pump station capital and O&M costs.

Table 1.6 Recycled Water Pump Station Estimated Operation and Maintenance Costs
Wastewater Collection and Treatment Facilities Integrated Master Plan
City of Riverside

Year	Year	Escalation Rate	Exist O&M Cost	New PS O&M Cost	Add'l Labor Cost 365 hrs/yr@ $50/hr	Annualized Project Cost	Total Annual Cost	Discount Annual Cost	$/ac-ft
2007	1	-	$175,000	$63,544	$18,250	$201,427	$458,221	$458,221	106.22
	2	6%	$185,500	$67,356	$18,798	$201,427	$473,081	$446,303	109.66
	3	6%	$196,630	$71,398	$19,925	$201,427	$489,380	$435,547	113.44
2010	4	6%	$208,428	$75,681	$21,121	$201,427	$506,657	$425,399	117.45
	5	6%	$220,933	$80,222	$22,388	$201,427	$524,971	$415,826	121.69
	6	4%	$229,771	$83,431	$23,284	$201,427	$537,913	$401,960	124.69
	7	4%	$238,962	$86,768	$24,215	$201,427	$551,372	$388,696	127.81
	8	4%	$248,520	$90,239	$25,184	$201,427	$565,370	$376,003	131.06
2015	9	4%	$258,461	$93,849	$26,191	$201,427	$579,928	$363,854	134.43
	10	4%	$268,799	$97,603	$27,239	$201,427	$595,068	$352,220	137.94
	11	4%	$279,551	$101,507	$28,328	$201,427	$610,814	$341,075	141.59
	12	4%	$290,733	$105,567	$29,461	$201,427	$627,189	$330,395	145.39
	13	4%	$302,363	$109,790	$30,640	$201,427	$644,219	$320,157	149.33
2020	14	4%	$314,457	$114,181	$31,865	$201,427	$661,931	$310,339	153.44
	15	4%	$327,036	$118,749	$33,140	$201,427	$680,351	$300,920	157.71
	16	4%	$340,117	$123,499	$34,465	$201,427	$699,508	$291,880	162.15
	17	4%	$353,722	$128,438	$35,844	$201,427	$719,432	$283,202	166.77
	18	4%	$367,870	$133,576	$37,278	$201,427	$740,152	$274,866	171.57

Table 1.6 Recycled Water Pump Station Estimated Operation and Maintenance Costs
Wastewater Collection and Treatment Facilities Integrated Master Plan
City of Riverside

Year	Year	Escalation Rate	Exist O&M Cost	New PS O&M Cost	Add'l Labor Cost 365 hrs/yr@ $50/hr	Annualized Project Cost	Total Annual Cost	Discount Annual Cost	$/ac-ft
2025	19	4%	$382,585	$138,919	$38,769	$201,427	$761,701	$266,857	176.57
							Present Value	**$6,783,721**	

Assumptions:
Pump Station - Project Cost: $2,247,550.
Annual Interest Rate (assumes loan): 6 percent.
Period: 19 years.
Discount Rate: 6 percent.
Flow - Average Day: 2,674 gpm.
Flow: 4,314 afy.
Labor Rate Increase: 3 percent per year.

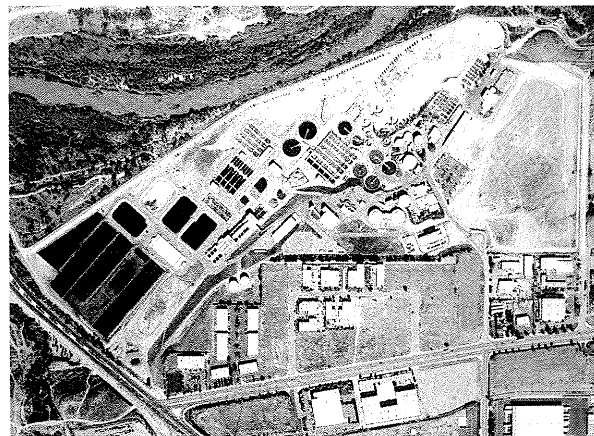
Appendix A

CITY OF RIVERSIDE RECYCLED WATER PHASE I FEASIBILITY STUDY AND CITYWIDE MASTER PLAN (PARSONS, SEPTEMBER 2003)

CITY OF RIVERSIDE

RIVERSIDE

PUBLIC UTILITIES



Recycled Water Phase I Feasibility Study and Citywide Master Plan

PARSONS

SEPTEMBER 2003

PARSONS

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September 5, 2003

Mr. Kevin Milligan, P.E.
Principal Water Engineer
Riverside Public Utilities
City of Riverside
3900 Main Street
Riverside, CA 92522

Subject: Recycled Water Phase 1 – Feasibility Study and Citywide Master Plan

Dear Mr. Milligan:

Parsons is pleased to submit ten (10) copies of the Recycled Water Phase I – Feasibility Study and Citywide Master Plan to the City of Riverside. Ten (10) copies of CD ROMs for the report are also submitted for your use.

We greatly appreciate the contribution from the City of Riverside's staff in completing this report, which provides details of the planning effort for the implementation of the Phase I Water Recycling Project and future water recycling projects.

Please feel free to call me at (626) 440-6263 if you have any questions.

Respectfully,

Surendra K. Thakral, P.E., DEE
Vice President – Water and Infrastructure, Inc.

Enclosure

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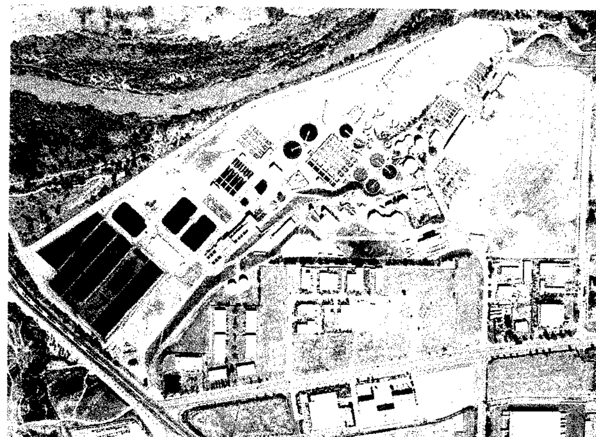

Recycled Water Phase I Feasibility Study and Citywide Master Plan

PARSONS

SEPTEMBER 2003

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CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Executive Summary

PARSONS

This executive summary presents a brief summary of the **Recycled Water Phase I Feasibility Study and Citywide Master Plan** for the City of Riverside (City).

PROJECT BACKGROUND

The City objectives include optimizing the use of recycled water from the Regional Water Quality Control Plant (RWQCP) for various non-potable applications.

The 1992 Recycling Master Plan focused on recycled water quantity and quality evaluation, recycled water use options, market assessment, development of a core distribution system, and excess recycle management. Although the City has not formally adopted and implemented this master plan, it has gradually increased the use of recycled water around the RWQCP on a case-by-case basis.

PURPOSE OF STUDY

This study has been conducted to assist the City in evaluating the cost effectiveness and benefits of using recycled water for landscape irrigation, agricultural irrigation, groundwater recharge, and commercial and industrial purposes. It updates the 1992 Recycling Master Plan with an economic analysis of the development and phased implementation of recycled water systems for non-potable water users throughout the City as well as the Jurupa Community Water District.

The specific purposes of this study included developing a more detailed plan for the Phase I Water Recycling Project and updating the City-wide Water Recycling Master Plan to validate the future demands and capital outlay.

RECYCLED WATER QUALITY CRITERIA AND REGULATIONS

California recognizes the importance of recycling water to meet overall water demand, as backed by Resolution No. 77-1, State Board's Policy with Respect to Water Reclamation in California, and specifically addressed in the California Water Code, Sections 13575 and 13577. As California's demand for water continues to increase, so will the necessity to recycle wastewater effluent from water reclamation facilities throughout the state. The Department of Health Services (DHS) establishes water quality standards and treatment reliability criteria for water recycling under Title 22, Chapter 4, of the California Code of Regulations (Title 22), and in Title 17, Division 1, Chapter 5, Group 4, Article 1, and Section 7604 (Title 17). Requirements for recycled water use in California, not described in Title 22, are considered and approved by DHS on a case-by-case basis.

Title 22 sets bacteriological water quality standards based on the expected degree of public contact with recycled water.

- For water reuse applications with a high potential for the public to come in contact with the recycled water, Title 22 requires disinfected tertiary treatment.

- For applications with lower potential for public contact, Title 22 requires three levels of secondary treatment, differing by the amount of disinfection required.

In addition to establishing recycled water quality standards, Title 22 specifies the reliability and redundancy of each recycled water treatment and use operation.

Title 17 provides protection against cross-connections between potable water systems and recycled water systems.

RECYCLED WATER QUALITY AND QUANTITY

The RWQCP, a municipal wastewater treatment plant operated by the City, is located on a 121-acre site at 5950 Acorn Street, south of the Santa Ana River, near the intersection of Van Buren Boulevard and Jurupa Avenue. The City completed construction of the first phase of the Hidden Valley Wetlands Enhancement Project (HVWEP) in March 1995. The HVWEP has been expanded to include an educational pond and other ponds. Approximately 100 acres of constructed wetlands are being used for additional wastewater treatment (nitrogen removal) from the RWQCP final effluent.

The RWQCP is currently producing about 32 mgd of recycled water on an annual average basis, while it is designed and permitted to produce up to 40 mgd of recycled water. The RWQCP is master planned for an ultimate capacity of 60 mgd. Thus, with the growth in population, the availability of recycled water is likely to go up to 40 mgd in the near future and 60 mgd ultimately.

Considering the City's obligations associated with the Prado Settlement (maximum 13.38 mgd) and potential evaporation losses at the HVWEP (about 0.5 mgd), about 18 mgd on annual average basis is available for the non-potable water uses discussed in Section 4 of this master plan.

Considering the projected population growth in the RWQCP service area, including population growth in the City, Jurupa, Rubidoux, and Edgemont, recycled water availability is likely to grow with time. However, to be conservative, this master plan has considered only 19 mgd to be available for non-potable water uses.

RECYCLED WATER MARKET ANALYSIS

Table EX-1 below summarizes the City's total non-potable reuse potential. Approximately 20,400 AFY (18 mgd annual average) of recycled water demand can be reasonably anticipated within the City limits and in the vicinity. Preliminary supply and demand analysis indicates that the 32 mgd of recycled water produced from the RWQCP will meet annual average demands. Storage facilities will be required to meet the peak monthly/daily/hourly demands.

Due to the speculative nature of current arrangements between the City and neighboring cities, this report assumes all required water will be available from the RWQCP. No arrangement for potable water supply supplement is investigated, although minimally a potable water supply hookup will be required for emergencies.

This estimated market does not include demands within the City's 15,000-acre southerly sphere of influence.

Table EX-1
Recycled Water Average Annual Demand
Assessment of Direct Non-potable Reuse Market

	User Code	Category	Reuse Potential (AFY) Existing Establishment		Future Establishment
A.	**Within the City Limts/School Districts**				
	Landscape Irrigagation				
	100	Cemeteries	253		
	200	Colleges/Universities/Schools	2,256		176
	300	Golf Courses	1,335		400
	400	Parks	1,744		895
	500	Miscellaneous	268		270
	600	Freeway Irrigation and City Greenbelts	793		100
	800	Industrial - Landscape Irrigation	422		
			7,070		
		Minor Potential Users	1,000		
		Subtotal - Landscape Irrigation	**8,070**		**1,841**
	Industrial Process/Commercial				
	700	Commercial	500		300
	900	Industrial - Processes	86		850
		Subtotal - Industrial Process/Commercial	**586**		**1,150**
Total Within City Limits			**8,656**		**2,991**
Total Existing and Future			**11,700**	**AFY**	
B.	**Additional Users Along City's Notherly Boundary**		**1,310**	**AFY**	
C.	**Potential User's Along City's Southerly Boundary**		**1,360**	**AFY**	
D.	**Potential Gage Canal Agricultural Irrigation Usage**		**6,000**	**AFY**	
E.	**Grand Total (A + B + C + D)**		**20,370**	**AFY**	
		Say	**20,400**	**AFY**	

CITYWIDE RECYCLED WATER MASTER PLAN

The City recycled water core distribution systems, for users identified in Section 4, will provide recycled water to users throughout the City, JCSD and users located in southerly boundaries in the Western Municipal Water District (WMWD). The core system provides an estimate of the pipe sizes and footage, pipeline alignments, reservoirs and pump stations to supply recycled water and to provide the basis for the conceptual cost estimates.

The total estimated capital cost for the citywide distribution system is approximately $64,670,000. As detailed in Section 5, the capital cost can be financed according to different scenarios. The monthly capital and O&M costs to the City for the various financing scenarios are listed in **Table 5-7** through **Table 5-10** of Section 5. With a potential reuse of 20,400 AFY, as described in Section 4, the cost for reclaimed water production ranges from $264/AFY to $409/AFY, depending on the financing option as summarized in **Table EX-2** below.

Table EX-2
Summary of Alternative Pricing Options for
Citywide Recycled Water Production Cost

Item No.	Description of Preliminary Project Cost	Recycled Water Production Cost ($/AF/Y)
1.	City Funds - No Grants and/or Loans	309
2.	City Funds (75%) and Grant (25%)	244
3.	City Funds (25%) and SRF Loan (75%)	263
4.	Grant (25%) and SRF Loan (75%)	197

PHASE 1 – WATER RECYCLING PROJECT

Section 6 describes the Phase I – Water Recycling Project. The Phase I Project is restricted to about a 3-mile radius around the City's RWQCP. This 3-mile radius includes major potential users within the City, Jurupa Community Service District (JCSD) and Rubidoux Community Service District (RCSD). Two alternatives, with two sub-alternatives each, were identified, surveyed and evaluated for the development of Phase I – Water Recycling Project. These alternatives include:

- **Alternative 1a** – System designed with no citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue.
- **Alternative 1b** – System designed with citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue.
- **Alternative 2a** – System designed with no citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue, Adams Street and Magnolia Avenue.
- **Alternative 2b** – System designed with citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue, Adams Street and Magnolia Avenue.

A detailed presentation of the above alternatives, along with their associated costs under different financing scenarios, is given in Section 6 (**Table 6-3 through Table 6-36**). To summarize, the total Phase I project cost will include miscellaneous water resources costs, the incremental costs associated with upgrading the City RWQCP system, and distribution costs within the City. **Table 6-37** (reproduced below as **Table EX-3**) presents the combined capital and operation and maintenance costs for the different alternatives assessed for the project. It is observed that the water production cost for a system designed to meet only Phase I demand is lower than that for a system designed to meet citywide demand. Considering that the typical water production cost in Southern California ranges between $300/AFY to $700/AFY, the feasible Phase I recycled water system alternatives are:

- Alternative 1a – with or without grant and loan.
- Alternative 1b – only with grant and loan.
- Alternative 2a – with or without grant and loan.
- Alternative 2b – with or without grant and loan.

POTENTIAL FUNDING SOURCES

A variety of funding alternatives could be used to funding the projects developed under this master plan. The standard practice for water recycling projects such as this one relies on California SRF loans, Proposition 13 grants, water system cash reserves, and, as required, long-term debt. The availability of water system cash reserves, or relatively short-term loans from the City, with repayment at interest from the water sales, is an important financing resource. The City would like to explore grants under the federal funds, Propositions 50 and 13 grants, and SRF loan. It is obvious that some kind of innovative project funding approach is needed for the economical viability of the City's water recycling project.

The Project Recommendations and Implementation Plan (Section 8) of this master plan evaluates the potential project alternatives under the following economical scenarios:

- No grant and SRF (City' own financing)
- Only 25% Proposition 13 grants

- Combination of propositions 13 and low interest rate SRF loan for 75 percent of project cost

PROJECT RECOMMENDATIONS AND IMPLEMENTATION PLAN

The Citywide Project and the two alternatives for the Phase I Project evaluated in this report vary considerably in cost. However, they have similar features, including serving all the major potential users and providing flexibility of phased implementation. The Phase 1 Project has a potential recycled water reuse of approximately 1,870 AFY. The Citywide project has a significant number of potential recycled water users with an estimated demand of 12,400 AFY.

As the initial phase of a water recycling system, Parsons recommends the implementation of Alternative 1a or 2a. Alternatives 1a and 2a have the lowest overall cost per acre-foot compared to other alternatives with SRF loan and 25% grant. The estimated production cost of Alternative 1a is $360/AFY and Alternative 2a is $362/AFY.

Implementation of a recycled water program must consider many issues before design and construction programs are initiated. These issues must be resolved or addressed before final project feasibility and scope can be accurately determined. The following proposed implementation sequence provides a directive for effective implementation of the water recycling program in conjunction with the City's overall objectives. All of these tasks should be completed prior to project design.

- **Water Quality Issues**
- **Water Recycling Ordinance**
- **Recycled Water Supply**
- **Agreement with JCSD and neighboring Cities**
- **Users Agreement**
- **Environnemental Documentation**
- **Loan Application**
- **Engineering Report (Title 22 Report)**
- **Public Information Program**
- **Conversion Costs**
- **Reliability and Public Health Protection**
- **Groundwater Recharge Issues**

Table EX-3
Summary of Alternative Pricing Options

Alternatives	Riverside Potential Reuse (AFY)	Pipe Length (LF)	Approximate Capital Cost	Water Production Cost Option 1 ($/AFY)	Option 2 ($/AFY)	Option 3 ($/AFY)	Option 4 ($/AFY)	Option 5 ($/AFY)
1 - JCSD, City of Riverside Users up to Arlington Ave.								
A. System to meet phase I demand only	1,100	31,104	$6,297,000	550	439	470	360	276
B. System to meet Citywide demand also	1,100	31,104	$7,904,000	651	513	552	413	308
Difference (A - B)			$1,607,000	$101	$74	$82	$53	$32
2 - JCSD, City of Riverside Users up to Arlington Ave., Adams St. & Magnolia Ave.								
A. System to meet phase I demand only	1,500	47,026	$9,368,000	569	448	482	362	270
B. System to meet Citywide demand also	1,500	47,026	$9,961,000	594	466	502	374	277
Difference (A - B)			$593,000	$26	$18	$20	$13	$7

Option 1: City Funds - No Grants and/or Loans
Option 2: City Funds (75%) and Grant (25%)
Option 3: City Funds (25%) and SRF Loan (75%)
Option 4: Grant (25%) and SRF Loan (75%)
Option 5: Grant (50%) and SRF Loan (50%)

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Section 1
Introduction

PARSONS

SECTION 1
INTRODUCTION

Water is always in short supply in southern California and the need for water is expected to grow, driven by increasing population, need for protection of the Delta, and continued industrialization. Increased conservation efforts will slow but not stop this growth in demand. In fact, the California Department of Water Resources has predicted chronic water shortages by the year 2020.

As water demands and environmental needs grow, water recycling provides an additional viable source that will play a greater role in California's overall water supply. Using drought-proof recycled water reduces dependence on freshwater for uses such as landscape irrigation, dust control and industrial cooling; thus reserving the best and purest source of water for public drinking water. Water recycling can help conserve and sustainably manage California's vital water resources.

The City of Riverside's objectives include optimizing use of recycled water from the Regional Water Quality Control Plant (RWQCP) for various non potable uses.

1.1 PROJECT BACKGROUND

The City of Riverside (City) 1992 Reclamation Report (1992 Recycling Master Plan) focused on recycled water quantity and quality evaluation, recycled water use options, market assessment, development of a core distribution system, and excess recycle management.

Although, the City has not formally adopted and implemented the water recycling master plan, it has gradually increased the use of recycled water around the RWQCP on a case-by-case basis.

Users that have made the switch to recycled water include Van Buren Golf Course (Sky Links Executive Golf Course), Toro Manufacturing and Urban Forest. However, several types of non-potable water users that do not require potable water, such as landscape irrigation, commercial and industrial consumers are still using high quality potable water. No formal effort has been made to convince these users to use non-potable water.

While water recycling is a sustainable approach and has been cost-effective in other communities, the treatment of wastewater (no extra cost in this case) for reuse and the installation of distribution systems can be initially expensive compared to water supply alternatives such as ground water or imported water. Considering this situation, the Metropolitan Water District, the California State and Federal governments, have several financial support incentive programs to promote and make water recycling projects more cost effective and viable for a variety of purposes.

1.2 PURPOSE

This study has been conducted to assist the City in evaluating the cost effectiveness and benefits of using recycled water for landscape irrigation, agricultural irrigation, groundwater recharge, commercial and industrial purposes. It updates the 1992 Recycling Master Plan with an economic analysis of the development and phased implementation of recycled water systems for non-potable water users throughout the City as well as Jurupa Community Service District.

The specific purposes of this study included developing a more detailed plan for the Phase I Water Recycling Project and updating the City-wide Water Recycling Master Plan to validate the future demands as well as capital outlay.

1.3 PROJECT ORGANIZATION

This master plan report is organized into the following 8 sections and relevant appendices.

SECTIONS

Section 1 – Introduction

Section 2 – Recycled Water Quality Criteria and Regulations

Section 3 – Recycled Water Quality and Quantity

Section 4 – Recycled Water Market Analysis

Section 5 – Citywide Recycled Water System

Section 6 – Phase I – Water Recycling Project

Section 7 – Potential Funding Sources

Section 8 – Project Recommendation and Implementation Plan

APPENDICES:

Appendix A: 001 NPDES Permit

Appendix B: Prado Agreement

Appendix C: Hydraulic Modeling Results

Appendix D: Water Recycling Funding Guidelines

Appendix E: Prop 50 Funding Forms

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Section 2

Recycled Water Quality Criteria

PARSONS

SECTION 2

RECYCLED WATER QUALITY CRITERIA AND REGULATIONS

2.1 RECYCLED WATER QUALITY CRITERIA

Water reclamation and reuse criteria are principally directed at health and environmental protection and typically address wastewater treatment, recycled water quality, treatment reliability, distribution systems, and use area controls.

There are no federal regulations governing water reclamation and reuse in the U.S.; the regulatory burden rests with the individual states. The criteria vary among the states that have developed regulations. California's regulations (Title 22 and Title 17) are briefly discussed in this section. The U.S. Environmental Protection Agency (EPA) published guidelines in 1992 that are intended to provide guidance to states that have not developed their own criteria or guidelines.

Water quality criteria are based on a variety of considerations, including the following:

- ***Public health protection***: Recycled water should be safe for the intended use. Most existing water reuse regulations are directed at public health protection.
- ***Use requirements***: Many agricultural, industrial and other applications have specific physical and chemical water quality requirements that are not related to health considerations. Water quality requirements not associated with public health or environmental protection are seldom included in water reuse criteria by regulatory agencies.
- ***Irrigation effects***: The effect of individual constituents or parameters on crops or other vegetation, soil, and groundwater or other receiving water affects the water quality requirements. User water quality concerns often fall outside the scope of regulatory responsibility.
- ***Environmental considerations:*** The natural flora and fauna in and around recycled water use areas and the recycled water should not adversely impact receiving waters.
- ***Aesthetics***: For high level uses, e.g. urban irrigation and toilet flushing, the recycled water should be no different in appearance than potable water, i.e., clear, colorless, and odorless. For recreational impoundments, recycled water should not promote algal growth.
- ***Economics and Political realities:*** Regulatory decisions regarding water reclamation and reuse are influenced by public policy, technical feasibility, and economics.

2.2 RECYCLED WATER ACCEPTABILITY ISSUES

The acceptability of recycled water for any particular use is dependent on the physical, chemical, and microbiological quality of the water. Factors that affect the quality of

recycled water include source water quality, wastewater treatment processes and treatment effectiveness, treatment reliability, and distribution system design and operation. Local considerations include:

- Industrial wastes discharged to municipal sewerage systems can introduce chemical constituents that may adversely affect biological wastewater treatment processes and subsequent recycled water quality. California requires implementation of **industrial source control programs** to limit the input of chemical constituents that may adversely affect biological treatment processes and subsequent acceptability of the water for specific uses.
- Assurance of **treatment reliability** is an obvious, yet sometimes overlooked, quality control measure.
- **Distribution system design and operation** is important to ensure that the recycled water is not degraded before use and not subject to misuse.
- Open storage may result in water quality degradation by microorganisms, algae, or particulate matter, and may cause objectionable odor or color in the recycled water.

Making recycled water suitable and safe for reuse applications is achieved by eliminating or reducing the concentrations of microbial and chemical constituents of concern through wastewater treatment and/or by limiting public or worker exposure to the water via design and operational controls.

Toxic, and Microbial Constituents

The presence of toxic chemicals and microbial pathogens in wastewater creates the potential for adverse health effects where there is contact, inhalation, or ingestion of chemical or microbiological constituents of health concern.

The potential transmission of infectious disease by pathogenic agents is the most common concern associated with non-potable reuse of treated municipal wastewater. The principal infectious agents that may be found in raw municipal wastewater can be classified into three broad groups: bacteria; parasites (protozoa and helminths); and viruses. Excluding the use of raw sewage or primary effluent on sewage farms in the late 19th century, there have not been any confirmed cases of infectious disease resulting from recycled water use in the U.S.

Organic Constituents

Health effects related to the presence of organic constituents are of primary concern with regard to potable reuse. Both organic and inorganic constituents must be considered where recycled water is utilized for food crop irrigation, where recycled water from irrigation or other beneficial uses reaches potable groundwater supplies, or where organics may bio-accumulate in the food chain, e.g., in fish-rearing ponds.

The effect of organic constituents in recycled water used for crop irrigation may warrant attention if industrial wastes contribute a significant fraction to the wastewater.

Chemical Constituents and Physical Parameters

The chemical constituents potentially present in municipal wastewater generally are not a major health concern for urban uses of recycled water but may affect the acceptability of the water for uses such as food crop irrigation, industrial applications, and indirect potable reuse. Chemical constituents may be of concern when recycled water percolates into potable groundwater aquifers because of irrigation, groundwater recharge, or other uses.

Effects of physical parameters, e.g. pH, color, temperature, and particulate matter, and chemical constituents, e.g. chlorides, sodium, and heavy metals, are well known, and recommended limits have been established for many constituents.

2.3 WATER QUALITY CONSIDERATIONS FOR REUSE APPLICATIONS

2.3.1 Irrigation – Landscape and Agricultural

Both agricultural and landscape irrigation with recycled water are well accepted and widely practiced in the U.S. The water quality requirements and operational controls placed on the system depend on the area being irrigated, its location relative to populated areas, and the extent of public access or use of the grounds. The chemical composition of recycled water that has received secondary or higher levels of treatment, although highly variable, normally meets existing guidelines for landscape and agricultural irrigation use.

The recycled water available at the RWQCP goes through advanced treatment (tertiary filtration, chlorination and dechlorination) and meets existing guidelines for irrigation use.

Landscape Irrigation

Landscape irrigation involves the irrigation of golf courses, parks, cemeteries, school grounds, freeway medians, residential lawns, and similar areas. The concern for pathogenic microorganisms is somewhat different than for agricultural irrigation in that landscape irrigation frequently takes place in urban areas where the likelihood of human contact is higher and control over the use of the recycled water is more critical.

Agricultural Irrigation

The mechanism of potential food contamination from irrigation with recycled water includes:

- Physical contamination, where evaporation and repeated application may result in a buildup of contaminants on crops;
- Uptake through the roots from the applied water or the soil; and
- Foliar uptake.

Spray irrigation of food crops that grow above the ground surface requires more stringent requirements than surface irrigation because of the direct contact between the recycled water and the crops. Surface irrigation of root crops, such as carrots, beets, and onions also results in direct contact between the crop and recycled water; hence, irrigation of those and similar root crops should be subject to the same requirements.

Organisms contaminating food crops remain viable on the food surface unless they succumb to desiccation, exposure to sunlight, starvation, or action of other organisms or chemical agents. The reliability and completeness of pathogen inactivation by these mechanisms are questionable. Therefore, recycled water that is essentially free of measurable levels of pathogens is typically required for the spray irrigation of all crops that are eaten or sold raw.

Trace elements in recycled water normally occur in low concentrations that are not hazardous, but some are toxic at elevated concentrations. Some constituents are known to accumulate in particular crops, thus presenting potential health hazards to both grazing animals and/or humans.

2.3.2 Dual Systems

Although use of recycled water inside buildings for toilet and urinal flushing or for fire protection does not result in frequent human contact with the water, regulatory agencies usually require that the recycled water be essentially pathogen-free to reduce health hazards upon inadvertent cross-connection to potable water systems.

Areas that use both potable and recycled water are usually required to have backflow prevention devices on the potable water supply line to each site to reduce the potential of contaminating the potable drinking water system in the event of an inadvertent cross-connection.
Currently recycled water for toilet or urinal flushing or for fire protection is not allowed in single family residential dwellings.

2.3.3 Industrial Reuse

The suitability of recycled water for industrial processes depends on the particular use. Recycled water is used in the manufacture cooling and a wide variety of paper products, ranging from kraft pulp newsprint to high quality paper for stationery and wrappings. Additional site specific treatment beyond the Title 22 Requirements might be required on a particular use.

Use of recycled water in industrial or commercial facilities where the waste flow is returned to the municipal sewer system could increase the TDS load at the municipal treatment plant. The effect of this additional load should be analyzed on a case-by-case basis.

2.3.4 Recreational and Environmental Uses

Impoundments may serve a variety of functions from aesthetic non-contact uses to boating, fishing, and swimming. The level of treatment required will vary with the intended use of the water. Water quality requirements and thus required treatment levels increase as the potential for human contact increases. Typical quality requirements include:

- The appearance of the recycled water is important when it is used for impoundments, and treatment for nutrient removal may be required. Without nutrient control, there is a potential for algae blooms, resulting in odors, an unsightly appearance, and eutrophic conditions.

- Recycled water used for recreational impoundments where fishing and boating are allowed should not contain high levels of pathogenic microorganisms or heavy metals that accumulate in fish to levels that present health hazards to the consumers of the fish.
- For use in nonrestricted recreational impoundments where full-body contact with the water is allowed, the water should be microbiologically safe, colorless, and non-irritating to eyes and skin.

2.3.5 Groundwater Recharge – Spreading and Injection

The purposes of groundwater recharge using recycled water include establishing saltwater intrusion barriers in coastal aquifers, providing soil-aquifer treatment (SAT) for future reuse, providing storage of recycled water, controlling or preventing ground subsidence, and augmenting potable or non-potable aquifers. The two principal means of recharging groundwater basins with recycled water are surface spreading and injection.

Surface Spreading

Where surface spreading of recycled water is used to augment potable groundwater supplies, tertiary treatment, i.e., secondary treatment followed by filtration and disinfection, or advanced wastewater treatment processes may be needed and in some cases required by regulatory agencies to assure that the recharged water does not contain pathogens or health-significant levels of chemical constituents.

Injection

Injection involves pumping recycled water directly into the groundwater zone, which is usually a confined aquifer. Injection requires water of higher quality than surface spreading:

- To prevent clogging of injection equipment
- Because of the absence of soil matrix treatment afforded by surface spreading, and,
- More importantly, to have the injection water meet drinking water standards or match or exceed the quality of the groundwater into which it is injected.

Treatment processes beyond secondary treatment that may be used before injection include chemical coagulation/clarification, filtration, air stripping, ion exchange, granular activated carbon, reverse osmosis or other membrane processes, and disinfection.

2.4 U.S. EPA WATER REUSE GUIDELINES

The U.S. Environmental Protection Agency, in conjunction with the U.S. Agency for International Development, published *Guidelines for Water Reuse* in 1992 (Ref. EPA/625/R-92/004). The primary purpose of the document is to provide guidelines, with supporting information, for utilities and regulatory agencies in the U.S., particularly in states where standards do not exist or are being revised or expanded. California's comprehensive standards are discussed later in this section.

The guidelines address all of the important aspects of water reuse including recommended treatment processes, recycled water quality limits, monitoring frequencies, setback distances, and other controls for various water reuse applications. The guidelines address water reclamation and reuse for nonpotable applications as well as indirect potable reuse by groundwater recharge and augmentation of surface water sources of supply.

The treatment processes and recycled water quality limits recommended in the guidelines for various recycled water applications are presented in **Table 2-1**. Both recycled water quality limits and wastewater treatment unit processes are recommended for the following reasons:

(1) Water quality criteria involving surrogate parameters alone do not adequately characterize recycled water quality;

(2) A combination of treatment and quality requirements known to produce recycled water of acceptable quality obviates the need to monitor the finished water for certain constituents;

(3) Expensive, time-consuming, and in some cases, questionable monitoring for pathogenic microorganisms is eliminated without compromising health protection; and

(4) Treatment reliability is enhanced.

The guidelines suggest that, regardless of the type of recycled water use, some level of disinfection should be provided to avoid adverse health consequences from inadvertent contact or accidental or intentional misuse of a water reuse system.

Table 2-1
U.S. EPA Guidelines for Water Reuse
(Applicable to the States not having their own standards)

Type of Use	Treatment	Recycled Water Quality
Urban uses, Food crops eaten raw, Recreational impoundments	• Secondary • Filtration • Disinfection	• pH = 6-9 • 10 mg/L NO3-N • 2NTU[a] • No detectable fecal coli/l00 mL[b] • 1 mg/L Cl_2 residual[c]
Restricted access area irrigation, Processed food crops, Nonfood crops, Aesthetic impoundments, Construction uses, Industrial cooling[d], Environmental reuse	• Secondary • Disinfection	• pH = 6-9 • 30 mg/L BOD • 30mg/L SS • 200 fecal coli/l00 mL[e] • 1 mg/L Cl_2 residual[c]
Groundwater recharge of nonpotable aquifers by spreading	• Site specific & use dependent • Primary (minimum)	• Site specific & use dependent
Groundwater recharge of nonpotable aquifers by injection	• Site specific & use dependent • Secondary (minimum)	• Site specific & use dependent
Groundwater recharge of potable aquifers by spreading	• Site specific • Secondary & Disinfection (minimum)	• Site specific • Meet drinking water standards after percolation through vadose zone
Groundwater recharge of potable aquifers by injection, Augmentation of surface supplies	• Includes the following: • Secondary • Filtration • Disinfection • Advanced wastewater treatment	• Includes the following: • pH = 6-8.5 • 2NTU [a] • No detectable fecal coli/100mL[b] • 1 mg/L Cl_2 residual[c] • Meet drinking water standards

[a] Should be met prior to disinfection. Average based on a 24-hour time period. Turbidity should not exceed *5* NTU at any time.
[b] Based on 7-day median value. Should not exceed 14 fecal coli/l00 mL in any sample.
[c] After a minimum contact time of 30 minutes.
[d] Re-circulating cooling towers.
[e] Based on 7-day median value. Should not exceed 800 fecal coli/l00 mL in any sample.
Source: Adapted from [31].

2.5 REGIONAL BOARD/LOCAL REQUIREMENTS

In California, nine Regional Boards oversee the federal clean water regulations and implement the federal National Pollutant Discharge Elimination System (NPDES) program. NPDES permit requirements related to wastewater treatment and discharges to the Santa Ana River are discussed briefly in Section 3.

The Regional Board authority to protect Waters of the State is stated in the Porter-Cologne Water Quality Act of 1969. In protecting Waters of the State, each of the 9 Regional Boards (which are territorially divided by drainage basins) develop and adopt water quality control plans (basin plans) whereby beneficial uses of waters in the respective drainage basins are established, and water quality objectives are also established to protect such beneficial uses. The Regional Boards issue NPDES permits and waste discharge requirements consistent with protection of the beneficial uses in the respective basin plan, as well as compliant with federal clean water standards.

The Regional Board adopted the Water Quality Control Plan Report, Santa Ana Region (Basin Plan) on March 11, 1994 and became effective on January 24, 1995. The Basin Plan sets forth requirements for adequate water quality planning, implementation, management, and enforcement practices. It provides a definitive program to preserve and enhance both surface water and groundwater quality in the basin.

2.5.1 Groundwater Recharge Objectives

Groundwater recharge of treated wastewater is handled in a similar manner to water reuse, although the limits and the amount of flow that is affected are different.

The Basin Plan establishes water quality objectives necessary to protect the beneficial uses of receiving waters, including groundwater, inland surface water and coastal water. Currently, the Basin Plan objectives dictate that the wastewater reaching the groundwater table must not exceed a TIN (Total Inorganic Nitrogen) concentration of 10 mg/L.

The draft Groundwater Recharge Reuse Guidelines (GRRG) currently promulgated by the DHS (Department of Health Services) stipulate a total nitrogen concentration range between 1 and 10 mg/L for the recharge water. The DHS is currently considering adoption of an exact limit for total nitrogen but is unsure what total nitrogen limit in recharge water is necessary to assure that the nitrate standard will not be exceeded due to any groundwater recharge projects. Nevertheless, the DHS recognizes and may allow TIN treatment and removal through the soil column. The result is that recycled water used for groundwater recharge could contain higher concentrations of TIN.

The Basin Plan, 1995 lists the groundwater and inland surface water beneficial uses by hydrographic subunit (HSU) as shown in **Table 2-2** with regulated parameters for total dissolved solids, hardness, sodium, chloride and sulfate.

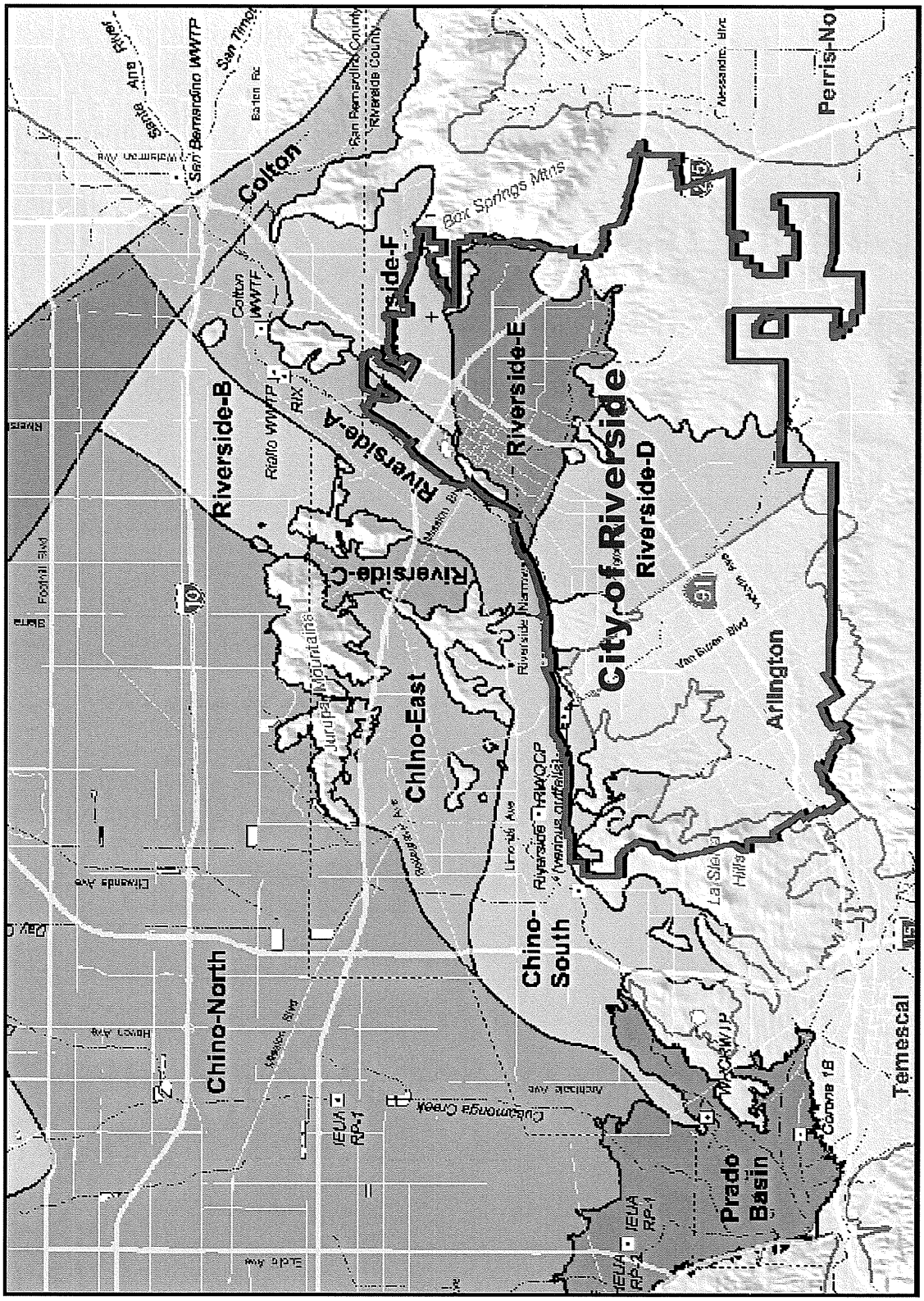
Table 2-2
RWQCP Sub Basins Ground Water Quality Objectives

Groundwater Supply Sub-basins	TDS	Hardness	Sodium Na	Chloride Cl	NO_3-N	Sulfate SO_4	Hydrologic Unit	
							Primary	Secondary
Arlington	1050	500	125	180	20	160	801.26	801.25
Bunker Hill I	260	190	15	10	1	45	801.51	-
Bunker Hill II	290	190	30	20	5	62	801.52	-
Bunker Hill Pressure	300	160	30	20	1	62	801.52	-
Riverside I	490	270	50	50	4	85	801.27	-
Riverside I	650	360	70	85	10	100	801.27	-
Riverside I	990	500	125	170	20	135	801.27	-

(Ref: Santa Ana Region Basin Plan, 1995)

Basin Plan Revision and New Groundwater Recharge Requirements

The Regional Water Quality Control Board (RWQCB) is scheduled to finalize a revision to the basin plan in the first quarter of 2004. The revision will include new groundwater basin boundaries and associated objectives for nitrate nitrogen and TDS. The proposed changes may limit the uses of reclaimed water in some areas due to water quality limitations. Under the proposed amendment, the City will overlay six different groundwater management zones (eight zones if the Jurupa and Rubidoux Community Services Districts are included). **Figure 2-1** overlays the City boundaries over the latest proposed groundwater management zones. Each of these zones will have specific groundwater objectives for TDS and nitrate nitrogen. Specific reclamation proposals will need to be assessed based on the type and location of the proposed activity after the revisions are finalized. **Table 2-3** summarizes the Water Quality Objectives associated with TDS and N03-N.



Source: Modified from Wildermuth Environmental, Inc.

Figure 2-1 – Groundwater Management Zone Boundaries and City of Riverside Boundary

Table 2-3
Revised Water Quality Objectives
(Likely to be adopted by RWQCB in few months)

Groundwater Subbasins Management Zones	Water Quality objective (mg/L)		HYDROLOGIC UNIT	
	TDS	NO_3-N	Primary	Secondary
SAN JACINTO RIVER BASIN				
Garner Valley*	300	2.0	802.22	
Idyllwild Area**	--	--	802.22	802.21
Canyon	230	2.5	802.21	
Hemet - South	730	4.1	802.15	802.21
Lakeview - Hemet North	520	1.8	802.14	802.15
Menifee	1020	2.8	802.13	
Perris North	570	5.2	802.11	
Perris South	1260	2.5	802.11	802.12, 802.13
San Jacinto - Lower	520	1.0	802.21	
San Jacinto - Upper	320	1.4	802.21	802.23
LOWER SANTA ANA RIVER BASIN				
La Habra**	--	--	845.62	
Santiago**	--	--	801.12	
Orange	580	3.4	801.11	801.13, 845.61, 801.14
Irvine**	910	5.9	801.11	
UPPER SANTA ANA RIVER BASIN				
Big Bear Valley	220	5.0	801.71	801.73
Beaumont "maximum benefit"++	340	5.0	801.62	801.63, 801.69
Beaumont "antidegradation"++	230	1.5	801.62	801.63, 801.69
Bunker Hill - A	310	2.7	801.51	801.52
Bunker Hill - B	330	7.3	801.52	801.53, 801.54, 801.57, 801.58
Colton	410	2.7	801.44	801.45
Chino - North "maximum benefit"++	420	5.0	801.21	481.21, 481.23, 481.22, 801.21, 801.23, 801.24, 801.27
Chino 1 - "antidegradation"++	290	4.9	802.21	481.21
Chino 2 - "antidegradation"++	260	2.9	802.21	
Chino 3 - "antidegradation"++	260	3.5	802.21	
Chino - East	730	10.0	802.21	801.27
Chino - South	680	4.2	802.21	801.26
Cucamonga "maximum benefit"++	420	5.0	801.24	801.21
Cucamonga "antidegradation"++	210	2.4	801.24	801.21
Lytle	260	1.5	801.41	801.42
Rialto	230	2.0	801.41	801.42
San Timoteo "maximum benefit"++	370	5.0	801.62	
San Timoteo "antidegradation"++	300	2.7	801.62	
Yucaipa "maxium benefit"++	370	5.0	801.61	
Yucaipa "antidegradation"++	320	4.2	801.61	
MIDDLE SANTA ANA RIVER BASIN				
Arlington	980	10.0	801.26	
Bedford**	--	--	801.32	
Coldwater	380	1.5	801.31	
Elsinore	480	1.0	802.31	
Lee Lake**	--	--	801.34	
Riverside - A	560	6.2	801.27	
Riverside - B	290	7.6	801.27	
Riverside - C	680	8.3	801.27	
Riverside - D	810	10.0	801.27	
Riverside - E	720	10.0	801.27	
Riverside - F	660	9.5	801.27	
Temescal	770	10.0	801.25	

* Additional objectives for Garner Valley: Hardness 100 mg/L; Sodium 65 mg/L; Chloride 30 mg/L; Sulfate 40

** Numeric objectives not established; narrative objectives apply

++ "maximum benefit" objectives apply unless Regional Board determines that lowering of water quality is no of maximum benefit to the people of the state; "antidegradation" objectives then would apply.

Groundwater recharge is a potential year-round use of recycled water in the area. This alternative must consider Title 22 guidelines such as required times (12 months) prior to withdrawal, blending ratios (20% recycled water, 80% natural groundwater), and setback requirements (injection/recharge points one mile away from potable wells). Total organic carbon concentrations must also be met, and the recharge of groundwater would likely require demineralization prior to injection/recharge to meet these.

The use of recycled water (RWQCP effluent), ranging TDS ranges between 515 to 540 mg/L, may not allowed to be used in certain groundwater management zones (sub basins which out demonstration to the RWQCB that it will not degrade the ground water quality. Under similar conditions, the RWQCB has required Salt Balance Study by qualified professional to demonstrate no impact on the ground water. This master planning efforts considers that the City will be eventually able to use the RWQCP effluent for the potential users located in these sub basins, thus such users are not precluded from this study.

Groundwater modeling would be required to determine impacts to and protection of beneficial guidelines. Long-term groundwater monitoring would likely be required as part of the alternative. Groundwater recharge would be the ideal alternative to compensate for the wide variation in recycled water availability at the RWQCP. When agricultural and turf irrigation demands are lowest (winter time), recharge of the groundwater can be implemented to its fullest extent, and it can be minimized during summer months when demands are high.

2.6 CALIFORNIA WATER RECYCLING AND REUSE CRITERIA

2.6.1 Treatment Requirements

The California Department of Health Services (DHS) has determined that recycled water should be essentially free of pathogenic organisms. DHS specifies treatment processes (secondary treatment, filtration, and disinfection), operational requirements (filtration rates, chlorine contact time, etc.), and water quality parameters (turbidity and coliform organisms) that have been demonstrated to result in the production of water of the desired quality.

2.6.2 Water Quality Monitoring

Water quality monitoring is a very prominent issue during development of reuse standards or guidelines. Monitoring decisions include selection of water quality parameters, numerical limits, sampling frequency, and the monitoring compliance point. Important issues include the need to monitor for viruses and the appropriate parameter for measurement of particulates. It would be impractical to monitor recycled water for all of the toxic chemicals and pathogenic organisms of concern, and surrogate parameters are universally accepted.

The state of California has comprehensive regulations (Title 22 and Title 17 Requirements) and prescribes requirements according to the end use of the water. The California reuse criteria include requirements for treatment reliability that address standby power supplies, alarm systems, multiple or standby treatment process units, emergency storage or disposal of inadequately treated wastewater, elimination of

treatment process bypassing, monitoring devices and automatic controllers, and flexibility of design.

California is in the process of revising its comprehensive regulations and reuse criteria. The most recent draft criteria are presented in **Table 2-4** (non-potable reuse) and **Table 2-5** (potable reuse via groundwater recharge).

Table 2-4
California Treatment and Quality Criteria[a] for Nonpotable Uses of Recycled Water (1)

Type of Use	Total Coliform Limits [b]	Treatment Required
Irrigation of fodder, fiber, & seed crops, orchards and vineyards[c], and processed food crops; Flushing sanitary sewers	None required	Secondary
Irrigation of pasture for milking animals, landscape areas[d], omamental nursery stock, and sod farms; Landscape impoundments; Industrial or commercial cooling water where no mist is created; Nonstructural fire fighting; Industrial boiler feed; Soil compaction; Dust control; Cleaning roads, sidewalks, and outdoor areas	23/100 mL	Secondary & disinfection
Surface irrigation of food crops; restricted landscape impoundments	2.2/100 mL	Secondary & disinfection
Irrigation of food crops[e] and open access landscape areas[f] Nonrestricted recreational impoundments; Toilet and urinal flushing; Industrial process water; Decorative fountains; Commercial laundries; Snow making; Structural fire fighting; Industrial or commercial cooling where mist is created	2.2/100 mL	Secondary Coagulation[g], filtration[h], & disinfection

[a] Includes proposed revisions.
[b] Based on running 7-day median.
[c] No contact between recycled water and edible portion of crop.
[d] Cemeteries, freeway landscaping, restricted access golf courses, and other controlled access irrigation areas.
[e] Contact between recycled water and edible portion of crop; includes edible root crops.
[f] Parks, playgrounds, schoolyards, residential landscaping, unrestricted access golf courses, and other uncontrolled access irrigation areas.
[g] Not required if the turbidity of the influent to the filters does not exceed 5 NTU more than 5 percent of the time.
[h] The turbidity of filtered effluent cannot exceed a daily average of 2 nephelometric turbidity units (NTU).
(1) Source Reference: (State of California. 1998. Draft Water Recycling Criteria. California Department of Health Services, Drinking Water Program, Sacramento, California)

Table 2-5
Proposed California Groundwater Recharge Criteria (1)

Treatment and Recharge Site Requirements	Project Category[a] I	II	III
Required treatment			
Secondary	X[b]	X	X
Filtration	X	X	X
Disinfection	X	X	X
Organics removal	X		X
Water Quality Limits	Drinking water standards except nitrogen, 10 mg/L total nitrogen, & 1 mg/L TOC of wastewater origin in extracted water		
Maximum allowable recycled water in extracted well water (%)	50	20	50
Depth to groundwater at initial percolation rate of:			
<0.5 cmlmin (<0.2 in/min)	3 m (10 ft)	3 m (10 ft)	n.a.[c]
<0.8 cm/min (<0.3 in/min)	6 m (20 ft)	6 m (20 ft)	n.a.[c]
Minimum retention time underground (months)	6	6	12
Horizontal separation	150m (500 ft)	150m (500 ft)	600m (2000 ft)

[a] Categories I and II, are for surface spreading projects. Category III is for injection projects.
[b] X means that the treatment process is required.
[c] Not applicable.
[d] From edge of recharge operation to the nearest potable water supply well.

(1) Source: Reference (State of California. 1999. Draft Proposed Groundwater Recharge Regulation. California Department of Health Services, Division of Drinking Water, Sacramento, California)

2.7 TITLE 22 CRITERIA - DEPARTMENT OF HEALTH AND SAFETY

California recognizes the importance of recycling water to meet the overall water demand, as backed by Resolution No. 77-1, State Board's Policy with Respect to Water Reclamation in California, and specifically addressed in the California Water Code, Sections 13575 and 13577. As California's demand for water continues to increase, so will the demand for and the necessity to recycle wastewater effluent from water reclamation facilities throughout the state.

The DHS establishes water quality standards and treatment reliability criteria for water recycling under Title 22, Chapter 4, of the California Code of Regulations (Title 22), and in Title 17, Division 1, Chapter 5, Group 4, Article 1, and Section 7604 (Title 17). Requirements for recycled water use in California, not described in Title 22, are considered and approved by DHS on a case-by-case basis.

Title 22 sets bacteriological water quality standards based on the expected degree of public contact with recycled water.

For water reuse applications with a high potential for the public to come in contact with the recycled water, Title 22 requires disinfected tertiary treatment.

For applications with lower potential for public contact, Title 22 requires three levels of secondary treatment, differing by the amount of disinfection required.
In addition to establishing recycled water quality standards, Title 22 specifies the reliability and redundancy for each recycled water treatment and use operation.

Title 17 provides protection against cross-connections between potable water systems and recycled water systems.

2.7.1 Proposed Title 22 Regulations Changes

California DHS issued the latest versions of both Title 17 and 22 on August 30, 1999 for public comment prior to formal adoption. The significant pending changes to Title 22 tertiary water treatment standards are with respect to the disinfection and filtration processes. These proposed changes are described as follows:

Section 60301.230, Disinfected Tertiary Recycled Water.

The chlorine disinfection process to achieve a 2.2 MPN (Maximum Probable Number) would require a "CT" (chlorine dosage times time, milligrams-minutes/liter) of not less than 450 at all times with a modal contact time of at least 90 minutes, based on peak dry weather flow. The current criterion requires a 2 hour detention time at plant maximum flow rate.

The combined disinfection/filtration process must also achieve 99.999 percent removal of the plaque-forming units of F-specific bacteriophage MS2, or polio virus in the recycled water. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration. This proposed requirement allows alternative disinfection processes, in combination with conventional filtration (chemical coagulation, clarification prior to filtration) and direct filtration alternatives that reliably meet the virus removal criteria.

Section 60301.320, Filtered Wastewater.

The filtration requirement recognizes direct filtration as an acceptable alternative, and now lists microfiltration, ultrafiltration, nanofiltration and reverse osmosis as alternative means of filtration.

2.7.2 Key Title 22 Requirements

2.7.2.1 Water Recycling Potential Uses Requirements (Title 22 – Article 3)

A. Use of Recycled Water for Irrigation (*Ref. Title 22 Code Section - §60304*)

(a) Recycled water used for the surface irrigation of the following shall be a disinfected tertiary recycled water, except that for filtration pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is

continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes:

(1) Food crops, including all edible root crops, where the recycled water comes into contact with the edible portion of the crop,

(2) Parks and playgrounds,

(3) School yards,

(4) Residential landscaping,

(5) Unrestricted access golf courses, and

(6) Any other irrigation use not specified in this section and not prohibited by other sections of the California Code of Regulations.

(b) Recycled water used for the surface irrigation of food crops where the edible portion is produced above ground and not contacted by the recycled water shall be at least disinfected secondary-2.2 recycled water.

(c) Recycled water used for the surface irrigation of the following shall be at least disinfected secondary-23 recycled water:

(1) Cemeteries,

(2) Freeway landscaping,

(3) Restricted access golf courses,

(4) Ornamental nursery stock and sod farms where access by the general public is not restricted,

(5) Pasture for animals producing milk for human consumption, and

(6) Any nonedible vegetation where access is controlled so that the irrigated area cannot be used as if it were part of a park, playground or school yard

(d) Recycled wastewater used for the surface irrigation of the following shall be at least undisinfected secondary recycled water:

(1) Orchards where the recycled water does not come into contact with the edible portion of the crop,

(2) Vineyards where the recycled water does not come into contact with the edible portion of the crop,

(3) Non food-bearing trees (Christmas tree farms are included in this category provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting or allowing access by the general public),

(4) Fodder and fiber crops and pasture for animals not producing milk for human consumption,

(5) Seed crops not eaten by humans,

(6) Food crops that must undergo commercial pathogen-destroying processing before being consumed by humans, and

(7) Ornamental nursery stock and sod farms provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting, retail sale, or allowing access by the general public.

(e) No recycled water used for irrigation, or soil that has been irrigated with recycled water, shall come into contact with the edible portion of food crops eaten raw by humans unless the recycled water complies with subsection (a).

B. Use of Recycled Water for Impoundments (*Ref. Title 22 Code Section - §60305*)

(a) Except as provided in subsection (b), recycled water used as a source of water supply for nonrestricted recreational impoundments shall be disinfected tertiary recycled water that has been subjected to conventional treatment.

(b) Disinfected tertiary recycled water that has not received conventional treatment may be used for nonrestricted recreational impoundments provided the recycled water is monitored for the presence of pathogenic organisms in accordance with the following:

(1) During the first 12 months of operation and use the recycled water shall be sampled and analyzed monthly for Giardia, enteric viruses, and Cryptosporidium. Following the first 12 months of use, the recycled water shall be sampled and analyzed quarterly for Giardia, enteric viruses, and Cryptosporidium. The ongoing monitoring may be discontinued after the first two years of operation with the approval of the department. This monitoring shall be in addition to the monitoring set forth in section 60321.

(2) The samples shall be taken at a point following disinfection and prior to the point where the recycled water enters the use impoundment. The samples shall be analyzed by an approved laboratory and the results submitted quarterly to the regulatory agency.

(c) The total coliform bacteria concentrations in recycled water used for nonrestricted recreational impoundments, measured at a point between the disinfection process and the point of entry to the use impoundment, shall comply with the criteria specified in section 60301.230 (b) for disinfected tertiary recycled water.

(d) Recycled water used as a source of supply for restricted recreational impoundments and for any publicly accessible impoundments at fish hatcheries shall be at least disinfected secondary-2.2 recycled water.

(e) Recycled water used as a source of supply for landscape impoundments that do not utilize decorative fountains shall be at least disinfected secondary-23 recycled water.

C. Use of Recycled Water for Cooling (*Ref. Title 22 Code Section - §60306*)

(a) Recycled water used for industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist shall be a disinfected tertiary recycled water.

(b) Use of recycled water for industrial or commercial cooling or air conditioning that does not involve the use of a cooling tower, evaporative condenser, spraying, or any mechanism that creates a mist shall be at least disinfected secondary-23 recycled water.

(c) Whenever a cooling system, using recycled water in conjunction with an air conditioning facility, utilizes a cooling tower or otherwise creates a mist that could come into contact with employees or members of the public, the cooling system shall comply with the following:

(1) A drift eliminator shall be used whenever the cooling system is in operation.

(2) A chlorine, or other, biocide shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other micro-organisms.

D. Use of Recycled Water for Other Purposes. (*Ref. Title 22 Code Section - §60307*)

(a) Recycled water used for the following shall be disinfected tertiary recycled water, except that for filtration being provided pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes:

(1) Flushing toilets and urinals,

(2) Priming drain traps,

(3) Industrial process water that may come into contact with workers,

(4) Structural fire fighting,

(5) Decorative fountains,

(6) Commercial laundries,

(7) Consolidation of backfill around potable water pipelines,

(8) Artificial snow making for commercial outdoor use, and

(9) Commercial car washes, including hand washes if the recycled water is not heated, where the general public is excluded from the washing process.

(b) Recycled water used for the following uses shall be at least disinfected secondary-23 recycled water:

(1) Industrial boiler feed,

(2) Nonstructural fire fighting,

(3) Backfill consolidation around nonpotable piping,

(4) Soil compaction,

(5) Mixing concrete,

(6) Dust control on roads and streets,

(7) Cleaning roads, sidewalks and outdoor work areas and

(8) Industrial process water that will not come into contact with workers.

(c) Recycled water used for flushing sanitary sewers shall be at least undisinfected secondary recycled water.

2.7.2.2 Recycled Water Use Area Requirements (Title 22 -Article 4)

(a) No irrigation with disinfected tertiary recycled water shall take place within 50 feet of any domestic water supply well unless all of the following conditions have been met:

(1) A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface.

(2) The well contains an annular seal that extends from the surface into the aquitard.

(3) The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities.

(4) The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well.

(5) The owner of the well approves of the elimination of the buffer zone requirement.

(b) No impoundment of disinfected tertiary recycled water shall occur within 100 feet of any domestic water supply well.

(c) No irrigation with, or impoundment of, disinfected secondary-2.2 or disinfected secondary-23 recycled water shall take place within 100 feet of any domestic water supply well.

(d) No irrigation with, or impoundment of, undisinfected secondary recycled water shall take place within 150 feet of any domestic water supply well.

(e) Any use of recycled water shall comply with the following:

(1) Any irrigation runoff shall be confined to the recycled water use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency.

(2) Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities.

(3) Drinking water fountains shall be protected against contact with recycled water spray, mist, or runoff.

(f) No spray irrigation of any recycled water, other than disinfected tertiary recycled water, shall take place within 100 feet of a residence or a place where public exposure could be similar to that of a park, playground, or school yard.

(g) All use areas where recycled water is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following wording: "RECYCLED WATER - DO NOT DRINK". Each sign shall display an international symbol similar to that shown in figure 60310-A. The Department may accept alternative signage and wording, or an

educational program, provided the applicant demonstrates to the Department that the alternative approach will assure an equivalent degree of public notification.

(h) Except as allowed under section 7604 of title 17, California Code of Regulations, no physical connection shall be made or allowed to exist between any recycled water system and any separate system conveying potable water.

(i) The portions of the recycled water piping system that are in areas subject to access by the general public shall not include any hose bibs. Only quick couplers that differ from those used on the potable water system shall be used on the portions of the recycled water piping system in areas subject to public access.

2.7.2.3 Dual Plumbed Recycled Water Systems Requirements (Title 22 - Article 5)

(a) No person other than a recycled water agency shall deliver recycled water to a dual-plumbed facility.

(b) No recycled water agency shall deliver recycled water for any internal use to any individually-owned residential units including free-standing structures, multiplexes, or condominiums.

(c) No recycled water agency shall deliver recycled water for internal use except for fire suppression systems, to any facility that produces or processes food products or beverages. For purposes of this Subsection, cafeterias or snack bars in a facility whose primary function does not involve the production or processing of foods or beverages are not considered facilities that produce or process foods or beverages.

(d) No recycled water agency shall deliver recycled water to a facility using a dual plumbed system unless the report required pursuant to section 13522.5 of the Water Code, and which meets the requirements set forth in section 60314, has been submitted to, and approved by, the regulatory agency.

2.7.2.4 Groundwater Recharge. (Title 22- Article 5)

Reclaimed water used for groundwater recharge of domestic water supply aquifers by surface spreading shall be at all times of a quality that fully protects public health. The State Department of Health Services' recommendations to the Regional Water Quality Control Boards for proposed groundwater recharge projects and for expansion of existing projects will be made on an individual case basis where the use of reclaimed water involves a potential risk to public health.

(a) The State Department of Health Services' recommendations will be based on all relevant aspects of each project, including the following factors: treatment provided; effluent quality and quantity; spreading area operations; soil characteristics; hydrogeology; residence time; and distance to withdrawal.

(b) The State Department of Health Services will hold a public hearing prior to making the final determination regarding the public health aspects of each groundwater recharge project. Final recommendations will be submitted to the Regional Water Quality Control Board in an expeditious manner.

2.8 TITLE 17 REQUIREMENTS

Title 17 of the California Administrative Code establishes regulations relating to cross-connections of potable and non-potable water systems to ensure safety of public health. The regulations require a cross-connection control program whereby the public water supply is protected from contamination.

In effect, the requirements state that connections to a domestic water system must be isolated from the recycled water main by an air gap, a reduced pressure principle device or a double check valve assembly. Title 17 regulations disallow direct connection between any system or facility delivering recycled water and the domestic water system.

2.8.1 Protection of Water System (Title 17- Article 2)

2.8.1.1 Approval of Backflow Preventers (*Ref. Title 17 Code Section* 7601)

(a) Air-gap Separation. An Air-gap separation (AG) shall be at least double the diameter of the supply pipe, measured vertically from the flood rim of the receiving vessel to the supply pipe; however, in no case shall this separation be less than one inch.

(b) Double Check Valve Assembly. A required double check valve assembly (DC) shall, as a minimum, conform to the AWWA Standard C506-78 (R83) adopted on January 28, 1978 for Double Check Valve Type Backflow Preventive Devices which is herein incorporated by reference.

(c) Reduced Pressure Principle Backflow Prevention Device. A required reduced pressure principle backflow prevention device (RP) shall, as a minimum, conform to the AWWA Standard C506-78 (R83) adopted on January 28, 1978 for Reduced Pressure Principle Type Backflow Prevention Devices which is herein incorporated by reference.

2.8.1.2 Location of Backflow Preventers (*Ref. Title 17 Code Section* 7603)

(a) Air-gap Separation. An air-gap separation shall be located as close as practical to the user's connection and all piping between the user's connection and the receiving tank shall be entirely visible unless otherwise approved in writing by the water supplier and the health agency.

(b) Double Check Valve Assembly. A double check valve assembly shall be located as close as practical to the user's connection and shall be installed above grade, if possible, and in a manner where it is readily accessible for testing and maintenance.

(c) Reduced Pressure Principle Backflow Prevention Device. A reduced pressure principle backflow prevention device shall be located as close as practical to the user's connection and shall be installed a minimum of twelve inches (12") above grade and not more than thirty-six inches (36") above grade measured from the bottom of the device and with a minimum of twelve inches (12") side clearance.

2.8.1.3 Type of Protection Required (*Ref. Title 17 Code Section* 7604)

The type of protection that shall be provided to prevent backflow into the public water supply shall be commensurate with the degree of hazard that exists on the consumer's

premises. The type of protective device that may be required (listed in an increasing level of protection) includes: Double Check Valve Assembly-(DC), Reduced Pressure Principle Backflow Prevention Device-(RP), and an Air-gap Separation-(AG). The water user may choose a higher level of protection than required by the water supplier. The minimum types of backflow protection required to protect the public water supply, at the water user's connection to premises with various degrees of hazard are given in Table 1. Situations which are not covered in Table 1 shall be evaluated on a case-by-case basis and the appropriate backflow protection shall be determined by the water supplier or health agency.

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Section 3

Recycled Water Quality and Quantity

PARSONS

SECTION 3
RECYCLED WATER QUALITY AND QUANTITY

This section describes the City's Regional Water Quality Control Plant (RWQCP) ownership, effluent quantity and quality, basin quality objectives, comparison between RWQCP final effluent and recycled water regulatory requirements.

3.1 REGIONAL WATER QUALITY CONTROL PLANT

RWQCP is a municipal wastewater treatment plant operated by the City. The plant is located on a 121 acre site at 5950 Acorn Street in the City, south of the Santa Ana River, near the intersection of Van Buren Boulevard and Jurupa Avenue. It started operation in 1946 as a small primary treatment plant and has gone through several major upgrades. The RWQCP is currently designed and permitted to treat 40 million gallons per day (mgd) of wastewater.

The City completed construction of the first phase of the Hidden Valley Wetlands Enhancement Project (HVWEP) in March 1995. The HVWEP has been expanded to include an educational pond and other ponds. Approximately 100 acres of constructed wetlands are being used for additional wastewater treatment (nitrogen removal) from the RWQCP final effluent.

Process Description

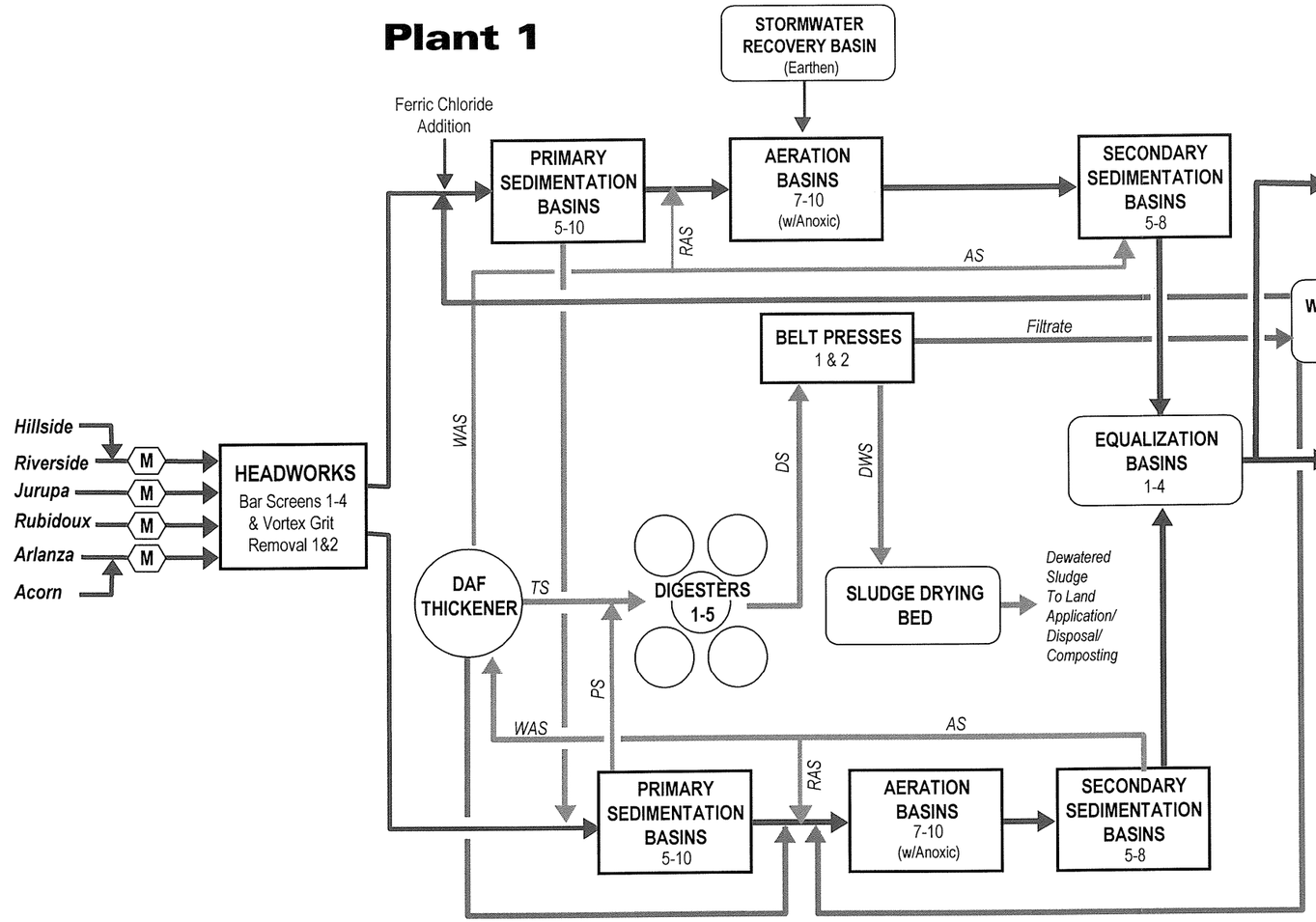
The RWQCP treats wastewater from the following agencies that have contractual agreements with the City: Jurupa Community Services District (JCSD), Rubidoux Community Services District (RCSD), Western Municipal Water District (WMWD) and Edgemont Community Services District (ECSD).

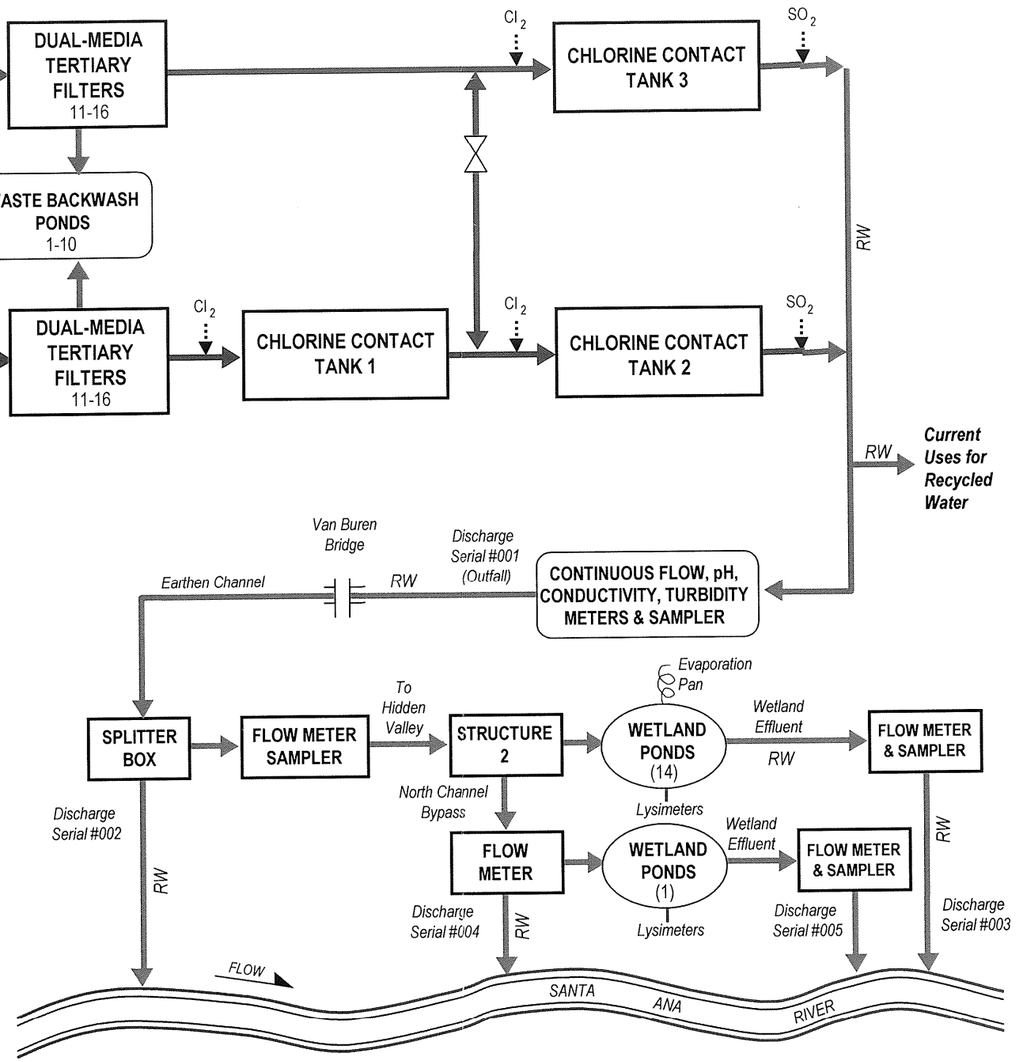
Influents to the RWQCP are metered at a common headworks structure consisting of bar screens and vortex grit removal (Pista Grit System). Effluent from the headworks is proportionately channeled to Plant 1 and Plant 2 consisting of primary clarifiers, aeration tanks, and secondary clarifiers.

Plant 1 and 2 flows are combined in equalization basins prior to tertiary treatment. Tertiary treatment consists of a chemical feed system, dual media filtration (16 filters), chlorination (3 chlorine contact tanks), and dechlorination by sulfur dioxide (SO_2).

The RWQCP discharges tertiary treated wastewater to Reach 3 of the Santa Ana River. Final effluent is conveyed through an earthen channel in the Santa Ana River basin to the HVWEP. Partial flow of approximately 19 mgd is discharged to the Santa Ana River just before the HVWEP; about 13 mgd of flow is directed through the HVWEP for further nitrogen removal.

A schematic diagram of the treatment process of the City's RWQCP is shown in **Figure 3-1**.





LEGEND	
	LIQUID FLOW
	SOLIDS FLOW
	PLANT RECYCLE
	RECYCLED WATER
M	FLOW MEASURED: - E.C. Monitored - pH Monitored - Sampler

ABBREVIATIONS	
PS	PRIMARY SLUDGE
RAS	RETURN ACTIVATED SLUDGE
WAS	WASTE ACTIVATED SLUDGE
AS	ACTIVATED SLUDGE
TS	THICKENED SLUDGE
DS	DIGESTED SLUDGE
DWS	DEWATERED SLUDGE
RW	RECYCLED WATER

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RECYCLED WATER PHASE I FEASIBILITY STUDY AND CITYWIDE MASTER PLAN

Figure 3-1 Riverside Water Quality Control Plant Process Flow Schematic

3.2 SANTA ANA RIVER DISCHARGE/NPDES PERMIT REQUIREMENTS

The Santa Ana River is an effluent dominated natural stream that provides water for recreation and for aquatic and wildlife habitat. River flows are also a significant source of groundwater recharge (approximately 70% of total recharge) in the lower basin, which provides domestic supplies for more than two million people.

The National Pollution Discharge Elimination System (NPDES) permit for discharge into Santa Ana River requires secondary treatment, virus control, in-line coagulation and filtration and improved disinfection (or their equivalents) for all wastewater discharges in order to protect the health of the people who used the Santa Ana River for contact recreation. Control of inorganic nitrogen levels in discharged water is also required to protect the aquatic habitat from un-ionized ammonia toxicity and to manage nitrate levels in groundwater for subsequent municipal uses. Control on residual chlorine levels in discharges is also a requirement of the NPDES permit.

3.2.1 Current NPDES Permit Requirements

The tertiary effluent from RWQCP is discharged into Santa Ana River at two discharge points – before and after the HVWEP. Both discharges are regulated by the recently adopted (January 2001) Santa Ana Regional Water Quality Control Board (RWQCB) Order No. 01-3 replacing Order No. 95-18, NPDES No. CA0105350. This Order is based on the plant's current design rating of 40 mgd ADWF. Copy of the referred NPDES permit is enclosed, as **Appendix A.** Effluent quality standards require tertiary treatment with filters and disinfection equivalent to Title 22 requirements for recycled water, due to the use of receiving waters for water contact recreation.

A summary of the main effluent quality limits is provided in **Table 3-1.**

3.2.2 Future NPDES Permit Requirements

The TIN limits at RWQCP are expected to be reduced to perhaps as low as 8 to 10 mg/L at the conclusion of the Santa Ana River TIN/TDS Study in the near future. Section 2.5 "Regional Board/Local Requirements" of this report discussed more in detail current status of the TIN/TDS study and anticipated TDS and NO3-N limits for groundwater subbasins.

Irrigation with recycled water must be performed in a manner that will ensure the groundwater quality objectives for TIN are met. The City of Riverside as the applicant must demonstrate that the application rates for recycled water do not exceed the plant nitrogen uptake. This will prevent nitrogen from migrating to the groundwater.

Table 3-1
Summary of Key NPDES Effluent Requirements

Parameter	Weekly Average	Monthly Average	Annual Average	Daily Max.	Notes
BOD	30 mg/L	20 mg/L	-	-	
TSS	30 mg/L	20 mg/L	-	-	
NH_4-N	-	5.0 mg/L	-	-	
Chlorine Residual	-	-	-	0.1 mg/L	Instantaneous max, ceiling 2 mg/L
TIN	-	-	10 mg/L 13 mg/L	-	For flow > 38 MGD For flow < 38 MGD
TDS	-	-	650 mg/L	-	250 mg/L incremental limit
Turbidity	-	-	-	-	Daily avg. 2 NTU 5 NTU for 5% of the time during any 24 hours
Coliform	< 2.2 MPN	-	-	-	Max. 23 MPN, once per mo.
pH	-	-	-	6.5-8.5	99% compliance
- not specified					

3.3 RECYCLED WATER - QUANTITY AND AVAILABILITY

3.3.1 Current And Future Availability Of Recycled Water

The RWQCP is currently producing about 32 mgd of recycled water on an annual average basis, while it is designed and permitted to produce up to 40 mgd of recycled water. The RWQCP is master planed for ultimate capacity of 60 mgd. Thus, with the growth in population, the availability of recycled water is likely to go up to 40 mgd in the near future and 60 mgd ultimately.

3.3.2 Santa Ana River Flow Contribution Requirements – Prado Dam Settlement

In support of the Prado Settlement, an agreement between the Western Municipal Water District (WMWD) and the City on November 30 1968, obligated an annual discharge of 15,5250 acre feet (13.38 mgd) from the RWQCP for maintenance of base flows at the Prado Dam. The volume may be slightly reduced by quality and credit adjustments.

The City delivers more effluent than is required under this agreement. It may, in any given year, reduce its adjusted contribution by the amount of such excess deliveries, but in no event shall the City's adjusted contribution be less than 13,420 AFY (11.78 mgd on annual average basis).

However, if the minimum obligations under the Prado Settlement are lowered to 34,000 AFY, then the 13,420 AFY shall be reduced to 12,420 AFY (10.88 mgd on annual average basis). Please note that the City has the option to discharge more during rainy days than during peak demand days.

A copy of the referenced agreement is provided in **Appendix B.**

3.3.3 Hidden Valley Wetlands Enhancement Project

The HVWEP consisting of several unlined wetlands ponds, Treats about 13 mgd of the RWQCP final effluent for further nitrogen removal. Nitrogen is removed by plant uptake. About 3 mgd of water is lost to evaporation and seepage. Therefore, about 10 mgd of the wetlands final effluent joins the Santa Ana River through surface flow. The City could pump this water for non-potable uses, but may prefer to leave it in the Santa Ana River to meet obligations related to Prado Settlement.

3.3.4 Recycled Water Availability for Non-Potable Uses

In summary, currently about 32 mgd of recycled water is available for both non-potable uses and ground water recharge.

Considering the City's obligations associated with the Prado Settlement (maximum 13.38 mgd) and potential losses at the HVWEP (about 3 mgd), about 16 mgd on annual average basis is available for the non-potable water uses discussed in the following section of this master plan.

Considering the projected population growth in the RWQCP service area, including population growth in the City, Jurupa, Rubidox, and Edgemont communities, the recycled water availability is likely to grow with time. However, to be conservative this master plan has considered only 16 mgd available for non-potable water uses.

3.4 RWQCP EFFLUENT (RECYCLED WATER) QUALITY

The RWQCP produces high quality effluent, which consistently exceeds the Title 22 requirements. The final effluent is being used for water recycling and is suitable for additional recycled water uses.

Tables 3-2 through 3-5 summarize the major effluent quality parameters.

Table 3-2
2001 Annual Summary of Suspended Solids, BOD & COD Effluent Monitoring Data (1)

Parameter:	SusSolids	SusSolids	SusSolids	SusSolids	SusSolids	BOD	BOD	BOD	BOD	BOD	COD
Units:	mg/l	mg/l	lbs/day	lbs/day	% red	mg/l	mg/l	lbs/day	lbs/day	% red	mg/l
Limits	20	30	6,672	10,008	85	20	30	6,672	10,008	85	
	avg mnth	avg wkly	avg mnth	avg wkly		avg mnth	avg wkly	avg mnth	avg wkly		
Month	**MONTHLY AVERAGES**										
January	<2	<2	282	283	99.5	<2	<2	454	719	99.2	16
February	<2	<2	<533	<533	99.5	<2	<2	<533	<533	99.3	17
March	<2	<2	<533	<533	99.1	<2	<2	<533	<533	99.1	17
April	<2	<2	<533	<533	99.3	<2	<2	<533	<533	99.1	17
May	<2	<2	661	674	98.8	<2	<2	432	426	98.9	21
June	2	<2	609	553	98.9	2	<2	511	448	99.1	*
July	5	5	1225	1275	98.0	3	3	715	746	98.7	*
August	<2	<2	<518	<518	99.2	<2	<2	<518	<518	99.0	*
September	<2	<2	<568	<568	99.5	<2	<2	<568	<568	99.3	*
October	<2	<2	<576	<576	99.6	<2	<2	<576	<576	99.4	*
November	<2	<2	<572	<572	99.6	<2	<2	<572	<572	99.4	*
December	<2	<2	<564	<564	99.7	<2	<2	<564	<564	99.1	*
	ANNUAL SUMMARY										
Min	2	<2	0	37	95	<2	<2	241	264	98.2	10
Max	10	3	2,590	885	100	4	3	1,058	787	100.0	40
Avg	2.5	1	346	346	99.4	1.9	1.2	451	446	99.2	17
Violations	0	0	0	0	0	0	0	0	0	0	0

(1) Ref: RWQCP 2001 Annual Report

Table 3-2 (Continued)
2001 Annual Summary of Suspended Solids, BOD & COD Effluent Monitoring Data [1]

Parameter:	Flow	ECond	pH	pH	Cl2 Res	Turbidity	Turbidity	Coliform	Coliform	NH_3-N
Units:	MGD	μmhos/cm	SU	SU	mg/l	NTU	NTU	MPN	MPN	mg/l
Limits					0.1 max		≯5	2.2		5
		mnthly avg	6.5 min	8.5 max	[99%]	2	[5%]	7D med max	23 max	avg mnthly
Month	**MONTHLY AVERAGES & MINIMUMS/MAXIMUMS OF pH & COLIFORM**									
January	**32.11**	**928**	**6.57**	**7.23**	**<01**	**0.88**	**0**	**<2**	**4**	**0.20**
February	**32.84**	**920**	**6.71**	**7.17**	**<01**	**0.63**	**0**	**<2**	**2**	**0.20**
March	**32.60**	**929**	**6.71**	**7.10**	**<01**	**0.68**	**0**	**<2**	**23**	**0.20**
April	**31.78**	**923**	**6.68**	**8.32**	**<01**	**0.77**	**0**	**<2**	**4**	**0.20**
May	**31.24**	**937**	**6.71**	**7.13**	**<01**	**0.57**	**0**	**<2**	**2**	**0.30**
June	**31.21**	**921**	**6.76**	**7.27**	**<01**	**0.50**	**0**	**<2**	**13**	**0.30**
July	**31.17**	**924**	**6.50**	**7.21**	**<01**	**0.63**	**0**	**<2**	**2**	**0.13**
August	**31.05**	**919**	**6.84**	**7.24**	**<01**	**0.45**	**0**	**<2**	**2**	**0.38**
September	**31.83**	**922**	**6.51**	**7.48**	**<01**	**0.46**	**0**	**<2**	**2**	**0.60**
October	**32.46**	**917**	**6.62**	**7.16**	**<01**	**0.46**	**0**	**<2**	**2**	**0.30**
November	**32.45**	**926**	**6.50**	**7.50**	**<01**	**0.54**	**0**	**<2**	**23**	**0.38**
December	**31.60**	**960**	**6.50**	**7.00**	**<01**	**0.76**	**0**	**<2**	**2**	**1.10**
	ANNUAL SUMMARY									
Min	**23.52**	**659**	**6.41**	**6.61**	**<01**	**0.29**	**0**	**<2**	**2**	**<0.1**
Max	**38.96**	**990**	**7.36**	**8.32**	**1.88**	**1.52**	**0**	**2**	**23**	**3.9**
Avg	**31.85**	**928**	**6.82**	**7.03**	**0.02**	**0.61**	**0**	**<2**	**<2**	**0.08**
Tot	**11,626.23**									
Violations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

(1) Ref: RWQCP 2001 Annual Report

Table 3-3
Potable Water - Weighted Average Constituent Concentrations[1]

12 MONTH AVE. DATA				1 MONTH AVERAGE DATA						
DATE	POTABLE WATER TDS	EFFLUENT TDS	INCREMENT	TDS	Cl	SO_4	HARD	Na	NO_3	B
01/01	331	531	200	322	30	54.1	176	37	20.5	0.084
02/01	332	524	192	340	33	56.4	187	40	22.6	0.083
03/01	332	518	186	327	31	55.4	179	39	20.4	0.083
04/01	329	515	186	317	29	56.6	179	38	20.4	0.078
05/01	330	515	185	328	30	54.1	189	40	23.0	0.080
06/01	329	516	186	326	31	53.2	188	38	23.3	0.085
07/01	329	513	184	326	31	52.9	187	39	23.5	0.079
08/01	329	518	189	328	31	53.4	190	39	23.8	0.078
09/01	329	521	192	332	31	54.6	189	39	23.1	0.078
10/01	330	524	194	334	31	54.2	189	39	23.2	0.077
11/01	330	527	197	328	30	57.3	183	39	21.5	0.081
12/01	328	532	204	332	32	57.8	185	41	20.3	0.082

(1) Ref: RWQCP 2001 Annual Report

Table 3-4
RWQCP Effluent Monitoring Part I

Constituent	12-month Avg-Limit (mg/l)	12-month Average (mg/l)	# Exceeded	12-month Avg Emission Rate Limit (lbs/day)	12-month Avg Emission Rate Value (lbs/day)
Total Filtrable Residue	650	531	0	216,840	140,629
Total Hardness	275	207	0	91,740	54,797
Chloride	140	88	0	46,704	23,342
Sodium	110	91	0	36,696	24,370
Sulfate	125	85	0	41,700	21,718
Boron	0.75	0.4	0	250	103
Fluoride	1	0.4	0	334	121
Barium	1	0.02	0	334	6
Iron	0.3	<0.10	0	100	<27
Manganese	0.05	<0.02	0	17	<5
Total Inorganic Nitrogen *(Note 1)*	13	10.1	0	5,004	2,690

Table 3-5
RWQCP Effluent Monitoring on Part II

	Max Daily Limit (µg/l)	Max Daily Value (µg/l)	# Exceeded	Avg Monthly Limit (µg/l)	Avg Monthly Value (µg/l)	# Exceeded
Chromium (VI) *	16	<15	0	11	<15	0
Mercury	2.4	<0.5	0			
Selenium	20	<14	0	5	<14	0
Silver	13.1	<16	0			
Total Recoverable Cadmium	19	<15	0	4.4	<15	0
Total Recoverable Copper	84	22	0	53	19	0
Total Recoverable Lead	1040	<26	0	77	<26	0

	Daily Mass Rate Limit (lbs/day)	Max Daily Mass Rate (lbs/day)	# Exceeded	Avg Monthly Mass Rate Limit (lbs/day)	Avg Monthly Mass Rate (lbs/day)	# Exceeded
Chromium (VI) *	5	<3.8	0	4	<3.8	0
Mercury	0.8	<0.2	0			
Selenium	7	<3.6	0	2	<3.6	0
Silver	4	<4	0			
Total Recoverable Cadmium	6	<3.8	0	1	<3.8	0
Total Recoverable Copper	28	6	0	18	5	0
Total Recoverable Lead	347	<6.6	0	26	<6.6	0

Table 3-6
Effluent Monitoring on January 16, 2001

	Sample Date	Monthly Average (mg/l)	Daily Max (mg/l)	Sample Type
Total Organic Carbon	01/16/2001	7.7		Comp
Carbonate	01/16/2001	0		Comp
Bicarbonate	01/16/2001	150		Comp
Calcium	*		64	Comp
Magnesium	*		11.7	Comp
Specific Cond. in umhos/cm	CONTINUOUS	928	952	Cont
Ammonia nitrogen	*	0.2	Limit = 5.0 mg/l monthly avg	Grab

Table 3-7
Influent Monitoring on January 16, 2001

	Monthly Average		Daily Max		Daily Min	
Ammonia Nitrogen		mg/l	28.1	mg/l		
Total Inorganic N		mg/l	27.3	mg/l		
TDS	579	mg/l		mg/l		
Specific Conductivity	1163	umhos/cm	1242	umhos/cm		
pH			8.92	S.U.s	6.13	S.U.s

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Section 4
Recycled Water Market Analysis

PARSONS

SECTION 4
RECYCLED WATER MARKET ANALYSIS

City of Riverside (City) prepared a Technical Memorandum on Water Reclamation (TM-2 of the 1992 Master Plan Update) in 1992 to establish the framework for a water recycling system. This section updates the recycled water market survey and assessment (Chapter 4 of TM-2) and includes any changes in demand, and addition/ deletion of potential users. The market analysis focuses on major potential users and their potential contribution to the Phase I project distribution system. The market assessment results will become the basis for the development of this report.

4.1 EXISTING RECYCLED WATER USES

The City currently serves recycled water from the Regional Water Quality Control Plant (RWQCP) to the following three existing users for landscape irrigation:

- Van Buren Golf Center (Sky Link Executive Golf Course)
- Toro Manufacturing Company
- Urban Forest

Table 4-1 summarizes the existing recycled water consumption (November 2001 data) and presents the estimated demands of these users. The estimated demands are approximately 290 acre-feet per year (AFY). The recycled water utilization by these users is anticipated to be stable and should not vary too much in the future. These existing users installed their own pipeline distribution system. The Van Buren Golf Center currently pays about $80/AF for golf course irrigation with recycled water. The Urban Forest irrigates landscape median twice a week on Van Buren/Jurupa (just before the Van Buren Bridge) therefore is not charged for recycled water usage. Toro Manufacturing Company uses recycled water for industrial processing and pays a lower rate of $6/AF.

Table 4-1
City of Riverside Existing Recycled Water Reuse
Recycled Water Usage in November 2001[1]

Facility	Maximum (gpd)	Minimum (gpd)	Average (gpd)	Estimated Demand (AFY)
Van Buren Golf Center (Sky Link Executive Golf Course)	335,000	14,000	173,373	195
Urban Forest	4,550	0	921	25[3]
Toro Manufacturing Company	---	---	62,488 [2]	70

(1) Information is from the RWQCP
(2) Estimated value based on telecom with Toro Manufacturing staff
(3) Including Van Buren Median & Frontage usage

4.2 POTENTIAL RECYCLED WATER USES

The Title 22 effluent produced from the RWQCP is suitable for a variety of reuses, including the following:

Landscape Irrigation

- Parks and recreation centers
- School yards and athletic fields
- Freeway medians and street median strips
- Golf courses
- Churches and cemeteries
- Areas around residential/commercial/industrial developments

Recreational Uses –

- Recreational impoundments
- Ornamental landscape uses and decorative water features (e.g. fountains, reflecting pools, waterfalls, etc.)

Agricultural Uses –

- Food crops
- Harvested feed, fiber and seed
- Orchards and vineyards
- Pasture, nursery and sod, etc.

Industrial/Commercial Uses –

- Industrial process water
- Cooling water
- Vehicle/window washing
- Mixing water for pesticides, herbicides, liquid fertilizers, etc.
- Dust control
- Concrete production
- Fire protection
- Other miscellaneous uses

There are many other potential uses for recycled water, as outlined in the Title 22 guidelines (**Table 4-2**). Many of the identified alternative uses are more occasional or intermittent in nature, such as dust control, fire fighting, flushing sewers, for example. Some uses can provide constant demands throughout the year, such as toilet flushing and groundwater recharge, if feasible for implementation.

Table 4-2

Recycled Water Uses Allowed* In California

This summary is prepared for WateReuse Association, from the December 2, 2000, Title-22 adopted Water Recycling Criteria, and supersedes all earlier versions.

Use of Recycled Water	Treatment Level: Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Irrigation of:				
Food crops where recycled water contacts the edible portion of the crop, including all root crops	Allowed	Not allowed	Not allowed	Not allowed
Parks and playgrounds	Allowed	Not allowed	Not allowed	Not allowed
School yards	Allowed	Not allowed	Not allowed	Not allowed
Residential landscaping	Allowed	Not allowed	Not allowed	Not allowed
Unrestricted-access golf courses	Allowed	Not allowed	Not allowed	Not allowed
Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	Allowed	Not allowed	Not allowed	Not allowed
Food crops, surface-irrigated, above-ground edible portion, and not contacted by recycled water	Allowed	Allowed	Not allowed	Not allowed
Cemeteries	Allowed	Allowed	Allowed	Not allowed
Freeway landscaping	Allowed	Allowed	Allowed	Not allowed
Restricted-access golf courses	Allowed	Allowed	Allowed	Not allowed
Ornamental nursery stock and sod farms with unrestricted public access	Allowed	Allowed	Allowed	Not allowed
Pasture for milk animals for human consumption	Allowed	Allowed	Allowed	Not allowed
Nonedible vegetation with access control to prevent use as a park, playground or school yard	Allowed	Allowed	Allowed	Not allowed
Orchards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Vineyards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Non food-bearing trees, including Christmas trees not irrigated less than 14 days before harvest	Allowed	Allowed	Allowed	Allowed
Fodder and fiber crops and pasture for animals not producing milk for human consumption	Allowed	Allowed	Allowed	Allowed
Seed crops not eaten by humans	Allowed	Allowed	Allowed	Allowed
Food crops undergoing commercial pathogen-destroying processing before consumption by humans	Allowed	Allowed	Allowed	Allowed
Ornamental nursery stock, sod farms not irrigated less than 14 day before harvest	Allowed	Allowed	Allowed	Allowed
Supply for impoundment:				
Nonrestricted recreational impoundments, with supplemental monitoring for pathogenic organisms	Allowed**	Not allowed	Not allowed	Not allowed
Restricted recreational impoundments and publicly accessible fish hatcheries	Allowed	Allowed	Not allowed	Not allowed
Landscape impoundments without decorative fountains	Allowed	Allowed	Allowed	Not allowed
Supply for cooling or air conditioning:				
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist	Allowed***	Not allowed	Not allowed	Not allowed
Industrial or commercial cooling or air conditioning not involving cooling tower, evaporative condenser, or spraying that creates a mist	Allowed	Allowed	Allowed	Not allowed

WateReuse Association 1 (916) 442-2746 www.watereuse.org/h2o

Table 4-2 (Continued)

Recycled Water Uses Allowed* In California

This summary is prepared for **WateReuse Association**, from the December 2, 2000, Title-22 adopted **Water Recycling Criteria**, and supersedes all earlier versions.

Use of Recycled Water	Treatment Level			
	Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Other uses:				
Groundwater Recharge	**Allowed under special case-by-case permits by RWQCBs******			
Flushing toilets and urinals	**Allowed**	Not allowed	Not allowed	Not allowed
Priming drain traps	**Allowed**	Not allowed	Not allowed	Not allowed
Industrial process water that may contact workers	**Allowed**	Not allowed	Not allowed	Not allowed
Structural fire fighting	**Allowed**	Not allowed	Not allowed	Not allowed
Decorative fountains	**Allowed**	Not allowed	Not allowed	Not allowed
Commercial laundries	**Allowed**	Not allowed	Not allowed	Not allowed
Consolidation of backfill material around potable water pipelines	**Allowed**	Not allowed	Not allowed	Not allowed
Artificial snow making for commercial outdoor uses	**Allowed**	Not allowed	Not allowed	Not allowed
Commercial car washes, not heating the water, excluding the general public from washing process	**Allowed**	Not allowed	Not allowed	Not allowed
Industrial process water that will not come into contact with workers	**Allowed**	**Allowed**	**Allowed**	Not allowed
Industrial boiler feed	**Allowed**	**Allowed**	**Allowed**	Not allowed
Nonstructural fire fighting	**Allowed**	**Allowed**	**Allowed**	Not allowed
Backfill consolidation around nonpotable piping	**Allowed**	**Allowed**	**Allowed**	Not allowed
Soil compaction	**Allowed**	**Allowed**	**Allowed**	Not allowed
Mixing concrete	**Allowed**	**Allowed**	**Allowed**	Not allowed
Dust control on roads and streets	**Allowed**	**Allowed**	**Allowed**	Not allowed
Cleaning roads, sidewalks and outdoor work areas	**Allowed**	**Allowed**	**Allowed**	Not allowed
Flushing sanitary sewers	**Allowed**	**Allowed**	**Allowed**	**Allowed**

* Refer to the full text of the December 2, 2000 version of Title-22: California Water Recycling Criteria. This chart is only an informal summary of the uses allowed in this version.

The complete and final 12/02/2000 version of the adopted criteria can be downloaded from : <http://www.dhs.ca.gov/ps/ddwem/publications/Regulations/recycleregs_index.htm>

** With "conventional tertiary treatment". Additional monitoring for two years or more is necessary with direct filtration.

*** Drift eliminators and/or biocides are required if public or employees can be exposed to mist.

**** Refer to Groundwater Recharge Guidelines, available from the California Department of Health Services.

Prepared by Bahman Sheikh and edited by EBMUD Office of Water Recycling, who acknowledge this is a summary and not the formal version of the regulations referenced above.

Toilet flushing with recycled water is becoming more prevalent in Southern California (e.g. Irvine Ranch Water District). However, dual plumbing with cross-connection prevention and backflow protection devices would be required to protect potable water. Therefore, this is generally implemented for new buildings. Retrofitting existing facilities for dual plumbing is costly and cumbersome. Similarly, it would require extensive geotechnical investigation to determine the feasibility of groundwater recharge projects. For the purpose of this study, only landscape irrigation, agricultural irrigation, recreational, commercial and industrial uses will be addressed in the market survey and assessment.

4.3 MARKET SURVEY

The market survey compiled for this project consist of major potential users within Phase I project boundary, which includes a 70 percent probability capture of the City users, as well as users in Jurupa Community Service District (JCSD) and Rubidoux Community Service District (RCSD) that are located around the City boundaries, as shown on **Figure 4-1**.

The City dictates that the market survey be limited within a two-mile radius of the RWQCP for the Phase I Feasibility Study. The major potential recycled water users were identified and compiled using information contained in the City's 1992 Master Plan Update TM-2, Thomas Bros. Maps, JCSD Indian Hills Water Recycling Project Report and field survey by Parsons.

Letters and questionnaire forms were sent to existing and potential recycled water users within the City to gather information to update projected demands and assess degree of future customer interest. It was anticipated that these identified users would have the most interest in the distribution systems developed in this study.

4.3.1 Classification of Potential Users

The market survey and assessment focuses on the users, which will significantly impact the recycled water distribution system alignment and project economic feasibility. In order to quantify and organize total potential demands, the users have been categorized as follows:

- **Major Potential Users.** Major users have a potential recycled water demand of 10 AFY or more. These users are the focus of the market survey since they represent the majority of potential reuse and dictate the alignment of the distribution system. Major potential users are further distinguished as existing or future consumers.
    - **Existing Facilities.** These users include facilities that are either currently in place or will be in business in the near-term. Near-term denotes facilities scheduled for development and water connection in the next five years. These facilities are typically in a construction or final planning stage.
    - **Future/Planned Facilities.** Accordingly, these users denote facilities in the preliminary or conceptual planning stage. Facility development will not occur in the next five years.

LEGEND

User Symbol		Potential Reuse (Acre Feet / Year)
Existing Facility	Future Facility	
▲	△	10 - 49
■	□	50 - 99
●	○	100 - 199
◆	◇	200 - 399
⬣	⬡	400 Plus
		City of Riverside Boundary

GRAPHIC SCALE

0 6000' 12000'

SCALE: 1" = 6000'

FIGURE 4-1 POTENTIAL RECYCLED WATER USERS

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY AND CITYWIDE MASTER PLAN

SEPTEMBER 2003

H:\Client\Riversid_SAOW\7472A00\Rpt\Volume 07\Appendix\City Of Riv Recycled Water Phase 1.pdf

- **Minor Potential Users.** Minor users include users with a potential recycled water demand less than 10 AFY. Minor users include small parks and schoolyards and small residential, commercial, and industrial landscape irrigation areas. Since minor users are prevalent throughout the City, they do not influence the alignment of the recycled water distribution system and are not specifically identified in this market survey. Furthermore, it may not be economically feasible to serve many minor users due to remoteness from major reuse areas or prohibitive on-site repiping costs for small industrial users. While minor industrial users are not included in the market assessment, some minor irrigation users near main recycled water transmission lines can be served. Therefore, the Market Assessment section of this chapter incorporates some potential minor irrigation consumption when assessing market demands.

4.3.2 Survey of Major Potential Users

A comprehensive market survey was conducted throughout the City to identify the potential major recycled water users. Many potential users were contacted to verify water consumption, estimate potential reuse, and assess the general sentiment on water recycling. As mentioned earlier, market survey was focused on the major users who could have a significant effect on distribution system alignment and project economics. The market survey involved data collection from the following categories:

Landscape Irrigation. This irrigation market includes cemeteries, universities, colleges, schools, golf courses, parks, hospitals, airports, sports complex, nursery, greenbelts, commercial, commercial and industrial users. An initial database of potential users was developed from the City's 1992 Master Plan Update (TM-2). The following sources provided information to update and expand user base and estimate potential demands:

- City of Riverside – Park & Recreation, Public Works, Public Utilities, and Planning Departments
- Riverside and Alvord Unified School Districts
- Contacts with major potential users
- Various reports
- City maps and Thomas Brothers Map Guide

Selected agencies representing cemeteries, universities, colleges, schools, parks, golf courses, hospitals, and industries were contacted to obtain information about their current water use and future potential recycled water uses.

Agricultural Irrigation. No market survey was conducted for the agricultural users. The City has substantial agricultural acreage, primarily orange groves, which are presently served by the Gage Canal, Riverside Canal and some potable wells. These users are ideal candidates for recycled water. The water pumped from various wells to the canal is currently distributed to agricultural users by Gage Canal Company at a relatively low rate. It may be the City's best interest to replace the potable quality water in the Gage Canal with recycled water to serve these sites in the future.

Agricultural irrigation is included in this market assessment for potential recycled water demand but is not considered for the development of the core distribution system and cost analysis.

Industrial. Several industries were contacted to obtain their potential interest in using recycled water for irrigation and/or processing water. Additional input from the RWQCP's Compliance and Monitoring Group was also obtained to update the reuse potential of those industries previously identified on the 1992 list.

Commercial. No specific information was available on potential commercial reuse. An estimate was generated for the market assessment based on the City's 1992 Master Plan Update, field survey, and previous experience.

4.3.3 User Codes and Classifications

Each major potential user was allocated a unique code number with the first digit corresponding to the type of facility (golf course, park, industry, etc.). Major potential users are categorized as shown in **Table 4-3** below.

Table 4-3
Potential Recycled Water User Code and Classification

Code	Description of Users
100 Series	Cemeteries
200 Series	Colleges, Universities, Schools
300 Series	Golf Courses
400 Series	Parks
500 Series	Miscellaneous (airport, nurseries, etc.)
600 Series	Freeway Irrigation and City Greenbelts
700 Series	Commercial
800 Series	Industrial - Landscape Irrigation
900 Series	Industrial - Process

Larger users are located and represented symbolically on the map figures of this report based on their potential reuse, as shown in **Table 4-4**.

Table 4-4
Symbolical Representation

Symbol	Potential Recylced Water Users (Acre Feet/Year)
▲	10 - 49
■	50 - 99
●	100 - 199
◆	200 - 399
⬢	400 or more

The potential users who currently exist or will be in business within the next 5 years are identified with solid colored symbols while future facilities are represented with hollow symbols. This procedure identifies general growth areas and facilitates distribution system layout, phasing and extensions.

4.4 MARKET ASSESSMENT

Data gathered in the market survey included existing and major potential recycled water users, type of recycled water use, specific water quality requirements, estimated demands and schedule of water usage for irrigated areas.

The following were steps undertaken to assess potential recycled water users market for the Phase I Project:

1. Evaluated several alternatives and identified Phase I project boundary based on major potential recycled water users around the vicinity of RWQCP.
2. Sent letters and recycled water user survey forms to potential users to verify and update demands.
3. Conducted field investigations within Phase I project boundary to ensure accuracy in demands of identified major potential users.
4. Developed understanding for on-site conversion needs from potable to recycled water.
5. Performed economical analysis on various alternatives to identify the most cost effective recommendation for the project.

4.4.1 Average Annual Demand

Tables 4-5, 4-6 and 4-7 summarize the average annual demand for the potential major recycled water users within the City, and along the northerly and southerly boundaries, respectively. Their ID code number, acreage (if available) and potential reuse volume are also included in these tables. Note that some of the schools within the Riverside and Alvord Unified School Districts are located outside of City limit (see Figure 4-1) but are grouped together with the other schools in Table 4-5.

The potential landscape irrigation demands are based on actual water consumption data if available. Otherwise, demand is calculated as 2.5 AFY per irrigated acre based on the findings of previous area studies. This multiplier was previously verified by an investigation of water consumption by the City Parks and Recreation Department.

The potential commercial reuse demand is an estimated value. The potential industrial demands are based on actual consumption data provided by the water utilities department. Location of these potential users can be found on Figure 4-1.

4.4.2 Potential User Demands by Category Within the City

Cemeteries. Three cemeteries within the City were identified and assessed with an estimated total potential demand of 253 AFY. Crestlawn Memorial Park currently uses non-potable ground water for irrigation.

Table 4-5
Recycled Water Average Annual Demand
Major Potential Users within the City/School Districts

ID Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)
	CEMETERIES			
101	Crestlawn Memorial Park	190	35	88
102	Evergreen Memorial Park	25	22	55
103	Olivewood Memorial Park	78	35	110
	SUBTOTAL			**253**
	SCHOOLS			
	Colleges/Universities			
201	California Baptist University	65	23	60
202	California School for the Deaf	90	32	80
203	La Sierra University	--	90	225
204	Riverside Community College	115	40	100
205	University of California Riverside	1,140	320	480
				945
	Riverside Unified School District			
206	Adams Elementary School	8	4	10
207	Alcott Elementary School	10	5	13
208	Arlington High School	47	24	59
209	Bethel Christian High School	20	10	25
210	Bryant Elementary School	3	1	3
211	Castle View Elementary School	12	6	15
212	Central Middle School	21	11	26
213	Chemawa Middle School	21	11	26
214	Earhart Middle School	20	15	38
215	Emerson Elementary School	10	5	13
216	Franklin Elementary School	10	5	13
217	Fremont Elementary School	10	5	13
218	Gage Middle School	18	9	23
219	Grant Elementary School	10	2	5
220	Harrison Elementary School	15	8	19
221	Hawthorne Elementary School	6	3	6
222	Highgrove Elementary School	10	5	13
223	Highland Elementary School	10	5	13
224	Hyatt Elementary School	8	4	10
225	Jackson Elementary School	11	6	14
226	Jefferson Elementary School	10	5	13
227	King High School	50	35	88
228	Liberty Elementary School	6	2	5
229	Lincoln High (Alternative School)	4	2	4
230	Longfellow Elementary School	5	0.3	1
231	Madison Elementary School	10	5	13
232	Magnolia Elementary School	9	5	11
233	Monroe Elementary School	10	5	13
234	Mt View Elementary School	13	7	16
235	North High School	43	22	54
236	Notre Dame High School	20	10	25
237	Pachappa Elementary School	7	3	6

Table 4-5 (Continued)
Recycled Water Average Annual Demand
Major Potential Users within the City/School Districts

ID Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)
238	Poly High School	40	20	50
239	Raincross High/Ed Options Center (Alt. Sch.)	7	1	2
240	Ramona High School	54	27	68
241	Riverside Adult School (Alt. School)	6	1	1
242	Riverside Christian High School	20	10	25
243	Rivera Elementary School	10	1	2
244	Sierra Middle School	20	10	25
245	Sunshine Elementary School	10	0.1	0.3
246	Taft Elementary School	10	5	13
247	University Heights Middle School	18	9	23
248	Victoria Elementary School	6	3	6
249	Washington Elementary School	10	5	13
				833
	Alvord Unified School District			
251	Alvord High School	4	2	5
252	Arizona Intermediate School	20	10	25
253	Arlanza Elementary School	12	6	15
254	Colette Elementary School	10	5	13
255	Foothill Elementary	11	6	14
256	La Granada Elementary	7	4	10
257	La Sierra Academy High School	20	10	25
258	La Sierra High School	46	23	58
259	Loma Vista Intermediate School	22	11	28
260	McAuliffe Elementary School	10	5	13
261	Myra Linn Elementary School	8	4	10
262	Norte Vista High School	47	24	59
263	Orrenmaa Elementary School	10	5	13
264	Promenade Elementary School	10	5	13
265	Rosemary Kennedy Elementary School	10	5	13
266	Sherman Indian High School	85	40	100
267	Terrace Elementary School	10	5	13
268	Twinhill Elementary School	11	6	14
269	Valley View Elementary School	10	5	13
270	Wells Intermediate School	20	10	25
				478
	SUBTOTAL			**2,256**
	Future Schools			
271	Ysmael Village Elementary School	--	6	15
272	Alessandro Heights Elem School	10	5	13
273	Lake Hills Elementary School	10	5	13
274	Mockingbird Canyon Elementary	10	5	13

Table 4-5 (Continued)
Recycled Water Average Annual Demand
Major Potential Users within the City/School Districts

ID Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)
275	Orangecrest 2 Elementary School	12	6	15
276	Orangecrest High School	54	27	68
277	Orangecrest Middle School	21	11	26
278	South Woodcrest Elem School	10	5	13
	SUBTOTAL			**176**
	GOLF COURSES			
301	Canyon Crest Country Club	152	120	300
302	Fairmount Park Golf Course	100	80	200
303	Ingalls	35	30	75
304	Riverside Golf Club	108	86	215
305	Van Buren Golf Center (Sky Links Golf Course)	--	--	195
306	Victoria Club	120	100	350
	SUBTOTAL			**1,335**
	Future Golf Courses			
307	Tequesquite Landfill Golf Course	100	80	200
308	Rancho La Sierra	100	80	200
	SUBTOTAL			**400**
400	**PARKS**			
401	Arlington	4	4	10
402	Bergamont	5	2	6
403	Bobby Bonds Park/Cesar Chavez Ctr.	15	15	38
404	Bordwell Park/Stratton Center	23	23	58
405	Bryant, John/Aelanza Center	22	22	55
406	Carlson	1.8	1.4	4
407	Castleview	26.6	1.25	3
408	Castleview Park Site	27	27	68
409	Collett	6	4	9
410	Dario Vasquez	1.8	1.03	3
411	Don Derr Park	24	24	61
412	Don Jones	6	6	15
413	Don Lorenzi Sport Camp	9	9	22
414	Evans, Samuel C.	12	12	30
415	Fairmount	165	70	175
416	Frost Reservoir	10	10	25
417	Harrison	6	6	15
418	Highland	7	7	17
419	Hunt Park/ Renck Center	14	14	35
420	Hunter	36	26	65
421	Islander	28	24	60
422	La Sierra Park / La Sierra Center	28	28	70
423	Lincoln	4	3	7

Table 4-5 (Continued)
Recycled Water Average Annual Demand
Major Potential Users within the City/School Districts

Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)
424	Low	1	1	3
425	Martha Mclean Anza Narrows	--	200	500
426	Mount Vernon	8	8	20
427	Mtn. View	6	6	15
428	Myra Linn	9	9	23
429	Newman	0.4	0.4	1
430	Nichols Park / Joyce Jackson Center	17	17	43
431	North	1.4	1.4	4
432	Orange Terrace Community	--	15	38
433	Patterson	5	5	11
434	Rancho Loma	7	6	14
435	Reid Park / Ruth Lewis Center	41	29	73
436	Rutland	9	9	23
437	Shamel	10	10	25
438	Swanson	1	1	2
439	Taft	7	2	4
440	Thundersky	12	10	26
441	Villegas Park / Ysmael Villegas Ctr.	18	18	45
442	Washington	4	4	10
443	White Park / Dales Center	6	6	15
	SUBTOTAL			**1,744**
	Future Parks			
444	Alessandro Heights	10	10	25
445	Andulka	37	37	93
446	Campbell & Golden	10	10	25
447	Challen Hill	34	34	85
448	Hillside Ave	10	10	25
449	Hunter Business	10	10	25
450	Landfill Area Park	40	40	100
451	Lusk Highlander	10	10	25
452	Mitchell Ave	6	6	15
453	Orange Terrace Comm.	21	21	53
454	Orangecrest #2	4	4	10
455	Prenda Reservoir	25	15	38
456	Quail Run	27	27	68
457	Rancho La Sierra	60	60	150
458	River Ranch	10	10	25
459	Tequesquite Arroyo	43	43	108
460	Victoria - Cross	10	10	25
	SUBTOTAL			**895**
	MISCELLANEOUS USES			
501	Kaiser Permanente Hospital	40	12	30
502	Parkview Comm. Hosp. Med. Ctr.	--	5	13

Table 4-5 (Continued)
Recycled Water Average Annual Demand
Major Potential Users within the City/School Districts

ID Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)
503	Riverside Municipal Airport	304	50	125
504	Riv. Community Hospital	--	--	10
505	Teen Challenge International	--	10	25
506	AB Brown Sports Complex	47	24	59
507	Wholesale Nursery	10	3	6
	SUBTOTAL			**268**
	Future Miscellaneous Uses			
503	Riverside Municipal Airport	304	100	250
508	Riverside Pkwy @ La Sierra University	--	--	20
	SUBTOTAL			**270**
	GREENBELTS			
601	Caltrans Hwy 60 (2 Mi)	--	--	71
602	Caltrans Hwy 215 (2 Mi)	--	--	71
603	Caltrans Hwy 91 (12 Mi)	--	--	213
604	City Medians	165	165	413
605	Van Buren Median & Frontage (Urban Forest)	-	10	25
	SUBTOTAL			**793**
	Future Greenbelts			
604	City of Medians	40	40	**100**
	COMMERCIAL			
	Existing Commercial Establishments	--	--	**500**
	Future Commercial Establishments	--	--	**300**
	INDUSTRIES - LANDSCAPE IRRIGATION			
801	Bourns, Inc.	--	5	13
802	Caddock Electronics, Inc.	--	--	6
803	Corona College Heights	--	--	6
804	Layton Softwater	--	--	6
805	Progressive Wheel	--	--	6
806	Toro Irrigation (Manufacturing Company)	--	--	70
807	Dow Jones & Company, Inc.	--	--	50
808	Airport Industrial Area	--	--	100
809	La Sierra Industrial Area	--	5	13
810	Hunter Park Industrial Area	--	50	125
811	Residential Industrial Area	--	5	13
812	Presidential Industrial Area		6	15
	SUBTOTAL			**422**
	INDUSTRIES - PROCESS			
901	Alumax Mill	--	--	74
902	Bourns	--	--	12
	SUBTOTAL			**86**

Table 4-5 (Continued)
Recycled Water Average Annual Demand
Major Potential Users within the City/School Districts

ID Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)
	Future Industries - Process			
903	400 MW Power Plant (planned by PUD)	--	--	150
	Other future industries	--	--	700
	SUBTOTAL			**850**
	MINOR POTENTIAL REUSE			
	City Total	--	--	**1,000**

SUMMARY OF POTENTIAL USES

Existing		
Landscape Irrigation		6,648
Industrial Process/Commercial		1,008
Minor		1,000
SUBTOTAL		**8,656**
Future Establishments		
Landscape Irrigation		1,841
Industrial Process/Commercial		1,150
SUBTOTAL		**2,991**
GRAND TOTAL		**11,647**
	Say	**11,700**

Table 4-6
Recycled Water Average Annual Demand
Major Potential Users Along City's Northerly Boundary

ID Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)	Status*
	AREA GOLF COURSES				
309	El Rivino Country Club	90	72	180	Existing
310	India Hills Golf Course**	--	--	600	Existing
311	Jurupa Hills Country Club	110	88	220	Existing
312	Paradise Knolls Golf Course	70	56	140	Existing
	SUBTOTAL			**1,140**	
	AREA PARKS				
461	Havenview Park No. 1**	35	30	12	Existing
462	Havenview Park No. 2**	35	30	15	Existing
	SUBTOTAL			**27**	
	MISCELLANEOUS				
509	EDA Streetscape East of Camino Real & Limonite	--	--	36	Existing
510	JUSD (Linares)**	--	--	27	Existing
511	NE Corner Limonite and Clay**	--	--	9	Existing
512	W. Side Camino Real**	--	--	8	Existing
513	Camino Real South of Lamonite**	--	--	0.1	Existing
	SUBTOTAL			**80**	
	INDUSTRIES				
903	Northwest Pipe Company	--	6	25	Existing
904	Robertson Ready Mix	--	--	35	Existing
	SUBTOTAL			**60**	
	TOTAL			**1,307**	
			Say	**1,310**	

* Only existing potential users were assessed outside the City limits
** JCSD Indian Hills Water Recycling Project

Table 4-7
Average Annual Demand
Major Potential Users Along City's Southerly Boundary

ID Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)	Status*
1. USERS CURRENTLY SERVED BY GAGE CANAL AND/OR RIVERSIDE CANAL					
	AREA CEMETERIES				
104	Riverside National Cemetery	740	280	700	Existing
	SUBTOTAL			**700**	
200	**AREA SCHOOLS**				
279	Woodcrest Christian High School	20	10	25	Existing
280	Woodcrest Elementary School	10	2	4	Existing
	SUBTOTAL			**29**	
300	**AREA GOLF COURSES**				
313	March AFB Golf Course	90	72	180	Existing
	SUBTOTAL			**180**	
500	**MISCELLANEOUS**				
514	March Air Force Base	--	6	15	Existing
	SUBTOTAL			**15**	
600	**GREENBELTS**				
606	March Air Force Base	--	6	**15**	Existing
	TOTAL			**939**	
2. USERS CURRENTLY SERVED BY POTABLE WATER					
	AREA CEMETERIES				
105	Green Acres Memorial Gardens	85	55	138	Existing
	SUBTOTAL			**138**	
300	**AREA GOLF COURSES**				
314	Cresta Verde Golf Course	140	112	280	Existing
	SUBTOTAL			**280**	
	TOTAL			**418**	
	GRAND TOTAL			**1,360**	

* Only existing potential reuse was assessed outside the City limits

Schools. Five colleges/universities and two school districts were surveyed. La Sierra University has its own well. Irrigated areas for all schools were identified and assessed at 2.5 AFY per acre. The reuse potential for the colleges/universities totals 945 AFY for landscape irrigation. Existing major elementary, intermediate, and high schools have been assessed at 1,311 AFY. Future schools add another 176 AFY.

Four schools under this category has a recycled water demand equal to or greater than 100 AFY, including La Sierra University (225 AFY), Riverside Community College (100 AFY), University of California Riverside (480 AFY), and Sherman Indian High School (100 AFY).

Golf Courses. Six existing area golf courses were assessed at a total potential recycled water demand of 1,335 AFY. These existing golf courses include Canyon Crest, Fairmount Park, Ingalls, Riverside, Van Buren (Sky Links) and Victoria courses. An additional potential demand of 400 AFY is identified for two future golf courses, the Tequesquite Landfill Golf Course and Rancho La Sierra Golf Course. The Van Buren golf course is one of the three existing recycled water users in the City. All except one golf course have a demand close to or greater than 200 AFY.

Minimal amount of water is currently purchased from the City because the majority of these golf courses have their own wells. However, these potential users are still considered and are included in this market assessment.

Parks/Recreational Areas. Forty-three existing major parks/recreational areas have a total reuse potential of 1,744 AFY with an additional 895 AFY for future parks. Seventeen future major parks were identified within the City with a total area of 357 acres. Fifteen of the seventeen future parks are planned with an area larger than 10 acres. It should be noted that parks can have acreage less than 5 AFY and could be served recycled water economically.

Five of the parks/recreational areas were identified with a recycled water demand exceeding 100 AFY, including Fairmount, Martha Mclean Anza Narrows, Landfill Area Par, Rancho La Sierra, and Tequesquite Arroyo.

Miscellaneous Irrigation. This category includes irrigation at hospitals, airport, sports complex and nursery grounds. The major reuse potential in this group is Riverside Municipal Airport, which has an existing reuse demand of 125 AFY and a future demand of 250 AFY. The total potential reuse demand for this category is 268 AFY for existing facilities and 270 AFY for future facilities.

Greenbelts and Freeway Irrigation. Approximately 355 AFY is assessed for irrigating the three freeways that traverse through the City (i.e. Hwy 60, Hwy 215, and Hwy 91). The recycled water demands for irrigating the city medians are estimated to be 438 AFY for the existing facilities and 100 AFY for future facilities.

Commercial. The potential commercial users were not surveyed for recycled water use. A total estimate of 800 AFY for total commercial reuse was generated based on the City's 1992 Master Plan Update, field survey, and previous experience.

Industries Landscape Irrigation. The primary users in this group are various industries and the future 400 MW power plant planned by the City of Riverside Public

Utility Department. The user base identified a total potential users demand of 422 AFY for existing facilities and 850 AFY for future facilities.

Industries Process. Two industries in this category were identified with a total recycled water demand of 86 AFY.

Minor Potential Reuse. The minor potential reuse assessment represents a fragment of the minor nonpotable market in the City. Minor users include small greenbelts, parks, schoolyards, residential, commercial and industrial landscape irrigation areas. The minor reuse potential has been assessed at 1,000 AFY.

Agricultural Irrigation. The City owns the Gage Transmission System, which is operated by the Gage Canal Company. The present capacity of the system, as reported by the City, is approximately 30,000 gpm (43 mgd). The City owns 19000 gpm of this capacity.

Gage Canal gets 24,000 gpm from Gage well system and 6,000 gpm from the City potable wells. Out of 24,000 gpm from Gage wells, the City is stockholder for 13,000 gpm and Gage Canal Company for 11,000 gpm. Out of 11,000 gpm, the City trades with the Gage Canal for 5,400 gpm for potable uses and provides 25 percent more from the Riverside Canal system in the down stream.

The total length of the Gage Canal transmission system is approximately 54,300 linear feet. In the upper reach of the Gage Transmission Pipeline (approximately 6,500 linear feet) the pipeline increases in diameter from 24 to 30, 36, 42 and 48 inches. The remainder of the transmission pipeline varies in diameter from 48 to 60 inches. At the terminal point of the pipeline (Linden Street), a 36-inch diameter pipeline delivers potable water to the Linden and Evans Reservoirs.. Given the City's share of the Gage Canal Company and water exchange agreements, the City's continuous delivery of domestic water to the Linden and Evans reservoirs is approximately 24,400 gpm (35.6 mgd). Typically, for a period of two months in the winter, the lower Gage Canal system is taken out of service for maintenance and the entire Gage transmission capacity is available for use by the City of Riverside. All deliveries up to 27,000 gpm (39 mgd) flow by gravity through a 36-inch-diameter pipeline, which connects the turnout on Linden Street to the Linden and Evans reservoirs.

The lower reaches of the Gage Transmission system, which is used exclusively for agricultural irrigation, could be of use for excess recycled water. This utilization would reduce the amount of groundwater pumping required for irrigation.

The City operates a second canal, the Riverside Water Company Canal, that is used for irrigation water conveyance and storm water control. Non-potable wells in the Colton and Riverside groundwater basins are pumped to provide the exchange water with the Gage Canal Company, and to meet irrigation conveyance and delivery obligations with other agencies.

"Approximately 8,000 AFY of non-potable water is delivered to the Gage Canal Company through a pumping system on the Riverside Canal. An additional 6,000 AFY may be delivered to Western Municipal Water District under the terms of a 2003

agreement. In addition the Riverside Canal conveys water produced on behalf of San Bernardino Valley Municipal Water District for delivery to Orange County Water District, and water produced for delivery to Elsinore Valley Municipal Water District (the so-called Temescal Water rights)."

The agricultural demand currently met through the use of non-potable water represents a large potential market for recycled water, perhaps as much as 30,000 AFY. However, the non-potable water supply is cheap and easily accessible. Furthermore, there are a number of institutional issues related to the delivery of recycled water to these other agencies. However, the feasibility and cost effectiveness of this recycling opportunity should be explored in detail.

For the purpose of this study, the agricultural users are included in the market assessment as potential users but not considered for development of the core distribution system and cost analysis. The impact of future development in the agricultural areas must be considered as it affects water reuse.

4.4.3 Potential Recycled Water Demands Along City's Northerly Boundary

A study was done by the JCSD entitled Indian Hills Water Recycling Project which provided the potential user demand for both JCSD and RCSD. This report consists of areas currently using potable water and proposed new areas of reuse. Approximately 1,310 AFY is predicted by JCSD for potential reuse of recycled water for golf course irrigation (4 courses), park irrigation, industrial use, and other miscellaneous uses. **Table 4-6** provides detailed information of these potential users along the City's northerly boundary.

4.4.4 Additional Recycled Water Demands Along City's Southerly Boundary

The City may consider selling recycled water to downstream users (e.g. Norco, Rancho La Sierra, etc.) in the future. Among the potential water recycling opportunities along the City's southerly boundary, there are some existing users currently receiving water from either Gage Canal or Riverside Canal. Approximately 940 AFY of recycled water demand is expected from these potential users.

In addition to the above potential users currently served by the Gage Canal/Riverside Canal, other users along the City's southerly boundary currently served by potable water were also identified with a total potential recycled water demand of 440 AFY. Nearly all of the identified demands are for irrigation. **Table 4-7** provides detailed information of these potential users along the City's southerly boundary.

4.5 PEAKING FACTORS

Recycling water user demands typically vary on a monthly, daily, and hourly basis. A typical irrigation demand curve is depicted in **Figure 4-2**. Peaking factors used for the hydraulic modeling are described under Section 5.3 of this report.

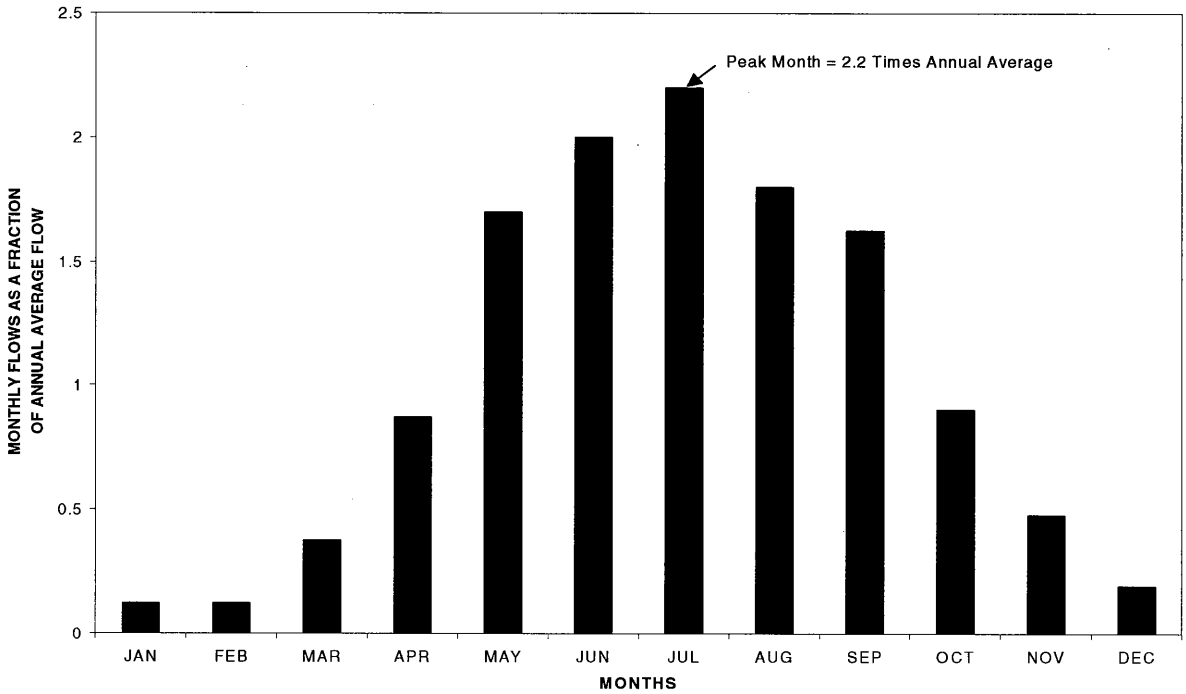


Figure 4-2
Typical Monthly Irrigation Demand

The peaking factors terminology normally used is discussed below.

- **Maximum Month Demand (MMD).** Demand is greatest during the months with low precipitation. MMD varies greatly in most arid regions due to climate changes and evapo-transpiration rates from winter to summer. MMD is important to consider for availability of plant effluent for various customers, and seasonal storage requirements. .
- **Maximum Day Demand (MDD).** MDD is important in determining on-site or off-site storage requirements to meet the demands, and available recycled water for delivery to customers. The peaking factor for MDD is generally depicted as a ratio of the MDD to the MMD.
- **Peak Hour Demand (PHD).** PHD is important in determining proper distribution system sizing (pipelines and pumping requirements). With recycled water irrigation for landscape irrigation, demands and irrigation schedules are generally restricted to nighttime irrigation, an 8- to 10-hour irrigation "window". Due to this restriction, PHD for recycled water systems is typically high compared to that for potable water systems. PHD for recycled water systems range from 1.5 to 3.0 times the MDD.

4.6 SUMMARY

Table 4-8 summarizes the City's total non potable reuse potential. Approximately 20,400 AFY of recycled water demand can be reasonably anticipated within the City limits and in the vicinity. By category, the potential reuse of recycled water for irrigation totals 12,600 AFY; the industrial process/commercial reuse is assessed at 1,800 AFY. The reuse potential for agricultural irrigation is conservatively estimated at 6,000 AFY through the replacement of pumped non-potable groundwater with recycled water in the Gage and Riverside canals.

Preliminary supply and demand analysis indicates that the 32 mgd of recycled water produced from the RWQCP would meet annual average demands. Storage facilities would be required to meet the peak monthly/daily/hourly demands.

Due to the speculative nature of current arrangements between the City of Riverside and neighboring cities, this report assumes all required water would be available from the RWQCP. No arrangement for potable water supply supplement is investigated, although minimally a potable water supply hookup will be required for emergencies.

This estimated market does not include demands within the City's 15,000 acre southerly sphere of influence.

Table 4-8
Recycled Water Average Annual Demand
Assessment of Direct Nonpotable Reuse Market

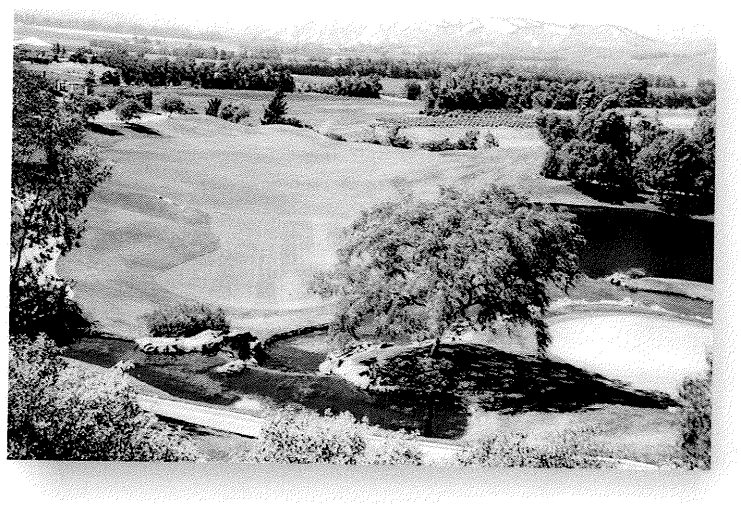
User Code	Category	Reuse Potential (AFY) Existing Establishment		Future Establishment
A.	**Within the City Limts/School Districts**			
	Landscape Irrigagation			
100	Cemeteries	253		
200	Colleges/Universities/Schools	2,256		176
300	Golf Courses	1,335		400
400	Parks	1,744		895
500	Miscellaneous	268		270
600	Freeway Irrigation and City Greenbelts	793		100
800	Industrial - Landscape Irrigation	422		
	Subtotal	7,070		
	Minor Potential Users	1,000		
	Subtotal - Landscape Irrigation	**8,070**		**1,841**
	Industrial Process/Commercial			
700	Commercial	500		300
900	Industrial - Processes	86		850
	Subtotal - Industrial Process/Commercial	**586**		**1,150**
Total Within City Limits		**8,656**		**2,991**
Total Existing and Future		**11,700**	**AFY**	
B.	**Additional Users Along City's Notherly Boundary**	**1,310**	**AFY**	
C.	**Potential User's Along City's Southerly Boundary**	**1,360**	**AFY**	
D.	**Potential Agricultural Irrigation Usage**	**6,000**	**AFY**	
E.	**Grand Total (A + B + C + D)**	**20,370**	**AFY**	
	Say	**20,400**	**AFY**	
	Jurupa Community Water District	**770**	**AFY**	**(Ref. Table 6.1)**

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Section 5

Citywide Recycled Water System



PARSONS

SECTION 5
CITYWIDE RECYCLED WATER SYSTEM

5.1 GENERAL PROJECT DESCRIPTION

The purpose of the Citywide Recycled Water Master Plan is to update the 1992 Water Reclamation Master Plan Technical Memorandum No. 2: Water Reclamation for the Regional Water Quality Control Plant Master Plan report prepared by Montgomery Watson.

This chapter discusses the City of Riverside (City) recycled water core distribution systems for users identified in Section 4. This system will provide recycled water to users throughout the City, JCSD and uses located in southerly boundaries in the Western Municipal Water District (WMWD). The core system provides an estimate of pipe sizes and footage, pipeline alignments, reservoirs and pump stations, to supply recycled water and to provide the basis for the conceptual cost estimates.

5.2 PIPELINE ALIGNMENT

The purpose of the core system alignment is not to set the specific route for the distribution system, but to identify a possible alignment, which will serve the largest users and user clusters. Site constraints such as existing water and sewer lines, traffic, and utilities may revise the proposed alignments and must be investigated during pre-design phase. The primary alignment in **Figure 5-1** is effective in the planning stage to present the reuse concept, model the system, and develop project economics.

The alignment is sensitive to the location of the largest users and clusters of users. The pipeline lengths used in the proposed system are approximate and will need to be verified during pre-design phase. Service distribution lines from the core system to each user are not included in the estimates.

The service area of the core distribution system incorporates the total potential reuse of about 20,400 AFY as detailed in Table 4-8 Section 4.

5.3 HYDRAULIC MODEL

The hydraulic model geometry and physical characteristics for the City's Recycled Water System was developed using H_2ONET v3.1 software, which includes a 24-hour simulation and performance analysis. Water demand data from potential users developed from market survey analysis in Section 4 was used to develop the proposed demands for the recycled water distribution system model.

The hydraulic model geometry and physical characteristics of the distribution system includes pipes (length, diameter, Hazen-Williams friction C-factor), pumps (hydraulic head, pump characteristic curve), and storage facilities. GIS files provided by the City were used as the basis to develop the model geometry. **Figure 5-1** presents a schematic of the transmission pipelines throughout the City.

Preliminary pipes were sized based on hydraulic criteria of having friction loss less than 12-ft per 1000-ft of pipe and a velocity at peak flow of less than 10ft/sec. Estimated pressures at the nodes were calculated based on Hazen Williams equation for head loss in the pipe including the elevation difference between nodes of pipe segments. Booster pumps are incorporated when the downstream demand node pressures were less than 50 psi.

Design Criteria

Peaking factors have been established to account for monthly, daily and hourly variations in demand due to fluctuations in irrigation demands. Generally the average maximum day to yearly average day demand factor is approximately 2.5 for water recycling systems.

The peak hour to the yearly average day varies considerably depending on the type of water use. Industrial process demands are generally constant.

As a basis for design for the hydraulic model, the following peaking factors for irrigation demands were used:

- Golf Courses → 5.0
- Schools, Parks and Cemeteries → 3.0
- Industrial → 2.5

Peak hourly demands for golf courses is based on the assumption that irrigation operation will be four hours per day between midnight and 4:00 am, while for schools, parks, cemeteries and other irrigation users, an eight hour per day irrigation operation between the hours of 10:00 p.m. and 6:00 a.m. It should be noted that if golf courses incorporate water hazards (lakes) the peaking factor would be 1.0. The assumption is that recycled water can be delivered to a water hazard at a constant rate 24 hours of the day. At such time when irrigation demands are required, the water source will be the water hazards. The distribution system is designed to deliver the peak hourly demand while maintaining a minimum system pressure of 50 psi and a maximum pressure of 120 psi. Maximum pipeline velocities were maintained at 10 ft/sec or less.

Modeling Results

The following is a summary of the modeling results for each supply alternative as required to meet system demands anticipated in the citywide master plan.

- ***Pipelines.*** **Table 5-1** summarizes the pertinent pipeline characteristics for the core distribution system including length and diameter of each pipe section. **Figure 5-1** shows schematic of the hydraulic model.
- ***Junction Nodes.*** **Table 5-2** summarizes the pertinent junction node characteristics for the core distribution system.

Table 5-1
Pipe Sizes for Citywide System

Pipe#	Length (ft)	Pipe Size (in)
1	2020	30
3	6114	18
5	5629	30
7	7691	24
9	8145	12
11	10242	12
13	3521	12
17	10885	12
19	6160	24
21	5449	24
23	6868	24
25	3516	18
27	6089	24
29	4696	12
31	10155	12
33	10876	24
35	2617	24
41	11898	24
45	12737	12
47	2609	24
49	2644	24
51	7649	12
59	5850	24
61	5649	24
71	8169	12
73	7182	24
75	1000	24
77	3385	12
81	8198	12
83	3775	24
85	6866	24
87	9180	24
89	8661	24
91	2686	24
93	3806	24
97	14708	12
99	3096	12
101	5292	12
105	8509	24
107	6039	24
109	3088	24
111	8604	12

City of Riverside

Citywide Water Recycling Master Plan

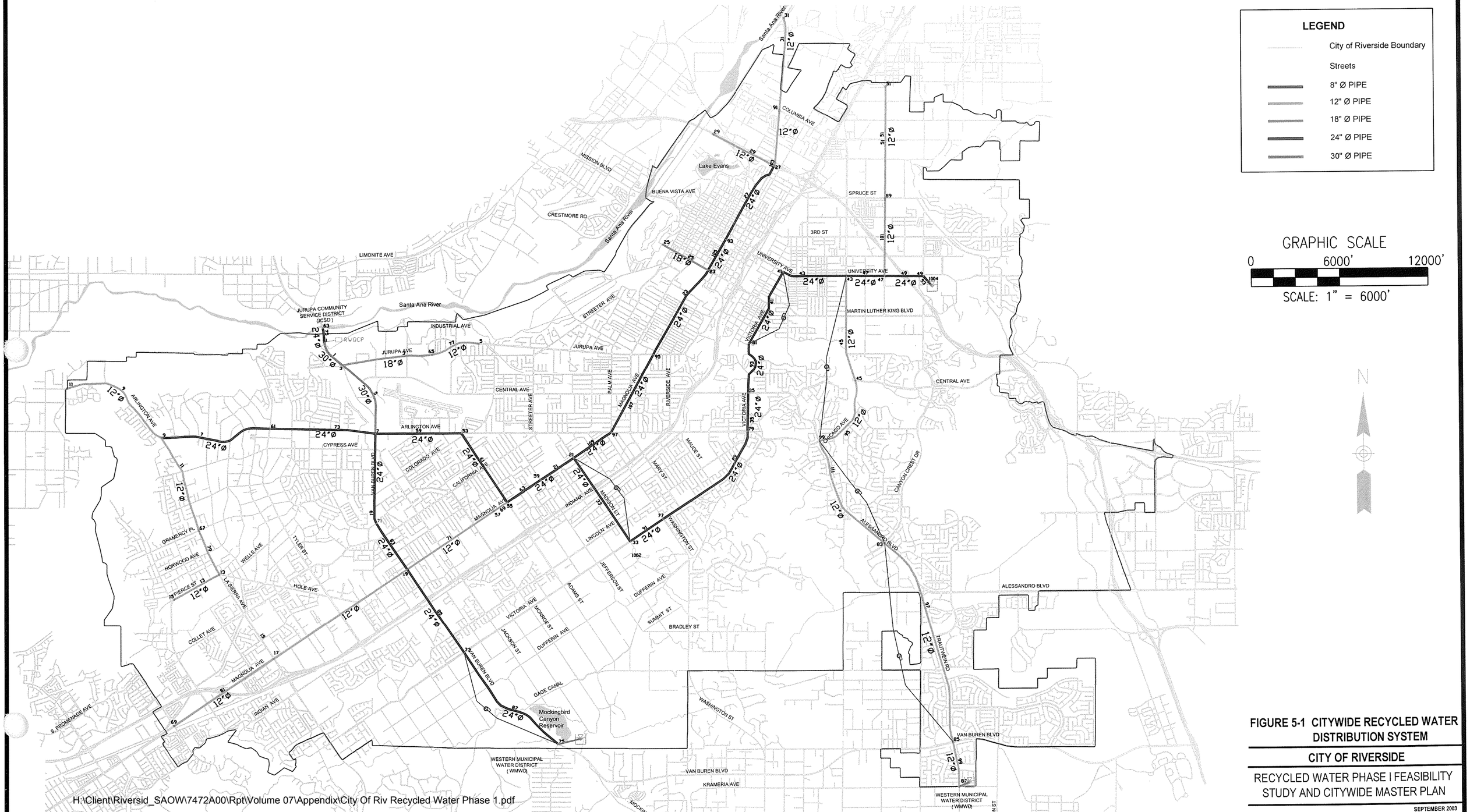


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FIGURE 5-1 CITYWIDE RECYCLED WATER DISTRIBUTION SYSTEM

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY AND CITYWIDE MASTER PLAN

SEPTEMBER 2003

Table 5-2
Junction Node Characteristics for Citywide System

Node#	Average Day Demand (gpm)	Peak Hour Demand (gpm)
3	30	89
5	911	2950
7	416	1458
9	146	661
11	398	1666
13	66	199
15	248	744
17	250	777
19	35	105
21	42	126
23	107	320
25	294	1129
29	244	981
31	292	1105
33	44	129
35	107	322
43	39	117
49	733	2198
51	125	348
53	14	43
57	181	561
61	166	720
63	896	4478
65	310	1148
69	194	928
71	123	369
72	111	333
75	19	56
77	38	113
79	77	231
81	217	1085
83	48	145
85	232	697
87	580	1962
89	79	236
93	13	40
95	11	32
97	49	147
99	320	1332

- ***Storage Facilities.*** Assuming an eight-hour irrigation period, sixteen hours of peak day storage is required. With a peak hourly demand of 25,600 gpm, about 7 million gallons of operational storage are required.

  The recommended location for these storage facilities is at the University of California, Riverside and at the service boundary between the City of Riverside and Western Municipal Water District.

- **Pumping Station.** Seven booster-pumping stations are required for the core distribution system to operate on a 24 hours continuous basis, see **Table 5-3**.

Table 5-3
Estimate Size for Booster Pump Station

Pump Location	Average Flow (gpm)	Required Head (ft)	HP
RWQCP to system	7300	277	730
Van Buren Blvd. between Victoria Ave. and Mockingbird reservoir	3000	198	215
Madison St. between Magnolia Ave. and Victoria Ave.	4000	107	155
Victoria Ave. between Central Ave. and University Ave.	4000	70	100
Chicago Ave. between Central Ave. and Arlington Ave.	1000	180	65
Alessandro Blvd. between Arlington Ave. and E Alessandro Blvd.	1000	370	135
Alessandro Blvd. between E Alessandro Blvd. and Van Buren Blvd.	1000	160	60
Total			**1460**

5.4 DISTRIBUTION SYSTEM COST ANALYSIS

In order to assess overall project cost and economics, it is necessary to discuss the project components and estimated construction costs. The estimates consider normal engineering design, construction, and construction management costs with moderate utilities interference. Costs for right-of-way and property acquisition are not included. Additionally, other related costs for legal counsel, administrative overhead, public awareness programs, coordinate with the Regional Board or Department of Health Services are not included. Costs are presented in current dollars with an *Engineering News-Record* (ENR) index of 7228 for November 2002 for the Los Angeles area. See **Table 5-5** for a complete list of cost assumptions.

Table 5-4 summarizes the preliminary capital costs associated with pipe sizes and lengths. The capital cost for citywide pipe system is approximately $64,670,000. Lateral distribution piping to individual users is not included in this conceptual plan, and therefore, no cost estimates were included for the distribution pipes. Each user will generally require on-site conversion. Consideration should be given to requiring new development to install irrigation systems to meet AWWA and DHS standards for recycled water use.

A total of six booster pump stations are anticipated for the citywide master plan. The capacity of the booster stations will range from 1,000 gpm to 4,000 gpm. The estimated capital cost for the six booster pump stations is $2,520,000. An additional booster pump station at the RWQCP will be required and is estimated to have a firm capacity

of approximately 7,300 gpm. The estimated capital cost for the RWQCP booster pump station is $1,314,000.

Storage tanks are needed to provide supply to the distribution system during peak demand periods and storage during off peak times such that the booster pump stations can operate at an efficient rate. It is anticipated that three storage reservoirs will be required with a total storage capacity of approximately 7 million gallons. The estimated construction cost for the three storage reservoirs is approximately $5,600,000, not including land acquisitions.

Table 5-4
Citywide System Preliminary Capital Cost Analysis

System Description	Quantity	Total Cost
1 RWQCP Facilities		
a. Booster Pump Station (including disinfection & Misc. Structures)	7,300 gpm	$1,314,000
2 Transmission Pumps		
a. 1000 gpm Booster Pump Station (3 ea.)	3,000 gpm	$540,000
b. 3000 gpm Booster Pump Station (1 ea.)	3,000 gpm	$540,000
c. 4000 gpm Booster Pump Station (2 ea.)	8,000 gpm	$1,440,000
Tansmission Pumps Subtotal	14,000 gpm	$2,520,000
3 Transmission Pipelines		
a. 12" Transmission Pipelines	119,483 LF	$10,036,572
b. 18" Transmission Pipelines	9,630 LF	$1,213,380
c. 24" Transmission Pipelines	135,191 LF	$22,712,088
d. 30" Transmission Pipelines	7,649 LF	$1,606,290
Tansmission Pipeline Subtotal	272,000 LF	$35,570,000
4 Reservoir Storage		
a. 3 MG Reservoir (2 ea.)	6 MG	$4,800,000
b. 1 MG Reservoir (2 ea.)	1 MG	$800,000
Reservoir Storage Subtotal	7 MG	$5,600,000
5 Provision for On-Site Conversion @ Average $10,000/Each Site	186 Ea	$1,860,000
Total Estimated Cost		**$46,864,000**
Contigency @ 20%		**$9,372,800**
Engineering, Legal and Administration @ 15%		**$8,435,520**
Total Estimated Project Cost		**$64,672,320**
say		**$64,670,000**

Note:
- The estimate is based on year 2002 costs at an ENR Construction cost index of 7228 for the Los Angeles area for November 2002.
- It is assumed that the pipeline will be installed in existing City easements and/or public rights-of-way such as public streets.
- It is assumed that equalization basin at RWQCP is already in existence.
- Above estimates do not include financing cost.

5.5 COST CRITERIA

Table 5-5
Citywide System Cost Criteria for Capital Cost Estimate

Item	Cost Factor
Pipeline Construction	$7/ft-in dia
Onsite conversion	$10,000/each
Storage Tanks	$0.80/gal
Booster Pump Station (including disinfection & miscellaneous structures)	$180/gpm
Engineering, Legal & Construction Administration	15% of total estimated cost
Construction Contingency	20% of total estimated cost

5.6 OPERATION COST ESTIMATE AND FINANCING ALTERNATIVES

Operation and maintenance costs include the annual maintenance costs for pipelines, power, labor and pump station repairs. These costs were estimated as a percentage of construction cost. It was assumed that JCSD would share proportion of the costs for power, O & M and miscellaneous costs with the City. **Table 5-6** summarizes the cost criteria used to estimate the operation and maintenance cost as well as total annual costs.

Table 5-6
Cost Criteria for Annual Cost Estimates

Item	Cost Factor
Maintenance	
Pipelines	(Capital Expenditure) - (25% Grant x Capital Cost) (Capital Expenditure) - (75% SRF Loan x Capital Cost)
Reservoirs	None
Operation	
Power	$0.10/KWH
Treatment	None
Capitalization	5.5% Interest (City's loan) 2.4% Interest (SRF Loan) 20 Years Recovery Period

Total annual costs are based on the amortized construction cost plus the annual operation and maintenance cost. Capital costs are amortized based on 5.5 percent interest and a 20-year recovery period. in **Tables 5-7** through **Table 5-10** show the O&M cost assessed for the different alternatives.

Table 5-7
Citywide System Preliminary Cost Estimate

City Funds - No Grants and/or Loans

Item Description	Total Cost	City of Riverside Share
1. Annuity on Loan	$445,000 /month	$445,000 /month
2. Operations and Maintenance		
a. Power Cost	$27,000 /month	$26,000 /month
b. Operation and Maintenance Cost [(a)]	$50,000 /month	$45,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$10,000 /month	$9,500 /month
Total		**$525,500 /month***
Recycled Water Production Cost for City of Riverside (20,400 AFY)		**$309 /AFY**

Note:

(a) 5 additional persons full time, City of Riverside share 4.5 persons time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 5-8
City Funds (75%) and Grant (25%)

Item Description	Total Cost	City of Riverside Share
1. Annuity on Loan	$334,000 /month	$334,000 /month
2. Operation and Maintenance Cost		
a. Power Cost	$27,000 /month	$26,000 /month
b. Operation and Maintenance Cost [(a)]	$50,000 /month	$45,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$10,000 /month	$9,500 /month
Total		**$414,500 /month***
Recycled Water Production Cost for City of Riverside (20,400 AFY)		**$244 /AFY**

Note:

(a) 5 additional persons full time, City of Riverside share 4.5 persons time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 5-9
City Funds (25%) SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Capital Cost		
a. City Fund	$112,000 /month	$112,000 /month
b. SRF Loan	$255,000 /month	$255,000 /month
2. Operation and Maintenance Cost		
a. Power Cost	$27,000 /month	$26,000 /month
b. Operation and Maintenance Cost [(a)]	$50,000 /month	$45,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$10,000 /month	$9,500 /month
Total		**$447,500 /month***
Recycled Water Production Cost for City of Riverside (20,400 AFY)		**$263 /AFY**

Note:
(a) 5 additional persons full time, City of Riverside share 4.5 persons time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 5-10
Grant (25%) and SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity on Loan	$255,000 /month	$255,000 /month
2. Operation and Maintenance Cost		
a. Power Cost	$27,000 /month	$26,000 /month
b. Operation and Maintenance Cost [(a)]	$50,000 /month	$45,000 /month
3. Miscellaneous Costs	$10,000 /month	$9,500 /month
Total		**$335,500 /month***
Recycled Water Production Cost for City of Riverside (20,400 AFY)		**$197 /AFY**

Note:
(a) 5 additional persons full time, City of Riverside share 4.5 persons time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

5.7 SUMMARY

Total estimated capital cost for the citywide distribution system is approximately $64,670,000. This capital cost can be financed monthly by different alternatives, together with O&M cost the monthly costs to the city are listed in **Table 5-7** through **Table 5-10**. With a potential reuse of 20,400 AFY as detailed in Section 4, the cost for reclaimed water production ranks from $197/AFY to $309/AFY depending on the financing option as summarized in **Table 5-11** below. Cost of water production for citywide system is lower than system that is limited to Phase I users only. Compare to a typical production cost range of $300/AFY to $700/AFY in Southern California, the recycled water system therefore is feasible.

Table 5-11
Summary of Alternative Pricing Options for Citywide Water Production Cost

Item No.	Description of Preliminary Project Cost	Recycled Water Production Cost ($/AF/Y)
1.	City Funds - No Grants and/or Loans	309
2.	City Funds (75%) and Grant (25%)	244
3.	City Funds (25%) and SRF Loan (75%)	263
4.	Grant (25%) and SRF Loan (75%)	197

Section 6

Phase I - Water Recycling Project

PARSONS

SECTION 6

PHASE 1 – WATER RECYCLING PROJECT

This section presents Phase I – Water Recycling Project including project boundary, current and potential users of recycled water from within the City of Riverside (City), outside the City, the criteria and basis for the hydraulic modeling, preliminary costs and economic analysis.

6.1 DEFINITION AND CRITERIA

Recycled Water Phase I Feasibility Study is an economical analysis to be used in the development and implementation of recycled water within the City of Riverside focusing on its funding, regulatory compliance, constructability, operability and expandability. Phase I Project is restricted to about 2-mile radius around the city's RWQCP. This 2-mile radius includes major potential users within the City, Jurupa Community Service District (JCSD) and Rubidoux Community Service District (RCSD).

6.2 ALTERNATIVES

Two alternatives were identified, surveyed and evaluated for the development of Phase I – Water Recycling Project. These alternatives include:

- Alternative 1 – JCSD, City of Riverside Users up to Arlington Avenue; and
- Alternative 2 – JCSD, City of Riverside Users up to Arlington Avenue, Adams Street and Magnolia Avenue.

6.2.1 Alternative 1

Alternative 1, would supply recycled water to major potential users located along:

- Van Buren Boulevard between Jurupa Avenue and Arlington Avenue;
- Jurupa Avenue between Van Buren Boulevard and Florence Street;
- Arlington Avenue between Van Buren Boulevard and Tyler Street; and
- Arlington Avenue between Van Buren Boulevard and Adams Street

The service area for Alternative 1 incorporates the total potential reuse of about 1,870 AFY as shown in **Table 6-1.**

6.2.2 Alternative 2

Alternative 2, would supply recycled water to major potential users located along:

- Van Buren Boulevard between Jurupa Avenue and Arlington Avenue;
- Jurupa Avenue between Van Buren Boulevard and Florence Street;
- Arlington Avenue between Van Buren Boulevard and Adams Street;
- Adams Street between Arlington Avenue and Magnolia Avenue;
- Magnolia Avenue between Adams Street and Verde Street; and
- Magnolia Avenue between Adams Street and Wayne Center

The service area for Alternative 2 incorporates the total potential reuse of about 2,270 AFY as shown in **Table 6-2.**

Table 6-1
Alternative 1 – JCSD, City of Riverside Users up to Arlington Avenue

Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)	
A	**JURUPA COMMUNITY SERVICE DISTRICT USERS**				
-	**AREAS CURRENTLY USING POTABLE WATER**				
-	Havenview Park No. 1	--	--	12	
-	Havenview Park No. 2	--	--	15	
-	JUSD (Linares)	--	--	27	
-	NE Corner Limonite and Clay	--	--	9	
-	W. Side Camino Real	--	--	8	
-	Camino Real South of Lamonite	--	--	<1	
	PROPOSED NEW AREAS OF REUSE				
-	Plant 2 (Indian Hills Golf Course)	--	--	600	
-	EDA Streetscape East of Camino Real & Limonite (Rubidioux Community Services District Area)	--	--	36	
	SUBTOTAL			**707**	*
	INDUSTRIES				
-	Robertson Ready Mix	--	--	25	
-	Northwest Pipe Company	--	--	35	
	SUBTOTAL			**60**	
	JCSD USERS SUBTOTAL			**767**	
			Say	**770**	**AFY**
B	**CITY OF RIVERSIDE USERS**				
200	**SCHOOLS**				
206	Adams Elementary School	8	4	10	
226	Jefferson Elementary School	10	5	13	
262	Norte Vista High School	47	24	59	
267	Terrace Elementary School	10	5	13	
	SUBTOTAL			**95**	
300	**GOLF COURSES**				
305	Van Buren Golf Center (Sky Links Executive Golf Course)	--	--	195	
	SUBTOTAL			**195**	
400	**PARKS**				
425	Martha McLean Anza Narrows	--	200	500	**
436	Rutland	9	9	23	
448	Hillside Ave (Future)	10	10	25	
	SUBTOTAL			**548**	

Table 6-1 (cont.)
Alternative 1 – JCSD, City of Riverside Users up to Arlington Avenue

500	**MISCELLANEOUS**				
503	Riverside Municipal Airport	304	50	125	
503	Riverside Municipal Airport (Future)	304	100	250	
605	Van Buren Median and Frontage (Urban Forest)	--	10	25	
	SUBTOTAL			**400**	
800	**INDUSTRIES - LANDSCAPE IRRIGATION AND POWER PLANT**				
806	Toro Irrigation (Manufacturing Company)	--	--	70	
807	Dow Jones & Company, Inc.	--	--	50	
903	400 MW Power Plant (planned by PUD in the near future)	--	--	150	**
	SUBTOTAL			**270**	
	CITY OF RIVERSIDE SUBTOTAL			**1,508**	**AFY**
	PROBABILITY OF CAPTURE - CITY OF RIVERSIDE (Approx. 70%)			**1,056**	**AFY**
			Say	**1,100**	**AFY**
	TOTAL USERS (CITY OF RIVERSIDE & JCSD)			**1,870**	**AFY**

Note:

* From JCSD Indian Hill Water Recycling Project Report

** Estimated per information provided by the City of Riverside Public Utility Department

Table 6-2
Alt. 2 – JCSD, City of Riverside Users up to North of Freeway 91 on Magnolia Ave. between Madison and Van Buren

Code	Potential Users	Total Acres	Irrigation Acres	Reuse Potential (AFY)
A	**JURUPA COMMUNITY SERVICE DISTRICT USERS**			
-	**AREAS CURRENTLY USING POTABLE WATER**			
-	Havenview Park No. 1	--	--	12
-	Havenview Park No. 2	--	--	15
-	JUSD (Linares)	--	--	27
-	NE Corner Limonite and Clay	--	--	9
-	W. Side Camino Real	--	--	8
-	Camino Real South of Lamonite	--	--	<1
	PROPOSED NEW AREAS OF REUSE			
-	Plant 2 (Indian Hills Golf Course)	--	--	600
-	EDA Streetscape East of Camino Real & Limonite (Rubidoux Community Services District Area)	--	--	36
	SUBTOTAL			**707 ***
	INDUSTRIES			
-	Robertson Ready Mix	--	--	25
-	Northwest Pipe Company	--	--	35
	SUBTOTAL			**60**
	JCSD USERS SUBTOTAL			**767**
			Say	**770 AFY**
B	**CITY OF RIVERSIDE USERS**			
200	**SCHOOLS**			
201	Cal Baptist University	65	40	60
206	Adams Elementary School	8	4	10
213	Chemawa Middle School	21	11	26
225	Jackson Elementary School			14
226	Jefferson Elementary School	10	5	13
228	Liberty Elementary School			5
231	Madison Elementary School			13
236	Notre Dame Elementary School			25
240	Ramona High School	54	27	68
242	Riverside Christain High School	20	10	25
266	Sherman Indian High School	85	40	100
	SUBTOTAL			**359**

Table 6-2 (cont.)
Alt. 2 – JCSD, City of Riverside Users up to Arlington Ave., Adams St. & Magnolia Ave.

300	**GOLF COURSES**				
305	Van Buren Golf Center (Sky Links Executive Golf Course)	--	--	195	
	SUBTOTAL			**195**	
400	**PARKS**				
401	Arlington			10	
412	Don Jones			15	
413	Don Lorenzi Sport Camp			22	
424	Low			3	
425	Martha McLean Anza Narrows	--	200	500	**
436	Rutland	9	9	23	
437	Shamel			25	
448	Hillside Ave (Future)	10	10	25	
	SUBTOTAL			**623**	
500	**MISCELLANEOUS**				
502	Parkview Comm. Hosp. Med.Ctr.			13	
503	Riverside Municipal Airport	304	50	125	
503	Riverside Municipal Airport (Future)	304	100	250	
605	Van Buren Median and Frontage (Urban Forest)	--	10	25	
	SUBTOTAL			**413**	
800	**INDUSTRIES - LANDSCAPE IRRIGATION AND POWER PLANT**				
806	Toro Irrigation (Manufacturing Company)	--	--	70	
807	Dow Jones & Company, Inc.	--	--	50	
903	400 MW Power Plant (planned by PUD in the near future)	--	--	150	**
	SUBTOTAL			**270**	
C	**CALTRANS**				
C-2	3440 ADAMS			**23.2**	
C-7	3440 JACKSON			**24.0**	
C-8	3440 JEFFERSON			**14.7**	
C-10	3440 MADISON			**23.0**	
C-11	3440 MONROE			**9.9**	
C-14	3440 VAN BUREN			**34.7**	
	SUBTOTAL			**129.6**	**AFY**
	CITY OF RIVERSIDE SUBTOTAL			**1,990**	**AFY**
	PROBABILITY OF CAPTURE - CITY OF RIVERSIDE			**1,432**	**AFY**
	(Capture Probability is assumed 70% except for above CALTRANS data for which it is 100%)		**Say**	**1,500**	**AFY**
	TOTAL USERS (CITY OF RIVERSIDE & JCSD)			**2,270**	**AFY**

Note:

* From JCSD Indian Hill Water Recycling Project Report

** Estimated per information provided by the City of Riverside Public Utility Department

6.3 ALIGNMENTS

Several alignments for the Phase I Project distribution system were considered. These alternatives were reviewed to consider relative advantages based on field investigations, traffic conditions, existing utilities and input from City staff. A summary of the approximate footage for each alternative is shown in **Tables 6-3 and 6-4.**

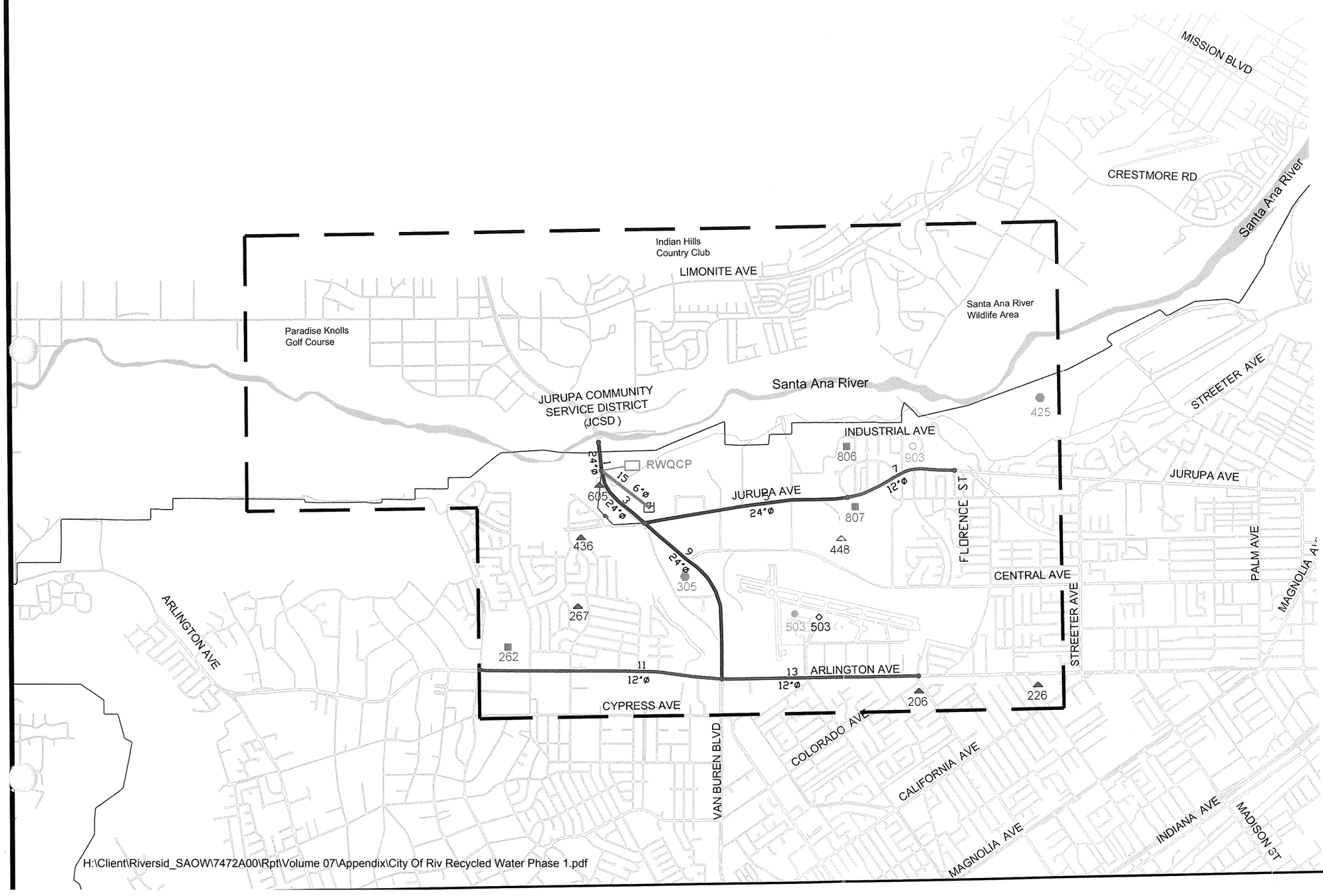
It is necessary to consider both economic and non-economic factors in the evaluation of each alternative alignment. Economic considerations include capital costs and constructability. Non-economic factors include community impact, traffic disruption, utility conflicts, easement/ROW requirements and permits, if required.

6.4 HYDRAULIC MODEL

The hydraulic model for the Phase I project was developed using H_2ONET v3.1 software, which included a 24-hour simulation and performance analysis. Water demand data of potential users was developed from a market survey analysis discussed in Section 4.

The hydraulic model geometry and physical characteristics of the distribution system include pipes (length, diameter, Hazen-Williams friction C-factor), pumps, and storage facilities. GIS files, provided by the City, were used as the basis to develop the model base maps. **Figures 6-1 and 6-2** present the proposed size of transmission pipelines for Alternatives 1 and 2 respectively.

City of Riverside
Recycled Water Phase I Feasibility Study



LEGEND

User Symbol Existing	User Symbol Future	Potential Reuse (Acre Feet / Year)
▲	△	10 - 49
■	□	50 - 99
●	○	100 - 199
◆	◇	200 - 399
●	⬡	400 Plus

- City of Riverside Boundary
- Alternative 1 Boundary
- Streets
- 6"Ø PIPE
- 12"Ø PIPE
- 24"Ø PIPE

N

GRAPHIC SCALE

0 3000' 6000'

SCALE: 1" = 3000'

FIGURE 6-1 PHASE 1 - ALTERNATIVE 1

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY AND CITYWIDE MASTER PLAN

SEPTEMBER 2003

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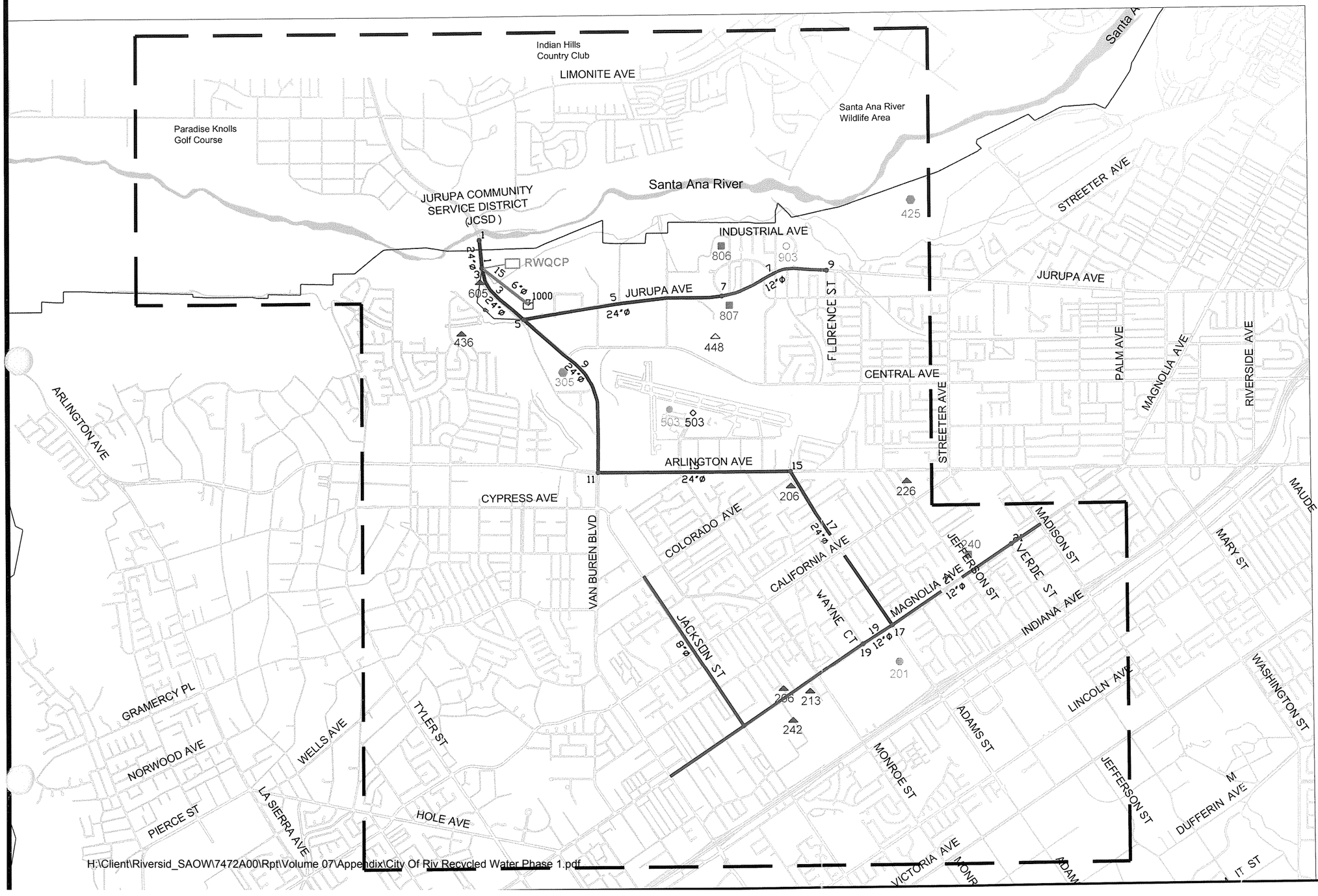
City of Riverside
Recycled Water Phase I Feasibility Study



LEGEND

User Symbol Existing	User Symbol Future	Potential Reuse (Acre Feet / Year)
▲	△	10 - 49
■	□	50 - 99
●	○	100 - 199
◆	◇	200 - 399
⬢	⬡	400 Plus

- City of Riverside Boundary
- Alternative 1 Boundary
- Streets
- 6"Ø PIPE
- 8"Ø PIPE
- 12"Ø PIPE
- 24"Ø PIPE

FIGURE 6-2 PHASE 1 - ALTERNATIVE 2

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY AND CITYWIDE MASTER PLAN

SEPTEMBER 2003

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Design Criteria

Peaking factors have been established to account for monthly, daily and hourly variations in demand due to fluctuations in irrigation demands. Generally the average maximum day to yearly average day demand factor is approximately 2.5 for water recycling systems.

The peak hour to the yearly average day varies considerably depending on the type of water use. Industrial process demands are generally constant, but depend upon the hours of operation and on-site storage.

As a basis for design for the hydraulic model, the following peaking factors for irrigation demands were used:

- Golf Courses → 5.0
- Schools, Parks and Cemeteries → 3.0
- Industrial → 2.5

Peak hourly demands for golf courses is based on the assumption that irrigation operation will be four hours per day between midnight and 4:00 am, while for schools, parks, cemeteries and other irrigation users, an eight hour per day irrigation operation between the hours of 10:00 p.m. and 6:00 a.m. It should be noted that if golf courses incorporate water hazards (lakes) the peaking factor would be 1.0. The assumption is that recycled water can be delivered to a water hazard at a constant rate 24 hours of the day. At such time when irrigation demands for golf courses are required, the water source will be from the water hazards. The distribution system is designed to deliver the peak hourly demand while maintaining a minimum system pressure of 50 psi and a maximum pressure of 120 psi. Maximum pipeline velocities were maintained at 10 ft/sec or less.

Modeling Results

The following is a summary of the modeling results for each supply alternative as required to meet system demands anticipated in the Phase I project.

- ***Pipelines.*** **Tables 6-3 and 6-4** summarize the pertinent pipeline characteristics for Alternatives 1 and 2, respectively. The location, length, and proposed pipe diameter of each section are listed.
- ***Storage Facilities.*** The recycled water storage will be from the RWQCP chlorine contact tanks, which will be used as the operational storage for the Phase I Project.
- ***Pumping Station.*** It is anticipated that a booster pumping station will be installed at the chlorine contact tanks. The pumping facility at RWQCP requires a total firm capacity of approximately 6100 gpm. The station would include multiple pumps with one standby pump equal to the largest pump used in operation.

Table 6-3
Pipe Characteristics for Alternative 1a

Pipeline Location	Diameter (in)	Length (ft)
Van Buren Blvd. between City Limits (JCSD) and RWQCP	24	851
Van Buren Blvd. between RWQCP and Arlington Ave.	24	7700
Jurupa Ave. between Van Buren Blvd. and UP Railroad	24	6104
Jurupa Ave. between UP Railroad and Florence St.	12	3382
Arlington Ave. between Van Buren Blvd. and Tyler St.	12	7205
Arlington Ave. between Van Buren Blvd. and Adams St.	12	5862

Table 6-4
Pipe Characteristics for Alternative 2a

Pipeline Location	Diameter (in)	Length (ft)
Van Buren Blvd. between City Limits (JCSD) and RWQCP	24	851
Van Buren Blvd. between RWQCP and Arlington Ave.	24	7700
Jurupa Ave. between Van Buren Blvd. and UP Railroad	24	6104
Jurupa Ave. between UP Railroad and Florence St.	12	3382
Arlington Ave. between Van Buren Blvd. and Adams St.	24	5862
Adams St. between Arlington Ave. and Magnolia Ave.	24	5642
Magnolia Ave. between Adams St. and Van Buren Blvd.	12	7345
Magnolia Ave. between Adams St. and Medison St.	12	4700
Jackson St. between Magnolia Ave. and Colorado Ave.	8	5440

6.5 PHASE I FLEXIBILITY AND EXPANDABILITY

In analyzing the proposed pipe sizing for the Phase I project, consideration is given to determining the required ultimate pipe size when the citywide recycled water system is implemented. This approach, of course, increases the initial costs for the Phase I project due to the installation of larger diameter pipes. However installing the ultimate pipe size during Phase I will avoid the cost of installing parallel pipes when the citywide recycled water system is implemented in the future.

Tables 6-5 and 6-6 summarize the sizes of pipe installed in phase I in order to serve the citywide system. The detail analysis for these pipe sizes is discussed in Section 6, Citywide Recycled Water Master Plan.

Table 6-5
Pipe Characteristics for Alternative 1b
(Enlarged Size to Serve the Citywide System)

Pipeline Location	Diameter (in)	Length (ft)
Van Buren Blvd. between City Limits (JCSD) and RWQCP	24	851
Van Buren Blvd. between RWQCP and Arlington Ave.	30	7700
Jurupa Ave. between Van Buren Blvd. and UP Railroad	18	6104
Jurupa Ave. between UP Railroad and Florence St.	12	3382
Arlington Ave. between Van Buren Blvd. and Tyler St.	24	7205
Arlington Ave. between Van Buren Blvd. and Adams St.	24	5862

Table 6-6
Pipe Characteristics for Alternative 2b
(Enlarged Size to Serve the Citywide System)

Pipeline Location	Diameter (in)	Length (ft)
Van Buren Blvd. between City Limits (JCSD) and RWQCP	24	851
Van Buren Blvd. between RWQCP and Arlington Ave.	30	7700
Jurupa Ave. between Van Buren Blvd. and UP Railroad	18	6104
Jurupa Ave. between UP Railroad and Florence St.	12	3382
Arlington Ave. between Van Buren Blvd. and Adams St.	24	5862
Adams St. between Arlington Ave. and Magnolia Ave.	24	5642
Magnolia Ave. between Adams St. and Van Buren Blvd.	12	7345
Magnolia Ave. between Adams St. and Medison St.	24	4700
Jackson St. between Magnolia Ave. and Colorado Ave.	8	5440

6.6 PRICING CONCEPTS

The commitment of users from the City and JCSD to "buy into" a recycled water system is a factor in determining whether the project is economically feasible. The following items will determine the feasibility to construct a new recycled water system:

- Provide for incremental variable expenses (booster pumps, energy, chemicals) of the water distribution system. These incremental and variable expenses include the variable expenses associated with the RWQCP water treatment facility, booster pumps, the storage option, and transmission pipelines. The transmission pipelines are sized according to the capacity needed for distribution, and therefore the allocation of annual costs associated with financing and maintaining them should be easy to determine and non-controversial.
- Provide for fixed operations and maintenance (O&M) expense associated with water treatment facility, storage option selected, and the distribution system.
- Extent of availability of grants and other subsidies
- Repay fixed debt service (SRF loans and other debt service), and
- Repay cash advances (from other funds) over a predetermined schedule, including a mutually agreed-upon interest rate.

6.7 COMPARING ALTERNATIVE PRICING OPTIONS

Water rate data was collected from the City and evaluated to form the basis for recycled water pricing in the area. The City's potable water rates are summarized as follows:

- During summer, $379/AF ($0.87/100 CF)
- During winter, $292/AF
- Gage Shareholder Customers, $90/AF
- Schools, $350/AF
- Toro Manufacturing Company, $6/AF
- Sky Links Golf Course, $80/AF

As can be seen by these rates, there is a wide variation in rates for water usage provided by the City. Pricing of recycled water can range from a small fraction of the cost of potable water, to as costly as potable water or even more.

6.8 RECYCLED WATER PRODUCTION COST SUMMARY

Tables 6-7 through 6-10 summarize the anticipated recycled water production costs under different funding scenarios for Alternatives 1a and 1b. **Tables 6-11 through 6-36** provides cost criteria, capital and O&M calculations under selected funding scenarios for Alternatives 1a and 1b.

Table 6-7
Phase I Alternative 1a – System Designed with no Citywide Expansion Considerations
Summary of Recycled Water Production Cost Design for the Needs of City of Riverside

Item No.	Description of Preliminary Project Cost	Recycled Water Production Cost ($/AFY)
1.	City Funds - No Grants and/or Loans	550
2.	City Funds (75%) and Grant (25%)	439
3.	City Funds (25%) and SRF Loan (75%)	470
4.	Grant (25%) and SRF Loan (75%)	360
5	Grant (50%) and SRF Loan (50%) & no City Funds	276

Table 6-8
Phase I Alternative 1b – System Designed with Citywide Expansion Considerations
Summary of Recycled Water Production Cost Enlarged for the City of Riverside

Item No.	Description of Preliminary Project Cost	Recycled Water Production Cost ($/AFY)
1.	City Funds - No Grants and/or Loans	651
2.	City Funds (75%) and Grant (25%)	513
3.	City Funds (25%) and SRF Loan (75%)	552
4.	Grant (25%) and SRF Loan (75%)	413
5	Grant (50%) and SRF Loan (50%) & no City Funds	308

Table 6-9
Phase I Alternative 2a – System Designed with no Citywide Expansion Considerations
Summary of Recycled Water Production Cost for the City of Riverside

Item No.	Description of Preliminary Project Cost	Recycled Water Production Cost ($/AFY)
1.	City Funds - No Grants and/or Loans	569
2.	City Funds (75%) and Grant (25%)	448
3.	City Funds (25%) and SRF Loan (75%)	482
4.	Grant (25%) and SRF Loan (75%)	362
5	Grant (50%) and SRF Loan (50%) & no City Funds	270

Table 6-10
Phase I Alternative 2b – System Designed with Citywide Expansion Considerations
Summary of Recycled Water Production Cost Enlarged for the City of Riverside

Item No.	Description of Preliminary Project Cost	Recycled Water Production Cost ($/AFY)
1.	City Funds - No Grants and/or Loans	594
2.	City Funds (75%) and Grant (25%)	466
3.	City Funds (25%) and SRF Loan (75%)	502
4.	Grant (25%) and SRF Loan (75%)	374
5	Grant (50%) and SRF Loan (50%) & no City Funds	277

6.9 CAPITAL COST COMPARISON

Construction costs are estimated on a unit cost basis for each system component including a cost per linear ft for pipeline construction. Unit costs factors are broken down by pipe diameter with different cost factors used for urban and rural construction. Costs for pump stations and reservoirs are based on equations, with estimate cost for pump stations based on pump capacity and reservoir based on capacity.

Miscellaneous costs are included for meters, backflow prevention devices, and stand-by domestic service. Engineering costs and contingency costs are included as a percentage of construction cost. **Table 6-11** summarizes cost criteria used to estimate capital costs.

Table 6-11
Cost Criteria for Capital Cost Estimate

Item	Cost Factor
Pipeline Construction	$7/ft-in dia
Onsite conversion	$10,000/each
Storage Tanks	$0.80/gal
Booster Pump Station (included disinfection & miscellaneous structures)	$180/gpm
Engineering, Legal & Construction Administration	15% of total estimated cost
Construction Contingency	20% of total estimated cost

Preliminary capital and operational costs of two alternatives were estimated in order to determine the unit cost for recycled water. The cost and other criteria will be used to select a recycled water system alternative. The estimate is based on year 2001 costs at an ENR construction cost index of 7228 for the Los Angeles area for November 2002. It is assumed that the pipeline will be installed in existing City easements and/or public rights-of-way such as public streets. It is also assumed that the existing chlorine contact basins will serve as the system storage. The unit cost is based on 20-year bond. Potential savings of $209,856 on capital cost could be realized if using the existing 2,186 LF of 12" pipe from the RWQCP to Van Buren Golf Course.

A summary of the cost estimates for the two alternatives is presented in **Tables 6-12, 6-13, 6-14 and 6-15**. The estimate does not include financing cost. Estimated projected cost for the City of Riverside share includes 59% of Booster Pump Station cost. It is anticipated that the other 41% of Booster Pump Station cost will be paid by JCSD.

Table 6-12
Phase I Alternative 1a - Capital Cost for Transmission System Designed with no Citywide Expansion Considerations

System Description	Quantity	Total Cost
1. RWQCP Facilities		
a. Booster Pump Station (Including disinfection & Misc. Structures)	5,700 gpm	$1,026,000
2. Transmission Pipelines		
b. 12" Transmission Pipeline	16,449 LF	$1,381,716
c. 24" Transmission Pipeline	14,655 LF	$2,462,040
Transmission Pipeline Subtotal	31,104 LF	$3,843,756
3. Provision for On-Site Conversion @ Average $10,000/Each Site	13 Ea	$130,000
Total Estimated Cost		**$4,999,756**
Contingency @20%		**$999,951**
Engineering, legal and Administration @ 15%		**$899,956**
Total Estimated Project Cost		**$6,899,663**
	Say	**$6,900,000**
City of Riverside - Capital Expenditure Share		**$6,296,471** *
	Say	**$6,297,000**

Note:
- The estimate is based on year 2002 costs at an ENR construction cost index of 7228 for the Los Angeles area for November 2002.
- It is assumed that the pipeline will be installed in existing City easements and/or public rights-of-way such as public streets.
- It is assumed that equalization basin at RWQCP is already in existence.
- Above estimates does not include financing cost.
- Potential savings on Capital Cost could use an existing 12" pipe located within RWQCP to Van Buren Golf Course.
  Estimated footage from RWQCP to Van Buren Golf Course: 2,186 LF
  Estimated Cost Savings: $183,624

* City of Riverside share includes proportion of Booster Pump Station cost.
(a) Potential Project Savings Cost to be deducted from City of Riverside - Capital Expenditure Share
(b) Assumed

Table 6-13
Phase I Alternative 1b - Capital Cost for Transmission System Designed with Citywide Expansion Considerations

System Description	Quantity	Total Cost
1. RWQCP Facilities		
a. Booster Pump Station (Including disinfection & Misc. Structures)	5,700 gpm	$1,026,000
2. Transmission Pipelines		
b. 12" Transmission Pipeline	3,382 LF	$284,088
c. 18" Transmission Pipeline	6,104 LF	$769,104
d. 24" Transmission Pipeline	13,918 LF	$2,338,224
e. 30" Transmission Pipeline	7,700 LF	$1,617,000
Transmission Pipeline Subtotal	31,104 LF	$5,008,416
3. Provision for On-Site Conversion @ Average $10,000/Each Site	13 Ea	$130,000
Total Estimated Cost		**$6,164,416**
Contigency @ 20%		**$1,232,883**
Engineering, Legal and Adminstration @15%		**$1,109,595**
Total Estimated Project Cost		**$8,506,894**
	Say	**$8,507,000**
City of Riverside - Capital Expenditure Share		**$7,903,471** *
	Say	**$7,904,000**

Note:
- The estimate is based on year 2002 costs at an ENR construction cost index of 7228 for the Los Angeles area for November 2002.
- It is assumed that the pipeline will be installed in existing City easements and/or public rights-of-way such as public streets.
- It is assumed that equalization basin at RWQCP is already in existence.
- Above estimates does not include financing cost.
- Potential savings on Capital Cost could use an existing 12" pipe located within RWQCP to Van Buren Golf Course.

* City of Riverside share includes proportion of Booster Pump Station cost.
(a) Potential Project Savings Cost to be deducted from City of Riverside - Capital Expenditure Share
(b) Assumed

Table 6-14
Phase I Alternative 2a - Capital Cost for Transmission System Designed with no Citywide Expansion Considerations

System Description	Quantity	Total Cost
1. RWQCP Facilities		
a. Booster Pump Station (Including disinfection & Misc. Structures)	6,100 gpm	$1,098,000
2. Transmission Pipelines		
a. 8" Transmission Pipeline	5,440 LF	$304,640
b. 12" Transmission Pipeline	15,427 LF	$1,295,878
c. 24" Transmission Pipeline	26,159 LF	$4,394,628
Transmission Pipeline Subtotal	47,026 LF	$5,995,146
3. Provision for On-Site Conversion @ Average $10,000/Each Site	22 Ea	$220,000
Total Estimated Cost		**$7,313,146**
Contingency @ 20%		**$1,462,629**
Engineering, legal and Administration @ 15%		**$1,316,366**
Total Estimated Project Cost		**$10,092,142**
	Say	**$10,093,000**
City of Riverside - Capital Expenditure Share		**$9,367,449** *
	Say	**$9,368,000**

Note:
- The estimate is based on year 2002 costs at an ENR construction cost index of 7228 for the Los Angeles area for November 2002.
- It is assumed that the pipeline will be installed in existing City easements and/or public rights-of-way such as public streets.
- It is assumed that equalization basin at RWQCP is already in existence.
- Above estimates does not include financing cost.
- Potential savings on Capital Cost could use an existing 12" pipe located within RWQCP to Van Buren Golf Course.
  Estimated footage from RWQCP to Van Buren Golf Course: 2,186 LF
  Estimated Cost Savings: $183,624

* City of Riverside share includes propotion of Booster Pump Station cost.
(a) Potential Project Savings Cost to be deducted from City of Riverside - Capital Expenditure Share
(b) Assumed

Table 6-15
Phase I Alternative 2b - Capital Cost for Transmission System Designed with Citywide Expansion Considerations

System Description	Quantity	Total Cost
1. RWQCP Facilities		
a. Booster Pump Station (Including disinfection & Misc. Structures)	6,100 gpm	$1,098,000
2. Transmission Pipelines		
a. 8" Transmission Pipeline	5,440 LF	$304,640
b. 12" Transmission Pipeline	10,727 LF	$901,068
c. 18" Transmission Pipeline	6,104 LF	$769,104
d. 24" Transmission Pipeline	17,055 LF	$2,865,240
e. 30" Transmission Pipeline	7,700 LF	$1,617,000
Transmission Pipeline Subtotal	47,026 LF	$6,457,052
3. Provision for On-Site Conversion @ Average $10,000/Each Site	13 Ea	$130,000
Total Estimated Cost		**$7,685,052**
Contingency @ 20%		**$1,537,010**
Engineering, legal and Administration @ 15%		**$1,383,309**
Total Estimated Project Cost		**$10,605,372**
	Say	**$10,606,000**
City of Riverside - Capital Expenditure Share		**$9,960,118 ***
	Say	**$9,961,000**

Note:
- The estimate is based on year 2002 costs at an ENR construction cost index of 7228 for the Los Angeles area for November 2002.
- It is assumed that the pipeline will be installed in existing City easements and/or public rights-of-way such as public streets.
- It is assumed that equalization basin at RWQCP is already in existence.
- Above estimates does not include financing cost.
- Potential savings on Capital Cost could use an existing 12" pipe located within RWQCP to Van Buren Golf Course.

* City of Riverside share includes proportion of Booster Pump Station cost.
(a) Potential Project Savings Cost to be deducted from City of Riverside - Capital Expenditure Share
(b) Assumed

6.10 O&M COST COMPARISON

Operation and maintenance costs include the annual maintenance costs for pipelines, power, labor and pump station repairs. These costs were estimated as a percentage of construction cost. It was assumed that JCSD would share proportion of the costs for power, O & M and miscellaneous costs with the City. **Table 6-16** summarizes the cost criteria used to estimate the operation and maintenance cost as well as total annual costs.

Table 6-16
Cost Criteria for Annual Cost Estimates

Item	Cost Factor
Maintenance	
Pipelines	(Capital Expenditure) - (25% Grant x Capital Cost) (Capital Expenditure) - (75% SRF Loan x Capital Cost)
Reservoirs	None
Operation	
Power	$0.10/KWH
Treatment	None
Capitalization	5.5% Interest (City's loan) 2.4% Interest (SRF Loan) 20 Years Recovery Period

Total annual costs are based on the amortized construction cost plus the annual operation and maintenance cost. Capital costs are amortized based on 5.5 percent interest and a 20-year recovery period. **Tables 6-17 through 6-32** show the O & M cost assessed for the different alternatives.

Table 6-17
Alternative 1a – Preliminary Cost Estimate
City Funds – No Grants and/or Loans

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$43,300 /month	$40,600 /month
2. Operations and Maintenance		
a. Power Cost	$9,000 /month	$5,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$50,400 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$550 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-18
Alternative 1a – Preliminary Cost Estimate
City Funds (75%) and Grant (25%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$32,500 /month	$30,400 /month
2. Operation and Maintenance Cost		
a. Power Cost	$9,000 /month	$5,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$40,200 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$439 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-19
Alternative 1a – Preliminary Cost Estimate
City Funds (25%) SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan		
a. City Fund	$10,800 /month	$10,100 /month
b. SRF Loan	$24,800 /month	$23,200 /month
2. Operation and Maintenance Cost		
a. Power Cost	$9,000 /month	$5,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$43,100 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$470 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-20
Alternative 1a – Preliminary Cost Estimate
Grant (25%) and SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$24,800 /month	$23,200 /month
2. Operation and Maintenance Cost		
a. Power Cost	$9,000 /month	$5,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$3,000 /month	$2,500 /month
Total		**$33,000 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$360 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-21
Alternative 1a – Preliminary Cost Estimate
Grant (50%) and SRF Loan (50%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$16,500 /month	$15,500 /month
2. Operation and Maintenance Cost		
a. Power Cost	$9,000 /month	$5,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$3,000 /month	$2,500 /month
Total		**$25,300 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$276 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-22
Alternative 1b – Preliminary Cost Estimate
City Funds – No Grants and/or Loans

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$54,400 /month	$50,900 /month
2. Operations and Maintenance		
a. Power Cost	$7,200 /month	$4,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$59,700 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$651 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-23
Alternative 1b – Preliminary Cost Estimate
City Funds (75%) and Grant (25%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$40,800 /month	$38,200 /month
2. Operation and Maintenance Cost		
a. Power Cost	$7,200 /month	$4,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$47,000 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$513 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-24
Alternative 1b – Preliminary Cost Estimate
City Funds (25%) SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan		
a. City Fund	$13,600 /month	$12,700 /month
b. SRF Loan	$31,100 /month	$29,100 /month
2. Operation and Maintenance Cost		
a. Power Cost	$7,200 /month	$4,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$50,600 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$552 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-25
Alternative 1b – Preliminary Cost Estimate
Grant (25%) and SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$31,100 /month	$29,100 /month
2. Operation and Maintenance Cost		
a. Power Cost	$7,200 /month	$4,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$3,000 /month	$2,500 /month
Total		**$37,900 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$413 /AF**

Note:

(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-26
Alternative 1b – Preliminary Cost Estimate
Grant (50%) and SRF Loan (50%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$20,700 /month	$19,400 /month
2. Operation and Maintenance Cost		
a. Power Cost	$7,200 /month	$4,300 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$3,000 /month	$2,500 /month
Total		**$28,200 /month***
Recycled Water Production Cost for City of Riverside (1,100 AFY)		**$308 /AF**

Note:

(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-27
Alternative 2a – Preliminary Cost Estimate
City Funds – No Grants and/or Loans

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$64,500 /month	$60,400 /month
2. Operations and Maintenance		
a. Power Cost	$9,300 /month	$6,200 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$71,100 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$569 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-28
Alternative 2a – Preliminary Cost Estimate
City Funds (75%) and Grant (25%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$48,300 /month	$45,300 /month
2. Operations and Maintenance		
a. Power Cost	$9,300 /month	$6,200 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$56,000 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$448 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-29
Alternative 2a – Preliminary Cost Estimate
City Funds (25%) SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan		
a. City Fund	$16,100 /month	$15,100 /month
b. SRF Loan	$36,900 /month	$34,500 /month
2. Operation and Maintenance Cost		
a. Power Cost	$9,300 /month	$6,200 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$3,000 /month	$2,500 /month
Total		**$60,300 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$482 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-30
Alternative 2a – Preliminary Cost Estimate
Grant (25%) and SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$36,900 /month	$34,500 /month
2. Operation and Maintenance Cost		
a. Power Cost	$9,300 /month	$6,200 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$3,000 /month	$2,500 /month
Total		**$45,200 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$362 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-31
Alternative 2a – Preliminary Cost Estimate
Grant (50%) and SRF Loan (50%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$24,600 /month	$23,000 /month
2. Operation and Maintenance Cost		
a. Power Cost	$9,300 /month	$6,200 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$3,000 /month	$2,500 /month
Total		**$33,700 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$270 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-32
Alternative 2b – Preliminary Cost Estimate
City Funds – No Grants and/or Loans

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$68,500 /month	$64,200 /month
2. Operations and Maintenance		
a. Power Cost	$8,400 /month	$5,600 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$4,000 /month	$2,500 /month
Total		**$74,300 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$594 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-33
Alternative 2b – Preliminary Cost Estimate
City Funds (75%) and Grant (25%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$51,400 /month	$48,100 /month
2. Operations and Maintenance		
a. Power Cost	$8,400 /month	$5,600 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$4,000 /month	$2,500 /month
Total		**$58,200 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$466 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-34
Alternative 2b– Preliminary Cost Estimate
City Funds (25%) SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan		
a. City Fund	$17,100 /month	$16,000 /month
b. SRF Loan	$39,200 /month	$36,700 /month
2. Operation and Maintenance Cost		
a. Power Cost	$8,400 /month	$5,600 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous, PS Repair & Maintenance Costs	$4,000 /month	$2,500 /month
Total		**$62,800 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$502 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-35
Alternative 2b – Preliminary Cost Estimate
Grant (25%) and SRF Loan (75%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$39,200 /month	$36,700 /month
2. Operation and Maintenance Cost		
a. Power Cost	$8,400 /month	$5,600 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$4,000 /month	$2,500 /month
Total		**$46,800 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$374 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

Table 6-36
Alternative 2b – Preliminary Cost Estimate
Grant (50%) and SRF Loan (50%)

Item Description	Total Cost	City of Riverside Share
1. Annuity of Loan	$26,100 /month	$24,500 /month
2. Operation and Maintenance Cost		
a. Power Cost	$8,400 /month	$5,600 /month
b. Labor Cost [(a)]	$2,500 /month	$2,000 /month
3. Miscellaneous Costs	$4,000 /month	$2,500 /month
Total		**$34,600 /month***
Recycled Water Production Cost for City of Riverside (1,500 AFY)		**$277 /AF**

Note:
(a) 1 person half time

* Assumes JCSD will share proportion of the costs for power, O & M and miscellaneous costs.

6.11 SUMMARY

Section 6 describes the Phase I – Water Recycling Project. The Phase I Project is restricted to about a 3-mile radius around the City's RWQCP. This 3-mile radius includes major potential users within the City, Jurupa Community Service District (JCSD) and Rubidoux Community Service District (RCSD). Two alternatives, with two sub-alternatives each, were identified, surveyed and evaluated for the development of Phase I – Water Recycling Project. These alternatives include:

- Alternative 1a – System designed with no citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue.
- Alternative 1b – System designed with citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue.
- Alternative 2a – System designed with no citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue, Adams Street and Magnolia Avenue.
- Alternative 2b – System designed with citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue, Adams Street and Magnolia Avenue.

A detailed presentation of the above alternatives, along with their associated costs under different financing scenarios, is given in Section 6 (**Table 6-3** through **Table 6-36**). To summarize, the total Phase I project cost will include miscellaneous water resources costs, the incremental costs associated with upgrading the City RWQCP system, and distribution costs within the City. **Table 6-37** (shown below) presents the combined capital and operation and maintenance costs for the different alternatives assessed for the project. It is observed that the water production cost for a system designed to meet only Phase I demand is lower than that for a system designed to meet citywide demand. Considering that the typical water production cost in Southern California ranges between $300/AFY to $700/AFY, the feasible Phase I recycled water system alternatives are:

- Alternative 1a – with or without Grant and Loan.
- Alternative 1b – only with Grant and Loan.
- Alternative 2a – with or without Grant and Loan.
- Alternative 2b – with or without Grant and Loan.

Total project cost will include miscellaneous water resources costs, the incremental costs associated with upgrading the City RWQCP system, and distribution costs within the City. **Table 6-37** presents the combined capital and operation and maintenance costs for the different alternatives assessed for the project. It is observed that water production cost for system designed to meet only phase I demand is lower than that for system to meet citywide demand. With a typical water cost ranging between $300/AFY to $700/AFY in Southern California, recycled water system for the city is feasible with Grant and Loan for phase I system that will implement citywide demand and feasible even without Grant and Loan for system that serve water users in phase I only.

Table 6-37
Summary of Alternative Pricing Options

Alternatives	Riverside Potential Reuse (AFY)	Pipe Length (LF)	Approximate Capital Cost	Water Production Cost Option 1 ($/AFY)	Option 2 ($/AFY)	Option 3 ($/AFY)	Option 4 ($/AFY)	Option 5 ($/AFY)
1 - JCSD, City of Riverside Users up to Arlington Ave.								
A. System to meet phase I demand only	1,100	31,104	$6,297,000	550	439	470	360	276
B. System to meet Citywide demand also	1,100	31,104	$7,904,000	651	513	552	413	308
Difference (A - B)			$1,607,000	$101	$74	$82	$53	$32
2 - JCSD, City of Riverside Users up to Arlington Ave., Adams St. & Magnolia Ave.								
A. System to meet phase I demand only	1,500	47,026	$9,368,000	569	448	482	362	270
B. System to meet Citywide demand also	1,500	47,026	$9,961,000	594	466	502	374	277
Difference (A - B)			$593,000	$26	$18	$20	$13	$7

Option 1: City Funds - No Grants and/or Loans
Option 2: City Funds (75%) and Grant (25%)
Option 3: City Funds (25%) and SRF Loan (75%)
Option 4: Grant (25%) and SRF Loan (75%)
Option 5: Grant (50%) and SRF Loan (50%)

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Section 7
Potential Funding Sources

PARSONS

SECTION 7
POTENTIAL FUNDING SOURCES

The recycled water project will provide benefits for many years after it is completed. There are several ways to finance such a project. Capital items that have a useful life over a long period may be financed over that period or on a "pay-as-you-use" basis. The term of the borrowing should coincide with or be less than the estimated useful life of the improvements if bond market conditions permit and if the debt obligation is within the City's ability to pay.

Majority of projects are financed by a combination of resources and financing techniques. The water recycling projects typically are not cost effective without innovative funding. Some of the more common financing techniques applicable in this case are reviewed here with the objective of finding the least cost method that is reasonable and within the City's ability to pay.

7.1 FUNDING ALTERNATIVES

A variety of funding alternatives as briefly described below could possibly used in for funding the projects developed under this master plan.

Proposition 13 (2000 Bond Law)

The Costa-Machado Water Act of 2000 (AB 1584) was approved by the voters as Proposition 13 on March 7, 2000. This new bond law includes loans and grants for the design and construction of water recycling projects. These are projects that reclaim either municipal wastewater or polluted groundwater. The State Water Resources Control Board (SWRCB) develops the priority list of projects proposed for funding with these grants and loans. The SWRCB administers two funding programs under Proposition 13:

- ***Water Recycling Facilities Planning Grant Program***

  The Water Recycling Facilities Planning Grant Program provides grants up to $75,000 to local public agencies to investigate the feasibility of water recycling and to prepare a facility's plan documenting the analyses and conclusions of the investigation.

- ***Water Recycling Construction Program***

  The Water Recycling Construction Program (formally the Water Recycling Loan Program) provides low-interest loans and grants to local public agencies for the design and construction of water recycling facilities. The types of facilities include wastewater treatment, recycled water storage facilities, pump stations, and recycled water distribution pipelines. A funding application includes a facilities plan to document the need for the project, the alternatives that were analyzed, and the engineering, economic, financial, and institutional feasibility of the proposed facilities.

Funding is provided to projects within the categories of projects that have completed or are in the final stages of facilities planning and that augment the state's water supply or provide other local benefits. A maximum funding amount of combined grant and loan per eligible water recycling project is set as $20 million. A set grant funding to 25 percent of eligible costs, up to $5 million per project with the balance of the eligible project cost to be funded with a low interest loan.

Proposition 13 provides both grants and additional SRF loan funds. 25% of project cost is allocated towards Proposition 13 Grant, while 75% of project cost is allocated towards State Revolving Fund (SRF) Loan with a low interest rate (typically it ranges between 2.8% and 2.4 %). There is no application deadline. The grant is allocated on a first come first serve basis.

Proposition 50

Water Quality, Supply and Safe Drinking Water Projects. Coastal Wetlands Purchase and Protection, State of California

Proposition 50 authorizes $3,440,000,000 general obligation bonds, to be repaid from state's General Fund, to fund a variety of water projects including: specified CALFED Bay-Delta Program projects including urban and agricultural water use efficiency projects; grants and loans to reduce Colorado River water use; purchasing, protecting and restoring coastal wetlands near urban areas; competitive grants for water management and water quality improvement projects; development of river parkways; improved security for state, local and regional water systems; and grants for desalination and drinking water disinfecting projects.

Appendix E provides copy of Proposition 50 and SAWPA Project information Form for Prop 50 potential funding.

Bureau of Reclamation

A bond measure was passed in 1984 authorizing the state to issue $25 million in low-interest loans for water recycling projects, which met certain technical and cost-effective criteria. This fund would be replenished through the repayment of loans drawn from it. Loan repayment was slow and the fund was being quickly depleted and subsequent bond measures were necessary to support the fund.

This program is administered by the SWRCB, Office of Water Recycling. Loan funds are available up to 100 percent of design and construction of water recycling projects. However, no single project may receive more than $5 million. Loans may be for a period of up to 20 years with an interest rate equal to the state's most recent General Obligation Bond sale interest rate.

California State Revolving Fund (SRF) Loans

The Federal Clean Water Act provides for the creation of a State Revolving Fund (SRF) Loan Program capitalized in part by federal funds. Between $150 to $200 million are available each year in this program. This program, which was originally designed to provide funding for high priority wastewater treatment and disposal

projects, was revised in September 1990 to include water recycling projects within its list of eligible projects.

SRF low interest loans are available through the California Department of Water Resources (DWR). With a successful application, DWR will commit funds on a predetermined schedule. California requires repayment of SRF loans at ½ of the interest rate it pays on the immediately preceding sale of its General Obligation Bonds, and therefore these loans are for a very low interest rate, currently at 2.4 percent. The State sells bonds on roughly 2-month intervals. Term for repayment may be from 15 to 20 years. It is thought repayment can be structured with an escalating annual debt service payment (if required) to match a reliable schedule of hook-ups, to track with anticipated cash flow from the project.

City's water recycling project already on the SWQCB priority list. Loans are provided based upon the readiness to construct, project qualification and availability of funds. Terms for a SRF loan are that the maximum repayment period is expected to be 20 years starting with the date on the grant/loan contract.

Other Grants and Loans

Occasionally, federal, state, and/or local grants and loans are available for water recycling projects. Federal funds are mostly available for low-income localities, and it is thought the service area may not qualify. City staff usually provides tracking of the availability and application requirements for locally available grants and loans.

General Obligation Bonds

Proposition 46 passed in 1986 opened the door to financing public facilities through general obligation (G.O.) bonds. G.O. bonds are the most efficient form of long-term financing (other than SRF loans) because the bond issues require neither a reserve fund nor funded interest during construction of the project financed. Costs of issuance are lower because these bonds are easier to structure, review from a legal standpoint, and analyze for credit-worthiness. G.O. bonds are secured by the properties in the City. Costs are generally borne by property owners in proportion to the assessed valuation of their properties. There would be considerable inequity because assessed valuation in many cases would not be representative of the true costs of the property if it had not changed ownership. Property owners throughout the City would in effect subsidize recycled water users. The major difficulty in issuing G.O. bonds is that they need to be approved by a two thirds majority of the voters. Educating the voters about the issues require time and resources. Because of the inequities discussed above, approval of two thirds of the electorate required before the bonds could be sold would be difficult.

Revenue Bonds

Revenue bonds are secured solely by a pledge of revenues. Usually an enterprise's revenues are derived from the facility that the bonds are used to acquire, construct, or improve. There is no obligation on the part of the enterprise to levy assessments for the payment of revenue bond service or for the maintenance and operation of the enterprise that produces the revenues that are pledged to pay bond service.

One measure of revenue bond security is the "coverage" provided. Coverage is the ratio of net revenue to annual bond service requirements. Net revenue is defined as the difference between operating revenues (including interest but not including connections fees) and the operating expenses (not including expenses related to new connections or depreciation). For revenue bonds to be saleable, the issuer normally pledges to maintain net revenue of 1.25 times annual bond service. The marketability of the bonds will be enhanced if it can be shown that the actual coverage provided by the net revenues will exceed the pledged ratio.

In addition, revenue bond buyers demand further safeguards by the establishment of a reserve fund equal to the average or maximum annual bond service. This reserve is normally created from the proceeds of the bond sale. The reserve is maintained for the entire life of the bond issue to meet annual principal and interest requirements in case operating revenues are insufficient for bond service in any given year.

Certificates of Participation (COPs)

This form of financing provides long term financing through a lease, installment sale agreement or loan agreement that is not subject to statutory limitations such as elections, interest rate limits, etc. The parties involved in a COP issue include the public entity (lessee), another public agency such as a redevelopment agency, or parking authority (the lessor) and a trustee. Legal basis for COPs comes from basic laws that allow public entities to enter into lease agreements one year at a time, with the understanding that a public entity cannot obligate future governing bodies to honor a lease agreement. This may result in COPs commanding a higher interest rate than revenue bonds. In other respects COPs are similar to revenue bonds.

Federal Budget Line Item Appropriations

Various large recycled water projects (such as the West Basin MWD Recycled Water Project located in the South Bay area of Los Angeles County) have been funded in part through Federal line item appropriations. This funding alternative is unusual and requires a lengthy lead-time.

7.2 SUMMARY

To summarize, standard practice for water recycling projects such as this one relies on California SRF loans, Proposition 13 grants, water system cash reserves, and, as required, long-term debt. The availability of water system cash reserves, or relatively short-term loans from the City, with repayment at interest from the water sales, is an important financing resource. The City would like to explore grant under the federal funds as discussed, Proposition 13 grants, and SRF loan. It is obvious that some kind of innovative project funding approach is must for the economical viability of the City's water recycling project.

The Section 8 of this master plan evaluates the potential project alternatives under following economical scenarios:

- No grant and SRF (City' own financing)
- Only 25% Proposition 13 grants
- Combination of proposition 13 and low interest rate SRF for the 75 percent of project cost.

Economic analysis based upon 100% grant money is not fair without commitment of full grant.

CITY OF RIVERSIDE

RECYCLED WATER PHASE I FEASIBILITY STUDY
AND CITYWIDE MASTER PLAN

Section 8

Project Recommendations and Implementation Plan

PARSONS

SECTION 8

PROJECT RECOMMENDATION AND IMPLEMENTATION PLAN

This section describes the recommendations and implementation plan for the Phase I Project and Citywide Water Recycling Master Plan.

The scope of this study included the following issues and topics:

- Recycled water source (City of Riverside, RWQCP), quantity and quality analysis;
- Identify potential direct recycled water users;
- Recycle water demand and supply analysis;
- Development of alternatives for recycled water system alternatives;
- Preliminary cost estimates and cost economics for most viable alternatives;
- Financial, institutional and regulatory issues;
- Recommendation of the most viable alternative; and
- Implementation plan for the recommended alternative.

8.1 CITYWIDE WATER RECYCLING MASTER PLAN

Section 5 describes the ultimate recycled water system to serve users within the City and JCSD and also Western MWD. The citywide project has a significant number of potential recycled water users with an estimated demand of 20,400 AFY. Preliminary capital and operational cost estimates and life-cycle costs for the citywide project were developed. This report will be used as road map to implement phased water recycling projects. A predesign/feasibility study, hydraulic analysis, funding plan, and economic analysis will be required for each phase.

8.2 WATER RECYCLED PHASE I PROJECT

Section 6 examined the following alternatives for developing Phase I - Project within the City and delivery of recycled water to JCSD. Each of these alternatives was also reviewed based on installing the ultimate pipe size required for the citywide water recycling system. The alternatives included:

- **Alternative 1a** – System designed with no citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue.
- **Alternative 1b** – System designed with citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue.
- **Alternative 2a** – System designed with no citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue, Adams Street and Magnolia Avenue.

- **Alternative 2b** – System designed with citywide expansion considerations for JCSD and City of Riverside Users up to Arlington Avenue, Adams Street and Magnolia Avenue.

Section 6 also provided preliminary capital and operational cost estimates for the two alternatives and cost economics and life-cycle costs for each of the alternatives.

8.2.1 Phase I Project Implementation Recommendations

The following issues will impact the selection of the most viable alternative:

- Most practical and cost-effective;
- Consideration of groundwater recharge during low demand period;
- Refinement of distribution system during predesign; and
- Extent of environmental impacts.

As the initial phase of a water recycling system, Parsons recommends implementing Alternative 1a or 2a with grants and SRF loan. Both alternatives are very close and within the error of margin. Selection of any of these alternatives will depend upon conformation/firming of agreements with users and availability of funds.

8.2.2 Phase I Project Implementation Guidelines

Implementation of a recycled water program must consider many issues before design and construction programs are initiated. These issues must be resolved or addressed before final project feasibility and scope can be accurately determined. The following proposed implementation sequence provides a directive for effective implementation of the water recycling program in conjunction with the City's overall objectives. All of these tasks should be completed prior to project design.

- **Water Quality Issues.** Discuss water quality and groundwater recharge objectives with the RWQCP, especially regarding total dissolved solids (TDS) and nitrogen limitations. This issue is critical to the viability of the project and needs must be definitely resolved prior to implementation of the program.
- **Water Recycling Ordinance.** Consider issuing an ordinance on water recycling and a reuse compliance policy. This ordinance could mandate use of recycled water, and incorporate rules and regulations regarding the use of recycled water pursuant to DHS guidelines.
- **Recycled Water Supply.** Reevaluate the availability of the recycled water supply for the City of Riverside during different periods of the year based on additional information concerning JCSD and Western MWD systems. Consider implementing the project in phases in order to minimize the use of potable water during summer months.

- **Agreement with JCSD and Neighboring Cities.** Develop an agreement with JCSD and neighboring cities. Emphasize the following issues:
  - Recycled water purchase cost
  - JCSD and neighboring Cities system upgrade capital and O&M costs sharing
  - Recycled water sharing during different months of the year
  - Priority for surplus City of Riverside RWQCP water

  In the event of RWQCP expansion, the City should receive priority for all surplus water exceeding the City of Riverside requirements. This will provide an opportunity to serve more users within the City and within neighboring areas including JCSD, Rubidoux CDS, City of Norco, etc.
- **Users Involvement.** Contact all the identified users in order to get "buy-in" to a water recycling system as well as to confirm their demands. Obtain letters of intent from each user.
- **Environmental Documentation.** Prior to implementing the proposed project, the City will have to comply with the requirements of the California Environmental Quality Act (CEQA). An Initial Environmental Study (EIS) would investigate issues such as the potential impacts from the project construction on local traffic, air quality, biological resources, and/or archaeological resources. Operational impacts from project, including impacts to groundwater quality, would also be addressed. If no significant impacts were identified in the EIS, a Negative Declaration could be prepared. Otherwise, an Environmental Impact Report (EIR) will be required in order to fully address and mitigate any significant environmental effects.
- **Grant/Loan Application.** In order to obtain financial assistance from the State or other agencies, specific details of the proposed water recycled project must be provided in the grant/loan application. Due to the large number of grant/loan applicants and the long lag time between the application and granting of various loans, submission of all required information should be in as timely a fashion as feasible. Additionally, for state loans, certification of the required environmental documentation is required prior to an application package being deemed complete.
- **Engineering Report (Title 22 Report).** Title 22, Chapter 3, Article 7, Section 60323 of the California Code of Regulations requires an engineering report to be filed for any project producing or supplying recycled water for direct reuse. The report includes a description of recycled water production, transmission of the recycled water, existing and future users, and the proposed method of administering the recycled water system. Both the Regional Water Quality Control Board and the Department of Health Services review the Title 22 report prior to the Board issuing Water Reclamation Requirements for the project.
- **Public Information Program.** Develop a public information/awareness program in conjunction with the related conservation program.

- **Conversion Costs.** Estimate on-site conversion requirements and costs for each user.
- **Reliability and Public Health Protection.** Consider treatment reliability and public health protection guidelines (Appendix A).
- **Groundwater Recharge.** Evaluate the feasibility of groundwater recharge with recycled water from the RWQCP during low demand periods when up to 15-18 mgd of supply could be available. It may be cost effective for the City to recover recharged water as potable without any further treatment.

APPENDIX A

California Regional Water Quality Control Board
Santa Ana Region

January 19, 2001

ITEM: 10

SUBJECT:

Waste Discharge Requirements for the City of Riverside's Regional Water Quality Control Plant, Riverside County, Order No. 01-3, NPDES No. CA0105350.

DISCUSSION:

See Attached Fact Sheet

RECOMMENDATION:

Adopt Order 01-3, NPDES No. CA0105350, as presented.

Comments were solicited from the following agencies:

U.S. Environmental Protection Agency, Permits Issuance Section (WTR-5) - Terry Oda
U.S. Army District, Los Angeles, Corps of Engineers, Regulatory Branch
U.S. Fish and Wildlife Service - Carlsbad
State Water Resources Control Board, Office of the Chief Counsel - Ted Cobb
State Water Resources Control Board, Division of Water Quality - James Kassel
State Department of Health Services, Santa Ana – Frank Hamamura
State Department of Health Services, Santa Barbara - Jeff Stone
State Department of Health Services, San Diego – Toby Roy
State Department of Water Resources - Glendale
State Department of Fish and Game - Long Beach
Orange County Water District - Nira Yamachika
Riverside County Flood Control and Water Conservation District
Santa Ana River Dischargers Association
Santa Ana Watershed Project Authority – Joseph Grindstaff
Inland Empire Utilities Agency - Douglas D. Drury
Orange County Coastkeeper
Lawyers for Clean Water C/c San Francisco Baykeeper

California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

January 19, 2001

FACT SHEET

The attached pages contain information concerning an application for the renewal of waste discharge requirements and a National Pollutant Discharge Elimination System (NPDES) permit.

I. FACILITY DESCRIPTION:

The City of Riverside operates the Riverside Regional Water Quality Control Plant (RRWQCP). The RRWQCP is a municipal wastewater treatment plant located on a 121 acre site at 5950 Acorn Street in the City of Riverside, south of the Santa Ana River near the intersection of Van Buren Boulevard. The RRWQCP discharges tertiary treated wastewater to Reach 3 of the Santa Ana River.

The plant started operation in 1946 and underwent major upgrading in 1992. The City completed construction of the Hidden Valley wetlands in March, 1995. Approximately 50 acres of constructed wetlands are being used for additional wastewater treatment (nitrogen removal).

The discharge from the facility is currently regulated by Order No. 95-18, NPDES No. CA 0105350, which expired on May 1, 2000. On October 29, 1999, the discharger submitted a complete application for the renewal of the NPDES permit.

The RRWQCP treats wastewater from the City of Riverside and from the following sewering agencies that have contractual agreements with the City of Riverside: Edgemont Community Services District, Jurupa Community Services District, and Rubidoux Community Services District.

The RRWQCP is designed to treat 40 million gallons per day (mgd) of wastewater. The annual average daily flow into the plant is 32.26 mgd with the highest monthly average value of 32.81 mgd.

The RRWQCP consists of two secondary treatment plants (Plants 1 and 2), one tertiary treatment plant that treats the flow from both Plants 1 and 2, and solids handling facilities that treat the sludge produced from wastewater treatment.

Influent flows into the RRWQCP are metered at a common headworks structure consisting of barscreens and vortex grit removal. Effluent from the headworks is proportionately channeled to Plant 1 and Plant 2. The following table shows the appurtenant structures in each plant:

Plant 1 20 MGD Capacity	**Plant 2 20 MGD Capacity**
6 primary sedimentation basins 4 aeration basins w/ anoxic zones 4 secondary sedimentation basins	4 primary sedimentation basins 6 aeration basins w/ anoxic zones 4 secondary sedimentation basins

Prior to tertiary treatment, flows from Plants 1 and 2 are combined in equalization basins. Tertiary treatment consists of alum and/or polymer injection, dual media filtration (16 filters), chlorination (3 chlorine contact tanks), and dechlorination by sulfur dioxide (SO_2). Tertiary treated wastewater is then discharged to Reach 3 of the Santa Ana River. Currently, a portion of the tertiary treated wastewater is directed through constructed wetlands for further nitrogen removal.

Solids handling includes dissolved air flotation (DAF) thickeners, anaerobic digestion (5 digesters), dewatering (2 belt presses) and air drying.

The RRWQCP discharges tertiary treated wastewaster at five points designated Serial Nos. 001, 002, 003, 004, and Serial No. 005. Discharge Serial No. 001 is the main discharge point where all treated effluent from the plant is discharged. It discharges into an earthen channel that leads to a splitter box where the waste stream is split into two, one discharges directly into the river, the other goes to the Hidden Valley wetlands. Prior to entering the wetlands, at Structure No. 2, the waste stream is again split into two, one goes to a metering structure where the waste could either be discharged to the river (Discharge Serial 004) or diverted into a wetland pond after which the waste is discharged through Discharge Serial No. 005. The other waste stream at Structure No. 2 goes to the wetland ponds after which it is discharged through Discharge Serial No. 003. This could best be visualized by looking at Attachment "B" of this fact sheet. The discharge points are described as follows:

Discharge Serial No.	Latitude	Longitude	Description
001	33°57'55"	117°27'28"	Effluent metering structure at dike
002	33°57'48"	117°28'30"	Splitter box discharge
003	33°57'48"	117°29'52"	Wetland effluent structure 1
004	33°57'52"	117°29'36"	Cottonwood diversion structure
005	33°58'01"	117°30'03"	Wetland effluent structure 2

The facility location is shown in Attachment "A" of this fact sheet. Page 2 of Attachment "A" shows the RWQCP location in relation to the discharge points and Hidden Valley wetlands.

A schematic diagram of the treatment process and discharge points is shown in Attachment "B" of this fact sheet.

II. REGULATORY BASIS FOR WASTE DISCHARGE REQUIREMENTS:

This Order includes requirements that implement the Water Quality Control Plan (Basin Plan), which was adopted by the Regional Board on March 11, 1994. The Basin Plan was approved by the Office of Administrative Law and became effective on January 24, 1995. This Plan specifies water quality objectives and beneficial uses for the waters of the Santa Ana Region. The Plan also specifies wasteload allocations for total dissolved solids (TDS) and total inorganic nitrogen[1] (TIN) for the upper Santa Ana River dischargers, including the RRWQCP. These allocations were established to assure compliance with the TDS and TIN objectives for the River and to protect underlying groundwater. The TDS and TIN limits specified in this Order are based on the wasteload allocations.

Tertiary treated wastewater from the facility is discharged to Reach 3 of the Santa Ana River. The beneficial uses of Reach 3 of the Santa Ana River include agricultural supply, groundwater recharge, water contact recreation, non-contact water recreation, warm freshwater habitat, wildlife habitat, and rare, threatened or endangered species. The discharge points overlie the Chino III Groundwater Subbasin, the beneficial uses of which include municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply. Receiving waters that may be affected by the discharge include the downgradient groundwater subbasins in Orange County, which are used for municipal and domestic supply and other uses.

Under dry weather conditions, most of the flow in Santa Ana River, Reach 3, is comprised of effluent discharges from municipal wastewater treatment facilities, including the discharge from the RRWQCP. Very little natural flow exists in the River.

Article 5, Section 60315 of Title 22, Chapter 3, "Reclamation Criteria" of the California Code of Regulations specifies that recycled water used as a source of supply in a nonrestricted recreational impoundment shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater (tertiary treated). The degree of treatment specified represents an approximately 5-log reduction in the virus content of the water. The State Department of Health Services has determined that this degree of virus removal is necessary to protect the health of people using these impoundments for water contact recreation. The Department of Health Services has developed wastewater disinfection guidelines ("Wastewater Disinfection for Health Protection", Department of Health Services, Sanitary Engineering Branch, February 1987) for discharges of wastewater to surface waters where water contact recreation (REC-1) is a beneficial use. The disinfection guidelines recommend the same treatment requirements for wastewater discharges to REC-1 waters as those stipulated in Title 22 for supply of recycled water to nonrestricted recreational impoundments, since the public health risks under both scenarios are analogous. The disinfection guidelines are based on sound science and are widely used as guidance to assure public health and beneficial use protection.

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1 *Total Inorganic Nitrogen (TIN) is the sum of nitrate-N, nitrite-N and ammonia-N.*

Santa Ana River, Reach 3 is not a "nonrestricted recreational impoundment," nor is "recycled water[2]" being used as a supply source for the River pursuant to the definitions in Title 22. However, except during major storms, most of the flow in the River is composed of treated municipal wastewater discharges. The River is used for water contact recreation and, accordingly, is designated REC-1 (water contact beneficial use). People recreating in the River face an exposure similar to those coming in contact with recycled water in an impoundment. Therefore, to protect the water contact recreation beneficial use and to prevent nuisance and health risk, it is necessary and appropriate to require the same degree of treatment for wastewater discharges to the River as would be required for the use of recycled water in a nonrestricted recreational impoundment. Thus, this Order specifies requirements based on tertiary or equivalent treatment.

The City proposes to discharge secondary treated and disinfected wastewater into Reach 3 of Santa Ana River, when 20:1 dilution of the wastewater can be provided by the natural flow of the River at the point of discharge. The Department of Health Services has determined that public health and water contact recreation beneficial uses will be protected provided that at least 20:1 dilution of secondary treated and disinfected wastewater by natural receiving waters is achieved. (Wastewater Disinfection for Health Protection", Department of Health Services, Sanitary Engineering Branch, February 1987). Based on best professional judgement, the proposed Order implements these public health protection guidelines.

The proposed Order specifies numeric and narrative limits for the control of toxic substances. These limits are based on the following:

1. 1995 Basin Plan
2. Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California adopted on March 2, 2000 by the State Water Resources Control Board (hereinafter, "Policy")
3. Code of Federal Regulations (40 CFR Parts 122-503)
4. U.S. EPA, Quality Criteria for Water (1986)
5. National Toxics Rule (Federal Register, vol. 57, No. 256, Dec. 22, 1992, 60848-60922)
6. U.S. EPA, Office of Water Policy and Technical Guidance on Interpretation of Aquatic Life Metals Criteria (October 1, 1993)
7. Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001, March 1991)
8. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California, promulgated in May 18, 2000 by the U.S. EPA.
9. Santa Ana River Use-Attainability Analysis, Volume 10, Calculation of Total-to-Dissolved Metal Ratios to Translate Site-Specific Water Quality Objectives into NPDES Effluent Limits", Risk Sciences (May, 1994).

This Order implements federal regulations specified in 40 CFR 122, 123, 124, 125, 129 and 501, which pertain to all publicly-owned treatment works (POTW) with average design flows exceeding 1 mgd.

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[2] *As defined in the Reclamation Criteria, recycled water means water which, as a result of treatment of domestic wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.*

This Order contains requirements for the implementation of an effective pretreatment program pursuant to Section 307 of the Federal Clean Water Act Parts 35 and 403 of Title 40, Code of Federal Regulations (40 CFR 35 and 40 CFR 403) and Section 2233, Title 23, California Code of Regulations.

In accordance with Section 402 (p) of the Federal Clean Water Act, EPA published the final regulations for storm water runoff on November 16, 1990 (40 CFR Parts 122, 123 and 124). Industrial facilities, including POTW sites, are required to obtain NPDES Permits for storm water discharges. On April 17, 1997, the State Board adopted a General Industrial Storm Water Permit, Order No. 97-03-DWQ, NPDES No. CAS000001. There are no stormwater discharges to surface waters from the RRWQCP facility site. All stormwater are captured and treated at the plant. Therefore, coverage under Order No. 97-03-DWQ is not necessary for this facility

The State Water Resources Control Board adopted a water reclamation policy on January 6, 1977. This policy requires that wastewater reclamation requirements be issued to primary users of recycled water. Reclamation requirements are included in this Order to address any current and future use of recycled water.

The State Water Resources Control Board adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (Policy) on March 2, 2000. This Policy establishes implementation provisions for priority pollutant criteria promulgated by the U.S. Environmental Protection Agency (U.S. EPA) through the National Toxics Rule (NTR) (promulgated on December 22, 1992 and amended on May 4, 1995) and through the California Toxics Rule (CTR) (promulgated on May 18, 2000).

III. PROPOSED EFFLUENT LIMITATIONS:

The limitations in this Order are intended to control pollutants in the waste discharge, maintain water quality, and protect the beneficial uses of the affected receiving waters. Revisions to water quality objectives or to beneficial uses designated in the Basin Plan may occur in the course of periodic review and update of the Plan. These waste discharge requirements will be re-evaluated and may be revised to accommodate any of these changes.

In determining compliance with the effluent limitations in this Order, no mixing zone allowance is provided. No mixing zone allowance is proposed since there are essentially no natural receiving waters at the points of discharge.

A. Biological/ Mineral limitations

1. Biochemical Oxygen Demand (BOD), Suspended Solids, and Total Dissolved Solids (TDS)

The proposed Biological Oxygen Demand (BOD) and suspended solids limits are based on values that are achievable with tertiary treatment. These limits are intended to ensure that only adequately oxidized wastewater is discharged.

The proposed TDS limit for the discharge to Reach 3 of the Santa Ana River is based on the Basin Plan wasteload allocation for TDS discharges to the Santa Ana River system. To implement the Basin Plan, the proposed Order specifies a TDS limit of 650 mg/l, and a TDS limit based on the quality of the water supplied to the service area plus a reasonable use increment. The more restrictive of the two TDS limits applies to the discharges.

The Basin Plan recognizes that strict compliance with the TDS limits may be difficult to achieve. The Basin Plan describes the regulatory approach the Regional Board uses to address such situations. The Board incorporates offset provisions in waste discharge requirements whereby dischargers can participate in approved programs to offset TDS discharges in excess of specified TDS limits. Provided that the discharger implements an approved offset program, and provided that the discharger makes all reasonable efforts to improve the TDS quality of the water supply (and, thereby, the wastewater), the Board has indicated in its offset provisions its intent not to enforce violations of the TDS limits, except as required by Sections 13385 (h) and (i) of the California Water Code. The Board has indicated that participation in the watershed-wide study of TDS and total inorganic nitrogen (TIN) which is being conducted under the auspices of a number of dischargers and other interested parties, with participation by the Regional Board and coordination by the Santa Ana Watershed Project Authority (SAWPA), will constitute an acceptable TDS offset for the duration of the study. The study may lead to revised findings regarding TDS assimilative capacity and recommendations for changes to the TDS wasteload allocation and other TDS management strategies

2. Total Inorganic Nitrogen (Nitrate, Nitrite, Ammonia)

High concentrations of nitrates in domestic water can be toxic to human life. To protect human health, the concentrations of nitrates in lakes, streams, and ground water which are sources of drinking water shall not exceed 45 mg/l (as NO_3) or 10 mg/l (as N) as a result of controllable water quality factors.

Un-ionized ammonia exists in equilibrium with ammonium (NH_4^+) and hydroxide (OH^-) ions. The concentrations of ammonium and hydroxide ions change with temperature, pH and salinity of the water.

On November 15, 1991, the Regional Board adopted a revised wasteload allocation for total inorganic nitrogen in Publicly Owned Treatment Works (POTW) discharges to the Santa Ana River and its tributaries and to groundwater in the Upper Santa Ana River Basin. In accordance with the wasteload allocation, the proposed Order specifies a limit of 13.0 mg/l for flows up to 38 million gallons per day (mgd); for flows in excess of 38 mgd, the TIN limit is 10 mg/l.

In accordance with the Basin Plan, this Order specifies an effluent limitation of 5.0 mg/l for total ammonia-nitrogen.

B. Inorganic Salts

Certain inorganic chemical constituents may interfere with the beneficial uses of waters. In the Santa Ana River Basin, water is sometimes used as many as three times before ultimately being discharged to the ocean, and each cycle of use or reuse adds some increment of salts to the water. In order to protect the Basin waters for their beneficial uses, the Regional Board has determined that those inorganic chemical constituents in wastewaters which may adversely affect subsequent uses of those waters should be controlled. The constituents normally controlled and the beneficial uses that may be affected are described below.

Boron

Boron is not considered a problem in drinking water supplies until concentrations of 20-30 mg/l are reached. In irrigation, boron is an essential element. However, concentrations of boron in excess of 0.75 mg/l may be deleterious to certain crops. The maximum safe concentration of even the most tolerant plants is about 4.0 mg/l of boron.

Chloride

Excess chloride concentrations lead primarily to economic damage rather than public health hazards. Because excess chlorides will affect the taste of potable water, drinking water standards are generally based on potability standards rather than on health. Chlorides are considered to be among the most troublesome anions in water used for industrial or irrigation purposes. Chlorides significantly affect the rate of corrosion of steel and aluminum and are generally more toxic to plants than sulfates. A safe value for irrigation is considered to be less than 150 mg/l of chloride.

Fluoride

Fluoride in water supply used for industrial or irrigation purposes has limited detrimental effects. Fluoride in optimum concentrations in water supply (concentration dependent upon the mean annual air temperature) is considered beneficial for the teeth of the children, but concentrations above approximately 1 mg/l, or its equivalent, at a given temperature, are considered likely to increase the risk of occurrence of objectionable dental fluorosis.

Sodium

The presence of sodium in drinking water may be harmful to persons suffering from cardiac, renal, and circulatory diseases. It can contribute to tastes and with the taste threshold depending on the sodium salt involved. Sodium in excess concentrations in irrigation water reduces soil permeability to water and air and increases its solution pH. The deterioration of soil quality because of the presence of sodium in the irrigation water is a steadily cumulative process, and one that is accelerated by poor drainage.

Sulfate

Excessive sulfates in potable waters can lead to laxative effects, but this effect is usually temporary. It is of particular concern when sulfate is present in the form of magnesium sulfate. There is some taste effect from magnesium sulfate in the range of 400-600 mg/l as $MgSO_4$. Sulfate concentrations in waters native to this region are normally low, less than 40 mg/l, but imported Colorado River water contains approximately 300 mg/l of sulfate.

Total Dissolved Solids

The Department of Health Services recommends that the concentration of total dissolved solids in drinking water be limited to 500 mg/l (secondary drinking water standards). At present, no limitation is attributable to public health problems other than taste. For irrigation uses, suitable water under most conditions should have a total dissolved solids concentration under 700 mg/l. Quality-related consumer cost analyses in the basin planning program indicated that a benefit exists at or below 500 mg/l.

Total Hardness (as CaCO3)

The major detrimental effect of hardness is economic. Any concentration over 100 mg/l results in a waste of soaps and the encrustation of utensils in domestic uses. Hardness in industrial cooling waters is generally objectionable above 50 mg/l. However, higher hardness in surface waters mitigates toxicity from several heavy metals and thus can be beneficial to aquatic life.

Based on a review of historical effluent data, staff has determined that there appears to be no reasonable potential for the waste discharge to cause or contribute to violations of water quality objectives for individual mineral constituents (boron, chloride, fluoride, sodium, sulfate, and total hardness). Consequently, there are no effluent limitations for these constituents. However, monthly monitoring is still required to be conducted for these constituents.

C. Trace Constituent Limitations

The U.S. EPA has identified 126 priority pollutants, including metals and organic chemicals. For certain of these trace constituents, numeric limitations for the protection of aquatic life and public health are specified in this Order. For discharges to Santa Ana River, Reach 3, the numeric limitations for trace constituents are based on the U.S. EPA's California Toxics Rule. In some cases, these criteria are equations in which hardness is the variable. The actual numeric value of the criterion is calculated using hardness measurements. In determining effluent limitations for these constituents, a fixed hardness value of 250 mg/l was entered in the calculations. The fixed hardness value is based on the 5th percentile of 4 day average of hardness measurements taken in the Santa Ana River, downstream[3] of the discharge point from June 1998 to January 2000. Use of a fixed hardness value results in a fixed numerical effluent limit for each metal, thereby simplifying the effluent limitation and facilitating the determination of compliance.

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3 *The upstream river water hardness was higher than downstream river water hardness and use of downstream hardness will result in more stringent effluent limits.*

Federal regulations require that the effluent limits for metals be expressed as the total recoverable form. To comply with this requirement, the dissolved criteria are translated into total recoverable effluent limits using ratios of the total recoverable metals to dissolved metals (t/d) concentrations. The State Water Resources Control Board's Policy stipulates that in the absence of site-specific information, the conversion factors cited in the CTR should be used as the t/d translators. Site-specific translators for Cd, Cu and Pb, were developed in a study and reported in the "Santa Ana River Use-Attainability Analysis, Volume 10, Calculation of Total-to-Dissolved Metal Ratios to Translate Site-Specific Water Quality Objectives into NPDES Effluent Limits", Risk Sciences (March, 1994).

No numeric limitations are specified for those priority pollutants where there was no demonstrated reasonable potential to cause a water quality objective to be exceeded. To determine reasonable potential for pollutants to exceed water quality objectives, Board staff used the procedures outlined in the State Board's Policy. The maximum effluent concentrations for individual constituents that were detected in the effluent were compared to the criteria values specified in the California Toxics Rule. If the detected concentrations were less than the criteria, it was concluded that the effluent posed no reasonable potential to exceed water quality objectives for that constituent. In situations where the criteria value and all available effluent and receiving water data were below detection limits, staff was unable to determine if there was a reasonable potential to cause a water quality objective to be exceeded, due to unavailable and/or insufficient data. Therefore, effluent limits for those constituents also were not included in this Order. Only copper showed a reasonable potential to exceed water quality objectives. Limits for those constituents are based on the criteria values specified in the California Toxics Rule. The calculations for arriving at the effluent limits for Cu is in the Regional Board's file for RRWQCP.

Although past monitoring data for bis (2-ethylhexyl) phthalate indicate its presence in the effluent, recent studies conducted by the discharger and others indicate that the submitted results may be suspect due to contamination of samples during sampling and testing. These studies indicate that the contamination may be due to the use of plastic bottles and tubing (bis (2-ethylhexyl) phthalate is widely used in such materials) during sampling and testing. Based on this new information, staff believes that there is not sufficient data to make a determination that there is reasonable potential for the discharger to cause or contribute to an exceedance of the bis (2-ethylhexyl) phthalate objective in the receiving water. Therefore in accordance with Section 2.2.2.A. of the Policy, no limit for bis (2-ethylhexyl) phthalate is included in the Order. Rather, the Order includes an interim requirement for the discharger to conduct a controlled and intensive one-year monitoring program of the effluent for bis (2-ethylhexyl) phthalate using methods and equipment that would prevent sample contamination, produce a reliable test result and use a test detection level acceptable to the Regional Board. Should monitoring data show a reasonable potential for the constituent to exceed criteria values, this Order includes a reopener provision that allows the Regional Board to reopen the Order and include a limit for bis (2-ethylhexyl) phthalate.

Although limits for most of the priority pollutants are not included in this Order, the discharger is required to routinely monitor the effluent for all priority pollutants. If warranted by the results of this monitoring, this Order will be reopened to incorporate appropriate effluent limits.

D. Toxicity Limitations

This Order requires the discharger to conduct chronic[4] toxicity testing of the effluent on a monthly basis. The Order also requires the discharger to conduct an Initial Investigation Toxicity Reduction Evaluation (IITRE[5]) program when either the two month median of toxicity test results exceeds 1 TUc or any single test exceeds 1.7 TUc for survival endpoint. Based on the results of this investigation program and at the discretion of the Executive Officer, a more rigorous Toxicity Reduction Evaluation/Toxicity Identification Evaluation (TRE/TIE) may be required. A re-opener provision is included in the Order to incorporate a chronic toxicity effluent limitation if warranted by the toxicity test results.

E. Compliance

Many of the objectives specified in the California Toxics Rule, and the effluent limits that implement them, are at extremely low concentrations. In several cases, these concentrations are below current laboratory detection values. As such, it is necessary to require laboratory analyses to be performed to the lowest possible concentrations. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (Policy) includes a list of priority pollutants with their respective Minimum Levels (ML)[6] on which "reported Minimum Levels" (i.e., quantitation values for the sample) shall be based. The Policy recognizes that the "reported ML" may be orders of magnitude different than the listed MLs depending on the amount of dilution/concentration required for sample preparation, and the amount of dilution necessary to address matrix interferences. Unfortunately, the policy lacks guidance for the development of appropriate "reported MLs".

For the last several permit cycles, the Regional Board has required discharges to meet practical quantitation levels (PQLs[7]). The PQLs for wastewater were developed based on the following:

1. A survey of laboratories in the Southern California area and a review of method detection levels (MDLs) in accordance with 40 CFR 136 for a wastewater matrix reported by local laboratories;

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4 *The chronic test method for the water flea "Ceriodaphnia dubia" also measures acute toxicity.*

5 *An IITRE is the initial stage of investigation conducted prior to implementing a complete toxicity reduction evaluation (TRE) study. A TRE is a stepwise process for identifying the agent(s) and/or source(s) of toxicity in a given effluent.*

6 *Minimum Level is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.*

7 *PQL is the lowest concentration of a substance that can be determined within ± 20 percent of the true concentration by 75 percent of the analytical laboratories tested in a performance evaluation study. Alternatively, if performance data are not available, the PQL is the method detection limit (MDL) x 5 for carcinogens and MDL x 10 for noncarcinogens.*

2. The consensus PQLs determined during the meeting of major Southern California laboratories with the Regional Board staff on January 28, 1992. The consensus PQLs are believed to represent the lowest quantitation levels that can be achieved by most laboratories in Southern California based on proven laboratory performance and the reasonable application of best available analytical technology for most toxic substances;

3. The report "A Study To Determine The Practical Quantitation Levels (PQL) For Selected Water Chemistry Parameters Analyzed by Commercial Laboratories Operating In The Santa Ana River Watershed" (Risk Sciences, 1993). This report recommended PQLs for cadmium, copper, lead, selenium, and silver that better represented the actual PQLs attained by analytical laboratories performing analyses for these substances in a recycled water matrix.

Order No. 01-3 sets the PQLs listed in Attachment "A" of the monitoring and reporting program as the "reported MLs" for those constituents listed, until July 1, 2001. Order No. 01-3 requires that by July 1, 2001, the discharger shall meet the quantitation levels specified in Attachment "B" of the Monitoring and Reporting Program No. 01-3, unless an alternative minimum level is approved by the Regional Board's Executive Officer. The Executive Officer is authorized to extend this schedule provided that the discharger demonstrates good cause and that the extension is as short as possible.

In cases where the discharger believes that the sample matrix justifies a different "reported ML", the discharger is required to demonstrate to the satisfaction of the Regional Board's Executive Officer the appropriateness of the alternative "reported ML" for that sample matrix prior to July 1, 2001.

All analytical data are required to be submitted with the corresponding MDLs and MLs. Sample results shall be reported as "DNQ" (Detected, but Not Quantified) if the results are less than the reported ML, but greater than the MDL. Sample results shall be reported as "ND" (Not Detected) if the results are less than the MDL.

Dischargers shall be deemed out of compliance with an effluent concentration limit if the concentration of the effluent sample is greater than the effluent limit and greater than or equal to the "reported ML". Dischargers shall not be deemed out of compliance for any sample result reported as DNQ or ND. However, the discharger is required to conduct a Pollutant Minimization Program, as described in the Policy, if there is an indication that a constituent is present in the effluent above an effluent limitation and either:

a. A sample result is reported as DNQ and the effluent limitation is less than the "reported ML", or

b. A sample result is reported as ND and the effluent limitation is less than the MDL.

IV. ANTIDEGRADATION ANALYSIS:

The Regional Board has considered antidegradation pursuant to 40 CFR 131.12 and State Board Resolution No. 68-16. The water quality of the receiving waters is not expected to degrade as a result of this discharge. Neither the volume of the discharge nor the mass loading of pollutants associated with the discharge will adversely impact the receiving waters. Therefore, this discharge is consistent with federal and state antidegradation policies.

V. WRITTEN COMMENTS:

Interested persons are invited to submit written comments on the proposed discharge limits and the Fact Sheet. Comments should be submitted by December 29, 2000, either in person or by mail to:

Jun Martirez
California Regional Water Quality Control Board
Santa Ana Region
3737 Main street, Suite 500
Riverside, CA 92501-3348

VI. INFORMATION AND COPYING:

Persons wishing further information may write to the above address or call Jun Martirez of the Regional Board at (909) 782-3258. Copies of the application, proposed waste discharge requirements, Fact Sheet, and other documents (other than those which the Executive Officer maintains as confidential) are available at the Regional Board office for inspection and copying between the hours of 8:00 a.m. and 4:00 p.m., Monday through Thursday (excluding holidays).

VII. REGISTER OF INTERESTED PERSONS:

Any person interested in a particular application or group of applications may leave his name, address, and phone number as part of the file for an application.

VIII. PUBLIC HEARING:

The Regional Board will hold a public hearing regarding the proposed waste discharge requirements as follows:

DATE:	**January 19, 2001**
TIME:	**9:00 a.m.**
PLACE:	**City Council Chambers of Loma Linda** **25541 Barton Road** **Loma Linda, California**

Location Map

Discharge Points Location Map

Schematic of Wastewater Flow

California Regional Water Quality Control Board
Santa Ana Region

Tentative

ORDER NO. 01-3
NPDES NO. CA0105350

Waste Discharge and Producer/User Reclamation Requirements

for the

City of Riverside
Regional Water Quality Control Plant
Riverside County

California Regional Water Quality Control Board
Santa Ana Region

ORDER N0. 01-3
NPDES NO. CA0105350

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California Regional Water Quality Control Board
Santa Ana Region

ORDER NO. 01-3
NPDES NO. CA0105350

Waste Discharge and Producer/User Reclamation Requirements
for
The City of Riverside
Riverside Regional Water Quality Control Plant
Riverside County

The California Regional Water Quality Control Board, Santa Ana Region (hereinafter Regional Board), finds that:

1. The City of Riverside (hereinafter discharger) operates the Riverside Regional Water Quality Control Plant (RRWQCP), a municipal wastewater treatment plant. Order No. 95-18 NPDES NO. CA. 0105350 currently regulates the discharge from the RRWQCP. Order No. 95-18 expired on May 1, 2000.

2. The RRWQCP is located at 5950 Acorn Street in the City of Riverside in the SE¼ of Section 25, T2S, R6W, SBB&M.

3. The RRWQCP is designed to treat 40 million gallons per day (mgd) of wastewater. Wastewater treatment at the plant includes the following:

   a. Preliminary treatment consisting of bar screens and vortex grit removal.

   b. Two parallel secondary treatment plants (Plant 1 and Plant 2) that use the activated sludge process. Plants 1 and 2 operate simultaneously and independently. The treatment facilities include primary sedimentation basins, aeration basins and secondary sedimentation basins.

   c. A tertiary treatment facility that handles the effluents from Plants 1 and 2. Flows from both plants are combined in four equalization basins prior to tertiary treatment. The tertiary treatment consists of alum and/or polymer injection, dual media filtration, chlorination, dechlorination by SO_2, and nitrogen removal by constructed wetlands.

   d. Solids handling facilities that handle all solids produced in the plant. Solids handling includes 6 dissolved air flotation thickeners, 5 anaerobic digesters, 2 belt presses for dewatering, and sludge drying beds for air drying (as required).

4. The RRWQCP treats domestic and industrial wastewater from the City of Riverside and from the following sewage collection agencies:

   a. Edgemont Community Services District
   b. Jurupa Community Services District, and
   c. Rubidoux Community Services District.

5. A revised Water Quality Control Plan (Basin Plan) became effective on January 24, 1995. The Basin Plan contains beneficial uses and water quality objectives for waters in the Santa Ana Region.

6. The requirements contained in this Order are necessary to implement the Basin Plan.

7. The RRWQCP discharges tertiary treated wastewater into Reach 3 of the Santa Ana River at the following discharge points:

Discharge Serial No.	Latitude	Longitude	Description
001	33°57'55"	117°27'28"	Effluent metering structure at dike
002	33°57'48"	117°28'30"	Splitter box discharge
003	33°57'48"	117°29'52"	Wetland effluent structure 1
004	33°57'52"	117°29'36"	Cottonwood diversion structure
005	33°58'01"	117°30'03"	Wetland effluent structure 2

8. The beneficial uses of Reach 3 of the Santa Ana River include:

   a. Agricultural supply,
   b. Groundwater recharge,
   c. Water contact recreation,
   d. Non-contact water recreation,
   e. Warm freshwater habitat,
   f. Wildlife habitat, and
   g. Rare, threatened or endangered species.

9. The point of discharge also overlies the Chino III Groundwater Subbasin, the beneficial uses of which include:

   a. Municipal and domestic supply,
   b. Agricultural supply
   c. Industrial process supply, and
   d. Industrial service supply.

10. It is appropriate and necessary to control and limit the concentration of dissolved solids that may be discharged from the RRWQCP.

11. The limits contained in this Order for average concentrations of total dissolved solids are those that the discharger may reasonably be expected to achieve using methods such as, but not limited to a source control program and the control of water supply sources.

12. In conformance with the nitrogen wasteload allocation specified in the 1995 Basin Plan, this Order specifies a limit of 13 mg/l total inorganic nitrogen (TIN) for discharges up to 38 mgd; for discharges in excess of 38 mgd, the limit is 10 mg/l.

13. The 1995 Basin Plan includes a revised wasteload allocation for discharges of total dissolved solids (TDS) to the Santa Ana River system. In conformance with the wasteload allocation, this Order specifies a TDS limit of 650 mg/l for the discharge. An alternative limit based on the TDS quality of the water supply in the RRWQCP's service area plus a 250 mg/l TDS increment is also specified. The more restrictive of the two TDS limits applies.

14. The toxicity of copper, for which effluent limitations are specified in this Order, is dependent on water hardness. In this case, the effluent limit is calculated using equations[1] wherein water hardness is a variable. This Order uses a hardness value of 250[2] mg/l to calculate the effluent limits. A fixed effluent hardness value was utilized to facilitate determination of compliance. Federal regulations require that effluent limits for metals be expressed as the total recoverable form. To comply with this requirement, the calculated dissolved values were translated into total recoverable effluent limits using ratios of the total recoverable metal to dissolved metal (t/d) concentrations. The translator used for copper was developed in a recent study and reported in the "Santa Ana River Use-Attainability Analysis, Volume 10, Calculation of Total-to-Dissolved Metal Ratios to Translate Site-Specific Water Quality Objectives into NPDES Effluent Limits', Risk Sciences (March 1994).

15. As required by the Clean Water Act and regulations adopted thereunder, the chemical specific limitations contained in this Order are designed to prevent a violation of any applicable water quality standard for receiving waters adopted by the Regional Board, the State Board or U.S. EPA. If more stringent applicable water quality standards are approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Regional Board will revise and modify this Order in accordance with such more stringent standards.

16. This Order contains requirements for the implementation of an effective pretreatment program pursuant to Section 307 of the Federal Clean Water Act; Parts 35 and 403 of Title 40, Code of Federal Regulations (40 CFR 35 and 40 CFR 403); and/or Section 2233, Title 23, California Code of Regulations.

17. The following sewering agencies are within the discharger's service area and have developed effective pretreatment programs. The discharger has signed contractual agreements with these agencies, giving the discharger the authority to implement and enforce the pretreatment program within the service areas if the agencies fail to properly implement their approved programs:

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1 *Equations were taken from the California Toxics Rule.*

2 *This hardness number is derived from the 5th percentile 4 day average of receiving water hardness downstream of the discharge point.*

a. Edgemont Community Services District
b. Jurupa Community Services District, and
c. Rubidoux Community Services District

18. This Order incorporates the requirements specified in the EPA and the Regional Board approved pretreatment programs for the discharger's service area as enforceable conditions of this Order.

19. Effluent limitations, national standards of performance, and toxic pretreatment effluent standards established pursuant to Section 208(b), 301, 302, 303(d), 304, 306, and 307 of the Clean Water Act, and amendments thereto, are applicable to the discharge.

20. Article 5, Section 60315 of Title 22, Chapter 3, "Reclamation Criteria" of the California Code of Regulations specifies that reclaimed water used as a source of supply in nonrestricted recreational impoundments shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater (tertiary treated). The degree of treatment specified represents an approximately 5-log reduction in the virus content of the water. The State Department of Health Services has determined that this degree of virus removal is necessary to protect the health of people using these impoundments for water contact recreation.

21. The Department of Health Services has developed wastewater disinfection guidelines ("Wastewater Disinfection for Health Protection", Department of Health Services, Sanitary Engineering Branch, February 1987) for discharges of wastewater to surface waters where water contact recreation (REC-1) is a beneficial use. The disinfection guidelines recommend the same treatment requirements for wastewater discharges to REC-1 waters as those stipulated in Title 22 for supply of reclaimed water to nonrestricted recreational impoundments, since the public health risks under both scenarios are analogous. The disinfection guidelines are based on sound science and are widely used as guidance to assure public health and beneficial use protection.

22. The Santa Ana River is not a "nonrestricted recreational impoundment," nor is "reclaimed water[3]" being used as a supply source for the River pursuant to the definitions in Title 22. However, except during major storms, most of the flow in the River is composed of treated municipal wastewater discharges. The River is used for water contact recreation and, accordingly, is designated REC-1 (water contact beneficial use). People recreating in the River face an exposure similar to those coming in contact with reclaimed water in an impoundment. Therefore, to protect the water contact recreation beneficial use and to prevent nuisance and health risk, it is necessary and appropriate to require the same degree of treatment for wastewater discharges to the River as would be required for the use of reclaimed water in a nonrestricted recreational impoundment.

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3 *As defined in the Reclamation Criteria, reclaimed water means water which, as a result of treatment of domestic wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.*

23. On January 6, 1977, the State Board adopted a water reclamation policy regarding the issuance of wastewater reclamation requirements to primary users of reclaimed water. This Order incorporates requirements for the production and use of reclaimed water in conformance with the "Policy and Action Plan for Water Reclamation in California" adopted by the State Board and "Reclamation Criteria" (Title 22 Division 4 California Code of Regulations) adopted by the California Department of Health Services. The Regional Board has consulted with the Department of Health Services regarding these requirements and has incorporated its recommendations.

24. On April 17, 1997, the State Board adopted the General Industrial Storm Water Permit, Order No. 97-03-DWQ, NPDES No. CAS000001. This General Permit implements the Final Regulations (40 CFR 122, 123, and 124) for storm water runoff published on November 16, 1990 by EPA in compliance with Section 402(p) of the Clean Water Act (CWA). There are no stormwater discharges to surface waters from the RRWQCP facility site. All stormwater are captured and treated at the plant. Therefore, coverage under Order No. 97-03-DWQ is not necessary for this facility.

25. On March 2, 2000, the State Water Resources Control Board adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California. This Policy includes implementation provisions for the California Toxics Rule.

26. On May 18, 2000, the U.S. Environmental Protection Agency issued a final rule for the establishment of Numeric Criteria for Priority Toxic Pollutants necessary to fulfill the requirements of Section 303(c)(2)(B) of the Clean Water Act for the State of California. This rule is commonly referred to as the California Toxics Rule.

27. On February 19, 1993, the U.S. Environmental Protection Agency (U.S. EPA) issued a final rule for the use and disposal of biosolids (40 CFR 503). This rule requires that producers of biosolids meet certain reporting, handling, and disposal requirements. The State of California has not been delegated the authority to implement this program. Therefore, the U.S. EPA is the implementing agency.

28. The Regional Board has considered antidegradation pursuant to 40 CFR 131.12 and State Board Resolution No. 68-16 and finds that the RRWQCP discharge is consistent with those provisions.

29. In accordance with Water Code Section 13389, the issuance of waste discharge requirements for this discharge is exempt from those provisions of the California Environmental Quality Act contained in Chapter 3 (commencing with Section 21100), Division 13 of the Public Resources Code.

30. The Regional Board has notified the discharger and other interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written views and recommendations.

31. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that the discharger, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. DISCHARGE SPECIFICATIONS:

1. The discharge of wastes containing constituent concentrations and mass emissions in excess of the following limits is prohibited:

   a. Conventional Pollutant Limitations:

EFFLUENT WITHOUT 20:1 DILUTION (RIVER FLOW[4] : WASTEWATER FLOW)				
Constituent	Average Weekly (mg/l)	Average Monthly (mg/l)	Average Weekly Emission Rate[5] (lbs/day)	Average Monthly Emission Rate (lbs/day)
Biochemical Oxygen Demand	30	20	10,008	6,672
Suspended Solids	30	20	10,008	6,672
EFFLUENT WITH 20:1 DILUTION (RIVER FLOW[5] : WASTEWATER FLOW)				
Constituent	Average Weekly (mg/l)	Average Monthly (mg/l)	Average Weekly Emission Rate (lbs/day)	Average Monthly Emission Rate (lbs/day)
Biochemical Oxygen Demand	45	30	15,012	10,008
Suspended Solids	45	30	15,012	10,008

4 *Exclusive of discharges to surface waters from upstream publicly owned treatment works.*

5 *Except where noted, mass emission rates for this and all other tables in this permit are based on 40 mgd.*

b. Ammonia-Nitrogen/Chlorine Residual Limitations:

Constituent	Instantaneous Maximum (mg/l)	Average Monthly (mg/l)	Average Monthly Emission Rate (lbs/day)
Ammonia-Nitrogen		5.0	1,668
Total Chlorine Residual[6]	0.1		

c. TDS Limitations:

i. The 12-month average total dissolved solids concentration shall not exceed 650 mg/l and 12-month average mass emission rate shall not exceed 216,840 lbs/day. [7] , and

ii. The 12-month average total dissolved solids concentration shall not exceed the 12-month average total dissolved solids concentration in the water supply by more than 250 mg/l.

The lower of the two total dissolved solids limits is the limit.

d. Total Inorganic Nitrogen (TIN) Limitation:

The 12-month average total inorganic nitrogen concentration for flows up to 38 million gallons per day shall not exceed 13 mg/l and for flows exceeding 38 mgd shall not exceed 10 mg/l. The 12-month average emission rate shall not exceed the computed value using the equation:

TIN 12-month emission rate (lbs/day) = 4120 lbs[8] + (flows above 38 mgd x 8.34 x 10 mg/l)

6 *See Section G.6., "Compliance Determination"*

7 *See Section G.8. and G.9., "Compliance Determination"*

8 *Derived from 38 mgd x 8.34 x 13 mg/l*

e. Toxic Pollutant Effluent Limitations:

Constituent	Maximum Daily Limit (µg/l)	Average Monthly Limit (µg/l)	Maximum Daily Mass Rate (lbs/day)	Average Monthly Mass Rate (lbs/day)
Copper[9]	82.7	41.2	27.6	13.8

2. The discharge shall at all times be an adequately filtered and disinfected wastewater (tertiary treated effluent) if the flow in the Santa Ana River, Reach 3 is less than that required for a dilution of 20:1 (receiving water flow[10] : wastewater flow) at the point of discharge. Filtered wastewater means an oxidized, coagulated, and clarified wastewater which has been passed through natural undisturbed soils or filter media, such as sand or diatomaceous earth (or equivalent as determined by the State Department of Health Services). The discharge shall be considered adequately filtered if the turbidity does not exceed an average of 2.0 turbidity units nor exceeds 5.0 turbidity units more than 5 percent of the time during any 24-hour period. The discharge shall be considered adequately disinfected if the median number of coliform organisms does not exceed 2.2 per 100 milliliters and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample within any 30-day period. The median value shall be determined from the bacteriological results of the last 7-days for which analyses have been completed.

3. The discharge of secondary treated wastewater when the flow[11] in Santa Ana River Reach 3 results in a dilution of 20:1 (receiving water flow : wastewater flow) or more at the point of discharge shall be an adequately disinfected and oxidized wastewater. The discharge shall be considered adequately disinfected if at some location in the treatment process, the median number of coliform organisms does not exceed 23 per 100 milliliters. The median value shall be determined from the bacteriological results of the last 7-days for which analyses have been completed. The discharge shall be considered adequately oxidized if it complies with the average weekly and average monthly effluent limitations for BOD and suspended solids as specified in Discharge Specification A.1.a., above.

   The discharger shall make provisions for the measurement of the receiving water flow[11] at a suitable location upstream of the discharge point and determine whether a 20:1 dilution exists before discharging secondary treated effluent. A dilution of 20:1 or more is required at the point of discharge.

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9 *Limits for hardness dependent metals were computed based on a 250 mg/l hardness value.*

10 *Exclusive of discharges to surface waters from upstream publicly owned treatment works.*

4. The monthly average biochemical oxygen demand and suspended solids concentrations of the discharge shall not be greater than fifteen percent (15%) of the monthly average influent concentrations.

5. The discharge of any substances in concentrations toxic to animal or plant life in the affected receiving water is prohibited.

6. There shall be no visible oil and grease in the discharge.

7. The pH of the discharge shall be within 6.5 and 8.5 pH[11].

B. <u>TOXICITY REQUIREMENTS</u>:

1. This Order contains no numeric limitation for toxicity. However, the discharger shall conduct chronic toxicity monitoring as specified in Monitoring and Reporting Program (M&RP) No. 01-3.

2. The discharger shall implement the accelerated monitoring as specified in Section D.4. of M&RP No. 01-3 when the result of any single chronic toxicity test of the effluent exceeds 1.0 TUc.

3. The discharger shall develop an Initial Investigation Toxicity Reduction Evaluation (IITRE) work plan that describes the steps the discharger intends to follow if required by Toxicity Requirement No. 4, below. The work plan shall include at a minimum:

   a. A description of the investigation and evaluation techniques that will be used to identify potential causes/sources of the exceedance, effluent variability, and/or efficiency of the treatment system in removing toxic substances. This shall include a description of an accelerated chronic toxicity testing program.

   b. A description of the methods to be used for investigating and maximizing in-house treatment efficiency and good housekeeping practices.

   c. A description of the evaluation process to be used to determine if implementation of a more detailed TRE\TIE is necessary.

4. The discharger shall implement the IITRE work plan whenever the results of chronic toxicity tests of the effluent exceed:

   a. A two month median value of 1.0 TUc for survival or reproduction endpoint or,

   b. Any single test value of 1.7 TUc for survival endpoint.

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11 *See Section G.7., "Compliance Determination"*

5. The discharger shall develop a detailed Toxicity Reduction Evaluation and Toxicity Identification Evaluation (TRE/TIE) work plan that shall describe the steps the discharger intends to follow if the implemented IITRE fails to identify the cause of, or to rectify, the toxicity.

   The discharger shall use as guidance, at a minimum, EPA manuals *EPA/600/2-88/070* (industrial), *EPA/600/4-89-001A* (municipal), *EPA/600/6-91/005F* (Phase I), *EPA/600/R-92/080* (Phase II), and *EPA-600/R-92/081* (Phase III) to identify the cause(s) of toxicity. If during the life of this Order the aforementioned EPA manuals are revised or updated, the revised/updated manuals may also be used as guidance. The detailed TRE/TIE work plan shall include:

   a. Further actions to investigate and identify the cause of toxicity;
   b. Actions the discharger will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and
   c. A schedule for these actions.

6. The discharger shall implement the TRE/TIE workplan if the IITRE fails to identify the cause of, or rectify, the toxicity, or if in the opinion of the Executive Officer the IITRE does not adequately address an identified toxicity problem.

7. The discharger shall assure that adequate resources are available to implement the required TRE/TIE.

C. BIOSOLIDS REQUIREMENTS:

1. Collected screenings, biosolids, and other solids removed from liquid wastes shall be disposed of in a manner that is consistent with Chapter 15, Division 3, Title 23, of the California Code of Regulations and approved by the Executive Officer.

2. The use and disposal of biosolids shall comply with existing Federal and State laws and regulations, including permitting requirements and technical standards included in 40 CFR 503. (see also Section K.6. – Permit Re-opening, Revision, Revocation, and Re-issuance).

3. Any proposed change in biosolids use or disposal practice from a previously approved practice shall be reported to the Executive Officer and EPA Regional Administrator at least 90 days in advance of the change.

4. The discharger shall take all reasonable steps to minimize or prevent any discharge or biosolids use or disposal which has the potential of adversely affecting human health or the environment.

D. RECEIVING WATER LIMITATIONS[12]:

1. The discharge of wastes shall not cause a violation of any applicable water quality standards for receiving waters adopted by the Board or State Board, as required by the Clean Water Act and regulations adopted thereunder.

2. The discharge shall not cause any of the following:

   a. Coloration of the receiving waters which causes a nuisance or adversely affects beneficial uses.

   b. Deposition of oil, grease, wax or other materials in the receiving waters in concentrations which result in a visible film or in coating objects in the water, or which cause a nuisance or affect beneficial uses.

   c. An increase in the amounts of suspended or settleable solids in the receiving waters which will cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors.

   d. Taste or odor producing substances in the receiving waters at concentrations which cause a nuisance or adversely affect beneficial uses.

   e. The presence of radioactive materials in the receiving waters in concentrations which are deleterious to human, plant or animal life.

   f. The depletion of the dissolved oxygen concentration below 5.0 mg/l.

   g. The temperature of the receiving waters to be raised above 90°F (32°C) during the period of June through October, or above 78°F (26°C) during the rest of the year.

   h. The concentration of pollutants in the water column, sediments, or biota to adversely affect the beneficial uses of the receiving water. The discharge shall not result in the degradation of inland surface water communities and populations, including vertebrate, invertebrate, and plant species.

3. Pollutants not specifically mentioned and limited in this Order shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health.

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12 *Receiving water limitations are specific interpretations of water quality objectives from applicable water quality control plans. As such they are a required part of this Order. A receiving water condition not in conformance with any of these receiving water limitations, is not necessarily a violation of this Order. The Regional Board may require an investigation to determine the cause and culpability prior to asserting a violation has occurred, or requiring that corrective action be taken.*

E. PRETREATMENT REQUIREMENTS:

1. The discharger shall update as necessary and appropriate the contractual agreements with all governmental agencies[13]. The contractual agreements shall give the discharger the authority to implement and enforce the EPA approved pretreatment program within the sewer service areas of the treatment facility. The discharger shall assure that any other steps necessary to provide this implementation and enforcement authority (e.g. adoption of ordinances, etc.) are taken by all governmental agencies. If a governmental agency has an EPA approved pretreatment program for any portion of the service area of the treatment facility, the discharger's pretreatment program shall contain provisions ensuring that that governmental agency's program is implemented. In the event that any contributory agency fails to effectively implement its individual EPA approved pretreatment program, the discharger shall implement and enforce its approved program within that agency's service area.

2. The discharger shall ensure that the POTW[14] pretreatment programs for all contributory agencies to the treatment facility are implemented and enforced. The discharger shall be responsible and liable for the performance of all Control Authority pretreatment requirements contained in 40 CFR 403, including any subsequent regulatory revisions to Part 403. Where Part 403 or subsequent revisions place mandatory actions upon the discharger as Control Authority but does not specify a timetable for completion of the actions, the discharger shall submit for approval of the Regional Board's Executive Officer, a schedule for implementation of the required actions and shall implement the approved schedule. The schedule for implementation shall be submitted within six months from the date that such mandatory actions are established. For violations of pretreatment requirements, the discharger shall be subject to enforcement actions, penalties, fines and other remedies by the EPA, or other appropriate parties, as provided in the CWA, as amended (33 USC 1351 et seq.). The EPA or the Regional Board may also initiate enforcement action against an industrial user (IU) for non-compliance with applicable standards and requirements as provided in the CWA.

3. The discharger shall enforce the requirements promulgated under Sections 307(b), 307(c), 307(d), and 402(b) of the CWA with timely, appropriate and effective enforcement actions. The discharger shall cause industrial users (IUs) subject to the Federal Categorical Standards to achieve compliance no later than the date specified in those requirements or, in the case of a new IU, upon commencement of the discharge.

4. The discharger shall perform the pretreatment functions as required in 40 CFR Part 403 including, but not limited to:

   a. Enforce the pretreatment requirements under 40 CFR 403.5 and 403.6;

   b. Implement the necessary legal authorities as provided in 40 CFR 403.8(f)(1);

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13 *Member agencies and sewering agencies discharging wastewater into the facility.*

14 *Publicly owned treatment works*

c. Implement the programmatic functions as provided in 40 CFR 403.8(f)(2);

d. Publish a list of significant non-compliance as required by 40 CFR 403.8(f)(2)(vii), and

e. Provide the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3).

5. The following wastes shall not be introduced into the treatment works:

a. Wastes which create a fire or explosion hazard in the treatment works;

b. Wastes which will cause corrosive structural damage to treatment works, but, in no case, wastes with a pH lower than 5.0 unless the works are designed to accommodate such wastes;

c. Wastes at a flow rate and/or pollutant discharge rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency;

d. Solid or viscous wastes in amounts which would cause obstruction to the flow in sewers or otherwise interfere with the proper operation of the treatment works.

6. The discharger shall ensure compliance with any existing or future pretreatment standard promulgated by EPA under Section 307 of the CWA or amendments thereto for any discharge to the municipal system.

7. The discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. The discharger shall require each user not in compliance with any pretreatment standard to submit periodic notice (over intervals not to exceed nine months) of progress toward compliance with applicable toxic and pretreatment standards developed pursuant to the CWA or amendments thereto. The discharger shall forward a copy of such notice to the Regional Board and to the EPA Regional Administrator.

F. WATER RECYCLING REQUIREMENTS:

1. The discharger shall be responsible for assuring that recycled water is delivered and utilized in conformance with this Order, the reclamation criteria contained in Title 22, Division 4, Chapter 3, Sections 60301 through 60355, California Code of Regulations, and the "Guidelines for Use of Reclaimed Water" by the California Department of Health Services. The discharger shall conduct periodic inspections of the facilities of the recycled water users to monitor compliance by the users with this Order.

2. The discharger shall establish and enforce rules and regulations for recycled water users, governing the design and construction of recycled water use facilities and the use of recycled water in accordance with the uniform statewide reclamation criteria established pursuant to the California Water Code Section 13521.

3. The storage, delivery, or use of recycled water shall not individually or collectively, directly or indirectly, result in a pollution or nuisance, or adversely affect water quality, as defined in the California Water Code. The use of recycled water shall be in conformance with the wastewater reclamation plan specified in the Basin Plan (Table 5-7). Proposed large scale wastewater reclamation activities which are not in conformance with the Basin Plan shall be considered for approval by the Regional Board on a case by case basis (see also Section F.5., below).

4. Prior to delivering recycled water to any new user, the discharger shall submit to the Regional Board, the California Department of Health Services and the Riverside County Health Department a report containing the following information for review and approval:

    a. The average number of persons estimated to be served at each use site area on a daily basis.
    b. The specific boundaries of the proposed use site area including a map showing the location of each facility, drinking water fountain, and impoundment to be used.
    c. The person or persons responsible for operation of the recycled water system at each use area.
    d. The specific use to be made of the recycled water at each use area.
    e. The methods to be used to assure that the installation and operation of the recycled system will not result in cross connections between the recycled water and potable water piping systems. This shall include a description of the pressure, dye or other test methods to be used to test the system.
    f. Plans and specifications which include following:
        1) Proposed piping system to be used.
        2) Pipe locations of both the recycled and potable systems.
        3) Type and location of the outlets and plumbing fixtures that will be accessible to the public.
        4) The methods and devices to be used to prevent backflow of recycled water into the potable water system.
        5) Plan notes relating to specific installation and use requirements.

5. Proposed large scale reclamation activities which are not in conformance with the Basin Plan shall be initiated only with the prior approval of the Regional Board. The Executive Officer may require the submission of additional information in order to evaluate the water quality impacts of the proposal.

6. An on-site supervisor responsible for the operation of the recycled water distribution system shall be designated by the user. The supervisor shall be responsible for enforcing this Order, prevention of potential hazards, the installation, operation and maintenance of the distribution system, maintenance of the distribution and irrigation system plans in "as-built" form, and for the distribution of the recycled wastewater in accordance with this Order.

G. COMPLIANCE DETERMINATION:

1. The "maximum daily" concentration is defined as the measurement made on any single grab sample or composite sample.

2. Compliance with average weekly and monthly discharge limitations specified under Discharge Specifications A.1.a., A.1.b., and A.1.e. shall be determined from the average of the analytical results of all samples collected during a calendar week or month, respectively.

3. Compliance with the 12-month average limits specified in Discharge Specifications A.1.c. and A.1.d. shall be determined monthly by the arithmetic mean of the last twelve monthly averages.

4. The discharger shall be deemed out of compliance with an effluent limitation if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation.

   a. Until July 1, 2001, compliance determination shall be based on the practical quantitation levels[15] (PQL) specified in Attachment "A" of M&RP No. 01-3 or on the lower reporting level(s) that may reasonably be achieved by the discharger. (with prior approval by the Executive Officer of the Regional Board)

   b. As of July 1, 2001, compliance determination shall be based on the quantification levels specified in Attachment "B" of the Monitoring and Reporting Program No. 01-3, unless an alternative minimum level[16] (ML) is approved by the Regional Board's Executive Officer. The Executive Officer is authorized to extend the July 1, 2001 date provided that the discharger demonstrates good cause and that the extension is as short as possible.

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15 *PQL is the lowest concentration of a substance which can be determined within ± 20 percent of the true concentration by 75 percent of the analytical laboratories tested in a performance evaluation study. Alternatively, if performance data are not available, the PQL is the method detection limit (MDL) x 5 for carcinogens and MDL x 10 for noncarcinogens.*

16 *Minimum level is the concentration at which the entire analytical system must give a recognizable signal and acceptable point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.*

c. When determining compliance with an average monthly limit and more than one sample result is available in a month, the discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of detected but not quantified (DNQ) or not detected (ND). In those cases, the discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1) The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

2) The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ. If a sample result, or the arithmetic mean or median of multiple sample results, is below the reported ML, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the discharger conducts a pollutant minimization program (PMP)[17] (as described in Section J.8.), the discharger shall not be deemed out of compliance.

5. Compliance with effluent limitations for all constituents is determined at the RRWQCP effluent metering structure (Discharge Serial 001), except for toxicity and TIN. Toxicity shall be determined at the splitter box (discharge Serial 002) when effluent is being delivered to the wetlands or from the channel at the Van Buren crossing when effluent is not being delivered to the wetland. Compliance with TIN limits shall be calculated based on the discharge from the effluent metering structure minus losses at the Hidden Valley wetlands using methods approved by the Executive Officer of the Regional Board.

6. Compliance determinations for total chlorine residual shall be based on 99% compliance. To determine 99% compliance with the effluent limitation specified in Discharge Specification A.1.b. for total chlorine residual, the following conditions shall be satisfied:

a. The total time during which the total chlorine residual values are above 0.1 mg/l (instantaneous maximum value) shall not exceed 7 hours and 26 minutes in any calendar month;

b. No individual excursion from 0.1 mg/l value shall exceed 30 minutes; and

c. No individual excursion shall exceed 5.0 mg/l.

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17 *The goal of the PMP shall be to reduce all potential sources of a priority pollutant(s) through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation.*

7. Pursuant to 40 CFR 401.17, the discharger shall be in compliance with the pH limitation specified in this Order (Discharge Specification A.7., above), provided that both of the following conditions are satisfied:

   a. The total time during which the pH values are outside the required range of 6.5-8.5 pH values shall not exceed 7 hours and 26 minutes in any calendar month; and

   b. No individual excursion from the range of pH values shall exceed 60 minutes.

8. The Regional Board will not initiate enforcement action for violations of the TDS limit specified in Discharge Specifications A.1.c.i., except as required in Sections 13385 (h) and (i) of the California Water Code, provided that:

   a. The discharger demonstrates to the satisfaction of the Regional Board's Executive Officer that:

      1) the violation is due to the TDS quality of water supply sources utilized in the discharger's service area; and

      2) that all reasonable steps, as agreed upon by the Executive Officer, have been taken to ensure that best TDS quality supplies are obtained and utilized in the discharger's service area; and

   b. The discharger develops and implements, with the approval of the Executive Officer, a plan to mitigate the effects of the violation on the affected receiving waters.

9. The Regional Board will not initiate enforcement action for violations of the TDS limits specified in Discharge Specifications A.1.c.i. or A.1.c.ii., except as required in Sections 13385 (h) and (i) of the California Water Code, provided that:

   a. The discharger demonstrates to the satisfaction of the Executive Officer that:

      1) The TDS violation(s) are due solely to chemical additions in the treatment process needed to meet waste discharge requirements or other valid regulatory requirements; and

      2) The discharger has taken all steps to optimize chemical additions so as to minimize the TDS increases;

   b. The discharger develops and implements, with the approval of the Executive Officer, a plan to mitigate the effects of the violation on the affected receiving waters.

10. Compliance determinations shall be based on available analyses for the time interval associated with the effluent limitation. Where only one sample analysis is available in a specified time interval (e.g., monthly or weekly average), that sample shall serve to characterize the discharge for the entire interval. If quarterly sample result shows noncompliance with the average monthly limit and that sample result is used for compliance determinations for each month of the quarter, then three separate violations of the average monthly limit shall be deemed to have occurred.

11. For non-priority pollutants, compliance based on a single sample analysis shall be determined where appropriate, as described below:

    a. When the effluent limitation is greater than or equal to the PQL, compliance shall be determined based on the effluent limitation in either single or multiple sample analyses.

    b. When the effluent limitation is less than the PQL, compliance determinations based on analysis of a single sample shall only be undertaken if the concentration of the constituent of concern in the sample is greater than or equal to the PQL.

12. For non- priority pollutants, the discharge shall be considered to be in compliance with an effluent limitation which is less than or equal to the PQL specified in Attachment "A" of M&RP No. 01-3 if the arithmetic mean of all test results for the monitoring period is less than the constituent effluent limitation. Analytical results that are less than the specified PQL shall be assigned a value of zero.

13. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with effluent limitations in this Order because of factors beyond the reasonable control of the discharger. An upset does not include noncompliance caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, failure to implement an appropriate pretreatment program, or careless or improper action. A discharger that wishes to establish the affirmative defense of an upset in an action brought for noncompliance shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

    a. an upset occurred due to identifiable cause(s) and that the discharger can identify the cause(s) of the upset;

    b. the permitted facility was being properly operated at the time of the upset;

    c. the discharger submitted notice of the upset as required in Section H.15., below;

    d. the discharger complied with any remedial measures required under Section J.11., below.

No determination made before an action for noncompliance, such as during administrative review of claims that noncompliance was caused by an upset, is final administrative action subject to judicial review. In any enforcement proceeding, the discharger seeking to establish the occurrence of an upset has the burden of proof.

H. REQUIRED NOTICES AND REPORTS:

1. Reporting Provisions:

   a. All applications, reports, or information submitted to the Regional Board shall be signed and certified in accordance with 40 CFR 122.22 except as otherwise specified by the Regional Board's Executive Officer.

   b. The discharger shall furnish, within a reasonable time, any information the Regional Board or EPA may request to determine compliance with this Order or whether cause exists for modifying, revoking and reissuing, or terminating this Order. The discharger shall also furnish to the Regional Board, upon request, copies of records required to be kept by this Order.

   c. Except for data determined to be confidential under Section 308 of the CWA, all reports prepared in accordance with the terms of this Order shall be available for public inspection at the offices of the Regional Board and the Regional Administrator of EPA. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statements on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA and Section 13387 of the California Water Code.

2. By April 2, 2001, the discharger shall notify the Executive Officer of its continuous involvement with the comprehensive mercury investigation program currently being conducted by a group of Santa Ana River system dischargers. If the discharger discontinues its involvement with this comprehensive program, the discharger shall, within 60 days of that date, submit for the approval of the Executive Officer its plan for the annual testing of mercury levels in fish flesh samples collected from the Santa Ana River, upstream of, at, and downstream of the point of discharge. Upon approval, the discharger shall implement the plan.

3. By April 2, 2001, the discharger shall submit an updated written description of electrical power failure safeguards. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means. The description of the safeguards provided shall include an analysis of the frequency, duration, and impact of power failures experienced over the past year(s) of treatment plant operation on effluent quality and on the capability of the discharger to comply with the requirements of this Order. Deficiencies in present safeguards must be identified together with a plan for any necessary corrective actions. The adequacy of the safeguards and the corrective action plan (if necessary) is subject to the approval of the Executive Officer.

4. By April 2, 2001, the discharger shall submit an updated technical report on the discharger's preventive (failsafe) and contingency (response and cleanup) plans for controlling accidental discharges and for minimizing the effect of such events. This technical report may be combined with that required under Section H.3., above. The technical report shall:

   a. Identify the possible sources of accidental loss, untreated waste bypass, and contaminated drainage. Loading and storage areas, power outage, waste treatment outage, and failure of process equipment, tanks, and pipes should be considered.

   b. Evaluate the effectiveness of present facilities and procedures and state when they become operational.

   c. Describe any new facilities and procedures needed. Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

   d. Describe proposed and completed training programs and schedules to train and familiarize plant operating personnel with the discharger's preventive (failsafe) and contingency (response and cleanup) plans for controlling accidental discharges and for minimizing the effect of such events.

5. By April 2, 2001, the latest signed copy of the pretreatment contractual agreements with the Edgemont Community Services District, Jurupa Community Services District, and Rubidoux Community Services District shall be submitted to the Regional Board Office and to the U.S. EPA, Region 9.

6. By April 2, 2001, the discharger shall submit a copy of the Initial Investigation Toxicity Reduction Evaluation work plan specified in Toxicity Requirement B.3 of this Order.

7. By April 2, 2001, the discharger shall submit a copy of the TRE/TIE work plan specified in Toxicity Requirement B.5 of this Order.

8. By May 1, 2001, the discharger shall submit for approval by the Executive Officer, a report which details the manner in which sampling, monitoring and reporting will be performed as required in this Order.

9. The discharger shall orally notify the Executive Officer of the Regional Board, or designee, within 24 hours of a discharge of secondary treated and disinfected wastewater into Santa Ana River.

10. The discharger shall give advance notice to the Regional Board of any planned physical alterations or additions to the permitted facility or changes in operation or activity that may result in noncompliance with these waste discharge requirements.

11. The discharger shall provide adequate notice to the Regional Board of:

    a. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to Sections 301 or 306 of the CWA if it were directly discharging those pollutants.[18]

    b. Any change in the volume or character of pollutants being introduced by an existing or new source into the treatment facility that will cause or threaten to cause a violation of this Order.

    c. Any planned changes in the discharger's biosolids use or disposal practice, or provision of additional disposal sites not reported during the permit application process.

    d. Any proposed change in the character, location, or method of disposal of the discharge, or any proposed change in ownership of the facility.

    e. All instances of noncompliance. Reports of noncompliance shall be submitted with the discharger's next scheduled self-monitoring report or earlier, as specified in this Order, or if requested by the Executive Officer, or if required by an applicable standard for biosolids use and disposal.

12. The discharger shall file with the Regional Board the documents required in Section F.4., above, prior to delivering recycled water to any new user.

13. The discharger shall file a written report with the Regional Board within ninety (90) days after the average dry-weather waste flow for any month equals or exceeds 75 percent of the design capacity of the waste treatment and/or disposal facilities. The discharger's senior administrative officer shall sign a letter which transmits that report and certifies that the policy making body is adequately informed about it. The report shall include:

    a. Average daily flow for the month, the date on which the instantaneous peak flow occurred, the rate of that peak flow, and the total flow for the day.

    b. The discharger's best estimate of when the average daily dry-weather flow rate will equal or exceed the design capacity of the treatment facilities.

    c. The discharger's intended schedule for studies, design, and other steps needed to provide additional capacity for the waste treatment and/or disposal facilities before the waste flow rate equals the capacity of present units.

14. The discharger shall file with the Regional Board a Report of Waste Discharge at least 180 days before making any material change in the character, location, or volume of the discharge. A material change includes, but is not limited to, the following:

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18 *Adequate notice shall include information on the quality and quantity of effluent introduced, and any anticipated impact of the change on the quantity or quality of the discharger's effluent and/or sludge.*

a. Adding a major industrial waste discharge to a discharge of essentially domestic sewage, or adding a new process or product by an industrial facility resulting in a change in the character of the waste.

b. Significantly changing the disposal method or location, such as changing the disposal to another drainage area or water body.

c. Significantly changing the method of treatment.

d. Increasing the treatment plant design capacity beyond that specified in this Order.

15. The discharger shall immediately report any condition related to the discharger's collection, treatment or disposal facilities that may endanger human health or the environment including any unauthorized discharge not regulated by this Order of treated, partially treated, or untreated wastewater from the discharger's collection, treatment, or disposal system in excess of 1000 gallons. All available information concerning the condition and/or unauthorized discharge shall be provided to the Executive Officer or the Executive Officer's designee (909-782-4130) and the Office of Emergency Services (1-800-852-7550), as soon as the discharger becomes aware of the circumstances. A written report shall be submitted within 5 days and shall contain a description of the condition and its cause; the duration of the condition, including exact dates and times, and, if the condition has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the condition, with a schedule for their implementation. The following shall be included as information that must be reported within 24 hours under this paragraph:

a. Any unanticipated bypass that exceeds any requirement of this Order.

b. Any upset that exceeds any requirement of this Order.

c. Any violation of a maximum daily discharge limitation for any of the pollutants listed in this Order.

d. Any unauthorized discharge not regulated by this Order of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from the discharger's collection, treatment or disposal system.

e. The Executive Officer or the Executive Officer's designee may waive the above-required written report on a case-by-case basis.

Discharges of less than 1000 gallons that do not endanger human health or the environment shall be reported to the Executive Officer's designee no later than the last day of the month following the month the discharges occurred.

I. PENALTIES:

1. Violation of any of the provisions of the NPDES program or of any of the provisions of this Order may subject the violator to any of the penalties described under Section 309(c) of the CWA, or any subsequent amendments to Section 309(c). The violator may be subjected to any combination of the penalties described herein at the discretion of the prosecuting authority; however, only one kind of penalty may be applied for each kind of violation.

2. The CWA provides that any person who violates any portion of this Order implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any Order requirement or limitation implementing any such sections in this Order, is subject to a civil penalty not to exceed $25,000 per day for each violation. The CWA provides that any person who willfully or negligently violates this Order with regard to these sections of the CWA is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates a provision implementing these sections is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment of not more than 3 years, or both.

3. The CWA provides that any person who knowingly falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this Order shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 2 years per violation, or by both.

4. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Order, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 2 years per violation, or by both.

5. The California Water Code provides that any person who violates an order of the Regional Board is subject to civil penalties of up to $25,000 per day of violation, and when the violation involves the discharge of pollutants, additional civil penalties of up to $25 per gallon.

J. PROVISIONS:

1. This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the CWA, or amendments thereto, that shall become effective 10 days after the date of adoption, provided the Regional Administrator of the EPA has no objection. If the Regional Administrator objects to its issuance, this Order shall not serve as an NPDES permit until such objection is withdrawn.

2. Neither the treatment nor discharge of waste shall create, or threaten to create, a nuisance or pollution as defined by Section 13050 of the California Water Code.

3. Order No. 95-18 is hereby rescinded.

4. This Order expires January 1, 2006 and the discharger must file a Report of Waste Discharge in accordance with Title 23, Division 3, Chapter 9 of the California Code of Regulations not later than 180 days in advance of this expiration date. The Report of Waste Discharge shall serve as the application for issuance of new waste discharge requirements.

5. The discharger shall comply with M&RP No. 01-3 as issued by the Executive Officer. This monitoring and reporting program may be modified by the Executive Officer at any time during the term of this Order, and may include a reduction or an increase in the number of parameters to be monitored, the frequency of the monitoring or the number and size of samples to be collected.

6. The discharger shall immediately implement the approved contingency plan for mercury investigation (see Section H.2., above), if a single effluent monitoring result for mercury shows a concentration level at or above the PQL specified in Attachment "A" of the M&RP No. 01-3.

7. The discharger shall maintain a copy of this Order at the site so that it is available to site operating personnel at all times. Key operating personnel shall be familiar with its content.

8. The discharger shall conduct a Pollutant Minimization Program (PMP) when there is evidence that the priority pollutant is present in the effluent above an effluent limitation (e.g., sample results reported as detected but not quantified (DNQ) when the effluent limitation is less than the MDL, sample results from analytical methods more sensitive than those methods included in the permit, presence of whole effluent toxicity, health advisories for fish consumption, results of benthic or aquatic organism tissue sampling) and either: (i) A sample result is reported as DNQ and the effluent limitation is less than the reported ML; or (ii) A sample result is reported as ND and the effluent limitation is less than the MDL. The PMP shall include, but not be limited to, the following actions and submittals acceptable to the Regional Board:

   a. An annual review and semi-annual monitoring of potential sources of the reportable priority pollutant(s), which may include fish tissue monitoring and other bio-uptake sampling;
   b. Quarterly monitoring for the reportable priority pollutant(s) in the influent to the wastewater treatment system;
   c. Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable priority pollutant(s) in the effluent at or below the effluent limitation;
   d. Implementation of appropriate cost-effective control measures for the reportable priority pollutant(s), consistent with the control strategy; and
   e. An annual status report that shall be sent to the Regional Board including:
      1) All PMP monitoring results for the previous year;
      2) A list of potential sources of the reportable priority pollutant(s);
      3) A summary of all actions undertaken pursuant to the control strategy; and
      4) A description of actions to be taken in the following year.

9. The discharger shall conduct a controlled and intensive monitoring program for bis (2-ethylhexyl) phthalate for one year until March 1, 2002, using methods, equipment and processes that will prevent contamination of effluent samples during sampling and testing and assure reliability of testing results. The discharger's testing laboratory shall be able to achieve a minimum detection level of 5 micrograms per liter for quantifying bis (2-ethylhexyl) phthalate concentrations in the effluent.

10. The discharger must comply with all of the requirements of this Order. Any violation of this Order constitutes a violation of the California Water Code and may constitute a violation of the CWA and its regulations, and is grounds for enforcement action, termination of this Order, revocation and re-issuance of this Order, denial of an application for re-issuance of this Order; or a combination thereof.

11. The discharger shall take all reasonable steps to:

    a. minimize or prevent any discharge that has a reasonable likelihood of adversely affecting human health or the environment.

    b. minimize any adverse impact to receiving waters resulting from noncompliance with any requirements specified in this Order, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

12. The discharger shall provide safeguards to assure that should there be reduction, loss, or failure of electric power, the discharger will comply with the requirements of this Order.

13. The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control including biosolids use, disposal facilities, and related appurtenances which are installed or used by the discharger to achieve compliance with this Order. Proper operation and maintenance includes adequate laboratory controls, appropriate quality assurance procedures, effective performance, adequate funding, adequate staffing and training, and adequate process controls. This provision requires the operation of back up or auxiliary facilities or similar systems which are installed by a discharger only when the operation is necessary to achieve compliance with the requirements of this Order.

14. The discharger shall update as necessary, the "Operation and Maintenance Manual (O&M Manual)" which it has developed for the Riverside Regional Water Quality Control Plant to conform with latest plant changes and requirements. The O&M Manual shall be readily available to operating personnel onsite. The O&M Manual shall include the following:

    a. Description of the treatment plant table of organization showing the number of employees, duties and qualifications and plant attendance schedules (daily, weekends and holidays, part-time, etc). The description should include documentation that the personnel are knowledgeable and qualified to operate the treatment facility so as to achieve the required level of treatment at all times.

b. Detailed description of safe and effective operation and maintenance of treatment processes, process control instrumentation and equipment.

c. Description of laboratory and quality assurance procedures.

d. Process and equipment inspection and maintenance schedules.

e. Description of safeguards to assure that, should there be reduction, loss, or failure of electric power, the discharger will be able to comply with requirements of this Order.

f. Description of preventive (fail-safe) and contingency (response and cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events. These plans shall identify the possible sources (such as loading and storage areas, power outage, waste treatment unit failure, process equipment failure, tank and piping failure) of accidental discharges, untreated or partially treated waste bypass, and polluted drainage.

15. The discharger's wastewater treatment plant shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Title 23, Division 3, Chapter 14, California Code of Regulations.

16. The discharge of any radiological, chemical, or biological warfare agent or high level radiological waste is prohibited.

17. The provisions of this Order are severable, and if any provision of this Order, or the application of any provisions of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order shall not be affected thereby.

18. The filing of a request by the discharger for modification, revocation and re-issuance, or termination of this Order or a notification of planned changes or anticipated noncompliance does not stay any requirements of this Order.

19. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the discharger from liabilities under federal, state, or local laws, nor guarantee the discharger a capacity right in the receiving waters.

20. This Order does not convey any property rights of any sort, or any exclusive privilege.

21. This Order is not transferable to any person except after notice to, and approval by the Executive Officer. The Regional Board may require modification or revocation and re-issuance of this Order to change the name of the discharger and incorporate such other requirements as may be necessary under the CWA.

22. Failure to provide a required BOD or Coliform analysis based on tests failure to meet laboratory QA/QC requirements shall not be considered a violation of the terms of this Order.

23. Collected screenings, biosolids, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Regional Board's Executive Officer.

24. If the discharger demonstrates a correlation between the biological oxygen demand (BOD) and total organic carbon (TOC) concentrations in the effluent to the satisfaction of the Executive Officer, compliance with the BOD limits contained in this order may be determined based on analyses of the TOC of the effluent.

25. In the event of any change in control or ownership of land or waste discharge facility presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Regional Board.

26. It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the requirements of this Order.

27. Bypass (the intentional diversion of waste streams from any portion of a treatment facility or collection system) is prohibited unless it is permitted under the terms of this Order. The Regional Board may take enforcement action against the discharger for unpermitted bypass unless:

    a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.);

    b. There were no feasible alternative to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment down time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment down time or preventive maintenance; and

    c. The discharger submitted a notice to the Regional Board at least ten days in advance of the need for a bypass. The discharger may allow a bypass to occur that does not cause effluent limitations to be exceeded, but only if the by-pass is required for essential maintenance to assure efficient operation, and neither effluent nor receiving water limitations are exceeded. In such a case, the above bypass conditions are not applicable. The discharger shall promptly notify the Regional Board and the EPA within 24 hours of each such bypass.

28. The Regional Board, EPA, and other authorized representatives shall be allowed:

    a. Entry upon premises where a regulated facility or activity is located or conducted, or where records are kept under the requirements of this Order;

    b. Access to copy any records that are kept under the requirements of this Order;

    c. To inspect any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

    d. To photograph, sample and monitor for the purpose of assuring compliance with this Order, or as otherwise authorized by the CWA.

K. PERMIT RE-OPENING, REVISION, REVOCATION, AND RE-ISSUANCE:

1. This Order may be modified, revoked and reissued, or terminated for cause.

2. This Order may be reopened to address any changes in State or federal plans, policies or regulations that would affect the quality requirements for the discharges.

3. This Order may be reopened to include effluent limitations for pollutants determined to be present in the discharge in concentrations that pose a reasonable potential to cause or contribute to violations of water quality objectives.

4. This Order may be reopened to include an appropriate bioconcentration based limit for mercury, if test results (as required in M&RP No. 01-3) show that the concentration levels of mercury in the edible portions of fish are at or above 0.35 milligram per kilogram of fish tissue.

5. This Order may be reopened and modified in accordance with the requirements set forth at 40 CFR 122 and 124, to include the appropriate conditions or limits to address demonstrated effluent toxicity based on newly available information, or to implement any EPA-approved new State water quality standards applicable to effluent toxicity.

6. This Order may be reopened to incorporate appropriate biosolids requirements if the State Water Resources Control Board and the Regional Water Quality Control Board are given the authority to implement regulations contained in 40 CFR 503.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on January 19, 2001.

_____

Gerard J. Thibeault
Executive Officer

APPENDIX B

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THE PRADO AGREEMENT

A zero discharge strategy is contingent on the interpretation of the Prado Settlement, which was instigated by the Orange County Water District (OCWD) to keep groundwater from leaving the Santa Ana River Basin. In support of the Prado Settlement, an agreement between Western Municipal Water District and the City of Riverside (excerpts included herein) obligated an annual discharge of 15,250 acre feet from the RWQCP for maintenance of base flows at the Prado Dam. This volume may be slightly reduced by quality and credit adjustments.

Based on a meeting with the City Utilities Department in November 1991, however, the OCWD's Prado objective is to keep groundwater from leaving the basin, not necessarily to keep flow in the Santa Ana River. OCWD may be open to the idea of water reuse throughout the area which percolates into the groundwater; This needs to be verified. Pending an agreement with OCWD, the City can investigate zero discharge alternatives for NPDES/ISWP compliance.

AGREEMENT BETWEEN
WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY
AND CITY OF RIVERSIDE IN REGARD TO
PRADO SETTLEMENT.

AGREEMENT made this 20th day of November, 1968, between WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, a public agency, hereinafter called Western, and the CITY OF RIVERSIDE, a municipal corporation, hereinafter called Riverside.

RECITALS

(a) A settlement has been negotiated terminating the stream system adjudication in the case of Orange County Water District v. City of Chino, et al., Orange County Superior Court No. 117628. This settlement, hereinafter called the "Prado Settlement," provides for a physical solution whereby certain Base Flows are jointly assured by Western and the Chino Basin Municipal Water District (Chino hereinafter) at Prado, and by the San Bernardino Valley Municipal Water District (San Bernardino hereinafter) at Riverside Narrows.

(b) As part of the Prado Settlement all defendants, except for the three municipal water districts mentioned above, will be dismissed from the suit without pumping restrictions. The judgment in the first Orange County suit, the Irvine Decree, and certain other restrictions in the area above Prado will also be set aside so long as such Settlement is carried out.

(c) In order to implement the Prado Settlement, and subject to final Court approval thereof, Western and Chino have further agreed between themselves as to the responsibility of each District for contributions to the flow at Prado.

(d) The primary purpose of this agreement is to provide for the commitment to Western and the Prado Settlement of certain quantities of Riverside sewage effluent.

(e) All terms specially defined in the Prado Settlement documents, and in the agreement between Western and Chino, are herein used in the context of such documents.

In consideration of the mutual covenants of the parties, and of the assumption by Western of the obligations imposed by the Prado Settlement, IT IS HEREBY AGREED AS FOLLOWS:

1. Contribution. Riverside shall be obligated to discharge annually to the Santa Ana River in the vicinity of Riverside Narrows 15,250 acre feet of effluent from its sewage treatment plant, adjusted for quality as hereinafter provided, and subject to the conditions of Paragraphs 5 and 8.

2. Quality Adjustment. The quantity of effluent actually delivered in any year shall be adjusted for quality in accordance with the following formula. The amount which results from the application of such formula shall constitute Riverside's "adjusted contribution", and such adjusted contribution shall be used to determine the City's compliance with its obligations hereunder.

As used in the formula, TDS means the weighted average annual total dissolved solids in the effluent for the year in question.

Weighted Average TDS in ppm	Formula for Determining Adjusted Contribution
Greater than 800	$Q - \frac{16}{15,250} Q \ (TDS-800)$
700 - 800	Q
Less than 700	$Q + \frac{16}{15,250} Q \ (700-TDS)$

Where Q = the amount of effluent actually delivered.

3. Effective Date. Riverside's commitment of such effluent shall be effective October 1, 1970, and is contingent upon final Court approval of the Prado Settlement.

4. Measurements. Both the quantity and quality of the effluent discharged hereunder shall be measured and determined in such manner as to meet the requirements of the Prado Settlement and of Western's agreement with Chino. The point of measurement for quantity and quality shall be at Riverside's sewage treatment plant measuring flume. The cost of installing and maintaining any new measurement devices which may be required, and of obtaining necessary water quality analyses, shall be borne by Western. Records shall be kept of all such measurements and determinations, and these shall be available to both parties.

5. Use of Credits. If Riverside delivers more effluent than is required under this Agreement, it may in any given year reduce its adjusted contribution by the amount of such excess deliveries, but in no event shall Riverside's adjusted contribution be less than 13,420 acre feet each year. However, if the minimum obligation under the Prado Settlement is lowered to 34,000 acre feet, then the amount of 13,420 in this paragraph shall be reduced to 12,420 acre feet.

6. Modification of Prado Settlement. In the event the Prado Settlement is modified by the Court under its continuing jurisdiction and the obligation of Western is affected thereby, or in the event of modification of the Western-Chino Agreement, appropriate adjustments if required shall be made in this agreement; provided that the unadjusted amount of 15,250 shall not be subject to increase.

7. Right of First Refusal. If Riverside proposes to sell, lease or otherwise transfer title to any of its sewage effluent not committed hereunder, Western shall have the right of first refusal to acquire such effluent.

8. Pumping Limitation. In the event Riverside should be required to reduce its pumping from any portion of the Santa Ana system, without replenishment being provided by Western, or without similar limitations being imposed upon all other substantial pumpers and diverters taking water for use within Western, Riverside shall have the right to withdraw up to 3000 acre feet annually, on a non-cumulative basis, from the effluent

commitment made herein; provided that such effluent is used to offset the reduction in pumping; or in the alternative, it shall have the right to offset such reduction by increasing its pumping elsewhere in the river system up to a maximum of 3000 acre feet per year without liability to Western for any pump tax on account of such increase.

CITY OF RIVERSIDE

By: _____
Mayor

ATTEST:

_____
City Clerk

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY

By: _____
President

By: _____
Secretary

APPROVED AS TO FORM:

_____
LELAND J. THOMPSON, JR.
Special Counsel

APPENDIX C

phase I, alternative 1, juction report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	1	2,400.00	700.00	951.35	108.96
2	11	1,060.80	730.00	949.97	95.36
3	13	134.10	780.00	949.58	73.51
4	15	42.90	780.00	949.93	73.67
5	3	-5,700.00	700.00	951.68	109.10
6	5	89.40	735.00	950.61	93.47
7	7	548.70	826.00	949.65	53.60
8	9	930.00	778.00	943.05	71.55

phase I, alternative 1, pipe report

	ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
1	1	3	1	850.65	24.00	2,400.00	1.70
2	11	11	13	7,204.92	12.00	134.10	0.38
3	13	11	15	5,861.57	12.00	42.90	0.12
4	15	3	1000	1,790.68	6.00	494.10	5.61
5	3	3	5	2,085.90	24.00	2,805.90	1.99
6	5	5	7	6,104.25	24.00	1,478.70	1.05
7	7	7	9	3,382.28	12.00	930.00	2.64
8	9	5	11	5,614.17	24.00	1,237.80	0.88

phase I, alternative 1, pipe report

		ID	Headloss (ft)	HL/1000 (ft/kft)	Roughness
1		1	0.33	0.39	140.00
2		11	0.39	0.05	140.00
3		13	0.04	0.01	140.00
4		15	31.68	17.69	140.00
5		3	1.07	0.51	140.00
6		5	0.96	0.16	140.00
7		7	6.59	1.95	140.00
8		9	0.64	0.11	140.00

phase I, alternative 1, reservoir report

		ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)	% Full (%)
1		1000	494.10	700.00	920.00	95.37	11.00

phase I, alternative 2, junction report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	1	2,400.00	700.00	944.68	106.07
2	11	1,060.80	730.00	943.39	92.50
3	15	42.90	780.00	943.19	70.74
4	17	0.00	800.00	943.01	61.99
5	19	466.80	790.00	942.35	66.04
6	21	126.60	810.00	942.76	57.55
7	3	-6,100.00	685.00	945.01	112.71
8	5	89.40	735.00	944.53	90.83
9	7	548.70	826.00	943.57	50.97
10	9	930.00	780.00	936.97	68.05

phase I, alternative 2, pipe report

		ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
1		1	3	1	850.65	24.00	2,400.00	1.70
2		13	11	15	5,861.57	24.00	636.30	0.45
3		15	3	1000	1,790.68	6.00	434.80	4.93
4		17	15	17	5,641.96	24.00	593.40	0.42
5		19	17	19	1,058.94	12.00	466.80	1.32
6		21	17	21	4,385.90	12.00	126.60	0.36
7		3	3	5	2,085.90	30.00	3,265.20	1.48
8		5	5	7	6,104.25	24.00	1,478.70	1.05
9		7	7	9	3,382.28	12.00	930.00	2.64
10		9	5	11	5,614.17	24.00	1,697.10	1.20

phase I, alternative 2, pipe report

		ID	Headloss (ft)	HL/1000 (ft/kft)	Roughness
1		1	0.33	0.39	140.00
2		13	0.19	0.03	140.00
3		15	25.01	13.96	140.00
4		17	0.19	0.03	130.00
5		19	0.66	0.62	130.00
6		21	0.25	0.06	130.00
7		3	0.48	0.23	140.00
8		5	0.96	0.16	140.00
9		7	6.59	1.95	140.00
10		9	1.14	0.20	140.00

phase I, alternative 2, reservoir report

		ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)	% Full (%)
1		1000	434.80	700.00	920.00	95.37	11.00

~~Work on~~

1. PRINT COVER & ALL Figures at A-3 Printer

2. PRINT ALL THE APPENDICIES

3. PRINT DIVIDERS

4. PRINT TEXT (SECTION) / EDIT

5 ARRANGE 3 - RING BINDERS while D-RING (15 Copies)

6 Have 15 CDs to Burn

COVER
Diverders
New Figure on the Basin
Cover Page
CD Copies
CD Jacket

Fig 3-1 11X17
Figure-1 11X17
5-1 11X17
6-1 11X17
6-2 11X17

RWQCB Latest RS NPDES

State water Quality Board.

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APPENDIX D

WATER RECYCLING FUNDING GUIDELINES

April 17, 1997

California State Water Resources Control Board
Office of Water Recycling
WATER RECYCLING FUNDING GUIDELINES

TABLE OF CONTENTS

California State Water Resources Control Board
Office of Water Recycling

WATER RECYCLING FUNDING GUIDELINES

April 17, 1997[a]

PART ONE: BACKGROUND INFORMATION

I. INTRODUCTION

The State Water Resources Control Board (SWRCB) has three programs to provide financial assistance to local agencies for water recycling projects. The purpose of these guidelines is to explain the types of assistance available under each program and describe the procedures and funding criteria for applicants to obtain funds. Definitions of terms and abbreviations used in these guidelines are provided in Appendices A and B.

Grant funding assistance is available for water recycling project planning under the Water Recycling Facilities Planning Grant Program (FPGP). In addition, low interest loans are also available for planning under the State Revolving Fund (SRF). Low interest loan funds are available for design and construction of water recycling projects under the Water Recycling Loan Program (WRLP) or the SRF. The guidelines are presented in three parts. The first part includes background information applicable to all funding programs. A description of the FPGP is provided in the second part. Part Three has descriptions of the WRLP and SRF loan assistance programs.

These guidelines apply to all projects that have not received a preliminary grant or loan commitment from the SWRCB as of April 17, 1997. The provisions of these guidelines dealing with mandatory use ordinances for recycled water market assurances do not apply to agencies where their ordinances have received approval for the current loan application prior to June 16, 1994.

Funding for the WRLP is provided by three bond laws described below. The basis for the FPGP is the Safe, Clean, Reliable Water Supply Act (1996 Bond Law). The SRF is funded by federal grants and various state and local sources. These guidelines are also applicable to the SRF for all water recycling projects except those justified only on the basis of meeting pollution control needs (classified as Category II recycling projects later in these guidelines). In addition to these water recycling guidelines, the "Policy for Implementing the State Revolving Fund for Construction of Wastewater Treatment

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[a] These guidelines were adopted by the State Water Resources Control Board on April 17, 1997.

Facilities" (SRF Policy) also applies to agencies applying for an SRF loan. Because of some differences in the laws and policies governing the WRLP and SRF, an SRF applicant should refer to "State Revolving Fund Loan Program Funding for Water Recycling Projects." (Refer to Appendix E to obtain other SWRCB publications related to these programs.)

A. Clean Water Bond Law of 1984

A Water Reclamation Account was established under the Clean Water Bond Law of 1984 (1984 Bond Law) which authorized up to $25 million for low-interest loans to municipalities to assist in the design and construction of water recycling projects. Repayments of principal and interest are returned to the Water Reclamation Account to make additional loans. Also, the first $30 million in principal and interest repaid for loans for wastewater facilities from the Clean Water Construction Grant Account, provided for in the 1984 Bond Law, will be deposited in the Water Reclamation Account. Loans for water recycling projects can be for a period of up to 25 years at an interest rate equal to 50 percent of the rate paid by the State on the most recent sale of state general obligation bonds. A moratorium on payments of principal and interest is not permitted. No single project may receive more than a $10 million loan from this program. Loans can cover any part of a project up to 100 percent of eligible project design and construction costs.

B. Clean Water and Water Reclamation Bond Law of 1988

Up to $30 million was initially available under the Clean Water and Water Reclamation Bond Law of 1988 (1988 Bond Law) for low-interest loans to local public agencies to aid in the design and construction of water recycling projects. In addition, the SWRCB exercised authority under the 1988 Bond Law to transfer an additional $10 million into the Water Reclamation Account. "Local public agencies" do not include state agencies, which are included in the 1984 Bond Law as part of "municipalities". Loan repayments from these funds do not become part of a revolving fund as is the case of the 1984 Bond Law. The loan provisions are the same as for the 1984 Bond Law with the exceptions that the maximum loan period is 20 years instead of 25 years, no maximum loan amount per project is specified, and state agencies cannot receive loans.

C. Safe, Clean, Reliable Water Supply Act of 1996

A Water Recycling Subaccount was established in the Safe, Clean, Reliable Water Supply Act (1996 Bond Law) for low-interest loans for design and construction of water recycling projects and for grants for facilities planning of recycling projects. Loans for water recycling projects can be for a period of up to 20 years at an interest rate equal to 50 percent of the rate paid by the State on the most recent sale of state general obligation bonds. A moratorium on payments of principal and interest is not permitted. Loans may cover up to 100 percent of eligible project design and construction costs. Loan repayments are returned to the subaccount to make additional loans. Grants are limited to $75,000 per planning study.

D. State Revolving Fund

The State Revolving Fund Loan Program provides low interest loans for planning, design, and construction of collection, treatment, disposal and recycling of municipal wastewater, for implementation of nonpoint source and storm drainage pollution control management programs, and for the development and implementation of estuary conservation and management programs. SRF loan provisions are similar to those in the bond laws described above for the WRLP. A detailed description of SRF provisions is provided in the SRF Policy.

E. Water Recycling Project Categories

There are four sources of funding under two programs for providing loans for the design and construction of water recycling projects. Because each funding source has its own legal constraints and primary objectives, it is necessary to define four categories of water recycling projects. The categories and their funding sources are described below.

Category I. New Water Supply: A cost-effective alternative for augmenting the state water supply by offsetting new freshwater development by reclaiming municipal wastewater. Generally, this category would involve wastewater that is discharged into marine or brackish waters. The recycled water users served must be water users that were using or would have used fresh water without the availability of recycled water. Category I projects with an eligible cost of less than $15 million will be funded by the WRLP. SRF funds will be available if the eligible cost exceeds either the funds available in the WRLP or $15 million.

Category II: Pollution Control: An essential component of the cost-effective alternative for the treatment and disposal of municipal wastewater to meet waste discharge requirements imposed for water pollution control. Category II projects will be funded only by the SRF.

Category III: Local Water Supply: A cost-effective alternative that would augment a local water supply by reclaiming municipal wastewater but that may not augment the state's water supply. Development of a local recycled water supply for one area can reduce the availability of recycled water already being used in another area. A project in Category III must not result in a net decrease in the state's water supply. The recycled water users served must be water users that were using or would have used fresh water without the availability of recycled water. Generally, this category would involve wastewater that is being discharged into fresh water or a usable groundwater basin and is being reused indirectly. Category III projects will be funded only by the WRLP with 1996 Bond Law funds.

Category IV: Miscellaneous: Any water recycling project not included in the other categories. The source of water that is recycled may be municipal wastewater or groundwater that has become polluted primarily because of

human activities. The project must be cost-effective based on the project objective. Category IV projects will be funded by the WRLP with 1984 or 1996 Bond Law funds or by the SRF, depending on a case-by-case evaluation of eligibility under the specific funding source.

F. Further Information and Assistance

To apply for a recycling planning grant or construction loan, complete an application form and submit it and supporting documents to the Office of Water Recycling (OWR) of the SWRCB.

Additional information can be secured by use of the order form in Appendix E. The OWR is available to answer questions and advise the applicant during the planning process. An agency anticipating a possibility of seeking a loan in the future is encouraged to contact OWR early in the planning to ensure that the scope and content of planning will cover the key issues necessary for loan approval. Advice on which category a project would fall in can be provided. The OWR can be contacted by writing to

Office of Water Recycling
State Water Resources Control Board
P. O. Box 944212
Sacramento, California 94244-2120

This office can also be contacted by telephone at (916) 227-4580 or 227-4400 or by Fax at (916) 227-4595.

II. FACILITIES PLANNING CONCEPTS

The planning process generally comprises three levels of detail--conceptual, feasibility, and facilities. At the conceptual level, a potential project is sketched out, rough costs are estimated, and a potential recycled water market is identified. At this level little investigation has occurred and information is generally preliminary in nature.

At the feasibility level, a preliminary market assessment is performed, including direct consultation with potential recycled water users. Alternative facilities are screened, considering economics, technical constraints, and other factors. The most promising project is then investigated sufficiently to determine whether it is appropriate to proceed to the facilities planning stage.

The facilities planning level represents the final stage of the planning process. Agencies are expected to complete this stage of the planning process at the conclusion of a planning grant or before filing a loan application. At the facilities planning stage, a thorough cost-effectiveness analysis is conducted for all potential alternatives. Such an analysis includes evaluation of economics, environmental and social factors, and technical feasibility. Environmental, technical, and institutional issues are identified and potential obstacles are resolved. All necessary facilities of the recommended project have been identified, and the project is described with sufficient detail to seek funding

and approvals by regulatory agencies. Potential recycled water users have been informed of the conditions for using recycled water, including probable price. A detailed market assessment is performed, and a construction financing plan and revenue program are developed. Agencies initiate formal discussions with suppliers, wholesalers, retailers, and users of the recycled water, and institutional arrangements are decided upon. Market assurances, such as mandatory use ordinances or letters of intent from users, are obtained.

As part of the planning process the agency must conduct an environmental review. Environmental review should be consistent with requirements for obtaining SRF funding from the SWRCB. Guidance is provided in 'Environmental Review Process Guidelines for State Loan and Small Community Grant Applicants.' It will also be necessary to obtain clearance from the SWRCB's Division of Water Rights regarding compliance with Water Code Section 1211, if the proposed water recycling project will modify a current wastewater discharge to a surface water course by changing the point of discharge, place of use, or purpose of use of the treated wastewater. Because of the time involved in state water rights review, the Petition Unit of Division of Water Rights should be contacted early in the planning process. The SWRCB will not authorize a loan commitment until water recycling requirements have been issued by the Regional Water Quality Control Board (RWQCB).

The completed facilities planning should be documented in a report, which is to be submitted in fulfillment of a planning grant or with a loan application form. The information that should be contained in a facilities planning report is shown in Appendix C. Monetary analyses, market assessment, and market assurances are described in the following sections and Appendix D.

A. Monetary Analyses

An important factor in the cost-effectiveness analysis of water recycling is an analysis of monetary costs and benefits. Monetary costs and benefits can be analyzed in different ways depending on the use of the results. In water resources planning two general categories of monetary analyses have been established: economic analysis and financial analysis. The purpose of the economic analysis is to determine whether a project alternative is justified by quantifying all monetary costs and benefits regardless of who pays the costs or receives the benefits. The intent is to determine the alternative of least net cost. The economic analysis does not have the viewpoint of any particular public agency or private entity. A financial analysis is intended to determine who pays the costs and receives the benefits and to determine financial feasibility. This analysis should indicate costs and benefits to the recycled water user, the taxpayer, and the water retailer or wholesaler, and the sources of funds to implement the project alternatives being evaluated. A detailed discussion of monetary analyses can be found in Interim Guidelines for Economic and Financial Analyses of Water Projects (see Appendix F to order this).

1. Economic Analysis

The first step in an economic analysis is to identify all items of increased or decreased cost as a result of each alternative under consideration, including continuing without a project. The economic analysis should include the costs of all future components necessary to obtain the estimated recycled water yield for a project. If a proposed project or loan application is for system component that in itself would be insufficient to produce and transport recycled water to potential users, the costs for all associated facilities should be estimated. Costs experienced by entities other than the project sponsor must also be identified. For example, recycled water users may incur additional costs to convert to recycled water or may incur savings in fertilizer use because of nutrients in recycled water. If indirect reuse is taking place downstream from an effluent discharge, diversion of the effluent for direct reuse may result in increased water supply costs downstream.

The basis of comparison for justifying a water recycling project will depend on which category applies to the project. Some general principles apply to the analysis regardless of category. All monetary values are expressed in current dollars, excluding inflation. Because the debt service or fixed operating costs of existing facilities would not be reduced by use of recycled water, these costs are not included in the economic analysis. In an economic analysis, the present value of all immediate and future cost increases and decreases is calculated, including those experienced by other entities. The present values should be computed using a discount rate (a type of interest rate) specified by the SWRCB. To be able to compare the net cost of recycling alternatives and proposed water supply developments on a common basis, dollars per acre-foot of water developed should be computed. A water recycling alternative is considered economically justified if its net cost is less than the least net cost of other alternatives to achieve the same project objective.

Category I: For Category I the basis of comparison for justifying a water recycling project is a new freshwater supply that will be needed to serve the area of the recycled water project. The appropriate freshwater alternative for comparison is established in the facilities planning report in which the freshwater needs are projected and available facilities are discussed. The costs for use in the economic analysis of the new freshwater supply consist primarily of the capital and operation and maintenance costs of the new freshwater facilities and the variable costs of operating any existing water facilities that are needed in conjunction with the new facilities to deliver the new supply to the same market area as of the recycled water.

Category II: The basis of comparison for Category II projects is the least cost alternative pollution control project that would be needed to meet Regional Water Quality Control Board waste discharge requirements for the protection of receiving waters.

Category III: The basis of comparison for Category III projects is existing or new freshwater supplies, analyzed similarly to Category I projects. If the effect

of recycling would be to reduce the water supply to another agency, the economic effects of this must be included in the analysis.

Category IV: The factors to include in economic analyses will be determined on a case-by-case basis because the basis of Category IV projects may include objectives that do not include water supply, such as environmental enhancement. In general terms the economic analysis will include a comparison with appropriate alternatives to achieve the same project objectives. The economic effects of reduced water supply to another agency must be included, if appropriate.

2. Financial Analysis

The financial analysis actually consists of several analyses. An agency developing a water recycling project must determine the costs and savings it will experience for each potential alternative to determine whether an alternative is financially feasible. It must identify sources of funds to finance proposed alternatives. The construction financing plan and revenue program demonstrate the basic financial feasibility from the perspective of the agency. These are described in Appendix D.

Important information for the recycled water users is the cost or savings they will experience. Recycled water prices must be compared to the cost of fresh water that the users would otherwise use. The costs of on-site conversion to recycled water use must be estimated. Savings in fertilizer use should be considered.

In performing financial analyses, it is appropriate to use inflated dollars for future costs and to use an interest rate in present value analyses that is based on an agency's borrowing cost.

B. Recycled Water Market Assessment

The completion of a detailed recycled water market assessment is a critical element of the facilities planning process and crucial to the success of any water recycling project. A market assessment involves the identification of potential recycled water users, collection of information related to the users, and evaluation of the suitability of the recycled water to serve the potential market. Information is needed about and from the users to determine design criteria for a recycled water system, a recycled water pricing policy, financial feasibility, the amount and source of fresh water displaced, the institutional framework for the project, and the capability and willingness of users to take recycled water. The suitability of the recycled water is governed both by health and water pollution concerns and by the water quality needs of the users. Costs are a key element in bringing together recycled water and the potential water market. The general expectations of users is that the conditions of recycled water service will be comparable to alternative freshwater supplies, particularly for users already accustomed to taking potable water.

The recycled water market assessment process generally includes two levels of detail--preliminary and detailed. Agencies typically perform a preliminary market assessment during the feasibility planning stage. The preliminary market assessment is developed through consultation with users and provides general data, such as the number of potential users, and the amount and type of potential recycled water use. While this information is adequate to allow an agency to determine whether a project warrants further consideration, additional information is necessary to determine the economic and financial feasibility of the project.

Agencies are required to conduct a detailed market assessment as part of the facilities planning process. The market assessment shall include, as a minimum, all of the users or service area for the capacity of the facilities for which loan funding is or may be requested. Like the preliminary market assessment, the detailed market assessment must be developed through direct consultation with potential users. The following information should be included in the detailed market assessment:

A. General Information

1. List and map of potential users in the study area and types of uses.

2. State and local health department recycled water quality requirements and delivery requirements (backflow prevention, irrigation methods, levels of treatment, etc.) for each type of use.

3. Regional Water Quality Control Board recycled water quality and delivery requirements for each type of use and any restrictions in certain geographical areas for protection of ground water or surface water.

4. An estimate of the probable water quality of recycled water that could be made available in the future and a comparison of this quality to the health and water quality requirements of potential users.

5. An estimate of future freshwater supply costs to users.

6. An estimate of costs for facilities or modifications needed on user sites to accept recycled water for each type of user site.

B. Individual User Information

1. Specific potential uses of recycled water.

2. Location of user.

3. Present and future quantity needs. (For existing water users, present water use should be documented with three previous years of water usage.)

4. Timing of needs (seasonal, daily, hourly demands).

5. Quality needs.

6. Reliability needs regarding availability and quality of recycled water.

7. Needs regarding disposal of used recycled water.

8. Internal capital investment for on-site treatment or plumbing retrofit needed to accept recycled water (also gather data to develop an independent estimate to compare with user's estimate). (This item is required for planning grant recipients only.)

9. Needed savings on recycled water to recover on-site costs or desired pay-back period and rate of return on investment. (This item is required for planning grant recipients only.)

10. Present source of water, present water retailer, cost of present source of water.

11. When user would be prepared to begin using recycled water.

12. Future land use trends that could eliminate recycled water use, such as conversion of farm lands to urban development.

13. For undeveloped future potential sites, the year in which water demand is expected to begin, current status and schedule of development (with supporting evidence, such as subdivision maps, land use permits, general plan land use designations, irrigated acreages, etc.).

14. Evidence that the prospective user was informed of a potential water recycling project, was asked for a preliminary impression of willingness to use recycled water, and what response the prospective user gave regarding willingness. This evidence may be presented in the forms of a table with a list of users, correspondence from users, or some other record of user response. Users should be informed of applicable health and RWQCB restrictions, potential recycled water quality available depending on treatment level, future cost, and quality of fresh water. (This item is required for planning grant recipients only.)

15. The data listed above may be grouped into categories for numerous small users of similar characteristics. However, please consult with OWR before doing so.

Determination of the market for recycled water in future development depends upon various sources of information of varying reliability. For near-term development that is proposed for inclusion in the ninth-year eligible capacity, information will generally be expected directly from land developers of their intentions, following the model format available from the Office of Water Recycling. This information shall be submitted for review before facilities plan approval is issued. Undeveloped sites may be included as part of the first year delivery commitment if the development has proceeded sufficiently through design and received sufficient approvals and permits that the SWRCB can safely assume that the user will be ready to accept recycled water upon completion of construction of the recycling project.

The preparation of the market assessment should not be viewed as a data collection exercise, but as an integral step in the recycled water marketing process. Potential customers should be familiarized with details of the proposed project, including the proposed project schedule, the projected water quality and reliability, and the projected price of recycled water in comparison with alternative water supplies (if such water supplies would be available to the customer). An agency that has adopted a mandatory use ordinance should also provide information about the ordinance and the customer's responsibility under the ordinance. Evidence of this effort to inform potential users (e.g., a copy of the information package provided to potential users) should be included in the detailed market assessment. The detailed market assessment should be documented in the facilities planning report.

C. Market Assurances

Reclaimed water market assurances serve to ensure that the water produced by a project will be utilized within the time frame envisioned in the facilities planning documents. Market assurances take the forms of 1) binding measures to ensure the participation of recycled water users upon initial project operation and 2) the agency□s plans for connecting additional users later to fulfill the entire eligible capacity of the project. The binding measures for securing the initial recycled water users generally take two forms: 1) mandatory use ordinances in which potential users are mandated to participate in the project or 2) user contracts in which potential users voluntarily commit themselves to participate in the project. The two forms of assurances are described in Section IX in Part Three. Which approach to take should be evaluated during facilities planning.

PART TWO: PLANNING GRANT PROGRAM

III. WATER RECYCLING FACILITIES PLANNING GRANT PROGRAM

A. Introduction

The Water Recycling Facilities Planning Grant Program (FPGP) provides grants to public agencies for facilities planning studies for water recycling. The program is administered by the Office of Water Recycling (OWR) of the SWRCB. The grant program's statutory requirements, policies and procedures are provided in this section.

B. Purpose

The purpose of the FPGP is to assist local agencies in the preparation of facilities planning studies for water recycling using treated municipal wastewater. In addition to encouraging new recycling planning studies, the SWRCB intends that these funds be used to supplement local funds to enhance the quality of local planning efforts and to produce documents needed by the SWRCB to evaluate applications for design and construction loans if a cost-effective project is identified.

C. General Guidelines

Public agencies may apply for the grants. Grants will be provided for facilities plans to determine the feasibility of using recycled water that will offset new freshwater development and augment the state's or a local water supply. Pollution control studies, in which water recycling is an alternative, will not be eligible for a grant. The grant will cover 50 percent of eligible costs up to a maximum grant of $75,000.

Each grant must result in a complete facilities planning report. The report will include an analysis of all of the essential components of potential operable projects. The plan will designate a potential recycled water service area and analyze the feasibility of serving all or portions of the designated study area. An agency may receive more than one grant. The OWR will not recommend approval of a grant application if the scope of the study is not sufficiently distinct from previous studies performed by an agency.

The SWRCB will establish a time limit in its resolution of grant approval for submitting a final facilities planning report. The allowable time will be the time estimated by the agency in the grant application to prepare and submit a final facilities planning report. This limit will be the basis of the grant contract term. At any point during a grant an agency may submit one request for an extension of the grant term and an increase in costs accompanied by a justification. After review of the request, OWR may approve an extension of the grant contract of up to twelve months from the date specified in the SWRCB resolution or an increase in maximum grant by up to 50 percent from the amount authorized in the resolution. OWR staff shall bring to the SWRCB for approval 1) any increases in grant contract term or amount beyond these amounts or 2) additional requests for changes after the first one. After approval, a grant contract

amendment will be processed, subject to approval, if necessary, by the Department of General Services.

D. Grant Process

The overall process of a FPGP grant is illustrated in the following flow chart.

Request grant application for package	Grant application is distributed to interested party upon request.
Grant application submittal	Agency submits grant application, including plan of study.
OWR reviews application	OWR reviews grant application.
Application review meeting	OWR and agency meet to discuss the plan of study and grant program procedures
SWRCB authorizes grant	SWRCB approves proposed grant, authorizes a grant commitment and subsequent grant contract to agency.
Grant contract execution	OWR drafts grant contract, agency and SWRCB execute contract, contract approved by Department of General Services.
Agency submits draft facilities plan	Agency undertakes facilities planning study, drafts a plan, and submits draft to OWR.
Plan review	OWR reviews draft plan for clarity and completeness, submits comments to agency.
50% payment	OWR processes 50 percent grant payment.
Final facilities plan submittal	Agency revises draft facilities plan and submits final plan to OWR.
Facilities plan approval and final payment	OWR approves final facilities planning report and processes 100 percent grant payment.

E. Grant Application

The grant application will consist of an application form, a resolution by the agency authorizing the grant application, and a plan of study.

The plan of study should describe the nature and scope of the proposed facilities planning study. The following components should be included:

1. A description of the recycled water service area that will be investigated.

2. The sources of recycled water that will be investigated and a brief summary of the unit processes currently in use at existing treatment facilities.

3. A description of the current fate of the effluent that could be recycled.

4. A map of the study area showing the sources of recycled water and potential service area.

5. Identification of the water supply and wastewater agencies having jurisdictions over the sources of recycled water or the potential service area.

6. General description of water recycling and freshwater supply alternatives that will be evaluated.

7. A description of the opportunities for participation of the public, potential recycled water users, and other affected agencies in the study.

8. A schedule with the starting and completion dates of specific tasks associated with the facilities planning study.

9. A list of potential problems that could cause delays in the progress of the study and description of the means to reduce the impact of these potential problems.

10. Identification of the entities that will be conducting the study and description of their roles; description of proposed subcontracts with consultants or interagency agreements with other agencies, and any force account work.

11. Proposed budget for study, including estimated costs of specific tasks, sources of financing, sources of funds for cash flow until grant reimbursement.

After an initial review of the application, the OWR will schedule a meeting with the agency to discuss the plan of study and grant program procedures. Upon completion of application review by OWR, the application will be presented to the SWRCB with staff recommendation whether to approve and authorize execution of a grant contract.

F. Facilities Plan Review and Approval

The facilities planning study consists of facilities planning and associated environmental impact analysis. Where a recommended project has been identified, completion of the study for the purposes of the grant consists of submittal of the following items:

1. a final facilities planning report that fully documents all aspects of the study

2. a copy of a resolution certifying or adopting the environmental document as required under the California Environmental Quality Act.

Background information on facilities planning, monetary analyses, recycled water market assessment, and recycled water market assurances is found in Part One of these guidelines. Appendix C includes an outline of information that should be obtained or issues that should be addressed during facilities planning. The information and analysis of issues are documented in the facilities planning report. The report must include an analysis of all of the essential components of potential operable projects. The level of detail should be commensurate with the size and complexity of the proposed project. While some factors listed in the outline may not be relevant to a particular project, all should at least be considered. If the conclusion of the study is a recommendation to proceed with implementation of a water recycling project, the agency should have completed initial work on assuring a recycled water market and drafted any necessary water recycling ordinances and/or interagency agreements.

During the course of planning, it may be concluded that a viable recycling project cannot be recommended. In this case, after consultation with the OWR and approval, the planning may be terminated before completion of all of the tasks specified in these guidelines. The results of the work completed and the basis for the conclusion should be documented in a report. After submittal of the report, the agency will receive grant funds for the work completed in the study and preparation of the report.

While it is appropriate to extract information from previous studies, the product submitted for a grant should not be an assemblage of copied material. Any extracted material should be revised and made consistent as needed prior to incorporation in a facilities planning report.

Environmental review should be consistent with requirements for obtaining SRF funding from the SWRCB. Guidance is provided in 'Environmental Review Process Guidelines for State Loan and Small Community Grant Applicants.'
An essential component of facilities planning is to identify the potential recycled water users that will participate in the recommended project. The agency should have determined how it will secure the recycled water market, generally through recycled water user contracts or use of a mandatory use ordinance. At the conclusion of facilities planning, the agency should either have obtained letters of intent to use recycled water from potential users or drafted a water recycling mandatory use ordinance and contacted all potential users regarding the project.

G. Funding Restrictions and Eligible Costs

An agency may conduct the facilities planning study by force account with its own resources or by contract with consulting firms or another public agency. Costs incurred either way are eligible insofar as they are for work within the scope of work approved in the grant application. A billing code should be established by the agency to assign grant eligible costs. In general, force account eligible costs will be limited to direct costs, including labor overhead, chargeable to the planning study. More specific guidance is provided in WRLP 'Guidelines on Force Account Eligible Costs.' If the agency uses consulting services, the scope of work for the services should distinguish between grant-eligible and ineligible work and such work should be billed separately. It is recommended that the agency provide an opportunity for the OWR to review the consultant contracts prior to their execution to ensure that the scope of work separates grant-eligible tasks from other tasks for billing purposes.

Eligible costs are costs incurred after execution of the grant contract.

A grant will be provided to reimburse the agency for 50 percent of eligible costs up to a maximum grant of $75,000. The remaining 50 percent share of costs is the responsibility of the agency, but may include grants or loans from other entities, such as federal, state, or regional agencies. To prevent duplication of funding, the grant will be reduced if the agency receives more than 50 percent financial assistance from other sources.

H. Disbursement of Grant Funds

Grant funds will be provided in two disbursements. Disbursement of 50 percent of the total estimated grant will be made upon submittal of a draft facilities plan. A final disbursement will be made after approval by the OWR of the final facilities plan, including associated documents, such as the environmental impact analysis.

Requests for disbursement will be made on forms provided by the OWR. The requests must be accompanied by documentation, including a copy of consulting contracts, billings from consulting firms, and a monthly summary of agency staff hours and associated costs.

PART THREE: LOAN FUNDING PROGRAMS

IV. LOAN FUNDING PROGRAMS

The Water Recycling Loan Program (WRLP) and the State Revolving Fund Loan Program (SRF) provide low interest loans to local agencies to design and construct water recycling projects. Water recycling loan applications are processed by the Office of Water Recycling (OWR) of the SWRCB. The purpose of the WRLP is to encourage the development of cost-effective water recycling projects by providing low interest loans to local agencies to lower the cost of reclaiming and reusing treated wastewater.

A. Program Funding Criteria

Generally, available funds will be committed to projects for which facilities planning is complete, provided the project meets the loan program requirements and is ready to proceed. However, the SWRCB reserves the right to manage the program to achieve the best use of loan funds. For example, the SWRCB may reserve funds for projects deserving special consideration or offer partial loans to achieve the maximum use of available loan funds.

Multiple-purpose projects may consist of components in more than one category. The components will be analyzed in accordance with the criteria of the applicable category and eligibility will be established accordingly.

Depending on the source of loan funds, there may be a cap on the total amount of a loan. The SWRCB establishes a cap on SRF loan funds annually based on the availability of SRF funds. There is a $10 million statutory cap per project for loans made from 1984 Bond Law funds. The SWRCB has established a $15 million cap per project for loans made from 1996 Bond Law funds.

B. General Eligibility

The general basis of eligibility of a water recycling project is established in the various bond laws and the SRF statutes, regulations, and policies. Projects for reclaiming ground water, including desalting and nitrate removal projects, are eligible under the WRLP (1996 Bond Law funds only) if the water to be treated has become unusable primarily because of human activities. Under the SRF, funding is restricted to projects reusing water of municipal wastewater origin. All projects must be cost-effective based on the project objective and the available alternatives to achieve the objective.

While the loan terms for the WRLP and the SRF are essentially the same, such as interest rate, there are some important procedural and eligibility differences that can jeopardize funding under one program or the other if applicants are not alert to program requirements from the commencement of project planning through completion of construction. As an agency begins planning, it may not be possible for the SWRCB to assure the agency of which program might be available for funding for Category I and IV

projects. In addition, because the SWRCB incorporated the Water Reclamation Account of the 1984 Bond Law into the SRF as a subaccount in order to secure additional federal matching funds, certain SRF requirements will apply to 1984 Bond Law loans. Therefore, all potential loan applicants for Category I, II, and IV projects should place their proposed projects on the SRF priority list and follow SRF environmental procedures.

It is the policy of the SWRCB that loans from the WRLP or the SRF shall be provided to cover 100 percent of eligible costs, excepting annual loan caps that may be established by the SWRCB. The agency may receive funds from other local, state, or federal programs to pay for ineligible costs or a share of eligible costs, provided that there is no duplication of funding of eligible components.

All applicants will be subject to the SWRCB 'Environmental Review Process Guidelines for State Loan and Small Community Grant Applicants.' The SWRCB cannot authorize a loan until the environmental review process is complete. The SWRCB must be notified immediately of any change in the project after completion of the environmental review process or after facilities plan approval (also called concept approval) by the SWRCB. Such changes may result in the need to revise environmental documents.

V. WATER RECYCLING LOAN PROGRAM PROCESS

The WRLP loan application process begins with the OWR staff distributing loan application packages to interested agencies upon request. The completed applications, including project planning documents, are submitted by the applicant for review. The OWR staff make a preliminary determination regarding the appropriate category assignment and which source of funds is most appropriate to fund the proposed project.

After the OWR staff has determined that the loan application is complete, that is, that project planning is complete and all other application requirements have been met, that the project is ready to proceed, and that loan funds are available, staff will issue facilities plan approval. The application will then be presented to the SWRCB for approval of a preliminary loan commitment and subsequent loan contract. If loan funds are not currently available, consideration may be given to reserving future repayments returning to one of the revolving funds.

If OWR determines that a proposed project is not cost-effective, OWR will provide a written explanation to the agency. Upon request by the agency, the OWR will bring the proposed project before the SWRCB with the explanation of the decision of OWR and the agency's request for review and authorization for facilities plan approval.

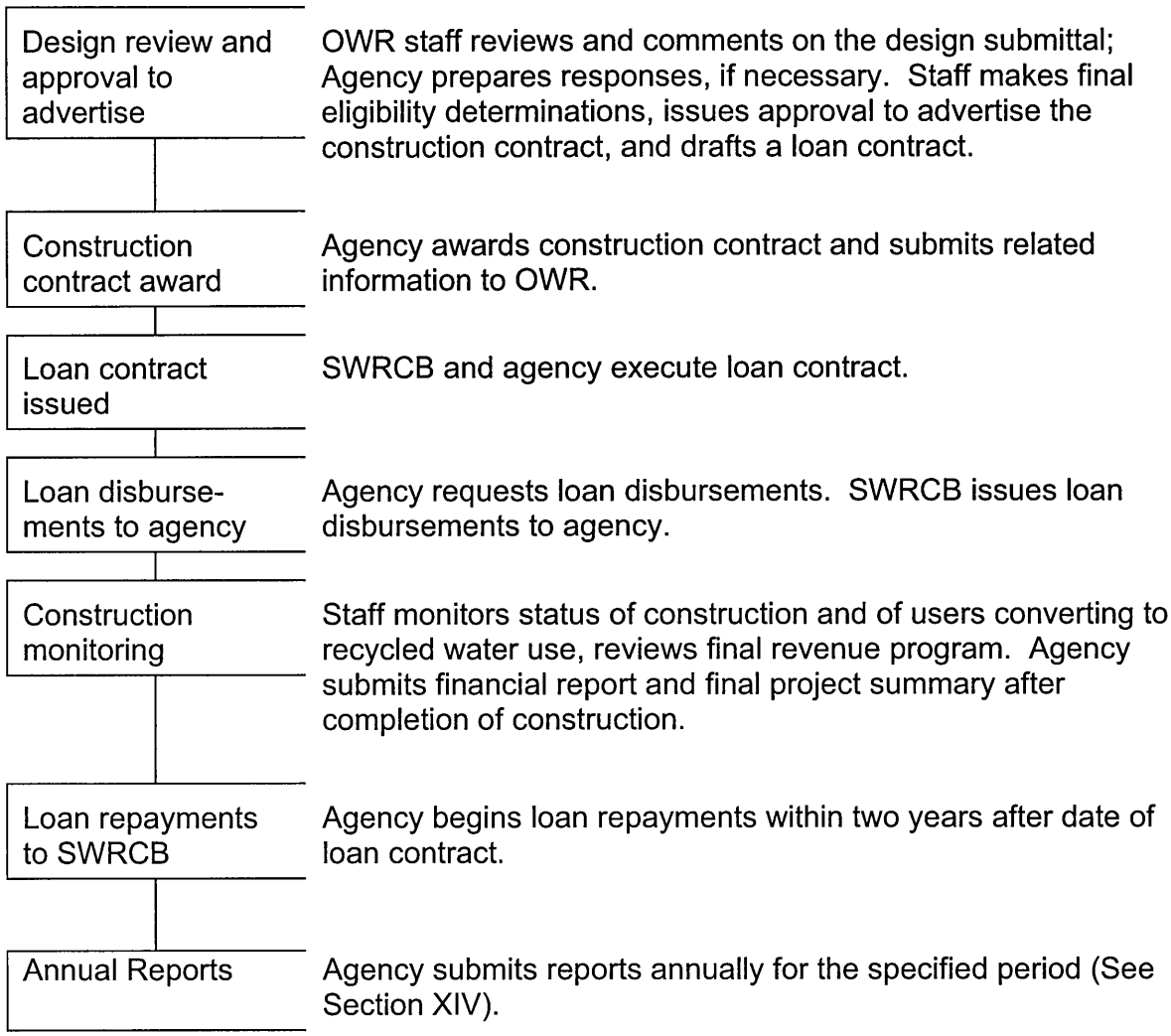
The preliminary loan commitment will expire at the end of the time period specified in the SWRCB resolution approving the loan commitment. The end of the period will be 8 weeks after the applicant's scheduled date for submittal to the state of final plans and specifications to account for time for the Division of Clean Water Programs (Division) to review plans and specifications. If biddable plans and specifications are not received

and approved by the expiration date of the preliminary loan commitment, the OWR may approve up to a 90 day extension for a good cause.

The procedures and administration of the SRF differ somewhat from the WRLP. Refer to the "Policy for Implementing the State Revolving Fund for Construction of Wastewater Treatment Facilities" (SRF Policy) for projects funded under the SRF. **The procedures described below apply to the WRLP.**

Submittal of preliminary design plans for review by the OWR is encouraged, but not required. Once the project design is completed, OWR reviews and approves the plans and specifications, final market assurances, construction financing plan, and revenue program. An approval to advertise is then issued to the applicant, and a loan contract is drafted. When the applicant has awarded the construction contract, the loan contract is executed and loan disbursements may commence. Loan repayments from the applicant to the SWRCB must begin within two years after the date of the loan contract. The entire application process is summarized below.

Request for application package	Application is distributed to interested party upon request.
Facilities planning and environmental compliance by applicant	Agency does planning without financial assistance from the Loan Program. OWR staff is available for meetings and guidance. Agency must comply with environmental review, water rights, State Health Department, and other requirements.
Application completed	Agency submits completed application, authorizing resolution, and planning documents to SWRCB.
SWRCB review	OWR staff reviews and comments on the application and planning documents. Agency prepares responses, if necessary.
Project facilities plan approval and eligibility determination	OWR staff issues project facilities plan approval, makes preliminary eligibility determination and determines availability of loan funds.
SWRCB authorizes loan	SWRCB approves the proposed project, authorizes a loan commitment and subsequent loan contract to the agency.
Design submittals	Agency submits 100% design submittal, including cost estimate, construction financing plan, revenue program, final market assurances, and plan for the use of remaining project capacity.



VI. STATE REVOLVING FUND PROCESS

The procedures and administration of the SRF are described in the SRF Policy. Category II recycling projects are administered under the SRF Policy only. In addition to the SRF Policy, the Water Recycling Funding Guidelines are applicable to the Category I and IV water recycling projects funded under the SRF. A copy of the SRF Policy may be obtained by request (refer to Appendix E).

VII. PLANNING REVIEW CRITERIA

In order for a project to be approved for a loan, a project must be cost-effective. A water recycling project will be considered cost-effective when, compared with the development of other alternatives to achieve the project objective, the proposed project will result in the minimum total resources costs over time to meet project objectives. Resource costs to be evaluated include monetary costs as well as nonmonetary factors, including social and environmental effects. An economic analysis, which considers all monetary costs associated with each alternative, is given primary consideration unless other factors are overriding. Other important factors include an assessment of the

recycled water market, availability of recycled water, financial feasibility, energy consumption, and engineering.

VIII. FACILITIES PLANNING

OWR staff will not consider a loan application for funding until the facilities planning process has been completed. Agencies are encouraged to notify OWR staff of their interest in applying for a loan early in the planning process. OWR staff can then advise agencies about the availability of funding and assist agencies in developing facilities planning documents that comply with funding guidelines and preparing loan applications. The facilities planning concepts discussed in Part One will be applicable. If the loan application and supporting documents are incomplete, the applicant will be advised about what additional information is necessary. Funds are available to assist in facilities planning either through the FPGP or an allowance under the SRF. No planning cost allowance is available under the WRLP.

IX. MINIMUM USE REQUIREMENTS

Existing users are expected to begin use in the first year of operation unless phasing of these users is justified. Projects are expected to reach certain minimum usage levels during the operating life of the project. These minimum levels are based on the eligible project capacity determined in accordance with Section XI.A.6. These minimum usage levels are explained below.

A. At least 50 percent of the total eligible project capacity must serve users that will exist by the time of completion of construction. (See Appendix A for definition of 'existing user'.)

B. Generally, all existing water users proposed to be included in the eligible project capacity will be expected to be connected to the system upon initial project operation. Proposals to connect existing users after initial project operation must be approved in the facilities plan approval based on the market assurances explained in Section X.C.

C. During the first year of project operation, the agency will be expected to use at least 25 percent of the eligible project capacity. The agency will also be expected to reach use of the total project capacity in accordance with the schedule of project usage approved in the facilities plan approval.

X. RECLAIMED WATER MARKET ASSURANCES

Documentation is required to provide an assurance of participation of users in the project. Existing users must be covered by a mandatory use ordinance or user contract. Documentation must be provided if phasing of project usage is proposed. These provisions are explained below.

A. Mandatory Use Ordinances

A mandatory use ordinance is a law adopted by a retail water purveyor requiring the use of recycled water in place of another source of water. For the ordinance to be an acceptable form of market assurance, it shall contain certain provisions:

1. Specification of the types of use of water for which recycled water must be used.

2. Specification of the conditions under which recycled water must be used or new development must be plumbed for future recycled water use.

3. Procedure for determining which water users are required to either convert to recycled water service or be plumbed to accept recycled water upon new water service.

4. Procedure to provide notice to potential users that they are subject to the ordinance and specification that the notice include information about the project, the responsibilities of the users under the ordinance, the price of the recycled water, and description of the on-site retrofit facilities requirements.

5. Procedure for request by the users for a waiver.

6. A penalty for noncompliance with the ordinance. Acceptable penalties are discontinuance of freshwater service, a freshwater rate surcharge of at least 50 percent of the freshwater rate, or an equally effective penalty.

If the agency implementing the recycled water project does not have the legal authority to enforce a mandatory use ordinance (for example, a sewerage agency), the mandatory use ordinance may be implemented by the retail water purveyor.

The OWR staff will review a copy of the adopted ordinance along with the loan application. Facilities plan approval of the project will establish the eligible capacity of the project based on the market assessment.

The SWRCB's resolution approving a loan commitment will include a requirement that the local public agency submit either 1) copies of letters of intent to participate in the project or 2) copies of the notifications to the users subject to the ordinance, a statement of whether any notified users appealed the conditions of recycled water use, and documentation showing the disposition of any appeals. The resolution will require that these items be submitted to the OWR staff before approval to advertise for construction, but in no case later than six months from the date of the resolution. The OWR staff will have 60 days from the date of receipt of submittals to approve or reject them, otherwise the submittals will be considered adequate. The SWRCB's resolution will include a provision that if the agency does not submit these items within six months or if the submittal is considered inadequate by the OWR staff, the resolution is null and void, and the project will need to be resubmitted for approval. Submittal of copies of letters of intent or notifications of users may be waived by OWR for users that have their

sites already plumbed and metered for use of recycled water, but are temporarily using potable water. Considerations for a waiver will include, but not be limited to, the number of years of successful recycling experience of the agency and the type of water use.

There may be limitations on the application of mandatory use ordinances. Certain potential users may not be subject to the ordinance for various reasons, for example, a user may not be obtaining water service from the agency with the ordinance or the user may be outside of the service area of the agency. In such situations, user contracts may be expected to cover users intending to take recycled water during the first year of operation. The ordinance shall apply to sufficient users such that in aggregate they represent most of the recycled water deliveries for water users that will exist by the time of completion of construction.

B. User Contracts

A user contract is a binding agreement between recycled water purveyors and users, signed by both parties. For the OWR staff to accept a user contract as an acceptable form of market assurance the contract must contain certain provisions:

1. A commitment to use the recycled water for a minimum period of 10 years.

2. The amount of recycled water the user intends to take annually.

3. The sites and the types of use of the recycled water.

4. Specification of the conditions of recycled water use, including the water quality.

5. The price of the recycled water.

6. Description of the regulatory and water purveyor requirements for on-site retrofit facilities needed to convert from freshwater to recycled water.

7. Date when recycled water use will commence.

User contracts are required from sufficient users such that in aggregate they represent most of the recycled water deliveries for water users that will exist by the time of completion of construction. The agency must submit with the loan application letters of intent from the proposed recycled water users intended to execute user contracts. The content of the letters should follow the model format provided by the Office of Water Recycling. The user contracts shall be submitted before OWR approval to advertise for construction.

C. Documentation of Future Connections

If the agency proposes to connect users after initial project operation, market assurances should include a description and schedule of the future connection of users to the eligible project facilities. Anticipated delay in connection of existing users after

initial project operation should be supported by adequate reasons for the delay in connection and a firm schedule for the construction of facilities to make the connections. The plan for use of the full eligible project capacity or pipeline capacities should be submitted with the loan application and updated, if necessary, with the submittal of final plans and specifications. An approved schedule of deliveries to reach the eligible project capacity will be included in the facilities plan approval.

XI. ELIGIBILITY CRITERIA

The following eligibility policies have been established by the SWRCB regarding costs and types of projects eligible and ineligible for loans.

A. Eligible Costs

1. Costs of construction for water recycling treatment, storage, and distribution systems shall be eligible for loans.

2. Allowances:

   a. WRLP: The eligible cost may include an allowance, if requested by the loan recipient, to cover engineering, legal and administrative services associated with the design and construction of the eligible recycling project. The amount of such allowance shall be up to 15 percent of the eligible cost of construction.

      In addition, the eligible cost may include an allowance, if requested by the loan recipient, to cover design services only for design costs of future phased expansions of facilities on the same site as facilities to be constructed as part of the loan. The phased expansions may include a capacity for up to 20 years after completion of construction. The amount of the allowance shall be up to 10 percent of the engineer's estimate of the construction cost of expansions based on 100 percent design.

   b. SRF: The eligible cost may include allowances for facilities planning, design, construction management, administration, and prime engineering. The SRF Policy should be consulted for details.

3. Project facilities which are eligible must remain in public ownership and have provision for adequate operation and maintenance and adequate right-of-way.

4. Reclaimed water distribution systems from the source of supply to the property line of the reuse sites shall be eligible for a loan. Eligibility of a system on the property of the user should be limited to:

   - Reclaimed water service line up to and including the water meter if the meter is located in the proximity of the property line.

- Reclaimed water service line up to a main storage facilities serving the user on the reuse site or, if there are more than one use areas that are widely separated on the property, up to the point of initially dividing the water flow.

5. A recycled water distribution pipeline shall be eligible if the terminal point serves a user that is committed by mandatory use ordinance or by user contract to take recycled water during the initial operation of the project. If only a portion of a pipeline serves users secured by a firm commitment, then eligibility shall extend to the most downstream user secured by a firm commitment.

6. The capacity of a project eligible for a loan shall be that capacity which can be used within nine years of completion of construction. However, pump station wet wells and buried pipelines at the treatment facility or in the distribution system shall have an eligible capacity of up to twenty years when documented by a market assessment showing the twenty year service area and identifying and analytically projecting all existing and future uses to be served by the recycled water pipeline proposed for loan funding. These eligible capacities are measured in terms of annual recycled water deliveries. Eligible sizes of facilities components are based on reasonable design criteria, including peaking factors, to serve these annual deliveries. There shall not be any restriction on the capacity of a project. Capacity in excess of the eligible project shall be funded with funds other than the SWRCB loan. Eligible costs for partially eligible capacity will be determined on an incremental cost rather than pro rata cost basis.

7. Agencies constructing pipelines or treatment facility capacity in excess of that which can be utilized within five years of completion of construction must demonstrate that adequate reclaimable water supplies will be available to support that future capacity. This documentation may take the form of: 1) an urban water management plan or equivalent water supply planning document which specifically identifies measures intended to assure that, in a year of normal supply and demand, an adequate supply of water will be available to support the projected growth in wastewater flows or, 2) certification by the agency that existing tributary wastewater flows will meet or exceed the capacity of the proposed recycling project at the time of the completion of the project.

8. Reasonable costs to provide an emergency backup water supply for the recycled water system are eligible.

B. Ineligible Costs

1. The following costs are not eligible for WRLP loan funds:

   - costs of planning for a project
   - costs of applying for a loan
   - costs of land, easements, and rights of way
   - costs for operation and maintenance of project facilities

- legal and court costs resulting from violation of state and federal laws, excluding the cost of capital facilities required to be built as a condition or result of a legal or court settlement.

2. Eligible costs of construction performed by the loan recipient's work force shall not include indirect costs, that is, expenses not readily identifiable with the eligible recycling project, such as ordinary operating expenses of the loan recipient. A more detailed discussion may be found in "Water Reclamation Loan Program Guidelines on Force Account Eligible Costs."

C. Miscellaneous

1. Multiple-purpose projects shall be eligible in proportion to the costs allocated to water recycling. In addition, projects utilizing supplemental sources of water are eligible in proportion to the costs allocated to the recycled water. An example of a multiple-purpose project would be a ground water recharge project that percolates both storm water runoff and treated wastewater. For projects using multiple sources of water, costs will be allocated to each source on a pro rata basis.

2. Projects for reclaiming ground water, including desalting and nitrate removal projects, are eligible under the WRLP (1996 Bond Law funds only) if the water to be treated has become unusable primarily because of human activities. This includes municipal, industrial, or agricultural activities. The degraded source water may be provided to the project directly, such as from a wastewater treatment plant, or indirectly, such as pumping from a brackish or polluted ground water basin. Projects for desalting naturally occurring saline or brackish waters are not eligible for a loan.

3. Recycling of industrial wastewater is eligible for a loan provided the loan applicant is a municipality, public agency, or a local public agency, depending on the source of loan funds, as defined in Appendix A. In-plant recycling projects are not eligible for a loan.

4. Project changes are permitted after approval of the project by the SWRCB, provided that there is no change in the scope of the project. If there is a change in scope of a project, the OWR staff shall bring the project to the SWRCB for reapproval. The scope of a project is considered to have changed if there is any of the following:

   a. A decrease in the recycled water deliveries projected for the ninth year following completion of construction by more than 15 percent.

   b. A change required in the environmental documents prepared under the California Environmental Quality Act such that the SWRCB is required to reconsider the environmental documents.

c. An increase in the total economic cost of the project such that the cost exceeds the alternative benchmark, such as the freshwater cost, by more than 15 percent.

d. An increase in the total eligible project cost such that it exceeds the preliminary loan commitment amount by more than 50 percent.

e. An adverse effect on the engineering or financial feasibility of the project.

The SWRCB Project Manager shall be promptly informed of project changes during construction. Because changes may affect project eligibility or require reapproval by the SWRCB, substantial changes during construction should be approved before initiating the change.

The maximum loan amount will be based on bid amount at the time of award of the construction contract, as described in Section XII. All project changes during construction that result in cost increases above the maximum loan amount shall be the responsibility of the loan recipient. Changes during construction may result in decreases in eligible costs. Such decreases may offset cost increases for eligible project costs. Eligible cost increases may result from 1) overruns in quantities beyond estimates in original bids for eligible work specified at the time of bid or 2) change orders for changed work which has been approved for eligibility. The final loan amount will be adjusted downward for any decreases in eligible cost items less any eligible offsetting cost increases, up to the maximum loan amount. Change orders will be reviewed for eligibility only if there is a request from the loan recipient and there is an offsetting cost decrease.

5. Retroactive funding of construction is not eligible for loan funds under the WRLP, with the exception that eligibility may be reserved for advance construction of minor portions of a proposed project with prior approval by OWR staff. Advance construction is not eligible for any facilities commencing construction before submittal of the loan application. Advance construction shall be justified based on the cost savings or time coordination with the main portion of the project. Prior approval does not constitute an assurance of final eligibility. Such eligibility is determined at the time of plans and specifications approval of the main project. The SRF Policy should be consulted for the retroactive funding policy under the SRF.

XII. LOAN FINANCIAL PROVISIONS

The provisions for the disbursement and repayment of loan funds under the SRF are discussed in the SRF Policy. The following discussion on loan provisions applies only to the WRLP. Successful loan applicants will receive loan funds during project construction based on evidence of satisfactory construction progress. No loan funds will be advanced during design. Interest charges on loan funds begin to accrue as soon as loan funds are disbursed. The maximum loan amount will be based on bid amount at the time of award of the construction contract. An allowance for design costs and

engineering, legal, and administrative costs may be included. Increases in the loan amount will not be permitted due to changes in cost during construction. The standard loan provisions will provide for equal annual repayments for a 20-year term following the date of the loan contract. However, shorter repayment periods are encouraged and may be imposed. The repayment will consist of principal and interest. The initial repayment shall be made not later than two years after the date of the loan contract. Additional details regarding the financial aspects, as well as general contractual requirements, can be found in Appendix D and in the model loan contract, which can be obtained upon request (refer to Appendix E).

XIII. DESIGN AND CONSTRUCTION

Before a project can receive approval to advertise the construction contract under the WRLP or plans and specifications approval under the SRF, Division staff must ensure that:

1. The design is consistent with the project described in the facilities plan approval;

2. The construction contract documents comply with all state and, if applicable, federal administrative requirements and contain provisions specified in the loan contract;

3. Agency has the required market assurances; and

4. All other state and facilities plan approval conditions have been met.

The procedures applicable to design, plans and specifications review, and approval to award construction for the SRF are described in the SRF Policy. The following discussion applies only to the WRLP. Staff must review final plans and specifications and other documents before issuing approval to advertise. The final design submittal consists of the following: 1) complete, biddable, and signed plans and specifications; 2) a detailed, itemized engineer's cost estimate; 3) updated revenue program; 4) updated construction financing plan and; 5) recycled water market assurances.

Promptly upon award of the construction contract or contracts, the agency shall notify the SWRCB Project Manager of the award. The notice shall be accompanied by a tabulation of bids received, the most recent engineer's estimate of project cost, a copy of the lowest acceptable bid proposal, a description of any bid protest received together with a description of how the protest was resolved, a copy of any project changes or addenda issued since approval to advertise was given, and a copy of the signed construction subcontract. If the agency awarded to anyone other than the apparent low bidder, the reasons for not awarding to the apparent low bidder shall be provided.

XIV. OPERATION

Agencies are encouraged to adopt a recycled water ordinance or regulation to ensure the long term successful operation of a recycling project in compliance with health, safety, and water quality requirements. A recycled water ordinance can include conditions under which users accept recycled water and define the requirements for on-

site facilities design, construction, operation, monitoring and inspection, connection fees and service charges, enforcement, and penalties. An ordinance can ensure that certain design criteria and standards incorporated into the original project can be carried on in project expansion as new users are added.

Agencies are also encouraged to prepare a recycled water user manual. The manual is used by personnel employed by users of recycled water who handle recycled water on a daily basis, such as park maintenance staff. The manual, usually a two to ten page guide, would cover in simplified language such topics as irrigation scheduling, precautionary measures, emergency procedures, control of runoff, and routine maintenance. It can also include a simplified description of the treatment that recycled water receives before reuse and the overall recycled water system.

Once the project begins operation, the project will be monitored for progress in connecting recycled water users and delivering recycled water. Annual reports must be submitted by the loan recipient until at least one full year after all proposed users are connected up to a maximum of nine years.

APPENDIX A DEFINITIONS

Award of Construction Contract: The formal approval of selection of a construction contractor by the governing board of the agency.

Completion of Construction: The date, as determined by the Division of Clean Water Programs after consultation with the loan recipient, that the construction of the project is substantially complete.

Construction Financing Plan: The demonstration of the financial capability to design and construct a project.

Cost-Effectiveness Analysis: An analysis to determine which project alternative will result in the minimum total resources cost (opportunity cost) over time to meet the project objectives, including local, state and federal requirements.

Economic Analysis: The procedure to determine the total monetary costs and benefits of all the resources committed to a project regardless of who in the society contributes them or who in the society receives the benefits.

Eligible Water Recycling Project: A water recycling project that is cost-effective based on the project objective when compared to the appropriate alternatives to achieve the objective. The project shall comply with applicable water quality standards, policies, and plans.

Existing user: An entity that currently exists or will exist before the completion of project construction and is using or would be expected to use fresh water if recycled water were not made available.

Financial Analysis: The procedure to determine financial feasibility through the determination of expenditures and incomes of or other financial impacts on the agency implementing the project, recycled water users, or others affected by the project.

Future user: An entity that currently does not exist and will not exist before the completion of project construction.

Local Public Agency: Any city, county, district, joint powers authority, or any other local public body or political subdivision of the state created by or pursuant to state law and involved with water or wastewater management (based on 1988 Bond Law). State agencies are not included in this term.

Municipality: Municipality shall have the same meaning as in the federal Clean Water Act (33 U.S.C. Sec. 1251 et. seq.) and shall also include the state or any agency, department, or political subdivision thereof (based on 1984 Bond Law).

Planning Period: The period over which a water development project is evaluated for cost-effectiveness. This period is not necessarily the same as the useful lives of the facilities under consideration. The planning period begins with the system's initial operations and is defined to be 20 years for the Water Recycling Loan Program.

Preliminary Grant Commitment or Preliminary Loan Commitment: A formal action by the SWRCB approving and reserving funds for a study or project.

Public Agency: Public agency shall have the same meaning as municipality.

Recycled Water: Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. (This term is synonymous with 'reclaimed water'.) (Based on California Water Code, Section 13050(n).)

Revenue Program: The demonstration of the financial feasibility of a project for the period after operation has begun.

Water Recycling: The process of treating wastewater to produce water for beneficial use, the storage and distribution of recycled water to the place of use, and the actual use of recycled water.

APPENDIX B LIST OF ABBREVIATIONS

CEQA	California Environmental Quality Act
Division	Division of Clean Water Programs
FPGP	Water Recycling Facilities Planning Grant Program
OWR	Office of Water Recycling
RWQCB	Regional Water Quality Control Board
SRF	State Revolving Fund Loan Program
SRF Policy	"Policy for Implementing the State Revolving Fund for Construction of Wastewater Treatment Facilities"
SWRCB	California State Water Resources Control Board
WRLP	Water Recycling Loan Program
1984 Bond Law	Clean Water Bond Law of 1984 (Proposition 25 on the November 6, 1984 ballot)
1988 Bond Law	Clean Water and Water Reclamation Bond Law of 1988 (Proposition 83 on the November 8, 1988 ballot)
1996 Bond Law	Safe, Clean, Reliable Water Supply Act (Proposition 204 on the November 5, 1996 ballot)

APPENDIX C RECOMMENDED PLANNING OUTLINE FOR WATER RECYCLING PROJECTS

This outline contains the components of a facilities planning report for water recycling. The facilities planning report outline emphasizes the information relevant to water recycling and its application for water supply purposes. For water pollution control facilities plans, additional information would be required to define the water quality problem and planning constraints and analyze the appropriate pollution control alternatives in addition to water recycling.

Facilities Plan/Project Report

A. Maps and diagrams

1. Vicinity Map.
2. Detailed map of study area boundaries.
3. Topographic map.
4. City boundaries.
5. Wholesale and retail water supply entity boundaries within study area and adjacent to study area.
6. Wastewater agency boundaries within and adjacent to study area.
7. Existing recycled water distribution pipelines, storage, and customers.
8. Ground water basin boundaries, major streams, streams receiving waste discharges.
9. Present and projected land use.
10. Each recycled water facilities alternative (including recommended project), showing locations of potential customers and approximate pipeline routes.
11. Wastewater treatment schematic--existing and proposed.

B. Study Area Characteristics

1. Hydrologic features.

2. Ground water basins, including quantities extracted by all users, natural and artificial recharge, losses by evapotranspiration, inflow and outflow of basins, and safe yield or overdraft.

3. Water quality--ground water and surface water.

4. Land use and land use trends.

5. Population projections of study area.

6. Beneficial uses of receiving waters and degree of use, portion of flow that is effluent.

C. Water Supply Characteristics and Facilities

1. Description of all wholesale and retail entities.

2. All sources of water for study area and major facilities, their costs, (costs should be broken down into fixed and variable), subsidies, and customer prices.

3. Capacities of present facilities, existing flows, estimated years when capacities to be reached for major components (water treatment plants, major transmission and storage facilities).

4. Ground water management and recharge, overdraft problems.

5. Water use trends and future demands, prices and costs.

6. Quality of water supplies.

7. Sources for additional water and plans for new facilities (for both the local entity and the wholesalers).

D. Wastewater Characteristics and Facilities

1. Description of entities.

2. Description of major facilities, including capacities, present flows, plans for new facilities, description of treatment processes, design criteria.

3. Water Quality of effluent and any seasonal variation.

4. Additional facilities needed to comply with waste discharge requirements.

5. Sources of industrial or other problem constituents and control measures.

6. Existing recycling, including users, quantities, contractual and pricing arrangements.

7. Existing rights to use of treated effluent after discharge.

8. Wastewater flow variations--hourly and seasonal.

E. Treatment Requirements for Discharge and Reuse

1. Required water qualities for potential uses.

2. Required health-related water qualities or treatment requirements for potential uses, operational and on-site requirements (such as backflow prevention, buffer zones).

3. Wastewater discharge requirements, anticipated changes in requirements.

4. Water quality-related requirements of the RWQCB to protect surface or ground water from problems resulting from recycled water use.

F. Recycled Water Market

1. Description of market assessment procedures.

2. Descriptions of all users or categories of potential users, including type of use, expected annual recycled water use, peak use, estimated internal capital investment required (on-site conversion costs), needed water cost savings, desire to use recycled water, date of possible initial use of recycled water, present and future source of water and quantity of use, quality and reliability needs, and wastewater disposal methods.

3. Summary tables of potential users and related data.

4. Definition of logical service area based on results of market assessment.

G. Project Alternative Analysis

1. Planning and design assumptions:
   a. Delivery and system pressure criteria.
   b. Peak delivery criteria.
   c. Storage criteria.
   d. Cost basis: cost index, discount rate, useful lives, etc.
   e. Planning period.

2. Water Recycling Alternatives to be Evaluated
   a. Treatment alternatives:
      i. Alternative levels of treatment.
      ii. Alternative unit processes to achieve a given level of treatment.
   b. Pipeline route alternatives.
   c. Alternative markets:
      i. Based on different levels of treatment.
      ii. Geographical areas.
   d. Alternative storage locations.
   e. Subalternatives of selected alternative:
      i. Marginal analysis for selected alternative for certain categories of users or certain geographic areas.
      ii. Varying storage, pump rates, and pipeline diameters.
      iii. Use of fresh water blending during peak irrigation months.

3. Non-recycled water alternatives.
   a. Discussion of other potentially viable new sources of water.
   b. Provide economic costs.

4. Water conservation/reduction analysis.
   a. Analysis.
   b. Impact on recycling, if any.
   c. Recommendation.
   d. Implementation.

5. Pollution control alternatives (if applicable) needed to comply with waste discharge requirements, and possible allocation of costs between recycling and pollution control.

6. No project alternative.

7. Information supplied for each alternative to include, but not be limited to:
   a. Cost tables for each alternative with breakdown of costs by total capital (without grants), O&M, unit processes, and with equivalent annual cost and per acre-foot cost.
   b. Lists of potential users assumed for each alternative.
   c. Economic analysis.
   d Energy analysis for each alternative, including direct and construction energy.
   e. Water quality impacts:
      i. Effect on receiving water by removing or reducing discharge of effluent, including effect on beneficial uses resulting from reduced flow.
      ii. Ground water impacts.

8. Comparison of above alternatives and recommendation of specific alternative.

H. Recommended Plan

1. Description of all proposed facilities and basis for selection.

2. Preliminary design criteria and refined pipeline routes.

3. Cost estimate based on time of construction.

4. List of all potential users, quantity of recycled water use, peak demand, commitments obtained.

5. Reliability of facilities as compared to user requirements.

6. Implementation plan:
   a. Coordination with water suppliers, determination of recycled water supplier and needed agreements or ordinances.
   b. Ability and timing of users to join system and make on-site investments.
   c. Tentative water recycling requirements of RWQCB.
   d. Commitments from potential users.
   e. Water rights impact.
   f. Permits, right-of-way, design, construction.
   g. Detailed schedule.

7. Operational plan--responsible people, equipment, monitoring, irrigation scheduling, etc.

I. Construction Financing Plan and Revenue Program

1. Sources and timing of funds for design and construction.

2. Pricing policy for recycled water.

3. Costs which can be allocated to water pollution control.

4. Annual projection of:
   a. Fresh water prices for each user or category of users.
   b. Recycled water used by each user.
   c. Annual costs (required revenue) of recycling project.
   d. Allocation of costs to users.
   e. Unit costs to serve each user or category of users.
   f. Unit price of recycled water for each user or category of users.
   g. Sensitivity analysis assuming portion of potential users fail to use recycled water.

5. Sunk costs and indebtedness.

J. Appendices

1. Tables of all abbreviations.

2. Copies of letters of interest or intent from recycled water users, or other documentation of support from potential users.

3. Draft of recycled water mandatory use ordinance or model user contract.

4. Drafts of necessary agreements, such as wholesale-retail agreement, joint powers agreement, etc.

APPENDIX D LOAN REPAYMENT AND FINANCIAL ANALYSES

I. Introduction

Typically, money is an essential ingredient for a feasible water recycling project. It must be raised to finance design and construction, to provide positive cash flow during construction, and, once operation has commenced, to repay debts and pay for operation and maintenance. These guidelines contain the repayment provisions for loans from the Water Recycling Loan Program and the desired documentation to demonstrate financial feasibility. More detailed information on financial analyses can be found in the SWRCB's Interim Guidelines for Economic and Financial Analyses of Water Reclamation Projects.

Two financial reports are required: a construction financing plan and a revenue program, which covers the period commencing with initial facilities operation. These two reports must be submitted with the loan application (as part of the facilities plan) and updated and submitted with the 100 percent design submittal. A final revenue program must be submitted at completion of construction.

II. Loan Repayment Provisions

Loans from the Water Recycling Loan Program will have an interest rate set at 50 percent of the average interest rate paid by the State on the most recent sale of general obligation bonds. The term of the loans may be for a period of up to 20 years. The loan term begins from the loan contract date. Repayments will begin on the last day of the month following two years after award of the prime construction contract.

III. Construction Financing Plan

It must be demonstrated that there are sufficient financial resources to finance the design and construction of the project. The construction financing plan generally consists of at least the following items:

1. An up-to-date capital cost estimate, including construction, engineering, legal, and administrative costs with a reasonable allowance for contingencies.

2. A cash flow analysis consisting of a monthly forecast of expenses during design and construction and sources of funds to meet those expenses.

3. The sources and amounts of funds for capital costs, including the status and timing in securing those funds.

There will be no disbursements of loan funds from the Water Recycling Loan Program until the award of construction contracts. Thus, the loan recipient must carry design costs until the initiation of construction. Loan disbursements will be made during construction in proportion to eligible costs incurred. If there are multiple construction

contracts, the loan disbursements will be proportioned amongst each construction contract.

The cash flow analyses should be based on the above procedures for loan disbursements and the assumption that receipt of loan funds will take 60 days from date of request.

IV. Pricing Policy

There are a variety of potential methods for determining the price customers will pay for recycled water. The most typical include:

1. The recycled water price is set to match exactly production costs.

2. The recycled water price is set at a given percentage discount from whatever potable water prices are.

3. The recycled water price is set at a given dollar discount from whatever potable prices are.

Some agencies charge a meter charge or have multiple rates if they have both wholesale and retail sales.

Some of the considerations involved in establishing recycled water rates are:

1. The costs that are expected to be recovered by recycled water revenue.

2. The costs and inconvenience to recycled water customers resulting from switching part of their water use to recycled water.

3. Whether the water agency will pay for on-site conversion costs of recycled water customers.

4. The degree of integration of the recycled water supply into the water agency's overall sources of supply, and thus the integration of costs and revenue from the various sources of supply.

Within the limits of financial feasibility, it is the recommendation of the Office of Water Recycling that the price of recycled water be as high as reasonable, taking into consideration the value of recycled water as compared to the price of fresh water. A reasonable discount from fresh water prices is often the most equitable.

V. Revenue Program

The financial feasibility of a project once it has started operation is shown in a revenue program. In general, a period of 10 years should be forecast. The following items should generally be included for each year:

1. recycled water demand by each user
2. fresh water prices applicable to the recycled water users
3. recycled water prices
4. total recycled water revenue
5. debt repayment
6. operation and maintenance costs, broken down by category with fixed and variable costs separated
7. supplementary funds provided to accommodate any revenue deficiency
8. sensitivity analysis assuming portion of potential users fail to use recycled water.

The assumptions and bases for all numbers should be fully stated and referenced. The pricing policy for the recycled water should be explained. It may be necessary to allocate project costs between pollution control and water supply or between categories of users.

Water supply agencies frequently have more than one source of water. The finances for these various sources are usually integrated, and customers are charged a common melded price, even if they receive water from only one of the sources. Likewise, recycled water should not be viewed as an alien source of water, but rather as simply an added supply to meet the overall water demands of a water supply agency. Its only distinction is that its quality restricts its uses. As such, it is desirable that the finances for a recycled water system be integrated with those for the fresh water sources of supply. Once it has been determined that recycled water costs are justifiable compared to other sources of supply, the recycled water supply should not be treated as an independent system financially.

With recycled water viewed as a complement to a water system, Recycled water prices should be established using the same standards as fresh water, taking into consideration some of the peculiarities mentioned in the previous section. If revenues from recycled water are insufficient to cover all expenses from the recycled water system, as is common in the initial years of operation, the shortfall can be made up with revenue from the fresh water system. Likewise, excess recycled water revenues can be used to cover other agency expenses, allowing all customers to benefit.

Because recycled water is serving as a replacement for fresh water, there inevitably is an effect on fresh water costs and revenue. It is desirable to quantify these effects and include them in the revenue program to describe fully the costs and benefits derived from the recycled water. This is often useful to provide justification for using fresh water revenue to help pay for a recycled water system.

APPENDIX E ORDER FORM FOR ADDITIONAL INFORMATION

Please review the below list of additional documents relating to the Water Recycling Loan Program. If you wish to obtain any of the documents, please provide the requested information.

A. Check the items desired:

[ ] 1. Clean Water Bond Law of 1984
[ ] 2. Clean Water and Water Reclamation Bond Law of 1988
[ ] 3. Safe, Clean, Reliable Water Supply Act (1996 Bond Law)
[ ] 4. Sample Letter of Intent for Use of Reclaimed Water
[ ] 5. Desirable Provisions of Reclaimed Water User Contracts
[ ] 6. Model Recycling Loan Contract
[ ] 7. Interim Guidelines for Economic and Financial Analyses of Water Reclamation Projects
[ ] 8. Background Information on Economic Analyses of Reclamation Projects
[ ] 9. Loan Application Package (Application Form, Water Recycling Funding Guidelines, and Environmental Review Process Guidelines for State Loan and Small Community Grant Applicants
[ ] 10. Policy for Implementing the State Revolving Fund for Construction of Wastewater Treatment Facilities

B. Provide the mailing address:

NAME:_____

TITLE:_____

AGENCY:_____

MAILING ADDRESS:_____

CITY, STATE, ZIP CODE:_____

C. Fold this order form in half, affix postage, and mail to pre-printed address on reverse side.

Place
Stamp
Here

Office of Water Recycling
Division of Clean Water Programs
State Water Resources Control Board
P. O. Box 944212
Sacramento, CA 94244-2120

WATER RECYCLING FUNDING GUIDELINES, April 17, 1997
WordPerfect6.1 document
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4/23/97

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APPENDIX E

PROPOSITION

50

★ ★ ★

WATER QUALITY, SUPPLY AND SAFE DRINKING WATER PROJECTS. COASTAL WETLANDS PURCHASE AND PROTECTION. BONDS. INITIATIVE STATUTE.

OFFICIAL TITLE AND SUMMARY

Prepared by the Attorney General

WATER QUALITY, SUPPLY AND SAFE DRINKING WATER PROJECTS. COASTAL WETLANDS PURCHASE AND PROTECTION. BONDS. INITIATIVE STATUTE.

- Authorizes $3,440,000,000 general obligation bonds to fund a variety of water projects, including:
  - Specified CALFED Bay-Delta Program projects including urban and agricultural water use efficiency projects;
  - Grants and loans to reduce Colorado River water use;
  - Purchasing, protecting and restoring coastal wetlands near urban areas;
  - Competitive grants for water management and quality improvement projects;
  - Development of river parkways;
  - Improved security for state, local and regional water systems;
  - Grants for desalination and drinking water disinfection.
- Appropriates money from state General Fund to pay off bonds.

SUMMARY OF LEGISLATIVE ANALYST'S ESTIMATE OF NET STATE AND LOCAL GOVERNMENT FISCAL IMPACT:

- State cost of up to $6.9 billion over 30 years to pay off both the principal ($3.44 billion) and interest ($3.46 billion) costs on the bonds. Payments of about $230 million per year.
- Reduction in local property tax revenues, ranging from a few million dollars to roughly $10 million annually, about one-half of which would be offset by state payments to schools to make up their revenue loss.
- Unknown costs to state and local governments to operate or maintain properties or projects purchased or developed with these bond funds.

ANALYSIS BY THE LEGISLATIVE ANALYST

BACKGROUND

Coastal Protection and Water Resources Programs. The state administers a number of programs to acquire and protect coastal wetlands and watersheds, conserve and protect water resources, and develop and improve the reliability of water supplies. The state also provides grants and loans to local agencies and nonprofit organizations for similar purposes. These programs are for a variety of specific purposes, including:

- *Coastal Wetlands and Watersheds.* The state has provided funds to acquire and restore coastal wetlands and watersheds.
- *Safe Drinking Water.* The state has provided funds for loans and grants to public water systems for facility improvements to meet safe drinking water standards.
- *Bay-Delta Restoration.* The state has also funded the restoration and improvement of fish and wildlife habitat in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (the Bay-Delta). Additionally, the state has funded water quality and supply projects in the Bay-Delta region which supplies a substantial portion of the water used in the state for domestic, industrial, agricultural, and environmental purposes. These funds have been provided through the CALFED Bay-Delta Program which is a joint state and federal effort to better manage water resources in this region.
- *Other Water Quality and Water Supply Projects.* The state has also provided funds for various other projects throughout the state that improve water quality and/or supply. For example, the state has provided loans and

ANALYSIS BY THE LEGISLATIVE ANALYST (CONT.)

grants to local agencies for the construction and implementation of wastewater treatment, water recycling, and water conservation projects and facilities. Also, the state has provided funds to line canals to conserve Colorado River water.

Funding for Coastal Protection and Water Resources Programs. Funding for these programs has come from various sources, including the state General Fund, federal funds, and general obligation bonds. Since 1990, voters have approved about $3 billion in bonds that are primarily for water-related purposes. It is estimated that about $1.9 billion of the bonds authorized by these previous bond acts will have been spent or committed to specific projects as of June 2002, leaving a balance of about $1.1 billion for future projects. In addition, in March 2002, voters approved a $2.6 billion resources bond measure. A majority of the funds from that bond are for park-related projects, although some funds are available for water conservation and water quality projects.

PROPOSAL

This measure allows the state to sell $3.44 billion in general obligation bonds for various water-related programs. Figure 1 summarizes the purposes for which the bond money would be available for expenditure by various state agencies and for loans and grants to local agencies and nonprofit associations. It shows that more than half of the funds would be allocated to two purposes—coastal protection and the CALFED Bay-Delta Program.

FISCAL EFFECTS

Bond Costs. The cost of these bonds would depend on their interest rates and the time period over which they are repaid. If the bonds were sold at an interest rate of 5.25 percent (the current rate for this type of bond) and repaid over 30 years, the cost would be about $6.9 billion to pay off both the principal ($3.44 billion) and interest ($3.46 billion). The average payment would be about $230 million per year.

However, total costs to the state will be somewhat less. This is because the measure requires that loans made for coastal nonpoint source pollution control (up to $100 million) be repaid to the General Fund. The repayment of these loans could reduce the General Fund costs by up to $100 million (not including interest payments) over the life of the bonds.

Property Tax-Related Impacts. The measure provides funds for land acquisition by governments and nonprofit organizations, for various purposes including coastal protection. Under state law, property owned by government entities, and by nonprofit organizations under specified conditions, is exempt from property taxation. To the extent that this measure results in property being exempted from taxation due to acquisitions by governments and nonprofit organizations, local governments would receive reduced property tax revenues. We estimate these reduced property tax revenues would range from a few million dollars to roughly $10 million annually. Because existing law requires the state to make up for any property tax losses experienced by schools, we estimate about one-half of any losses resulting from this change would be offset by the state.

Operational Costs. State and local governments may incur additional costs to operate or maintain a property or project that is purchased or developed with the bond funds. The amount of these additional costs is unknown.

FIGURE 1

PROPOSITION 50
USES OF BOND FUNDS

(In Millions)	Amount
Coastal Protection	**$950**
• Wetlands acquisition, protection, and restoration	750
• Watershed protection	200
CALFED Bay-Delta Program	**$825**
• Water use efficiency and conservation	180
• Water supply reliability	180
• Ecosystem restoration	180
• Watershed protection	90
• Water conveyance	75
• Delta levee restoration	70
• Water storage planning and studies	50
Integrated Regional Water Management	**$640**
• Various water supply, pollution reduction, water treatment, flood management, and wetlands restoration projects	500
• Land and water acquisitions to improve/protect water quality, water supply reliability, and fish and wildlife habitat	140
Safe Drinking Water	**$435**
• Small community drinking water system upgrades, contaminant removal and treatment, water quality monitoring, drinking water source protection	
Clean Water and Water Quality	**$370**
• Water pollution prevention, water recycling, water quality improvements	100
• River parkway projects	100
• Coastal nonpoint source pollution control	100
• Lake Tahoe water quality improvements	40
• Land and water acquisitions to protect water quality in the Sierra Nevada-Cascade Mountain Region	30
Desalination and Water Treatment Project	**$100**
• Desalination projects, treatment/removal of specified contaminants, drinking water disinfecting projects	
Colorado River Management	**$70**
• Ecosystem restoration	50
• Canal lining	20
Water Security	**$50**
• Protection of drinking water systems from terrorist attacks and other deliberate acts of destruction or degradation	
Total	**$3,440**

For text of Proposition 50 see page 75.

PROP
50

WATER QUALITY, SUPPLY AND SAFE DRINKING WATER PROJECTS. COASTAL WETLANDS PURCHASE AND PROTECTION. BONDS. INITIATIVE STATUTE.

ARGUMENT IN FAVOR OF PROPOSITION 50

YES ON 50. PROTECT OUR DRINKING WATER SUPPLY AND COASTLINE.

Our water supply is threatened by pollution, recurring drought, population growth, and inadequate security.

Proposition 50 will help overcome these threats and provide every California family a safe, reliable supply of clean drinking water by:

- Removing dangerous, cancer causing pollutants from our drinking water.
- Creating new water supplies to keep up with population growth.
- Keeping raw sewage and pollution out of our coastal waters and cleaning up beaches and bays.
- Protecting rivers, lakes and streams and preserving coastal wetlands.
- Protecting our reservoirs, dams, pumping stations and pipelines from terrorist threats and intentional contamination.

YES ON 50 KEEPS OUR WATER FLOWING

California's population is expected to nearly double in the next forty years. Proposition 50 funds state and local water system improvements needed to keep up with population growth by providing new water supplies and supporting water conservation programs.

YES ON 50 KEEPS OUR WATER CLEAN

Proposition 50 funds improved drinking water treatment to remove dangerous cancer causing chemicals, including arsenic, chromium and MTBE from our drinking water.

YES ON 50 KEEPS OUR WATER SAFE

Many of California's reservoirs, dams and pumping stations are protected by little more than a chain link fence. Proposition 50 protects local water delivery systems from terrorist threats and intentional contamination by funding early warning systems, alarms, fences, security systems, testing equipment and upgraded communications systems.

YES ON 50 PROTECTS OUR BEACHES, BAYS AND COASTLINE

Many of California's most beautiful beaches are unsafe for swimming because of pollution and raw sewage. Proposition 50 will fix aging local sewer and storm water systems that dump urban runoff into coastal waters. Proposition 50 also provides for protection and restoration of coastal wetlands vital to restoring the water quality, fisheries and wildlife of the San Francisco, Santa Monica and San Diego bays and of the coastal waters of the state.

YES ON 50 WILL NOT RAISE TAXES

Proposition 50 will use existing tax revenue where it is needed now—to protect our water supply and ensure safe drinking water for all Californians.

YES ON 50—SUPPORTED BY LOCAL WATER AGENCIES, CONSERVATION GROUPS, BUSINESS AND COMMUNITY GROUPS, INCLUDING:

- Metropolitan Water District of Southern California
- Contra Costa Water District
- East Bay Municipal Utility District
- League for Coastal Protection
- Heal the Bay
- Los Angeles Area Chamber of Commerce
- League of Women Voters of California
- The Nature Conservancy
- Southern California Agricultural Land Foundation
- National Wildlife Federation
- Audubon California
- American River Conservancy
- League to Save Lake Tahoe
- Clean Water Action

YES ON 50—PROTECT CALIFORNIA'S FUTURE:

California's future depends on investment in water supply and security, water quality and safe drinking water projects and on protecting our rivers, lakes, bays and coastal waters from contamination. Proposition 50 provides the funds that local water districts need to serve California's growing population.

Please join our campaign to protect California's water supply and coastline: *www.prop50yes.com*

BARBARA INATSUGU, *President*
League of Women Voters of California
DAN TAYLOR, *Vice President*
National Audubon Society
MARGUERITE YOUNG, *California Director*
Clean Water Action

REBUTTAL TO ARGUMENT IN FAVOR OF PROPOSITION 50

To say Proposition 50 creates *"new water sources to keep up with population growth"* is an outright lie. Just read Section 79560 of the initiative, it strictly prohibits bond funds from being spent for building new dams or reservoirs.

To say it *"will not raise taxes"* is another lie. Proposition 50 will cost California Taxpayers a total of $5.7 billion—that's $227 million each year for the next 25 years. Furthermore, this initiative does nothing to complete the California Water Project sponsored by Gov. Pat Brown to meet our long range water needs.

Millions of acre-feet of water flow down the Sacramento, through the Golden Gate, into the ocean each year. A canal is desperately needed to divert water around the Delta so it can flow down the California Aqueduct to drought stricken areas of our State. Proposition 50 does nothing to address this badly needed source of new water.

Proposition 50 is more about money than water. The proponents solicited various special interests and apparently traded bond monies for campaign cash. It's called *quid pro quo* and under normal circumstances, it's illegal. However, in the arena of initiative politics, it's not illegal. Some of the largest real estate developers in California are big investors in this scheme to extract $3.44 billion from the taxpayers.

The principals of the San Juan Company put up $50,000 for the effort at the same time they are trying to get approval to build 14,000 houses in an environmentally sensitive southern Orange County.

EDWARD J. (TED) COSTA, *Chairman*
California Taxpayers Coalition
RICHARD AHERN, *Vice President*
Waste Watchers, Inc.

ARGUMENT AGAINST PROPOSITION 50

It seems like every time we have a general election, someone asks for a few billion dollars for safe drinking water. This time we are being asked to pass the largest water bond in history. A whopping $5.7 billion—when you consider the principal ($3.44 billion) and the interest ($2.24 billion).

In spite of all the water bonds California taxpayers have approved in the last 30 years, our Governor and Legislature have taken no action to develop new water storage facilities. In fact, the construction of dams and reservoirs has been at a virtual standstill for many years in California.

Most of water bond monies California voters have been approving have gone for endless studies of the problem, and to pander to unrealistic environmental demands.

It's time for all good taxpayers to say *"no dice"* to these bond schemes that do nothing to improve our long range water supply.

Yes, we are fast approaching a big water shortage crisis in California, the likes of which we have never seen before. Proposition 50 provides virtually no money to alleviate that crisis.

We need new dams on the American River at Auburn and on the upper San Joaquin River at Friant. $3.44 billion will build both of them and provide us with a much needed new water supply.

We need to build the Sites Reservoir in Colusa County, and the Los Banos Grande Reservoir in Merced County to store an additional 6 million acre feet of new water for drought protection and to accommodate all the new construction of the last 30 years. $3.44 billion would go a long way to build these worthwhile new reservoirs.

All of California desperately needs a diversion channel around the Delta so that excess water that now flows out the Golden Gate into the ocean can be sent to drought stricken areas of our State. $3.44 billion would substantially fund that project.

Proposition 50 does nothing to start, or plan for completion of any of the projects listed above.

Proposition 50 has been described as the *"stealth bond issue."* Proponents are trying to sell it as a clean drinking water initiative. However, all California taxpayers should know it was drafted by a Sacramento lobbyist for several environmental groups and the Metropolitan Water District of Southern California.

Supporters then hired professional signature gatherers and paid as much as $2.50 a signature to qualify this deceptive initiative for the ballot.

What Proposition 50 really does is dole out bond funds to the pet projects of those environmental groups that paid to put it on the ballot. And, you and your children will have to come up with $227 million each year for the next 25 years to pay for it.

Recently, a group of 30 taxpayer organizations from around the State met in Convention under the name California Taxpayer's Coalition and voted unanimously to oppose Proposition 50.

Vote no on Proposition 50.

For more information *tedcosta@tedcosta.com* or *peoplesadvocate.org* 1-800-501-8222.

ERNIE DYNDA, *President*
United Organizations of Taxpayers
EDWARD J. (TED) COSTA, CEO
People's Advocate
TOM C. ROGERS, *Chairman*
Citizens Against Unfair Taxation

50

REBUTTAL TO ARGUMENT AGAINST PROPOSITION 50

PROP 50 IS NEEDED NOW TO PROVIDE A CLEAN, RELIABLE AND SAFE WATER SUPPLY FOR OUR FAMILIES AND OUR FUTURE.

We've made progress in improving water quality and reliability, but there's a lot more that needs to be done *now*. Prop 50 supports vitally needed water projects critical to ensuring clean drinking water and a reliable water supply.

Even the small groups opposing Prop 50 agree that OUR LOOMING WATER CRISIS MUST BE RESOLVED. But their approach, coming from people claiming to represent taxpayers, would cost drastically more than Prop 50's cost-effective approach.

PROPOSITION 50 WILL:

- *Keep our drinking water clean* by removing toxic substances and protecting our rivers, lakes and streams.
- *Keep our water flowing* by providing new water supplies, improving local water systems, and supporting water efficiency and conservation programs.
- *Protect our beaches, bays and coastline* by repairing aging sewer and storm water systems.
- *Keep our water system safe and secure* by protecting against terrorist threats and intentional contamination.

"Local water agencies responsible for providing Californians with safe drinking water agree: Prop 50 is vitally needed to provide a reliable supply of clean drinking water."—James Pretti, President of the Board, Contra Costa Water District

"Nothing is more important than secure water supplies. Prop 50 can help avert attacks on and contamination of our drinking water supply."—Lieutenant Ed Gray, President, California Organization of Police and Sheriffs

JOIN public safety groups, public health experts, water agencies, conservation groups, businesses and community groups throughout California in voting YES ON 50.

DAN TERRY, *President*
California Professional Firefighters
BARBARA INATSUGU, *President*
League of Women Voters of California
PHILLIP J. PACE, *Chairman*
Metropolitan Water District of Southern California

SAWPA Project Information Form for Prop 50 Potential Funding

Edit Project Information

The information for your project is summarized below. Click the edit and then update, buttons to make any changes. Click 'Add Project Map', 'Add Project Schedule', or 'Add Cooperating Agency' to upload a new map or schedule for the project or add a Cooperating Agency.

Add Project Map | Add Project Schedule | Add Cooperating Agency

Edit

Agency Contact Information

Organization:	City of Riverside
Contact First:	Zahra
Contact Last:	Panahi
Address:	3900 Main Street, 4th Floor
City:	Riverside
State:	CA
Zip:	92522
Phone:	909 826 5612
Cell:	
Fax:	909 826 2498

IWP Projects

Edit

General Project Information

Project Name:	Water Recycling Project - Phase I
Project Cost:	12300000
Project Description:	The proposed project involves implementation of Riverside water recycling project - phase I. The project includes construction of a booster pump station and installation of over 31,000 feet of transmission pipeline raging in size from 12" through 30". The recycled water is to replace domestic water use for irrigation by the City of Riverside and Jurupa Community Service District (JCSD) for landscape and park irrigation.
Project Location:	The project facilities would be located near the Riverside Water Quality Control Plant along Van Buren Boulevard, Jurupa Avenue, Arlington Avenue, and Adams Street.
Annual Water Yield: (9999=Unknown)	2070
If outside watershed, impact on watershed resources:	In Watershed
Part of Larger Project:	False
Larger Project Start:	NA
Larger Project Finish:	NA
Institutional Barriers:	None
Constructed Similar Projects:	True

CEQA Complete:	False
CEQA Approval Date:	January 2004
Contract Award Date:	January 2005
Fund PreConstruction:	True
Other Funding:	None
Other Prop 50 qualifiers:	None
IWP Project Number:	None
Comments:	None

Prop 50 Purposes met by Project

IWP Purpose:
Programs for water supply reliablility, conservation, and efficiency

Edit

Your Project Information:
The project would provide water supply reliabity by providing additional source of water supply.

IWP Purpose:
Edit Storm water capture, storage, treatment, and management

Your Project Information:

IWP Purpose:
Edit Removal of non-native plants, creation and enchancement of wetlands

Your Project Information:

IWP Purpose:
Edit Non-point source pollution reduction, management and monitoring

Your Project Information:

IWP Purpose:
Edit Groundwater recharge and management

Your Project Information:

IWP Purpose:
Edit Contaminant and salt removal

Your Project Information:

IWP Purpose:
Edit Water banking, exchange, reclamation, and quality improvement

Your Project Information:

IWP Purpose:
Edit Planning, implementation of multipurpose flood control programs

Your Project Information:

IWP Purpose:
Edit Watershed management and planning

Your Project Information:

IWP Purpose:
Edit Projects to develop new water treatment and distribution methods

Your Project Information:

IWP Purpose:
Edit Provide other benefits to the watershed

Your Project Information:

	Fund Description	Fund Amount	Fund Percent
Edit	Prop 50	10300000	84
Edit	Local Matching Funds	2000000	16
Edit	Other Matching Funds		
Edit	Total Project Funds	12300000	100

	IWP Document	Part of IWP
Edit	Water Resources Component	No
Edit	Environmental and Wetlands Component	No
Edit	SARI Line Component	No

Winston H. Hickox
Secretary for Environmental Protection

State Water Resources Control Board

Division of Financial Assistance
1001 I Street • Sacramento, California 95814 • (916) 341-5700
Mailing Address: P.O. Box 944212 • Sacramento, California • 94244-2120
FAX (916) 341-5470 • Internet Address: http://www.swrcb.ca.gov

Gray Davis
Governor

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at http://www.swrcb.ca.gov.

March 2003
ANNOUNCEMENT
Release of
CONSOLIDATED REQUEST FOR CONCEPT PROPOSALS
Watershed and Nonpoint Source Pollution Control Programs

The purpose of this document is to announce the availability of up to $138 million in Watershed/Nonpoint Source grants through the State Water Resources Control Board's (State Board) Division of Financial Assistance, in partnership with:

- California Bay/Delta Authority (CALFED)
- U.S. Environmental Protection Agency (USEPA)
- California Coastal Commission
- California Resources Agency

These grants are made available through funding from:

- Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act of 2000 (Proposition 13)
- Federal Clean Water Act section 319
- Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50)

GRANT PROGRAM SUMMARIES

- **Nonpoint Source Programs**

1. Nonpoint Source Pollution Control Program (Water Code, Division 26, Chapter 7, Article 2) (Proposition 13 = $25 million).
   The Nonpoint Source Pollution Control Program provides grant funding to local public agencies and nonprofit organizations formed by landowners for projects that protect the beneficial uses of water throughout the state through the control of nonpoint source pollution. Grants are available to local public agencies, or nonprofit organizations formed by landowners to prepare and implement local nonpoint source plans. Of the $25 million available, $18.5 million is available to projects within six designated counties, San Diego, Orange, Los Angeles, Ventura, Riverside, and San Bernardino Counties. $6.5 million is available for projects within the other 52 counties.

2. Coastal Nonpoint Source Pollution Control Program (Water Code, Division 26, Chapter 7, Article 5) (Proposition 13 = $11.1 million).
   The program provides grants to municipalities, local public agencies, nonprofit organizations, and educational institutions for coastal nonpoint source projects that restore and protect the water quality and environment of coastal waters, estuaries, bays, and near shore waters and groundwater. Of the $11.1 million available, $7 million is available to coastal projects within the geographic areas of Regional Water Quality Control Boards (Regional Boards) 1, 2, or 3. The remaining $4.1 million will go to coastal projects within Regional Boards 4, 8, or 9.

3. Nonpoint Source Implementation Program (Federal Clean Water Act Section 319) ($5-6 million).
   The 319 Nonpoint Source Implementation Program provides grant funding for projects to implement measures and practices that reduce or prevent nonpoint source pollution to ground and surface waters. In particular, proposals that implement measures to achieve pollutant load reductions and address TMDL implementation will be favored in the selection process. Grants are available to municipalities, local public agencies, educational institutions, nonprofit organizations or Indian tribes. Funds cannot be used for activities undertaken pursuant to a NPDES permit (including stormwater).

4. CALFED Drinking Water Quality Program (DWQP) (Proposition 13 = $12.7 million)
5. CALFED Drinking Water Quality Program (DWQP) (Proposition 50 = $18.5 million)
   Projects funded through Proposition 13 must meet the minimum requirements of both the Proposition 13 Nonpoint Source Pollution Control Program and the DWQP, whereas projects funded through Proposition 50 only need to meet the requirements of the DWQP. The DWQP is focused on improving the quality of Central Valley and Delta water sources used for drinking water. Thus, projects eligible for DWQP funding will generally be located in the watersheds of the Central Valley Regional Board (Region 5). However, projects outside of Region 5 may also be eligible for funding if the applicant can demonstrate that its project will improve or protect the quality of drinking water derived from the Central Valley-Delta system. For example, a project that addresses NPS pollution in the watersheds of the southern reservoirs of the State Water Project (which are primarily filled with Delta water) may be a viable project. In the end, it is the responsibility of the project proponent to demonstrate, in its application for funding, a substantive link to the goals and objectives of the DWQP.

- **Watershed Programs**

6. Watershed Protection Program (Water Code, Division 26, Chapter 6, Article 2) (Proposition 13 = $32.8 million)
   Special Consideration – $7.9 million of the above amount must go to small communities that meet financial hardship criteria outlined in the Request For Concept Proposal (RFCP). Grants are available to municipalities, local agencies, or nonprofit organizations to develop and implement local watershed management plans to reduce flooding, control erosion, improve water quality, and improve aquatic and terrestrial species habitats. Of the funds available, $1,000,000 are available for the development of watershed management or restoration plans.

7. CALFED Watershed Program (Proposition 13 = $12.1 million)
8. CALFED Watershed Program (Proposition 50 = up to $15-20 million).
   Special Consideration – $7.9 million of the Proposition 13 amount must go to small communities that meet financial hardship criteria outlined in the RFCP. Projects funded through the Proposition 13 allocation must meet the minimum requirements of both the Proposition 13 Watershed Protection and the CALFED Watershed Programs, whereas projects funded through Proposition 50 only need to meet the requirements of the CALFED Watershed Program. Of the Proposition 13 funds available, $800,000 is available for the development of watershed management or restoration plans. The Watershed Program will support activities that provide benefits to the areas within the CALFED Solution Area. Actions that would result in beneficial impacts on the resources of the Bay-Delta watershed and that support the goals and objectives of CALFED will be considered, regardless of the physical location of implementation. In addition to supporting the achievement of the goals and objectives outlined for CALFED and its Watershed Program, proposals should also be developed and implemented using the CALFED Watershed Program Principles of Participation.

Project proponents that have previously received funding from either State Board or CALFED programs will be considered subject to any performance assessments, restrictions or other special circumstances resulting from that earlier funding. Successful applications will make clear connections to nonpoint source, water quality, or watershed management issues, and the requirements outlined in this request for concept proposals.

A copy of the Request for Concept Proposals is available online at **www.swrcb.ca.gov/funding/docs/2003RFCP.doc**. We strongly encourage applicants to read the entire Request for Concept Proposals and review the reference materials before developing a grant proposal.

If, after reading these materials, you have any questions or need further assistance, please contact your Regional Board, State Board, Coastal Commission, or USEPA contacts listed in Attachment 6 of the RFCP. If you are unable to reach your Regional or State Board contact, you may call the following toll free number where a staff person will direct your call to the appropriate staff, 1-866-434-1083. You may also send an e-mail to **DFA_Grants@swrcb.ca.gov.**

WORKSHOPS

Workshops regarding this funding will be scheduled throughout the State during the month of April. Location and times will be posted on the State Board Web-site at **www.swrcb.ca.gov/funding/index.html**.

TEXT OF PROPOSED LAW

This initiative measure is submitted to the people in accordance with the provisions of Section 8 of Article II of the California Constitution.

This initiative measure adds sections to the Water Code; therefore, new provisions proposed to be added are printed in italic type to indicate that they are new.

PROPOSED LAW

WATER SECURITY, CLEAN DRINKING WATER, COASTAL AND BEACH PROTECTION ACT OF 2002

SECTION 1. Division 26.5 (commencing with Section 79500) is added to the Water Code, to read:

DIVISION 26.5. WATER SECURITY, CLEAN DRINKING WATER, COASTAL AND BEACH PROTECTION ACT OF 2002

CHAPTER 1. GENERAL PROVISIONS

79500. This division shall be known and may be cited as the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002.

79501. The people of California find and declare that it is necessary and in the public interest to do all of the following:

(a) Secure and safeguard the integrity of the state s water supply from catastrophic damage or failure from terrorist acts or other deliberate acts of destruction.

(b) Provide a safe, clean, affordable, and sufficient water supply to meet the needs of California residents, farms, and businesses.

(c) Provide adequate financing for balanced implementation of the CALFED Bay-Delta Program to:

(1) Provide good water quality for all beneficial uses.

(2) Improve and increase aquatic and terrestrial habitats and improve ecological functions in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary to support sustainable populations of diverse plant and animal species.

(3) Reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system.

(4) Reduce the risk to land uses and associated economic activities, water supply, infrastructure, and ecosystems from catastrophic breaching of Delta levees.

(d) Establish and facilitate integrated regional water management systems and procedures to meet increasing water demands due to significant population growth that is straining local infrastructure and water supplies.

(e) Improve practices within watersheds to improve water quality, reduce pollution, capture additional storm water runoff, protect and manage groundwater better, and increase water use efficiency.

(f) Protect urban communities from drought, increase supplies of clean drinking water, reduce dependence on imported water, reduce pollution of rivers, lakes, streams, and coastal waters, and provide habitat for fish and wildlife.

(g) Invest in projects that further the ability of all Californians to live within Californias basic apportionment of 4.4 million acre-feet per year of Colorado River water pursuant to the Colorado River Water Use Plan.

(h) Protect, restore, and acquire beaches and coastal uplands, wetlands, and watershed lands along the coast and in San Francisco Bay to protect the qual ity of drinking water, to keep beaches and coastal waters safe from water pollution, and to provide the wildlife and plant habitat and riparian and wetlands areas needed to support functioning coastal and San Francisco Bay ecosystems for the benefit of the people of California.

79502. It is the intent of the people in enacting this division that it be administered and executed in the most expeditious manner possible, and that all state, regional and local officials implement this division to the fullest extent of their authority.

79503. It is the intent of the people that water facility projects financed pursuant to this division shall be designed and constructed so as to improve the security and safety of the state s drinking water system.

79504. It is the intent of the people that investment of public funds pursuant to this division should result in public benefits.

79505. As used in this division, the following terms shall have the following meanings:

(a) "Acquisition" means the acquisition of a fee interest or any other interest, including easements, leases, and development rights.

(b) "Board" means the State Water Resources Control Board. .

(c) "CALFED" means the consortium of state and federal agencies with management and regulatory responsibilities in the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary.

(d) "CALFED Bay-Delta Program" means the undertaking by CALFED to develop and implement, by means of the final programmatic environmental impact statement/ environmental impact report, the preferred programs, actions, projects, and related activities that will provide solutions to identified problem

(e) "Department" means the Department of Water Resources.

(f) "Fund" means the Water Security, , Clean Drinking Water, Coastal and Beach Protection Fund of 2002 created pursuant to Section 79510.

(g) "Nonprofit organization" means any nonprofit corporation formed pursuant to the Nonprofit Public Benefit Corporation Law (Division 2 (commencing with Section 5000) of Title 1 of the Corporations Code) and qualified under Section 501(c)(3) of the United States Internal Revenue Code.

(h) "Secretary" means the Secretary of the Resources Agency.

(i) "Wetlands" means lands that may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools.

79506. Every proposed activity to be financed pursuant to this division shall be in compliance with the California Environmental Quality Act (Division 13 (commencing with Section 21000)) of the Public Resources

Code.

79507. Watershed protection activities financed pursuant to this division shall be consistent with the applicable adopted local watershed management plan and the applicable regional water quality control plan adopted by the regional water quality control board.

79508. Watershed protection activities in the San Gabriel and Los Angeles River watersheds shall be consistent with the San Gabriel and Los Angeles River Watershed and Open Space Plan as adopted by the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy and the Santa Monica Mountains Conservancy. Notwithstanding any other provision of law, this plan shall be implemented pursuant to Division 23 (commencing with Section 33000) of the Public Resources Code in the watershed of the Los Angeles River upstream of the northernmost boundary of the City of Vernon and pursuant to Division 22.8 (commencing with Section 32600) of the Public Resources Code in the San Gabriel River and in the lower Los Angeles River watershed.

79509. Except for projects financed pursuant to Chapter 6 (commencing with Section 79545) or Chapter 10 (commencing with Section 79570), to be eligible to be financed pursuant to this division, any project that will wholly or partially assist in the fulfillment of one or more of the goals of the CALFED Bay-Delta Program shall be consistent with the CALFED Programmatic Record of Decision, and shall be implemented, to the maximum extent possible, through local and regional programs.

CHAPTER 2. THE WATER SECURITY, CLEAN DRINKING WATER, COASTAL AND BEACH PROTECTION FUND OF 2002

79510. The Water Security, Clean Drinking Water, Coastal and Beach Protection Fund of 2002 is hereby created.

79511. All money deposited in the fund shall be used only for the purposes and in the amounts set forth in this division and for no other purpose.

79512. Except as otherwise expressly provided in this division, upon a finding by the agency authorized to administer or expend money appropriated from the fund that a particular project or program for which money has been allocated or granted cannot be completed, or that the amount that was appropriated, allocated, or granted is in excess of the total amount needed, the Legislature may reappropriate the money for other high priority needs consistent with this division.

CHAPTER 3. WATER SECURITY

79520. The sum of fifty million dollars ($50,000,000) shall be available for appropriation by the Legislature from the fund for the purpose of protecting state, local, and regional drinking water systems from terrorist attack or deliberate acts of destruction or degradation. This money may be expended or granted for monitoring and early warning systems, fencing, protective structures, contamination treatment facilities, emergency interconnections, communications systems, and other projects designed to prevent damage to water treatment, distribution, and supply facilities, to prevent disruption of drinking water deliveries, and to protect drinking water supplies from intentional contamination.

79521. The Legislature may enact such legislation as is necessary to implement this chapter.

CHAPTER 4. SAFE DRINKING WATER

79530. (a) The sum of four hundred thirty five million dollars ($435,000,000) shall be available for appropriation by the Legislature from the fund to the State Department of Health Services for grants and loans for infrastructure improvements and related actions to meet safe drinking water standards including, but not limited to, the following types of projects:

(1) Grants to small community drinking water systems to upgrade monitoring, treatment, or distribution infrastructure.

(2) Grants to finance development and demonstration of new technologies and related facilities for water contaminant removal and treatment.

(3) Grants for community water quality monitoring facilities and equipment.

(4) Grants for drinking water source protection.

(5) Grants for treatment facilities necessary to meet disinfectant by-product safe drinking water standards.

(6) Loans pursuant to the Safe Drinking Water State Revolving Fund Law of 1997 (Chapter 4.5 (commencing with Section 116760) of Part 12 of Division 104 of the Health and Safety Code) .

(b) Not less than 60 percent of the money appropriated pursuant to this section shall be available for grants to Southern California water agencies to assist in meeting the state's commitment to reduce Colorado River water use to 4.4 million acre feet per year.

79531. The Legislature may enact such legislation as is necessary to implement this chapter.

CHAPTER 5. CLEAN WATER AND WATER QUALITY

79540. (a) The sum of one hundred million dollars ($100,000,000) shall be available for appropriation by the Legislature from the fund to the board for competitive grants for the following purposes:

(1) Water pollution prevention.

(2) Water reclamation.

(3) Water quality improvement.

(4) Water quality blending and exchange projects.

(5) Drinking water source protection projects.

(6) Projects to mitigate pathogen risk from recreational uses at drinking water storage facilities.

(b) Priority shall be given to projects that assist in meeting water quality standards established by the board.

(c) The Legislature may enact such legislation as is necessary to implement this section.

79541. The sum of one hundred million dollars ($100,000,000) shall be available for appropriation by the Legislature from the fund to the secretary for the acquisition from willing sellers, restoration, protection, and

development of river parkways. The secretary shall allocate this money in accordance with Article 6 (commencing with Section 78682) of Chapter 6 of Division 24 or pursuant to any other statute that provides for the acquisition, restoration, protection, and development of river parkways. Priority shall be given to projects that are implemented pursuant to approved watershed plans and include water quality and watershed protection benefits. This money may also be used to acquire facilities necessary to provide flows to improve water quality downstream.

79542. The sum of forty million dollars ($40,000,000) shall be available for appropriation by the Legislature from the fund to the California Tahoe Conservancy for acquisition from willing sellers, restoration, and protection of land and water resources to improve water quality in Lake Tahoe.

79543. The sum of one hundred million dollars ($100,000,000) shall be available for appropriation by the Legislature from the fund to the board for the purpose of financing projects that restore and protect the water quality and environment of coastal waters, estuaries, bays and near-shore waters, and groundwater. All expenditures, grants, and loans made pursuant to this section shall be consistent with the requirements of Article 5 (commencing with Section 79148) of Chapter 7 of Division 26. Not less than twenty million dollars ($20,000,000) shall be expended to implement priority actions specified in the Santa Monica Bay Restoration Plan. Money made available pursuant to this section shall supplement, not supplant, money appropriated or available pursuant to that Article 5 (commencing with Section 79148) , and no money appropriated pursuant to this section shall be used for a project for which an appropriation was made pursuant to that Article 5 (commencing with Section 79148) .

79544. The sum of thirty million dollars ($30,000,000) shall be available for appropriation by the Legislature from the fund to the secretary for the purpose of grants to local public agencies, local water districts, and nonprofit organizations for acquisition from willing sellers of land and water resources to protect water quality in lakes, reservoirs, rivers, streams and wetlands in the Sierra Nevada-Cascade Mountain Region as defined in Section 5096.347 of the Public Resources Code.

CHAPTER 6. CONTAMINANT AND SALT REMOVAL TECHNOLOGIES

79545. The sum of one hundred million dollars ($100,000,000) shall be available for appropriation by the Legislature from the fund to the department for grants for the following projects:

(a) Desalination of ocean or brackish waters. Not less than fifty million dollars ($50,000,000) of the money appropriated by this chapter shall be available for desalination projects. To be eligible to receive a grant, at least 50 percent of the total cost of the project shall be met by matching funds or donated services from non-state sources.

(b) Pilot and demonstration projects for treatment or removal of the following contaminants:

(1) Petroleum products, such as MTBE and BTEX.

(2) N-Nitrosodimethylamine (NDMA).

(3) Perchlorate.

(4) Radionuclides, such as radon, uranium, and radium.

(5) Pesticides and herbicides.

(6) Heavy metals, such as arsenic, mercury, and chromium.

(7) Pharmaceuticals and endocrine disrupters.

(c) Drinking water disinfecting projects using ultraviolet technology and ozone treatment.

79546. The Legislature may enact such legislation as is necessary to implement this chapter.

CHAPTER 7. CALFED BAY-DELTA PROGRAM

79550. The sum of eight hundred twenty-five million dollars ($825,000,000) shall be available for appropriation by the Legislature from the fund for the balanced implementation of the CALFED Bay-Delta Program. Expenditures and grants pursuant to this chapter shall be limited to the following:

(a) Fifty million dollars ($50,000,000) for surface water storage planning and feasibility studies.

(b) Seventy-five million dollars ($75,000,000) for the water conveyance facilities described in subparagraph (B) of paragraph (2) of subdivision (d) of Section 79190.

(c) Seventy million dollars ($70,000,000) for Delta levee restoration. Money expended pursuant to this subdivision shall be subject to Section 79050.

(d) One hundred eighty million dollars ($180,000,000) for water supply reliability projects that can be implemented expeditiously and thereby provide near-term benefits, including, but not limited to, projects that facilitate ground water management and storage, water transfers, and acquisition of water for the CALFED environmental water account. In acquiring water, preference shall be given to long-term water purchase contracts and water rights. Money allocated pursuant to this subdivision shall be subject to Article 4 (commencing with Section 79205.2) of Chapter 9 of Division 26.

(e) One hundred eighty million dollars ($180,000,000) for ecosystem restoration program implementation of which not less than twenty million dollars ($20,000,000) shall be allocated for projects that assist farmers in integrating agricultural activities with ecosystem restoration.

(f) Ninety million dollars ($90,000,000) for watershed program implementation.

(g) One hundred eighty million dollars ($180,000,000) for urban and agricultural water conservation, recycling, and other water use efficiency projects.

79551. All appropriations pursuant to this chapter shall include money for independent scientific review, monitoring, and assessment of the results or effectiveness of the project or program expenditure.

79552. All projects financed pursuant to this chapter shall be consistent with the CALFED Programmatic Record of Decision including its provisions regarding finance and balanced implementation.

79553. Consistent with the CALFED Programmatic Record of Decision, priority shall be given to projects that achieve multiple benefits across CALFED program elements. Not more than 5 percent of the money available pursuant to this chapter may be used for administrative costs.

79554. All real property acquired with money appropriated or granted pursuant to subdivision (e) or (f) of Section 79550 shall be acquired from willing sellers.

CHAPTER 8. INTEGRATED REGIONAL WATER MANAGEMENT

79560. The sum of five hundred million dollars ($500,000,000) shall be available for appropriation by the Legislature from the fund for competitive grants for projects set forth in this section to protect communities from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water. No project financed pursuant to this section shall include an on-stream surface water storage facility or an off-stream surface water storage facility other than percolation ponds for groundwater recharge in urban areas. No river or stream channel modification project whose construction or operation causes any negative environmental impacts may be financed pursuant to this chapter unless those impacts are fully mitigated.

79561. Money appropriated in Section 79560 shall be available for grants for water management projects that include one or more of the following elements:

(a) Programs for water supply reliability, water conservation, and water use efficiency.

(b) Storm water capture, storage, treatment, and management.

(c) Removal of invasive non-native plants, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands.

(d) Non-point source pollution reduction, management, and monitoring.

(e) Groundwater recharge and management projects.

(f) Contaminant and salt removal through reclamation, desalting, and other treatment technologies.

(g) Water banking, exchange, reclamation, and improvement of water quality.

(h) Planning and implementation of multipurpose flood control programs that protect property; and improve water quality, storm water capture and percolation; and protect or improve wildlife habitat.

(i) Watershed management planning and implementation.

(j) Demonstration projects to develop new drinking water treatment and distribution methods.

79562. An amount, not to exceed 10 percent of the money available for appropriation in Section 79560, may be appropriated by the Legislature for facilities, equipment, and other expenses associated with the establishment of comprehensive statewide groundwater monitoring pursuant to Part 2.76 (commencing with Section 10780) of Division 6.

79563. At least 50 percent of the amount available for appropriation in Section 79560 shall be appropriated to the board. The board shall establish procedures for selecting among eligible projects specified in Section 79561 that use the procedures developed by the board for stakeholder-based accelerated selection and contracting pursuant to Section 79104.32.

79564. To be eligible for financing pursuant to Section 79563, a project shall meet both of the following criteria:

(a) The project is consistent with an adopted integrated water management plan designed to improve regional water supply reliability, water recycling, water conservation, water quality improvement, storm water capture and management, flood management, recreation and access, wetlands enhancement and creation, and environmental and habitat protection and improvement.

(b) The project includes matching funds or donated services from non-state sources.

79565. Notwithstanding Section 13340 of the Government Code, the sum of one hundred forty million dollars ($140,000,000) is hereby continuously appropriated from the fund to the Wildlife Conservation Board, without regard to fiscal years, for expenditure by the board and for grants, for the acquisition from willing sellers of land and water resources, including the acquisition of conservation easements, to protect regional water quality, protect and enhance fish and wildlife habitat, and to assist local public agencies in improving regional water supply reliability.

CHAPTER 9. COLORADO RIVER

79567. The sum of twenty million dollars ($20,000,000) shall be available for appropriation by the Legislature from the fund to the department for grants for canal lining and related projects necessary to reduce Colorado River water use pursuant to the California Colorado River Water Use Plan adopted by the Colorado River Board of California.

79568. (a) The sum of fifty million dollars ($50,000,000) shall be available for appropriation by the Legislature from the fund to the Wildlife Conservation Board for the acquisition, protection, and restoration of land and water resources necessary to meet state obligations for regulatory requirements related to California's allocation of water supplies from the Colorado River. No money allocated pursuant to this section may be used to supplant or pay for the regulatory mitigation obligations of private parties under state or federal law.

(b) All real property acquired pursuant to this section shall be acquired from willing sellers.

CHAPTER 10. COASTAL WATERSHED AND WETLAND PROTECTION

79570. The sum of two hundred million dollars ($200,000,000) shall be available for appropriation by the Legislature from the fund for expenditures and grants for the purpose of protecting coastal watersheds, including, but not limited to, acquisition, protection, and restoration of land and water resources and associated planning, permitting, and administrative costs, in accordance with the following schedule:

(a) The sum of one hundred twenty million dollars ($120,000,000) to the State Coastal Conservancy for coastal watershed protection pursuant to Division 21 (commencing with Section 31000) of the Public Resources Code.

(b) The sum of twenty million dollars ($20,000,000) to the State Coastal Conservancy for expenditure for the San Francisco Bay Conservancy Program for coastal watershed protection pursuant to Chapter 4.5 (commencing with Section 31160) of Division 21 of the Public Resources Code.

(c) The sum of forty million dollars ($40,000,000) to the Santa Monica Mountains Conservancy. Twenty million dollars ($20,000,000) of this sum shall be expended for protection of the Los Angeles River watershed upstream of the northernmost boundary of the City of Vernon, and twenty million dollars ($20,000,000) shall be expended for protection of the Santa Monica Bay and Ventura County coastal watersheds, pursuant to Division 23 (commencing with Section 33000) of the Public Resources Code.

(d) The sum of twenty million dollars ($20,000,000) to the San Gabriel and Lower Los Angeles Rivers and

Mountains Conservancy for protection of the San Gabriel and lower Los Angeles River watersheds pursuant to Division 22.8 (commencing with Section 32600) of the Public Resources Code.

79571. Ten percent of the money allocated in each of the categories in Section 79570 shall be used for grants for the acquisition and development of facilities to promote public access to and participation in the conservation of land, water, and wildlife resources. Eligible projects include, but are not limited to, the following:

(a) Training and research facilities for watershed protection and water conservation activities conducted by nonprofit organizations. Priority shall be given to projects operated by nonprofit organizations in collaboration with the University of California and public water agencies.

(b) Nature centers that are in or adjacent to watersheds and wetlands identified for protection pursuant to this chapter, that provide wildlife viewing, outdoor experiences, and conservation education programs to the public and to students. Priority shall be given to projects that are operated by or in cooperation with nonprofit organizations and are designed to serve children from urban areas that lack access to natural areas and outdoor education programs.

79572. (a) Notwithstanding Section 13340 of the Government Code, the sum of seven hundred fifty million dollars ($750,000,000) is hereby continuously appropriated from the fund to the Wildlife Conservation Board, without regard to fiscal years, for the acquisition, protection, and restoration of coastal wetlands, upland areas adjacent to coastal wetlands, and coastal watershed lands. Money appropriated pursuant to this section shall be for the acquisition, protection, and restoration of lands in or adjacent to urban areas. Eligible projects shall be limited to the following:

(1) Acquisition, protection, and restoration of coastal wetlands identified in the Southern California Coastal Wetlands Inventory as of January 1, 2001, published by the State Coastal Conservancy, located within the coastal zone, and other wetlands connected and proximate to such coastal wetlands, and upland areas adjacent and proximate to such coastal wetlands, or coastal wetlands identified for acquisition, protection, and restoration in the San Francisco Baylands Ecosystem Habitat Goals Report, and upland areas adjacent to the identified wet lands.

(2) Acquisition, protection, and restoration of coastal watershed and adjacent lands located in Los Angeles, Ventura, and Santa Barbara Counties. Any project financed pursuant to this paragraph within the Santa Monica Mountains Zone, as defined in Section 33105 of the Public Resources Code, shall be by grant from the Wildlife Conservation Board to the Santa Monica Mountains Conservancy. Any project financed pursuant to this paragraph within the Baldwin Hills area, as defined in Section 32553 of the Public Resources Code, shall be by grant from the Wildlife Conservation Board to the Baldwin Hills Conservancy.

(b) Not less than three hundred million dollars ($300,000,000) of the amount appropriated in this section shall be expended or granted for projects within Los Angeles and Ventura Counties. Of the remaining funds available pursuant to this section the Wildlife Conservation Board shall give priority to the acquisition of not less than 100 acres consisting of upland mesa areas, including wetlands therein, adjacent to the state ecological reserve in the Bolsa Chica wetlands in Orange County.

(c) Not more than two hundred million dollars ($200,000,000) of the amount appropriated in this section may be expended or granted for projects in the San Francisco Bay area, as described in Section 31162 of the Public Resources Code. Any project within the San Francisco Bay area may be by grant from the Wildlife Conservation Board to the State Coastal Conservancy.

79573. (a) The purchase price for each acquisition made pursuant to Section 79572 shall not exceed the fair market value of the property as defined in Section 1263.320 of the Code of Civil Procedure. Fair market value shall be determined by an appraisal that is prepared by a licensed real estate appraiser and approved by the Wildlife Conservation Board and the Department of General Services.

(b) All real property acquired pursuant to this chapter shall be acquired from willing sellers.

CHAPTER 11. FISCAL PROVISIONS

79580. Bonds in the total amount of three billion four hundred forty million dollars ($3,440,000,000), not including the amount of any refunding bonds issued in accordance with Section 79588, or so much thereof as is necessary, may be issued and sold to be used for carrying out the purposes set forth in this division and to be used to reimburse the General Obligation Bond Expense Revolving Fund pursuant to Section 16724.5 of the Government Code. The bond proceeds shall be deposited in the Water Security, Clean Drinking Water, Coastal and Beach Protection Fund of 2002 created by Section 79510. The bonds shall, when sold, be and constitute a valid and binding obligation of the State of California, and the full faith and credit of the State of California is hereby pledged for the punctual payment of both principal of and interest on the bonds as they become due and payable.

79581. The bonds authorized by this division shall be prepared, executed, issued, sold, paid, and redeemed as provided in the State General Obligation Bond Law (Chapter 4 (commencing with Section 16720) of Part 3 of Division 4 of Title 2 of the Government Code), and all provisions of that law shall apply to the bonds and to this division and are hereby incorporated in this division by this reference as though fully set forth in this division.

79582. (a) Solely for the purpose of authorizing the issuance and sale, pursuant to the State General Obligation Bond Law, of the bonds authorized by this division, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 Finance Committee is hereby created. For purposes of this division, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 Finance Committee is the committee as that term is used by the State General Obligation Bond Law. The committee shall consist of the Controller, the Director of Finance, and the Treasurer, or their designated representatives. The Treasurer shall serve as chairperson of the committee. A majority of the committee may act for the committee.

(b) For purposes of this chapter and the State General Obligation Bond Law, the secretary is designated as the board.

79583. The committee shall determine whether or not it is necessary or desirable to issue bonds authorized pursuant to this division in order to carry out the actions specified in this division and, if so, the amount of bonds to be issued and sold. Successive issues of bonds may be authorized and sold to carry out those actions progressively, and it is not necessary that all of the bonds authorized to be issued be sold at any one time.

79584. There shall be collected annually in the same manner and at the same time as other state revenue is collected, in addition to the ordinary revenues of the state, a sum in an amount required to pay the principal of, and interest on, the bonds maturing each year, and it is the duty of all officers charged by law with any duty in regard to the collection of the revenue to do so and perform each and every act that is necessary to collect that additional sum.

79585. Notwithstanding Section 13340 of the Government Code, there is hereby appropriated from the

General Fund, for purposes of this division, an amount that will equal the total of the following:

(a) The sum annually necessary to pay the principal of, and interest on, bonds issued and sold pursuant to this division, as the principal and interest become due and payable.

(b) The sum which is necessary to carry out the provisions of Section 79586, appropriated without regard to fiscal years.

79586. For the purposes of carrying out this division, the Director of Finance may authorize the withdrawal from the General Fund of an amount or amounts not to exceed the amount of the unsold bonds that have been authorized to be sold for the purpose of carrying out this division. Any amounts withdrawn shall be deposited in the fund. Any money made available under this section shall be returned to the General Fund, plus the interest that the amounts would have earned in the Pooled Money Investment Account, from money received from the sale of bonds that would otherwise be deposited in that fund.

79587. All money derived from premium and accrued interest on bonds sold shall be reserved and shall be available for transfer to the General Fund as a credit to expenditures for bond interest.

79588. Any bonds issued or sold pursuant to this division may be refunded by the issuance of refunding bonds in accordance with Article 6 (commencing with Section 16780) of Chapter 4 of Part 3 of Division 4 of Title 2 of the Government Code. Approval by the electors of the state for the issuance of the bonds shall include approval of the issuance of any bonds issued to refund any bonds originally issued or any previously issued refunding bonds.

79589. The people of California hereby find and declare that inasmuch as the proceeds from the sale of bonds authorized by this division are not proceeds of taxes as that term is used in Article XIII B of the California Constitution, the disbursement of these proceeds is not subject to the limitation imposed by that article.

SEC. 2. If any provision of this act or the application thereof is held invalid, that invalidity shall not affect other provisions or applications of the act which can be given effect without the invalid provision or application, and to this end the provisions of this act are severable.