City of Los Angeles
Integrated Resources Plan

Facilities Plan
Volume 2: Water Management

July 2004

Prepared For:

City of Los Angeles

Department of Public Works

Bureau of Sanitation

and

Department of Water and Power

Prepared By:

CH:CDM, A Joint Venture

Final Report

Acknowledgments

Project Directors

Adel Hagekhalil, Bureau of Sanitation

Tom Erb, Department of Water and Power (DWP)

Kellene Burn-Roy, CDM

Jack Baylis, CH2M HILL

Project Managers

Chuck Turhollow, Bureau of Sanitation

William Van Wagoner, DWP

Paul Gustafson, CDM

Judi Miller, CH2M HILL

Facilities Plan Task Managers

Reina Pereira, Bureau of Sanitation

Heather Boyle, CDM

Financial Plan Task Managers

Lisa Mowery, Bureau of Sanitation

Dan Rodrigo, CDM

Mike Matichich, CH2M HILL

Public Outreach Task Managers

Hyginus Mmeje, Bureau of Sanitation

Chris Harris, Harris & Company

Environmental Task Managers

Ara Kasparian, Bureau of Engineering

Jawahar Shah, Bureau of Sanitation

Louis Utsumi, Envicraft, LLC

Kathleen Bullard, CH2M HILL

Stakeholder Facilitator

Paul Brown, CDM

Management Advisory Committee and Technical Advisory Committee

Varouj Abkian/BOE

Sam Alavi/BOS

Vik Bapna/LA County DPW

Melinda Bartlett/DEA

Angelo Bellomo/LAUSD

Mel Blevins/ULARA Watermaster

Barry Berggren/BOS

Dale Burgone/BOS

Bee Campbell/CAO

Jeff Catalano/CD9

Donna Chen/BOS

Dan Comorre/BOE

Glen Dake/CD13

Steve Davis/RAP

Gus Dembegiotes/BOS

Ed Demesa/USACE

John De Witt/Rec & Parks

Mark Dierking/CD7

Tom Erb/DWP

Kurt Erikson/City of Glendale

Doug Failing/Caltrans

Dario Gomez/Mayor's Office

Dan Griset/SCAG

Keith Hanks/BOE

Daniel Hackney/BOS

Adel Hagekhalil/BOS

Tim Haug/BOE

Patricia Huber/CAO

Gideon Kracov/City Attorney's Office

Ara Kasparian/BOE

Shahram Kharaghani/BOS

Rod Kubomoto/LACDPW

Jim Langley/BOS

Wayne Lawson/BOE

Julie Lee/CD8

Joe Linton/CD1

Andy Lipkis/TreePeople

Carmelo Martinez/BOS

Mark Mackowski/ULARA Watermaster

Gerald McGowen/EAD

Jon Mukri/Rec & Parks

Andy Miller/USACE

Larry Millar/BOS

Traci Minamide/BOS

Joe Mundine/BOS

Greg Nelson/DONE

Hiddo Netto/BOS

Ana Nieves-Munsell/CD4

Adan Ortega/MWD

Reina Pereira/BOS

Randy Price/BOS

Rafael Prieto/CLA

Mike Qualls/PAO

Phil Richardson/BOE

Adriana Rubalcava/BPW

Cynthia Ruiz/ BPW

Brian Sasaki/LACDPW

Mark Starr/BOS

Shahrouzeh Saneie?BOS

Jawahar Shah/BOS

Valerie Shaew/BPW

John Sheppard/Mayor's Office

Cathy Shuman/USACE

Mike Spiker/LAG

William Steele/US Bureau of Reclamation

Robert Tanowitz/BOS

Paul Thakur/Caltrans

Rick Thorpe/MTA

Chuck Turhollow/BOS

Herman Van Buren/CLA – Planning

Lupe Vela/CD1

Bill Van Wagoner/DWP

Deborah Weintraub/BOE

Chris Westhoff/City Attorney's Office

Brian Williams/Mayor's Office

Judy Wilson/JW & Associates

Don Wolfe/LA County DPW

Ana Mea Yutan/CAO

Steve Zurn/City of Glendale

Contributing Staff and Consultants for Facilities Plan

Wastewater Management

Treatment

Chuck Turhollow, Bureau of Sanitation
Tim Haug, Bureau of Engineering
Varouj Abkian, Bureau of Engineering
Joe Mundine/Bureau of Sanitation
Ken Redd, Bureau of Engineering
Steve Fan, Bureau of Sanitation
Larry Miller, Bureau of Sanitation
Bob Birk, Bureau of Sanitation

Curt Roth, CH2M HILL
Hector Ruiz, CH2M HILL
Heather Boyle, CDM
Glen Daigger, CH2M HILL
Ilknur Ahmad, CH2M HILL
Gary Guyll, CH2M HILL
Angie Klein, CH2M HILL
Rod Reardon, CDM

Collection System

Farsheed Farhang, Bureau of Sanitation
Randy Price, Bureau of Sanitation
Betty Dong, Bureau of Sanitation
John Wang, Bureau of Sanitation
Kim O'Hara, Bureau of Sanitation

Omone Oshiomegie, CH2M HILL
Devang Parikh, MapVision
Manik Mohandas, MARRS Services
Dale Cannon, CH2M HILL
Judi Miller, CH2M HILL

Biosolids

Ray Kearney, Bureau of Sanitation
Reza Iranpour, Bureau of Sanitation
Diane Gilbert, Bureau of Sanitation
Omar Mogahaddam, Bureau of Sanitation

Ruth Roxburgh, CH2M HILL
Sava Nedic, CH2M HILL
Fred Soroushian, CH2M HILL

Water Management

William Van Wagoner, DWP
Tom Gackstetter, DWP
Alvin Bautista, DWP
Victoria Cross, DWP
Jennifer Trausch, DWP
Mike Mullin, Bureau of Sanitation
Steve Ott, DWP

Dan Rodrigo, CDM
Scott Lynch, CH2M HILL
Megan Laetsch, CH2M HILL
Bob Kemmerle, E2
Omone Oshiomegie, CH2M HILL
Tom West, CDM
Kathleen Higgins, CH2M HILL
Winthrop Allen, CH2M HILL
Mike Savage, CDM

Runoff Management

Shahram Kharaghani, Bureau of Sanitation
Morad Sedrak, Bureau of Sanitation
Robert Vega, Bureau of Sanitation
Mike Mullin, Bureau of Sanitation
Wing Tam, Bureau of Sanitation
Hampik Dekermenjian, CDM
Jennifer Gronberg, CDM
Tina Ponce, CDM
Evelyn You, CDM
Don Schroeder, CDM
Judi Miller, CH2M HILL
Curt Roth, CH2M HILL
Andy Lipkis, TreePeople
Bob Kemmerle, E2

Decision Science

Dan Rodrigo, CDM
Enrique Lopez-Calva, CDM
Amy Jones, Bureau of Sanitation

Regulatory Forecast

Jim Langley, Bureau of Sanitation
Ray Kearney, Bureau of Sanitation
Traci Minamide, Bureau of Sanitation
Shahram Kharaghani, Bureau of Sanitation
Adel Hagekhalil, Bureau of Sanitation
Donna Toy Chen, Bureau of Sanitation
Diane Gilbert, Bureau of Sanitation
Lisa Mowery, Bureau of Sanitation
Reina Pereira, Bureau of Sanitation
William Van Wagoner, DWP
Carrie Takayama, DWP
Chris Westhoff, City Attorney's Office
Judy Wilson, JW & Associates
Michele Pla, CH2M HILL
Tina Ponce, CDM
Ruth Roxburgh, CH2M HILL
Paul Gustafson, CDM
Heather Boyle, CDM

Facilities Plan
Volume 2: Water Management
Contents

Figures

Tables

Abbreviations

Acre-ft	Acre feet
Acre-ft/yr	Acre-feet per year
BMP	Best Management Practice
BOS	Bureau of Sanitation
CIP	Capital Improvement Program
CITY	City of Los Angeles
CUWCC	California Urban Water Conservation Council
DWP	Department of Water and Power
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	Environmental Protection Agency
ET	Evapotranspiration
EVWRP	East Valley Water Recycling Project
FP	Financial Plan
gpd	gallons per day
HTP	Hyperion Treatment Plant
HyblB	Alternative 1: Hyperion Expansion/ Moderate Potential for Water Resources Projects
Hyb2C	Alternative 2: Tillman and LAG Water Replenishment Plant Expansions/ High Potential for Water Resources Projects
Hyb3C	Alternative 3: Tillman Water Replenishment Plant Expansion/ Moderate Potential for Water Resources Projects
Hyb3C	Alternative 4: Tillman Water Replenishment Plant Expansion/ High Potential for Water Resources Projects
IEUA	Inland Empire Utilities Agency
IPWP	Integrated Plan for the Wastewater Program
IRP	Integrated Resources Plan
LAGWRP	Los Angeles Glendale Water Reclamation Plant
LA River	Los Angeles River
LAA	Los Angeles Aqueduct System
MF	microfiltration

MF/RO	microfiltration/reverse osmosis
mgd	million gallons per day
MW	mega watts
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
NdN	nitrification/denitrification
PWP	Pasadena Water and Power
SCAG	Southern California Associations of Government
SFR	Single Family Residential
SPS	Supplemental Purchase Specification
TITP	Terminal Island Treatment Plant
TWRP	Donald C. Tillman Water Reclamation Plant
ULF	Ultra-low-flush
UWMP	Urban Water Management Plan
WFP	Wastewater Facilities Plan

Section 1
Introduction

1.1 Background

The City of Los Angeles (City) has embarked on a unique approach of technical integration and community involvement to guide policy decisions and water resources facilities planning. The Integrated Resources Plan (IRP) incorporates a future vision of water, wastewater and runoff management in the City that explicitly recognizes the complex relationships that exist among all of the City's water resources activities and functions. Addressing and integrating the water, wastewater and runoff needs of the City in the year 2020, the IRP also takes an important step towards comprehensive basin-wide water resources planning in the Los Angeles area. This integrated process is a departure from the City's traditional single-purpose planning efforts for separate agency functions, and it will result in greater efficiency and additional opportunities for citywide benefits, including potential overall cost savings. This integrated process also highlights the benefits of establishing partnerships with other citywide and regional agencies, City departments, and other associations, both public and private.

The IRP sought to accomplish two basic goals as part of developing an implementable facilities plan:

- Integrate water supply, water conservation, water recycling, and runoff management issues with wastewater facilities planning through a regional watershed approach, and
- Enlist the public in the entire planning and design development process at a very early stage beginning with the determination of policy recommendations to guide planning.

The IRP is a multi-phase program:

- Phase I [Integrated Plan for the Wastewater Program (IPWP)] (completed in 2001): focused on defining the future vision for the City by developing a set of guiding principles to direct future, more-detailed water resources planning.
- Phase II (Integrated Resources Plan): Focuses on the more detailed planning required to developing a facilities plan, environmental impact report and financial plan.
- Projects (Implementation) (2005 and beyond): Includes future concept reports, studies, and design and construction projects to implement the capital improvement program (CIP) developed as part of Phase II.

The City is facing many challenges, including: the dynamic nature of current and projected regulations affecting the recycled water, runoff and wastewater programs; potential community concerns with siting new wastewater, runoff and recycled water facilities in neighborhoods; potential funding needs for the proposed facilities and programs, and the importance of inter-agency coordination to handle jurisdictional issues. By addressing these challenges now as part of the IRP, the City will have the structure and tools in place to adapt to changing conditions in the future.

The combination of Phases I and II constitute the documentation and overall implementation plan for the IRP, which is intended as an integration of the City's water (water reuse/recycle and water conservation), wastewater (collection, treatment and biosolids) and runoff (dry weather and wet weather) service functions. By using this integrated approach, the City will establish a framework for a sustainable future for the Los Angeles basin, one where there are sufficient wastewater services, adequate water supply, and proper and proactive protection and restoration of the environment.

1.2 Overview of Document

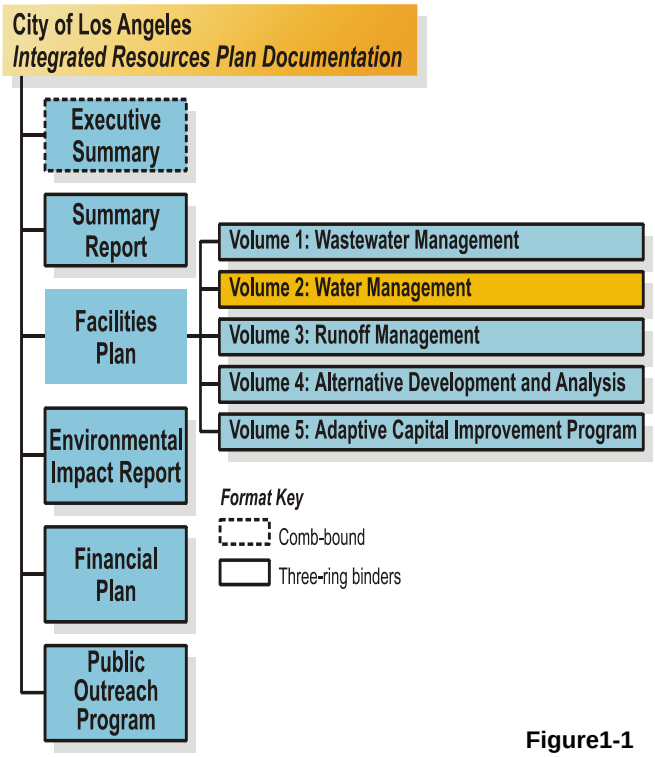


Figure1-1
Final IRP Documentation

The IRP documentation includes a series of volumes that includes an Executive Summary; Summary Report; Facilities Plan (5 volumes); Final Environmental Impact Report (EIR); Financial Plan; and Public Outreach. Each volume will include sections and subsections. Figure 1-1 illustrates the organization of these volumes.

Facilities Plan Volume 2: Water Management focuses on the water service area of the project, specifically the potable system, water conservation, and the recycled water system. Table 1-1 provides a description of each of the sections of this document. A separate document titled, "Los Angeles Recycled Water Master Plan," will be submitted in summer 2004.

Table 1-1 **Volume 2: Water Management Structure**	
Section	**Description**
1 – Introduction	Study objectives and background
2 – Approach	Study approach
3 – Planning Parameters	Summary of planning year, water service area, regulatory requirements and guiding principles
4 – Potable System	Summary of potable system demands and supply sources
5 – Water Conservation	Description of current, planned, and additional water conservation measures
6 – Recycled Water System	Summary of the recycled water system and options (See "*Recycled Water Master Plan*" for more detail).
7 – Alternatives Analysis	Description of the water management components included in the recommended alternatives. (See "*Volume 4: Alternatives Analysis*" for additional discussion)
References	Summarizes the sources of data, information, and contributions of others.
Appendices	

Section 2
Approach

2.1 Introduction

The IRP approach is to involve those who have a stake in the outcome of the program (i.e., "stakeholders") in developing the objectives and focus of the program, and to involve technical staff in developing feasible alternatives to meet the objectives in the planning year 2020. A separate document titled, "Public Outreach Program," discusses the IRP stakeholders program in detail.

2.2 Overall Project Approach

The IRP is a multi-phase program:

- Phase I [Integrated Plan for the Wastewater Program (IPWP)] (completed in 2001): focused on defining the future vision for the City by developing a set of guiding principles to direct future, more-detailed water resources planning.
- Phase II (Integrated Resources Plan): Focuses on the more detailed planning required in developing a facilities plan, environmental impact report and financial plan.
- Projects (Implementation) (2005 and beyond): Will include future concept reports, studies, and design and construction projects to implement the capital improvement program (CIP) developed as part of Phase II.

Using the year 2020 as the planning horizon, the steps in the IRP approach for facilities planning include:

- Developing and confirming data (general and specific): Establish the system demands in year 2020 and intermediate years; summarize the current and potential future regulatory drivers and confirm the capacities of the existing systems and programs to meet those demands.
- Identifying shortfalls and options: Determining shortfalls (or gaps) between demands and existing systems for the water, wastewater and runoff systems and options to address the gaps.
- Developing preliminary alternatives to meet the water, wastewater and runoff program requirements.
- Perform initial screening: evaluate the appropriateness and effectiveness of the different strategies using criteria established by the IRP public stakeholders, i.e., the Steering Group; select the most preferred strategies or strategy combinations.
- Refine alternatives using detailed models.

- Screen to final alternatives using information from financial planning team.
- Prepare CIP and implementation plan for preferred alternative determined during the environmental analysis.

Figure 2-1 illustrates the facilities planning approach and the relationship with the financial and environmental planning tasks.

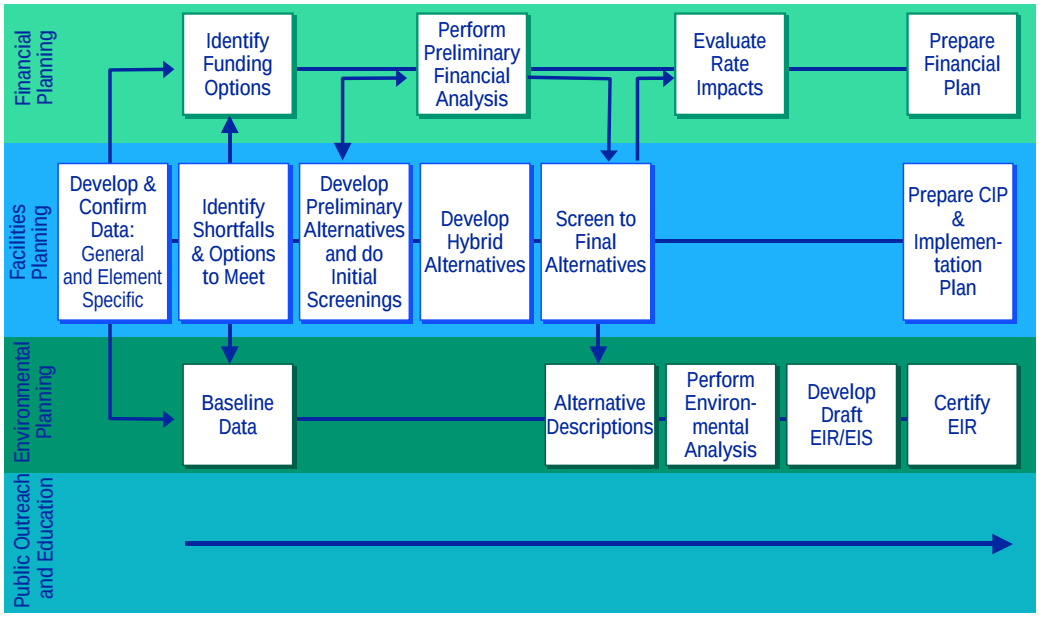


Figure 2-1
Overall IRP Approach

2.3 Water Management

The Los Angeles Department of Water and Power (DWP) provides potable water for single-family residences, multi-family residences, industries, commercial businesses, and government agencies throughout the City. DWP's mission is "to provide our customers with reliable, high quality and competitively priced water services in a safe and publicly and environmentally responsible manner."

In an arid region like Southern California, managing water demands and available supplies is an important issue. The California Urban Water Management Planning Act requires water suppliers to develop water management plans that:

- Outline their efforts to use water efficiently;
- Describe their current and future efforts for the development of alternative supplemental water supplies to meet growing water needs; and update their water resources management plan to coincide with changing needs and the diversity of water supply options available.

Consistent with this legislation, the City's *Year 2000 Urban Water Management Plan* (UWMP) described the DWP's efforts to promote efficient use and management of its water resources. The fiscal year 2002 annual update, which covers the period from July 1, 2001 through June 30, 2002, is the second annual follow-up to the City's *Year 2000 UWMP*.

The IRP will complement the UWMP by providing input to DWP's UWMP process. The water management component of the IRP focuses on the following elements:

- Water conservation and its impact on potable water demands, wastewater flows, and dry weather urban runoff quantity
- Recycled water and its impact on water supply
- Beneficial use of runoff and its impact on water supply

Detailed discussion of the Recycled Water elements of the IRP will be included in a separate document, titled *Los Angeles Recycled Water Master Plan*.

Section 3
Planning Parameters

3.1 Introduction

Planning parameters are the baseline considerations that will be used for developing the Integrated Resources Plan (IRP). Planning parameters include the planning year, area of focus (or service area), regulatory requirements and guiding principles from Phase I. Other planning parameters include demographic data and land use. This section will focus on the planning parameters that will be used for the water management analysis of the IRP. Discussion of demographic data is summarized here, but further detailed in *Volume 1: Wastewater Management*. Discussion of land use data is included in *Volume 3: Runoff Management Volume*.

3.2 Planning Year

The goal of the IRP is to develop a facilities plan to meet the system needs in the future. A facilities plan is required by EPA Rules and Regulations, 40 CFR, Section 35.917 to satisfy Section 201 of the Clean Water Act:

> Facilities planning will demonstrate the need for facilities and, by a systematic evaluation of feasible alternatives, will also demonstrate that the proposed measures represent the most cost-effective means of meeting established effluent and water quality goals while recognizing environmental and social considerations.

Facilities plans are typically developed with a 20-year planning window and updated every 10 years. The City prepared a *Wastewater Facilities Plan (WFP)* in 1982 and prepared an update in 1991. The 1991 WFP Update planned for facilities through the year 2010.

Planning parameters include the planning year, area of focus, regulatory requirements, and guiding principles.

This IRP serves to renew the information prepared in the 1991 WFP Update, while also considering the water and runoff system needs. The IRP will use year 2020 as the planning year for evaluating the existing water system and determining how current and upcoming regulations will guide the needs through 2020.

For the IRP, "current" or "today" will correspond to year 2002. In addition, the system will be evaluated for years 2005, 2010, and 2015 to allow the development of an adaptable capital improvement program (CIP).

3.3 Water Service Area

The City's water service area is aligned with the City boundary, as shown in Figure 3-1. The City encompasses approximately 465 square miles and serves a population of approximately 3.8 million. DWP manages the City's water system.

The water management analysis of the facilities plan will focus on the conservation and recycled water facilities planning for the service area shown in Figure 3-1.

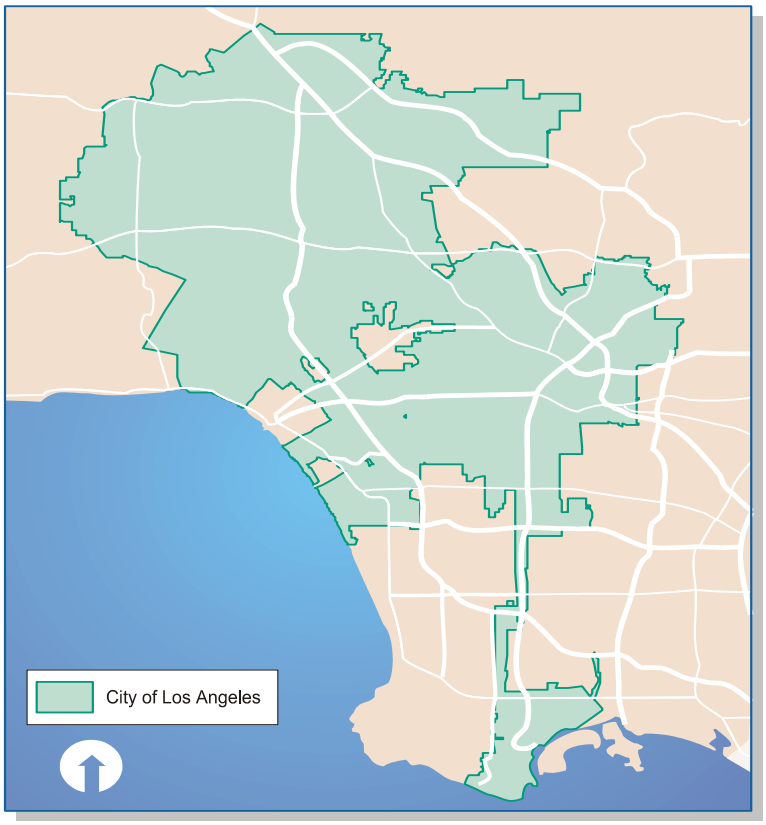


Figure 3-1
City of Los Angeles Water Service Area

3.4 Population and Employment Projections

This demographic data is detailed in *Volume 1: Wastewater Management* and is summarized here. For a more extensive discussion, refer to *Volume 1: Wastewater Management*.

3.4.1 Recommended Population Projections

Based on the analysis of the population projection and uncertainties associated with them (*Volume 1: Wastewater Management*), the following recommendations are being made for the IRP:

- The SCAG 2001 population projection is the best single source of data to use for the IRP. This data source has population projections through year 2020 for the City.
- Sources of uncertainty in population projections will be used in a risk analysis to determine the sensitivity that varying levels of population have on facilities timing and sizing.

- When SCAG releases its 2003 population projections. They will be used in this risk analysis.

The use of SCAG data is also consistent with the City's planning process and is in compliance with the requirements of the EPA. Table 3-1 shows the population projections for the years 2000, 2005, 2010, 2015 and 2020.

Table 3-1
Summary of Population Projections and Percent Increase Compared to 2000

Year	Population Projection Projections for IRP[1]	% Increase in Population compared to Year 2000
2000	4,278,156	0%
2005	4,478,676	5%
2010	4,639,281	8%
2015	4,802,072	12%
2020	5,024,987	17%

Note: [1] Based upon SCAG-02 projections

3.4.2 Recommended Employment Projections

Estimating employment is also an important component of water planning. Employment is a factor used to estimate the water needs from commercial businesses.

For the IRP, the SCAG 2001 *Regional Transportation Plan* will be the source of employment data.

The projected employment for the years 2000, 2005, 2010, 2015 and 2020 are presented in Table 3-2.

Table 3-2
Summary of Employment Projections and Percent Increase Compared to 2000

Year	Population Projection Projections for IRP[1]	% Increase in Population compared to Year 2000
2000	2,329,509	0%
2005	2,429,691	4%
2010	2,525,179	8%
2015	2,589,443	11%
2020	2,626,498	13%

Note: [1] Based upon SCAG-02 projections

3.5 Regulatory Requirements

Understanding the regulatory forecast and developing appropriate environmental quality goals are essential steps in the facilities planning process. For the IRP, a technical memorandum was generated to document the anticipated regulatory forecast for pretreatment, wastewater collection and treatment, water recycling, air quality, biosolids management, and stormwater /runoff management.

This document titled, *Regulatory Forecast Technical Memorandum* (CH:CDM, May 2003) is included in Appendix A of this volume.

3.6 Guiding Principles Affecting Water Management

In the first phase of the IRP (the Integrated Plan for the Wastewater Program), the Steering Group created six primary objectives for the program Figure 3-2.

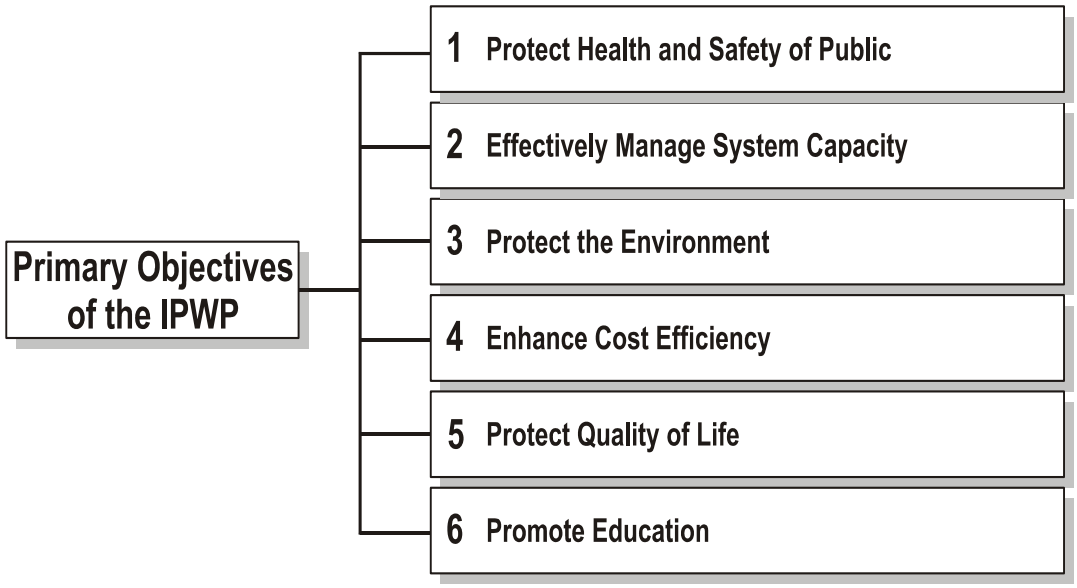


Figure 3-2
IRP Objectives

The IRP objectives are the goals that define the essential purposes of the IRP in broad, overarching terms. The objectives can be seen as a set of goals that answer the question: Why do we want to have an IRP?

There are many different means to meet these objectives. The goal of Phase I of the IRP was to develop a set of guiding principles that provide the instructions or guidelines for building alternatives to meet the objectives. These guiding principles were recommended by the Steering Group and staff for consideration by the City Council in planning for the future of the City.

On December 14, 2001, the City Council concurred with the guiding principles of the Integrated Plan for the Wastewater Program developed by the IPWP Steering Group and City staff. The City council also directed the Bureau of Sanitation (BOS) staff to continue working with the community stakeholders and proceed with the development of an Integrated Resources Plan (IRP), which includes a Wastewater Facilities Plan, an Environmental Impact Report, a Financial Plan (FP), and an associated public outreach program to address the facility needs of the City's wastewater program through the Year 2020 in accordance with the guiding principles of the Integrated Plan for the Wastewater Program.

The guiding principles are essential planning parameters in this more detailed facilities planning phase of the IRP. The complete set of guiding principles is included in a separate document titled *Summary of the Steering Group Process and Their Recommendations for Integrated Resources Planning* (Summary Statement) and is found in Appendix B of this Volume.

Several of the guiding principles are specific to water management. These guiding principles include:

- ***Producing and using as much recycled water as possible from the existing and planned facilities***

  Because of our location in Southern California, the need to maximize opportunities to responsibly use recycled water should be recognized. Recycled water can be used for irrigation, industrial uses, environmental enhancement and groundwater recharge. Based on public input, irrigation and industrial uses for recycled water were most preferred, followed by environmental enhancement. The use of recycled water for groundwater recharge must be approached thoughtfully and with a very open, public process that addresses public health concerns and participatory decision-making. A key element in this approach is a public education program that considers the benefits and risks associated with using recycled water in comparison with other alternatives.

- ***Increasing the level of water conservation beyond what is currently planned***

  Water conservation programs have proven to be effective, especially whenever the public appreciates both the need to conserve and the resultant benefits that accrue. In Southern California, water conservation is an important aspect of daily life, and the sustainable use of available water resources is paramount to quality of life and environmental resources. Los Angeles residents have long known the importance of considering conservation as a means to extend limited water supplies. Recognizing the reduction in the availability of imported water and the resultant wastewater flows generated, the IPWP Stakeholders recommended moving toward increased levels of water conservation beyond the levels currently planned by the Department of Water and Power. The concept of responsibility and accountability of each individual user to help eliminate water waste should also be emphasized.

- ***Focusing on lower-cost solutions within the framework of the policy elements noted above***

  Providing for improvements in, and maintenance of, wastewater, recycled water, stormwater and water services that are adequate for meeting future needs may require increased investment in the programs which, in turn, could result in increased user costs. A wide range of possible costs for future actions is indicated by the alternatives studied in the Phase I process. In fact, individual economic preferences were considered in selecting the preferred thematic alternative. Many alternatives feature options that require significant investments, yet offer the added

value of achieving level-of-service and environmental goals that are important for the City and may result in economic savings over time. Nonetheless, it is possible, within the scope of the desired options and policies outlined above, to strive for the lowest cost solutions that meet performance requirements. For these reasons, the Steering Group supported the use of lower cost solutions where they are available within the framework of the other policy elements.

Section 4
Potable Water

4.1 Introduction

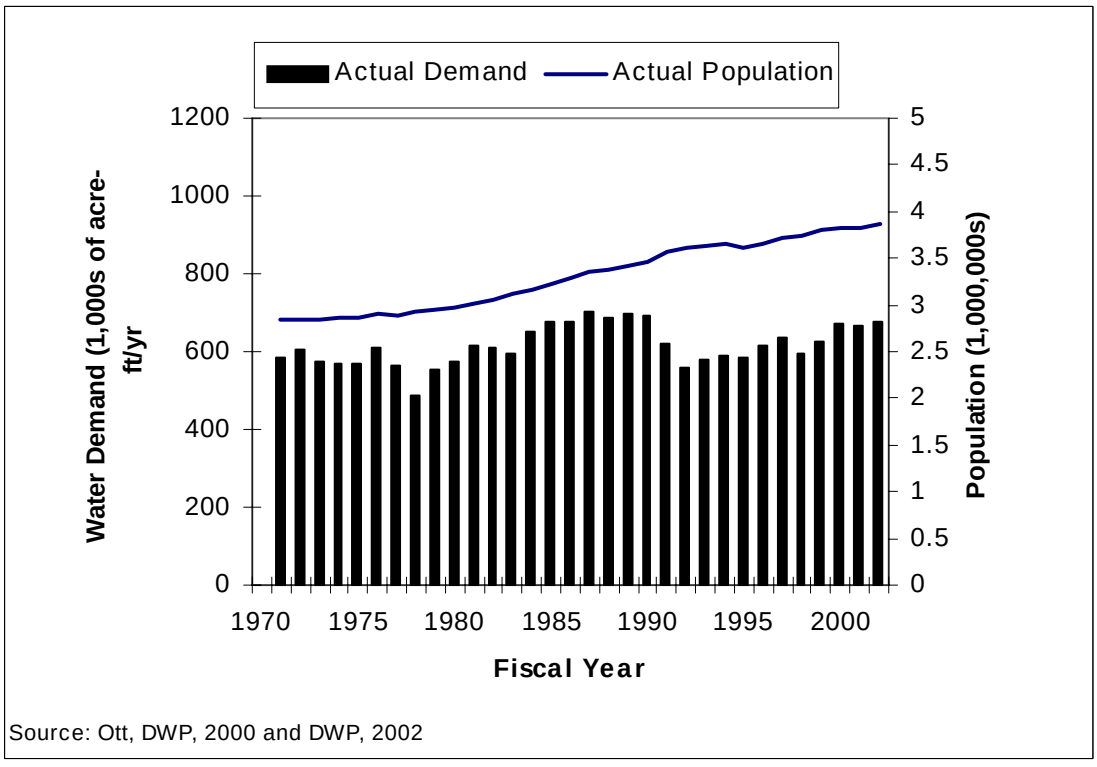
Understanding the current and future issues related to potable water is an important element to the IRP. Although the IRP primarily focuses on facilities planning for the wastewater, recycled water and runoff systems, options and alternatives in those areas could provide additional source water for non-potable or potable demands. The purpose of this section is to summarize the current and projected potable water demands and anticipated sources, as presented in the City's *Year 2000 Urban Water Management Plan* (UWMP) and fiscal year 2002 annual update.

4.2 Demands

4.2.1 Historic Water Usage

There are several factors influencing water usage including demographics, climate, the economy, water pricing, and water conservation programs. Figure 4-1 presents total annual water usage in Los Angeles from fiscal years 1970 through June 2002. Estimated population served is also presented on the figure.

As shown in Figure 4-1, although population has increased 35 percent between 1970



Source: Ott, DWP, 2000 and DWP, 2002

Figure 4-1
DWP Historical Water Demand and Population

and 2002, the water usage has not increased at the same rate. Climate impacts are reflected between 1976 and 1978 and again between 1987 and 1992, when the City experienced droughts and implemented mandatory rationing. The reduced water usage since the 1992 drought shows the impact of the City's water conservation program, which was adopted in 1990. The City's water conservation program has been instrumental in the significant per capita reductions in water usage over the last decade. Additional benefits are expected as these programs are expanded and a greater percentage of residential properties include water conserving plumbing fixtures.

4.2.2 Projected Water Usage

The DWP projects water demands using population, housing forecast, historical demand data, and future conservation efforts. Population and conservation are key factors influencing water use. An increase in the number of persons residing and/or working in an area results in an increase in the number of toilet flushings, showers, clothes washing, and yards watered. In developing the *2000 UWMP*, DWP developed water demand projections though the year 2020. The population and employment estimates used for these projections were based on the SCAG-98 data and were modified to account for the DWP service area. A summary of these data is presented in Table 4-1.

Table 4-1
Demographic Projections for the DWP Service Area[1]

Demographic Unit	2005	2010	2015	2020	Average Annual Growth Rate
Total Population	4,035,305	4,277,206	4,551,189	4,856,887	1.3%
Single-Family Households	530,518	544,687	561,425	589,715	0.7%
Multi-Family Households	788,429	870,653	937,182	1,040,173	2.0%
Total Households	1,318,947	1,415,340	1,498,607	1,629,888	1.4%
Persons/Household	3.0	3.0	3.0	3.0	
Commercial Employment	258,513	262,232	265,951	269,669	0.3%
Industrial Employment	1,665,382	1,744,267	1,820,690	1,902,460	1.1%
Total Employment	1,923,895	2,006,499	2,086,641	2,172,129	0.9%

Note:
[1]Source: Urban Water Management Plan (DWP, 2000) and is based on SCAG-98 data.

Water demand forecasts are also based on weather that is considered normal as defined by historical data. The water usage for single-family residential (SFR) use was higher than projected in 1997 and 2002, and lower than projected in 1998. As is the case worldwide, temperature is also rising in the City of Los Angeles. The DWP has observed a pattern of increased weather-normalized demand consistent with higher normal temperatures since 1980. During this 21-year period, the temperature in the Los Angeles area has deviated above normal 18 years (DWP, 2001). Global warming

can impact water demand and supply. If this trend continues, future DWP projections may involve higher per household demands for SFR and for irrigation.

A summary of the water projections for each customer class is presented in Table 4-2. It is expected that the actual water usage between 2000 and 2020 should fall within plus or minus six percent of these projections (DWP, 2000).

Table 4-2
Projected Water Demands for Each Customer Class in Thousands of Acre-/ft[1]

Customer Category	2005	2010	2015	2020	Average Annual Growth Rate
Single Family Residential	234	240	249	260	0.8%
Multi Family Residential	216	240	260	283	2.2%
Commercial	121	124	128	131	0.7%
Industrial	26	27	28	30	1.3%
Government	42	44	45	47	0.7%
Subtotal	639	675	710	751	1.2%
Unaccounted Water[2]	40	43	46	49	1.6%
Total	679	718	756	800	1.3%

Notes:
[1]Source: Urban Water Management Plan (DWP, 2000)
[2]6 percent of the subtotal (DWP, 2000)

The total projected water demands are shown in Figure 4-2.

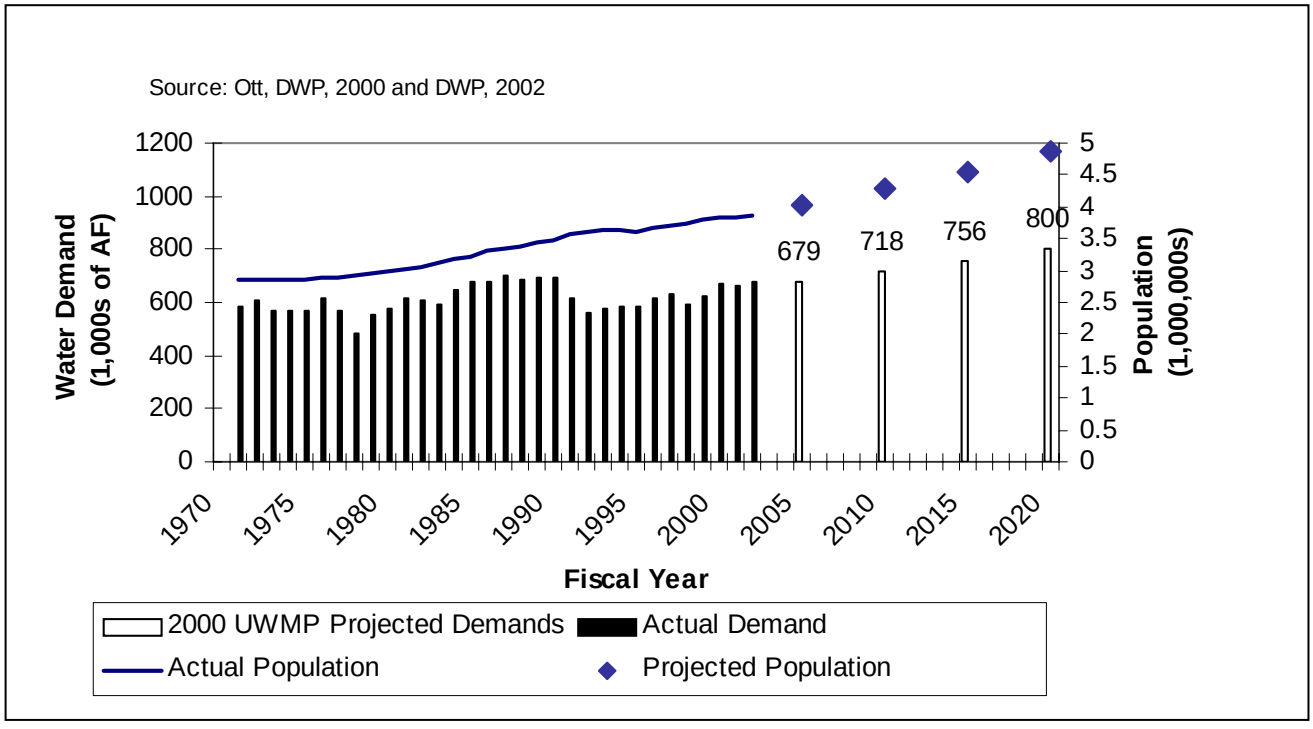


Figure 4-2
DWP Historical and Projected Water Demand and Population

4.3 Supply

The City has four principal water supply sources as shown in Figure 4-3:

- Los Angeles Aqueduct System (Los Angeles Owens River, 1st and 2nd Aqueducts)
- Local groundwater
- Purchased water imported by the MWD through the State Water Project and Colorado River Aqueduct
- Recycled water

Figure 4-4 shows the average year percentage of total annual usage for the last 10 years supplied by each source (DWP).

Figure 4-3
Principal Water Supply Sources

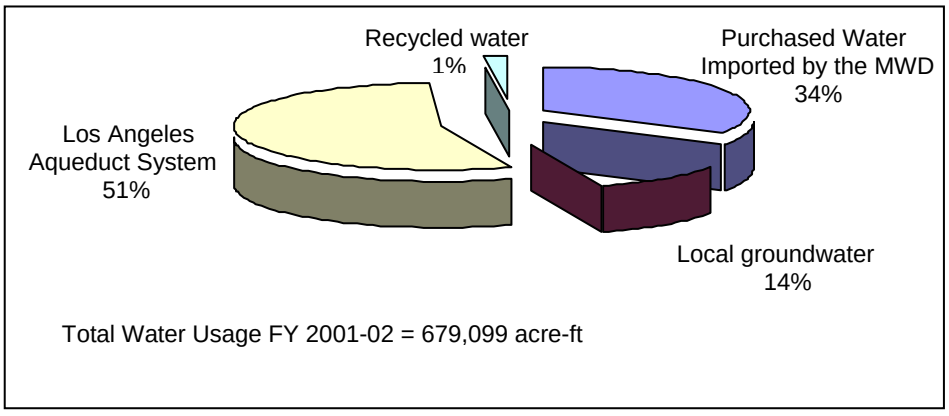


Figure 4-4
Summary of Water Supply for the Average of 10 Years

4.3.1 Los Angeles Aqueduct System

The Los Angeles Aqueduct System (LAA) delivers high quality Eastern Sierra Nevada runoff and Owens Valley groundwater to the City. Since the addition of the second Los Angeles Aqueduct in 1970, the LAA provided about two-thirds of the City's needs.

The LAA deliveries, however, were significantly curtailed starting in 1989 to meet environmental obligations. The average water delivery through the LAA from 1971 to 1989 was about 456,000 acre-ft/yr. After 1989, the LAA has delivered an average of about 284,000 acre-ft/yr. Information on the annual LAA deliveries is included in Figure 4-5.

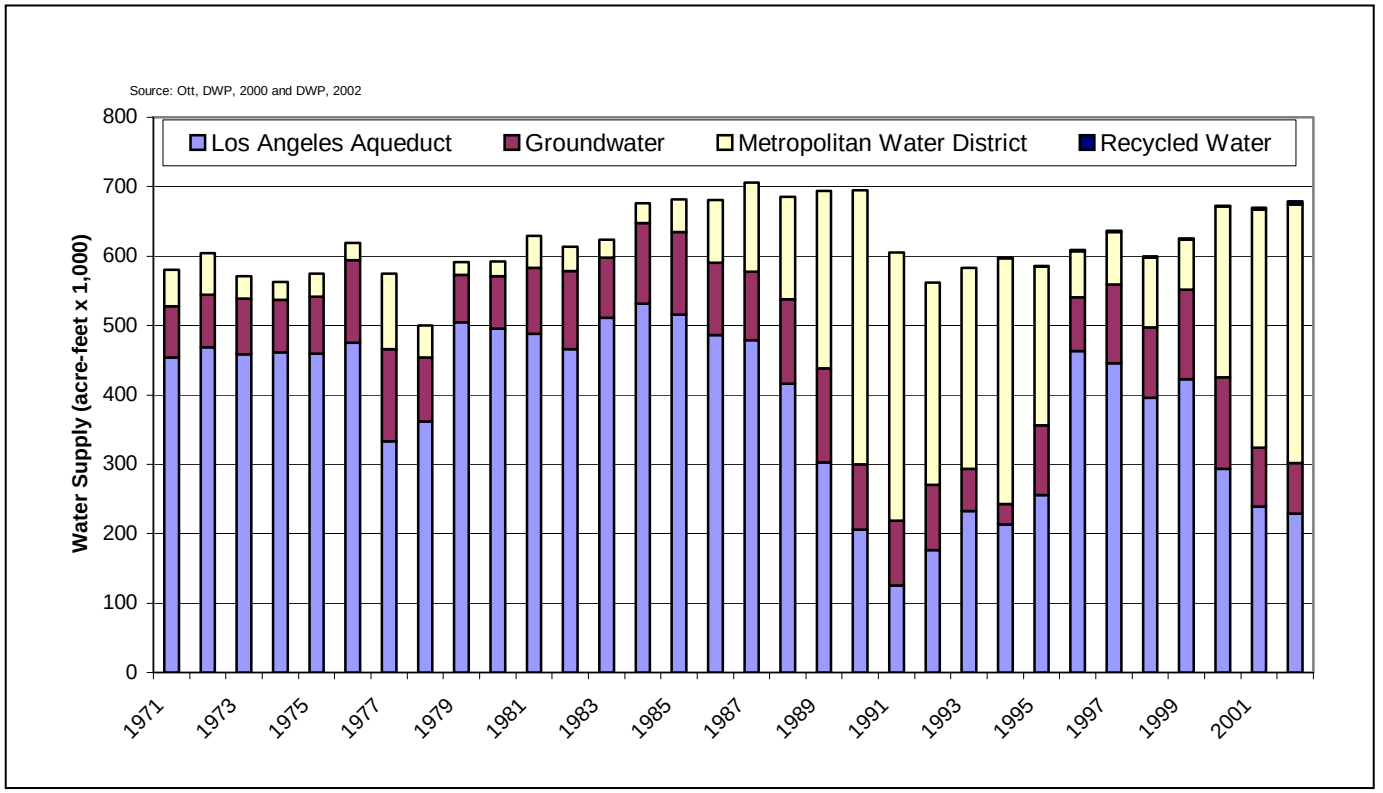


Figure 4-5
DWP Historical Water Supply Sources

In 1989, the City water exports were curtailed to restore the Mono Basin's ecosystem. Prior to this date, about 95,000 acre-ft/yr were diverted from this area. The Mono Basin water exports are expected to remain at 16,000 acre-ft/yr through the year 2020.

The Owens River was the main source of water for Owens Lake prior to the late 1920s. This lake dried out completely as a result of diversions from the Owens River for local agriculture and the LAA. The exposed lakebed became a source of windblown dust resulting in the EPA classifying the lower Owens Valley as a serious non-attainment area for particulates (dust) in 1991. The DWP financed the Phase I

North Project that was completed December 2001 and will flood irrigate about 13.5 square miles of lakebed as a dust control measure. The Phase I South project was completed August 2002 and manages native vegetation (saltgrass) on a 4.3 square-mile area. DWP is continuing to develop dust control projects on the lake. It is expected that about 67,000 acre-ft/yr may ultimately be required to sustain all of the existing and future shallow flooding and managed vegetation projects on Owens Lake.

In addition, the Lower Owens River Project will release water from the LAA to rewater a 60-mile section of the Owens River that has been dry since the City diverted the river flow. A pump station will be constructed to recover a portion of this water. It is estimated that about 16,000 acre-ft/yr of the transported water will be retained within the riparian habitat.

The water available to the LAA also fluctuates because the system is primarily fed by snowmelt runoff that varies with hydrologic conditions in the Eastern Sierra Nevada area. The historical snow pack accumulation at Mammoth Pass on April 1 has historically averaged 42.8 inches. Since 1990, the snow pack accumulation has been below this average eight times and above this average five times (DWP, 2002). While this variation in the accumulation may represent typical fluctuations, there is evidence that global climatic patterns, such as "El Nino" or the warming of the Pacific Ocean waters off the cost of South America can significantly alter hydrology in the West. DWP will continue to monitor developments in climate research in order to assess the effects of climate change on water resources.

Based on foreseeable factors, DWP expects to have a median annual LAA delivery of 296,000 acre-ft/yr through the year 2020. Dry year delivery (that delivery expected to be exceeded nine of ten times) is expected to be 135,000 acre-ft/yr with a delivery minimum of 113,000 acre-ft/yr. Other sources, discussed below, will be utilized more fully than currently projected if the LAA deliveries are below this estimate.

4.3.2 Local Groundwater

The City was founded along the banks of the Los Angeles River and initially supported a growing population by using surface flows from the river and local groundwater, primarily from the San Fernando Basin. The City owns water rights in four separate groundwater basins: San Fernando, Sylmar, Central and West Coast.

The DWP operates 64 active wells that have delivered an average of about 91,000 acre-ft/yr since 1990 but only about 73,000 AF in FY 2002. Local groundwater deliveries over the last two years were reduced to allow the basin to recharge after higher than normal pumping was conducted to determine the DWP groundwater pumping capacity during FY 2000. The groundwater deliveries since 1971 are presented in Figure 4-5.

The DWP is currently entitled to up to 90,000 acre-ft/yr from the San Fernando Basin, 15,000 acre-ft/yr from the Central Basin, 3,100 acre-ft/yr from the Sylmar basin, and

1,500 acre-ft/yr from the West Coast Basin. In FY 2002, the San Fernando Basin groundwater accounted for 64,156 AF while the Central and Sylmar Basins accounted for the rest. While the City also holds water rights in the West Coast Basin, no water was extracted there due to poor water quality in that basin.

DWP recently concluded a feasibility study of replacing the former Lomita Wells to take advantage of the City's 1,500-acre-ft/yr water rights, and determined that under certain circumstances, the project might be feasible with substantial treatment facilities including reverse osmosis. Alternatives to construction new wells and treatment that are being considered include; exchange for Central Basin water rights, lease of the water rights to other West Basin users, non-potable use, sale of the water rights, and inter-basin pumping transfers.

Conjunctive use, the coordinated use of surface and groundwater, is used to provide a higher level of reliability within the City's overall water supply. This is accomplished by reducing groundwater pumping during wet years to allow the groundwater basin to recover. Groundwater pumping is then maximized during dry weather when surface water supplies are reduced.

Unused groundwater supplies may be "banked" for future withdrawals. In emergencies or during prolonged drought periods, additional groundwater can be extracted from the San Fernando Basin. As of October 2001, the City had credit for approximately 234,270 AF in underground storage within the San Fernando Basin. This water can be withdrawn at any time to supplement the annual entitlement of 90,000 acre-ft/yr.

Given the size of the San Fernando Basin, there are potential opportunities to increase the recharge of the groundwater basin using natural sources (non-urban runoff) and/or augment the basin through the recharge of treated water, thereby increasing the groundwater production of the basin.

4.3.3 Metropolitan Water District

Metropolitan Water District (MWD) serves 26 member agencies in Southern California encompassing 5,200 square miles with a population of nearly 17 million people. MWD is a "wholesaler" as opposed to the DWP that acts as a water "retailer" and provides water directly to individual customers rather than agencies. Since 1970, the City has purchased an average of 140,000 acre-ft/yr (22 percent of the City's total supply) from MWD. The City's annual MWD purchases can vary significantly depending on the need to supplement LAA delivers when dry climate conditions occur. During the last three years of the 1987 to 1992 drought, MWD supplied more than 60 percent of the City's needs. During the FY 2002, a dry year, MWD water accounted for 55 percent of the City's total supply. A chart of the annual MWD deliveries since 1971 is presented in Figure 4-5.

The MWD firm (dry year) supply totals 2.1 million acre-ft/yr. The Colorado River (1.05 million acre-ft/yr), State Water Project (650,000 acre-ft/yr) and the dry-year

storage exchange program in the Central and Imperial Valleys and in Ventura County (400,000 acre-ft/yr) make up the core of this supply. In addition, MWD stores water in the Diamond Valley Lake (with a total capacity of 800,000 AF).

The City is working with MWD and other agencies to implement the California's Colorado River Water Use Plan (California Plan). This strategy is designed to ensure that California meets its water needs while reducing its reliance on Colorado River surplus waters. California has been using an average of 5.2 million acre-ft/yr of Colorado River water, which includes the state's entitlement of 4.4 million acre-ft/yr plus surplus supplies not currently being used by the other river basin states. This approach includes water transfers, storage, and exchange agreements that will be implemented when the Colorado River water surplus is unavailable.

The CalFed Bay-Delta Program is also a key factor affecting the MWD supply. This program was approved in August 2000 and will improve water quality within the Delta while ensuring that a stable water supply is available. Elements include increased storage, improved conveyance efficiency in the Bay-Delta area, improved water use efficiency, water use transfers, and ecosystem restoration. An environmental water account will be used to acquire, store and allocate water to protect fish and habitats at critical times. MWD and other water users have transferred water supplies to this account, which provides some level of reliability to MWD's State Water Project supplies during periods of high water demands.

4.3.4 Recycled Water

The City continues to develop recycled water projects to help meet increasing demands by augmenting the City's water supply. To date the City's water recycling projects include the East Valley, Westside, LA Harbor, Griffith Park, and the Greenbelt-Water Recycling Projects, which are expected to deliver up to approximately 21,100 acre-ft/yr once they are fully developed. The City also provides approximately 28,500 acre-ft/yr for environmental projects in the Sepulveda Basin including the Japanese Gardens, the Wildlife Lake, and Lake Balboa. Existing and planned recycled water projects will be described in detail in Section 6.

4.3.5 Alternative Supplemental Water Supplies

In addition to recycled water use, DWP is investigating potential alternative supplemental water supplies. These alternative supplemental water supplies include:

- ***Water marketing:*** The transfer, sale or lease of water or water rights. DWP is investigating opportunities to engage in water transfers to replace environmental water uses in the Owens Valley.

- ***Seawater desalination:*** The technology of desalting seawater to provide a drinking water source. DWP has submitted a proposal to MWD to fund a 12 million gallons per day capacity seawater desalination facility situated on a 5.5-acre site within the Scattergood Generating Station located in Playa Del Rey. DWP has also partnered with the Long Beach Water Department to construct a 300,000 gpd prototype

seawater desalination facility to test a proprietary two-stage nanofiltration process, which is patent-pending. The facility will be constructed at DWP's Haynes Generation Station in Long Beach, and is scheduled to be operational by March 2004. DWP has also partnered with the American Water Works Research Foundation, West Basin Municipal Water District, and other agencies in an effort to advance the reverse osmosis process and analyze the water quality implications of large-scale seawater desalination projects.

- ***Conjunctive use:*** The use and storage of imported water supplies in groundwater basins and reservoirs during supply abundance for use during times of need. The City routinely uses this water management technique, which was initially developed by William Mulholland in the 1920s, in the San Fernando Basin. DWP is investigating additional opportunities for conjunctive use.

4.3.6 Summary of Water Supply Projections

A summary of the City's projected water supply sources is presented in Table 4-3, which summarizes the anticipated supply sources and demands for normal and dry climate conditions.

Table 4-3
Potable Water Forecasts for the City of Los Angeles

	Projected Demand (1000 acre-ft)		Projected Supply[1] (1000 acre-ft)									
			Local Groundwater		Los Angeles Aqueducts		Metropolitan Water District[4]		Recycled Water[3]		Seawater Desalination	
Year	Normal	Dry[2]	Normal	Dry	Normal	Dry	Normal	Dry	Normal	Dry	Normal	Dry
2005	679	720	108	135	296	135	267.35	442.35	44.15	44.15	0	0
2010	718	761	108	135	296	135	284.4	461.4	60.055	60.055	11.2	11.2
2015	757	802	108	135	296	135	318.15	497.15	72.75	72.75	11.2	11.2
2020	799	847	108	135	296	135	354.45	536.45	78.45	78.45	11.2	11.2

Notes:

[1]Source: Urban Water Management Plan (DWP 2000) and as updated in June 2003.

[2]The DWP defines a dry year as a year in which the total rainfall is at the 10th percentile (exceeded nine out of ten years). An estimated additional 6 percent of the projected demand will be required under these conditions (DWP, 1995).

[3]The recycled water values listed reflect what is included in draft 2003 UWMP update (Van Wagoner 2003) and include recycled water discharges to the Los Angeles River as an environmental enhancement. As part of the IRP, these values will be evaluated and modified as additional recycled water users are identified. See Section 5 for additional information.

[4]The MWD values reflect what is included in 2000 UWMP (DWP 2000) and as updated in June 2003. The IRP will evaluate potential reductions in these values as recycled water usage is increased.

In March 2003, MWD released a *Report on Metropolitan's Water Supplies* which outlines MWD's water resources development plans and reliability outlook for at least the next twenty years. Additionally, MWD and its member agencies are working on an update to *MWD's 1993 Integrated Resources Plan*. Both reports contain in detail the various elements of MWD's long-term plans to deliver Colorado River and State Water Project supplies.

Section 5
Water Conservation

5.1 Introduction

Water conservation has become a way of life in California and is a critical part of the state's overall strategy for managing water resources efficiently. The City of Los Angeles (City) operates one of the most successful conservation programs in the United States and has reduced its annual potable water demand by more than 15 percent since 2001. [DWP – UWMP FY 2001/02 Update].

Despite the fact that total water demand has slowly increased since the end of water rationing in 1992, water conservation levels remain above 15 percent. The conservation efforts correspond to actual water savings that have occurred as a result of changes in hardware and water usage patterns of residents and businesses within the City. The City's nationally recognized water conservation programs are largely responsible for the significant reduction in the City's water use over the last decade. According to DWP's UWMP, by 2020 hardware-based conservation alone is projected to contribute to a ten percent savings in water use.

The implementation of conservation programs not only saves water, but also delays the need for costly expansions of sewer and stormwater facilities by reducing wastewater discharge into the sewer collection and treatment system and reducing runoff. However, even with aggressive conservation measures, City water demands are expected to increase with population growth.

5.2 Participation in California Urban Water Conservation Council

In December of 1991, the Memorandum of Understanding (MOU) on Urban Water Conservation was signed by 120 urban water agencies, environmental groups and other interested groups, including DWP. The MOU identified "Best Management Practices" (BMPs), as proven conservation measures, as determined by the California Urban Water Conservation Council (CUWCC). All signatories to the MOU are committed to implement BMPs, subject to the condition that the BMPs are cost effective for the individual water agencies. The CUWCC was formed to promote urban water conservation, monitor implementation of the BMPs and to oversee modifications to the BMPS as well as the possible transition of potential BMPs to BMP status.

5.3 Existing and Planned Conservation Measures

DWP has implemented a plethora of water conservation measures, including tiered water pricing, financial incentives for the installation of ultra-low-flush (ULF) toilets and water efficient clothes washing machines, technical assistance programs for business and industry, and large scale irrigation efficiency programs. These programs

and their associated water savings are described in the 2000 Urban Water Management Plan (UWMP) and the FY 2001/02 Annual Update (DWP). Conservation programs can be grouped into five categories:

- Support and Education
- Residential
- Commercial /industrial/governmental
- Landscape
- System maintenance measures

The programs include traditional demand-side management measures, as well as infrastructure improvement programs that contribute to reductions in water consumption. Combined with a conservation pricing structure, these programs increase system reliability, efficiency, and in some cases provide water quality benefits. A conservation water pricing structure encourages consumers to reduce water consumption as the cost of water increases per unit with increased consumption.

5.3.1 Residential Conservation Measures

5.3.1.1 Toilet Replacement Program

For more than a decade, DWP's conservation efforts have focused on residential customers. In 1990, a ULF Toilet Rebate Program was inaugurated, followed two years later by the ULF Toilet Distribution Program. Under the rebate program DWP provides a rebate of $100 for replacement of each non-ULF toilet in single family residences, including town homes, condominiums, duplexes, and mobile homes. A rebate of $75 is provided for each non-ULF toilet replaced in a multi-family residence, such as an apartment complex. As of the end of fiscal year of 2002, more than 1.1 million toilets have been replaced with ULF toilets through the two programs. By replacing conventional toilets that use as much as 7 gallons per flush, with ULF toilets that use no more than 1.6 gallons per flush, the City now saves more than 11 billion gallons annually. [DWP – UWMP FY 2001 -2002 Update.].

DWP has also taken a leadership role in the development of a Supplemental Purchase Specification (SPS) for ULF toilets to ensure the long-term water savings resulting from the installation of these fixtures. The SPS includes requirements that go beyond the current national standards, has been endorsed by the Plumbing Manufacturers Institute, and been adopted by water agencies both within and outside California. More than 30 toilet models are currently SPS-certified. All toilets distributed through DWP's Toilet Exchange Program are required to meet the more stringent requirements of the SPS.

5.3.1.2 Retrofit on Resale Ordinance

DWP was instrumental in securing passage of an important amendment to the City's existing plumbing retrofit ordinance. Effective January 1, 1999, all residential properties that are for sale within the City must have ULF toilets installed prior to the close of escrow. This new requirement is strongly supported by DWP's toilet replacement programs.

5.3.1.3 Water Saving Shower Heads

Another residential conservation measure is the use of water saving shower heads. The City requires that new homes and apartments, as well as those resold, have low-flow shower heads that use 2.5 gallons per minute or less. Older showerheads use as much as 5 to 10 gallons per minute. DWP provides new 2.0 gallon per minute shower heads for the replacement older non-efficient showerheads. An ancillary benefit of this program is that residential users also reduce their consumption of natural gas or electricity as less hot water is utilized.

5.3.1.4 High-Efficiency Clothes Washer Program

In 1998, DWP initiated the High Efficiency Clothes Washer Rebate Program to promote the purchase and installation of high efficiency washer (HEW) models that save water and energy. Currently, DWP offers a rebate of $150 for the purchase of a qualifying HEW model. HEWs are more expensive to purchase than standard models, but the difference in cost is usually recovered over the typical 14-year lifespan of washing machines due to reduced water and energy use, and resulting reduction in sewer service charges. Beginning in 2007, only HEW models will be legally available for sale in the state of California. According to data provided by DWP, more than 30,000 of these machines have already been installed within DWP's service area. [DWP - Gackstetter – July 2004].

5.3.1.5 Gray Water Ordinance

In September 1994, the City approved an ordinance permitting the installation of gray water systems on residential lots. Gray water is wastewater from bathtubs, sinks, and washing machines that is diverted from entering the sewer system and utilized for irrigation purposes. Unlike recycled water that must comply with regulatory health standards, gray water is not subject to the same restrictions. Gray water can only be used for subsurface irrigation to minimize health concerns associated with surface use. The potable water savings for residential lots utilizing gray water systems is estimated between 2 and 10 percent. However, the high cost of installation has limited the use of gray water systems.

5.3.1.6 Smart Irrigation

Another potential conservation measure is to reduce water waste from the over-irrigation of landscape. Many water conservation professionals believe that landscape over-watering is a common problem for those having in-ground irrigation systems. "Smart Irrigation" refers to the use of weather sensitive irrigation control technology that results in as-needed irrigation. As an element of the City's water

conservation program, DWP is investigating the use and savings potential of "Smart Irrigation" in residential communities and nonresidential applications in the City. Weather sensitive technology utilizes historical and/or real time local weather data to determine and apply the appropriate amount of irrigation required for a given landscape (considering sprinkler type, plant type, soil type, degree of slope, microclimate). The multiple benefits accrued from appropriate irrigation include a reduction in water use due to over-watering, a reduction or elimination of dry weather runoff, and a healthy landscape that produces less green waste.

Two studies on Smart Irrigation are underway in the City, one assessing the technology at large commercial and residential multifamily landscape sites, and the other at residential single family sites. The first study is in the analysis stage, looking at the water savings from the installation two types of Smart Irrigation technology at 25 sites (83 total acres). The HydroPoint WeatherTRAK controller was installed in 18 locations, while the Water2Save technology was installed at 7 sites. The study report will be available in the summer of 2004.

The second study has just begun, with the recent installation of the HydroPoint WeatherTRAK controllers at 500 residential single family sites located predominantly in the San Fernando Valley. Site selection involved consumption and lot size analysis, telephone interviews with property owners, and site visits. The process resulted in the installation of controllers at 500 sites selected from a pool of more than 80,000. No analysis data is yet available for the IRP at this point, however multiple year consumption data will be collected and analyzed. Additionally, the City is looking at constructing two CIMIS weather stations in the Valley, which will allow for additional localized weather data for the devices.

As no results from the City's studies were available, the IRP looked at a water conservation study that was conducted by the Irvine Ranch Water District where Evapotranspiration (Smart Irrigation) controllers for irrigation were installed (Hunt and Lessick, June 2001). The devices were installed in low-density areas of single-family homes within the District. The results of the study are based on two years of pre (1996 to 1998) and one year of post (1998 to 1999) intervention consumption. The final study group, after meeting this and all other criteria, resulted in 33 treatment (ET controller installed), 56 postcard (received reminders to limit overwatering) and 155 reference group households.

The study showed sixteen percent average reduction in outdoor water use when ET controllers were installed (the treatment group), and approximately eleven percent reduction from the postcard group, with virtually no reduction from the reference group. It should be noted that while it appears that the reduction in the postcard group and the treatment group is minimal, the study also determined that the postcard group had a greater amount of overuse to begin with (i.e., more potential to reduce). The conclusions are that the treatment group (those with the ET controller) were able to convert roughly 85 percent of their outdoor conservation potential, while

the postcard group was able to convert only about 30 percent. This corresponded to a range of reduction per household of 35 to 40 gallons per day.

Studies in other water districts have been comparable to IRWD's study. These studies have proven that ET based irrigation controllers are reliable and well suited for maintaining landscapes and reducing runoff. Other communities also studying the effectiveness of using ET controllers are the City of Santa Rosa, Marin Municipal Water District, and Santa Barbara.

5.3.1.7 Native Landscaping

One of the current leading trends in landscape design is the use of native plants to achieve the goal of low-water use landscaping. Many native California plant are naturally drought-tolerant and make excellent landscaping choices in arid regions. There are many advantages on switching to native plants. For instance, there is a reduction in the use of water, translating to a reduction in the cost of water bills. In addition, native plants reduce the landscape maintenance costs and green wastes as compared to lush landscapes and large lawn areas. Of note: currently, not all smart irrigation devices have native plant schedule programming. Therefore, combining native landscaping with smart irrigation devices may require further study.

5.3.2 Commercial / Industrial / Governmental Conservation Measures

DWP made a similar effort that the one made for residential users to encourage commercial/industrial/institutional customers to replace non-ULF toilets.

Rebates are now available to these customers that also greatly reduce their cost of installing these water-saving toilets.

In addition to the ULF toilet replacement programs, DWP offers rebates for the installation of ULF urinals, cooling tower conductivity controllers, residential and coin-operated high efficiency clothes washing machines, and incentives of up to $50,000 for custom water conservation projects by larger business users.

Other ongoing conservation activities include the continued implementation of a landscape irrigation controller pilot program. DWP also is currently in the process of pursuing outside funding to implement large landscape water audits and incentives program, as outlined in the California Urban Water Conservation Council's BMP.

This category represents some of the largest volume water users in DWP's customer base, and efforts are being made to provide financial incentives that would make it cost-effective for business and industry to participate in programs that reduce water use.

5.3.3 Estimated Impacts of Current and Planned Measures

The primary goal of water conservation is to reduce potable water usage. With information that was provided from DWP, reduction in potable water demand was estimated as a result of the implementation of the conservation program previously explained. At the time of this analysis, DWP was in the process of updating the projected water conservation savings by year as part of developing the 2005 UWMP. Since this information was under development, the IRP team used the water savings estimates generated for the 2000 UWMP for the baseline "Current and Planned Measures" for the IRP. For year 2020, the UWMP (2000) estimated a total water savings due to conservation of 87,400 acre-ft/yr.

5.4 Potential Additional Conservation Measures

As discussed in Section 3.5, one of the IRP guiding principles is the consider increasing the level of water conservation beyond what is currently planned. This guiding principle is aligned with DWP's water conservation program, which continues to investigate new conservation measures. This section includes a summary of these additional measures that DWP is investigating for consideration into the conservation program.

5.4.1 Citywide Implementation of Smart Irrigation

As discussed earlier in Subsection 5.3.1.6, DWP is currently investigating implementation of smart irrigation ET controllers. Therefore, a potential additional conservation measure would be to expand DWP's program into citywide implementation.

There is a lack of reliable data concerning the number of properties in the City having in-ground irrigation systems and irrigation controllers. Therefore, estimating the future water savings due to smart irrigation in a large city like Los Angeles can be a challenge. For the relative comparison of IRP alternatives, the technical team estimated the upper range of potential savings due to smart irrigation devices by estimating potential smart irrigation connections in single-family homes, multi-family homes, and commercial/institutional properties by 2020. Therefore, it was estimated that if the City were to install smart irrigation devices at approximately 70 percent of these customer classes Citywide, there could be a maximum reduction in water consumption of up to 15,800 acre-feet/yr. This approach could over-estimate water savings since the number of City properties with underground irrigation systems and automatic controllers is unknown. In addition, future implementation would depend on available funding, customer acceptance, reliability, and commercial availability of smart irrigation controllers. More detailed studies would be needed to determine the full benefits of a smart irrigation program.

See Appendix C for additional description of assumptions.

5.4.2 X-Ray Film Processor Water Saving Rebate Program

5.4.2.1 Background

Existing x-ray processing systems in hospital applications consume large volumes of water during the film washing process. The water used in these film-processing systems presents a significant opportunity for conservation. Currently, none of the water used during the film washing process by x-ray processing systems is recycled. X-ray film processing systems use a continual flow of water to maintain required operating temperatures. Typically, that water flows directly into the drain once it is used. Hospital and clinics commonly have several medical x-ray processor systems operating on-site, 24 hours a day, 365 days a year. New technology has been developed that, when installed on the x-ray film processing systems, enables this equipment to save extraordinary amounts of water. The patented Water Saver/Plus™ water recycling system, manufactured by C & A X-Ray, located in Southern California, uses a simple reservoir and pump to re-circulate what had previously been "once through" flow. Recent studies undertaken by the DWP, the City of Irvine, and the Metropolitan Water District (MWD) have demonstrated that the addition of a specially designed package system to the existing x-ray film processor systems can save an average of about 3.2 acre-ft annually, per system, in hospital settings.

A series of independent studies by various water utilities involved retrofitting 38 x-ray film processing systems in seven major southern California hospitals with the Water Saver/Plus™ water recycling system. Prior to the retrofit, the 38 systems were consuming a total of 123 acre-ft/yr, an average of about 3.2 acre-ft for each system. In some cases, measurements taken by water utilities showed actual annual usage as high as 7.5 acre-ft per system. Following the installation of the recycling unit, annual water use dropped to less than 1/10th of an acre-ft for each of the 38 systems. It should be noted that the 3.2 acre-ft figure was derived from the installation of the Water Saver/Plus™ system on older, less efficient x-ray processors. According to research conducted by C & A X-Ray, the majority of x-ray processors are newer models having a lower water use rating, therefore the estimated water savings is reduced to 2.5 acre-ft annually.

5.4.2.2 Potential Water Savings in Los Angeles

To estimate the potential water savings associated with converting x-ray processer units to recycled systems, the IRP team contacted the Bureau of Sanitation Industrial Waste Management Division to obtain a list of potential users of x-ray processing systems. X-ray processor systems, commonly found in dental, doctor, chiropractor and veterinarian offices, utilize x-ray fixer and developer that contain silver. X-ray fixer is a hazardous waste because of its high silver content. Silver bearing wastes, including x-ray fixer, should not be discharged to the sewer unless they are first treated in a properly sized, designed, installed, operated, maintained, and serviced standard silver recovery system. Improper disposal of untreated silver bearing wastes to the sewer system may result in damage to the treatment facilities and/or the environment. Medical, dental and veterinarian offices that develop x-rays on-site

contract with service providers to remove the collected waste from the silver recovery system. These service providers treat the waste and dispose of it in a legal manner.

The City of Los Angeles, Bureau of Sanitation, provided the IRP team with a list of all the silver recovery facilities permitted to discharge their treated wastewater into the sewer system. Silver is removed from the collected wastewater, but the wastewater is not recycled. There are a total of 465 facilities within the City of Los Angeles with wastewater flows between 0 and 384,000 gallons per day.

Retrofitting existing x-ray film processing systems with water recycling devices has the potential to conserve large volumes of water on an annual basis.

5.4.2.3 Other Areas

Several water districts are also considering x-ray processor programs. The Inland Empire Utilities Agency (IEUA) applied for a Proposition 13, Urban Water Conservation Grant, to offer a regional rebate program within its 242 square mile service area for the retrofit of a maximum of 50 x-ray film processing systems with this new technology. As a result of this proposed program, the agency expects to conserve nearly 41 million gallons of water per year or 125.4 acre-ft annually. The program fulfils the requirements of BMP 9 for Commercial, Industrial and Institutional Conservation Programs.

The San Diego County Water Authority, in partnership with the DWP submitted a proposal for obtaining Proposition 13 funds that scored the highest of all the proposals submitted. The application proposed to jointly implement a project that provides incentives towards the purchase of a maximum of 500 Water Saver/Plus™ x-ray processing systems for local hospitals and large medical centers located in both Los Angeles and San Diego Counties. The approved Proposition 13 funding will provide $1,247 towards the purchase of each system. This is in addition to a $2,000 voucher that the MWD provides for these systems, representing a total rebate covering the entire installed cost.

Pasadena Water and Power (PWP) implemented a similar program. In 2001, Huntington Hospital teamed up with PWP to reduce water consumption in the facility's Radiology Division. The hospital worked with PWP and C & A X-Ray Corporation to install a Water Saver/Plus™ x-ray processing system.

5.4.2.4 Future of X-Ray Equipment

The future of x-ray equipment is uncertain at this point. There is speculation that digital processing may replace conventional x-ray equipment and processors in the future. It is unlikely that they will be replaced in the next 10 years, due to inadequate resolution of the new digital equipment, cost, and doctor preferences in making a diagnosis by looking at "film". Representatives of two different companies expect that the next generation of doctors would probably feel more comfortable looking at a monitor. DWP's existing Technical Assistance Program can offer incentives for

conversion of conventional x-ray equipment to digital equipment, in addition to funding the installation of recycling systems.

5.4.3 Retrofit of Existing Car Washes

Based on the information provided by the Bureau of Sanitation of the City of Los Angeles there are 499 permitted car washes within the City of Los Angeles. Approximately 10 percent of these facilities were contacted as a part of this study. Based upon the information the car washes provided, only 60 percent of the car washes recycle their water. It was not possible to obtain information on the amount of water the car washes used based solely on the flows they discharge to the sewer system. Further investigation is required to evaluate the impacts of the implementing a rebate program for the installation of a retrofit system at car washes to recycle water.

5.4.4 Additional Conservation Measures

Based on the information gathered from other conservation programs managed by other water districts, further studies could be undertaken for the following programs:

- Waterless urinals (no water is required for their use) if approved for use in the City. This technology is currently being studied by the Los Angeles Department of Building and Safety.

- A pre-rinse kitchen sprayer rebate program for restaurants. The savings associated with the reduction of water may cover the full cost of the kitchen device. Estimated annual savings per kitchen are 75,000 gallons.

5.4.5 Estimated Water Savings from Potential Additional Measures

5.4.5.1 Potential Potable Water Demand Reduction

Of the listed potential additional measures in described in this subsection, the measure with the greatest promise to significantly reduce potable water demand in the forthcoming years is the implementation of smart irrigation with the use of ET devices. As discussed in subsection 5.4.1 and Appendix C, the potential potable water demand savings from implementing a smart irrigation program Citywide are estimated at up to 15,800 acre-ft/yr in the year 2020. This approach could over-estimate water savings since the number of City properties with underground irrigation systems and automatic controllers is unknown. In addition, future implementation would depend on available funding, customer acceptance, reliability, and commercial availability of smart irrigation controllers. More detailed studies would be needed to determine the full benefits of a smart irrigation program.

Even though no formal estimate has been conducted of the water savings that could be realized from updating medical X-ray machines, this conservation measure is worth note. The installation of water recycle devices in X-ray machines has the potential to have a sizeable impact on water demand. As a result, it will be important

to monitor the behavior of the market in the upcoming years to better assess the magnitude of savings that could be realized from a change in technology. Also, if medical service providers switch to digital radiology devices in the near future, the water demand savings from recycling X-ray machines would not be as significant.

5.4.5.2 Wastewater Flow Reduction

As mentioned previously, the option with the greatest potential to assist in water conservation is the implementation of smart irrigation programs, which would not directly impact on wastewater flows.

5.4.5.3 Dry Weather Runoff Reductions

As mentioned previously, the option with the greatest potential to assist in water conservation is the implementation of smart irrigation programs. If smart irrigation were implemented City wide, it would reduce dry weather runoff by up to 11 mgd. This approach could over-estimate the reduction of runoff since the number of City properties with underground irrigation systems and automatic controllers is unknown. In addition, future implementation would depend on available funding, customer acceptance, reliability, and commercial availability of smart irrigation controllers. More detailed studies would be needed to determine the full benefits of a smart irrigation program.

Refer to *IRP Facilities Plan, Volume 3: Runoff Management* for additional discussion on the impacts of smart irrigation on dry weather runoff.

5.5 Conclusions

DWP has an extremely successful conservation program. The conservation options described above will assist in water conservation, and as a byproduct, the conservation of other resources. Many strategic programs including rebate programs, ET controllers, and xeriscaping contribute to local water conservation efforts. Consideration of all of additional conservation options will be evaluated in the IRP alternatives, as discussed in *IRP Facilities Plan, Volume 4: Alternatives Development and Analysis*.

Section 6
Recycled System

The use of "recycled" water (i.e., highly treated wastewater) for non-potable needs is an important area of focus for the IRP. One of the guiding principles from Phase I was to produce and use as much recycled water as possible from existing and planned facilities. Recognizing the importance of recycled water, the City continues to develop recycled water projects to help meet increasing demands by augmenting the City's water supply. In fact, the City's commitment to investigating and developing a plan for recycled water use is demonstrated by the development of a stand-alone *Los Angeles Recycled Water Master Plan* as part of the IRP. This section provides a short summary of the existing recycled water systems and potential demands.

6.1 Existing Recycled Water System and Demands

6.1.1 Wastewater Treatment Plants

Wastewater in the City of Los Angeles is collected and transported through some 6,500 miles of major interceptors and mainline sewers, more that 11,000 miles of house-sewer connections, 46 pumping plants, and four treatment plants. The Department of Public Works, Bureau of Sanitation (BOS) is responsible for the planning and operation of the wastewater program. Figure 6-1 shows the City's four wastewater treatment plants and seven sewersheds that feed into the plants.

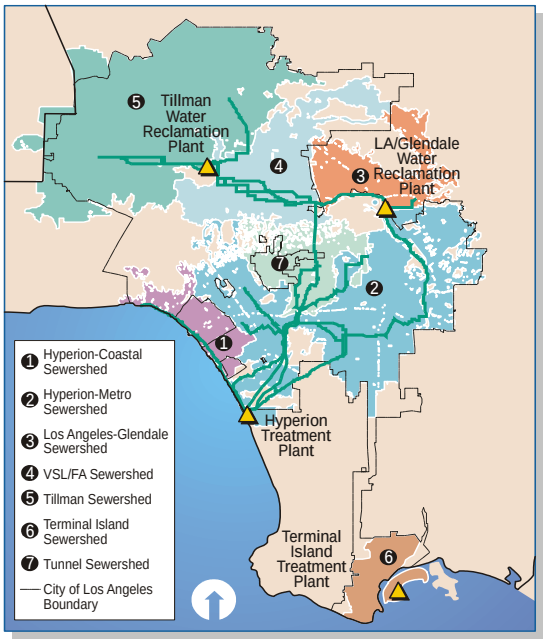


Figure 6-1
City Wastewater Plants and Sewersheds

A portion of the treated effluent from the wastewater plants is provided to DWP to meet recycled water demands. DWP is responsible for planning, construction and operations of recycled pipelines and connections that will take the treated effluent water to its customers.

At the core of the existing recycled water system there are four wastewater treatment plants.

Donald C. Tillman Water Reclamation Plant

In service since 1985, the Donald C. Tillman Water Reclamation Plant (TWRP) has a rated capacity of 64 million gallons per day (mgd) [1] and currently treats about 52 mgd. The current level of treatment is Title 22 (tertiary) plus nitrogen removal (NdN).

[1] Rated capacity of 64 mgd reflects assumed de-rating from 80 mgd due to nitrification/denitrification (NdN) project.

Currently, this plant is providing recycled water to Japanese Garden, Wildlife Lake, and Lake Balboa. The remaining tertiary-treated water is discharged into the Los Angeles River.

Los Angeles-Glendale Water Reclamation Plant

A joint project of the City of Los Angeles and City of Glendale, the Los Angeles-Glendale Water Reclamation Plant (LAGWRP) began treating wastewater in 1976. Originally designed without considering nutrient removal, its design capacity is 20 mgd and currently treats about 17 mgd. With a level of treatment of 22 plus nitrogen removal (NdN), the hydraulic capacity could decrease to 15 mgd to meet LA River discharge requirements. Recycled water from the LAGWRP plant provides landscape irrigation for Griffith Park and the Los Angeles Greenbelt Project. As with the TWRP, the remaining tertiary-treated water is discharged into the Los Angeles River.

Terminal Island Treatment Plant

Originally built in 1935, the Terminal Island Treatment Plant (TITP) has been providing secondary treatment since the 1970s. Tertiary treatment was added in 1996. Water from the plant is currently discharged into the Los Angeles Harbor. With the completion of the Advanced Wastewater Treatment Facility, which will add MF/RO treatment to a portion of the wastewater effluent, this recycled water can be used for seawater barrier and industrial and landscaping uses in the harbor area. The current capacity of the plant is 30 mgd, with average flows being about 16 mgd.

Hyperion Treatment Plant

Operating since 1894, the Hyperion Treatment Plant (HTP) is the oldest and largest of the City's wastewater treatment plants. Its $1.2 billion construction upgrade, completed in 1999, allows for full secondary treatment. A majority of the treated water is discharged into the Santa Monica Bay, and the rest is delivered to the West Basin Water Reclamation Plant to meet recycled demands in the West Basin Municipal Water District service area and parts of the City of Los Angeles. Currently about 34,000 acre-ft/ yr of water from HTP is sold to the West Basin Municipal Water District for additional treatment and then used to meet recycled water demands in its service area. The current capacity of HTP is 450 mgd, with an average wastewater flow of 350 mgd.

6.1.2 Existing Recycled Water Projects

There are seven recycled water projects that the City has developed. Six of these projects are currently providing recycled water for landscape irrigation and commercial uses.

Japanese Garden

The authentic 6.5 acre Japanese Garden is located at the Sepulveda Dam Recreation Area. It has more than 10,000 visitors per year. The TWRP provides about 4,400 acre-ft/ yr for the lake and landscaping at the Japanese Garden.

Wildlife Lake

Located in the Sepulveda Basin, the Wildlife Lake uses about 7,800 acre-ft/ yr of treated supply from the TWRP for wildlife habitat management.

Lake Balboa

Lake Balboa is the centerpiece of the Sepulveda Dam Recreation Area and is a popular recreational facility. About 16,300 acre-ft/ yr of water supply is provided for this lake from the TWRP.

Griffith Park

Started in 1979, the Griffith Park project was the City's first recycled water project. The LAGWRP supplies recycled water to irrigate two golf courses, some parkland, and a seven-mile stretch of the Golden State Freeway adjoining the park.

Los Angeles Greenbelt Project

Dedicated in 1992, the Los Angeles Greenbelt Project was the City's first commercial recycling project. Treated water supplied by the LAGWRP is used for landscape irrigation of Forest Lawn Memorial Park-Hollywood Hills, Mt. Sinai Memorial Park, Lakeside Golf Course and MCA Inc. In total, about 1,600 acre-ft/ yr is used for both the Griffith Park and Los Angeles Greenbelt projects. There is the potential for almost doubling the recycled water use in this area.

Westside Water Recycling Project

The Westside Water Recycling Project was initiated in 1996. The City provides secondary treated water from HTP to West Basin Municipal Water District. West Basin Municipal Water District then treats this water to Title 22 standards with its Water Reclamation Plant, and sells recycled water back to the City. This recycled water is used to offset about 350 acre-ft/ yr of demand for irrigation.

East Valley Water Recycling Project

The East Valley Water Recycling Project (EVWRP) is a $55 million project that can transport tertiary-treated water from the TWRP to the Hansen Spreading Grounds in the San Fernando Valley. Originally planned as a groundwater recharge project, public outcry forced the City to suspend on groundwater recharge using Title 22 recycled water and re-focus the project to meeting landscape irrigation and industrial uses. DWP is currently in the process of signing up large landscape and industrial process customers along this corridor for recycled water. The potential for groundwater recharge using these facilities is still possible with advanced treatment, such as microfiltration and reverse osmosis (MF/RO). However, a public information/education campaign would be necessary to garner the public's acceptance of this project.

Harbor Water Recycling Project

The Harbor Water Recycling Project, currently underway, is a multi-phase project that is developed jointly between LADWP and BOS. Treated water from the Terminal

Island Advanced Wastewater Treatment Facility will be used for industrial purposes, as well as groundwater recharge to protect against seawater intrusion. By 2005, it is expected that about 5,000 acre-ft/ yr will be supplied for these two purposes. Ultimately, the project could be expanded to meet another 20,000 acre-ft/ yr.

6.1.3 Summary of Existing Recycled Water Use

Table 6-1 summarizes the existing recycled water use that is occurring in the City of Los Angeles. The existing recycled water use is broken down into three main categories: (1) irrigation; (2) environmental/recreation; and (3) wholesale sales to West Basin Municipal Water District.

Table 6-1
Existing Recycled Water Use in City of Los Angeles

Type of Use/Project	Source of Supply	Amount of Supply
Irrigation		
-Griffith Park and LA Greenbelt	LAGWRP	1,600 acre-ft/ yr
-Westside	HTP/West Basin Plant	350 acre-ft/ yr
Sub-Total		1,950 acre-ft/ yr
Environmental/ Recreation		
-Japanese Garden	TWRP	4,400 acre-ft/ yr
-Wildlife Lake	TWRP	7,800 acre-ft/ yr
-Lake Balboa	TWRP	16,300 acre-ft/ yr
Sub-Total[1]		28,500 acre-ft/ yr
Wholesale Sales to West Basin Municipal Water District[2]	HTP	34,000 acre-ft/ yr
Total Beneficial Use		**64,450 acre-ft/ yr**

[1] The water provided to Japanese Garden, Wildlife Lake and Lake Balboa is ultimately discharged into the Los Angeles River and is providing additional environmental benefits.

[2] Secondary treated water provided to West Basin MWD, which is further treated to meet recycled water demands in its service area.

6.2 Potential Demands for Recycled Water

6.2.1 Approach

DWP's implementation of recycled water factors in economics, water quality regulations, and public acceptance. Even though there may be the high potential for recycled water use in the City, it would not be economically feasible to provide recycled water to all potential users. A recycled water system requires construction of pipelines, pump stations, and storage tanks to transport treated wastewater or treated runoff to DWP's water customers. In addition, most water customers do not have dual plumbing systems—meaning separate pipelines for potable and non-potable uses, such as irrigation. Therefore, retrofits for the plumbing system are needed. This can be very expensive depending on the plumbing layout of the water customers.

DWP's approach for identifying recycled water customers takes into account the following criteria:

- ***Size of potential customer*** – by focusing on larger water customers first, smaller customers along the routes can be economically added later (similar to the concept of anchor stores in a retail mall)

- ***Type of water use*** – landscape irrigation and some industrial/and commercial uses usually requires less cost (from a treatment standpoint) and regulatory hurdles; whereas some industrial uses or groundwater recharge would very likely require advanced treatment (such as MF/RO) and greater levels of public education and acceptance

- ***Proximity to existing recycled water system*** – those potential customers nearest to existing wastewater treatment plants or existing recycled water pipelines would be the least expense to develop because of the distribution cost (pipelines and pump stations)

- ***Willingness to use recycled water*** – not all potential water customers have a desire to use recycled water; and many base the decision to use such water on costs and/or reliability—meaning in most cases the City may need to must provide proper incentives.

The potential types of recycled water users can be summarized into three main categories:

1. Landscape irrigation for large users such as golf courses, cemeteries, parks, master planned communities, and other large developments

2. Industrial use for cooling towers, recirculation and process water

3. Groundwater recharge for seawater intrusion barrier and indirect potable use, which will require MF/RO advanced treatment and public acceptance

4. Other beneficial uses such as providing water for environmental and recreational needs, such as the Los Angeles River

6.2.2 Identifying DWP Top Water Customers

To estimate the potential for recycled water use in the City for irrigation and industrial demand, DWP's top water customers were identified using billing records. Top water customers were generally those that used more than 890 gallons per day (or approximately 1 acre-ft/ yr).

DWP uses billing rate codes to identify certain customers. Single-family residential rate codes were excluded from this search as they would be too expensive to connect to the recycled water system during this first phase. All rate codes that were identified as irrigation meters were considered excellent potential recycled water users as they already have separate irrigation (non-potable) plumbing systems.

The remaining rate codes for industrial and commercial customers were inspected more closely to determine the likelihood of accepting recycled water. Most of these other customers would use recycled water to meet landscaping water needs and were thought to be good potential recycled water users, even though they would require retrofit costs to create a separate plumping system for non-potable uses.

Those customers identified as industrial were assumed to have little irrigation demand potential—but instead could use recycled water for process use (i.e., cooling towers or recirculation systems). However, those industrial customers that manufactured foods, beverages, or pharmaceuticals were not considered as potential recycled water users as it was assumed that these customers would have more difficulty in accepting recycled water.

In addition to DWP's current customers, future customers were added to the potential. These future customers included new schools that are currently planned to be constructed by the Los Angeles Unified School District, new parks that will likely be constructed by Los Angeles Department of Recreation and Parks, and Playa Vista Development (residential and commercial master planned development).

The following summarizes the number of customers that were identified as representing the potential for recycled water:

- **Irrigation customers with separate metered connections for irrigation:**

Number of customers	768
Range of water demand	1 acre-ft/ yr to 2,296 acre-ft/ yr
Total water demand potential	20,200 acre-ft/ yr

- **Industrial customers that would likely use the water for process use, and would likely need user retrofit costs for installing separate plumbing for non-potable process demands:**

Number of customers	30
Range of water demand	15 acre-ft/ yr to 2,249 acre-ft/ yr
Total water demand potential	8,453 acre-ft/ yr

- **Other customers that would likely use the water for irrigation, but would likely need user retrofit costs for installing separate plumbing for non-potable irrigation demands:**

Number of customers	1,574
Range of water demand	1 acre-ft/ yr to 2,021 acre-ft/ yr
Total water demand potential	73,205 acre-ft/ yr

Figure 6-2 plots the potential recycled water customers with respect to their potential water demand.

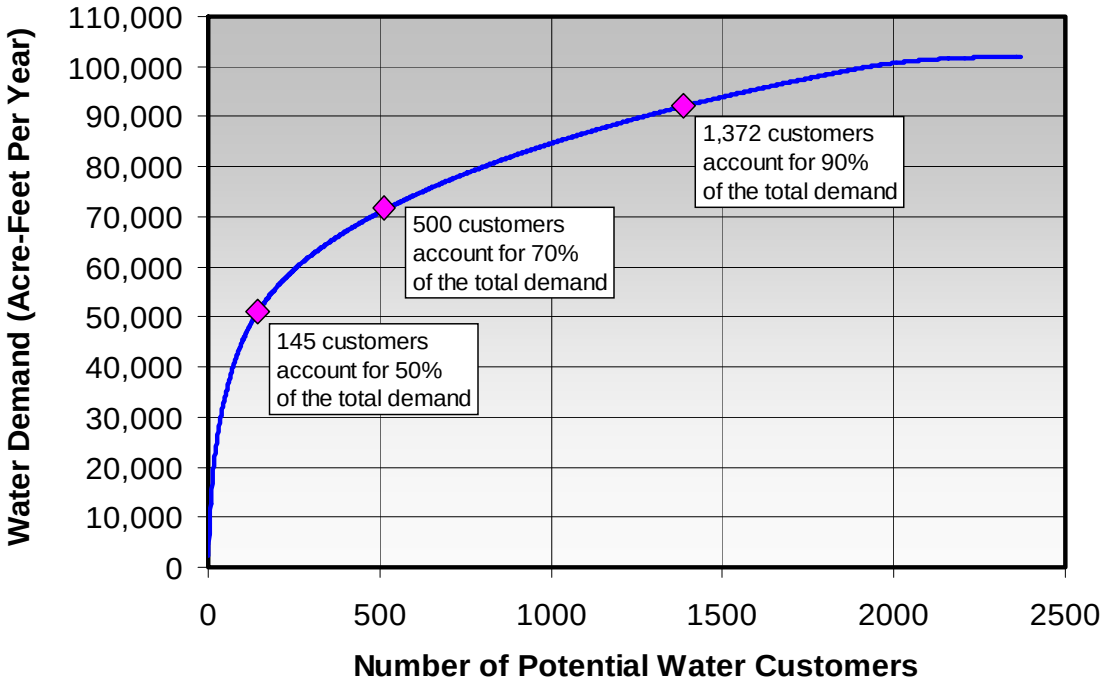


Figure 6-2
Potential Recycled Water Demand

Figure 6-2 shows that 2,372 potential water customers can use approximately 103,000 acre-ft/ yr of recycled water. The graph also shows that the first 145 customers (which only represent 6 percent of the total number of customers) account for 50 percent of the total water demand. Furthermore, 500 customers (which represent 21 percent of the total) account for 70 percent of the total water demand.

6.2.3 Mapping Potential Recycled Water Customers

After identifying the potential recycled water customers, the next step is to map them in order to determine their proximity to the existing (or planned) recycled water system. This was accomplished using GIS. Figure 6-3 shows this plot of the potential customers.

The pink shaded areas represent the Tier 1 potential for recycled water—the customers in these areas are the closest to the existing (or immediately planned) recycled water system. The green shaded areas represent the Tier 2 potential for recycled water—the customers in these areas are further away from the existing (or immediately planned) recycled water system. In general, the Tier 1 customers should be less expensive to serve than the Tier 2 customers.

Figure 6-3 shows four areas of the City where delivery of recycled water is the most economical to achieve:

1. ***The Valley*** – which has a Tier 1 recycled water demand potential of 14,200 acre-ft/ yr, and a Tier 2 potential of 42,400 acre-ft/ yr

2. ***Central City*** – which has a Tier 1 recycled water demand potential of 2,000 acre-ft/ yr, and a Tier 2 potential of 29,500 acre-ft/ yr

3. ***Westside*** – which has a Tier 1 recycled water demand potential of 4,000 acre-ft/ yr, and a Tier 2 potential of 14,300 acre-ft/ yr

4. ***Harbor*** – which has a Tier 1 recycled water demand potential of 9,300 acre-ft/ yr, and a Tier 2 potential of 10,900 acre-ft/ yr

5. ***Total*** – Tier 1 recycled water demand potential is 29,500 acre-ft/ yr, while the Tier 2 recycled water demand potential is 97,100 acre-ft/ yr

There are approximately 158 water customers that a considerable distance from existing City facilities and therefore do not meet Tier 2 criteria. This accounts for about 5,800 acre-ft/ yr of the 103,000 acre-ft potential (shown in Figure 6-2).

It should be noted that this potential for recycled water demand does not factor in the capacity limitations of the wastewater treatment plants. Wastewater flows, current and projected, could limit the amount of water that is available to be reused.

Section 7 summarizes alternatives for recycled water that take into account the amount of wastewater flows and urban runoff treatment flows that can be beneficially reused.

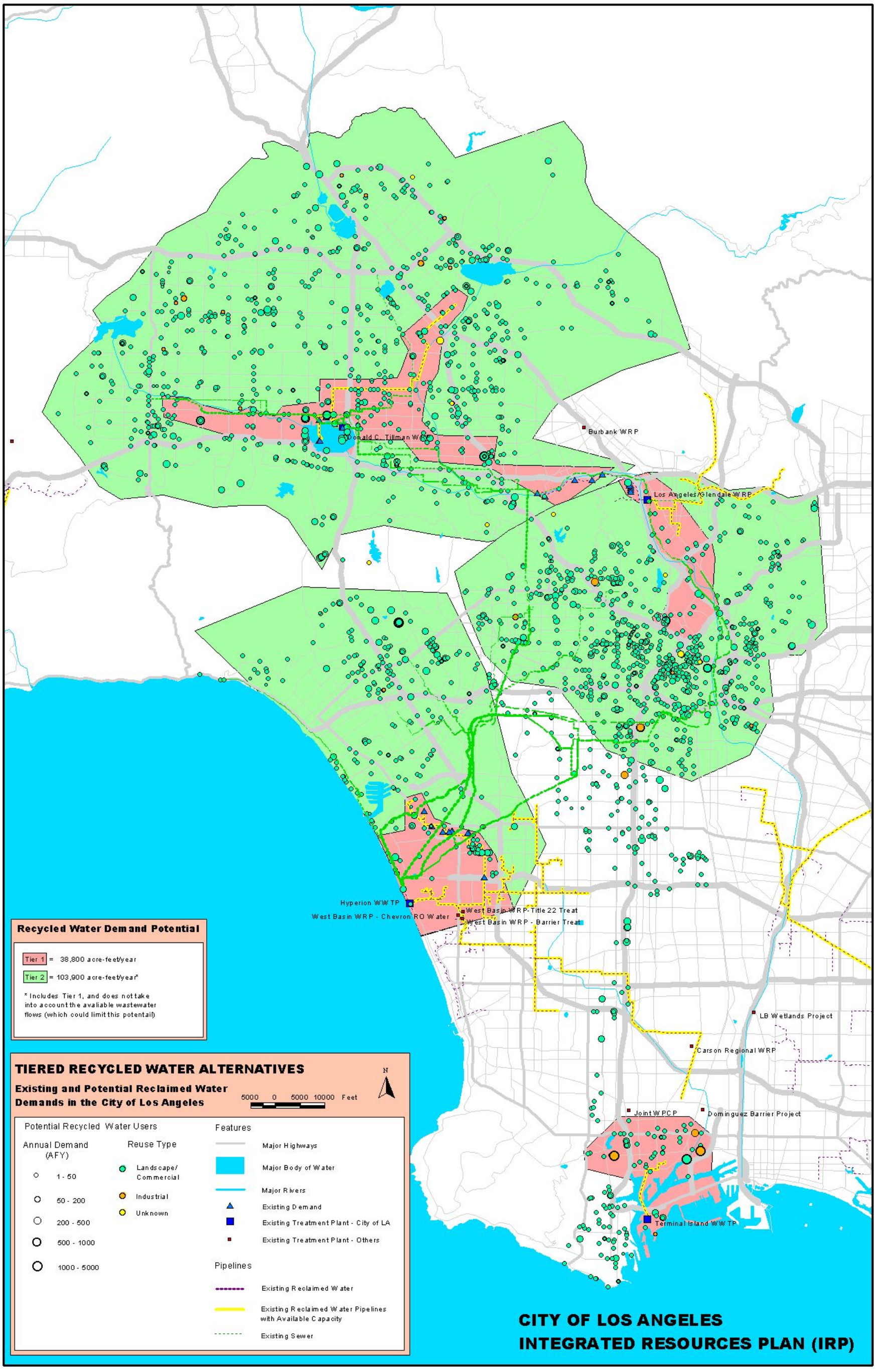


Figure 6-3
Potential Recycled Water Customers

Section 7
Alternatives Analysis

7.1 Approach

The IRP has identified planning parameters that will result in the need for new programs, infrastructure and facilities to meet the 2020 needs. These planning parameters, or drivers, include population growth, increased wastewater flows, increased dry and wet weather runoff flows, increased demands for drinking water and current and future regulations to protect water quality in the basin. In addition, the IRP has an established set of Guiding Principles to guide future planning, which includes such objectives as producing and using as much recycled water as possible from existing and planned facilities, increasing water conservation and increasing the beneficial use of runoff.

Alternatives are the means of accomplishing the objectives (which include options from each service function). They answer the question, "How are we going to accomplish the objectives?" In Section 6 of this document, the potential recycled water options (or projects) for meeting these drivers were discussed, and options for wastewater and runoff were discussed in the Facilities Plan *Volume 1: Wastewater Management,* and *Volume 3: Runoff Management,* respectively. To meet the 2020 needs, the IRP needed to develop integrated alternatives, which include combinations of wastewater, recycled water and runoff options into complete alternatives. By considering the system using an integrated watershed approach, more holistic alternatives could be identified and evaluated.

As shown in Figure 7-1, the IRP team used a multi-step process to create and evaluate alternatives: (1) develop preliminary alternatives; (2) evaluate preliminary alternatives; (3) refine alternatives and develop hybrid alternatives; (4) evaluate hybrid alternatives; and (5) screen to final alternatives for environmental analysis. Additional discussion of the alternatives and the evaluation process is presented in the Facilities Plan *Volume 4: Alternatives Development and Analysis*.

7.2 Preliminary and Hybrid Alternatives

7.2.1 Preliminary Alternatives

The first step in creating alternatives was defining preliminary alternatives. Each preliminary alternative was constructed with the different area of focus to reflect tradeoffs:

- ***Low cost/ minimum requirements:*** Alternatives include lower cost solutions to meet minimum requirements
- ***High beneficial use of water resources:*** Alternatives offer higher levels of water recycling, conservation and beneficial use of runoff to reduce imported water supplies

- ***High adaptability*** : Alternative provide adaptability to respond to changing conditions (e.g., changing flows, technology, or regulations)
- ***More decentralized***: Alternatives include more and smaller local projects rather than fewer and larger regional projects
- ***Lower risk***: Alternatives offer relatively lower risk either from a regulatory perspective or an ease-of-implementation perspective

All preliminary alternatives were constructed to meet current requirements related to regulatory requirements, system capacity, minimum levels of water recycling, beneficial use of runoff, conservation, and discharges to the Los Angeles River. Yet, not all alternatives are the same in terms of meeting future regulations. Some alternatives were designed to meet current regulations, some were designed to be flexible to meet new regulations; and some alternatives have anticipated future regulations and were designed to meet those from the start.

The detailed analysis of the preliminary alternatives can be found in *Volume 4: Alternative Development and Analysis.* Table 7-1 shows the components of each of the preliminary alternatives. The rows list all of the options available for managing the wastewater, water and runoff systems and the columns show each of the preliminary alternatives. The table can be read by selecting an alternative and reading down the column to see which options are included, and to what level. The cells that are blank indicate that the option listed in that row was not included in the alternative.

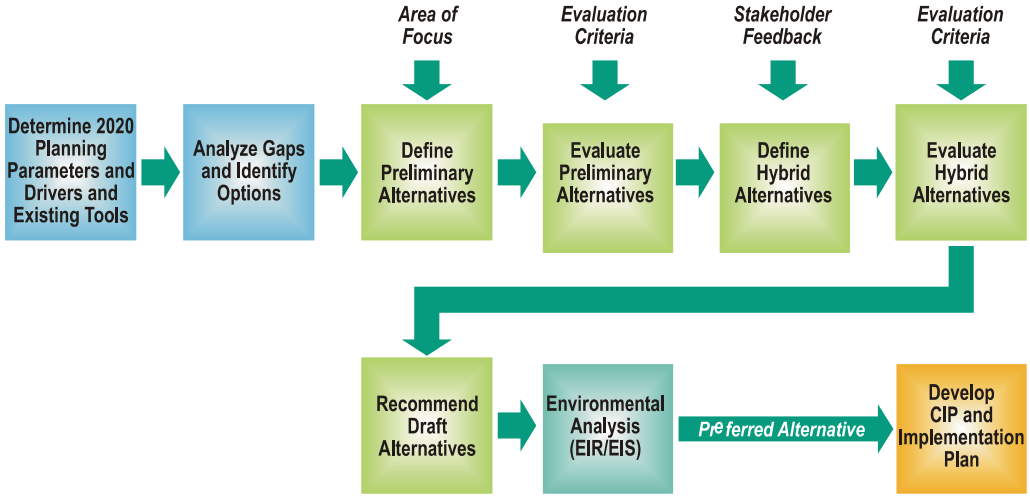


Figure 7-1
IRP Approach to Creating Alternatives

The Steering Group played an important role in the development, evaluation and screening of alternatives by providing a "sounding board" throughout the process, giving the necessary feedback to keep the facilities planning efforts aligned with the Guiding Principles. Many Steering Group members completed surveys, which were used in the decision-making process. For other members, feedback was

received via discussion during the workshop sessions through letters, emails, IRP open comment forms, during telephone conversations and individual meetings that were held as part of the workshops follow up activities.

7.2.2 Hybrid Alternatives

Using feedback from the Steering Group, the next step included creating a series of hybrid alternatives. To create the hybrid alternatives, the team sought feedback from the Steering Group and identified key concepts. The goal was to create alternatives that combined the best elements of the preliminary alternatives, thereby allowing them to perform better than the original preliminary alternatives. A set of nine hybrid alternatives were created as a result of the preliminary alternatives analysis.

The evaluation of the hybrid alternatives and selection of recommended draft alternatives is discussed in depth in *Volume 4: Alternative Development and Analysis*. Table 7-2 shows the components of each of the hybrid alternatives. The rows list all of the options available for managing the wastewater, water and runoff systems and the columns show each of the hybrid alternatives. The table can be read by selecting an alternative and reading down the column to see which options are included, and to what level. The cells that are blank indicate that the option listed in that row was not included in the alternative.

These nine hybrid alternatives were then analyzed by comparing their costs with their expected benefits on wastewater management, recycled water, dry weather urban runoff and wet weather urban runoff. Using this analysis, a limited number of recommended draft alternatives were selected for detailed environmental analysis, and are described in the sections that follow.

These recommended draft alternatives include:

- Alternative 1: Hyperion Water Treatment Plant expansion with high potential for water resources projects (Hyb1C)
- Alternative 2: Tillman and LAG Water Replenishment Plant expansions with high potential for water resources projects (Hyb2C)
- Alternative 3: Tillman Water Replenishment Plant expansion with moderate potential for water resources projects (Hyb3B)
- Alternative 4: Tillman Water Replenishment Plant expansion with high potential for water resources projects (Hyb3C)

A preferred alternative will be selected as part of the EIR analysis.

7.3 Water Management Projects in Recommended Draft Alternatives

After an intensive process that was built on stakeholder preferences, 21 initial alternatives were narrowed down to four alternatives. These alternatives will meet the wastewater infrastructure needs of the population of 2020. These alternatives will also maximize the beneficial use of recycled water and urban runoff, optimize the use of our existing facilities and water resources, reduce pollution and minimize our dependency on imported water. The water management portion of the alternatives is described in the sections that follow. For a detailed description of all the components of each of the alternatives, see *Volume 4: Alternatives Development and Analysis*. Further discussion of the recycled water program will be included in the *Los Angeles Recycled Water Master Plan*.

7.3.1 Alternative 1 (Hyperion Expansion/ Moderate Potential for Water Resources Projects)

The selected options for the water system in Alternative 1 (formerly Hyb1C) are such that they will work along with the wastewater system. The wastewater system for Alternative 1 includes expanding Hyperion to 500 mgd, upgrading Tillman to advanced treatment with no expansion and providing collection system improvements. Refer to *Volume 4: Alternatives Development and Analysis* for a detailed description of the components of each of the alternatives.

Stemming from the wastewater system improvements, water management options were selected and combined to create a complete alternative. The following is a summary of the recycled water options, which are included in Alternative 1:

- Meet the minimum Los Angeles River flow requirements by discharging an average of 27 mgd of reverse osmosis treated effluent.
- Use up to 38,700 acre-feet per year of recycled water above existing levels to serve irrigation and industrial demands in the San Fernando Valley, LAG, West Los Angeles, and Harbor areas.

Table 7-3 shows a breakdown of the potential amount of recycled water projected to be served annually from each treatment plant.

Table 7-1
City of Los Angeles
Integrated Resources Plan (IRP) - *Preliminary Alternatives Matrix*

	Low Cost/Min. Requirements (LCMR)	High Beneficial Use of Water Resources (WR)						High Adaptability (HA)		More De-centralized (MD)	Low Risk (LR)	
Option	**LCMR**	**WR1a**	**WR1b**	**WR2a**	**WR2b**	**WR3a**	**WR3b**	**HA1**	**HA2**	**MD**	**LR1**	**LR2**
Wastewater Treatment												
Tillman - Upgrade treatment (64 mgd) (Advanced Treatment)	64 mgd					64 mgd	64 mgd			64 mgd	64 mgd	64 mgd
Tillman - Upgrade and increase capacity to 80 mgd (Advanced Treatment)								80 mgd				
Tillman - Upgrade and increase capacity to 100 mgd (Advanced Treatment)				100 mgd	100 mgd							
Tillman - Upgrade and increase capacity to 120 mgd (Advanced Treatment)		120 mgd	120 mgd						120 mgd			
Los Angeles-Glendale - Maintain existing capacity (15 mgd) (Title 22)	15 mgd									15 mgd		15 mgd
Los Angeles-Glendale - Increase capacity to 20 mgd (Title 22)		20 mgd	20 mgd	20 mgd	20 mgd							
Los Angeles-Glendale - Increase capacity to 30 mgd (Title 22)						30 mgd	30 mgd					
Los Angeles-Glendale - Upgrade treatment (15 mgd) (Advanced Treatment)											15 mgd	
Los Angeles-Glendale - Upgrade and increase capacity to 30 mgd (Advanced Treatment)								30 mgd	30 mgd			
New Reclamation Plant - Build 10 mgd capacity near downtown (Title 22)				10 mgd	10 mgd							
New Reclamation Plant - Build 30 mgd capacity in valley (Title 22)						30 mgd	30 mgd					
New Reclamation Plant - Build 10 mgd capacity near downtown (Advanced Treatment)										10 mgd		
New Reclamation Plant - Build 30 mgd capacity in valley (Advanced Treatment)										30 mgd		
Hyperion - Maintain existing capacity (450 mgd)		450 mgd	450 mgd	450 mgd	450 mgd			450 mgd	450 mgd	450 mgd		
Hyperion - Increase capacity to 500 mgd	500 mgd					500 mgd	500 mgd					500 mgd
Hyperion - Increase capacity to 550 mgd											550 mgd	
Terminal Island - Maintain existing capacity (30 mgd)	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd
Wastewater Sewer System												
Build new interceptor sewer - Valley Spring Lane Interceptor Sewer	X	X	X	X	X	X	X			X	X	X
Build new interceptor sewer - Glendale Burbank Interceptor Sewer (GBIS)	X	X	X	X	X	X	X	X	X	X	X	X
Build new interceptor sewer - North East Interceptor Sewer (NEIS) Phase 2	X	X	X	X	X	X	X	X	X	X	X	X
Build new interceptor sewer - for New Plant (10 mgd - 2 miles)				X	X					X		
Build new interceptor sewer - for New Plant (30 mgd - 2 miles)						X	X			X		
Build new buried storage tank - 60 MG at Tillman								X	X			
Build new buried storage tank - 20 MG at Los-Angeles Glendale		X*	X*	X*	X*	X*	X*	X*	X*	X*		
Build new buried storage tank - 10 MG at new plant				X*	X*					X*		
Build new buried storage tank - 20 MG at new plant						X*	X*			X*		
Recycled Water (Non-Potable Demands)												
Meet Los Angeles River minimum requirements using treated wastewater	X	X	X	X	X	X	X	X	X	X	X	X
Meet Irrigation/Industry demands using treated wastewater (low/medium/high)	Low	High	Medium	High	High	High	High	Low	Low	Medium	Low	Low
Recharge groundwater basin using treated wastewater			High									
Meet Irrigation/Industry demands using treated runoff (low/medium/high)					Low		Low					
Recharge groundwater basin using treated runoff		High	High	High	High	High	High					
Conservation Programs												
Increase conservation efforts to DWP's planned 2020 levels	X	X	X	X	X	X	X	X	X	X	X	X
Increase conservation efforts further		X	X	X	X	X	X	X	X	X		
Dry Weather Urban Runoff												
Local/Neighborhood Solutions												
Smart Irrigation		X	X	X	X	X	X	X	X	X		
Increase public education and participation	X	X	X	X	X	X	X	X	X	X	X	X
Regional Solutions												
Diversion to Wastewater System (WW) or Divert to Urban Runoff Plant or wetlands and Beneficially Use (URP)[1]												
Divert - coastal (10 mgd)	WW	WW	WW	WW	WW	WW	WW	WW	WW	WW	WW	WW
Divert - inland (Bell Creek 2.8 mgd)		WW	WW		URP		URP				WW	
Divert - inland (Browns Creek 3 mgd)		WW	WW		URP		URP				WW	WW
Divert - inland (Aliso Wash 1.8 mgd)		WW	WW								WW	
Divert - inland (Wilbur Wash 1 mgd)					URP		URP				WW	WW
Divert - inland (Limekiln Canyon 1.5 mgd)					URP		URP				WW	WW
Divert - inland (Caballero Canyon 1mgd)		WW	WW								WW	WW
Divert - inland (Bull Creek 2.4 mgd)		WW	WW								WW	WW
Divert - inland (Tujunga Wash 6 mgd)											WW	
Divert - inland (Pacoima Wash 7 mgd)											WW	WW
Divert - inland (Arroyo Seco 5 mgd)											WW	
Divert - inland (Reach 3 LAR 4 mgd)											WW	
Divert - inland (Reach 2 LAR-12 mgd)											WW	
Divert - inland (Burbank Western Channel 1.8 mgd)											WW	
Divert - inland (Compton Creek 2.6 mgd)					URP		URP				WW	
Divert - inland (Ballona Creek 3.3 mgd)					URP		URP				WW	
Divert - inland (Sepulveda Channel 16 mgd)											WW	
Divert - inland (Dominguez Channel 16 mgd)											WW	
Percent of Dry Weather Runoff Managed (of watershed - 97 mgd)	10%	30%	30%	21%	28%	21%	28%	21%	21%	21%	100%	20%
Wet Weather Urban Runoff												
Local/Neighborhood Solutions												
New/Redevelopment Areas - On-site treatment/discharge	X	X	X	X	X	X	X	X	X	X	X	X
New/Redevelopment Areas - On-site percolation	X	X	X	X	X	X	X	X	X	X	X	X
Retrofit Areas - Cisterns (On-site storage/use)												
Residential (Low/Medium/High)		Low	Low	High	High	High	High			High		
Schools (Low/Medium/High)		Low	Low	High	High	High	High			High		High
Government (Low/Medium/High)		Low	Low	High	High	High	High			High		High
On-site percolation (infiltration trenches/basins, reduce paving/hardscape)												
Residential		X	X	X	X	X	X			X		
Schools		X	X	X	X	X	X			X		X
Government		X	X	X	X	X	X			X		X
Commercial		X	X	X	X	X	X			X		
Rec/Cemetaries		X	X	X	X	X	X			X		X
Neighborhood recharge												
Vacant Lots (East Valley) (Low/Medium/High)		Medium	Medium	Low	Low	Low	Low	High	High	Low		High
Parks/Open Space (East Valley) (Low/Medium/High)		Medium	Medium	Low	Low	Low	Low	High	High	Low		High
Abandoned Alleys (East Valley) (Low/Medium/High)		Medium	Medium	Low	Low	Low	Low	High	High	Low		High
Regional Solutions												
Non-urban regional recharge		X	X	X	X	X	X					
Runoff treatment and beneficial use/discharge												
Treat and benefical use/discharge (coastal area)	X	X	X	X	X	X	X	X	X	X	X	X
Treat and benefical use/discharge (all areas)											X	
Percent of Representative storm (1/2-inch) managed (of citywide 1,700 mgd)	10%	48%	48%	58%	58%	58%	58%	39%	39%	55%	100%	42%
Current/Anticipated Regulations Level of Compliance												
California Toxics Rule	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Current Total Maximum Daily Loads (TMDLs) - Bacteria (Santa Monica Bay), Trash	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Future Total Maximum Daily Loads (projection)	No	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Yes	Partial

Notes:

*Storage for daily (diurnal) peaks

[1]Flows indicated assume no smart irrigation. Implementing smart irrigation citywide would reduce total dry weather runoff estimates by ~11 mgd

Definitions of areas of focus:

Low Cost/Minimum Requirements: alternative includes lower cost solutions or low initial investment by meeting minimum requirements.

High Beneficial Use of Water Resources: alternatives that include high levels of recycled water, conservation, and beneficial use of runoff that reduces use of imported water.

High Adaptability: alternatives that are most able to adjust to changing conditions, such as population, wastewater flows and regulations.

More Decentralized: alternatives with solutions based on many small-scale projects centered on small neighborhoods, households or even individuals, rather than fewer and larger regional projects.

Lower Risk: alternatives that are lower in risk from a regulatory perspective (LR1) or in terms of ease of implementation from a technical, environmental and/or political and public acceptance perspective (LR2).

Table 7-2
City of Los Angeles
Integrated Resources Plan (IRP) - *Hybrid Alternatives Matrix*

	Option	LCMR	WR3a	HA1	LR1	Hyb1A	Hyb1B	Hyb1C	Hyb2A	Hyb2B	Hyb2C	Hyb3A	Hyb3B	Hyb3C
Wastewater Treatment														
Tillman - Upgrade treatment (64 mgd) (Advanced Treatment)		64 mgd	64 mgd		64 mgd	64 mgd	64 mgd	64 mgd						
Tillman - Upgrade and increase capacity to 80 mgd (Advanced Treatment)				80 mgd					80 mgd	80 mgd	80 mgd			
Tillman - Upgrade and increase capacity to 100 mgd (Advanced Treatment)												100 mgd	100 mgd	100 mgd
Tillman - Upgrade and increase capacity to 120 mgd (Advanced Treatment)														
Los Angeles-Glendale - Maintain existing capacity (15 mgd) (Title 22)		15 mgd				15 mgd	15 mgd	15 mgd				15 mgd	15 mgd	15 mgd
Los Angeles-Glendale - Increase capacity to 20 mgd (Title 22)														
Los Angeles-Glendale - Increase capacity to 30 mgd (Title 22)			30 mgd											
Los Angeles-Glendale - Upgrade treatment (15 mgd) (Advanced Treatment)					15 mgd									
Los Angeles-Glendale - Upgrade and increase capacity to 30 mgd (Advanced Treatment				30 mgd					30 mgd	30 mgd	30 mgd			
New Reclamation Plant - Build 10 mgd capacity near downtown (Title 22)														
New Reclamation Plant - Build 30 mgd capacity in valley (Title 22)			30 mgd											
New Reclamation Plant - Build 10 mgd capacity near downtown (Advanced Treatment)														
New Reclamation Plant - Build 30 mgd capacity in valley (Advanced Treatment)														
Hyperion - Maintain existing capacity (450 mgd)				450 mgd					450 mgd	450 mgd	450 mgd	450 mgd	450 mgd	450 mgd
Hyperion - Increase capacity to 500 mgd		500 mgd	500 mgd			500 mgd	500 mgd	500 mgd						
Hyperion - Increase capacity to 550 mgd					550 mgd									
Total Effective Hyperion Service Area Treatment Capacity[2] (mgd)		546	546	529	607	546	546	546	529	529	529	521	521	521
Terminal Island - Maintain existing capacity (30 mgd)		30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd	30 mgd
Wastewater Sewer System														
Build new interceptor sewer - Valley Spring Lane Interceptor Sewer		X	X		X									
Build new interceptor sewer - Glendale Burbank Interceptor Sewer (GBIS)		X	X	X	X	X	X	X	X	X	X	X	X	X
Build new interceptor sewer - North East Interceptor Sewer (NEIS) Phase 2		X	X	X	X	X	X	X	X	X	X	X	X	X
Build new interceptor sewer - for New Plant (10 mgd - 2 miles)														
Build new interceptor sewer - for New Plant (30 mgd - 2 miles)			X											
Build new buried storage tank - 60 MG at Tillman[3]				X		X	X	X	X	X	X	X	X	X
Build new buried storage tank - 10 MG at Los-Angeles Glendale						X*	X*	X*	X*	X*	X*	X*	X*	X*
Build new buried storage tank - 20 MG at Los-Angeles Glendale			X*	X*										
Build new buried storage tank - 10 MG at new plant														
Build new buried storage tank - 20 MG at new plant			X*											
Recycled Water (Non-Potable Demands)														
Meet Los Angeles River minimum requirements using treated wastewater		X	X	X	X	X	X	X	X	X	X	X	X	X
Meet Irrigation/Industry demands using treated wastewater		X	X	X	Low	X	X	X	X	X	X	X	X	X
Recharge groundwater basin using treated wastewater														
Meet Irrigation/Industry demands using treated runoff (low/medium/high)							Low	Low		Low	Low		Low	Low
Recharge groundwater basin using treated runoff			High											
Conservation Programs														
Increase conservation efforts to DWP's planned 2020 levels		X	X	X	X	X	X	X	X	X	X	X	X	X
Increase conservation efforts further			X	X			X	X		X	X		X	X
Dry Weather Urban Runoff														
Local/Neighborhood Solutions														
Smart Irrigation			X	X			X	X		X	X		X	X
Increase public education and participation		X	X	X	X	X	X	X	X	X	X	X	X	X
Regional Solutions														
Diversion to Wastewater System (WW) or Divert to Urban Runoff Plant or wetlands and Beneficially Use (URP)[1]														
Divert - coastal (10 mgd)		WW	WW	WW	WW	WW	WW	WW	WW	WW	WW	WW	WW	WW
Divert - inland (Bell Creek 2.8 mgd)					WW									
Divert - inland (Browns Creek 3 mgd)					WW			WW			URP[4]			URP[4]
Divert - inland (Aliso Wash 1.8 mgd)					WW									
Divert - inland (Wilbur Wash 1 mgd)					WW			WW			URP[4]			URP[4]
Divert - inland (Limekiln Canyon 1.5 mgd)					WW			WW			URP[4]			URP[4]
Divert - inland (Caballero Canyon 1mgd)					WW			WW			URP[4]			URP[4]
Divert - inland (Bull Creek 2.4 mgd)					WW			WW			URP[4]			URP[4]
Divert - inland (Tujunga Wash 6 mgd)					WW									
Divert - inland (Pacoima Wash 7 mgd)					WW			WW			URP[4]			URP[4]
Divert - inland (Arroyo Seco 5 mgd)					WW									
Divert - inland (Reach 3 LAR 4 mgd)					WW									
Divert - inland (Reach 2 LAR-12 mgd)					WW									
Divert - inland (Burbank Western Channel 1.8 mgd)					WW									
Divert - inland (Compton Creek 2.6 mgd)					WW		URP	URP		URP	URP		URP	URP
Divert - inland (Ballona Creek 3.3 mgd)					WW		URP	URP		URP	URP		URP	URP
Divert - inland (Sepulveda Channel 16 mgd)					WW									
Divert - inland (Dominguez Channel 16 mgd)					WW									
Percent of Dry Weather Runoff Managed (of watershed - 97 mgd)		10%	21%	21%	100%	10%	26%	42%	10%	26%	42%	10%	26%	42%
Wet Weather Urban Runoff														
Local/Neighborhood Solutions														
New/Redevelopment Areas - On-site treatment/discharge		X	X	X	X	X	X	X	X	X	X	X	X	X
New/Redevelopment Areas - On-site percolation		X	X	X	X	X	X	X	X	X	X	X	X	X
Retrofit Areas - Cisterns (On-site storage/use)														
Residential			X											
Schools			X					X			X			X
Government			X					X			X			X
On-site percolation (infiltration trenches/basins, reduce paving/hardscape)														
Residential			X											
Schools			X					X			X			X
Government			X					X			X			X
Commercial			X											
Rec/Cemetaries			X											
Neighborhood recharge														
Vacant Lots (East Valley) (Low/Medium/High)			Low	High			High	Med		High	Med		High	Med
Parks/Open Space (East Valley) (Low/Medium/High)			Low	High			High	Med		High	Med		High	Med
Abandoned Alleys (East Valley) (Low/Medium/High)			Low	High			High	Med		High	Med		High	Med
Regional Solutions														
Non-urban regional recharge			High					Med			Med			Med
Runoff treatment and beneficial use/discharge														
Treat and beneficial use/discharge (coastal area)		X	X	X	X	X	X	X	X	X	X	X	X	X
Treat and beneficial use/discharge (all areas)					X									
Percent of Representative storm (1/2-inch) managed (of citywide 1,700 mgd)		10%	58%	39%	100%	10%	39%	47%	10%	39%	47%	10%	39%	47%
Current/Anticipated Regulations Level of Compliance														
California Toxics Rule		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Current Total Maximum Daily Loads (TMDLs) - Bacteria (Santa Monica Bay), Trash		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Future Total Maximum Daily Loads (projection)		No	Partial	Partial	Yes	No	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial

Notes:

*Storage for daily (diurnal) peaks

[1]Flows indicated assume no smart irrigation. Implementing smart irrigation citywide would reduce total dry weather runoff estimates by ~11 mgd

[2]Effective Capacity is the total treatment capacity, minus solids and brine return flows to the sewer

[3]Includes new GBIS extension from NOS to GBIS.

[4]Runoff is treated and discharged. Runoff can potentially be treated and beneficially used if future demands are identified.

Definitions:

LCMR - Low Cost/Minimum Requirements: alternative includes lower cost solutions or low initial investment by meeting minimum requirements.

WR - High Beneficial Use of Water Resources: alternatives that include high levels of recycled water, conservation, and beneficial use of runoff.

HA - High Adaptability: alternatives that are most able to adjust to changing conditions, such as population, wastewater flows and regulations.

LR - Lower Risk: alternatives that are lower in risk from a regulatory perspective (LR1) or in terms of ease of implementation from a technical, environmental and/or political and public acceptance perspective (LR2).

Table 7-3
Alternative 1
Summary of Potential Additional Recycled Water

Plant	Level of Treatment	Area of Use	Use	Volume (acre-feet/yr)
Tillman	Advanced Treatment (MF/RO)	San Fernando Valley	Industrial and Irrigation	11,400
LAG	Title 22 w/ Nitrogen removal	Downtown	Industrial and Irrigation	5,400
Hyperion	Title 22[1]	Westside	Industrial and Irrigation	12,500
Terminal Island	Advanced Treatment (MF/RO)	Harbor	Industrial and Irrigation	9,400
Sub-Total (WW Only)	--	--	--	38,700
Urban Runoff Plants (Stormwater)	Title 22	Ballona and Compton Creeks	Industrial and Irrigation	3,300
Total Reused	--	--	--	42,000

Note:
[1]Assumed that secondary effluent from Hyperion would be delivered to West Basin for additional treatment before reuse

7.3.2 Alternative 2 (Tillman and LAG Water Reclamation Plant Expansion/ High Potential for Water Resources Projects)

The selected options for the water system in Alternative 2 (formerly Hyb2C) are such that they will work along with the wastewater system. The wastewater system for Alternative 2 includes expanding Tillman to 80 mgd with advanced treatment and expanding LAG to 30 mgd with advanced treatment as well as collection system improvements. Refer to *Volume 4: Alternatives Development and Analysis* for a detailed description of the components of each of the alternatives.

Stemming from the wastewater system improvements, water management options were selected and combined to create a complete alternative. The following is a summary of the recycled water options, which are included in Alternative 2:

- Meet the minimum Los Angeles River flow requirements by discharging an average of 27 mgd of reverse osmosis treated effluent.
- Use up to 49,900 acre-feet per year of recycled water above existing levels to serve irrigation and industrial demands in the San Fernando Valley, LAG, West Los Angeles, and Harbor areas.

Table 7-4 shows a breakdown of the potential amount of recycled water projected to be served annually from each treatment plant.

Table 7-4
Alternative 2
Summary of Potential Additional Recycled Water

Plant	Level of Treatment	Area of Use	Use	Volume (acre-feet/ yr)
Tillman	Advanced Treatment (MF/RO)	San Fernando Valley	Industrial and Irrigation	17,600
LAG	Title 22 w/ Nitrogen removal	Downtown	Industrial and Irrigation	10,400
Hyperion	Title 22[1]	Westside	Industrial and Irrigation	12,500
Terminal Island	Advanced Treatment (MF/RO)	Harbor	Industrial and Irrigation	9,400
Sub-Total (WW Only)	--	--	--	49,900
Urban Runoff Plants (Stormwater)	Title 22	Ballona and Compton Creeks	Industrial and Irrigation	3,300
Total Reused	--	--	--	53,200

Note:
[1]Assumed that secondary effluent from Hyperion would be delivered to West Basin for additional treatment before reuse

7.3.3 Alternative 3 (Tillman Water Reclamation Plant Expansion / Moderate Potential for Water Resources Projects)

The selected options for the water system in Alternative 3 (formerly Hyb3B) are such that they will work along with the wastewater system. The wastewater system for Alternative 3 includes expanding Tillman to 100 mgd with advanced treatment, and collection system improvements. Refer to *Volume 4: Alternatives Development and Analysis* for a detailed description of the components of each of the alternatives.

Stemming from the wastewater system improvements, water management options were selected and combined to create a complete alternative. The following is a summary of the recycled water options, which are included in Alternative 3:

- Meet the minimum Los Angeles River flow requirements by discharging an average of 27 mgd of reverse osmosis treated effluent.
- Use up to 40,100 acre-feet per year of recycled water above existing levels to serve irrigation and industrial demands in the San Fernando Valley, LAG, West Los Angeles, and Harbor areas.

Table 7-5 shows a breakdown of the potential amount of recycled water projected to be served annually from each treatment plant.

Table 7-5
Alternative 3
Summary of Potential Additional Recycled Water

Plant	Level of Treatment	Area of Use	Use	Volume (acre-feet/yr)
Tillman	Advanced Treatment (MF/RO)	San Fernando Valley	Industrial and Irrigation	20,800
LAG	Title 22 w/ Nitrogen removal	Downtown	Industrial and Irrigation	2,800
Hyperion	Title 22[1]	Westside	Industrial and Irrigation	12,500
Terminal Island	Advanced Treatment (MF/RO)	Harbor	Industrial and Irrigation	4,000
Sub-Total (WW Only)	--	--	--	40,100
Urban Runoff Plants (Stormwater)	Title 22	Ballona and Compton Creeks	Industrial and Irrigation	3,300
Total Reused	--	--	--	43,400

Note:
[1]Assumed that secondary effluent from Hyperion would be delivered to West Basin for additional treatment before reuse

7.3.4 Alternative 4 (Tillman Water Reclamation Plant Expansion / High Potential for Water Resources Projects)

The selected options for the water system in Alternative 4 (formerly Hyb3C) are such that they will work along with the wastewater system. The wastewater system for Alternative 4 includes expanding Tillman to 100 mgd with advanced treatment, and providing collection system improvements. Refer to *Volume 4: Alternatives Development and Analysis* for a detailed description of the components of each of the alternatives.

Stemming from the wastewater system improvements, water management options were selected and combined to create a complete alternative. The following is a summary of the recycled water options, which are included in Alternative 4:

- Meet the minimum Los Angeles River flow requirements by discharging an average of 27 mgd of reverse osmosis treated effluent.
- Use up to 52,800 acre-feet per year of recycled water above existing levels to serve irrigation and industrial demands in the San Fernando Valley, LAG, West Los Angeles, and Harbor areas.

Table 7-6 shows a breakdown of the potential amount of recycled water projected to be served annually from each treatment plant.

Table 7-6
Alternative 4
Summary of Potential Additional Recycled Water

Plant	Level of Treatment	Area of Use	Use	Volume (acre-feet/yr)
Tillman	Advanced Treatment (MF/RO)	San Fernando Valley	Industrial and Irrigation	25,500
LAG	Title 22 w/ Nitrogen removal	Downtown	Industrial and Irrigation	5,400
Hyperion	Title 22[1]	Westside	Industrial and Irrigation	12,500
Terminal Island	Advanced Treatment (MF/RO)	Harbor	Industrial and Irrigation	9,400
Sub-Total (WW Only)	--	--	--	52,800
Urban Runoff Plant (Stormwater)	Title 22	Ballona and Compton Creeks	Industrial and Irrigation	3,300
Total Reused	--	--	--	56,100

Note:
[1]Assumed that secondary effluent from Hyperion would be delivered to West Basin for additional treatment before reuse

7.3.5 Leadership Projects

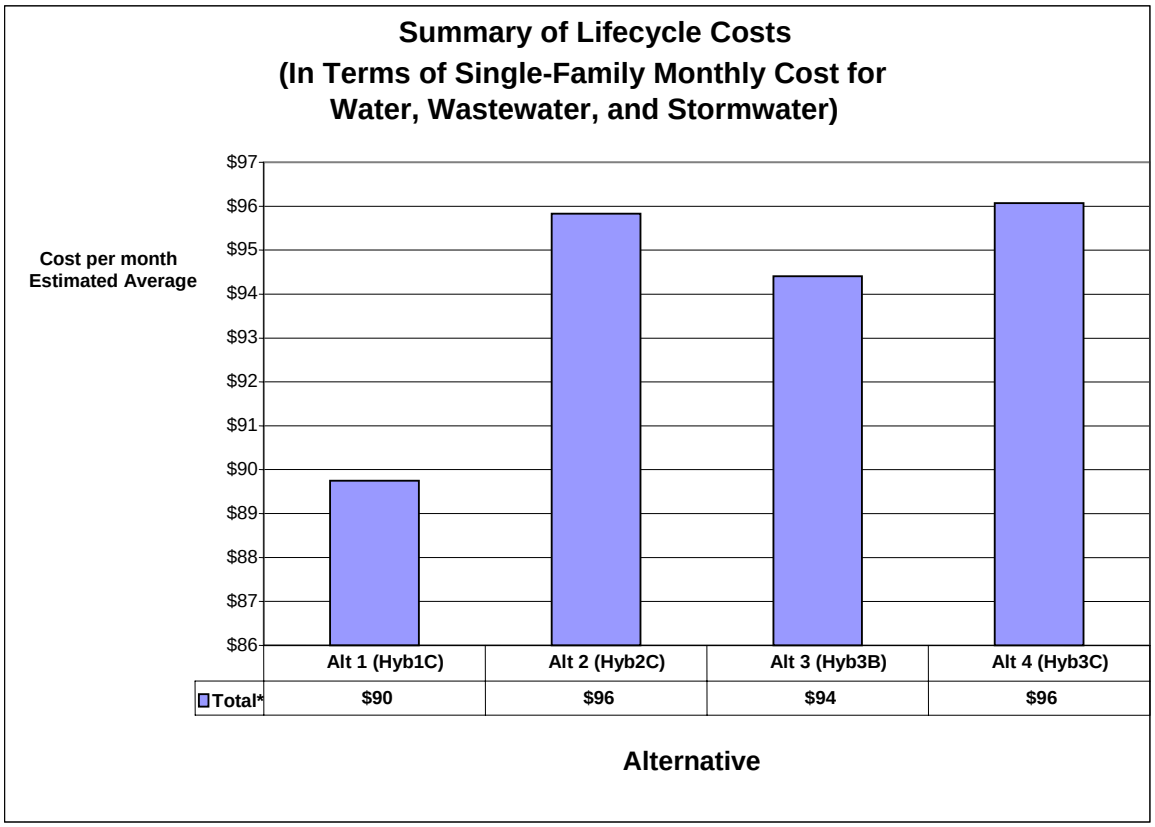
In addition to each of the options included in the alternatives, for each series of alternatives, leadership projects were identified where there was a need for further investigation on the technicalities, implementability, constraints, effectiveness, etc. of the option prior to full scale implementation. See *Volume 4: Alternatives Development and Analysis* for additional discussion on leadership projects.

7.3.6 Alternative Summary

Table 7-7 summarizes the components of each of the draft alternatives. Figure 7-2 shows the lifecycle costs for each of the recommended draft alternatives. See *Volume 4: Alternatives Development and Analysis* for detailed discussion of alternatives.

Table 7-7
Alternatives 1, 2, 3, and 4
Summary of Potential Additional Recycled Water Usage

Plant	Level of Treatment	Area of Use	Use	Volume (acre-ft/ yr)			
				Alt 1 (Hyb1C)	**Alt 2 (Hyb2C)**	**Alt 3 (Hyb3B)**	**Alt 4 (Hyb3C)**
Tillman	Advanced Treatment (MF/RO)	San Fernando Valley	Industrial and Irrigation	11,400	17,600	20,800	25,500
LAG	Title 22 w/ Nitrogen removal	Downtown	Industrial and Irrigation	5,400	10,400	2,800	5,400
Hyperion	Title 22[1]	Westside	Industrial and Irrigation	12,500	12,500	12,500	12,500
Terminal Island	Advanced Treatment (MF/RO)	Harbor	Industrial and Irrigation	9,400	9,400	4,000	9,400
Sub-Total (WW Only)	--	--	--	**38,700**	**49,900**	**40,100**	**52,800**
Urban Runoff Plants (Stormwater)	Title 22	Ballona and Compton Creeks	Industrial and Irrigation	3,300	3,300	3,300	3,300
Total Reused	**--**	**--**	**--**	**42,000**	**53,200**	**43,400**	**56,100**



Benefits

	Alt 1 (Hyb1C)	Alt 2 (Hyb2C)	Alt3 (Hyb3B)	Alt4 (Hyb3C)
Potable Demand Reduction through conservation	109,800	109,800	109,800	109,800
Additional Recycled Water Usage (AF/yr)	38,700	49,900	40,100	52,800
DWUR Managed (% of watershed - 97 mgd)	42%	42%	26%	42%
WWUR Managed (% of citywide 1,700 mgd)	49%	49%	40%	49%
DWUR and WWUR Beneficially Used (AF/yr)	37,700	37,700	32,500	37,700
Positive Impacts on Public Lands (acres)	353	353	580	353

*Totals do not include leadership projects

Acronyms
DWUR- Dry Weather Urban Runoff
WWUR-Wet Weather Urban Runoff
AF/ yr- Acre-feet per year
MGD- Million gallons per day
LAG-Los Angeles-Glendale

Figure 7-2
Summary of Lifecycle Costs

7.4 Summary

Through working with the Steering Group, various City departments and staff, the IRP has taken numerous water, wastewater and runoff options and created comprehensive alternatives. The preliminary alternatives were evaluated and improved upon to create the hybrid alternatives, and the hybrid alternatives were then evaluated to determine the best, or recommended draft alternatives. From this, the environmental analysis will be conducted on each of these four alternatives to determine the final alternative that will be implemented by the City. Implementation of the recommended alternative will depend on available funding and support. The components of this alternative will be fine tuned through the implementation of leadership projects that will better define which pieces work and which need to be improved upon prior to full scale implementation. The details of the final alternative and the CIP can be found in *Volume 5: Adaptive Capital Improvement Program*. Volume 5 will be finalized in 2006.

References

Ash, T., Bamezai, A. Western Policy Research., Berg, J. Municipal Water District of Orange County., Hunt, T. & Lessick D., Irvine Ranch Water District, Marian, M. Network Services, Inc., Pagano, D. d.d. Pagano, Inc., & Wiedmann, J. Metropolitan Water District of Southern California. 2001. *Residential Weather-Based Irrigation Scheduling: Evidence from the Irvine "ET Controller" Study.*

California Environmental Protection Agency. 2002. *303d list of the Clean Water Act.* http://www.swrcb.ca.gov/tmdl/

California Urban Water Management Planning Act. 2002, http://www.owue.water.ca.gov/urbanplan/faq/faq.cfm.

Camp Dresser and McKee Inc. and CH2M Hill. 2001. *Integrated Plan for the Wastewater Program.*

_____. 2001. *Integrated Plan for the Wastewater Program (IPWP), Stormwater Quality Management.* Los Angeles, California: City of Los Angeles. Technical memorandum prepared for the City of Los Angeles, Department of Public Works, Bureau of Sanitation, Wastewater Engineering Service Division.

_____. 2001. *Summary of the Steering Group Process and their Steering Group Recommendations for Integrated Resources Planning Policy Development*.

CH:CDM (CH2MHill and Camp Dresser and McKee Inc, a joint effort). 2003. *Regulatory Forecast Technical Memorandum*.

_____. 2004. *Integrated Resources Plan, Facilities Plan, Volume 1: Wastewater Management.*

_____. 2004. *Integrated Resources Plan, Facilities Plan, Volume 3: Runoff Management.*

_____. 2004. *Integrated Resources Plan, Facilities Plan, Volume 4: Alternatives Development and Analysis.*

City of Los Angeles. 1982. *City of Los Angeles, Wastewater Facilities Plan*. Los Angeles, California: Report prepared for the City of Los Angeles, Department of Pubic Works, Bureau of Engineering Services Division.

_____. 1991. *Wastewater Facilities Plan Update.* Los Angeles, California: Report prepared for the City of Los Angeles, Department of Pubic Works, Bureau of Engineering Services Division.

_____. 1995. *Donald C. Tillman Water Reclamation Plant Brochure.* Los Angeles, California: City of Los Angeles.

_____. 1998. *Hyperion Treatment Plant Brochure.* Los Angeles, California: City of Los Angeles.

_____. 1999. *Los Angeles-Glendale Water Reclamation Plant Brochure.* Los Angeles, California: City of Los Angeles.

_____. 2002. Watershed Protection Division data at http://www.lacity.org/SAN/wpd/index.htm.

_____. 2002. *Monthly Performance Report for HTP, TITP, DCTWRP, LAGWRP.* Los Angeles, California: City of Los Angeles. Reports prepared for City of Los Angeles, Department of Public Works Bureau of Sanitation.

City of Los Angeles, Bureau of Engineering. 2002. *City of Los Angeles Bureau of Engineering GIS database.*

City of Los Angeles, Department of Water and Power. 1995. *Urban Water Management Plan.*

_____. 2000. *Urban Water Management Plan.*

_____. 2001. *Urban Water Management Plan Fiscal Year.*

_____. *2002-03 Annual Update.* 2002. Recycling Group Data at http://www.ladwp.com/ladwp/homepage.jsp.

_____. 2004. *Evapotranspiration Controller Study.*

City of Los Angeles, Department of Water and Power and Bureau of Sanitation. 2002. *Development Best Management Practices Handboo*k.

City of Los Angeles, Watershed Protection Division. 2002. updated regularly, snapshot. *City of Los Angeles Watershed Protection Division GIS Database, Arc View 3.2.*

County of Los Angeles. 2002. *County of Los Angeles Flow Meters F319-R & 38 C metered flow data.*

County of Los Angeles Public Works Department. 2002. website at: http://www.ladpw.com/ and http://dpw.co.la.ca.us/wmd/npdes/.

Gackstetter, T. 2003. City of Los Angeles Department of Water and Power. *City of Los Angeles Update Urban Water Management Plan.*

Metropolitan Water District of Southern California. 1993. *Integrated Resources Plan.*

_____. 2003. *Report on Metropolitan Water Supplies.*

Ott, Steve, City of Los Angeles, Department of Water and Power. 2000 - 2002. *DWP Historical Water Demand and Population.*

Southern California Association of Governments (SCAG). 1998. *Regional Transportation Plan.* Report prepared for the Southern California Association of Governments.

_____. 2001. SCAG Geographical Information Systems (GIS) database.

_____. 2002. *Regional Transportation Plan.* Report prepared for the Southern California Association of Governments.

State Water Resources Control Board. 1993. *California Stormwater Best Management Practices Handbook – Industrial/ Commercial.*

United States EPA (Environmental Protection Agency). 2002. Rules and Regulations 40CRF, Section 35.917, Section 201. *Clean Water Act.*

Appendix A
Regulatory Forecast

Technical Memorandum:
Regulatory Forecast

To: *Chuck Turhollow, City of Los Angeles, Bureau of Sanitation*
Project Manager, Los Angeles Integrated Resources Plan

From: *Paul Gustafson, CH:CDM*
Project Manager

Michele Plá, CH:CDM
Regulatory Expert, Facilities Planning Team

Date: *May 15, 2003*

Abstract:

This technical memorandum identifies and summarizes the priority regulations and key policy issues that the City of Los Angeles must address in developing forward planning strategies. The memorandum will: (1) discuss the process of updating the regulatory forecast and the criteria for identifying priority regulations and key policy issues; (2) present the updated regulatory forecast; and (3) provide a summary of the key policy issues. Following this memorandum, sessions will be conducted with the City and the consultant team to develop appropriate environmental goals to meet the forecast.

Introduction and Purpose

Understanding the regulatory forecast and developing appropriate environmental quality goals are essential steps in the facilities planning process. For the Integrated Resources Plan (IRP), the overall approach the facilities planning team used to develop the forecast and associated goals is as follows:

- Update the forecast tables generated in Phase I [Integrated Plan for the Wastewater Program (IPWP)], and expand to include anticipated schedule.
- Interview senior staff to update "key policy issues".
- Prepare technical memorandum summarizing the anticipated regulatory forecast.
- Conduct sessions with City and consultant team to develop appropriate environmental goals to meet the forecast.

The purpose of this memorandum is to summarize the anticipated regulatory forecast and identify key policy issues. The resulting environmental goals will be discussed in a separate document.

Updated Forecast Tables

In the IPWP, regulations and policies affecting the wastewater and stormwater programs were summarized in two documents: "Pertinent Regulatory Requirements and Key Policy Issues Technical Memorandum" (April 2000) and the "Stormwater Quality Management Technical Memorandum" (April 2001).

The priority regulations and key policy issues for stormwater, pretreatment; collection system management; wastewater treatment and operations; water recycling; air quality; biosolids management; and construction were summarized using four categories:

- ***Current policies and regulations:*** those which are in place and are part of a permit, order, or other enforceable tool.
- ***Emerging policies and regulations***: those which are adopted, but not yet included in a permit, order or other enforceable tool.
- ***Proposed policies and regulations***: those which are in various development stages, but not yet adopted.
- "***Crystal Ball" policies and regulations:*** issues that have the potential of becoming proposed, emerging or current in the future. In developing these stages, and in applying them to specific regulations, the staff and consultants based their opinions on experience, communication within industry and regulatory agency leaders, and understanding of the regulatory environment in which the City's programs operate.

Because the IPWP documents were generated almost 2 years ago, the first step was to update the tables to:

- Identify if any of the requirements or policies or their phasing have been changed or eliminated (e.g., have we seen changes from proposed to current, do we have new crystal ball regulations)
- Test if the criteria for what is considered a key issue has changed in any way
- Identify to what extent the schedule for these key policy issues (when we expect them to truly impact the City's programs) has changed.

In addition, a similar table was generated for constructed wetlands.

The first step in this update was a review with the City of Los Angeles Bureau of Sanitation Regulatory Affairs Division staff of the complete list of tables that were prepared in the two Phase I documents. This review resulted in a number of deletions and additions of regulations, as well as many changes of the phase of the regulations. Not surprisingly, many regulations or policies that were proposed are now in the emerging phase, and some that were emerging a few years ago are now current.

The next step was to interview managers and key senior staff at the Bureau of Sanitation, Department of Water and Power, and the City Attorney's Office to discuss the revised forecast tables and get their feedback on what the resulting key policy issues are. The list of staff that have contributed to this effort is in Attachment A.

From information generated in those two steps, the regulatory forecast tables could be updated. Attachment B includes Tables B1 through B12, which summarize the updated regulatory forecast in the following order:

- Pretreatment (Table B1)
- Wastewater Collection System Management (Table B2)
- Wastewater Treatment and Operations – Donald C. Tillman Water Reclamation Plant (Table B3)
- Wastewater Treatment and Operations – LA-Glendale Water Reclamation Plant (Table B4)
- Wastewater Treatment and Operations – Hyperion Treatment Plant (Table B5)
- Wastewater Treatment and Operations – Terminal Island Treatment Plant (Table B6)
- Water Recycling (Table B7)
- Air Quality (Table B8)
- Biosolids Management (Table B9)
- Stormwater Runoff Management (Table B10)
- Construction Permits (Table B11)
- Constructed Wetlands (Table B12)

There are links and relationships between these priority regulations and key policy issues and those relationships are discussed below. This information is valuable to guide the development of environmental goals, which in turn, will play a major role in the alternative

analyses for the IRP Facilities Plan, which includes wastewater, stormwater runoff, and water recycling facilities.

Identifying Priority Issues

As shown in the regulatory forecast tables in Attachment B, there are many potential regulatory and/or policy issues that could affect the City. To allow for effective facilities planning, the IRP must focus on developing options/management approaches to address those issues considered a priority. During Phase I, a set of criteria was developed to help identify and focus on the priority issues. Consequently, in viewing the breath and scope of the regulations that impact the City and that must be accounted for in developing a Facility Plan, the criteria originally developed during Phase I have been applied using the collective judgment and expertise of the staff interviewed (the City, County, and Regional Water Quality Control Board) and the consultant team. In each case, the intention has been to highlight the regulation or policy so that it is accounted for and considered in the course of developing alternatives for the IRP.

Criteria

To determine what regulatory issues in the forecast should be considered a priority, the IRP team developed the following criteria:

- Requires extraordinary resources to resolve
- Could cause damage to the City's prestige or reputation
- Requires a fundamental shift in how the program operates
- Requires legal action

Requires Extraordinary Resources to Resolve

This category is defined as a regulation or policy that would require:

- Money that has not been budgeted or cannot be easily absorbed in the annual operating or capital budget, thus requiring raising funds; or
- The use of funds that were planned for other essential items, thus changing the priorities of the program and either delaying other essential work or requiring a rate increase in order to do all essential work; or
- Significant amounts of money, without having a measurable environmental benefit; or

- An extraordinary level of effort in organizing community or political opinion/action (consultants, lobbyists, public information effort, time spent on this issue rather than other issues).

Could Cause Damage to Prestige or Reputation of the Agency

This category is defined as a regulation or policy that:

- Has strong public appeal; or
- Is of central concern to interest groups and could result in citizen lawsuits, and negative publicity; or
- Has strong political support and is high priority for the United States Environmental Protection Agency (EPA), the President, the Governor, legislatures, or elected officials so that regulators will pay very close attention to its implementation; or
- Is the subject of a national or state enforcement policy; or
- If not responded to can result in consistent and continued negative publicity for the program and the City; or
- Requires local, regional, or national leadership to resolve; or
- Would have negative economic impacts on the City or the region.

Requires a Fundamental Shift in How the Program Operates

This category is defined as a regulation or policy that would require:

- A new approach for the program or taking on new responsibility that has not previously been contemplated; or
- A different or new organization or alliance in order to be resolved; or
- New or different managerial, financial, or operational arrangements.

Requires Legal Action

This category is defined as a regulation or policy that:

- Would require new or different contract conditions or agreements; or
- Could result in a lawsuit; or
- Would require the City to obtain new legal or regulatory authority.

Summary of Priority Issues

As a result of the review of the above criteria and the interviews, the original list of priority regulations and key policy issues was modified and updated. Again, although there are many key regulations, a subset of these key regulations and issues was felt to warrant special attention in the near-term. In developing the associated environmental goals for the wastewater and runoff programs, the technical teams will use these priority issues.

The full list of priority regulations and key policy issues is presented in Table 1. Each of these is then discussed in greater detail. The full set of updated priority regulations and key policy issues is presented in Attachment B.

Table 1
Priority Regulations and Key Policy Issues

Priority Issues	Program	Revised Phase of Program	Timing of Issue
Beneficial use designations for all water bodies and narrative standards in the Basin Plan	Wastewater	Current	As National Pollutant Discharge Elimination System (NPDES) Permits are Renewed
Clean Water Act 303(d) listings for all water bodies (including urban lakes)	Wastewater, Runoff	Current/ Proposed	Every 4 Years
Total Maximum Daily Load (TMDL) Development - Draft Strategy for Developing TMDLs and Attaining Water Quality Standards in the Los Angeles Region	Wastewater, Runoff	Current and Proposed	Per Consent Decree – with a proposal to bundle different pollutant TMDLs for the same watershed
Clean Water Enforcement and Pollution Prevention Act of 1999, as amended in 2000 by SB2165	Wastewater	Current	Current and ongoing for all effluent limits in NPDES permits unless Time Schedule Order (TSO) in place
California Toxics Rule and the State Implementation Plan for the Inland Surfaces Waters and the Enclosed Bays and Estuaries of California	Wastewater	Emerging	As NPDES Permits are Renewed
Local County Ordinances on land application of Biosolids – Must be Class A/May have even stricter restrictions on quality and application—Exceptional Quality	Biosolids	Emerging/ Crystal Ball	1-10 years
Prohibition of bypass of the headworks for sanitary sewage and promulgation of Sanitary Sewer Overflow regulation for management of sanitary collection systems	Collection System Management	Current and Proposed	New Regulation ~18 months
Sanitary System Management Plans in NPDES Permits	Collection System Management	Emerging	As NPDES Permits are Renewed
Enforcement of Pretreatment requirements and standards on satellite systems	Wastewater	Proposed	As NPDES Permits are Renewed
Groundwater Recharge, action levels, requirements and public health goals for nitrogen and TOC; new pollutants, endocrine disrupters and pharmaceutically active chemicals	DWP, Wastewater and Runoff Management	Proposed/ Crystal Ball	With Adoption of SSO Rule early in 2005
VOCs & Ammonia from Biosolids Composting Facilities (Rule 1133) consistent with AB 1450	Wastewater	Current	1-5 years
Odor as a result of VOCs & H2S from treatment plants and collection systems General Order # 034 from AQMD and potential for requirements from LARWQCB in NPDES permits	Wastewater and Collection System Management	Current/ Crystal Ball	2-20 years
Numerical Water Quality Standards for stormwater; as a result of TMDL development or across the board in the NPDES permit for all priority and toxic pollutants	Runoff and Watershed Management	Emerging per TMDLs; Crystal Ball for all stormwater permits	2 years for emerging 10-20 years for crystal ball

Beneficial Use Designations of Waters

The use designations for the Los Angeles River, Los Angeles Harbor, and Pacific Ocean beaches directly affect both current and future discharges from the treatment plants and the acceptable flow and quality of the runoff. Currently, the beneficial use designations for the Los Angeles River depend on the location and the access to the River. Uses include:

- REC-1 – Water contact recreation involving body contact with the water, as a potential and intermittent use depending on the location and access to the river;
- REC-2 – Non water contact recreation, in some area it is intermittent;
- WARM, COLD, – supports warm and cold water ecosystems such as fish, invertebrates and vegetation, existing, potential and intermittent depending on location;
- WILD – support terrestrial ecosystems and habitats for such as mammals, birds, reptiles and amphibians and invertebrates, existing, potential and intermittent depending on location;
- GRW – uses of water for natural or artificial recharge, existing, potential and intermittent depending on location;
- RARE – uses of water that support habitats necessary for rare, threatened or endangered plants or animals, existing in a few locations;
- SPW – uses of water that support high quality aquatic habitat for reproduction and early development of fish, existing in few locations in upper reaches of watershed in creeks;
- WET – support wetland ecosystems, including providing flood and erosion control and stream bank stabilization and purification of naturally occurring contaminants, existing in a few locations;
- MUN – uses for water supply, not limited to drinking water, potential on most reaches of the water and existing in a few.

The beneficial use designations for the Los Angles Harbor are:

- IND – industrial activities that do not depend primarily on water quality, existing use for Marines and Inner Areas of the Harbor;
- NAV – for shipping by private, military or commercial vessels, existing for all area of the Harbor;
- REC 1; REC 2, - as stated above – existing for all areas of the Harbor;

- COMM – commercial and sport fishing including those intended for human consumption or bait, existing for all areas of the Harbor;
- MAR – support marine ecosystems including vegetation, kelp, fish and shellfish or wildlife, existing for all areas of the Harbor;
- RARE – existing for all area of the Harbor;
- SPWN – potential for public beach areas of the Harbor;
- SHELL – potential for all areas of the Harbor except public beaches where it is listed as existing.

The beneficial use designations for the Pacific Ocean beaches are primarily REC 1 and REC 2. In addition, NAV, COMM, MAR, WILD and RARE and SHELL are existing uses in most of the beach locations in Los Angeles County.

These designations have profound impacts; they not only directly define the effluent limits, but they will also determine the impairments of the water bodies and, thereby, the Total Maximum Daily Load (TMDL) analyses. This issue also affects future enforcement and the potential future treatment needs and consequently, resource requirements.

Clean Water Act 303(d) Listings for All Water Bodies (Including Urban Lakes)

Section 303(d) of the Clean Water Act requires the States to list water bodies that do not meet the beneficial uses, and where the application of the technology requirement will not remove the impairment. The beneficial use designations are the starting point. Most beneficial uses were designated in the 1970s or earlier. If the use existed in November 1975, it cannot be changed without a full analysis of the attainability of that use. The 303(d) listings of impaired waters for the Los Angeles River, Los Angeles Harbor and Santa Monica Bay; and soon, the urban lakes indicates where the uses are not met, based on water quality violations or other determinations. The 303(d) list also determines the potential source of the impairment and the high, medium or low priority of the impairment. The listings lead to the development and adoption of TMDL allocations, then to subsequent basin plan amendments and finally to new discharge permit requirements. This entire process is the major driver in the water quality program across the country. In Los Angeles it may result in far-reaching technology and management solutions to address the eventual permit standards to remove impairments and attain and maintain beneficial uses.

It is important to remember that the 1998 303(d) list is not the only concern in the TMDL program. It is true that many of the listings from 1998 are included in a Consent Decree, which contains a schedule for completion of the TMDLs (see below). However, 303(d) listings in 2003 and beyond (likely every 4 years) will carry schedules for completion of the TMDLs. Although EPA has yet to approve the final State 2003 list, it does contain some de-listings for

Ballona Creek, Marina Del Rey, Los Angeles Harbor, Los Angeles River in Sepulveda Basin, and Los Angeles River Estuary; new listings for Los Angeles City Lakes such as Lake Lindero, Ballona Wetland Watershed, reaches of the Los Angeles River, and Marina Del Rey. A new category on the list is called "watch." This means that there is evidence that there are impairments, but it is not conclusive. Ballona Wetlands Watershed, Los Angeles Harbor, Los Angeles River Estuary, and Dominguez Channel are included on the "watch" list.

TMDL Development

In December 2002, the RWQCB, the SWRCB and EPA Region 9 jointly proposed a Strategy for Developing TMDLs and Attaining Water Quality Standards in the Los Angeles Region. The purpose of this strategy is to clarify when and how TMDLs will be developed over the next 10 years and how they will be coordinated with review of water quality standards and permit renewals. The strategy bundles the pollutant-specific TMDLs that are required in the Consent Decree by watershed so that there is a more efficient watershed/ecosystem approach to the TMDLs. The strategy opens the door to water quality standards revisions, which could be the result of use attainability type of studies or subclassification or refinement of uses.

The strategy also states that TMDL decisions will include guidelines describing how to implement the TMDLs through NPDES permits. Specifically, the strategy states that numerical waste load allocations that lead to numerical effluent limits will be expected for traditional point sources such as wastewater treatment plants. For wastewater NPDES permits, it is anticipated that TMDLs will have specific waste load allocations for individual treatment facilities. In the case of stormwater NPDES permits, the waste load allocation will likely be grouped under one or more general waste load allocations. This has already been demonstrated in the Santa Monica Bay TMDL for Bacteria. It has been assumed that all TMDLs must be adopted in Basin Plans prior to being implemented in NPDES permits. The strategy proposes that if a TMDL can be achieved in a single permitting action, a Basin Plan amendment may not be required.

The strategy also establishes a process by which stakeholder groups can lead the development of these watershed TMDLs and identifies opportunities for varying levels of stakeholder involvement in the TMDL process.

The strategy is clearly considered "proposed" at this time. The intention is that when the strategy becomes final it will be included in the SWRCB's Continuing Planning Process, which EPA is asking all states to reinvigorate and use as part of the TMDL listing process.

California Toxics Rule

The 1987 amendments, section 303(c)(2)(b), to the Clean Water Act required that toxic pollutants be regulated to protect the water quality and beneficial uses of the nation's waters. Across most of the country, the National Toxics Rule is in effect. However, in California, as a result of lawsuits and other issues between the State and the EPA, the California Toxics Rule (CTR) was promulgated in May 2000. The Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (the State Implementation Plan or the SIP) was adopted with the CTR. The CTR and the SIP, which includes the implementation approach to applying toxic pollutant objectives for discharge permits, are expected to result in new and considerably more stringent effluent discharges standards for all NPDES permits. In general, these new standards will be extremely difficult to meet on a consistent basis without new and more extensive treatment or source control programs; such commitments would go well beyond any requirements that are implemented in the United States today. Where new water quality standards are not met, such as standards to protect human health through water quality limits for water bodies with beneficial uses for fishing and shellfish consumption, there is a potential for new 303(d) listings of impairments. As stated above, 303(d) listings lead to TMDLs which can lead to requirements for more treatment, or source control.

Land Application of Biosolids

In October 1999, the Board of Supervisors in Kern County passed an ordinance that banned land application of non – exceptional quality (EQ) biosolids by January 1, 2003. The Southern California Alliance of POTWs (Publicly Owned Treatment Works) (SCAP) and several major POTWs in Southern California tried to work with Kern County to assist with development of the ordinance that addresses the need for local control and oversight of biosolids land application in a logical manner. This effort has been largely unsuccessful. Controversial provisions include: expensive road impact fee, soil sampling every 40 acres, dioxin concentrations must be below 10 parts per billion (ppb), no Class B application after January 2003, 10 mile per hour (mph) wind limit for spreading, etc. EQ biosolids products are exempt from the provisions of the ordinance. The City of Los Angeles and other SCAP members have participated in lawsuits contending that the County is overreaching it jurisdiction, especially in regards to the California Environmental Quality Act (CEQA) by restricting interstate commerce by placing a road impact fee for biosolids trucks only and other issues. The Superior Court in Tulare County ruled in favor of Kern County on every count. The County has developed a new ordinance that limits the amount of biosolids of any quality on land due to potential impacts on the groundwater resources. This too is being contested by the City.

In the meantime, in King County, an ordinance that bans Class B biosolids in February 2003 was adopted pending completion of CEQA documentation. The ordinance allows for the use of EQ biosolids until February 2006, thereafter only EQ Biosolids in compost form will be allowed. A lawsuit was filed against the ordinance. The court ruled in favor of King County and the ordinance despite appeals by the Orange County Sanitation District (OCSD). The

OCSD request for extended time on their permit was denied. The court decision on the adequacy of the CEQA compliance document was appealed. Orange County filed an appeal on the Board of Supervisors decision to not extend their use of Class B biosolids land application. This appeal was denied.

In Riverside County an ordinance banning the land application of Class B bisolids was adopted in November 2001, and there are questions as to whether Class A will be acceptable without large buffer zones so as not to be objectionable to neighbors.

As a result of these developments in Kern, Kings and Riverside Counties, the land application of biosolids and the related regulatory issues are considered a priority key issue because the alternatives to the land application of biosolids are extremely expensive and limited in number. The City has already extensively invested in Class A technology and land application sites. However, continued restrictions would inevitably demand more treatment, research and development or more distant land application sites. The issues related to biosolids reuse and/or disposal will likely have profound impacts on the technology and management solutions as well as locations of disposal and reuse.

Prohibition of Sanitary Sewer Overflows

With over 6,500 miles of sanitary sewers in its system, and because of the prohibition against bypassing any treatment plants, the potential for a sewer spill or overflow (a permit violation) is significant; consequently, the bypass prohibition is a key priority issue. It should be noted that mandatory enforcement under Senate Bill 709 does not apply to these spills and overflows because they are not effluent limit violations and because they occur in the collection system rather than at the treatment plant. In addition to current prohibition of overflows, proposed regulations for sanitary sewer systems will have a profound impact on collection system management and capacity determinations. The City has already implemented the Capacity, Management, Operations and Maintenance (CMOMs) requirements. However, under a proposed Sanitary Sewer Overflow (SSO) Rule, these requirements would now be in the NPDES permit and under regulatory scrutiny, especially the capacity requirements. The City may need to review and revise the subcontract agreements with the 27 entities that are satellite systems to gain assurance that SSOs are not caused by the lack of CMOMs program in the satellite systems. The following two issues are also related to this priority key issue.

Sanitary System Management Plans

A requirement for Sanitary System Management Plans could be included in future NPDES permits in the absence of a final national SSO Rule. In Orange County, California, the permit has included essentially a CMOM program called the Sanitary System Management Plan as a direct result and concern of the Beach Closures that have been occurring there. It is possible that the Los Angeles Regional Water Quality Control Board (LARWQCB) will add this plan to the City's Hyperion Treatment Plant NPDES permit as soon as it comes up for renewal. This

is considered a priority key issue because it is likely that such regulation will occur even without a national SSO Rule.

Pretreatment Program Enforcement

The state has begun to question why pretreatment programs implemented by the contract agencies (satellite system) are not enforced through the Bureau of Sanitation. Although this is beyond what is contemplated in the draft SSO Rule, this could lead to major new contractual requirements or resources and enforcement requirements for the Bureau of Sanitation.

Overall, regarding the above three issues, the prohibition of SSO and the implementation of new SSO requirements will lead to the need to consider even more storage and treatment for wet weather flows in the sanitary system, both of which will be important technology and cost issues for the Facilities Plan.

Groundwater Recharge

Groundwater recharge is a primary option for both supplementing water supply and for management of effluent and runoff. The political reluctance to support the East Valley Reclamation Project, and the draft groundwater recharge regulations from the Department of Health Services (DOHS) has caused this issue to become an extremely high priority. It appears that the DOHS and the LARWQCB are concerned about new toxic chemicals, total organic carbon (TOC) and nitrogen, endocrine disruptors, boron, N-nitrosodimethylamine (NDMA), and pharmaceutically active chemicals. The attempts to include public health goals and action levels in permits (which would require monitoring for these constituents) have the flavor of regulation and raise public doubt about the safety of groundwater recharge of recycled water. (This is currently the issue on the Dominguez Gap Salt Water Barrier permit for the Terminal Island Treatment Plant effluent).

One of the guiding principles for the IRP is to maximize the use of recycled water. Currently, it is becoming increasingly difficult and time-consuming to permit well injection or surface spreading of recycled water if there is indication that the groundwater is, or will become a potable water supply. This means that options for expanding and maximizing industrial and irrigation uses for recycled water will be necessary if the water recycling program is to grow to meet the guiding principle objectives.

It appears that continued percolation or even injection of stormwater runoff will not be a problem in the short run. Blending of recycled effluent with runoff for spreading or injection will be subject to scrutiny and may require a higher level of treatment [microfiltration, reverse osmosis (RO), and ultraviolet disinfection (UV)] in addition to extensive monitoring.

Odor and Air Quality Concerns

Odor concerns are traditionally related to wastewater collection and treatment facilities. But, the Air Quality Management District's (AQMD) new VOC and ammonia rule (Rule 1133) could affect other facilities, such as the composting facility at Griffith Park. The AQMD

adopted Rule 1133 on January 10, 2003. The rule regulates biosolids composting, requiring enclosure of the active composting and venting of emissions from both the active composting and the curing and storage operations to a control device such as a biofilter. The rule also requires an 80% reduction in VOC emissions.

Existing operations must phase in controls over the next few years. Existing facilities such as the one at Griffith Park must submit an emissions control plan that will demonstrate compliance with emission reductions as stipulated by the new rule. New facilities will be required to have these controls in place at the onset of operations beginning in 2007.

In response to the AQMD's recent rulemaking effort, SCAP undertook a study of VOC and odorous emissions from biosolids composting operations through each phase of the process. Emissions tests were carried out at specially-created aerated static piles at the Griffith Park facility. The study concluded that the emissions from composting operations depend greatly on the mixing of the pile and other operational parameters.

Regulation of VOCs and H_2S concerns at treatment plants are part of current air quality regulatory schemes. Recently, the Region 2 RWQCB put specific odor control requirements in the San Francisco NPDES permit for the Southeast Water Pollution Control Plant. This brings the air quality regulation beyond a nuisance issue of odor, to a discharge permit issue. Further application of air quality or nuisance regulations to the collection system is possible, especially under a CMOM scenario. Control of collection system odor and air quality emissions may require significant technology and management options in order to address and control these odors.

Odor control impacts all aspects of the reputation and credibility of the collection, treatment and disposal systems and the owner organization. As the IRP is developed, the impacts of odor on the public and sensitive receptors must be considered in order to protect and enhance the long-term credibility and reputation of the City.

Numerical Water Quality Standards for Stormwater Runoff Management

Based on current interpretation of the stormwater section of the Clean Water Act and the implementing regulations, best management practices (BMPs) based on reducing the discharge pollutants to the maximum extent practicable (MEP) is how the water bodies of the nation are protected from pollution due to stormwater runoff during wet weather. However, under the scenario of an impaired water body on the 303(d) list, (or an impaired use of the water body) for which the main source is stormwater runoff, the result may be numerical water quality standards for a wet weather stormwater runoff management permit. In the case of the Santa Monica Bay Bacteria TMDL, there is a proposed numerical standard for the quality of the wet weather stormwater runoff. This scenario may not apply for every TMDL for which stormwater is a major source of the impairment, but it is a possible outcome.

There is a potential that the broad application of best management practices and MEP for the non-TMDL related (wet weather) stormwater runoff management will be removed as a result of a lawsuit. Each year, lawsuits are filed by environmental activists against the EPA and state permitting agencies throughout the nation. These are similar in that they contend that numerical water quality standards are required, under the Clean Water Act, for all NPDES discharges. Thus far, judges have not ruled that all stormwater permits must contain numerical water quality standards, but it is possible that such an interpretation could be made. Such a judgment would have profound and far-reaching consequences for the City of Los Angeles and for the technology and management choices under the IRP.

Management Issues That Lead to Additional Regulatory Concerns

There are two major management issues, which are part of the IRP Guiding Principles, which will lead to future additional regulatory concerns. Although strictly speaking these are not regulations themselves, decisions in the facilities plan on how to accommodate these management issues could lead to future regulatory concerns.

Brine Treatment and Disposal

As mentioned in this memorandum and others on the subject of the Clean Water Act, the basis of the water quality program is the beneficial uses of designated water bodies. From that designation and the objectives for protecting the uses derives all the water quality standards, NPDES requirements and prohibitions and the listing of impaired waters. As a result of these regulations and requirements it is becoming more and more difficult to discharge to inland surface waters where dilution is not available. Consequently, both the wastewater and the stormwater programs plan to consider water recycling and stormwater recycling as alternatives to waste discharge in the future. As mentioned above however, the DOHS standards for groundwater recharge and recycled water use, may lead to management options that do two things: 1) require a higher level of treatment with an associated brine that contains not only salt but concentrated levels of toxic pollutants, and 2) recycled water facilities located upstream in the wastewater and stormwater collection system so that traditional methods of brine disposal in the ocean, bay or harbors is not as cost effective. Therefore, it can be anticipated, that there will be future regulatory concerns about brine, what it contains, where it can be discharged and if there are any environmental impacts or water quality impacts to alternative brine discharge. In the previous technical analyses of regulations, continued brine discharge into the Los Angeles Harbor is mentioned as potentially being disallowed in the future due to section 303(d) listings for the Harbor. The priority key issue for the future is whether brine can be treated or reused or recycled, and if not, what are the feasible disposal options for the brine.

Los Angeles River Redevelopment

A watershed approach, as a management option for the Los Angeles River is currently proposed to address environmental, water quality and quality of life and economic development issues for the City. A major emphasis of this management approach would likely be the restoration of the River ecosystem while simultaneously providing flood control and water quality improvements. These challenges will be especially difficult considering the TMDL numeric wasteload allocations and the Federal Emergency Management Agency (FEMA) requirements, both of which will likely be very precise. A watershed and ecosystem approach could lead to additional regulatory standards and requirements that would inevitably have financial ramifications and could require changes in the way that wastewater treatment plants operate or whether additional or alternative treatment is desired. For example, wetlands may be constructed which would require a specific flow during dry weather, would require a specific water quality and which would prevent or restrict the amount of recycled water development. Additionally, new wetlands can lead to new designations of the river, with new beneficial uses (or better defined uses), which need to be protected via higher levels of water quality or quantity. Although these are only examples, and ones that are not fully understood, the point is that management options can lead to application of water quality regulations beyond what is now contemplated. In the course of developing options for the IRP specifically designed to address the current, emerging, proposed or crystal ball regulations it is possible that other regulations could be triggered. Future evaluation of the Los Angeles River redevelopment should consider these potential impacts.

Comparison Between Phase I and Phase II lists

The list of priority key issues contained herein on Table 1 is essentially the same since Phase I. The Phase I Wastewater and the Phase I Stormwater Management list are now combined into this one list. A few new items have been added. The first of these is TMDL development, due to their impact on the wastewater and stormwater runoff programs. Secondly, Groundwater Recharge Standards was added because of the IRP guiding principle that calls for increased water recycling. The air quality requirement for VOCs and ammonia at composting facilities was also added. In addition, the SSO issue has been expanded to include enforcement of pretreatment rules and the new Sanitary Sewer Management Plan, all of which are priority key issues and are all related to collection system management and contractual arrangements with satellite systems.

Connections Between the Priority Key Issues

The water quality program under the Clean Water Act is constructed to:

- Develop beneficial use designations;
- Develop water quality criteria for protection of beneficial uses;

- Apply these criteria to specific water bodies based on the specific beneficial uses that need to be protected; and

- Apply anti-degradation to ensure that high quality water bodies remain high quality.

The basis of the regulatory drivers is the designated beneficial uses of each particular water body. If those uses, or the standards adopted to protect those uses, are violated or impaired, the water body becomes listed on the 303(d) list as impaired. This listing then leads to a TMDL, which potentially leads to a higher level of protection through technology applications and management practices. Therefore, for both the wastewater and the stormwater runoff management programs, the connection between these priority key issues starts with the designated beneficial uses.

In the case of the wastewater program, the next steps will involve the water quality standards, which are primarily the CTR and SIP limits for the three non-ocean effluent discharges. Meeting these requirements and the environmental goals they represent will require major considerations of the technology and management options in the IRP. In some cases, such as the option for a higher level of treatment (that can be for both water recycling and effluent discharge or for alternative disposal to a wetland or redeveloped riparian habitat) such as membrane bioreactors or reverse osmosis the result is another set of concerns: brine and where it can be disposed without causing environmental or public health problems.

If water quality standards cannot be met, TMDLs may be the next step. We have already seen in the State adopted 2003 303(d) list, new listings based on the CTR standards. As with brine, other byproducts, such as odor and biosolids, must be considered in establishing environmental goals for the IRP.

For the stormwater runoff management program, the major consideration is the TMDLs, and the new requirements for technology and management solutions not required under the non-TMDL related stormwater runoff program. Many of the environmental goals and the subsequent technology and management options will be the same as found in the wastewater program and will include: more or better treatment; more or better disinfection; development of alternative treatment or disposal options; relocation of discharge or removal of discharge; or reduction of runoff at the source through a variety of management options.

In addition to and somewhat unrelated to the goals of treatment and management of effluent and stormwater or the by products of these processes, is the priority key issue of the SSO Rule, and the Sanitary System Management Plan. This proposed rule and new NPDES permit requirement leads to major capacity determinations (including size of pipes and interceptors) for the collection system and potential capacity enhancement in order to prevent overflows in the system. But this rule is not limited to the collection system because once the wet weather flow is contained in the system it also has to be treated. This means capacity determinations

for treatment of all the captured flow either at existing treatment plant or at new peak wet weather treatment facilities has to be part of the IRP analysis for meeting future regulations.

Conclusions/Next Steps

The regulatory issue of concern for the wastewater program will continue to be driven by designated beneficial uses, the quality of the effluent from the treatment plants and the requirements of TMDLs as they are developed.

As discussed earlier, this Regulatory Forecast Technical Memorandum serves to summarize the anticipated regulatory requirements and the key issues the City could face in the future. The next step will be to conduct strategy sessions with technical staff from the runoff and wastewater disciplines to review these key issues and strategize appropriate environmental goals to meet them. These environmental goals, in conjunction with the wastewater flow projections and urban runoff loading projections will be the basis from which options are developed from the IRP.

The development of environmental goals should be based on:

- The anticipated California Toxic Rule (CTR)/State Implementation Plan (SIP) requirements for each treatment plant;
- The water recycling requirements, especially those for groundwater recharge as they are more stringent than those for industrial/irrigation use; and
- The scheduled TMDLs from the 1998 list and the proposed 2003 list focusing particularly on the pollutant and water body on the list correlated to the effluent discharge.

Through this process, air quality and biosolids quality and management, and collection system capacity will continue to be priority key issues, because they meet all the criteria for identification of priority key issues.

Stormwater runoff management is a much larger and less manageable program compared to the wastewater program. The intermittent nature of the wet weather runoff and sheer volume and magnitude of it requires larger facilities and more effective and dispersed management solutions. But as with the wastewater program, the key priority issues for the stormwater program start with the beneficial uses and lead to TMDLs which lead back to permits. The environmental goals in this case should be based on the TMDL schedule for the 1998 list and the proposed 2003 list.

Attachment A

Staff Involved in the Development of the Regulatory Forecast Technical Memorandum

Prepared By:

Michele Plá (CH:CDM)
Tina Ponce (CH:CDM)
Ruth Roxburgh (CH:CDM)

Contributed to/Reviewed By:

Shahram Kharaghani (Bureau of Sanitation, Watershed Protection Division)
Adel Hagekhalil (Bureau of Sanitation, Wastewater Engineering Services Division)
Judy Wilson (Bureau of Sanitation)
Jim Langley (Bureau of Sanitation)
Ray Kearney (Bureau of Sanitation)
Bill Van Wagoner (Department of Water and Power)
Carrie Takayama (Department of Water and Power)
Lisa Mowery (Financial Management Division)
Paul Gustafson (CH:CDM)
Heather Boyle (CH:CDM)
Reina Pereira (Bureau of Sanitation, Wastewater Engineering Services Division)
Gus Dembegiotes (Regulatory Affairs Division)
Donna Chen (Regulatory Affairs Division)
Diane Gilbert (Regulatory Affairs Division)
Chris Westhoff (City's Attorney's Office)

Attachment B – Regulatory Forecast Tables

Table B1 Regulatory Forecast - Pretreatment			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	40 CFR part 403	EPA	Current
2	NPDES permits Permit No. CA0056227 (for Tillman Water Reclamation Plant) Permit No. CA0050000 (for LA-Glendale Water Reclamation Plant) Permit No. CA0053856 (for Terminal Island Treatment Plant) Permit No. CA0109991 (for Hyperion Treatment Plant)	LARWQCB	Current
3	Los Angeles Municipal Code, Ordinance No. 64.30	City	Current
4	Rules 1171 and 1122, replacement of organic degreasing agents with water soluble degreasers	SCAQMD	Current
5	Clean Water Act Enforcement and Pollution Prevention Act of 1999 (SB 709)	SWRCB, LARWQCB	Current
6	Grease trap ordinance (possibly through Administrative Order) (FOG)	EPA, City	Current
7	TMDL Wasteload Allocations and Implementation Plans	LARWQCB	Emerging
8	40 CFR Part 131 (California Toxics Rule)	EPA	Emerging
9	Policy for implementation of toxic standards for inland surface waters, enclosed bays, and estuaries of California (State Implementation Plan, adopted March 2, 2000)	SWRCB	Emerging
10	40 CFR Part 444 (Commercial Hazardous Waste Combustors)	EPA	Proposed
11	40 CFR Part 445 (Pretreatment standards associated with landfills)	EPA	Proposed
12	40 CFR Part 405-71 (Reformatting effluent guidelines and standards)	EPA	Proposed
13	40 CFR Part 442 (Transportation equipment cleaning)	EPA	Proposed
14	40 CFR Part 437 (Centralized waste treatment industry)	EPA	Proposed
15	40 CFR Part 403 (Streamlining general pretreatment regulations)	EPA	Proposed
16	40 CFR Part 435 (Synthetic based drilling fluids in the oil gas extraction)	EPA	Proposed
17	40 CFR Part 438 (metal products and machinery)	EPA	Proposed

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B2 Regulatory Forecast - Wastewater Collection System Management			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	Clean Water Act National Pollutant Discharge Elimination System (NPDES)	EPA RWQCB/ SWRCB	Current
2	Cease and Desist Order 98-073 (sewage overflows)	RWQCB	Current
3	Porter-Cologne Water Quality Act California Water Code	RWQCB	Current
4	Regulation of Odors from Collection System (nuisance)	SCAQMD	Current
5	Sanitary Sewage Overflows ▪ Administrative requirements ▪ Capacity Assurance, Management, Operations, and Maintenance requirements (CMOM) Prohibitions on sewage overflow discharges to waters of the U.S.	EPA RWQCB	Proposed – National, Emerging – Local (due to OCSD beach closures) Current
6	Grease trap ordinance (possibly through Administrative Order) (FOG)	EPA	Current
7	Dry-Weather Urban Runoff Diversions to POTWs	RWQCB	Emerging/Proposed
8	Inflow & Infiltration Control Measures (part of CMOM)	RWQCB EPA	Proposed
9	Wet-Weather Urban Runoff Diversions / Bacteria TMDL Compliance	RWQCB	Proposed
10	Regulation of VOC and H2S Emissions from the Collection System (hazardous air pollutants)	EPA SCAQMD	Crystal Ball

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B3 Regulatory Forecast - Wastewater Treatment and Operations Donald C. Tillman Water Reclamation Plant			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	NPDES permit (permit no. CA0056227) (New: March 2003)	LARWQCB	Current/Emerging
2	General Industrial Stormwater Permits	SWRCB	Current
3	Clean Water Enforcement and Pollution Prevention Act of 1999 (SB 709) (Revised)	EPA, SWRCB, LARWQCB	Current
4	Writ of Mandate and Stay of Permit	LARWQCB	Current/Emerging
5	Beneficial use designations for LA River (including narrative), leading to application of water quality standards (WQS) and listings of impairments.	LARWQCB	Current
6	Total Maximum Daily Loads (TMDLs) (LA River)	EPA, SWRCB, LARWQCB	Emerging
7	Water Quality Based Effluent Limitations	EPA, SWRCB, LARWQCB	Emerging
8	40 CFR Part 131 [California Toxics Rule (CTR)] Policy for implementation of toxic standards for inland surface waters, enclosed bays, and estuaries of California [State Implementation Plan (SIP)]	EPA, SWRCB	Emerging
9	Effluent-dependent waterbody provisions in SIP for development of permit levels for CTR discharge standards	SWRCB, LARWQCB	Proposed
10	More stringent Title 22 Requirements for Groundwater Recharge Operations (e.g., virus monitoring; percentage of reclaimed water in aquifers)	DOHS	Current/Proposed
11	Issues related to Los Angeles River (e.g., redevelopment of the river, groundwater recharge in unlined stretches of the river; options and technologies for effluent disposal	Environmental Advocate Organizations / City Council Ad Hoc Committee on River	Proposed
12	Nutrient Criteria for effluent discharges	EPA	Proposed
13	Pollutants that are not problems now, but will become in the future (e.g., NDMA)	EPA, SWRCB, LARWQCB	Crystal Ball
14	New aquatic and human health criteria (beyond CTR)	EPA, SWRCB. LARWQCB	Crystal Ball
15	Sediment criteria for metals	EPA, SWRCB, LARWQCB	Crystal Ball
16	Wildlife criteria to protect threatened and endangered species	EPA, SWRCB, LARWQCB	Crystal Ball
17	Controls or standards for endocrine disruptors and pharmaceutically active chemicals	EPA, SWRCB, LARWQCB	Crystal Ball
18	Substantial flow contributions from local contract agencies leading to increased pretreatment standards and amendments to agreements with contract agencies	EPA, SWRCB, LARWQCB	Crystal Ball

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B4 Regulatory Forecast - Wastewater Treatment and Operations Los Angeles-Glendale Water Reclamation Plant			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	NPDES permit (permit numbers CA005000, and CA 00949333) (new: Nov/Dec 2002?)	LARWQCB	Current/Emerging
2	General Industrial Stormwater Permits	SWRCB	Current
3	Clean Water Enforcement and Pollution Prevention Act of 1999 (SB 709) (Revised)	EPA, SWRCB, LARWQCB	Current
4	Writ of Mandate and Stay of Permit	LARWQCB	Current/Emerging
5	Beneficial use designations for LA River (including narrative), leading to application of water quality standards (WQS) and listings of impairments.	LARWQCB	Current
6	Total Maximum Daily Loads(TMDLs) (LA River)	EPA, SWRCB, LARWQCB	Emerging
7	Water Quality Based Effluent Limitations	EPA, SWRCB, LARWQCB	Emerging
8	40 CFR Part 131 [California Toxics Rule (CTR)] Policy for implementation of toxic standards for inland surface waters, enclosed bays, and estuaries of California [State Implementation Plan (SIP)]	EPA, SWRCB	Emerging
9	Effluent-dependent waterbody provisions in SIP for development of permit levels for CTR discharge standards	SWRCB, LARWQCB	Proposed
10	More stringent Title 22 Requirements for Groundwater Recharge Operations (e.g., virus, monitoring; percentage of reclaimed water in aquifers)	DOHS	Proposed
11	Issues related to Los Angeles River (e.g., redevelopment of the river, groundwater recharge in unlined stretches of the river; options and technologies for effluent disposal	Environmental Advocate Organizations / City Council Ad Hoc Committee on River	Proposed
12	Nutrient criteria for effluent discharges	EPA	Proposed
13	Pollutants that are not problems now, but will become in the future (e.g., NDMA)	EPA, SWRCB, LARWQCB	Crystal Ball
14	New aquatic and human health criteria (beyond CTR))	EPA, SWRCB, LARWQCB	Crystal Ball
15	Sediment criteria for metals	EPA, SWRCB, LARWQCB	Crystal Ball
16	Wildlife criteria to protect threatened and endangered species	EPA, SWRCB, LARWQCB	Crystal Ball
17	Control or standards for endocrine disruptors and pharmaceutically active chemicals	EPA, SWRCB, LARWQCB	Crystal Ball
18	Substantial flow contributions from local contract agencies leading to increased pretreatment standards and amendments to agreements with contract agencies	EPA, SWRCB, LARWQCB	Crystal Ball

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B5 Regulatory Forecast - Wastewater Treatment and Operations Hyperion Treatment Plant			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	NPDES permit (permit no. CA CA0109991)	LARWQCB	Current/Emerging
2	General Industrial Stormwater Permit		
3	Clean Water Enforcement and Pollution Prevention Act of 1999 (SB 709) (Revised)	EPA, SWRCB, LARWQCB	Current
4	The State Ocean Plan	SWRCB	Current/Proposed
5	40 CFR part 503, sludge regulations	EPA	Current
6	Kern County Ordinances on land application of biosolids; class A, EQ and fee for road use	Kern County	Current and Emerging
7	West Basin Water Recycling Project - Agreement	DWP, West Basin Municipal Water District	Current
8	Nutrient criteria for salt water bodies	EPA	Proposed
9	Effects of diversion of dry weather runoff flows to HTP	LARWQCB	Proposed
10	Effects of diversion of wet weather runoff flows to HTP for treatment and impact of bypass regulations on this option	EPA, LARWQCB	Proposed
11	Water Quality Limitation Associated with West Basin Project	DOHS, LARWQCB, West Basin	Crystal Ball
12	New aquatic and human health criteria (beyond CTR)	EPA, SWRCB, LARWQCB	Crystal Ball
13	Sediment criteria for metals	EPA, SWRCB, LARWQCB	Crystal Ball
14	Wildlife criteria to protect threatened and endangered species	EPA, SWRCB, LARWQCB	Crystal Ball
15	Controls or standards for endocrine disruptors and pharmaceutically active chemicals	EPA, SWRCB, LARWQCB	Crystal Ball

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B6 Regulatory Forecast - Wastewater Treatment and Operations Terminal Island Treatment Plant			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	NPDES permit (permit no. CA0053856) (renewal pending)	LARWQCB	Current/Emerging
2	General Industrial Stormwater Permit		
3	Clean Water Enforcement and Pollution Prevention Act of 1999 (SB 709) (Revised)	EPA, SWRCB, LARWQCB	Current
4	Enclosed Bays and Estuaries Plan and application of CTR levels to NPDES permit	LARWQCB	Current/Emerging
5	Harbor Water Recycling Project (lead to studies for implementation of advanced treatment processes)	DWP	Current
6	40 CFR part 503, sludge regulations	EPA	Current
7	Kern County Ordinances on land application of biosolids; class A, EQ and fee for road use	Kern County	Current/Emerging
8	Chronic Toxicity Testing Requirements	LARWQCB	Current
9	Bay Protection and Toxics Cleanup program	SWRCB	Emerging
10	Groundwater Replenishment and Industrial Reuse-Permit	LARWQCB, DOHS,	Emerging/Current
11	Increased control requirements of toxic pollutants in order to recycle effluent (e.g., Boron, NDMA, MTBE, perchlorates)	SWRCB /DOHS	Proposed
12	Nutrient criteria for effluent discharges	EPA	Proposed
13	Effect of possible changes in the local industrial activity - impacts on trace elements that could require higher level of treatment for groundwater recharge or effluent discharge	LARWQCB/DOHS	Crystal Ball
14	New aquatic and human health criteria (beyond CTR)	EPA, SWRCB. LARWQCB	Crystal Ball
15	Sediment criteria for metals	EPA, SWRCB, LARWQCB	Crystal Ball
16	Wildlife criteria to protect threatened and endangered species	EPA, SWRCB, LARWQCB	Crystal Ball
17	Control or standards for endocrine disruptors and pharmaceutically active chemicals	EPA, SWRCB, LARWQCB	Crystal Ball
18	Removal of Discharge Brine (from proposed RO facilities) Waste from LA Harbor	LARWQCB	Crystal Ball

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B7 Regulatory Forecast - Water Recycling			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	California Code of Regulations, Title 22, Division 4, Chapter 3 (wastewater reclamation criteria)	DOHS	Current
2	Water Quality Control Plan (Basin Plan)	LARWQCB	Current
3	Reclamation NPDES permits	LARWQCB (close coordination with DOHS)	Current
4	Use of reclaimed water in instances where the public may be exposed	Los Angeles County Health Department	Current
5	Vector control requirements	State and local	Current
6	Increased degree of removal of pathogens and toxic compounds (e.g., *Cryptosporidium*, *Giardia*)	DOHS	Emerging
7	Establishment of more consistent water reclamation criteria (e.g., site-specific basis)	DOHS	Emerging
8	TMDLs	LARWQCB	Emerging
9	Triennial Review Process	LARWQCB	Emerging
10	California Toxics Rule	EPA	Emerging
11	Enhanced Surface Water Treatment Rule	EPA	Proposed
12	Proposed Title 22 Revisions	DOHS	Proposed
13	Control of endocrine disrupters and disinfection by-products	DOHS	Proposed
14	Alternative disinfection methods (e.g., UV radiation)	DOHS	Proposed
15	Considerations and/or Proposals for Recognition of Effluent Dependent Water Bodies and Expanded Water Recycling efforts	LARWQCB	Proposed
16	Water Conservation and Reclaimed Water Marketing Rules	LARWQCB	Proposed
17	Advanced treatment processes (reverse osmosis or other membrane-based treatment requirements, ultraviolet disinfection, etc.)	DOHS, EPA, SWRCB, LARWQCB	Crystal Ball
18	Dilution allowances for discharges to the ocean and enclosed bays	LARWQCB	Crystal Ball
19	Incidental groundwater recharge in the LA Angeles River	LARWQCB	Crystal Ball
20	Direct potable reuse	DOHS	Crystal Ball
21	Brine lines for disposal of membrane-process wastes	LARWQCB	Crystal Ball
22	Revitalization/de-urbanization of the LA River (concrete removal, bike paths, public and commercial uses, etc.)	Los Angeles County; possibly US Army Corps of Engineers	Crystal Ball
23	Aquatic/wildlife maintenance flows for the LA River	DFG, USFWS	Crystal Ball
24	Viruses in reclaimed water (monitoring, DNA verification and identification, etc.)	DOHS	Crystal Ball
25	Arsenic limitations due to presence in water supplies	EPA, SWRCB	Crystal Ball

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B8 Regulatory Forecast - Air Quality			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	Clean Air Act (CAA) and the 1990 Clean Air Act Amendment (CAAA) 40 CFR 50 – 99 CAA Title III, Section 112 (r) – RMP CAA Title III, Section 112 (r) – General Duty Clause	EPA CARB SCAQMD Administrative Agency OES	Current
2	Addendum to the 1997 Air Quality Management Plan (AQMP) and the State Implementation Plan 1994 AQMP 1997 AQMP 1997 AQMP Addendum The SIP	EPA CARB SCAQMD	Current
3	Title V Operating Permits 1990 Clean Air Act Amendments (CAA), Title V	EPA SCAQMD	Current
4	Solvent Cleaning Operations and Solvent Degreasers Rule 1171 and 1122, respectively	SCAQMD	Current
5	Odor and Dust from Treatment Plants General Order #034	SCAQMD Local Jurisdictions such as the Cities of El Segundo and Los Angeles	Current
6	California Accidental Release Prevention (Cal ARP) Program	Administrative Agencies – Fire Departments & Local Health Departments OES	Current
7	Portable Equipment Registration and Permits	CARB SCAQMD	Current
8	Maximum Achievable Control Technology for Publicly Owned Treatment Works (POTWs MACTs) and the Integrated Urban Air Toxics Strategy (The Strategy) 64 CFR 57572 and the 1990 Clean Air Act Amendments (CAAA), Title III for the POTWs MACTs Clean Air Act (CAA), Section 112 (k) for The Strategy Section 129 – New Source Performance Standards (NSPS) for POTW Combustion Sources	EPA SCAQMD	Emerging/Current
9	Diesel Particulate Matter as a Toxic Air Contaminant, California Toxic Air Contaminant Act (AB 1807, Tanner Act) Air Toxic “Hot Spots” Information and Assessment Act (AB 2588)	CARB SCAQMD	Current
10	Environmental Justice Initiatives (1997 AQCD)	SCAQMD	Current
11	Architectural Coatings Rule 1113 1994 AQMP 1997 AQMP	SCAQMD	Emerging
12	Environmental Health Protection for Children SB 25	CARB	Emerging
13	Proposed Amendments to the New Source Review of Carcinogenic Air Contaminants (Rule 1401) & Control of Toxic Air Contaminants from Existing Sources (Rule 1402) Rule 1401	SCAQMD	Current

Table B8 Regulatory Forecast - Air Quality			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
	Rule 1402 Multiple Air Toxics Exposure Study (MATES – II)		
14	New Source Review/Best Available Control Technology (BACT) 1990 Clean Air Act Amendment (CAAA) and SCAQMD Regulation XIII	EPA SCAQMD	Current
15	Replacement of Fleet Vehicles for Government and Airport Operations – Rule 1190 Health and Safety Code, Section 40447.5 and SCAQMD Proposed Rule 1190	SCAQMD	Current
16	VOCs & Ammonia from Biosolids Composting Facilities (Rule 1133) AB 1450	SCAQMD	Current
17	Environmental Justice Act SB 115	State Office of Planning and Research Cal EPA	Current
18	Hazardous Air Pollutants (HAPs) Emission from wastewater collection system	EPA	Crystal Ball
19	Laws, Regulations, and Rules that result in Cross-Media Pollution Transfers	SCAQMD	Crystal Ball
20	Future List of Carcinogenic Substances	CARB	Crystal Ball
21	Environmental Justice Issues (exposure/risk issues)	SCAQMD	Emerging

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B9 Regulatory Forecast - Biosolids Management			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	40 CFR 503 (Regulations governing handling/treatment of biosolids	EPA	Current
2	Resource, Conservation, and Recovery Act (Waste Discharge Guidelines and Landfill Construction Regulations)	EPA RWQCB CISWMB	Current
3	Conditional Use Permits	Local Jurisdictions	Current
4	California Integrated Solid Waste Management Act, Assembly Bill 939 (AB 939)	California Integrated Waste Management Board	Current
5	Persistent Bioaccumulation Toxic Chemicals (reporting thresholds of PBTs)	EPA	Emerging
6	Kern County Biosolids Ordinance (imposes fees and bans land application of non-exceptional quality biosolids)	Kern County	Current
7	Biosolids Environmental Management System (to ensure biosolids are properly managed)	EPA, City of Los Angeles	Current
8	USDA Proposed Organics Rule (prevents biosolids from being used in organic crops)	USDA	Current
9	SB 205: Amendments to the Porter- Cologne Water Quality Act (development of waste discharge requirements for biosolids) (SWRCB General Order)	SWRCB/RWQCB	Current
10	Local Ordinances Banning Land Application of Biosolids	Local Jurisdictions (Cities & Counties)	Current Emerging/Proposed
11	Dioxin Reassessment (proposed amendments to 40CFR Part 503 regarding Dioxin in biosolids)	EPA	Emerging/Proposed
12	Radioactivity (NRC and EPA are evaluating whether radioactivity needs to be regulated in B.S.)	NRC, EPA City of Los Angeles	Proposed
13	Round 2 of 40 CFR Part 503 for Dioxin	EPA	Proposed
14	Beyond Class A cake	Local Jurisdictions	Crystal Ball
15	Fertilizer Regulations (labeling of biosolids)	California Department of Food and Agriculture	Crystal Ball

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B10 Regulatory Forecast - Stormwater/Runoff Management			
Item	**Regulations and Policies**	**Agency**	**Revised Phase**
1	Clean Water Act, Section 402(p) and Phase I regulations for MS4	EPA, LARWQCB	Current
2	National Pollutant Discharge Elimination System – Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles (Permit No. CAS614001)	LARWQCB	Current
3	Beneficial Use Designations per Clean Water Act (CWA) and State Resolutions (except for MUN)	LARWQCB and SWRCB	Current
4	New development specific design criteria for mitigating storm water impacts for the California Coastal Zone	California Coastal Commission	Current
5	Standard Urban Stormwater Mitigation Plan	County of Los Angeles Department of Public Works	Current
6	Policy Statement on the Environment	City of Los Angeles Adopted 1/26/99	Current
7	Storm water Ordinance No. 172172, Effective 10-01-98	City of Los Angeles Department of Public Works Bureau of Sanitation	Current
8	Section 303(d) of the Clean Water Act – Impaired Water Bodies	EPA, SWRCB and LARWQCB	Emerging and Proposed (new list Jan 2003)
9	Total Maximum Daily Loads (TMDLs) including Consent Decree Schedule for Completion of TMDLs in Los Angeles Region	LARWQCB, SWRCB and EPA	Emerging
10	Region 9 Draft Guidance for Issuing Permits for Discharges into Impaired Waters in the Absence of a TMDL	EPA, LARWQCB	Current
11	Trash and Bacteria TMDL for the Los Angeles River, Ballona Creek and Santa Monica Bay and Beaches	LARWQCB, EPA	Current/Emerging
12	Water Quality Enforcement Policy – LA Region	LARWQCB, SWRCB	Emerging
13	Treatment of Dry Weather Urban Runoff (per TMDLs to reduce load allocations to water body)	LARWQCB	Crystal Ball
14	Treatment of Wet Weather Urban Runoff (per Santa Monica Bay wet weather Bacteria TMDL)	LARWQCB	Proposed
15	Application of Numerical WQS in stormwater permits as a result of the TMDL	LARWQCB	Emerging
16	Application of Numerical WQS in stormwater NPDES permits for all priority pollutants and CTR pollutants	EPA, SWRCB and LARWQCB	Crystal Ball
17	Redirection, Reuse, or Treatment of Stormwater - see water recycling issues	LARWQCB/DOHS	Current/ Emerging and Proposed and Crystal Ball

Note: For additional discussion, refer to the “Stormwater Quality Management Technical Memorandum” (CDM and CH2M HILL, April 2001)

Table B11 Construction Permits		
Regulations and Policies	**Agency**	**Phase**
Permits under Section 404 of the Clean Water Act Permit under Section 10 of the Rivers and Harbors Act	U.S. Army Corps of Engineers EPA	Current
Consultation under the Endangered Species Act	U.S. Department of Interior (U.S. Fish and Wildlife Service) EPA	Current
General NPDES Permits Individual NPDES Permits	Regional Water Quality Control Board	Current
Review under Sections 1600-1607 of the California Fish and Game Code (streambed alteration) Review under Section 2080 *et.seq. of the Cal Fish and Game Code* relative to state listed endangered species	Department of Fish and Game	Current
Review and approval of historic property surveys	State Historic Preservation Office	Current
Coastal Development Permits	California Coastal Commission City of Los Angeles (for dual jurisdiction permits)	Current
Permits to construct pollution control devices and/or new emission sources	South Coast Air Quality Management District	Current
Encroachment Permits	California Department of Transportation	Current
Various land use, right-of-way, and construction permits	County of Los Angeles	Current
Review, coordination, and approvals from various City departments.	City of Los Angeles	Current
Conditional Use Permits; Approval of haul routes	Other Cities	Current
Scrutinizing of construction activities to a greater degree	State and Local Agencies	Emerging
Asbestos & Serpentine (airborne)		Emerging

Note: For additional discussion, refer to “Pertinent Regulations and Key Policy Issues Technical Memorandum” (CDM and CH2M HILL, April 2000)

Table B12 Constructed Wetlands		
Regulations and Policies	**Agency**	**Phase**
Permits under Section 404 of the Clean Water Act Permit under Section 10 of the Rivers and Harbors Act	U.S. Army Corps of Engineers EPA	Current
Consultation under the Endangered Species Act	U.S. Department of Interior (U.S. Fish and Wildlife Service) EPA	Current
General NPDES Permits Individual NPDES Permits	Regional Water Quality Control Board	Current
Review under Sections 1600-1607 of the California Fish and Game Code (streambed alteration) Review under Section 2080 *et.seq. of the Cal Fish and Game Code* relative to state listed endangered species	Department of Fish and Game	Current
Beneficial use designations for wetland in Basin Plan (including narrative), leading to application of water quality standards (WQS) and listings of impairments.	LARWQCB	Current
40 CFR Part 131 [California Toxics Rule (CTR)] Policy for implementation of toxic standards for inland surface waters, enclosed bays, and estuaries of California [State Implementation Plan (SIP)]	LARWQCB	Emerging
Effluent-dependent waterbody provisions in SIP for development of permit levels for CTR discharge standards	SWRCB/LAWRQCB	Proposed

Appendix B
Summary of the Steering Group Process and Their Recommendations for Integrated Resources Planning Development

Summary of the Steering Group Process and Their Recommendations for Integrated Resources Planning Policy Development

CITY OF LOS ANGELES
CALIFORNIA

JAMES K. HAHN
MAYOR

DEPARTMENT OF
PUBLIC WORKS

BUREAU OF SANITATION

JUDITH A. WILSON
DIRECTOR

DREW SONES
RAY KEARNEY
JAMES F. LANGLEY
JOSEPH MUNDINE
ASSISTANT DIRECTORS

433 SOUTH SPRING ST. 4TH FLOOR
LOS ANGELES, CA 90013-1957

On behalf of the City of Los Angeles Bureau of Sanitation, I would like to express our deepest gratitude to the Steering Group members for your phenomenal insight, vision and commitment during this first phase of our Integrated Resources Planning effort.

When we began this journey over 2 years ago, we started with a goal of providing an interactive stakeholder process and technical framework to assist our City's decision makers in developing supportable policies for the wastewater services that would integrate all of our City's water quality and water supply activities and elements. We began with a goal of building improved community involvement, understanding and support, through early and continued dialogue in this policy development process.

I think we have made dramatic progress toward meeting our goals. Together, we have shaped a strong and vibrant vision for the future of Los Angeles. I believe we have forged mutual respect and trust in our time together. We have built a framework for a sustainable future for the Los Angeles Basin, one where we can be sure that we have sufficient wastewater services, adequate water supply, and proper and proactive protection and restoration of our environment.

We have developed a progressive plan that, when implemented, will provide for reliable services while maximizing the use of our existing infrastructure, minimizing the need for extensive new construction, and aggressively conserving, protecting and beneficially reusing our limited natural resources.

I am proud of what we have accomplished together so far, and am truly excited about continuing our partnership through the ongoing planning and implementation of this shared dream for a healthy and safe tomorrow.

Thank you for your incredible efforts and contributions toward the Integrated Plan for the Wastewater Program.

Sincerely,

Judith Wilson

Judith A. Wilson, Director

Bureau of Sanitation

INTRODUCTION AND OVERVIEW

The Integrated Plan for the Wastewater Program (IPWP) describes a future vision of wastewater and stormwater management in the City of Los Angeles (City) that explicitly recognizes the complex relationships that exist among all of the City's water resources activities and functions. Addressing and integrating the water, wastewater, and stormwater needs of the City in the Year 2020, the IPWP also takes an important step towards comprehensive basin-wide water resources planning in the Los Angeles area.

We have participated in this process and assisted in the development of these policy recommendations because we want to be sure that Los Angeles has adequate water supply, wastewater treatment, flood control, and stormwater pollution prevention, while protecting and restoring our environment and improving our quality of life. With comprehensive planning and bold innovations, we can attempt to ensure that we meet the needs of Los Angeles.

This integrated process is a departure from the City's traditional single purpose planning efforts for separate agency functions, and will result in greater efficiency and additional opportunities for citywide benefits, including potential overall cost savings. This integrated process also highlights the benefits of establishing partners with other City-wide and regional agencies, City departments, and other associations, both public and private. The City selected a 20-year planning horizon for this program. Attached to this document is a glossary of terms used throughout this statement.

The goal of the IPWP effort is to define a general direction for planning by developing a set of policy recommendations to guide future investments. Therefore, the broad overview of technical issues was appropriate for relative comparisons. As a policy development guide, the IPWP acknowledges that actions taken to manage wastewater, biosolids and stormwater both affect and are affected by the water supply and water quality protection measures taken by the City and others.

Because the City not only treats wastewater generated within the City, but also manages and treats wastewater from 27 other nearby communities (i.e., "Contract Agencies" such as the cities of Santa Monica and Beverly Hills), this regional approach is essential in system planning. In that context, the IPWP presents policy recommendations that attempt to be responsive to the overall, long-term water resources needs of the community and the environment.

Just as the IPWP recognizes the complex interrelationships in the urban water cycle, it also acknowledges that decisions regarding the City's environment and water resources should be fundamentally community-driven. For this reason, a stakeholder Steering Group was organized to capture and address the community's objectives and preferences regarding the future picture of water resources management in Los Angeles. The Steering Group is comprised of individuals representing a wide range of political, economic, geographic, environmental and social interests from throughout the City.

The Steering Group focused on defining its values with respect to public health, infrastructure, the environment, cost efficiency, quality of life, and education. It also studied the means of achieving those objectives: through building facilities; through managing resources; and through managing demands.

Through ten interactive workshops and a series of site visits and facilities tours, the Steering Group reviewed the wastewater, water and stormwater service needs of the City, as presented by City/Consultant staff, for the Year 2020. The Steering Group, as a whole, did not,

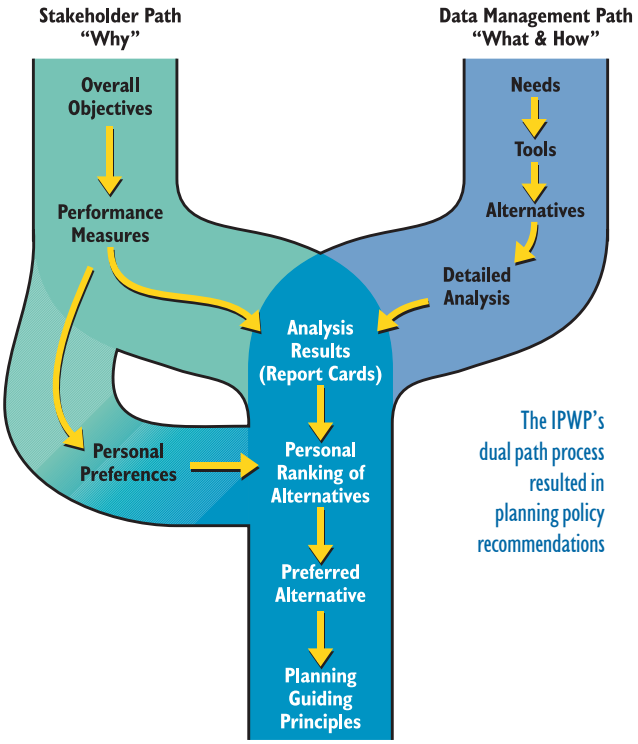
IPWP Steering Group members tour the Los Angeles Aqueduct Filtration Plant

and was not asked to, render an opinion on the acceptability of growth in the region. Such considerations were outside the scope of the Steering Group's objectives. Nonetheless, this document provides policy recommendations about growth and its associated potential impacts that were assumed for the planning process. The Steering Group recommends that the City convene, through a separate forum, a working group to address broader growth issues.

IPWP Steering Group members visit
West Basin Municipal Water District's water reclamation plant

The Steering Group also reviewed the interrelationships of wastewater, water, recycled water and stormwater service functions. The City/consultant staff presented to the Steering Group a number of integrated, alternative approaches for addressing future needs. The evaluation of alternatives relied upon value-based criteria that were developed by the Steering Group and considered the overall goals and objectives of the City. The Steering Group also developed performance measures, as well as their own individual satisfaction levels for each performance measure, which were then used to quantify how well a certain alternative performed in achieving the stated objectives.

City and Consultant staff interviewed each Steering Group member to determine how they, as individuals, would use the evaluation criteria in making personal decisions regarding alternatives. Based on the information considered in this exercise, the City and Consultant staff analyzed interview results, which indicated a preferred thematic alternative. In workshops, the Steering Group confirmed the



The IPWP's dual path process resulted in planning policy recommendations

"preferred" alternative that best met the diverse interests and objectives of the group. And from this preferred thematic alternative, the Steering Group identified the basic policy features that they now recommend for consideration by the City Council in planning for the future of the City.

The report that follows summarizes the recommendations and views of the IPWP stakeholder Steering Group. It reflects many hours of time and effort on the part of City/Consultant staff and Steering Group members devoted to developing an understanding of the City's needs, the tools available to address those needs, and the trade-offs required to arrive at a consensus approach to action.

IPWP Steering Group members at Workshop 6

BACKGROUND

The Integrated Plan for the Wastewater Program (IPWP)

Begun in October 1999 as the first phase of the City's overall Integrated Resources Planning process, the IPWP sought to accomplish two basic goals as part of developing wastewater planning policies:

- Enlist the public in the entire planning and design development process at a very early stage beginning with the determination of policies to guide planning; and
- Integrate water supply, water conservation, water recycling, and stormwater management issues with wastewater facilities planning through a regional watershed approach.

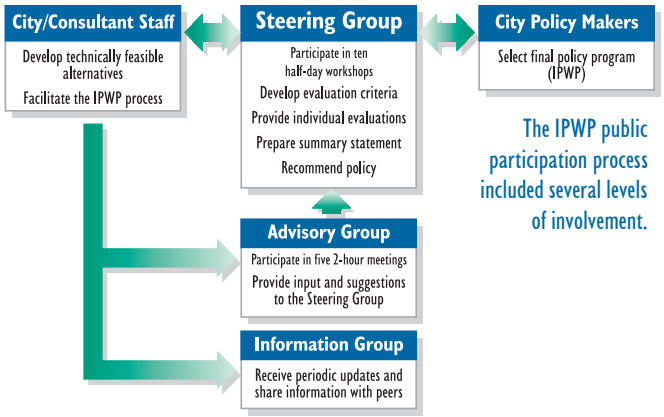
In implementing these goals, the IPWP combined traditional engineering-based planning concepts with consideration of less traditional technologies and non-structural options. These varied alternatives were evaluated in the context of the views of a broad cross-section of the community to establish planning policies that were both technically sound and publicly acceptable.

The Public Participation Process

As mentioned, a key component of the City's IPWP process was the involvement of the public at an early point in the facilities planning process. The City had never previously undertaken a comprehensive public outreach and involvement effort to this extent. Open dialog was important not only to gain public understanding of the wastewater program development process, but also to capture the collective ideas, experiences and opinions of the City's residents and customers.

To enlist public input, the City developed and implemented a comprehensive public outreach effort. Over a six-month period, over 1,100 organizations, agencies, associations, institutions and individuals were contacted directly to determine their ability and willingness to participate in the planning development process. To provide flexibility, three different levels of participation were made available to all for self-selection:

IPWP facilitator Paul Brown and Bureau of Sanitation Director Judith Wilson participate in Workshop 6



The IPWP public participation process included several levels of involvement.

Steering Group. The Steering Group committed to active participation through an extensive series of technical workshops. This level of participation represented the greatest commitment of time and energy. This group was responsible for guiding the process and ultimately developing the planning policy recommendations presented in this report. They were also responsible for keeping their respective organizations informed of project progress. A total of 54 people committed to this level of participation. Of this group, 31 members, representing organizations totaling more than 67,000 people, participated in a key interview process and formed the basis for policy recommendations.

Advisory Group. Participants in the Advisory Group provided feedback and comments to the City and the Steering Group through a series of quarterly meetings. This level of participation required a commitment to attend the meetings and to provide feedback from the organizations that the Advisory Group represented. Like the Steering Group, the Advisory Group was also responsible for keeping their respective organizations informed of project progress. A total of 74 people, representing organizations serving a total of more than 68,000 people, joined at this level of participation.

Information Group. Members of the Information Group expressed an interest in being kept informed about the project, but its members were not required to commit to attend meetings or provide feedback to the process. A total of 61 people, representing organizations with a combined membership of over 16,500 people and 17 governmental agencies, joined at this level of participation.

In an effort to enlist as much involvement of the community as possible, the City also developed an additional outreach effort. Coordinated with the City Councilmembers' Neighborhood Councils, approximately 40 additional organizations were identified and contacted, and over a dozen of these organizations sponsored a special presentation at their regular meetings to learn more about the project and how they could contribute. As a result of this effort, over 60 additional participants were enlisted into the process.

In addition to the community-based outreach effort, a variety of City, County and regional officials participated in the process:

City, County and Regional Officials. City, County and regional officials were kept informed of the IPWP process through various means. The Board of Public Works, the City Council offices, and Mayor's office received Steering Group workshop minutes, Advisory Group meeting minutes, and periodic newsletters. They also received regular briefings on the project from the Director of the Bureau of Sanitation.

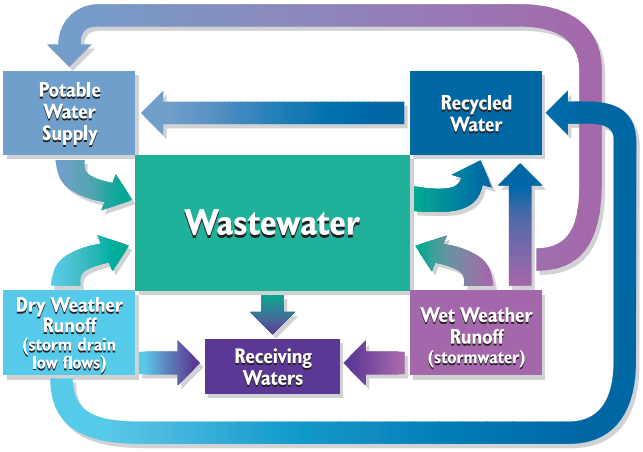
Technical and Management Advisory Committees. Staff members from various City departments (e.g., Bureau of Sanitation, Planning, Department of Water and Power, Bureau of Engineering, Environmental Affairs, City Administrative Officer, Chief Legislative Analyst) and other agencies (Los Angeles County Department of Public Works, California Department of Transportation (Caltrans), Army Corps of Engineers) guided the project through technical and management advisory committees.

Technical Development

As stated, from the outset, the City sought to consider the future needs for the wastewater system in the context of its relationships with both the potable water system and the stormwater system. The City/Consultant technical team prepared an extensive technical study, which defined the Year 2020 needs for each of the key service functions:

- Potable water
- Wastewater collection, treatment and discharge
- Recycled water; and
- Stormwater (both dry weather and wet weather)

The technical team used population projections



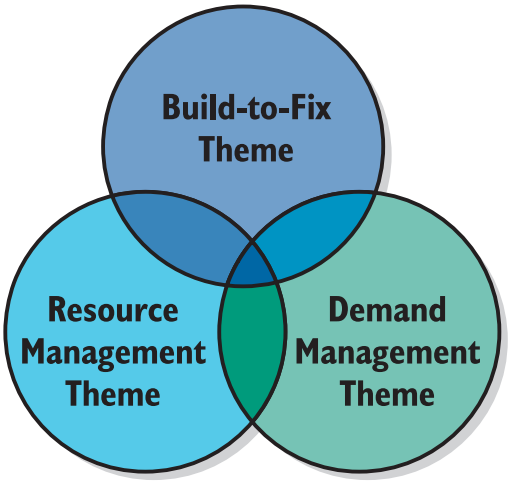
The IPWP recognizes the relationships between multi-agency service functions

provided by the Southern California Association of Governments to estimate Year 2020 water and wastewater needs. The technical team identified the differences, or "gaps", between Year 2020 needs and current capabilities. These gaps included wastewater collection and treatment infrastructure, potable water supply sources, and wet and dry weather urban runoff quality gaps. To address these "gaps", the technical team constructed a series of technical alternatives,

using combinations of both structural and non-structural options. As a starting point for discussion, the technical team created a set of "thematic" alternatives focusing on one of three broad approaches:

- Building more facilities (Build-to-Fix)
- Managing demand on the systems (Demand Management)
- Managing resources from the systems (Resource Management)

The Build-to-Fix theme focused on building new infrastructure to meet Year 2020 needs. The demand management theme focused on managing (reducing) demands to meet Year 2020 needs. The resource management theme focused on beneficial use or reuse of resources to meet Year 2020 needs. Although each theme was distinct, there was an overlap in the alternative components. For example, some methods of managing resources from the system inherently involved some construction (e.g., building more facilities).



The IPWP considered three broad approaches in developing thematic alternatives

In addition to the technical team's quality review process, some Steering Group members participated in a subcommittee to review the evaluation model for the project. While careful attention was paid to make sure that the technical information used in the IPWP was accurate and defensible, the goal of the IPWP was the development of recommendations for planning policies. The evaluation of the thematic alternatives, therefore, focused on allowing the Steering Group to make relative comparisons between different planning approaches; it was not focused on developing conceptual designs, physical layouts or re-evaluating the needs assessment.

Planning Policy Guidelines

To evaluate alternatives, the Steering Group developed a series of performance-based criteria that reflected their objectives and values. These evaluation criteria defined the essential purposes of this planning process. The primary objectives developed by the Steering Group included:

- Protect the Health and Safety of the Public
- Provide Effective Management of the System Capacity
- Protect the Environment
- Enhance Cost Efficiency
- Protect Quality of Life
- Promote Education

The Steering Group also identified sub-objectives for each primary objective. In addition, the Steering Group developed quantifiable performance measures for each sub-objective, enabling a systematic comparison of alternatives. Taken together, the Steering Group's identification of objectives, sub-objectives, and performance measures constitute the evaluation criteria used in the IPWP.

Under all conditions and alternatives, it was assumed as a starting point, that the City would comply with all existing and future legal requirements.

A key feature of this process involved documenting the individual importance and satisfaction that Steering Group members attached to evaluation criteria. City and Consultant staff interviewed each Steering Group member to determine how they, as individuals, would use the evaluation criteria in making personal decisions regarding alternatives. This system was used to develop the preferred thematic alternative.

Detailed documentation of the IPWP development, including background technical data, stakeholder evaluation process and descriptions of the overall preferred thematic alternative is provided in a separate document titled ***Integrated Plan for the Wastewater Program.*** This Summary Statement is included as a section of that document and is the only section formally developed and approved by the Steering Group.

The following table summarizes the assumed levels of performance of the Steering Group's preferred thematic alternative based on policy-level technical analyses for Year 2020:

Features of the Steering Group's Preferred Thematic Alternative

Service Function	Level of Implementation [1]
Wastewater Collection and Treatment	Focus on building new treatment facilities "upstream" in the system and size collection facilities to convey less flow "downstream" at the Hyperion Treatment Plant. Because there are adequate solids treatment processes downstream at the Hyperion Treatment Plant and Terminal Island Treatment Plant, it was assumed that these new upstream facilities would not include solids treatment processes.
Recycled Water	Beneficially reuse approximately 80% of the "recyclable" water in the system, of which use approximately 48% for irrigation, approximately 17% for industry, approximately 27% for groundwater recharge, and approximately 8% for environmental enhancement.
Inflow and Infiltration into the wastewater system	Reduce by approximately 50% through inflow reduction programs (approximate 13% reduction) and infiltration reduction programs (approximate 37% reduction), based infiltration and inflow generated from a 10-year, 24-hour duration storm.
Water Conservation	Continue current planned conservation programs, and increase conservation efforts beyond what is currently planned. It was estimated that these combined efforts would reduce potable water demand in year 2020 by approximately 18% (compared to 1990 levels).
Dry Weather Urban Runoff	Prevent approximately 38 million gallons per day from entering the receiving waters by diverting them to the wastewater system (22 million gallons per day) and to their own treatment facilities for reuse (16 million gallons per day).
Wet Weather Urban Runoff	Capture and beneficially use approximately 50% of the annual average wet weather urban runoff through onsite percolation treatment controls (approximately 20%) and storage and reuse facilities (approximately 30%).
Biosolids Management	Reuse 100% of biosolids generated at the wastewater treatment facilities.

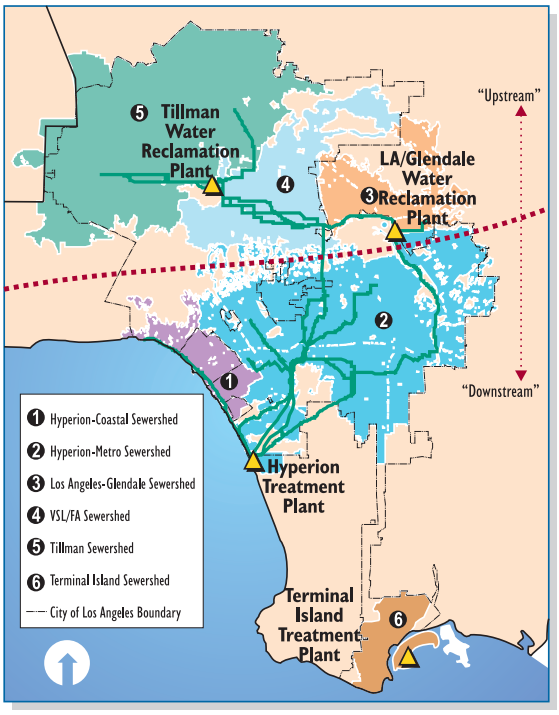
Note: [1] The assumed level of implementation for the Steering Group's preferred thematic alternative was based on broad technical analyses appropriate for policy-level planning. The actual levels of implementation will be further refined in the next, more detailed, phase of facilities planning.

RECOMMENDED ELEMENTS OF PLANNING POLICY

At the completion of the evaluation process, the Steering Group identified the structural and non-structural elements of an approach that would do the best job in addressing the system needs for the Year 2020 while meeting the individual objectives of the Steering Group. The following discussion presents both the majority and minority viewpoints of the interviewed Steering Group members. The broad elements that are recommended by the majority of the Steering Group for consideration by City Council in water resources planning are as follows:

Building new wastewater facilities "upstream" in the system

Under all conditions, there will be a need to construct and operate new or expanded wastewater facilities. Through the IPWP process, it has been shown that facilities placed upstream in the system offer greater opportunities for system operational flexibility, for beneficial reuse of treated effluent, and for reducing dependency on imported water for such uses as irrigation, industrial use, etc.



For wastewater system planning, the City of Los Angeles service area was split into "upstream" and "downstream" areas

For these reasons, all (31) of the interviewed Steering Group members prefer the building of new wastewater facilities in the upper part of the system. Because there are adequate solids treatment processes downstream at the Hyperion Treatment Plant and Terminal Island Treatment Plant, it was assumed that these new upstream treatment facilities would not include solids treatment processes.

Producing and using as much recycled water as possible from the existing and planned facilities

Treated wastewater should be recognized as a valuable water resource, not a nuisance product to be disposed. Because of our location in Southern California, the need to maximize opportunities to responsibly use recycled water must be recognized. *For this reason, all (31) of the interviewed Steering Group members support maximizing recycled water opportunities.*

The IPWP Steering Group tours the Donald C. Tillman Water Reclamation Plant

Recycled water can be used for irrigation, industrial uses, environmental enhancement and groundwater recharge. *All (31) of the interviewed Steering Group members would support the use of recycled water for irrigation and industrial uses.* The majority (19) of the interviewed Steering Group members would support the use of recycled water for any use. Five Steering Group members strongly preferred using recycled water for irrigation, industrial uses and groundwater recharge, rather than for environmental enhancement. Four Steering Group members strongly preferred using recycled water for irrigation, industrial uses and

environmental enhancement, rather than for groundwater recharge. Two Steering Group members were concerned with using recycled water for groundwater recharge; one member did not want it due to technical/public health issues, and the second member did not want it unless the concept had been approved by the public through a voting/referendum procedure.

All Steering Group members support providing a public education program on the benefits and risks associated with using recycled water.

Reducing the amount of rainfall-dependent inflow and infiltration as much as possible

During wet weather conditions, the wastewater system should be used to convey and treat wastewater, not wet weather urban runoff (i.e., stormwater) that makes its way into the system. Inflow and infiltration (I/I) of stormwater reduces conveyance capacity, increases the hydraulic demands at treatment plants, shortens the effective design lives of both types of facilities, and increases operation and maintenance costs.

Maintenance hole cover inserts prevent stormwater from making its way into the wastewater system

For these reasons, the majority (26) of the interviewed Steering Group members support reduction in inflow and infiltration. Five Steering Group members prefer demand management techniques other than I/I reduction, or they prefer only a minimal I/I reduction program. These Steering Group members cited objections to potential work on private property, noting that a "collective" rather than decentralized approach was more favorable to them, and/or they expressed concerns regarding the reliability and cost-effectiveness of I/I reduction.

Increasing the level of water conservation beyond what is currently planned

Water conservation programs have proven to be effective, especially whenever the public appreciates both the need to conserve and the resultant benefits that accrue. In Southern California, water conservation is an important aspect of daily life, and the sustainable use of available water resources is paramount to quality of life and environmental resources. The energy crisis has emphasized the importance of considering conservation as a means to meet needs.

Recognizing the reduction in the availability of imported water and the resultant wastewater flows generated, the majority (27) of the interviewed Steering Group members support increased levels of water conservation beyond the levels currently planned by the Department of Water and Power. These Steering Group members also support the concept of responsibility and accountability of each individual user to help eliminate water waste. Three Steering Group members, while supporting increased conservation, preferred a moderate program involving the City's plan to increase market penetration of current conservation efforts. Four Steering Group members were either somewhat or fully satisfied with the current levels of conservation, and felt that additional conservation would be less desirable. These Steering Group members expressed concern that new programs could be unnecessary or could promote undesired growth.

Increasing the amount of dry weather urban runoff that is diverted and treated or captured and beneficially used

The primary benefit of increased dry weather urban runoff diversion will accrue in reduced pollution throughout the City's waterways; this will have a major impact on the region's quality of life. In addition, dry weather urban runoff could potentially provide additional beneficial water reuse opportunities.

To protect all beneficial uses, all (31) of the interviewed Steering Group members supported a moderate dry weather urban runoff program. *Of these members, the majority (26) support an extensive dry weather urban runoff capture and beneficial reuse program.* It was assumed that these diversions would not impair the beneficial uses of the receiving waters. Five members expressed concerns regarding the technical feasibility and cost-effectiveness of an extensive program.

One member considered diversions as a near-term solution and preferred a long-term goal of preventing pollution of dry weather urban runoff, thereby keeping waters needed for beneficial uses in the rivers and streams in the Los Angeles basin.

Increasing the amount of wet weather urban runoff that can be captured and beneficially used

By capturing and beneficially using wet weather urban runoff, the City has the opportunity to further reduce its dependence on imported water. *For this reason, all (31) of the interviewed Steering Group members support capturing and beneficially using wet weather urban runoff.*

Steering Group member Andy Lipkis leads a tour of the Tree People BMP House in Los Angeles

Beneficially reusing biosolids

The requirements for biosolids beneficial reuse continue to become more stringent at the reuse locations and therefore require increased levels of treatment. The City's current beneficial use arrangements in Kern County will, at the very least, require the production of Class "A" biosolids in the very near future. Opportunities at alternative reuse locations will likely be similarly restrictive. However, the Steering Group recognizes the benefits to the community of the beneficial reuse of this important resource.

City staff demonstrates the beneficial use of biosolids at the Green Acres Farm in Kern County

Therefore, almost all (29) of the interviewed Steering Group members support the beneficial reuse of biosolids. Where possible, biosolids should be beneficially reused locally (within Los Angeles County). For one Steering Group member, a moderate amount of biosolids reuse was preferable to reuse of all biosolids because of concerns regarding the safety of some reuse methods. One other Steering Group member would be equally satisfied with any level of biosolids reuse. Several Steering Group members supported biosolids handling "upstream" at point of generation (i.e., decentralized treatment), rather than downstream at one central treatment facility (e.g., Hyperion Treatment Plant).

Steering Group members and City staff admire the crops grown in soil fertilized with biosolids at theGreen Acres Farm

Focusing on lower-cost solutions, within the framework of the policy elements noted above

Providing for improvements in, and maintenance of, wastewater, recycled water, stormwater and water services that are adequate for meeting future needs may require increased investment in the programs which, in turn, could result in increased user costs. A wide range of possible costs for future actions is indicated by the alternatives studied in the IPWP process. In fact, individual economic preferences were considered in selecting the Steering Group's preferred thematic alternative. Many alternatives feature options that require significant investments, yet offer the added value of achieving level-of-service and environmental goals that are important for the City and may result in economic savings over time. Nonetheless, it is possible, within the scope of the desired options and policies outlined above, to strive for the lowest cost solutions that meet performance requirements.

For these reasons, the majority (25) of the interviewed Steering Group members support the use of lower cost solutions where they are available within the framework of the other policy elements.

Of this majority, some (15) members indicated a maximum cost (which varied) above which they would be completely unsatisfied. Six Steering Group members did not favor lower cost solutions. Of these six members, three of them expressed no preference with regard to costs, i.e., they indicated that they would be equally satisfied with any monthly household cost required by any alternative within the range of consideration. The three others felt that lower cost solutions might not offer the benefits and flexibility that moderate spending could provide, and they indicated a preference for costs within the middle of the expected range. Some members support a "growth-pays-for-growth" concept.

Within each of these elements, the Steering Group identified specific planning policy recommendations that should be used in moving forward with wastewater facilities planning. In addition, the Steering Group also developed programmatic planning policy recommendations that addressed a wide range of the "non-technical" elements. These programmatic policy recommendations were seen as overarching and enhancing the entire process.

SPECIFIC PLANNING POLICY RECOMMENDATIONS

Based on the work accomplished in the IPWP, the Steering Group was able to recommend a series of policies that should be used by the City to guide facilities development in an integrated manner. These specific recommendations include action items, which, at a minimum, should be carried forward in the immediate future. Additional steps will also need to be developed in the future to ensure implementation by Year 2020. Also, these recommendations are not intended to preclude consideration of additional technical recommendations and action items that achieve the Steering Group's stated policy objectives.

Wastewater Treatment Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed building new treatment facilities upstream in the system. Because there are adequate solids treatment processes downstream at the Hyperion Treatment Plant and Terminal Island Treatment Plant, it was assumed that these new upstream facilities would not include solids treatment processes.

Specific Recommendations

Locate new wastewater treatment facilities in the upstream portions of the service area to maximize the potential for water reuse in the future.

Consider community impacts in evaluating potential sites for new facilities, including the proximity of new facilities to population.

Coordinate wastewater treatment facilities planning with other activities (inflow/infiltration reduction; water conservation; dry weather flow diversions) so that the need for expansion and/or new construction is minimized.

Continue to monitor technological developments and conduct appropriate pilot plant operations that could result in improved treatment quality as well as reduced operation and maintenance costs, including waterless treatment technology for onsite uses.

Ensure that all wastewater treatment operations comply, at a minimum, with all federal, state and local requirements.

Steering Group members visit the Donald C. Tillman Water Reclamation Plant in the San Fernando Valley

Action Items

Identify the sequence and timing for treatment facilities planning.

Regularly monitor population projections, water consumption rates and wastewater generation information to verify planning needs.

Establish a water quality forum to discuss environmental issues, upcoming regulations and public education programs.

Continue to implement the industrial source control program and regularly consider updates to address potential new industries not currently covered in the program.

Investigate, and implement as appropriate, options for denitrification (e.g., mechanical/biological unit processes, constructed wetlands, etc.).

Wastewater Collection System Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed building new treatment facilities upstream in the system and sizing the collection facilities to convey less flow downstream to the Hyperion Treatment Plant.

Specific Recommendations

Like wastewater treatment facilities planning, coordinate wastewater collection system facilities planning with other activities (inflow/infiltration reduction; water conservation; dry weather flow

diversions) so that the need for new construction is minimized.

Reduce, if not eliminate, all avoidable wastewater overflows system-wide, especially those occurring during dry weather that reach receiving waters. Achieve reductions through proactive enforcement of ongoing programs as well as any enhancements that are necessary or appropriate.

Action Items

Identify the sequence and timing for collection facilities planning.

Increase flow-monitoring locations citywide to improve the calibration of the dynamic hydraulic model of the collection system.

Establish a water quality forum to discuss environmental issues, upcoming regulations and public education programs.

Encourage expedient and reasonable resolution of the outstanding concerns of the community, environmental groups and regulatory agencies.

Water Recycling Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed beneficially using approximately 80% of the "recyclable" water in the system. This assumed level of implementation was based upon broad technical analyses appropriate for policy-level planning. The actual level of implementation will be further refined in the next, more detailed, phase of facilities planning.

Specific Recommendations

Maximize water recycling whenever possible. Focus efforts on irrigation and industrial demands, while continuing to develop environmental enhancement and groundwater recharge uses.

Maximize recycled water usage using expanded upstream plant facilities.

Recycled water is used to irrigate crops

Develop water reuse projects with no significant public health risks.

Continue to monitor technological developments and conduct appropriate pilot plant operations that could result in improved treatment quality that meets public health requirements.

Ensure that all wastewater effluent discharges comply, at a minimum, with all federal, state and local requirements.

Continue to coordinate water-recycling planning on a regional basis.

Promote the growth of demand for, and opportunities for development of, greater water recycling within the Los Angeles basin.

Develop an education program on the benefits and risks associated with recycled water use.

Action Items

Conduct biological study to determine the minimum flow necessary to maintain riparian habitat and aquatic-dependent species in surface waters within the Los Angeles basin.

Protect all beneficial uses of surface waters within the Los Angeles basin.

Provide incentives to encourage recycled water use.

Conduct a cost/benefit analysis for producing and delivering additional recycled water to end-users.

Coordinate with the Department of Health Services to ensure that groundwater recharge meets any requirements necessary to protect public health.

Review the recycled water market, and develop/implement proactive marketing efforts to maximize recycled water use, emphasizing irrigation and industrial purposes.

Seek outside funding (e.g. State, Federal, grants) to support recycled water delivery.

Conduct a cost/benefit analysis of the potential need to increase to higher level of treatment for groundwater recharge if recycled water becomes greater percentage of basin water consumption.

Seek potential partners to share both the costs and benefits of recycled water.

Conduct feasibility study for locations of additional spreading of recycled water in the Los Angeles basin.

Establish a water quality forum to discuss environmental issues, upcoming regulations and public education programs.

Inflow/Infiltration Reduction Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed reducing inflow/infiltration into the wastewater system by approximately 50% through inflow reduction programs (approximate 13% reduction) and infiltration reduction programs (approximate 37% reduction), based upon infiltration and inflow generated from a 10-year, 24-hour duration storm. This assumed level of implementation was based upon broad technical analyses appropriate for policy-level planning. The actual level of implementation will be further refined in the next, more detailed, phase of facilities planning.

Specific Recommendations

Maximize the reduction of inflow into the wastewater collection system.

Maximize the reduction of infiltration into the wastewater collection system.

Maintenance hole inserts reduce inflow

Action Items

Develop agreements with contract agencies to promote correction of inflow problems in their jurisdictions, including corrections on private properties.

Develop an action plan to correct infiltration from private laterals with options for financial assistance for homeowners.

Develop an action plan for sealing the sewers and house connections, and making maintenance holes more watertight.

Develop an action plan for enforcement of existing laws for disconnecting illegal area drains and re-routing downspouts on industrial and residential properties.

Establish goals for inflow source detection in main lines and lower laterals.

Invest in cost-effective infiltration detection methods.

Continue to monitor the system performance to identify any changes in the characteristics for the various sewer basins and incorporate the changes in the ongoing planning, reduction and upgrade efforts as necessary.

Develop an intensive inspection program to ensure results are achieved.

Water Conservation Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed that these combined conservation efforts would reduce potable water demand in 2020 by approximately 18% (compared to 1990 levels). This assumed level of implementation was based upon broad technical analyses appropriate for policy-level planning. The actual level of implementation will be further refined in the next, more detailed, phase of facilities planning.

Specific Recommendations

At a minimum, fully implement the currently planned conservation programs identified by the Department of Water and Power in the 2000 Urban Water Management Plan.

In addition, identify, evaluate, and implement, as appropriate, new opportunities for increased water conservation (beyond those measures already in place or planned).

Monitor technological developments throughout the world and conduct appropriate pilot testing to assess the likelihood of successful implementation in the Los Angeles basin.

Develop a comprehensive methodology for evaluating the "water conservation effectiveness" of new potential water conserving fixtures and appliances that consider both the associated water savings as well as their ability to successfully perform their designed function.

Coordinate the water conservation activities with all future wastewater facilities planning activities.

Action Items

Increase marketing and incentives to complete currently planned ultra-low flush toilet replacement and clothes washer replacement programs.

Invest in landscape water savings marketing and incentives.

Increase marketing and incentives to retrofit commercial, industrial and institutional toilets with ultra-low flush toilets.

Research and study applicability of retrofitting toilets with "Super" ultra-low flush toilets or waterless urinals.

Increase marketing and incentives for retrofitting car washes.

Research and study applicability of xeriscape-based landscape ordinances.

Determine the effects of increased conservation on raw wastewater concentrations and evaluate the impacts on wastewater treatment plant operation.

Bring all users to current conservation standards (e.g., through additional metering and potential subsidy).

Expand public education program.

Periodically review and update the conservation program, including funding/incentive programs.

Establish an enforcement mechanism for conservation ordinances.

Measure success of incentive-based conservation efforts and consider a tiered pricing structure, if needed.

Require all new construction to include individual metering.

Develop a plan for providing individual metering (both new and retrofit) to encourage individual user accountability and responsibility.

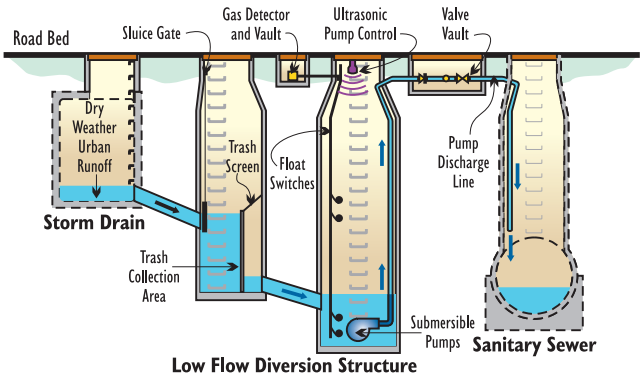
Dry Weather Urban Runoff Management Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed preventing approximately 38 million gallons per day of dry weather urban runoff from entering the receiving waters by diverting them to the wastewater system (approximately 22 million gallons per day) and to their own treatment facilities for reuse (approximately 16 million gallons per day). This assumed level of implementation was based upon broad technical analyses appropriate for policy-level planning. The actual level of implementation will be further refined in the next, more detailed, phase of facilities planning.

Specific Recommendations

Diversions to the wastewater system during dry weather

- *Maximize the amount of dry weather urban runoff in the coastal areas that is intercepted (before it reaches the beaches and the Santa Monica and San Pedro Bays) and diverted to the coastal wastewater collection system for conveyance to the Hyperion Treatment Plant for treatment or diverted to an urban runoff treatment facility for treatment.*



Low flow diversion structures capture dry weather urban runoff in the storm drains and pump it to the wastewater collection system

Treatment

- *Maximize the amount of dry weather urban runoff that is treated in other areas of the City. Treatment could include urban runoff treatment facilities, constructed wetlands technologies to provide a natural pollutant removal process, or a combination of treatment technologies. Compliance with the Standard Urban Stormwater Management Plan will also result in treatment of some dry weather urban runoff.*

Action Items

Diversions:

- *Resolve contractual differences in Contracting Cities Agreement to allow year-round diversions during dry weather. The current agreements prevent diversions during November through March. In the interim, plan/implement seasonal diversions.*
- *Address control issue of existing diversions to allow for year-round diversions during dry weather.*
- *Conduct evaluation of site-specific technical issues related to inflow, sewer capacity, monitoring and diversion controls and automation.*
- *Pilot test select sites for additional diversions for implementability and reliability.*
- *Identify sites for additional diversions, using criteria from evaluation and pilot tests.*
- *Develop agreements with affected agencies for sites identified for potential diversion.*
- *Conduct detailed sewer capacity evaluation to determine availability of excess sewer capacity to accommodate additional diversions.*
- *Conduct cost/benefit evaluation for additional diversions as compared to other treatment options.*

Constructed wetlands provide a natural process to remove pollutants from urban runoff

Treatment:

- *Monitor performance of the existing urban runoff plant with regard to treatment performance, influent water quality variability, operational challenges and costs.*
- *Address site-specific technical challenges related to storm-drain low flow collection and delivery to an urban runoff plant.*
- *Conduct site-specific market identification study to determine availability of potential end users for treated dry weather urban runoff.*
- *Pilot test to identify and fine-tune preferred treatment technologies.*
- *Conduct a cost/benefit analysis to determine the relative trade-offs between capital and operation costs of an urban runoff plant versus additional diversions.*
- *Conduct pilot testing to demonstrate the ability of constructed wetlands to meet water quality goals.*
- *Identify available sites for constructed wetlands.*

Continue development of public education programs and enforcement plans to change the waste disposal behavior for everyone who works or lives in the Los Angeles basin, thereby reducing and eliminating urban runoff pollution.

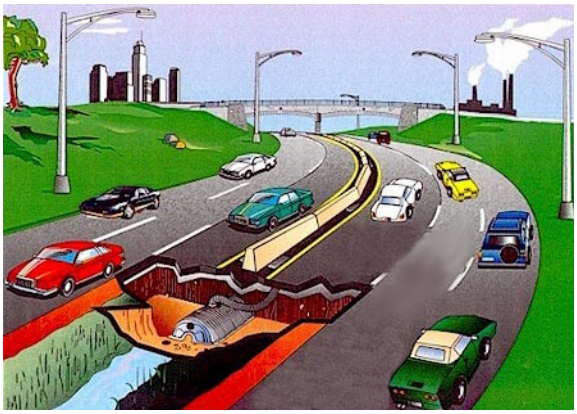
Develop and implement a stormwater management plan with regional and site-specific Best Management Practices to capture, treat or infiltrate wet and dry weather urban runoff to meet runoff capture goals.

Wet Weather Urban Runoff Management Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed capturing and beneficially using approximately 50% of the annual average wet weather urban runoff through onsite percolation controls (approximately 20%) and storage and reuse facilities (approximately 30%). This assumed level of implementation was based upon broad technical analyses appropriate for policy-level planning. The actual level of implementation will be further refined in the next, more detailed, phase of facilities planning.

Specific Recommendations

Maximize the amount of wet weather urban runoff that can be captured and beneficially used through on-site treatment controls using percolation technology. At a minimum, the City should focus on applying this technology to new developments or to areas undergoing redevelopment, as required by the Regional Water Quality Control Board's Standard Urban Stormwater Mitigation Plan.



Onsite percolation controls capture stormwater from streets and percolate it into the ground

Maximize the amount of additional wet weather urban runoff that is captured and beneficially used through a centralized storage facility, decentralized storage facilities (onsite retrofits), or a combination of both.

Promote the concept of multi-purpose facilities in developing wet weather capture and use facilities.

Action Items

Develop and implement a stormwater management plan with regional and site-specific Best Management Practices to capture, treat or infiltrate wet and dry weather urban runoff to meet runoff capture goals.

Maintain, or if possible, improve groundwater quality. Conduct water quality evaluation of best management practice performance.

Conduct site identification study. Screen candidate sites considering soil type, site size, depth to groundwater, groundwater contamination issues, etc.

Conduct percolation studies and soil testing.

Conduct studies to determine pretreatment requirements.

Conduct studies for technical options to meet established water quality standards.

Seek outside sources of funding (e.g., State, Federal, grants).

Select design storm for stormwater capture for sites or projects that extend beyond the current legal requirements (i.e., Standard Urban Stormwater Mitigation Plan).

Research beneficial use options and conduct market survey of potential end users.

Conduct cost/benefit analysis, including infrastructure to deliver water to end-users.

Work with the Upper Los Angeles River Area water master to resolve issues of water "ownership" and permissibility of capturing and using rainwater for landscape irrigation purposes.

Establish agreements with individuals and the Upper Los Angeles River Area water master to permit private parties to capture and beneficially use stormwater in the Upper Los Angeles River Area.

Fully implement the requirements of the Standard Urban Stormwater Mitigation Plan.

Coordinate with the County and other agencies in development of programs.

Consider ordinances to standardize and schedule maintenance of facilities on private properties.

Biosolids Management Recommendations

The following recommendations are based on the Steering Group's preferred thematic alternative. The Steering Group's preferred thematic alternative assumed reusing 100% of the biosolids generated at the wastewater treatment facilities.

Specific Recommendations

Modify treatment processes so that only Class A (or better) quality biosolids are produced at all plants if used for land application.

Beneficially reuse 100% of biosolids produced.

Maximize reuse of biosolids within the City, Contract Agencies, and Los Angeles County whenever it is feasible, environmentally responsible, and in compliance with all regulations.

Action Items

Investigate alternate technologies for producing higher-quality biosolids or new uses of biosolids.

City staff and Steering Group members tour the Green Acres Farm in Kern County

Provide additional research and education of alternative biosolids management technologies (e.g., composting toilets and neighborhood sewage systems). Research would include evaluating potential changes to the building code to facilitate implementation; developing incentives to encourage implementation; investigating appropriate education/ outreach programs; and setting specific implementation targets and schedule.

Encourage the use of biosolids by City residents and investigate any existing City regulations that might restrict biosolids use.

Programmatic Recommendations

Public Health and Safety

All regulations pertaining to public health and safety must be met.

Protecting the Environment

All regulations pertaining to protection of the environment must be met.

Enhance Cost Efficiency

Proper cost accounting practices must be utilized in developing costs for projects and should take into consideration the potential economic benefits associated with a given environmental project (such as job creation, reduced imported water costs, etc.) as well as the additional benefits gained from multi-use projects.

Develop and maintain database of funding sources and partnering opportunities.

Promote Quality of Life

New facilities and programs should be planned and implemented in a way that ensures that no communities suffer disproportionately from adverse human health or environmental effects, and that all people live in clean, healthy, and sustainable communities.

New wastewater facilities should, whenever and wherever possible, be sited in a way that does not concentrate construction in areas that already have experienced recent disruptions.

New facilities should, whenever and wherever possible, enhance public lands.

Promote Education

The public must be involved in the ongoing development of wastewater facilities planning.

IPWP assistant manager Robert Manning explains the wastewater system to the Steering Group members

Design a comprehensive public education program to raise public understanding of wastewater issues, opportunities and implications to enable the public to effectively participate in the policy development conversations and to become partners with the City in implementing conservation strategies.

Develop a public education effort that begins with research to determine the levels of awareness and the best methods to use to achieve the desired level of awareness. At a minimum, the undertaking should cover water recycling benefits and risks, conservation, and urban runoff.

Promote Development of New Technologies

Investigate new technologies showing promise to meet the City's objectives (e.g., cisterns, waterless toilets, etc.)

Promote Cooperation with other Agencies and City Departments

Continue to look for integration opportunities, both within the City and externally with other agencies and groups, to develop partnerships and programs with mutually beneficial goals and objectives.

In summary, the Steering Group has generally recommended a policy of balanced and diversified investments in both the facilities and programs that offer reductions in the demands on infrastructure and efficient use of facilities and resources. Their views reflect a profound respect for the community, the environment, and the natural and fiscal resources that the City has been entrusted with protecting. This Summary Statement is not intended to preclude consideration of additional technical recommendations and action items that achieve the Steering Group's stated policy objectives. The policy objectives in this Summary Statement are intended for broad planning purposes and community outreach efforts only and should not be used for other purposes without Steering Group notification and acceptance.

The Steering Group has demonstrated a desire to provide ongoing input in the future of potable water, wastewater, recycled water and stormwater in the City, as well as a commitment to public education on the importance of integrated resource management. Their collective efforts have produced a vision of the future that should improve the environment and help sustain a high quality of life for the diverse communities of Los Angeles.

CONFIRMATION OF SUMMARY STATEMENT RECOMMENDATIONS

The Steering Group confirms that it has participated in the IPWP process and that the recommendations contained in this Summary Statement reflect the work that has been completed.

We have participated in this process and assisted in the development of these policy recommendations because we want to be sure that Los Angeles has adequate water supply, wastewater treatment, flood control, and stormwater pollution prevention, while protecting and restoring our environment and improving our quality of life. With comprehensive planning and bold innovations, we can attempt to ensure that we meet the needs of Los Angeles.

Steering Group Member	Date	Comments
Domingo Leon for the Society Hispanic Engineers Domingo F. Leon	9-18-2001	It was a great honor for me to represent the hispanic constituency in this Steering group to assess the future of the waste water plant of L.A.
PHILLIP C. HAGAR FOR THE APARTMENT ASSOCIATION OF GREATER LOS ANGELES Phillip C. Hagar		"THIS IS JUST THE BEGINNING OF THE JOURNEY"
Cherie Mann North Valley Coalition Cherie Mann	9/18/01	Yes! Give hope for the future
D.R. "Curt" Curtiss Past President Westchester Revitalization Curt Curtiss		Now to implement

Confirmation of Summary Statement Recommendations

Steering Group Member	Date	Comments
Johnnie Raines	9/19	Happy to have been a part of the Program
Deborah Berg	9/19/01	Thank you for the opportunity to participate in this impressive effort
Lucia M. McGovern	9/20/01	It was great to provide input on something very vital to the City's infrastructure
Scott Wilson	9/21/01	Nice to implement the vision
Charles A. Tolbert	9/21/01	Thanks for the opportunity to be a part of making history I've learned a lot.
Mark Gold	9-24-01	Heal the Bay is eager to help the City implement this progressive vision
Julie Inouye Vista del Mar Neighbors Assoc. Playa del Rey	9/24/01	Thank you for being leaders in this "New Direction" for the City of L.A. Now, let's make our ideas become reality!

Steering Group Member	Date	Comments
Polly Ward	9/24/01	I'm impressed by the outreach into the greater community
Andy Lipkis	9/24/01	This is the exact integration of programs that TreePeople has been pushing for 10 years. We're here to make it happen
Charles Brink	9-24-01	a good first start
Zigmund Vays	09/25/01	It was a great example of productive team work
Cindy O'Connor	9/25/01	Exactly the way public business should be done
Charles Church	9/25/01	Thank you FOR TRYING TO PREPARE FOR THE FUTURE.
Charles Gremer		Keep up the good work. You've given me a lot of education. I hope I helped you out

Confirmation of Summary Statement Recommendations

Steering Group Member	Date	Comments
Steve Fleischli	9/25/01	Let's settle that Semque case.
Sheila H. Bernard	9/26/01	I don't want Los Angeles to die of thirst. We need to handle water in a new way.
William T. Savage, Jr.	9/26/01	We are very fortunate to have a group of advisors to lead us thru the labyrinth to better use of resources.
John S. Lang	9/26/01	LET'S BUILD IT RIGHT!
Gary Futral	9/28/01	Relying on our infrastructure
James R. Davis II	9/28/01	This is a good start
Dorothy Green	10/3/01	The process has been extra-ordinary. Keep up the good work.

Steering Group Member	Date	Comments
Linda Scheid	10/9/2001	Lets keep the process going. Great Start.
Elenore A. Williams	10/9/01	I was proud to participate on this very important project affecting water for Ut. in the future.
Dr. Daniel L. Morgan	10/11/01	delighted to serve the community & department in such meaningful fashion
Judith L. Schwartze	10/11/01	The process was excellent - and thorough and reached the interested community of stakeholders
Deborah J. Smith	11-8-01	We look forward to working with the City to make water a safe and sustainable resource for this region.

IPWP Steering Group

Monica Avila, Pacoima Neighborhood Watch
Andrew H. Barrera, Valley Economic Development Center, Inc.
Deborah Berg, Women's Transportation Seminar
Sheila H. Bernard, Lincoln Place Tenants Association
Charles Brink, Resident of Van Nuys
Maria Lou Calanche, USC - Civic & Community Relations
Charles Church, Resident of Canoga Park
Joe Coria, Boyle Heights Chamber of Commerce
Curt Curtiss, Westchester Vitalization Corporation
James R. Davis, II, National Institute for Communities Enlightenment
Rocky Delgadillo, Resident of Los Angeles
Carlos Ferreyra, Valley Glen Neighborhood Association
Steve Fleischli, Santa Monica Baykeeper
Gary Futral, Engineering Contractors Association
Judy Garris, Santa Susana Mountain Park Association
Mark Gold, Heal the Bay
Charles Gremer, West Hills Property Owners Association
Dorothy Green, Los Angeles - San Gabriel Rivers Watershed Council
Mary Hambel, City of Culver City/RBF
Phillip C. Hagar, Apartment Association of Greater Los Angeles
Jonathan Hou, California Chinese American Association of Construction Professionals
Julie Inouye, Vista Del Mar Neighborhood Association
John S. Lang, South Shores Homeowners Association
Larry Lehtihalme, Resident of Granada Hills
Domingo F. Leon, Society of Hispanic Professional Engineers, Inc.
Andy Lipkis, Tree People
William G. Luddy, Carpenters/Contractors
Elsa Lopez, Madres de Este de Los Angeles/Santa Isabel
Cherie Mann, North Valley Coalition
Gretchen Martin, Resident of Chatsworth
Lucia M. McGovern, West Basin Municipal Water District
Daniel L. Morgan, Guidance Church of Religious Science
Cindy O' Connor, League of Women Voters of Los Angeles
Manuel Padron, Resident of Marina Del Rey
Ray Pearl, Building Industry Association
Johnnie Raines, 8th District Empowerment Congress
Lynne Joy Rogers, Los Angeles Urban League Business
William T. Savage, Jr., Westwood Hills Property Owners Association
Linda Scheid, Miracle Mile Apartment Association
Judith L. Schwartze, Central City Association
Jayne Shapiro, Resident of Encino
Deborah J. Smith, Regional Water Quality Control Board
Wesley Staples, Cahuenga Hills Tennis Condominiums
Bruce Steele, Occidental College
Jesse C. Taylor, Jr., SEIU Local 347
Charles A. Tolbert, New Life Academy/Apostolic Faith Home Assembly
Zigmund Vays, Community Enhancement Services
Victor N. Viereck, North Hollywood Residents Association
Alonzo Villarreal, La Collectiva
Polly Ward, Studio City Residents Association
Geraldine Washington, NAACP
Brian Whelan, US Army Corps of Engineers
Elenore A. Williams, Habitat for Humanity
Scott Wilson, North East Trees

I N M E M O R I U M

Robert Manning
1962 - 2001

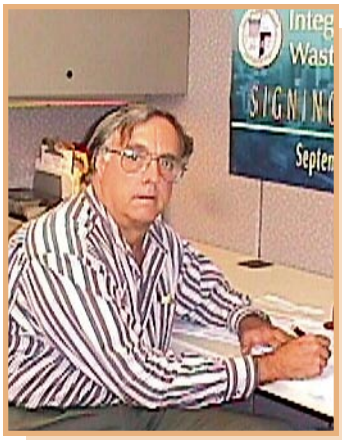
Johnnie Raines
1925 - 2001

They helped realize this vision for a better Los Angeles

Domingo F. Leon

Society of Hispanic
Professional Engineers, Inc.

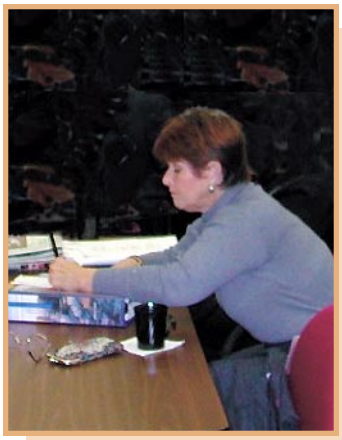
"It was a great honor to represent the Hispanic constituents in the Steering Group to assess the future of the Wastewater Plan of L.A."



Phillip C. Hagar

Apartment Association
of Greater Los Angeles

"This is just the beginning of the journey."



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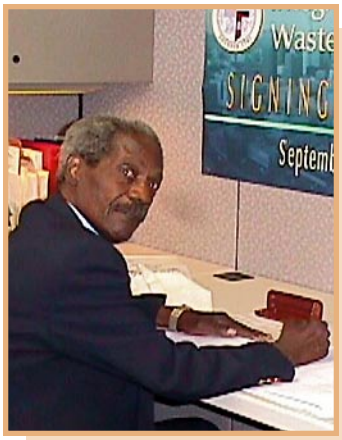

Johnnie Raines

8th District
Empowerment Congress

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Scott Wilson
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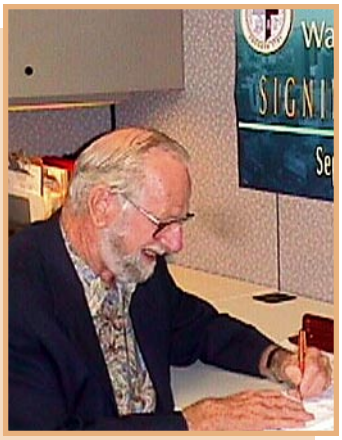

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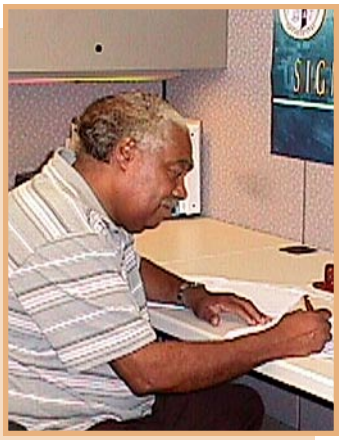

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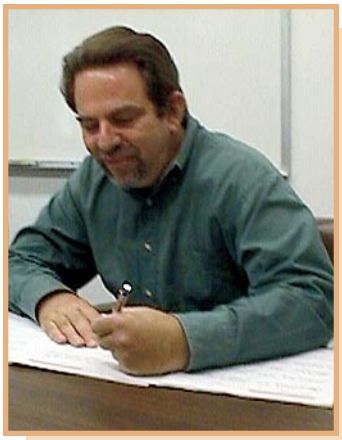

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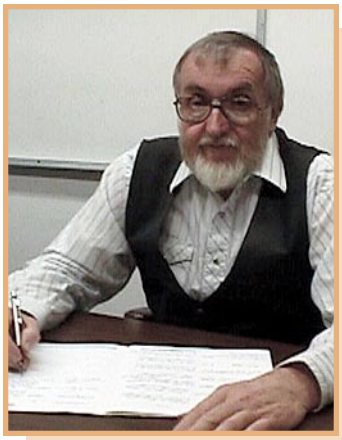
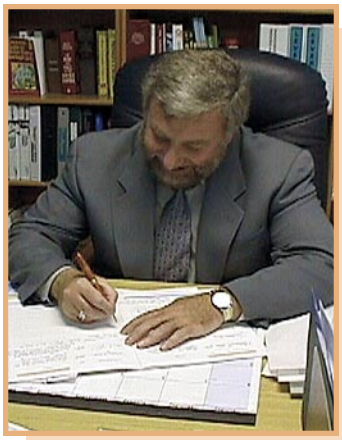


Charles Brink

Resident of Van Nuys

"A good first start."



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Community Enhancement Services

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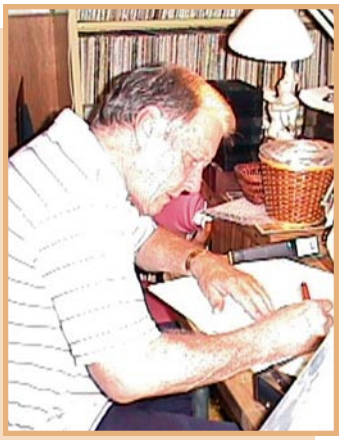

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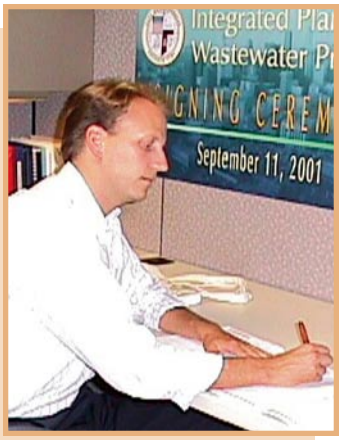
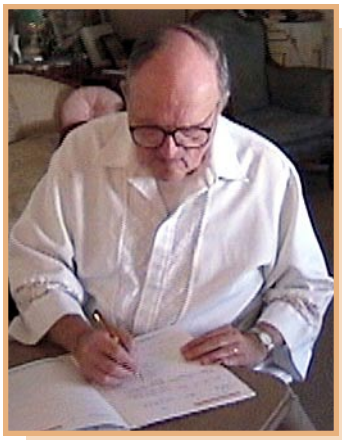
Santa Monica Baykeeper

"Let's settle that sewage case!"



Sheila H. Bernard
Lincoln Place Tenants Association

"I don't want Los Angeles to die of thirst. We need to handle water in a new way."

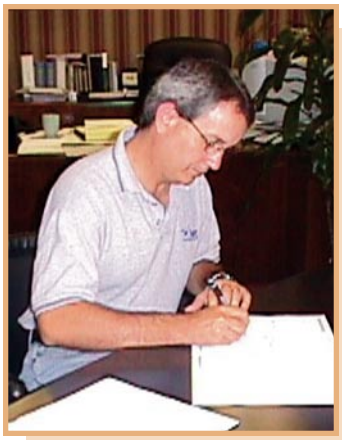


William T. Savage, Jr.
Westwood Hills
Property Owners Association

"We were very fortunate to have a group of advisors to lead us through the labyrinth to better use of our resources."

John S. Lang
South Shores
Homeowners Association

"Let's build it right!"



Gary Futral
Engineering Contractors
Association

"Relying on our infrastructure."

James R. Davis, II
National Institute
for Communities Enlightenment

"This is a good start."

Dorothy Green
Los Angeles-San Gabriel Rivers
Watershed Council

"The process has been extraordinary. Keep up the good work."

Linda Scheid
Miracle Mile Apartment Association

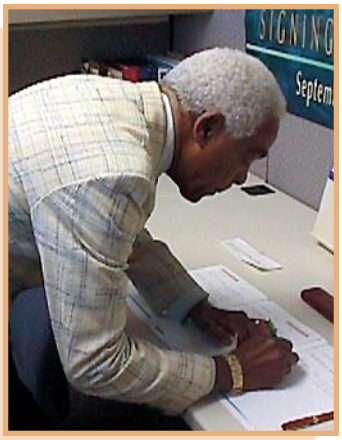
"Let's keep the process going. Great start."

Elenore A. Williams
Habitat for Humanity

"I was proud to participate in this very important project affecting water for L.A. in the future."

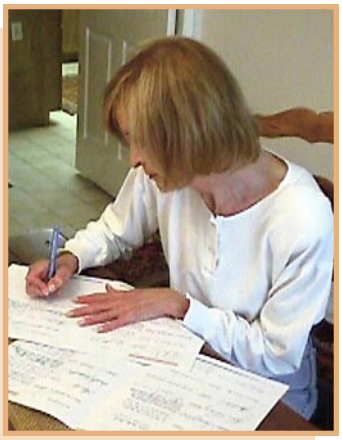
Dr. Daniel L. Morgan
Guidance Church
of Religious Science

"Delighted to serve the community and department in some meaningful fashion."



Judith L. Schwartze
Central City Association

"The process was excellent and thorough and reached the entire community of stakeholders."



Deborah J. Smith
Regional Water Quality
Control Board

"We look forward to working with the City to make water a safe and sustainable resource for this region."

Glossary of Terms

Basin
A drainage area whose boundary is dictated by gravity flow.

Beneficial uses
Designations for water bodies that (in California) Regional Water Quality Control Boards establish so appropriate water quality objectives can be established for that water body. The designated beneficial uses, together with water quality objectives form water quality standards. Such standards are mandated for all water bodies within the state under the California Water Code. In addition, the federal Clean Water Act mandates standards for all surface waters, including wetlands. In the Los Angeles Region, there are 24 Beneficial Use designations. Example designations include Municipal and Domestic Supply (MUN), Water Contact Recreation (REC-1), Wetland Habitat (WET), and Marine Habitat (MAR).

Best Management Practice (BMP)
Any program, technology, process, siting criteria, operating method, measure or device that controls, prevents, removes, or reduces pollution.

Biosolids
Solid materials resulting from wastewater treatment that meets government criteria for beneficial use, such as for fertilizer.

Class A biosolids
A designation established by the U.S. Environmental Protection Agency in the Standards for the Use or Disposal of Sludge (40 CFR 503), in which disinfection processes reduce pathogen levels in biosolids to "below detectable levels."

Collection system
The network of piping and pumping stations that conveys raw wastewater (sewage) from homes, businesses, etc., to a facility for treatment.

Composting
An enhanced process of rapidly oxidizing a solid material using atmospheric oxygen.

Conservation
Act of using the resources only when needed for the purpose of protecting from waste or loss of resources.

Conserve
To save a natural resource, such as water, through intelligent management and use.

Constructed wetlands
Wetlands that are designed and built similar to natural wetlands; some are used to treat wastewater. Constructed wetlands for wastewater treatment consist of one or more shallow depressions or cells built into the ground with level bottoms so that the flow of water can be controlled within the cells and from cell to cell. Roots and stems of the wetland plants form a dense mat where biological and physical processes occur to treat the wastewater. Constructed wetlands are being used to treat domestic, agricultural, industrial, and mining wastewaters.

Contamination
The state of being contaminated or impure (not pure) by contact or mixture; the state of having a substance introduced into the air, water, or soil that reduces its usefulness to humans and other organisms in nature.

Contracting cities/agencies
Neighboring cities or agencies in the Los Angeles area that rely on the City of Los Angeles to provide wastewater treatment and disposal services, through a formal agreement.

Discharged
Released into a water body.

Disposal
A disposing of or getting rid of something, as in the disposal of waste material.

Downstream
In the direction of a stream's current.

Dry weather urban runoff
Runoff to the storm drain system that occurs when there is no measurable precipitation. Typically includes flows from car washing, landscape irrigation, street washing, dewatering during construction activities, and illicit connections and dumping into the storm drains.

Dynamic hydraulic model
A computer program designed to simulate how a system performs over time, under varying flow conditions.

Effluent
Treated water (or product) leaving a facility.

Environmental justice
The fair treatment of people of all races, cultures and income levels with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Environmental Protection Agency (EPA)
The U.S. agency responsible for efforts to control air and water pollution, radiation and pesticide hazards, ecological research, and solid waste disposal.

Gravity
The force of attraction, characterized by heaviness or weight, by which terrestrial bodies tend to fall toward the center of the earth.

Groundwater
Water that infiltrates into the earth and is stored in usable amounts in the soil and rock below the earth's surface; water within the zone of saturation.

Groundwater discharge
The flow or pumping of water from an aquifer.

Groundwater recharge
The addition of water to an aquifer.

Habitat
The arrangement of food, water, shelter, and space suitable to animal's needs.

Impermeable
Impassable; not permitting the passage of a fluid through it.

Industrial source control program
An established pre-treatment program for industries, which requires removal of constituents from their wastewater before it enters the City's wastewater collection system, i.e., the pollutants are removed or controlled by the generator (or user) rather than by the City.

Infiltration
See Rainfall-Dependent Infiltration (RDI)

Inflow
That portion of precipitation that enters sewers through holes in maintenance holes and through roof leaders by illegal connection.

Infrastructure
The underlying foundation or basic framework of a system.

Maintenance hole
An opening that allows a person to gain access to a structure.

National Pollutant Discharge Elimination System (NPDES)
Part of the Clean Water Act requiring municipal and industrial wastewater treatment facilities to obtain permits which specify the types and amounts of pollutants that may be discharged into water bodies.

National Water Quality Standards
Maximum contaminant levels for a variety of chemicals, metals, and bacteria set by the Safe Drinking Water Act.

Natural resource
Something (as a mineral, forest, or kind of animal) that is found in nature and is valuable to humans.

Non-permeable surfaces
Surfaces that will not allow water to penetrate, such as sidewalks and parking lots.

Onsite retrofits
Improvements or management practices that manage runoff before it reaches the storm drain system.

Percolation
The gradual downward flow of water from the surface of the earth into the soil.

Percolation studies
Investigations to determine how much water can flow from the surface of the earth into the soil.

Pilot tests
Small-scale applications intended to demonstrate the applicability of a process if applied in a larger scale.

Pollutant
An impurity (contaminant) that causes and undesirable change in the physical, chemical, or biological characteristics of the air, water, or land that may be harmful to or affect the health, survival, or activities of humans or other living organisms.

Population
The organisms inhabiting a particular area or biotope.

Potable
Fit or suitable for drinking, as in potable water.

Rainfall- Dependent Infiltration (RDI)
Rainfall runoff that enters a sewer system and service connections from the ground during, after, and as a result of a rainfall event, through such sources as (but not limited to) defective pipes, pipe joints, connections, and maintenance holes.

Recharge
Replenish a water body or an aquifer with water.

Reclaim
To return to original condition.

Reclaimed water
See recycled water

Recyclable
In the context of the IPWP, refers to wastewater flows to plant sites that either have recycling facilities or could accommodate them, or to flows from Hyperion that could be exported to West Basin Municipal Water District for additional treatment. For the IPWP, the total 2020 "recyclable" flows were estimated to be 420 million gallons per day.

Recycled water
Treated wastewater that can be used to offset potable drinking water use. Recycled water can be used for irrigation, industrial uses and groundwater recharge.

Regional Board
Regional Water Quality Control Board (RWQCB): California agencies that implement and enforce Clean Water Act NPDES permit requirements, and are issuers and administrators of these permits as delegated by the EPA. There are nine regional boards working with the State Water Resources Control Board.

Reuse
To use again, especially after reclaiming or reprocessing.

Riparian
Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.

River
A large natural stream emptying into an ocean, lake, or other water body.

Runoff
Water that flows across surfaces rather than soaking in; eventually enters water body; may pick up and carry a variety of pollutants.

Sewage
Liquid waste conveyed in a sewer; wastewater

Sewer
A pipe or conduit constructed or installed to convey wastewater.

Stakeholder
Someone with an interest or share in a process or project outcome.

Stormwater
Runoff caused by rainfall.

Stormwater system
The system used for the collection of wet weather urban runoff.

Thematic
Of, or relating to, a specific and distinctive quality, characteristic or concern.

Treatment plant
Facility for cleaning and treating fresh water for drinking, or cleaning and treating wastewater before discharging into a water body.

Upstream
In the opposite direction of a stream's current.

Urban runoff
See runoff.

VSL/SA
Valley Spring Lane/Forman Avenue

Wastewater
Spent water after homes, industries, commercial establishments, public places, and similar entities have used their water.

Wastewater treatment
Physical, chemical, and biological processes used to remove pollutants from wastewater before reusing or discharging it into water body.

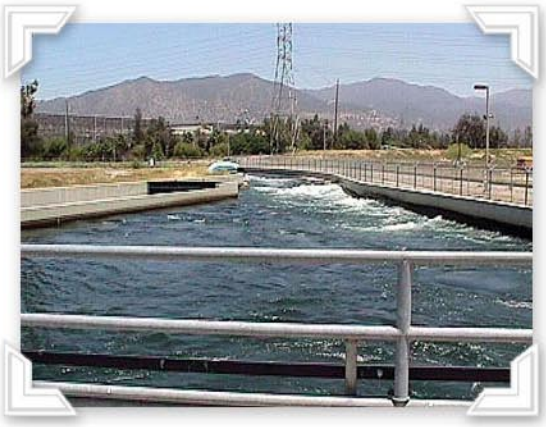
Water conservation
Practices that reduce water use.

Water cycle
The cycle of the earth's water supply from the atmosphere to the earth and back, which includes precipitation, transpiration, evaporation, runoff, infiltration, and storage in water bodies and groundwater. Also referred to as the "hydrologic cycle".

Water quality
The condition of water with respect to the amount of impurities in it.

Watershed
Land area from which water drains to a particular water body.

Wet weather urban runoff
Water (originating as precipitation) that flows across surfaces rather than soaking in; eventually enters water body; may pick up and carry a variety of pollutants.

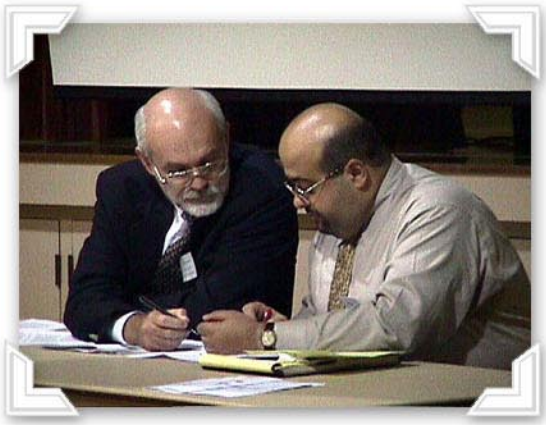



OZONE CONTACTOR
TRAIN 4


Elements of the Wastewater System
Wastewater


Technical Memorandum


Freshwater Reservoir



Camp Dresser & McKee and CH2MHILL in cooperation with the City of Los Angeles

Appendix C
Potential Water Savings from Implementing Smart Irrigation Devices

Appendix C
Potential Water Savings from Citywide Implementation of Smart Irrigation Devices

In 2001, the IRWD conducted a study titled *Residential Weather Based Irrigation Scheduling: Evidence from the Irvine "ET Controller" Study* (IRWD, 2001), which estimated the potential water savings due to implementation of ET controllers. Per the IRWD study, water consumption could be reduced by 35 to 40 gallons per day, or an average 37 gallons per day (gpd) per household. This represents a 7 percent reduction in total household use, and a 16 percent reduction in outdoor use.

Table C-1 presents a summary of potential additional smart irrigation connections by customer class.

Table C-1
Estimate of Potential Smart Irrigation Connections

	A	B	C	D	E	F
Customer Class	**Current (2003) Connections**	**Estimated Potential for Smart Irrigation Devices**		**Potential Growth per year**	**Potential Additional Smart Irrigation Connections by 2020**	**Total Estimated Potential Connections for IRP[1]**
		(%)	**(connections)**			
Single-Family Homes	480,000	80%	384,000	0.7% per year	45,700	429,700
Multi-Family Homes	121,000	50%	60,500	1.0% per year	10,300	70,800
Commercial/Institutional	71,000	20%	14,200	0.1% per year	200	14,400
Total Units	672,000	--	458,700	--	56,200	**514,900**
Weighted Average	--	70%	--	--	--	--

Notes:

[1] For the purposes of the IRP, the total estimated potential smart irrigation connections was used to estimate the upper range of water savings due to Citywide implementation. This approach could over-estimate the water savings since the number of City properties with underground irrigation systems and automatic controllers is unknown. In addition, future implementation would depend on available funding, customer acceptance, reliability, and commercial availability of smart irrigation controllers. More detailed studies would be needed to determine the full benefits of a smart irrigation program.

A: Source: "Department of Water Resources Public Water System Statistics, Calendar Year 2003"

B: Engineers estimate for the IRP. Actual potential will depend on more detailed studies and the success of initial programs.

C = A * B

D: Source: Urban Water Management Plan (2000), Exhibit 2A , For multi-family and commercial, these values represent growth rates lower than reported in the UWMP.

E = C * D * (2020-2003)

F = C + E

Assumptions

- Number of potential smart irrigation connections (see Table C-1): **514,900**
- Per IRWD study, estimated average savings in water per installed smart irrigation connection: **37 gallons per day (gpd)**
- Total number of days that smart irrigation would be used (dry weather days): **270** By analyzing 50 years of rainfall data (see *Volume 3: Runoff Management*) the IRP team identified that on average, there are 26 rain days per year, and by assuming that the day of the rain event and two days after would not require irrigation.

Table C-2 presents a summary of the estimated potential water savings from citywide smart irrigation. For the purposes of the IRP, the average reduction of 37 gpd was applied to single family, multi family and commercial/institutional customer classes throughout the City to estimate the upper range of water savings due to Citywide implementation. This approach could over-estimate the water savings since the number of City properties with underground irrigation systems and automatic controllers is unknown. In addition, future implementation would depend on available funding, customer acceptance, reliability, and commercial availability of smart irrigation controllers. More detailed studies would be needed to determine the full benefits of a smart irrigation program.

Table C-2
Maximum Annual Water Conservation Achieved through Smart Irrigation

Estimated Number of Smart Irrigation Units	Smart Irrigation Device Water Savings (gpd/unit)	Daily Water Conserved Citywide (mgd)	Total Number of Dry Days Per Year	Total Water Conserved Citywide (mg/year)	Total Water Conserved Citywide[1] (acre-ft/yr)
514,900	37	19	270	5,140	15,800

Note: [1]Conversion to acre-ft/yr based on: 43,560 sf/acre, 7.48 gal/cu. ft.
This approach could over-estimate the water savings since the number of City properties with underground irrigation systems and automatic controllers is unknown. In addition, future implementation would depend on available funding, customer acceptance, reliability, and commercial availability of smart irrigation controllers. More detailed studies would be needed to determine the full benefits of a smart irrigation program.

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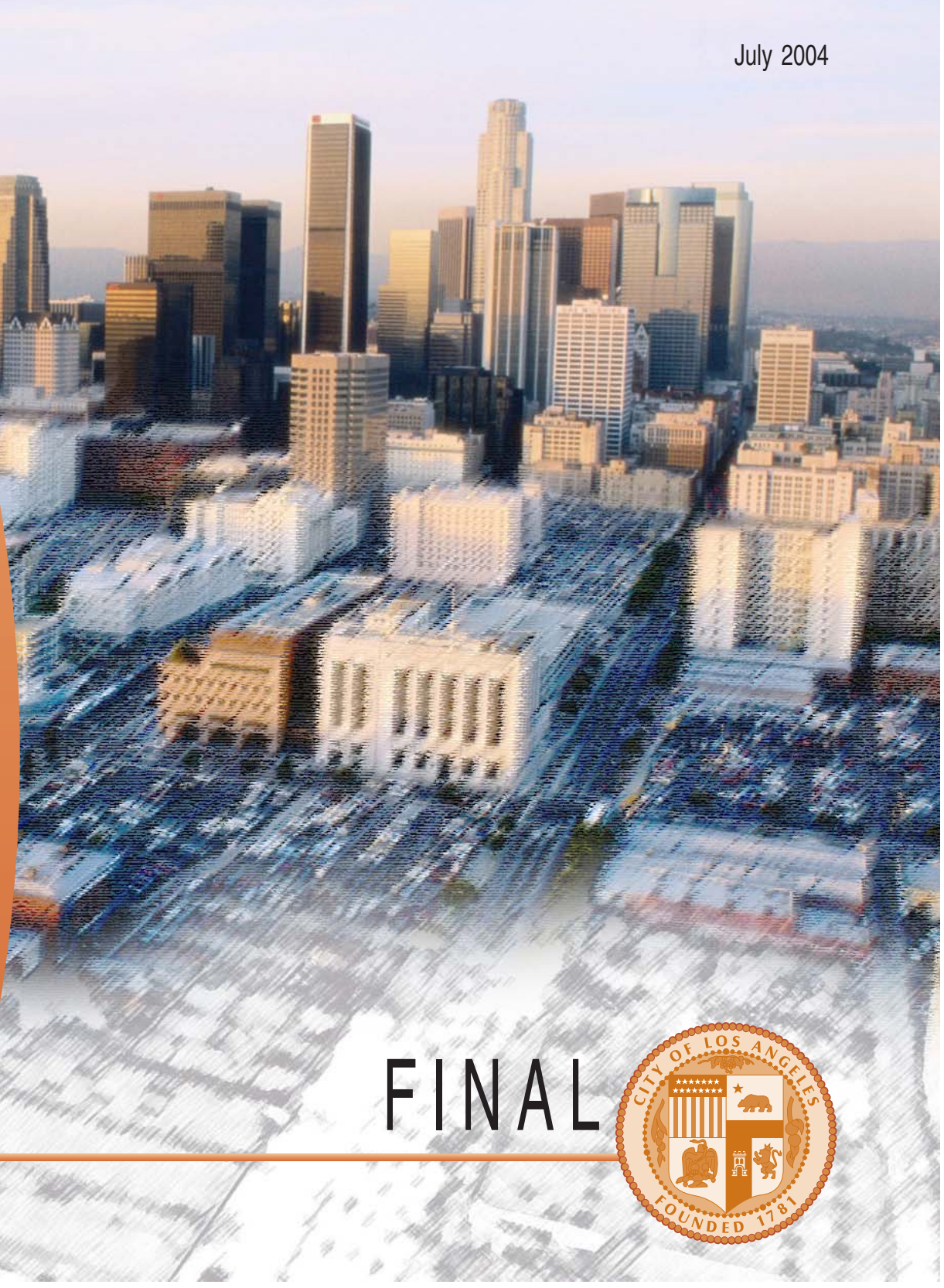
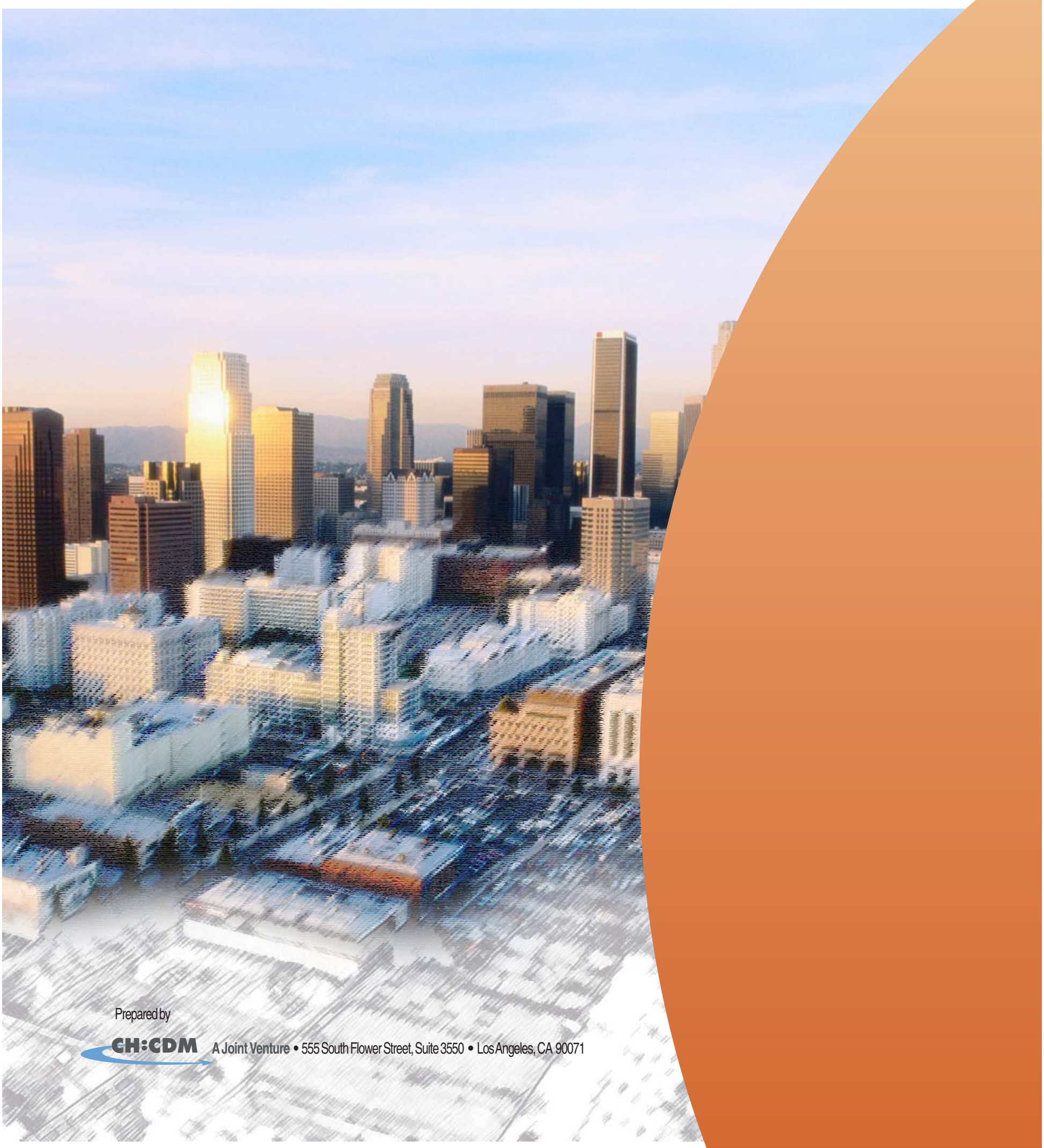


City of Los Angeles
Department of Public Works
Bureau of Sanitation
and
Department of Water and Power

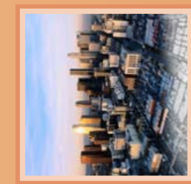
FINAL



Prepared by

CH:CDM A Joint Venture • 555 South Flower Street, Suite 3550 • Los Angeles, CA 90071

FACILITIES PLAN FINAL



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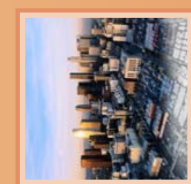

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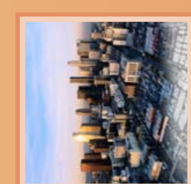

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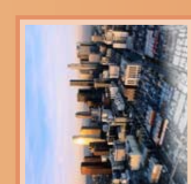

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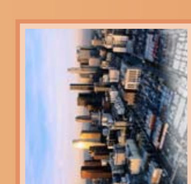

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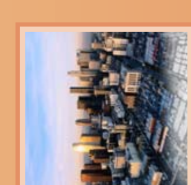

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