This document is released for the purpose of information exchange review and planning only under the authority of Tracy Anne Clinton, September 2017, State of California, PE No. 48199

City of Oxnard

Public Works Integrated Master Plan

RECYCLED WATER

PROJECT MEMORANDUM 4.1
BACKGROUND SUMMARY

REVISED FINAL DRAFT
September 2017

Engineers...Working Wonders With Water™

2700 YGNACIO VALLEY ROAD, SUITE 300 • WALNUT CREEK, CALIFORNIA 94598 • P. 925.932.1710 • F. 925.930.0208

PREFACE

The analysis and evaluations contained in these Project Memorandum (PM) are based on data and information available at the time of the original date of publication, December 2015. After development of the December 2015 Final Draft PMs, the City continued to move forward on two concurrent aspects: 1) advancing the facilities planning for the water, wastewater, recycled water, and stormwater facilities; and 2) developing Updated Cost of Service (COS) Studies (Carollo, 2017) for the wastewater/collection system and the water/distribution system. The updated 2017 COS studies contain the most recent near-term Capital Improvement Projects (CIP). **The complete updated CIP based on the near-term and long-term projects is contained in the Brief History and Overview of the City of Oxnard Public Works Department's Integrated Planning Efforts: May 2014 – August 2017 section.**

At the time of this Revised PWIMP, minor edits were also incorporated into the PMs. Minor edits included items such as table title changes and updating reports that were completed after the December 2015 original publication date.

City Of Oxnard

Public Works Integrated Master Plan

RECYCLED WATER

PROJECT MEMORANDUM 4.1
BACKGROUND SUMMARY

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1
1.1 PMs Used for Reference 1
1.2 Other Reports Used for Reference 2
2.0 GREAT PROGRAM HISTORY 3
3.0 EXISTING RECYCLED WATER SYSTEM 8
3.1 Source Water 8
3.2 Treatment Facilities 8
3.3 Distribution System 12
4.0 REGULATIONS 14
4.1 Current 14
4.1.1 California Code of Regulations - Title 22 15
4.1.2 Groundwater Recharge Regulations 15
4.1.3 Recycled Water State Policy 17
4.1.4 Anti-Degradation Policy 19
4.1.5 Direct Potable Reuse 19
4.1.6 Updates to the 2010 California Plumbing Code 20
4.1.7 City Recycled Water Ordinance 20
4.2 Future (Potential) 20
5.0 RECYCLED WATER DEMAND 21
5.1 Existing Irrigation Recycled Water Uses/Use Agreements 22
5.2 Future Irrigation Recycled Water Use 22

APPENDIX A – EXCERPT FROM 2004 GREAT PROGRAM EIR
APPENDIX B – 2012 GREAT PROGRAM UPDATE
APPENDIX C – NON-POTABLE REUSE DISCHARGE PERMIT
APPENDIX D – RECYCLED WATER ORDINANCE 2728
APPENDIX E – 2009 STATE OF CALIFORNIA RECYCLED WATER POLICY
APPENDIX F – RECYCLED WATER USER AGREEMENT FOR PHASE 1A/B

LIST OF TABLES

Table 1 GREAT Program (and related Recycled Water System) History Summary..... 4
Table 2 AWPF Design Criteria 9
Table 3 Design Criteria for Chemical Support Systems 10
Table 4 Summary of Approved Title 22 Uses of Recycled Water for Irrigation 15
Table 5 Summary of 2014 DDW Regulations for Groundwater Recharge as Applicable to Oxnard 16
Table 6 Recommended CEC Monitoring for Recycled Water System 21
Table 7 Existing and Future Recycled Water Demands 23

LIST OF FIGURES

Figure 1 AWPF Process Schematic 11
Figure 2 Phase 1A (Existing) and 1B (Planned) Recycled Water Distribution System 13

BACKGROUND SUMMARY

1.0 INTRODUCTION

The City of Oxnard (City) is committed to providing recycled water as part of its Groundwater Recovery Enhancement and Treatment (GREAT) Program. Through elements of the GREAT program, the City will have access to a reliable and sustainable water supply of improved water quality, decreasing the City's reliance on imported water. Key components of the GREAT program include the following macro-components:

Recycled Water System:
Treatment to most stringent levels (Advanced Water Purification Facility [AWPF]) and distribution.

Water Supply:
Treatment of groundwater for total dissolved solids (TDS) and nitrate reduction (referred to as a Desalter).

Indirect Potable Reuse (IPR)/Direct Potable Reuse (DPR) Through Groundwater Injection:
Wells that allow for injection of recycled water into and extraction out of the local groundwater aquifer.

Elements Related to Both:
Concentrate Collection and Treatment – Collect and treat concentrate (brine) from both AWPF and desalters.

Recycled water use is a key component of the GREAT program and its use within the City has been studied/planned over many years. A portion of the planned system for providing tertiary treated recycled water for irrigation use has been implemented as will be outlined within this Background Summary. The remainder of the planned systems were reviewed as part of this PWIMP.

1.1 PMs Used for Reference

Other Project Memoranda (PMs) that are referenced and/or expand on the recycled water system needs/recommended projects include:

- PM 2.5 – Water System – Supply and Treatment Alternatives.
- PM 3.1 – Wastewater System – Treatment Background Summary.
- PM 3.2 – Wastewater System – Flow and Load Projections.
- PM 4.2 – Recycled Water System – Infrastructure Modeling and Alternatives.

- PM 4.3 – Recycled Water System – AWPF / OWTP Outfall Regulatory Considerations.
- PM 4.4 – Recycled Water System – Arc Flash Assessment of Blending Stations.
- PM 4.5 – Recycled Water System – Envision Documentation and Certification Summary Assessment.
- PM 4.6 – Recycled Water System – Pathogen Analysis for Direct Potable Reuse (DPR) Summary.
- PM 4.7 – Recycled Water System – Salt and Nutrient Management Plan Summary.

1.2 Other Reports Used for Reference

In developing the alternatives in this PWIMP, recommendations from other reports were incorporated to ensure a well-rounded and holistic look at the water and recycled water systems. The following reports are referenced in this PWIMP analysis:

- Water Reclamation Master Plan, Malcom Pirnie-Montgomery Watson, September 1993. (Pirnie, 1993).
- *GREAT Program Advanced Planning Study*, Kennedy/Jenks Consultants, May 2002. (K/J, 2002).
- *GREAT Program Environmental Impact Report Final*, CH2M Hill, May 2004. (CH2M Hill, 2004).
- *Title 22 Engineering Report for the GREAT Program*, CH2M Hill, March 2008. (CH2M Hill 2008).
- *Recycled Water Master Plan, Phase 1*, Kennedy/Jenks Consultants, January 2009.
- *Recycled Water Master Plan, Phase 2*, Kennedy/Jenks Consultants, July 2010.
- *GREAT Program Update,* Preliminary Report for City of Oxnard Utilities Task Force, June 2012. (City, 2012).
- State Water Resources Control Board, 2012. Recycled Water Policy web site, accessed on July 14, 2012 at http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/. (SWRCB, 2012).
- State Water Resources Control Board, 2009. Preamble to SWRCB Recycled Water Policy (Res No. 2009-0011). (SWRCB, 2009).

- California Department of Public Health, 2014. Water Recycling Criteria. Title 22, Division 4, Chapter 3, California Code of Regulations. (CDPH, 2014a) http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/lawbook/RWregulations_20140618.pdf.
- California Department of Public Health, 2014. California Regulations Related to Drinking Water. California Department of Public Health. Published 7/1/14. (CDPH, 2014b) http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/lawbook/dwregulations-2014-07-01.pdf.
- City of Oxnard, *Advanced Water Purification Facility, Indirect Potable Reuse Potable Reuse Engineering Report*, Draft Version 2, Carollo Engineers, 2015. (Carollo, 2015).

2.0 GREAT PROGRAM HISTORY

The GREAT program was formally established in 2002 but its origins go back nearly a decade prior to that. The objectives of the program as it was first established included the following:

1. Increased water supply reliability during drought.
2. Reduced water supply costs.
3. Water supply security in meeting growing water demand.
4. Enhanced local water supply stewardship through recycling and reusing a substantial portion of the region's wastewater.
5. Environmental benefits associated with the development and rehabilitation of local saltwater wetlands.

The program has been evolving over the years but generally maintaining the same basic components of water recycling and reuse, groundwater injection, storage and recovery and groundwater desalination. The intent of this PWIMP is to build upon the program foundation already established and in place. In order to do that, it is helpful to consider the past reports to understand the evolution that has occurred up to this point in time. Table 1 provides a summary of the program elements identified in the previous reports.

As the GREAT program has evolved over the years, there has been a shift away from groundwater recharge for the sake of providing a sea water intrusion barrier to groundwater recharge as an ASR operation. Between the Program's inception in 2002 and the latest update in 2012, the City looked at details of providing the sea water intrusion barrier and discovered that it would take more wells than initially envisioned to provide an effective barrier. The cost of the wells was very expensive and the City did want to carry the full capital cost versus the direct benefit they would receive.

Table 1 GREAT Program (and related Recycled Water System) History Summary
Public Works Integrated Master Plan
City of Oxnard

Year	Ref Report	History / Elements Included
1993	Water Reclamation System Master Plan (Pirnie, 1993)	• Alternative uses considered (capacity ranged from 5 to 40 mgd of recycled water): • Irrigation only. • Irrigation and surface spreading (at the El Rio spreading grounds), ($750 to 960 per AF for nominal 20 mgd). • Direct injection into the groundwater basin ($760 to 990 per AF for nominal 20 mgd). • Advanced treatment - Full Title 22 filtration / disinfection with partial demineralization (MF/RO).
2002 – 2004	Advanced Planning Study (K/J, 2002) GREAT Program EIR (CH2M Hill, 2004)(1)	**Phase 1**
		• **Tertiary Treatment Facility (TTF)** – Construct 5 mgd facility & secondary effluent pipeline. • **Advanced Treatment Facility (ATF)** – Construct (or convert BWRDF) 3.8 mgd facility & Feed Water Pipeline. • **Recycled Water Delivery System** – Deliver 3.4 mgd through PTP and Ocean View Pipelines. • **Aquifer Storage and Recovery** – Construct Pilot Well at 620 gpm (to assess ASR/IPR) and Inland ASR Wells (7 – 8) for potable ASR. • **Regional Desalter** – Construct 5 mgd desalter to treat pumped groundwater obtained through City groundwater pumping allocation. • **Blending Station No. 5** – Construct 15 mgd blending station for improved reliability.
		Phase 2

Table 1 GREAT Program (and related Recycled Water System) History Summary
Public Works Integrated Master Plan
City of Oxnard

Year	Ref Report	History / Elements Included
		• **Tertiary Treatment Facility** – Expand to 32.6 mgd. • **Advanced Treatment Facility** – Expand to 15.3 mgd. • **Recycled Water Delivery System** – Expand to 24 mgd; tie-in to PVCWD irrigation system. • **Aquifer Storage and Recovery** – Construct coastal recycled water ASR / seawater intrusion barrier. • **Regional Desalter** – Expand to 10 mgd. • **Concentrate Collection System –** Collect and discharge brine from desalters and advanced treatment facility. • **Permeate Delivery System –** Convey permeate from Regional Desalter.
2009	RW Master Plan Phase 1 (K/J, 2009)	(Projects support the GREAT Program but are not directly included)(2) • **Phase 1A -** Construction of Recycled Water Backbone System (RWBS) to deliver non-potable recycled water to River Ridge Golf Course, River Park Development, International Paper and several other smaller landscape irrigation customers. • **Phase 1B –** Construct recycled water distribution loop off of the RWBS along H Street to serve several small landscape irrigation customers.

2010	RW Master Plan Phase 2 (K/J, 2010)	(Projects support the GREAT Program but are not directly included)(2)
		• **Phase 2 –** Contained three main elements:
		  • Construction of 9.8 miles of recycled water pipelines to serve irrigation customers within City limits (no/limited ag users).
		  • Construction of 3 MG of recycled water storage.
		  • Construction of an inland pilot ASR well at Well No. 18 (near the golf course).

Table 1 GREAT Program (and related Recycled Water System) History Summary
Public Works Integrated Master Plan
City of Oxnard

Year	Ref Report	History / Elements Included
2012 (June)	GREAT Program Update (City, 2012)[1]	**Phase 1[3]**
		• **FAT System (TTF / ATF) –** Construct 6.25 mgd (7,000 AFY) Capacity of full advanced treatment system (i.e., the AWPF); backup power, finished water storage. • **FAT Distribution (Recycled Water Delivery System) –** Install water pipelines to distribute FAT water. • **Potable Water Wells & Desalter –** Install to 1) pump and treat additional groundwater offset by FAT capacity (6.25 mgd) and 2) to reduce nitrates and TDS of currently pumped groundwater (unrelated to FAT). • **Concentrate Collection System** – Install pipeline to collection brine and discharge to OWTP outfall. • **Brine Treatment Wetlands** – Demonstration wetlands to treat brine from AWPF. • **ASR Well Retrofit** – Conversion of existing well to ASR well. • **Stormwater Treatment Demonstration Project.**
		Phase 2[3]
		• **FAT System (TTF / ATF) –** Expand to 12.5 mgd (14,000 AFY) capacity of full advanced treatment system (i.e., the AWPF). • **Potable Water Wells & Desalter –** Install to pump and treat additional groundwater offset by FAT capacity (additional 6.25 mgd). • **Concentrate Collection System** – Install pipeline to collection brine and discharge to OWTP outfall. • **ASR Well Retrofit** – Conversion of existing well to ASR well.
2012 (Nov)	--	Carollo was contracted to do recycled water retrofits…(TAC – could you write up a short blurb here?).

Table 1 GREAT Program (and related Recycled Water System) History Summary
Public Works Integrated Master Plan
City of Oxnard

Year	Ref Report	History / Elements Included
2014	This PWIMP Report (Carollo Engineers, 2016)	City began PWIMP project and directed Carollo to consider ag users, limited urban irrigation (along the existing RWBS) and ASR/IPR/DPR as the main options for RW use.

Notes:
(1) More complete summary table from the 2004 EIR is included in Appendix A.
(2) The projects in these master plans focused on recycled water market assessments and use of recycled water for urban uses such as irrigation of parks, school yards, golf courses, HOA'sand commercial uses; Phase 2 contained an analysis of various groundwater injection alternatives.
(3) Additional projects are included in future phases that were more undefined as per the timing. The full GREAT Program update memo is included in Appendix B.

Also, as part of the original plan, the City was to receive a 1:1 pumping credit for water put into the ground. However, due to the more recent pumping cut backs from the Fox Canyon Groundwater Management Agency (GMA), there is no guarantee of access to more local groundwater and thus, little direct benefit to the City to further explore the barrier.

During this same time period, the City began to look at IPR/DPR with renewed interest because of the benefit it would give the City and the impending regulatory acceptance for IPR/DPR. Therefore, the approach presented within this PWIMP consists of a focus on recycled water for irrigation use, for both urban and agricultural irrigation, as well as ASR/IPR/DPR.

3.0 EXISTING RECYCLED WATER SYSTEM

The recycled water system currently consists of an AWPF and distribution pumping and conveyance. Wastewater from the Oxnard Wastewater Treatment Plant (OWTP) provides secondary treated wastewater to the AWPF for recycled water treatment as outlined in PM 3.1, *Wastewater System – Background Summary*.

3.1 Source Water

The OWTP receives and treats flow from the Cities of Oxnard and Port Hueneme as well as the Point Mugu Naval Base and Channel Islands Beach Community Services District. In general, the collected flow is primarily residential. About 75 percent of all wastewater is domestic and the remaining 25 percent is from industrial users. In addition to wastewater, infiltration and inflow (I&I) of groundwater is present in the collection system and makes up 20 percent of the total flow to the OWTP.

Average secondary effluent flows (2009 - 2013) from the wastewater facility, as summarized in PM 3.2, *Wastewater System – Flow and Load Projections* are 20.5 million gallons per day (mgd) at average dry weather (ADWF) and 22.9 mgd for an average day maximum month day flow (ADMMF). The OWTP is permitted at a capacity of 31.7 mgd ADWF.

3.2 Treatment Facilities

The AWPF is a full advanced treatment (FAT) facility consisting of three treatment barriers or steps:

- <u>Microfiltration (MF):</u>
  provides pre-treatment for subsequent steps as well as removes particulate and microbial contaminants such as turbidity, Giardia, and Cryptosporidium.
- <u>Reverse Osmosis (RO)</u>:
  pressure driven membrane-separation process that removes dissolved contaminants such as TDS and organic compounds.

- Advanced Oxidation Process (AOP):
  Ultraviolet light (UV) combined with hydrogen peroxide provides disinfection and reduction of micro pollutants.

In addition to these three main treatment processes, several ancillary processes are present to support the operation of the main systems. Those include:

- Degasification:
  Decarbonator towers remove the excess carbon dioxide present in the RO effluent through air stripping. A portion of this carbon dioxide must be removed to increase pH and stabilize the RO effluent. The decarbonators work in conjunction with the lime addition system to stabilize the recycled water.
- Lime Addition:
  Lime is added to stabilize the aggressive post RO water by increasing the pH and thereby reducing the corrosion potential of the AWPF effluent.
- Process Chemicals:
  Continuously fed chemicals are flow paced and include sodium hypochlorite, hydrogen peroxide (AOP), sulfuric acid, threshold inhibitor, and liquid lime.
- Membrane Cleaning Chemicals:
  Several chemical systems are required to provide batch cleaning of the membrane. Batch cleaning chemicals include sodium hypochlorite, sodium hydroxide, citric acid, and sodium bisulfite.

Figure 1 illustrates a schematic of the AWPF process in its current configuration. Table 2 includes design criteria for the treatment system and Table 3 summarizes the design criteria for the supporting chemical systems.

Table 2 AWPF Design Criteria[1]
Public Works Integrated Master Plan
City of Oxnard

Process/ Component	Units	Phase 1 Capacity
MF System		
Feed	mgd	7.91
Filtrate	mgd	7.35
Hydraulic Loading Rate	gpm/sf	
Backwash Frequency	min	1 - 3
Chemical Clean Frequency	days	30
RO System		
Feed	mgd	7.35
Concentrate	mgd	1.10
Permeate	mgd	6.25
No. of Skids (3-stages)	--	2
Recovery	%	78 - 85

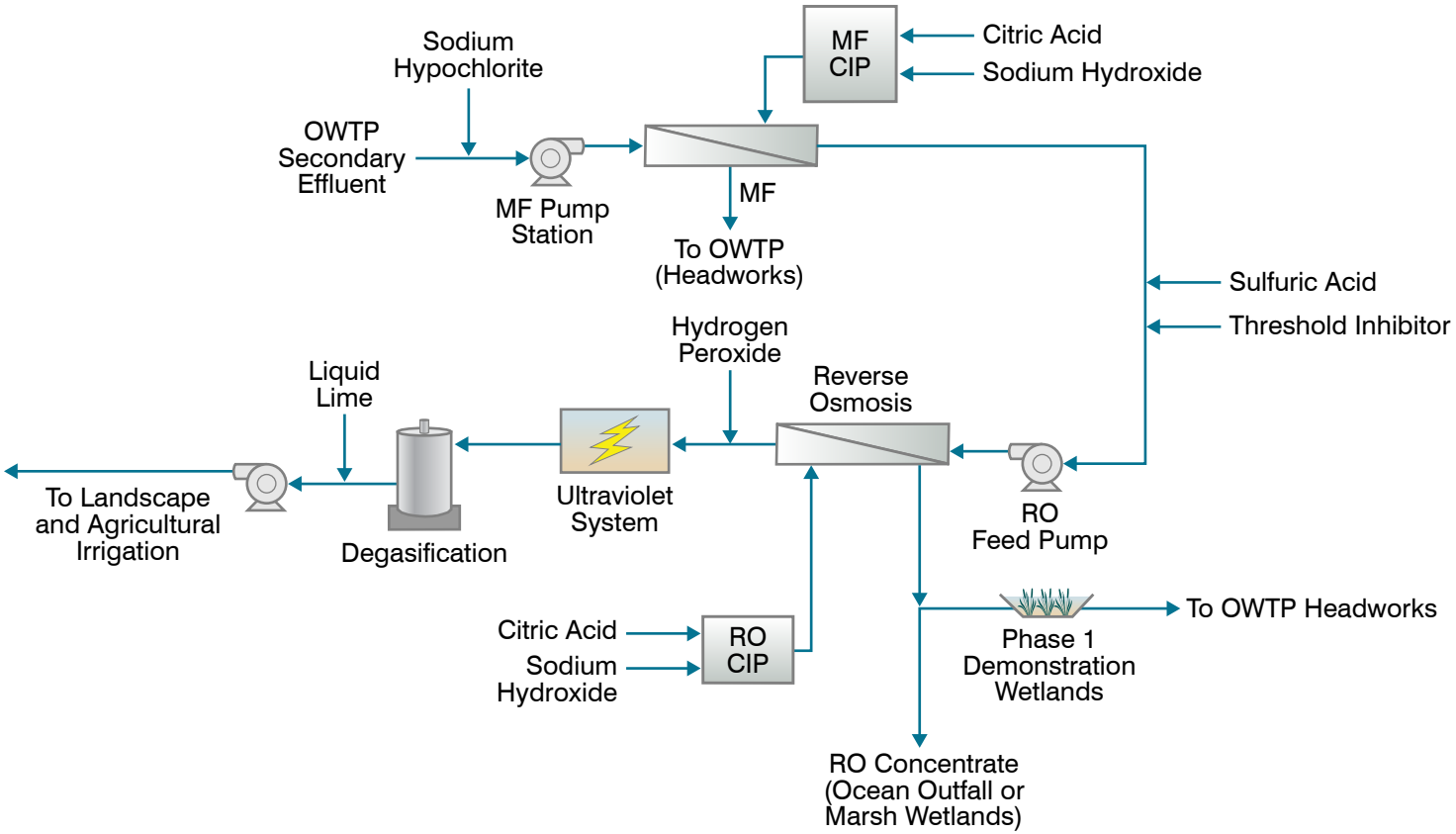
Table 2	AWPF Design Criteria[1] Public Works Integrated Master Plan City of Oxnard	
Process/ Component	**Units**	**Phase 1 Capacity**
UV/H_2O_2		
Feed/Effluent	mgd	6.25
UV Dose	mJ/cm^2	500
No. of UV Reactors	--	3
Type	--	LPHO
No. of Banks per Reactor	duty + standby	5 + 1
H_2O_2 Dose	mg/L	2.5
Decarbonator		
Feed	mgd	5
Bypass	mgd	1.25

Note:
(1) Source: All flows from AWPF Volume 5 Design Drawings; other criteria from AWPF Title 22 Report (CH2M Hill, 2008).

Table 3 Design Criteria for Chemical Support Systems
Public Works Integrated Master Plan
City of Oxnard

Chemical	Batched Feed (gph)[1]	Continuous Dosing (gph)[1]	Storage Capacity (gal)[2]	Storage Time (weeks)[2]
Sodium Hypochlorite (12.5%)	0.6	24	1,250	4
Sodium Bisulfite (38%)	0.3	--	4,000	31
Citric Acid (50%) (MF)	5.6	--	4,500	16
Citric Acid (50%) (RO)	1.0	--		
Sodium Hydroxide (50%) (MF)	1.4	--	3,500	25
Sodium Hydroxide (50%) (RO)	2.3			
Sulfuric Acid (98%)	--	8	12,000	2
Threshold Inhibitor (100%)	--	1	4,000	8
Hydrogen Peroxide (35%)	--	3	4,500	2
Liquid Lime (15-47%)	--	37	32,000	2

Note:
(1) Source: Construction Drawings for AWPF, Sept 2009.
(2) Source: Storage Capacity and Time, Title 22 Report (CH2M Hill, 2008).



AWPF SCHEMATIC

FIGURE 1

CITY OF OXNARD

PM NO. 4.1 – RECYCLED WATER BACKGROUND SUMMARY

PUBLIC WORKS INTEGRATED MASTER PLAN

CITY OF OXNARD CALIFORNIA

carollo Engineers...Working Wonders With Water®

ox1115f2-9587(PM4-1FIG1).ai

3.3 Distribution System

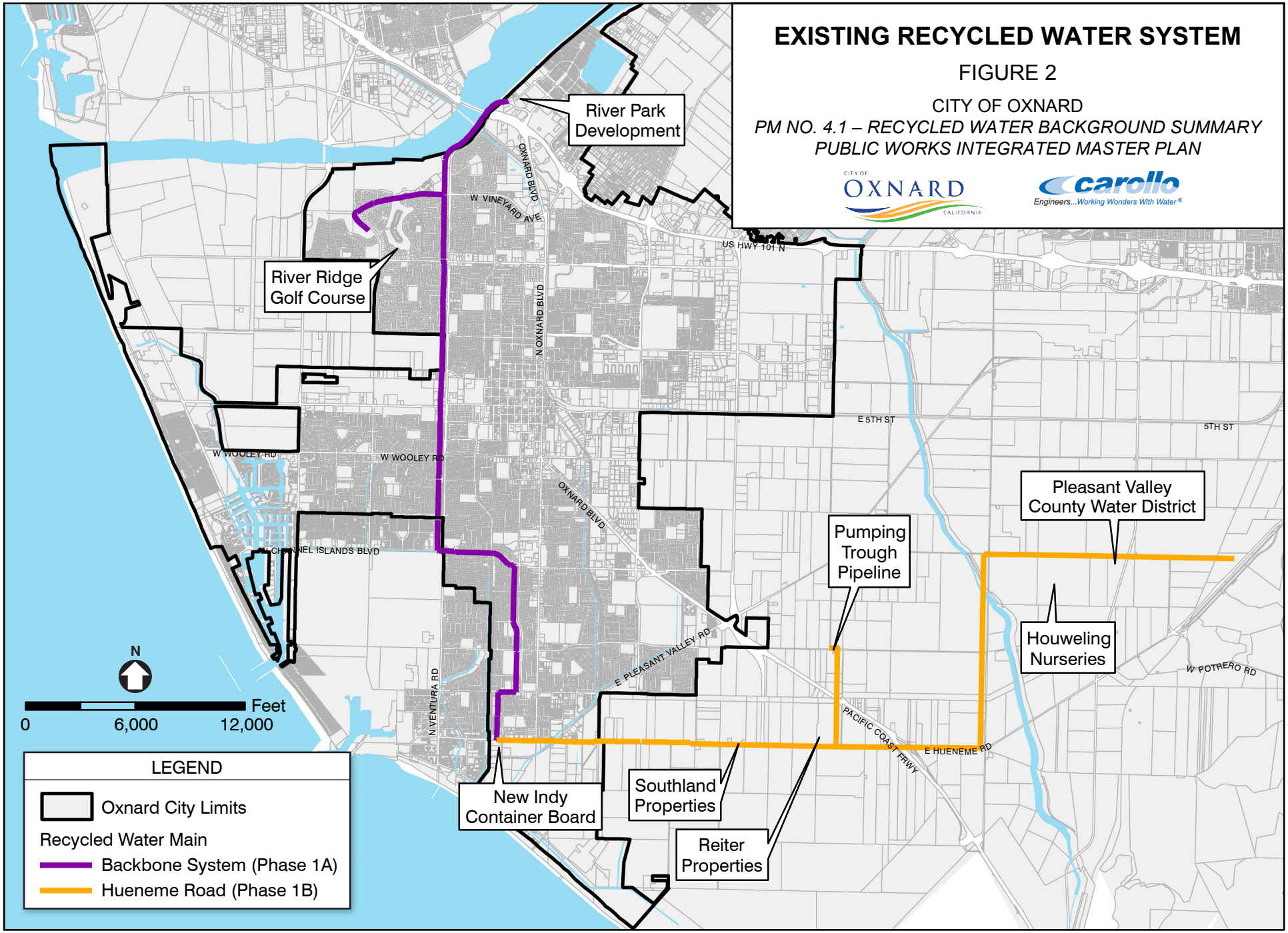
The main components of the existing recycled water distribution system include the following:

- Recycled Water Backbone System (RWBS):
  The constructed Phase 1 recycled water conveyance system is a combination of polyvinyl chloride (PVC) and high-density polyethylene (HDPE) pipelines, with diameters ranging from 14.5 inches to 36 inches in the main transmission line, and 6 and 8 inches in the distribution pipe going to River Park Development.

- Finished Recycled Water Pump Station:
  The AWPF recycled water pump station contains two variable frequency drive (VFD) pumps, each with a design capacity of 4,000 gallons per minute (gpm) with an output pressure of about 150-psi. These pumps are used to supply the RWBS and eventually the Phase 2 and Phase 3 expansion as discussed in PM 4.2.

- Temporary SMP Line:
  Presently, the City does not have the infrastructure to distribute all of the recycled water being produced by the AWPF. Eventually, the City will deliver water to agricultural customers in the Oxnard Plain via the Hueneme Road Pipeline (see further details in PM 4.2). However, it will be several years before the City's distribution pipeline is constructed and operational. Since the CMWD Salinity Management Pipeline (SMP) follows a parallel route with the City's planned Hueneme Road pipeline and the SMP is underutilized at this time, it presents an opportunity to temporarily deliver water to the agricultural customers in the Oxnard Plain. The Los Angeles Regional Water Quality Control Board (RWQCB) amended the City's WDRs, Order No. R4-2011-0079-A01 and Monitoring and Reporting Program, R4-2008-A01 in July of 2015 to allow for temporary use of the SMP to deliver AWPF water to the farmers. Construction and planning for the temporary SMP connection is underway with water delivery anticipated in early 2016.

- Ocean View Pump Station:
  This Pump Station contains two variable frequency drive (VFD) pumps, each with a design capacity of 2,210 gallons per minute (gpm) with an output pressure of about 50-psi. These pumps are used to supply the SMP Line. There are currently no storage tanks in the distribution system; peak demands must be met directly from the AWPF. A map of the existing Phase 1A and the planned Phase 1B recycled water distribution system is shown in Figure 2 along with major users (existing and planned). Further discussion of the RW distribution system is included in PM 4.2, *Infrastructure Modeling and Alternatives* and PM 2.5, *Supply and Treatment Alternatives*.



ox1115f3-9587(PM4-1FIG2).ai

4.0 REGULATIONS

Recycled water is regulated by established standards throughout the State of California. In June 2014, California legislature passed State Bill 861, which authorized transfer of California Department of Public Health (CDPH)'s drinking and recycled water responsibilities, including the issuance of waste discharge requirements (WDRs), to the State Water Resources Control Board (SWRCB). Now, regulatory authority for projects using recycled water falls to the Division of Drinking Water (DDW) within the SWRCB as well as the Regional Water Quality Control Board (RWQCB). The roles of the SWRCB, RWQCB, and DDW (formerly, CDPH) are further discussed in the following paragraph.

The SWRCB establishes general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The SWRCB also exercises general oversight over recycled water projects, including review of RWQCB permitting practices. The DDW is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. The RWQCB is charged with protection of surface and groundwater resources and with the issuance of permits that implement DDW recommendations.

4.1 Current

The City is planning on recycled water use for the purpose of urban and agricultural irrigation as well as aquifer storage and recovery (ASR) and groundwater recharge for indirect potable reuse (IPR) / direct potable reuse (DPR). DPR is currently not regulated and therefore, the permitting process is still a bit uncertain and on a case-by-case basis. Based on the remaining uses of recycled water being considered for the City, the following regulations and policies apply to these specific uses:

- Urban / Agricultural Reuse – California Code of Regulations (CCR), Title 22, Division 4, Chapter 3, Section 60301 et seq. (Title 22) & the Recycled Water Policy (SWRCB Res No. 2009-0011, RW Policy).
- IPR / Groundwater Recharge – DDW Groundwater Recharge Regulations and SWCRB's Recycled Water Policy and Anti-Degradation Policy.

The applicable recycled water regulations as noted above are summarized in the following sections. In addition to the above regulations, the City's GREAT program is currently permitted under Waste Discharge Permit, Order No. R4-2011-0079-A01, recently amended in July 2015. This permit (found in Appendix C) covers non-potable reuse within the GREAT program.

4.1.1 California Code of Regulations - Title 22

With the passage of SB861, DDW is now the State's primary agency responsible for the protection of public health, the regulation of drinking water, and the development of uniform water recycling criteria appropriate for particular uses of water. DDW promulgated regulatory criteria Title 22 recycled water regulations. (CDPH, 2014a)

Title 22 defines four types of recycled water uses based on the treatment process used and water quality produced as summarized in Table 4.

Table 4 Summary of Approved Title 22 Uses of Recycled Water for Irrigation
Public Works Integrated Master Plan
City of Oxnard

Treatment Level	Approved Uses	Total Coliform (median)
Disinfected Tertiary	Spray Irrigation of Food Crops Landscape Irrigation(1) Unrestricted Recreational Impoundment	2.2/100 ml
Disinfected Secondary 2.2	Surface Irrigation of Food Crops Restricted Recreational Impoundment Surface Irrigation of Orchards, Vineyards	2.2/100 ml
Disinfected Secondary 23	Pasture for Milking Animals Landscape Irrigation(2) Landscape Impoundment	23/100 ml
Undisinfected Secondary	Fodder, Fiber and Seed Crops	N/A

Notes:
(1) Includes unrestricted access golf courses, parks, playgrounds, schoolyards, and other landscaped areas with similar access.
(2) Includes restricted access golf courses, cemeteries, freeway landscapes, and landscapes with similar public access.

4.1.2 Groundwater Recharge Regulations

DDW has developed criteria for both non-potable uses of recycled water and groundwater recharge for subsequent potable use, with the most recent version of Title 22, updated as of June 2014 (CDPH, 2014b). Though draft regulations have been developed, there is still uncertainty as to the regulatory approval process and timing due to the fact that this is not yet widely practiced within the state.

"Groundwater Replenishment Reuse Projects," or GRRP, can employ surface spreading basins or subsurface injection methods, and there are separate regulations described for both methods. Both methods are considered to be IPR. The City is considering subsurface applications only but regulatory requirements for both are shown in Table 5 for reference.

Table 5	**Summary of 2014 DDW Regulations for Groundwater Recharge as Applicable to Oxnard Public Works Integrated Master Plan City of Oxnard**	
	Type of Recharge	
	Surface Applications	**Subsurface Applications**
Treatment	Disinfected tertiary	100% RO and AOP treatment for the entire waste stream
Recycled Water Max Initial Contribution (RWCmax)(2)	Initial: Up to 20% Alternative: Up to 100% if TOC of less than 0.5 mg/L in the SAT (based on a 20-week running average) is achieved	Up to 100% with RO & AOP
Total Organic Carbon	Mound < 0.5 mg/L ÷ RWC	< 0.5 mg/L
Total Nitrogen	Less than 10 mg/L at all times	
Response Retention time(1)	0.25 to 1 month, depending upon type of tracer analysis used	
Performance Monitoring	Meet DDW drinking water regs for MCLs and ALs for lead and copper. Monitoring required for priority toxic pollutants, chemicals with notification levels, and other chemicals specified by DDW.	
Monitoring Wells	2 wells required down gradient of GRRP: – 2 weeks < travel time < 6 months and – 30 days upgradient of the nearest drinking water well 1 well required between GRRP and nearest down gradient drinking water well	

Notes:
(1) Must be verified by a tracer study.
(2) RWC will be 100% for the City's projects.

RO: reverse osmosis
AOP: advanced oxidation process
mg/L: milligrams per liter

Subsurface applications (or injection) require full advanced treatment (FAT), defined in the draft DDW regulations as "the treatment of an oxidized wastewater […] using a reverse osmosis (RO) and an oxidation treatment process […]". FAT is required unless an alternative treatment has been demonstrated to DDW as providing equal or better protection of public health and has received written approval from DDW.

The treatment process used to treat recharge water for a GRRP must provide treatment that achieves at least 12-log enteric virus reduction, 10-log Giardia cyst reduction, and 10-log Cryptosporidium oocyst reduction. The treatment train shall consist of at least three separate treatment processes. No single process can receive more than a 6-log reduction credit. DDW (CDPH, 2014) also states that at least three processes must provide at least 1-log reduction. Beyond those three key processes, processes which provide <1-log reduction can be included within the analysis.

The DDW regulations for GRRPs also require a minimum "response retention time." Groundwater travel time can be estimated by various methods, including intrinsic tracer studies, numerical modeling, or analytical modeling. Depending on the method used, the "response time credit" is discounted by a factor of 1.0 (for tracer tests) to 0.25 (for analytical modeling). The more rigorous the estimating approach, the more advantageous the discounting factor.

Table 5 summarizes the key regulatory criteria for GRRP projects for the City. More detailed information regarding the regulatory requirements for the City's system are included in the Engineer's Report for the City's Aquifer Storage and Recovery Demonstration Well (Carollo, 2015).

4.1.3 Recycled Water State Policy

The SWRCB recognizes that a burdensome and inconsistent permitting process can impede the implementation of recycled water projects. In 2009, the SWRCB adopted a new RW Policy. The stated purpose of the Policy is "to increase the use of recycled water from municipal wastewater sources […]" (SWRCB, 2012) to allow the state to become more independent from its existing water supply sources, which are subject to significant climatic disruptions. In addition, as a separate measure, the Policy helps to "preserve, enhance, and restore the quality of California's water resources" (SWRCB, 2009). The adopted Recycled Water Policy (RW Policy) establishes more uniform requirements for water recycling throughout the State and streamlines the permit application process in most instances. The key points of the RW Policy are as follows:

- Goal to increase use of recycled water over 2002 levels by at least 200,000 AFY by 2020 and by at least 300,000 AFY by 2030.
- Also included are goals for stormwater reuse, conservation, and potable water offsets by recycled water. The onus for achieving these mandates and goals is placed both on recycled water purveyors and potential users.
- Recycled water irrigation projects that meet DDW requirements, and other State or Local regulations, be adopted by Regional Boards within 120 days, absent the monitoring component, unless unusual circumstances are present.
- Salt and Nutrient Management Plans must be developed and adopted for every basin in California by 2015. These Management Plans will be developed by local stakeholders and funded by the regulated community. The City is developing an SNMP for the Oxnard Plain and Pleasant Valley Basins which is included in PM 6.1, *Salt and Nutrient Management Plan Summary.*

- Anti-degradation plans required where the recycled water discharge is more than 10 percent of the basin's available assimilative capacity for one project, or 20 percent for multiple projects.
- Blue Ribbon Advisory Panel convened to guide future actions on Compounds of Emerging Concern.

Relevant components of the Policy to an IPR project specifically include Salt and Nutrient Management Plans (SNMPs), Recycled Water Groundwater Recharge Projects (GRPs), anti-degradation, and monitoring constituents of emerging concern (CECs). Each of these is summarized below.

4.1.3.1 Salt and Nutrient Management Policy

As required by the RW Policy, the City is developing its own specific SNMP, with a scheduled completion date in early 2016. The objective of the SNMP is to manage salts and nutrients from all sources "on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses." The SNMP includes the following tasks:

- Identify the SNMP work group and develop the SNMP work plan.
- Establish and manage a stakeholder process.
- Summarize/Characterize water management and salt/nutrient management goals and objectives.
- Characterize groundwater basin geology, hydrology, and hydrogeology.
- Summarize existing groundwater and surface water monitoring programs and water quality.
- Develop salt and nutrient source identification.
- Estimate assimilative capacity for each sub-basin.

4.1.3.2 Recycled Water Groundwater Recharge Projects

As listed in the RW Policy, approved GRRPs must meet the following criteria:

- Compliance with regulations adopted by DDW for groundwater recharge projects (CDPH, 2014).
- Implementation of a monitoring program for CECs and priority pollutants, consistent with recommendations from DDW.

Additionally, the RW Policy states that the "Regional Water Board" can implement "additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater."

4.1.3.3 CEC Monitoring

The RW Policy addresses CECs and acknowledges that the state of knowledge on CECs is incomplete. CEC concentrations in finished water should be minimized through effective source control and treatment programs.

4.1.4 Anti-Degradation Policy

A groundwater recharge/IPR project must also comply with the SWCRB's Resolution 68-16, or the state's Anti-degradation policy, titled "Statement of Policy with Respect to Maintaining High Water Quality in California." The key components of this Resolution, listed here verbatim, are:

- "Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality water will be maintained until it has been demonstrated to the state that any change will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies."
- "Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to ensure that (a) pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

4.1.5 Direct Potable Reuse

DPR has become a reality in the United States, with two projects in the US in operation (Big Springs Texas and Cloudcroft New Mexico). In California, the state legislature has directed the DDW to develop a regulatory framework for DPR by December 31, 2016. Further, there is ongoing research on how to properly implement DPR projects in California and nationally. It is anticipated that treatment technologies similar to FAT will be required for DPR and online monitoring will be a critical component of DPR.

4.1.6 Updates to the 2010 California Plumbing Code

The 2010 California Plumbing Code was recently updated to relax the restrictive rules for installing dual plumbing for indoor recycled water use, as well as for gray water. These changes pertain to Chapter 16 of Title 24, Part 5, of the California Code of Regulations.

The major features of the new dual plumbing rules are:

- Recycled water pipe can now run in the same wall/ceiling cavity as potable pipe.
- The labeling requirements for purple pipe are relaxed.
- The annual inspection is a visible inspection, followed by a cross-connection test if there is reason to believe a cross-connection exists, rather than an automatic cross-connection test each year.

4.1.7 City Recycled Water Ordinance

The City has adopted City Ordinance No. 2728, which stipulates mandatory recycled water use, when it is available, as well as conversion of existing facilities to recycled water use in accordance with the adopted version of the Recycled Water Master Plan. Further, all new development must consider recycled water use, as available to the site. A copy of the full ordinance can be found in Appendix D.

4.2 Future (Potential)

Future regulatory concerns for the use of recycled water consist of the potential regulation of endocrine disrupting chemicals and other compounds of emerging concern (CECs). The RW Policy highlights CECs as a potential issue for recycled water. A discussion of the current status of these emerging pollutants is provided below.

4.2.1.1 Microconstituents

In recent years, there have been heightened scientific awareness and public debate over potential impacts that may result from exposure to microconstituents, some of which are endocrine disrupting compounds (EDCs). Humans, fish, and wildlife species could potentially be affected by sufficient environmental exposure to EDCs.

Based on the current state of knowledge and the low levels of microconstituents in surface waters, it is likely to be many years before any such standards are promulgated. Nonetheless, in December 2009, the EPA took the first step in the regulation of microconstituents in water by putting 13 of these compounds on their Contaminant Candidate List. These compounds will be tested in the future to determine whether drinking water criteria are necessary. If, in the future, these compounds are given human health criteria, they will be given limits in GRRPs.

While there are no current regulations regarding these constituents in recycled water, in accordance with the Recycled Water Policy, the State Water Board convened a science advisory panel (Panel) to provide guidance on future actions related to monitoring CECs in recycled water. This Panel submitted a report titled: "Monitoring Strategies for Chemicals of Emerging Concern in Recycled Water – Recommendations of a Science Advisory Panel" (Panel Report). The State Water Board incorporated the Panel's recommendations into an amendment to the Recycled Water Policy, which was adopted April 25, 2013.

The Panel Report provided recommendations for monitoring specific CECs in recycled water used for groundwater recharge reuse. For recycled water used for landscape irrigation, the Panel did not recommend monitoring of CECs, but recommended monitoring of some surrogates. Table 6 summarizes the specific CECs that the City would need to consider monitoring given the planned application of their recycled water system. Appendix E contains the RW Policy, with further details on specific monitoring requirements for CECs.

Table 6 Recommended CEC Monitoring for Recycled Water System(1)
Public Works Integrated Master Plan
City of Oxnard

Constituent	Constituent Group	Relevance/Indicator Type	Reporting Limit (µg/L)
Groundwater Recharge – Subsurface Application			
17B-estradiol	Steroid Hormones	Health	0.001
Caffeine	Stimulant	Health & Performance	0.05
NDMA	Disinfection Byproduct	Health & Performance	0.002
Triclosan	Antimicrobial	Health	0.05
DEET	Personal care product	Performance	0.05
Sucralose	Food additive	Performance	0.1
Surrogates to Monitor			
Electrical Conductivity			
TOC			

Notes:
(1) Source: RW Policy (Appendix E).

5.0 RECYCLED WATER DEMAND

As noted, there are two main uses that the City is considering for its AWPF effluent: 1) irrigation reuse, either within the City or for agricultural use and 2) ASR/IPR and/or DPR. The demand for recycled water used for irrigation purposes within the City is based on the irrigation needs of a particular user. The agricultural demand, on the other hand, for recycled irrigation water is limited only by what the City can produce and convey to the farmers. Demand for IPR or DPR water is a function of what is needed for the City's water

supply, as it is considered an alternative water supply for the City. Further discussion of IPR / DPR uses is covered in PM 2.5, *Water System - Supply and Treatment Analysis*. The demand for recycled water used for irrigation will be detailed further herein.

5.1 Existing Irrigation Recycled Water Uses/Use Agreements

The City projects that approximately 7,000 AFY (acre-feet per year), or 6.25 mgd, of AWPF water will be produced in the initial phases of the GREAT program. The City has an approved Full Advanced Treatment Recycled Water Management and Use Agreement, A-7651 (located in Appendix F). According to the agreement, the following significant demands are accounted for:

- The City has right to the first 1,500 to 1,800 AFY which will be delivered to existing customers in-lieu of potable water and to the River Ridge Golf Club. In addition, the City will deliver RW water to River Park Development and New Indy Container Board for a total of approximately 2,800 AFY, or 2.5 mgd in Phase 1A. This RW will be used to offset potable water demand along the completed RWBS that would otherwise be served through the City's potable water system.
- For Phase 1B, an additional 2,000 AFY, or 1.8 mgd, of AWPF water is dedicated to ag users along the (future) Hueneme Road Pipeline.
- According to Agreement A-7651, the use of the remaining 7,000 AFY of RW available from the AWPF is to be determined between the City, UWCD and PVCWD.

Table 7 provides a summary of the existing and future recycled water demands, as they are known at this time. The City is also in the early stages of implementing 40 to 50 small urban irrigation users along the RWBS to offset further potable use.

Appendix F contains the user agreements for the customers in Phase 1A/B.

5.2 Future Irrigation Recycled Water Use

The AWPF is planned to be constructed in phases that correspond to the four phases of the GREAT program with the resulting AWPF capacities of 7,000, 14,000, 21,000 and 28,000 AFY. Per the recommendations in PM 2.5, *Supply and Treatment Alternatives*, any future AWPF effluent will preferentially go to the recycled water users that are currently under contract first, IPR/DPR second and agricultural reuse third (which would potential gain the City groundwater pump-back credits).

Table 7 Existing and Future Recycled Water Demands
Public Works Integrated Master Plan
City of Oxnard

Demand Name	Minimum Delivery Pressure	Estimated Annual Water Use (AFY)	Average Day RW Demand (gpm)	Maximum Day RW Demand (gpm)	Peak Hour Demand (gpm)	Demand Daily Timing	Demand Type	On-site Storage?	Seasonal Variation
Phase 1A Completed (Backbone System):									
River Ridge Golf Course (RRGC)	Not Specified	1,800	475	1,057	1,057	24 hours(1)	Landscape Irrigation/ Storage Filling	On-site storage tank	Varies with Irrigating Season
River Park Development	60	175	109	217	651	10:00 pm–6:00 am	Irrigation	None	Varies with Irrigating Season
New Indy Container Board	Not Specified(2)	800	384	456	456	24 hours	Industrial	On-site storage tank	Constant Annual Demand
Phase 1B Planned for Immediate Implementation									
Houweling Nursery	Not Specified(3)	800	1,000	1,000	1,000	6:00 pm–6:00 am	Ag Irrigation	On-site storage tank	Constant Annual Demand
Southland	60	400	500	500	500	6:00 am–6:00 pm	Ag Irrigation	TBD	Varies with Irrigating Season
Reiter	60	800	1,000	1,000	1,000	6:00 am–6:00 pm	Ag Irrigation	TBD	Varies with Irrigating Season

Notes:
(1) Golf Course irrigation occurs between 5 pm and 5 am, but recycled water is supplied to the storage pond over a constant 24 hours.
(2) Recycled water is delivered to an on-site storage tank so there is no minimum delivery pressure. However, because this demand is situated close the AWPF pump station, high pressures are an issue and pressure reducing valve is necessary.
(3) Although a minimum pressure is not specified, a low delivery pressure means the Nursery will have to boost the pressure. To avoid on-site boosting, the Nursery would prefer at least 60-psi similar to other RW turnouts.

APPENDIX A – EXCERPT FROM 2004 GREAT PROGRAM EIR

TABLE 2-1

Phase 1 and Phase 2 GREAT Program Elements Summary Table

GREAT Program Element	Phase 1	Phase 2
Recycled Water – Tertiary Treatment Facility* Tertiary treatment of Oxnard WWTP water	**Construct 5-mgd-capacity TTF** **Construct Secondary Effluent Pipeline** – 500 feet of 36-inch pipeline Purpose: Tertiary treatment of secondary effluent and potential landscape irrigation.	**Expand TTF to 32.6-mgd Capacity** Purpose: Tertiary treatment of secondary effluent and potential landscape irrigation.
Recycled Water – Advanced Water Treatment Facility* Advanced treatment of tertiary treated water	**Convert BWRDF to 3.8-mgd-capacity or Construct 3.8-mgd-capacity AWTF** **Option 1:** Upgrade the existing BWRDF – convert and expand BWRDF to advanced water treatment **Option 2:** Co-locate new AWTF with TTF **Construct Advanced Treatment Feed Water Pipeline** (if Option 1 is implemented) – 500 feet of 30-inch pipeline Purpose: Agricultural irrigation and groundwater injection.	**Expand AWTF to 15.3-mgd Capacity (with blending – 24-mgd Capacity)** Purpose: Agricultural irrigation, groundwater injection, and industrial users.
Recycled Water Delivery System Deliver recycled water to agricultural users	**Establish Recycled Water Delivery System to 3.4-mgd Capacity** **Convert Existing Ocean View Pipeline from Potable to Nonpotable Use** **Construct New Ocean View Potable Pipeline** - 22,300 feet of 12-inch pipeline **Construct Tie-in to Former Ocean View Pipeline** - 2,500 feet of 24-inch pipeline **Construct Tie-in to PTP Irrigation System** – **Option 1:** Channel Islands Blvd. Tie-in – 10,400 feet of 16-inch pipeline **Option 2:** Etting Road Tie-in – 9,200 feet of 16-inch pipeline **Option 3:** Nauman Road Tie-in – 5,400 feet of 16-inch pipeline Purpose: Distribute recycled water for irrigation to agricultural users served by the PTP in Pleasant Valley area.	**Expand Recycled Water Delivery System to 24-mgd Capacity** **Construct Phase 2 Recycled Water Delivery System** - 25,000 feet of 30-inch pipe, parallel to Ocean View Pipeline **Construct Tie-in to PVCWD Irrigation System** – **Option 1:** Sturgis Road Tie-in – 4,000 feet of 24-inch pipeline **Option 2:** Laguna Road Tie-in – 3,100 feet of 24-inch pipeline **Option 3:** Hueneme Road Tie-in – 2,700 feet of 24-inch pipeline Purpose: Expand recycled water distribution area to agricultural users served by PVCWD in the Pleasant Valley area.
Aquifer Storage and Recovery (ASR) Groundwater injection, storage, and extraction	**Implement ASR (620-gpm Total Capacity)** **Construct Pilot ASR Injection Well** – one 620-gpm-capacity well in the Lower Aquifer System (LAS) **Construct Pilot ASR Conveyance Pipeline** – 2,700 feet of 24-inch pipeline **Blending Option 1: Use Existing O-H Pipeline** – potable water delivery through existing infrastructure **Blending Option 2: Construct Turnout from Mugu Lateral** – 1,800 feet of 10-inch pipeline **Construct New and Retrofit Existing Inland ASR Wells for Potable Water ASR** – 7 to 8 potable ASR wells at the City Water Yard (251 Hayes Avenue) Purpose: Pilot ASR will assess the technical feasibility of using potable and recycled water for ASR, intended to help alleviate groundwater overdraft conditions and associated water quality problems, including coastal seawater intrusion in the Oxnard Plain and Pleasant Valley area. Inland Potable ASR will allow seasonal storage of potable water supplies to maximize use of the existing potable water distribution system, negating the need for construction of additional pipelines for additional distribution capacity.	**Expand Recycled Water ASR to 11.5-mgd Capacity** **Construct Coastal Recycled Water ASR/Seawater Intrusion Barrier** – Construct Coastal ASR Conveyance Pipeline Construct Coastal ASR Well Laterals **Inland Recycled Water ASR** – use various new or existing inland ASR wells Purpose: Control seawater intrusion in the Oxnard Plain and Pleasant Valley area. Assist with overall water balance of the Oxnard Plain and Pleasant Valley area.
Regional Desalter* Brackish/groundwater desalination for potable use	**Construct 5-mgd Regional Desalter** Purpose: Treat pumped groundwater obtained through unused City groundwater pumping allocation and groundwater storage credits for potable water production.	**Expand Regional Desalter to 10 mgd** Purpose: Expand capacity of Regional Desalter for treatment of pumped groundwater for production of additional potable water supplies.
Blending Station No. 5 Blend higher quality surface water with groundwater for potable use	**Construct 15-mgd Blending Station No. 5** **Construct Connection to O-H Pipeline** – 100 feet of 18-inch pipeline **Construct Connection to Industrial Lateral** – 100 feet of 18-inch pipeline **Construct Blended Water Pipeline Connection** – 2,200 feet of 20-inch pipeline Purpose: Provide improved water supply infrastructure reliability, water quality, and hydraulic efficiencies and to assist in meeting peak-hour and fire-flow water supply demands.	N/A
Concentrate Collection System Brine collection from regional brine dischargers	N/A	**Construct Concentrate Collection System** - 57,000 feet of gravity pipeline (6- to 54-inch) Purpose: Avoid discharge of high salinity concentrate into City sanitary sewer system and Oxnard WWTP.
Permeate Delivery System Permeate delivery from Regional Desalter to industrial users	N/A	**Construct Permeate Delivery System** - 21,100 feet of pressure pipeline (6- to 12-inch) Purpose: Convey permeate from Regional Desalter. This will negate the need for individual industrial facilities to operate their individual advanced water treatment systems for treatment of City water supply.
Concentrate Disposal	Discharge concentrate to ocean outfall	Discharge concentrate to ocean outfall

Note: * Generates concentrate requiring disposal

APPENDIX B – 2012 GREAT PROGRAM UPDATE

Groundwater Recovery Enhancement and Treatment (GREAT) Program Update

Preliminary Report for the City of Oxnard Utilities Task Force - June 21, 2012
Updated June 25, 2012

City of Oxnard
Public Works Department
Capital Projects Management Division

Daniel R. Rydberg, P.E. - Capital Projects Manager
GREAT Program Manager

Anthony Emmert - Water Resources Manager

Thien Ng, PE – Senior Process Engineer
AWPF Project Manager

Terry Kirsch - Construction Project Coordinator
GREAT Program Science Coordinator

Table of Contents

Glossary 1
1. Purpose and Accuracy 2
2. Key Points to Remember 2
3. Groundwater Recovery Enhancement and Treatment (GREAT) Program 4
4. Increasing Cost of Imported Water 6
5. Reducing Imported Water 7
6. GREAT Program Components 8
7. GREAT Program Phases 10
8. GREAT Program Capital Improvement Projects (CIP) Plan 11
9. Options for GREAT Program Completion 12
10. Funding the Future Projects 12
11. Engineering Economic Analysis 13
12. Assumptions in Economic Calculations 13
13. Cost of Full Advanced Treatment Water (FATW) 14
14. Rates 16
15. Savings & Revenue 18
16. Payback for the FAT Water and Desalter Systems 20
17. Short Term Plan 21
18. Long Range Plan 21
Appendix A1
Appendix 1: Full Advanced Treatment Water (FATW) Cost A2
Appendix 2: GREAT Program Capital Improvement Projects (CIP) Plan Summary A3
Appendix 3: Advanced Water Purification Facility Cost Allocated by Phase A4
Appendix 4: GREAT Program Pipeline Cost Estimates A5
Appendix 5: AWPF Operations and Maintenance Cost (O&M) A6
Appendix 6: Projected Future Water Cost A7
Appendix 7: Projected Future Revenue Payback Calculation A8
Appendix 8: GREAT Program Potential Retrofits A9

Glossary

AF – acre-foot. This is a measure of water volume. It is the amount of water that would fill a volume with an area of one acre and height of one foot. One AF is 43,560 cubic feet or 325,853 gallons.

AFY – acre-foot per year. This is a measure of water production or consumption.

ASR – Aquifer storage and recovery well – A well that can be used both to inject water into the ground for storage and to extract the water for later use.

AWPF – Advanced Water Purification Facility – This is the plant that purifies treated effluent, or discharge, from the Oxnard Wastewater Treatment Plant. It is also referred to as the recycled water facility or plant.

CMWD - Calleguas Municipal Water District – The regional wholesale water purveyor that the City of Oxnard purchases imported water from. CMWD is a member of the Metropolitan Water District of Southern California (MET).

DPH - Department of Public Health – One of the State agencies that regulate the use of recycled water.

Effluent – Treated wastewater that leaves the wastewater treatment plant and is sent to the AWPF to be purified (recycled) into Full Advanced Treatment Water. Effluent not sent to the AWPF is discharged to the Pacific Ocean.

FAT – full advanced treatment – Further treatment of tertiary treated wastewater using reverse osmosis and an oxidation treatment process. The finished water quality exceeds that of potable (drinking) water standards, but is not currently permitted by the California Department of Public Health to be used for potable water.

FATW – full advanced treatment water

FCGMA - Fox Canyon Groundwater Management Agency – The agency that manages the groundwater in Southern Ventura County, including the City's area, and places limits on the amount of groundwater that can be pumped. This amount is referred to as an allocation. The FCGMA code also allows for the accumulation of groundwater conservation and storage credits.

GREAT- Groundwater Recovery Enhancement and Treatment

LRP – Local Resource Program – A program from MET that pays an incentive to agencies for certain projects designed to reduce water imports.

mgd – million gallons per day. This is a unit of measure of water production or consumption.

MWD or MET – Metropolitan Water District of Southern California – The wholesale water purveyor that serves most of Southern California with water imported from Northern California through the State Water Project, or from the Colorado River Aqueduct. Calleguas Municipal Water District (CMWD) is a member agency of MET.

RWQCB -Regional Water Quality Control Board- One of the State agencies that regulate the use of recycled water.

RW – recycled water – A generic name used for wastewater that is treated by various means to various levels of purity.

TDS – Total dissolved solids - A measure of the level of dissolved minerals in water, commonly referred to as hardness. However, the definition of hardness is more specific.

UWCD - United Water Conservation District – The regional water conservation agency and wholesale water purveyor that manages the water resources of the Santa Clara River Watershed. UWCD sells groundwater pumped in the El Rio area to the City of Oxnard.

1. Purpose and Accuracy

The purpose of this report is to:

- Provide an overview of the Groundwater Recovery Enhancement and Treatment (GREAT) Program
- Update the GREAT Program Capital Improvement Projects (CIP) plan
- Estimate the cost for the full advanced treatment (FAT) water that will be produced by the Advanced Water Purification Facility (AWPF).

This will allow City Council members, staff, and residents to make informed decisions regarding future aspects of the program. The GREAT Program projects are continually evolving and some costs are only estimates. This analysis includes dozens of variables and hundreds of calculations. Many of the variables, such as electricity rates and construction costs, are continuously changing. In addition, Federal and State recycled water regulations are currently being updated. Therefore, the estimates in this report represent a snapshot in time of the most probable cost. This report represents the best available information on the program as of June 2012.

The projected future water cost and payback analysis in this report are based on theoretical scenarios and calculations and are not meant to estimate rates or revenue. These estimates provide a basis for comparing options. In addition, the cost estimates in this report are an engineer's estimate and do not represent a rate study. Not all of the rate and financial information is fully know at this time and conditions may change. For example financing costs could be reduced by future refinancing and revenues could be increased as markets change. However, every attempt was made to provide cost estimates within generally accepted standards, based on the information known at this time.

It should be noted that not all estimates in this report have the same accuracy. Costs in this report vary from invoices that have already been paid to estimates for projects that are only in the conceptual planning stage. Cost estimates that have more uncertainty are footnoted in the tables. Where projects are less well defined, and therefore cost estimates are less accurate, the estimates are more conservative.

2. Key Points to Remember

A. The two primary purposes of the GREAT Program are: to increase potable water quality by lowering its hardness; and to provide a reliable source of water at a competitive cost. This will be done using the groundwater Desalter System and the Full Advanced Treatment (FAT) Water System. These systems are related but distinctly different.

B. The Desalter System, used to lower water nitrates and Total Dissolved Solids (TDS), would be required without the recycled water program, but the Desalter System must be expanded in order to achieve all of the benefits of the Full Advanced Treatment (FAT) Water System.

C. Most of the reduction in imported water enabled by the GREAT Program will be achieved by pumping more groundwater. This will require the expansion of the Desalter System.

D. If the AWPF is expanded to Phase 2, recycled water will be less expensive than imported water.

E. The Advanced Water Purification Facility (AWPF) is designed for an ultimate capacity of 25 million gallons per day (mgd) or 28,000 acre-ft/yr (AFY). However, there is currently only enough wastewater effluent to make about 12.5 mgd or 14,000 AFY of FAT water. Approximately, 25% more FAT water could be produced if the City constructed a storage tank to equalize the daily fluctuation in flow rate from the wastewater plant. Storage would also increase reliability for customers.

F. The Phase 1 projects currently under construction do not constitute a fully functional system even at the 7,000 AFY initial capacity. More components are required to operate the system efficiently, avoid wasting recycled water, and use the pumping allocations that will be earned by selling the FAT water.
G. Phase 1 and 2 of the GREAT Program will benefit existing customers. Phases 3 and 4 could provide water for increased future demand. Of the initial $172 million spent on the GREAT Program, approximately $26.5 million is allocated for phases 3 and 4. However, because of economies of scale, the elimination of this work from the initial construction would have saved about 50% of the cost or $13.25 million. The additional cost will be paid by future uses via the Water Resources Development Fund.
H. The Full Advanced Treatment (FAT) Water System will pay for itself within 17 to 23 years while at the same time reducing the cost to rate payers for water as compared to continuing to pay for imported water. Future changes to water regulations could increase the value of FAT water, thus reducing the payback period.
I. Water costs Oxnard residents less than 1/2 cent per gallon. For the price of a gallon of gasoline, a resident can have 850 gallons of high quality drinking water delivered straight to her home.
J. FAT water will provide a reliable local sustainable source of water for the City.
K. Phase 2 of the GREAT Program could allow the City to stop buying all imported water. However, to increase flexibility, the City should continue to participate in the Calleguas Municipal Water District at least through the next 10 year agreement beginning in 2013.
L. The estimated additional cost to implement the GREAT program at the most efficient and economical level is $131.6 million, over the next 3 to 5 years.
M. The remaining cost of the GREAT Program could be paid for from savings from reduced purchases of imported water. Rate increases will need to keep pace with the projected Calleguas Municipal Water District (CMWD) increases of about 5% per year while the remaining components of the system are being constructed. However, soon after Phase 2 is complete, rate increases would be needed only to account for inflation and would be about half as much as they would have been without the recycled water program.
N. Approximately 18.5% of the current FAT water projects have been funded by grants. The largest grant was $20 million from the United States Department of the Interior Bureau of Reclamation. There are several grant programs that could fund future GREAT Program projects.
O. The cost of water to the ratepayer is going to rise, with or without the GREAT Program. With continued investment into the GREAT Program, the ratepayers will receive greater water supply reliability and potentially reduced percentages of future rate increases in the long run. Without the GREAT Program, ratepayers will continue to experience significant rate increases over the long term, with continued erosion of their water supply reliability.
P. An additional benefit to constructing GREAT Program facilities now is that construction prices and interest rates are both very low. This has and will greatly reduce the cost of the program. So far, most projects have been completed significantly under budget.

3. Groundwater Recovery Enhancement and Treatment (GREAT) Program

At the turn of the century, the City was faced with existing and impending water supply and quality issues. In response, the Public Works Department began looking for long term solutions to provide high quality, reliable water at stable rates for the residents and businesses of Oxnard. This effort spawned the GREAT Program. The two major components of the GREAT Program are the Desalter System and the Full Advanced Treatment (FAT) Water System.

Desalter System

The purpose of the Desalter System is to improve the quality of current drinking water supplies in the City by reducing the mineral content, or total dissolved solids (TDS), of the groundwater from the upper aquifers in the Oxnard Plain Basin. This purpose is completely independent of the FAT Water System. It is required to meet State recommended TDS standards standards and City Council direction, while at the same time following direction from the Fox Canyon Groundwater Management Agency (FCGMA) to minimize use of the lower aquifers, which are difficult to recharge. However, as part of the GREAT Program, more water will be pumped from within the City, which will require more desalter facilities in order to meet the TDS standard and maintain the quality of our drinking water.

The desalters also remove nitrate from groundwater in order to meet mandatory State standards. Table 1 lists the average nitrate and TDS levels for various water sources. Several of the City wells currently exceed the maximum contaminate level (MCL) for nitate.

Table 1: Average nitrate and TDS levels of various water sources.

	Standard	CMWD	UWCD	Oxnard Wells	Desalted	AWPF -FAT*
Nitrate (as NO3) (mg/l)	<45	3.6	17.1	15-65	12	2.91
Total Dissolved Solids (mg/l)	<500	330	949	1,100-1,800	27.9	50/200

*FAT water has an initial TDS of 50, but is raised to about 200 in order to balance the pH and reduce the corrosiveness of the water.

Full Advanced Treatment (FAT) Water System

The purpose of the FAT Water System is to recycle wastewater in order to:

1. **Reduce dependence on imported water** – When all components of the system are complete, full advanced treated (FAT) water will be a local water source that is dependable and sustainable, and can be completely controlled by the City.
2. **Stabilize rates** – The cost of imported water is anticipated to nearly double in the next 10 years. Once the GREAT Program is complete, the costs of FAT water should increase at or below the inflation rate. This could result in a 42% reduction in average water cost, as compared to imported water, by the end of the 30 year economic life of the AWPF.

   The Advanced Water Purification Facility (AWPF) will purify already-treated effluent from the City's Wastewater Treatment Plant on Perkins Rd, creating FAT water. The treated effluent from the Wastewater Treatment Plant is currently wasted by discharging it to the Pacific Ocean. The FAT water, permitted by the California Department of Public Health and the California Regional Water Quality Control Board, can be used for one or more of the following purposes:

   - **Landscape irrigation and industrial use within the City in lieu of using potable water** – Offsetting current imported water use is one of the most cost effective uses of the FAT water. Every gallon of FAT water that is used in the place of potable water, is a gallon that does not have to be moved 500 miles from Lake Oroville California to Oxnard.

- **Agricultural irrigation**- Local farms may use the FAT water to irrigate any crops. Some crops, such as berries, grow much better with FAT water because it has a lower TDS than well water. Most FAT water sold for agricultural use will also generate groundwater pumping credits for the City, which will then be used to reduce purchases of imported water.
- **Seawater intrusion barrier** – FAT water may be injected along the coastline in order to prevent seawater from entering fresh water aquifers. The City could also receive groundwater pumping credits for FAT water that is used for sea water barriers. The credits could then be used to reduce purchases of imported water.
- **Indirect potable reuse** – The FAT water from the AWPF exceeds drinking water standards. However, the California Department of Public Health currently does not allow recycled water to be used directly for drinking. However, current regulations allow FAT water to be injected into the ground for a minimum of six months and then extracted and used for drinking water. Extraction wells in the same aquifer must be hydraulically downstream from the injection well. Pending regulations will also allow the FAT water to be removed from the same well that it is injected in after a waiting period of not less than two months. The purpose of the waiting period is not for treatment, but to allow for the time delay needed to obtain water samples, perform laboratory analyses, prepare reports, and review results. The injected FAT water will be of higher quality than the native groundwater. Some quality may be lost during the waiting period. FAT water may absorb some minerals from the aquifer formations, blend with native groundwater, or flow downstream in the aquifer.

4. Increasing Cost of Imported Water

One of the key benefits of the GREAT Program is reducing reliance on water imported from Northern California. Imported water is expensive, uses more energy to produce and transport, and is subject to shortages due to drought. In addition, environmental issues in the Sacramento-San Jaoquin Delta area will reduce the availability and increase the cost greatly over the next decade.

Another reason for cost increases of imported water is long-term water shortages in the Colorado River Watershed. Early agreements and treaties allocating water rights to the Colorado River water were based on limited information. The approximately 50-year study period turned out to be the wettest period in approximately 2,000 years; therefore the agreements and treaties represent an over commitment of this resource.

Metropolitan Water District of Southern California (MET) also has a long-term contract to buy cheap electricity from the Hoover Dam Project. It uses this cheap electricity to transport the Colorado River water to Southern California. The long-term contract is due to expire soon, and the cost of the electricity will rise significantly. Without this cheap electricity, the cost to transport Colorado River water through MET's Colorado River Aqueduct will double and may triple.

These, and other factors, will reduce the availability of imported MET water through CMWD, and nearly double the cost over the next 10 years.

5. Reducing Imported Water

In general, more water is pumped from beneath the Oxnard Plain than is replaced each year. This has caused water levels in the Oxnard Plain Groundwater Basin and the Pleasant Valley Groundwater Basin to drop. However, the Oxnard Forebay Basin, near the Santa Clara River, is recharged at a much higher rate than the other two aquifers. The shallower aquifers of the Oxnard Plain Basin are also fairly quickly recharged via direct connection with the Oxnard Forebay Basin. This is key to the success of the GREAT Program.

Because of the limited supply of water, the Fox Canyon Groundwater Management Agency (FCGMA) has restricted the amount of groundwater that can be used by each agency or land owner. The City must have a water allocation in order to pump groundwater. Because the City uses more water than its allocation, it must import water for residents and businesses. It should be noted that the City uses less groundwater per acre than most agricultural uses on the Oxnard Plain. The City uses approximately 1.2 acre-ft of water per year for each acre of acre (AFY/A) of developed City area. Typical agriculture water use on the Oxnard plain ranges from about 1.5-2 AFY/A for lemons up to about 5 AFY/A for raspberries.

Most FAT water from the AWPF will be sold to farmers east of the City. The City will receive groundwater pumping credits in exchange for this water. The groundwater pumping credits will be used to pump water inside the City from the shallow aquifers in the Oxnard Plain Groundwater Basin that are more easily recharged from the Oxnard Forebay Basin. In this way, the GREAT Program will aid in replenishing aquifers on the east side of the Oxnard Plain, while at the same time providing drinking water from a more sustainable source.

Due to regulations on the use of recycled water, the maximum recycled water that could be used in the City is only about 3,200 acre-ft per year (AFY) or about 12% of current water use. However, the cost to construct pipelines and retrofit customer facilities is prohibitive in many cases. Therefore, the initial amount of recycled water used in lieu of potable water will be about 1,500 to 1,800 AFY.

The remaining 5,200 to 5,500 AFY of Phase 1 recycled water and the additional 7,000 AFY of Phase 2 FAT water will be used for agricultural irrigation or for injection wells. Water used for agricultural irrigation east of the City will reduce pumping from depleted aquifers. This will allow the City to pump water from within the City which in turn will allow the City to reduce purchases of imported water.

6. GREAT Program Components

The GREAT Program consists of several components including:

A. **Components related to the Deslter and FAT Systems**
   - **Feed water wells** – Potable (drinking) water wells that feed the desalters.
   - **Desalters** – Membrane filter systems used to remove dissolved minerals from groundwater, in order to reduce the levels of nitrates and total dissolved solids (TDS).
   - **Concentrate (brine) collection system** – Concentrate is water that contains the minerals that are removed from groundwater by a desalter. It is also sometimes referred to as brine. The concentrate lines will take the concentrate directly to the wastewater treatment plant ocean outfall. This will avoid treating the concentrate a second time in the wastewater plant and a third time in the AWPF. Treating water three times for no reason would obviously be costly and inefficient. After the brine treatment wetlands are complete, the concentrate will be used for wetland restoration instead being sent to the ocean.
   - **Concentrate (brine) treatment wetlands** – research will be conducted in coordination with the Bureau of Reclamation in order to determine the best method to treat concentrate from the desalters and AWPF. The treated concentrate eventually could be used to restore Ormond Beach Wetlands. This is important because the combined flow of concentrate from the AWPF and desalters may eventually be too much for the existing wastewater treatment plant outfall to properly disperse into the Pacific Ocean.
   - **Potable (drinking) water distribution lines** – Improvements to the existing water system to allow desalted water to be distributed to residents and businesses.

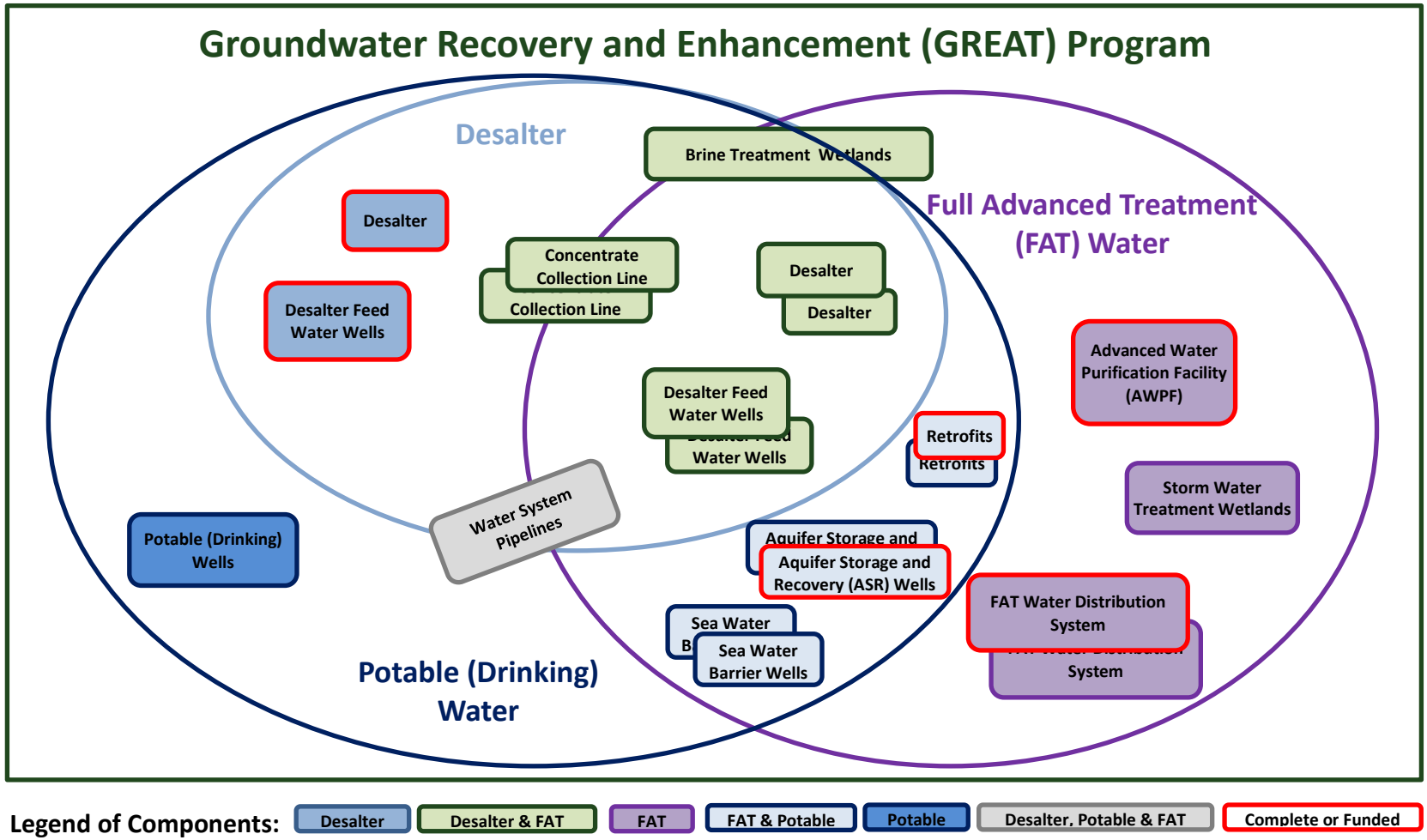
B. **Components related to Water System and FAT System**
   - **Water System Retrofits** – Conversion of potable (drinking) water systems to FAT water systems.
   - **Aquifer storage and recovery (ASR) wells** - Wells that can be used both to inject water into the groundwater aquifers for storage and to extract the water for later use. These may be required in order to avoid sending FAT water to the ocean during low demand periods, such as rainy days.
   - **Sea water barrier wells** – Wells that inject FAT water into the groundwater aquifers along the coastline, in order to prevent sea water from infiltrating into fresh water aquifers.

C. **Desalter System**
   - **Desalter feed water wells –** wells required for desalters -- not related to FAT water.
   - **Desalter** - treatment facilities required for removing nitrates and TDS from existing groundwater -- not related to FAT water.

D. Full Advanced Treatment (FAT) Water System
   - **Advanced Water Purification Facility (AWPF)** – The plant that purifies treated wastewater into Full Advanced Treatment (FAT) water, which can be used for most purposes except drinking directly from the plant.
     - **Finished water storage**- storage to allow the AWPF to operate without discharging FAT water to the ocean during periods of low demand.
   - **Full Advanced Treatment (FAT) water distribution lines** – Pipelines to take FAT water from the AWPF to FAT water customers.
   - **Storm water treatment wetlands** – Wetlands can also be used to treat storm water. This could increase the amount of recycled water, reduce storm water pollution, help restore Ormond Beach Wetlands, and provide a way for the City and developers to meet the new storm water regulations. This could also provide an additional mechanism for developers to pay for a portion of the GREAT Program.

Figure 1 is a Venn diagram of the GREAT Program systems showing how the various components are related. The three major systems are the Potable (drinking) Water System, the Desalter System and the Full Advanced Treatment (FAT) Water System.

Figure 1: Venn diagram of the GREAT Program components.



Legend of Components: Desalter | Desalter & FAT | FAT | FAT & Potable | Potable | Desalter, Potable & FAT | Complete or Funded

Boxes represent components of the GREAT Program. Components with red borders are complete or funded. Double boxes represent sets of more than one of a component, which are not necessarily built at the same time.

7. GREAT Program Phases

The GREAT Program is broken into four major phases which correspond to the phases of the AWPF. These phases result in AWPF capacities of 7,000 AFY, 14,000 AFY, 21,000 AFY and 28,000 AFY. Currently, there is only enough wastewater effluent to produce about 14,000 AFY of FAT water. However, construction of a flow equalization structure as well as increases in future wastewater flows could allow for increase FAT production. The components of the first two phases of the GREAT Program are listed below.

Phase 1 of the GREAT Program includes:

A. Components Related to Desalter, Water and FAT Systems

- Feed water wells required for additional groundwater that will be pumped as a result of the FAT Water System at 6.25 mgd or 7,000 AFY capacity.
- Desalters required for additional groundwater that will be pumped as a result of the FAT Water System at 6.25 mgd or 7,000 AFY capacity
- Brine treatment wetlands demonstration project
- Concentrate collection system lines
- Water system pipelines
- Aquifer storage and recovery (ASR) well retrofit – conversion of an existing well to an ASR well.

B. Desalter System

- Feed water wells required to reduce the nitrates and TDS of currently pumped groundwater not -- related to FAT water.
- Desalters required to reduce the nitrates and TDS of currently pumped groundwater --not related to FAT water.

C. Full Advanced Treatment (FAT) Water System

- Advanced Water Purification System (AWPF) at 6.25 mgd or 7,000 AFY capacity.
- AWPF backup power
- AWPF finished water storage
- FAT water distribution pipelines
- Storm water treatment demonstration project

Phase 2 of the GREAT Program includes:

A. Components Related to Desalter, Water and FAT Systems

- Feed water wells required for additional groundwater that will be pumped as a result of the FAT Water System at 12.5 mgd or 14,000 AFY capacity.
- Desalters required for additional groundwater that will be pumped as a result of the FAT Water System at 12.5 mgd or 14,000 AFY capacity
- Concentrate collection system lines
- Water system pipelines
- Aquifer storage and recovery (ASR) wells

B. Desalter System – No Phase 2 components

C. Full Advanced Treatment (FAT) Water System

- Advanced Water Purification System (AWPF) expansion to 12.5 mgd or 14,000 AFY capacity.

8. GREAT Program Capital Improvement Projects (CIP) Plan

The GREAT Program is currently funded through about 70% of Phase 1. Projects required to complete Phase 1 that are currently not under construction include: back up power, finished water storage, treatment wetlands, a pipeline to agricultural customers, and expansion of the Desalter System. The estimated cost to complete Phase 1 is $76 million and the estimated cost to complete Phase 2 is $55.6 million for a total additional cost of $131.6 million. The costs of components for each phase of the program are given in Table 2. See Appendix 2 for a more detailed plan.

Table 2: GREAT Program Capital Improvement Program Plan by Phase

	Phase 1 Complete or funded	Phase 1 Remaining	Phase 2	Future	Total
Full Advanced Treatment (FAT) Water System					
AWPF Expansion	$75,238,729	$0	$19,162,152	$41,650,598	$136,051,479
AWPF Improvements*	$0	$2,000,000	$0	$7,000,000	$9,000,000
Storage and wetland treatment	$0	$20,500,000	$5,500,000	$0	$26,000,000
Pipeline	$29,770,650	$15,296,000	$0	$16,806,990	$61,873,640
TOTAL	$105,009,379	$37,796,000	$24,662,152	$65,457,588	$232,925,119
Desalter System and Water System Components of the GREAT Program Related to FAT					
Desalter system & potable wells	$0	$22,000,000	$20,000,000	$0	$42,000,000
Concentrtate collection	$0	$12,724,200	$2,967,360	$0	$15,691,560
Treatmetn Wetlands	$0	$2,500,000	$1,000,000	$0	$3,500,000
ASR/Barrrier FAT wells	$1,000,000	$1,000,000	$7,000,000	$7,000,000	$16,000,000
Retrofit connections	$3,000,000	$0	$0		$3,000,000
TOTAL	$4,000,000	$38,224,200	$30,967,360	$7,000,000	$80,191,560
TOTAL FULL ADVANCED TREATMENT (FAT) WATER SYSTEM RELATED REQUIREMENTS					
TOTAL FATW PROGRAM	$109,009,379	$76,020,200	$55,629,512	$72,457,588	$313,116,679
RUNNING SUM ADDITIONAL		$76,020,200	$131,649,712	$204,107,300	
RUNNING SUM FAT TOTAL	$109,009,379	$185,029,579	$240,659,091	$313,116,679	
Desalter System and Water System Components of the GREAT Program Not Related to FAT					
Desalter system & potable wells	$30,000,000				$30,000,000
Other water and wastewater system	$33,000,000				$33,000,000
TOTAL	$63,000,000	$0	$0	$0	$63,000,000
TOTAL GREAT PROGRAM					
TOTAL GREAT PROGRAM	$172,009,379	$76,020,200	$55,629,512	$72,457,588	$376,116,679

*AWPF improvements include backup power, flow equalization storage, and a chlorination facility.

9. Options for GREAT Program Completion

The most efficient and cost effective level of AWPF production that is currently possible is Phase 2 which is 14,000 AFY. Completion of Phase 2 would result in the lowest cost recycled water, the shortest payback for the GREAT Program, and the lowest long term water rates for residents. However, other options are available. These are summarized in Table 3. Note that only Option D results in a payback that is less than the 30 year economic life of the AWPF.

Table 3: Options for completion of the GREAT Program

	Option			
	A. Operate without additional components	B. Add only the Hueneme Rd pipeline	C. Complete Phase 1	D. Complete Phase 2
Total Cost (O&M and Capital) per acre-ft	$5,098	$1,534	$1,680	$1,191
Maximum Plant Output	1,800 AFY	6,563 AFY	7,000 AFY	14,000 AFY
Reduction in Imported Water	0%	23%	62%	100%
Additional Capital Cost	$0	$15.3 million	$76.0 million	$131.6 million
Total Capital Cost	$172.0 million	$187.3 million	$248.0 million	$303.7 million
Payback for FAT System	>economic life	>economic life	>economic life	17 yr
Payback for all FAT Related Components	>economic life	>economic life	>economic life	23 yr

An additional option that is being evaluated is indirect reuse of the FAT water. A series of wells would be used to inject the FAT water into the ground, and another set of wells would extract the water after it had been underground for two to six months. The cost of this could be slightly lower than increasing pumping of existing groundwater because of reduced desalter costs. However, no revenue would be generated from the sales of recycled water, so the net benefit could be less than if water was sold to agricultural customers.

10. Funding the Future Projects

The option from Table 3 that provides the lowest cost FAT water and smallest future rate increases is Option D, complete Phase 2. It is anticipated that water rates will rise significantly as a result of increased costs from imported water, regardless of the option chosen. However, once Phase 2 is completed, rates would only need to be increased to account for inflation. These rate increases would be about half as much as they would have been without the GREAT Program for the term of the next 10 year Metropolitan Water District (MET) purchase order (January 2013 – December 2022). By the end of the 30 year economic life of the AWPF, the GREAT Program would reduce the average source water cost by 42%.

Approximately 18.5% of current FAT water projects have been funded by grants. There are still significant grant opportunities available which could lower the cost the program. Fees from development projects that do not have sufficient water allocation could also fund FAT projects through contributions to the Water Resources Development Fund.

One benefit to constructing GREAT Program facilities now is that construction prices and interest rates are both very low. This will greatly reduce the cost of the program. So far most projects have been completed significantly under budget.

11. Engineering Economic Analysis

There are many methods that can be used to determine the economic benefits of an investment in a project. These include return on investment, net present value, cost benefit analysis, and simple payback. The method chosen depends on the purpose of the analysis, the type of organization involved, and the individual circumstances of the project. For this analysis, payback was used because it is relatively easy to understand and to calculate. It is also a concept that most people are familiar with.

The definition of payback used here is the year in which the total estimated cost of the project equals the total economic benefits from the project. The total cost includes estimated construction, financing, operations and maintenance costs. The economic benefits of the project include revenue received from recycled water sales, savings from reductions of imported water purchases and Local Resource Program (LRP) incentives from MET. The interest rate used in these calculations is meant to be an estimated average for all financing. The payback calculation is not an exact calculation, but given the uncertainty of predicting future circumstances and costs, it provides an easy to understand method of estimating the economic benefits of a project.

12. Assumptions in Economic Calculations

The assumptions in this analysis are generally meant to be conservative and therefore should overestimate the payback period.

Project economic life: 30 years. After 30 years the plant will require significant repair, upgrade and replacement of components.

Operations and maintenance (O&M) cost: All fixed and variable costs are included as well as labor and contract costs. City indirect cost were included for labor only.

Interest rate: The average interest rate for all financing is assumed to be 5%

Inflation: The average inflation rate is assumed to be 3%

Imported water cost escalation: The estimated cost of imported water in the future was provided by Calleguas Municipal Water District (CMWD).

Recycled water use: Only currently permitted uses were included in the analysis. It is likely other, more beneficial uses, will be allowed in the future which will reduce the payback period.

Full treatment water Components: Only the components of the GREAT Program required to produce FAT water were included in the FAT payback calculation.

Calleguas Municipal Water District (CMWD) cost – The total cost of CMWD was used to determine savings from reduced purchases. This includes capacity rate and readiness to serve charges. However, it is recommended that the City continue to participate in CMWD at least through the nest 10 year agreement and potentially longer. The CMWD "standby" charges would be a benefit to all residents because of the increased reliability of another potential water source.

Use of groundwater conservation credits – Credits beyond the reserve will be used to reduce import water purchases after the next phase of Desalter System improvements, but before completion of Phase 2 of the AWPF.

13. Cost of Full Advanced Treatment Water (FATW)

Currently, water produced locally by the City and United Water Conservation District (UWCD) costs about $600 per acre-ft (AF) before distribution. This includes the cost of current desalter operations. The average total cost for water from Calleguas Municipal Water District (CMWD) that is imported from Northern California will be about $1,248 per AF as of January 2013. This is likely to increase to at least $1,608 per AF by 2018.

At the completion of Phase 1 of the AWPF, recycled water cost should cost about $1,680 per AF. However, if Phase 2 of the GREAT Program was completed at the same time, the cost of recycled water would be about $1,191 per AF. Table 4 lists the projected cost for each type of water for the years 2013, 2018, 2023, 2033 and 2042.

Table 4: Projected cost to purchase or produce water.

Water Source	Approximate Cost per acre-ft (AF)				
	2013	2018	2023	2033	2042
Local (City and UWCD)	$701	$871	$982	$1,259	$1,589
Imported (CMWD)	$1,248	$1,608	$2,055	$2,762	$3,604
Phase 1 AWPF	$1,680	$1,767	$1,868	$2,120	$2,420
Phase 2 AWPF	$1,191	$1,272	$1,366	$1,601	$1,881

Appendix 1 gives a summary of the recycled water unit calculations for various phases and scenarios. Appendices 2 to 5 provide the detailed cost estimates used to calculate the recycled water cost.

Figure 2 shows the projected costs for water from each source over the next 30 years. This does not include the distribution cost for potable water. Note that the reduction in cost of FAT water drops dramatically from Phase 1 to Phase 2.

Figure 3 shows the projected average potable water source cost (not including cost to distribute the water within the City) with and without the FAT water system. The average cost with FAT water curve has been smoothed slightly to remove artificial spikes caused by changes from one phase to the next. These curves represent theoretical cost calculations and will not necessarily directly correlate to rates. For example, these calculations assume that financing and major repair costs are uniformly distributed over the life of the project. Note that the average cost of water with or without FAT water system rises at about the same rate until 2019. From that point on, the cost with the FAT system is considerably less.

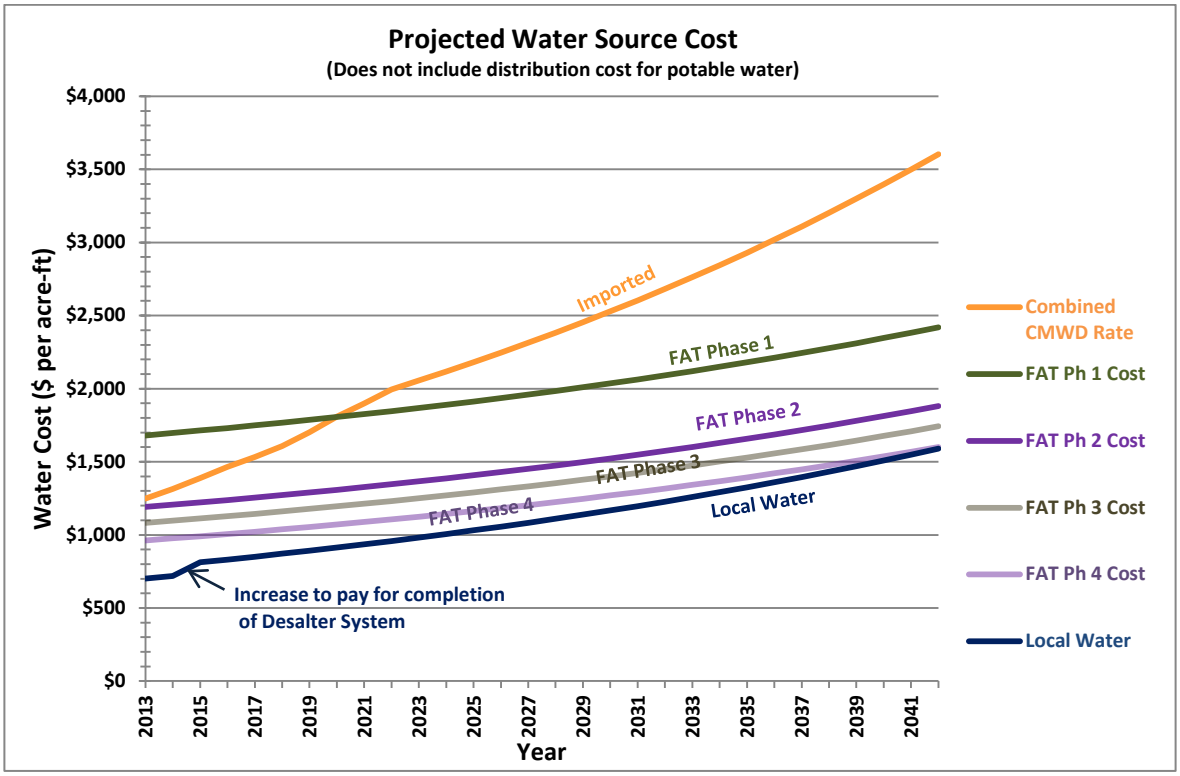


Figure 2: Projected water source cost (cost to purchase or produce water).

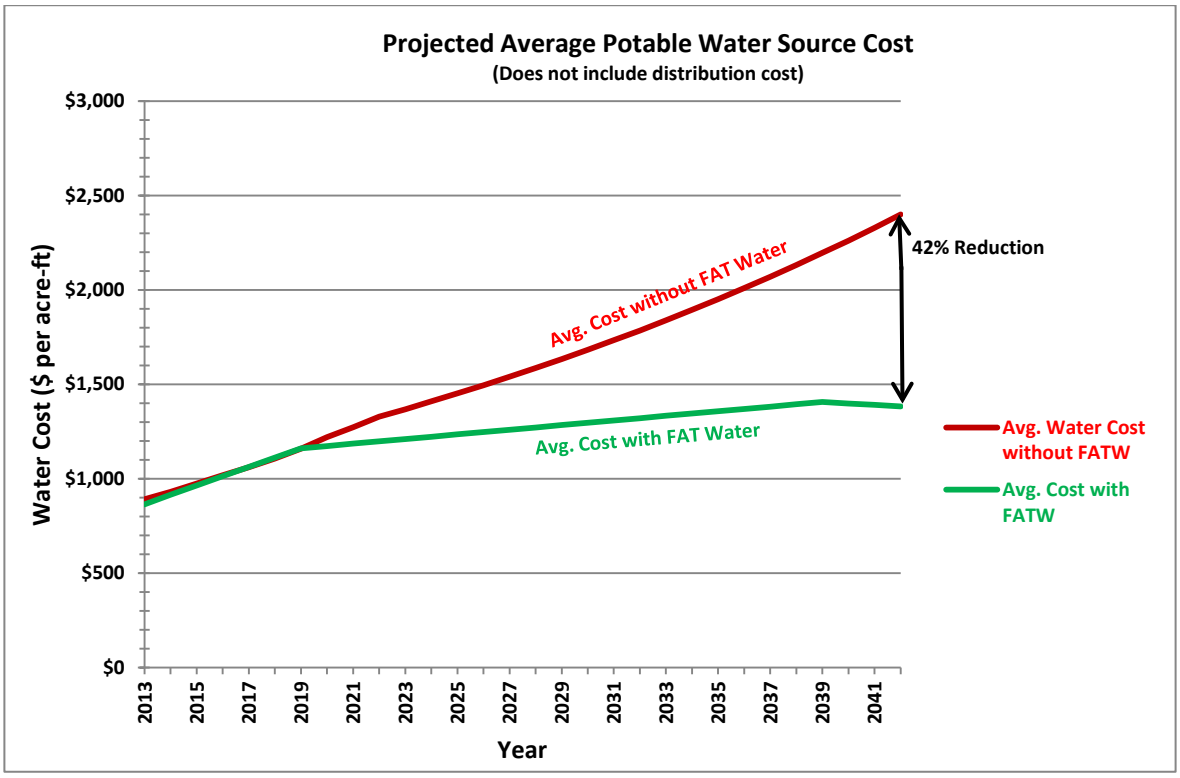


Figure 3: Projected average potable water source cost with and without the FAT water system.

14. Rates

Most revenue from the Full Advanced Treatment (FAT) Water System will come from sales of water inside as well as outside of the City. The rates are still being determined and are subject to change. However, for the purposes of this report the rates in Table 5 were used to determine estimated revenue. The rates and revenue estimates in this report do not represent a rate study. They are used to determine the relative benefits of various options. The Priority, Exchange and Interruptible rates are lower than the in-lieu of rates because the former rates include a pumping credit with the sale, i.e. the City will be allowed to pump an additional acre-ft of water for each acre-ft of FAT water sold. This will allow the City to use groundwater instead of expensive imported water.

The existing and proposed rate categories include:

A. **Landscape Irrigation Water Rate** – Potable water used for landscape irrigation within the City
B. **Recycled Water for Irrigation in Lieu of Potable Water** – This rate is for FAT water that is used for landscape irrigation within the City. It is currently set at 85% of the Landscape Irrigation Water Rate.
C. **FATW (Full Advanced Treatment Water) –** sold outside of city without credit **–** This Rate will not include a pumping credit and is anticipated to be set at 90% of the Landscape Irrigation Rate.
D. **FATW Priority Rate** – This rate will be for agriculture customers outside of the City who will have the first priority after customers within the City. The City will receive pumping credits for the sale of water at this rate.
E. **FATW Exchange Rate**- This rate is for standard priority agricultural customers outside of the City and will include a pumping credit.
F. **FATW Interruptible Rate**-This rate is for water agencies with large storage capacity and high demands. The water will be supplied on an as available basis and the customer will receive a discount for maximizing the use of the FATW. If these customers did not have the storage, the City would need to build facilities or risk wasting FATW by sending it to the ocean during low demand periods.

Table 5: Approximate rates for potable landscape irrigation water and FAT water

Approximate Rates	Approximate Price per acre-ft (AF)				
	2013	2018	2023	2033	2042
A. Landscape Irrigation Water Rate (potable water)	$1,542	$1,788	$2,072	$2,785	$3,634
B. RW for Irrigation in Lieu of Potable Water Rate	$1,311	$1,519	$1,761	$2,367	$3,089
C. FATW -outside City without credit	$1,388	$1,609	$1,865	$2,507	$3,270
D. FATW Priority Rate - with credt	$425	$493	$571	$768	$1,002
E. FATW Exchange Rate - with credit	$365	$423	$491	$659	$860
F. FATW Interruptable rate - United and PV	$300	$348	$403	$542	$707

Note: The proposed FATW interruptible rate is $325, however, the net rate after discounts for management of parts of the FAT distribution system, is approximately $300

Another source of revenue for the FAT Water System is incentives from the Local Resource Program (LRP) from Metropolitan Water District of Southern California (MET). The LRP incentive is $250 per acre-ft for recycled water used to offset water that would have been imported by MET. The City currently has a 20 year LRP agreement with MET for a maximum of 2,310 acre-ft per year.

15. Savings & Revenue

Savings from the FAT Water System will come in two ways. First, FAT water used for irrigation instead of imported water will directly reduce imported water purchases. Second, pumping credits earned from FAT water sales to agricultural customers will be used to pump additional groundwater instead of purchasing imported water.

To illustrate the revenue and expenses from various uses of water, sample calculations for seven water use scenarios are included in Tables 6 and 7. These include the expenses, revenue and savings to both the Recycled Water Program and the Water Program. These scenarios are simplified calculations meant to illustrate the various economic benefits of the GREAT Program; they are not calculations of projected rates or revenues.

The scenarios in Table 6 and Table 7 are:

A. **Imported potable water** – Water is imported and distributed through the potable water distribution system. The net is revenue from sales at the Landscape Irrigation Water Rate minus the total cost of CMWD water and the cost to distribute the water within the City.
B. **Weighted average potable water** – The weighted average cost of imported and local potable water. The City imports about 45% of its potable water.
C. **Local potable water** –Water is produced locally and distributed through the potable water distribution system. The net is the revenue from sales at the Landscape Irrigation Water Rate minus the average cost of City well and UMWD water including the cost for desalting and the distribution cost.
D. **RW In Lieu of Potable** – FAT water is produced at the AWPF and distributed through the recycled water distribution system. This water replaces potable water that would have been used otherwise. The net is revenue at the RW in Lieu of Potable Water Rate plus the MET LRP incentive minus the cost to produce and distribute FAT water.
E. **Exchange Rate** – FAT water is produced at the AWPF and distributed through the recycled water distribution system. This sale earns a credit which is then used to produce City (local) water which is distributed through the potable water distribution system. The net is revenue from sales at the FATW Rate plus revenue for the same amount of sales at the Landscape Irrigation Water Rate minus the cost to produce and distribute FAT water and the cost to produce and distribute an equal amount of local water.
F. **Average FAT** – This is the average of all FAT uses that receive a pumping credit.
G. **Savings from FAT** – This the difference between the average FAT and the In-lieu of imported.

In Table 6, the net revenue is the sum of the expenses, revenues and incentives. Note that the net revenue of average potable water (Scenario B) is $0, meaning the expenses equal the revenue. The other net revenues are positive if they are higher than average, and negative if they are lower than average. For example, in 2013 local potable water net revenue (Scenario C) is $246 more than average potable water and imported potable water net revenue (Scenario A) is $301 less than average potable water. The average potable water cost is weighted, and is equal to 55% of the local cost plus 45% of the imported cost.

The savings over imported water is the difference between the net revenue for a scenario and the net revenue for imported potable water (Scenario A). For example, in 2013 the savings over imported potable water for local potable water (Scenario C) is $547 ($246 minus negative $301).

Table 7 shows the projected savings of each scenario as compared to imported water for four different years. Note that FAT water is more expensive than imported water in the first year, but becomes much less expensive in later years.

Table 6: Sample calculations of cost, revenue, and incentives for various operating scenarios.

Expenses & Revenue	2013						
	A. Imported Potable	B. Avg. Potable	C. Local Potable	D. In-lieu of	E. Exchange	F. Avg FAT	G. Savings from FAT
Purchase imported water	($1,248)	($947)					$1,248
Produce groundwater			($701)		($701)	($701)	($701)
Distribute potable water	($595)	($595)	($595)		($595)	($595)	$0
Revenue from potable	$1,542	$1,542	$1,542		$1,542	$1,542	$0
Produce & distribute FAT water				($1,191)	($1,191)	($1,191)	($1,191)
Avg. Revenue from FAT sale				$1,311	$382	$504	$504
MET LRP incentive				$250			$0
Net Revenue	($301)	$0	$246	$370	($563)	($441)	($140)
Savings over imported water	$0	$301	$547	$671	($262)	($140)	

Expenses & Revenue	2028						
	A. Imported Potable	B. Avg. Potable	C. Local Potable	D. In-lieu of	E. Exchange	F. Avg FAT	G. Savings from FAT
Purchase imported water	($2,383)	($1,476)					$2,383
Produce groundwater			($1,110)		($1,110)	($1,110)	($1,110)
Distribute potable water	($927)	($927)	($927)		($927)	($927)	$0
Revenue from potable	$2,402	$2,402	$2,402		$2,402	$2,402	$0
Produce FAT water				($1,475)	($1,475)	($1,475)	($1,475)
Avg. Revenue from FAT sale				$2,042	$563	$1,042	$1,042
MET LRP incentive				$250			$0
Net Revenue	($907)	$0	$366	$817	($546)	($67)	$840
Savings over imported water	$0	$907	$1,273	$1,724	$361	$840	

Table 7: Summary of savings over imported water.

Year	Savings Over Imported Water					
	A. Imported Potable	B. Avg. Potable	C. Local Potable	D. In-lieu of	E. Exchange	F. Avg FAT
2013	$0	$301	$547	$671	($262)	($140)
2018	$0	$510	$737	$1,007	($84)	$65
2023	$0	$782	$1,074	$1,428	$231	$417
2028	$0	$907	$1,273	$1,724	$361	$840

16. Payback for the FAT Water and Desalter Systems

The GREAT Program Desalter System components unrelated to the FAT water system were not included in the payback analysis. These components were required to meet the mandatory nitrate standards and the recommended TDS standards for existing water supplies and are unrelated to the FAT system.

The payback for the FAT system included costs for the AWPF, FAT water distribution system, and the storm water treatment wetlands. The Payback for the FAT system related components included costs for all FAT System components as well as costs for all water and desalter FAT related components. These components are shown in the Full Advanced Treatment (FAT) Water system in Figure 1 on page 9.

Based on the assumptions in section 12 and the anticipated uses of FAT water, the payback for Phase 1 of the FAT System is beyond the 30 year life of the project. However, the payback of Phase 2 is approximately 17 years for the FAT System alone and 23 years for all FAT system related components including the desalter system expansion components, ASR & barrier wells, Phase 1 retrofits, and concentrate treatment wetlands. The payback for four options is included in Table 8.

Table 8: GREAT Program payback

Option	Description	FAT System Only	FAT System Related Components*
1	Operate the system with components as of Dec 2012	>economic life	>economic life
2	Add only Hueneme Rd Pipeline	>economic life	>economic life
3	Phase 1	>economic life	>economic life
4	Phase 2	17 years	23 years

*Recovering the cost of the Desalter System from revenue and savings resulting from the FAT System was not an objective of the GREAT Program. The Desalter System would have been required for other water supply options if the FAT System was not built. These costs are included in the payback just to show the added benefit of the GREAT Program.

17. Short Term Plan

The design and construction of current projects is still underway. However, planning for the completion of Phase 1 and Phase 2 has already begun. A decision on the schedule for completing these phases should be made by September 2012 in order to allow time to coordinate projects with the AWPF startup. Figure 4 gives a schedule for the next year of the GREAT Program.

Figure 4: GREAT Program short term schedule

Activity or Component	Jun 12	Jul 12	Aug 12	Sep 12	Oct 12	Nov 12	Dec 12	Jan 13	Feb 13	Mar 13	Apr 13	May 13	June 13	Jul 13	Aug13	Sep 13
Negotiations for the sale of Phase 1 FAT water																
Make a decision to complete phase 1 or 2																
Design of remaining Phase projects																
Begin remaining projects																
Obtain funding for Phase 2 of the Hueneme Rd FAT water line and remaining projects																
Construction of retrofit pipelines																
Construction of Hueneme Rd Phase 1A																
Construction of Hueneme Rd Phase 1B																
Start the AWPF																

18. Long Range Plan

After completion of Phases 1 and 2, the need for Phase 3 will have to be evaluated. Depending on the situation at that time, there could be a gap in the implementation of the GREAT Program. The potential permitting of some type of direct potable reuse of FAT water by the Department of Public Health (DPH) would almost certainly justify the implementation of the AWPF at the highest possible output. The DPH is required to produce an engineer's report on the feasibility of direct potable reuse by the end of 2016. The schedule for possible implementation of direct potable reuse will be better known at that time. Ocean desalination is another option for producing potable water in the future. A number of Southern California cities are already planning to develop ocean desalination facilities. Figure 5 gives a schedule for the long term implementation of the GREAT Program.

Figure 5: GREAT Program long term schedule

Activity or Component	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2032	2014-2038	2039-2043
Initial projects																						
Remaining Phase 1																						
Phase 2 AWPF & Desalter																						
Wetland research																						
Wetland implementation																						
Phase 3																						
Direct potable reuse																						
Phase 4																						
Ocean Desalination																						

Appendices

Appendix 1: Full Advanced Treatment Water (FATW) Cost
Table 1: Full Advanced Treatment (FAT) Water Cost
Table 2A: GREAT Program Capital Cost for Scenarios A to G (Page 1 of 2)
Table 2B: GREAT Program Capital Cost for Scenarios A to G (Page 2of 2)

Appendix 2: GREAT Program Capital Improvement Projects (CIP) Plan Summary
Table 1A: GREAT Program Capital Improvement Plan Summary (Page 1 of 3)
Table 1B: GREAT Program Capital Improvement Plan Summary (Page 2 of 3)
Table 1C: GREAT Program Capital Improvement Plan Summary (Page 3 of 3)

Appendix 3: Advanced Water Purification Facility Cost Allocated by Phase
Table 1A: Advanced Water Purification Facility (AWPF) Cost Allocated by Phase (Page 1 of 2)
Table 1B: Advanced Water Purification Facility (AWPF) Cost Allocated by Phase (Page 2 of 2)

Appendix 4: GREAT Program Pipeline Cost Estimates
Table 1: GREAT Program Pipeline Cost Estimates

Appendix 5: AWPF Operations and Maintenance Cost (O&M)
Table 1: AWPF Operations and Maintenance Cost
Table 2: Equipment Replacement Cost
Table 3: AWPF Lab & Facilities O&M Cost
Table 4: AWPF Staff Cost

Appendix 6: Projected Future Water Cost
Table 1A: Projected Future Water Costs (Page 1 of 2)
Table 1B: Projected Future Water Costs (Page 2 of 2)

Appendix 7: Projected Future Revenue and Payback Calculation
Table 1A: Projected Future Water Revenue and Payback (Page 1 of 2)
Table 1B: Projected Future Water Revenue and Payback (Page 2 of 2)

Appendix 8: GREAT Program Potential Retrofits
To Be Published.

Appendix 1: Full Advanced Treatment Water (FATW) Cost

The estimated total cost for FAT water including construction, financing, operations and maintenance is included in Appendix 1. All costs are in 2012 dollars. Future costs may increase due to inflation and decrease due to advancements in technology. The cost for FAT water was calculated for the following seven different scenarios.

A0. **Operate the system without additional components (as of Dec 2012)** - This includes only the cost for projects completed or funded as of June 2012 plus the cost of the Phase 2 Hueneme Rd FAT pipeline.

A. **Phase 1 as of 2012 plus Hueneme Rd** - This includes only the cost for projects completed or funded as of June 2012 plus the cost of the Phase 2 Hueneme Rd FAT pipeline. This scenario will not allow the City to use all of the water allocations that will be earned from sales of FAT water. However, this will reduce the capacity of the plant because of the high TDS of wastewater effluent due to the desalters and commercial brine discharges into the wastewater system.

B. **All Costs as of Phase 1** - This includes all recycled water costs incurred as of the completion of Phase 1 or 7,000 acre-feet per year capacity. It includes backup power, finished water storage, and desalter system improvements. This scenario will allow the City to use all of the water allocations earned from FAT sales. This is the least cost option to begin operating the AWPF at the full initial capacity of 7,000 acre-ft per year (AFY)

C. **Only Costs for Phase 1 Production** - This includes only the costs directly related to Phase 1 of production. This is a theoretical calculation of the cost that would be assigned to Phase 1 of production. It does not include portions of the Advanced Water Purification Facility (AWPF) that are for future expansion for Phases 2, 3 or 4 (See Appendix 3 for AWPF cost allocation by phase).

D. **All cost as of phase 2** - This includes all recycled water costs incurred as of the completion of Phase 2 or 14,000 acre-feet per year capacity.

Note: Phase 2 is the highest continuous level of production that can be achieved with the current quantity of effluent from the wastewater treatment plant. Construction of a flow equalization structure to store peak flow from the wastewater treatment plant could increase the AWPF capacity somewhat. Future increases in wastewater flow will allow for an increase in AWPF output

E. **Only Costs for Phase 1 & 2 Production** - This includes only the costs directly related to Phases 1 and 2 of production. This is a theoretical calculation of the cost that would be assigned to Phases 1 and 2 of production. It does not include portions of the Advanced Water Purification Facility (AWPF) that are for future expansion of Phase 3 or 4 (See Appendix 3 for AWPF cost allocation by phase).

F. **All Costs as of Phase 3** - This includes all recycled water costs incurred as of the completion of Phase 3 or 21,000 acre-feet per year capacity.

G. **All Costs as of Phase 4** - This includes all recycled water costs incurred as of the completion of Phase 4 or 28,000 acre-feet per year capacity.

Appendix 1, Table 1: Full Advanced Treatment (FAT) Water Cost

	(A0) Operate without additional components (as of Dec 2012)	(A) Phase 1 as of 2012 plus Hueneme Rd	**(B) All Costs as of Phase 1**	(C) Only Costs for Phase 1 Production	**(D) All cost as of phase 2**	(E) Only Costs for Phase 1 & 2 Production	(F) All Costs as of Phase 3	(G) All Costs as of Phase 4
AWPF Production, acre-ft/yr (AFY)	1,800 AFY	6,563 AFY	7,000 AFY	7,000 AFY	14,000 AFY	14,000 AFY	21,000 AFY	28,000 AFY
	Capital Cost							
FAT System Capital Cost per acre-ft produced in 30 yr economic life	$1,857.51	$509.49	$584.79	$388.47	$351.11	$288.32	$307.56	$253.48
Financing cost per acre-ft	$1,748.29	$479.53	$550.40	$365.63	$330.47	$271.36	$289.48	$238.58
FAT SystemTotal Capital & Financing cost per acre-ft	**$3,606**	**$989**	**$1,135**	**$754**	**$682**	**$560**	**$597**	**$492**
TOTAL ANNUAL BOND PAYMENT	$6,490,439	$6,490,439	$7,946,342	$5,278,749	$9,542,151	$7,835,500	$12,537,780	$13,777,701
	Operations and Maintenace (O&M) Cost							
Process O&M cost per acre-ft	$339.47	$339.47	$339.47	$339.47	$339.47	$339.47	$339.47	$339.47
Equip. Replace. cost per acre-ft	$339.47	$26.87	$26.87	$26.87	$26.87	$26.87	$26.87	$26.87
Facility O&M cost per acre-ft	$339.47	$49.00	$49.00	$49.00	$47.29	$47.29	$47.62	$47.11
Labor Cost per acre-ft	$473.35	$129.83	$129.83	$129.83	$95.50	$95.50	$72.12	$56.94
TOTAL O&M Cost per Acre-ft	**$1,492**	**$545**	**$545**	**$545**	**$509**	**$509**	**$486**	**$470**
TOTAL ANNUAL O&M Cost	$2,685,144	$3,577,685	$3,816,197	$3,816,197	$7,127,737	$7,127,737	$10,207,556	$13,170,711
	TOTAL COST							
GRAND TOTAL COST OF WATER per Acre-ft	**$5,098**	**$1,534**	**$1,680**	**$1,299**	**$1,191**	**$1,069**	**$1,083**	**$962**
TOTAL ANNUAL COST OF WATER	$9,175,583	$10,068,124	$11,762,539	$9,094,946	$16,669,888	$14,963,237	$22,745,336	$26,948,412
	RELATIVE COST							
Capital Cost	36.4%	33.2%	34.8%	29.9%	29.5%	27.0%	28.4%	26.3%
Finance cost	34.3%	31.3%	32.8%	28.1%	27.8%	25.4%	26.7%	24.8%
O&M Cost	29.3%	35.5%	32.4%	42.0%	42.8%	47.6%	44.9%	48.9%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	O&M RELATIVE COST							
Electricity cost	4.8%	15.8%	14.4%	18.6%	20.3%	22.7%	22.4%	25.2%
Other Processes	1.9%	6.3%	5.8%	7.5%	8.2%	9.1%	9.0%	10.1%
Equip. Replace. cost per acre-ft	6.7%	1.8%	1.6%	2.1%	2.3%	2.5%	2.5%	2.8%
Facility O&M cost per acre-ft	6.7%	3.2%	2.9%	3.8%	4.0%	4.4%	4.4%	4.9%
Labor Cost per acre-ft	9.3%	8.5%	7.7%	10.0%	8.0%	8.9%	6.7%	5.9%
TOTAL O&M COST	29.3%	35.5%	32.4%	42.0%	42.8%	47.6%	44.9%	48.9%

Appendix 1, Table 2A: GREAT Program Capital Cost for Scenarios A to G (Page 1 of 2)

Full Advanced Treatment (FAT) Water System

	(A) Phase 1 as of 2012 plus Hueneme Rd	**(B) All Costs as of Phase 1**	(C) Only Costs for Phase 1 Production	**(D) All cost as of phase 2**	(E) Only Costs for Phase 1 & 2 Production	(F) All Costs as of Phase 3	(G) All Costs as of Phase 4
Plant Production, acre-ft/yr (AFY)	6,563 AFY	7,000 AFY	7,000 AFY	14,000 AFY	14,000 AFY	21,000 AFY	28,000 AFY
Phase 1 Capital Cost	$75,238,729	$75,238,729	$34,012,870	$75,238,729	$34,012,870	$75,238,729	$75,238,729
Phase 2 Capital Cost				$19,162,152	$34,012,870	$19,162,152	$19,162,152
Phase 3 Capital Cost						$22,488,446	$22,488,446
Phase 4 Capital Cost							$19,162,152
TOTAL AWPF Capital Cost	**$75,238,729**	**$75,238,729**	**$34,012,870**	**$94,400,881**	**$68,025,739**	**$116,889,327**	**$136,051,479**
AWPF Capital Cost per acre-ft/yr capacity	$11,465	$10,748	$4,859	$6,743	$4,859	$5,566	$4,859
AWPF Capital Cost per acre-ft produced in 30 yr economic life	$382	$358	$162	$225	$162	$186	$162
Additional Capital Project Cost:							
AWPF Backup Power		$2,000,000	$2,000,000	$2,000,000	$2,000,000	$4,000,000	$4,000,000
Chlorination						$2,500,000	$2,500,000
Flow equalization						$2,500,000	$2,500,000
AWPF Storage & Stormwater Treatment		$20,500,000	$20,500,000	$26,000,000	$26,000,000	$26,000,000	$26,000,000
Ventura Rd	$19,850,650	$19,850,650	$19,850,650	$19,850,650	$19,850,650	$19,850,650	$19,850,650
Hueneme Rd and Wood Rd	$25,216,000	$25,216,000	$25,216,000	$25,216,000	$25,216,000	$25,216,000	$25,216,000
Rose Ave						$16,806,990	$16,806,990
TOTAL Add. Capital Project Cost	**$45,066,650**	**$67,566,650**	**$67,566,650**	**$73,066,650**	**$73,066,650**	**$96,873,640**	**$96,873,640**
TOTAL FAT SYSTEM CAPITAL COST	**$120,305,379**	**$142,805,379**	**$101,579,520**	**$167,467,531**	**$141,092,389**	**$213,762,967**	**$232,925,119**
Bureau of Reclamation (BOR) Grant	($20,000,000)	($20,000,000)	($20,000,000)	($20,000,000)	($20,000,000)	($20,000,000)	($20,000,000)
NET TOTAL CAPITAL COST	**$100,305,379**	**$122,805,379**	**$81,579,520**	**$147,467,531**	**$121,092,389**	**$193,762,967**	**$212,925,119**
FAT System Capital Cost per acre-ft/yr capacity	$15,285	$17,544	$11,654	$10,533	$8,649	$9,227	$7,604
FAT System Capital Cost per acre-ft produced in 30 yr economic life	$509	$585	$388	$351	$288	$308	$253
Interest Rate	5%	5%	5%	5%	5%	5%	5%
Bond Term (years)	30	30	30	30	30	30	30
Annual Bond Payment	**$6,490,439**	**$7,946,342**	**$5,278,749**	**$9,542,151**	**$7,835,500**	**$12,537,780**	**$13,777,701**
Financing cost per acre-ft	$480	$550	$366	$330	$271	$289	$239
FAT SystemTotal Capital & Financing cost per acre-ft	**$989**	**$1,135**	**$754**	**$682**	**$560**	**$597**	**$492**

Desalter System and Water System Components of the GREAT Program Related to FAT

	(A) Phase 1 as of 2012 plus Hueneme Rd	**(B) All Costs as of Phase 1**	(C) Only Costs for Phase 1 Production	**(D) All cost as of phase 2**	(E) Only Costs for Phase 1 & 2 Production	(F) All Costs as of Phase 3	(G) All Costs as of Phase 4
Annual Potable Water Use, acre-ft/yr (AFY)	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY
Desalter Improvements		$22,000,000	$22,000,000	$42,000,000	$42,000,000	$42,000,000	$42,000,000
Brine/concentrate collection pipeline		$12,724,200	$12,724,200	$15,691,560	$15,691,560	$15,691,560	$15,691,560
Treatment Wetlands		$2,500,000	$2,500,000	$3,500,000	$3,500,000	$3,500,000	$3,500,000
ASR/Seawater intrusion	$1,000,000	$2,000,000	$2,000,000	$9,000,000	$9,000,000	$16,000,000	$16,000,000
Retrofits	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000	$3,000,000
TOTAL Water Capital Cost	**$4,000,000**	**$42,224,200**	**$42,224,200**	**$73,191,560**	**$73,191,560**	**$80,191,560**	**$80,191,560**
Capital Cost per acre-ft/yr	$148.15	$1,563.86	$1,563.86	$2,710.80	$2,710.80	$2,970.06	$2,970.06
Capital Cost per acre-ft	$5	$52	$52	$90	$90	$99	$99
Interest Rate	5%	5%	5%	5%	5%	5%	5%
Bond Term (years)	30	30	30	30	30	30	30
Annual Bond Payment	**$258,827**	**$2,732,193**	**$2,732,193**	**$4,735,991**	**$4,735,991**	**$5,188,939**	**$5,188,939**
Financing cost per acre-ft	$5	$49	$49	$85	$85	$93	$93
TOTAL Capital & Financing cost per acre-ft	**$9.59**	**$101**	**$101**	**$175**	**$175**	**$192**	**$192**

TOTAL FULL ADVANCED TREATMENT (FAT) WATER SYSTEM RELATED REQUIREMENTS

	(A) Phase 1 as of 2012 plus Hueneme Rd	**(B) All Costs as of Phase 1**	(C) Only Costs for Phase 1 Production	**(D) All cost as of phase 2**	(E) Only Costs for Phase 1 & 2 Production	(F) All Costs as of Phase 3	(G) All Costs as of Phase 4
Combined Capital Cost	**$104,305,379**	**$165,029,579**	**$123,803,720**	**$220,659,091**	**$194,283,949**	**$273,954,527**	**$293,116,679**
Total Annual Bond Payment	**$6,749,266**	**$10,678,535**	**$8,010,942**	**$14,278,142**	**$12,571,491**	**$17,726,719**	**$18,966,640**
Total bond payments for FAT water infrastructure over 30 years	**$194,713,178**	**$238,390,263**	**$158,362,470**	**$286,264,524**	**$235,065,001**	**$376,133,398**	**$413,331,039**
Total bond payments for water infrastructure over 30 years	**$7,764,815**	**$81,965,776**	**$81,965,776**	**$142,079,731**	**$142,079,731**	**$155,668,157**	**$155,668,157**
GRAND TOTAL BOND PAYMENTS OVER 30 YEARS	**$202,477,993**	**$320,356,038**	**$240,328,245**	**$428,344,256**	**$377,144,732**	**$531,801,555**	**$568,999,197**

Appendix 1, Table 2B: GREAT Program Capital Cost for Scenarios A to G (Page 2of 2)

Desalter System and Water System Components of the GREAT Program Not Related to FAT

	(A) Phase 1 as of 2012 plus Hueneme Rd	**(B) All Costs as of Phase 1**	(C) Only Costs for Phase 1 Production	**(D) All cost as of phase 2**	(E) Only Costs for Phase 1 & 2 Production	(F) All Costs as of Phase 3	(G) All Costs as of Phase 4
Annual Potable Water Use (acre-ft/yr)	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY	27,000 AFY
Desalter system and feed water wells	$30,000,000	$30,000,000	$30,000,000	$30,000,000	$30,000,000	$30,000,000	$30,000,000
Other water and wastewater system	$33,000,000	$33,000,000	$33,000,000	$33,000,000	$33,000,000	$33,000,000	$33,000,000
TOTAL Water Capital Cost	**$63,000,000**	**$63,000,000**	**$63,000,000**	**$63,000,000**	**$63,000,000**	**$63,000,000**	**$63,000,000**
Capital Cost per acre-ft/yr	$2,333	$2,333	$2,333	$2,333	$2,333	$2,333	$2,333
Capital Cost per acre-ft	$78	$78	$78	$78	$78	$78	$78
Interest Rate	5%	5%	5%	5%	5%	5%	5%
Bond Term (years)	30	30	30	30	30	30	30
Annual Bond Payment	**$4,076,528**	**$4,076,528**	**$4,076,528**	**$4,076,528**	**$4,076,528**	**$4,076,528**	**$4,076,528**
Financing cost per acre-ft	$73	$73	$73	$73	$73	$73	$73
TOTAL Capital & Financing cost per acre-ft	**$150.98**	**$150.98**	**$150.98**	**$150.98**	**$150.98**	**$150.98**	**$150.98**

TOTAL GREAT PROGRAM

	(A) Phase 1 as of 2012 plus Hueneme Rd	**(B) All Costs as of Phase 1**	(C) Only Costs for Phase 1 Production	**(D) All cost as of phase 2**	(E) Only Costs for Phase 1 & 2 Production	(F) All Costs as of Phase 3	(G) All Costs as of Phase 4
Total FAT and non-FAT Capital Cost	**$167,305,379**	**$228,029,579**	**$186,803,720**	**$283,659,091**	**$257,283,949**	**$336,954,527**	**$356,116,679**
Total bond payments for GREAT Program infrastructure over 30 years	**$324,773,830**	**$442,651,875**	**$362,624,082**	**$550,640,092**	**$499,440,568**	**$654,097,392**	**$691,295,033**

GREAT Program Potential Retrofit Projects (TO BE PUBLISHED)

Retrofits	$0	$0	$0	$0	$0	$0	$0

TOTAL GREAT PROGRAM PLUS POTENTIAL RETROFITS

GRAND TOTAL CAPITAL COST	$167,305,379	$228,029,579	$186,803,720	$283,659,091	$257,283,949	$336,954,527	$356,116,679

Appendix 2: GREAT Program Capital Improvement Projects (CIP) Plan Summary

Appendix 2, Table 1A: GREAT Program Capital Improvement Plan Summary (Page 1 of 3)

Full Advanced Treatment (FAT) Water System

	Description	Total	Phase 1			Phase 2			Future Phase 3 & Phase 4		
			thru 11/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18-21/22	2022/23-26/27	2027/28-31/32
	AWPF Efficiency										
1	Backup power	$4,000,000		$2,000,000					$2,000,000		
2	Chlorination	$2,500,000							$2,500,000		
3	Influent flow equalization	$2,500,000							$2,500,000		
		$9,000,000	**$0**	**$2,000,000**	**$0**	**$0**	**$0**	**$0**	**$7,000,000**	**$0**	**$0**
	Storage and Treatment Wetlands										
1	Storage	$15,000,000		$10,000,000	$2,500,000			$2,500,000			
2	Stormwater treatment wetlands	$7,500,000		$5,000,000	$500,000			$2,000,000			
3	Brine Treatment wetlands	$3,500,000		$2,500,000				$1,000,000			
		$26,000,000	**$0**	**$17,500,000**	**$3,000,000**	**$0**	**$0**	**$5,500,000**	**$0**	**$0**	**$0**
	Pipeline										
1	Ventura Rd pipeline	$19,850,650	$19,850,650								
2	Hueneme Rd pipline Ph1	$9,920,000	$9,920,000								
3	Hueneme Rd pipline Ph2	$15,296,000		$15,296,000							
4	Rose Ave pipeline Ph 1	$6,377,200							$6,377,200		
5	Rose Ave pipeline Ph 2	$10,429,790							$10,429,790		
		$61,873,640	**$29,770,650**	**$15,296,000**	**$0**	**$0**	**$0**	**$0**	**$16,806,990**	**$0**	**$0**
	Subtotal	**$96,873,640**	**$29,770,650**	**$34,796,000**	**$3,000,000**	**$0**	**$0**	**$5,500,000**	**$23,806,990**	**$0**	**$0**
	AWPF Expansion										
1	Existing plant	$75,238,729	$75,238,729								
2	AWPF expansion	$60,812,750				$19,162,152				$22,488,446	$19,162,152
		$136,051,479	**$75,238,729**	**$0**	**$0**	**$19,162,152**	**$0**	**$0**	**$0**	**$22,488,446**	**$19,162,152**
	Total FAT water system	**$232,925,119**	**$105,009,379**	**$34,796,000**	**$3,000,000**	**$19,162,152**	**$0**	**$5,500,000**	**$23,806,990**	**$22,488,446**	**$19,162,152**
	Running Sum		**$105,009,379**	**$139,805,379**	**$142,805,379**	**$161,967,531**	**$161,967,531**	**$167,467,531**	**$191,274,521**	**$213,762,967**	**$232,925,119**

Appendix 2, Table 1B: GREAT Program Capital Improvement Plan Summary (Page 2 of 3)

Desalter System and Water System Components of the GREAT Program Related to FAT

	Description	Total	Phase 1			Phase 2			Future Phase 3 & Phase 4		
			thru 11/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18-21/22	2022/23-26/27	2027/28-31/32
	Desalters										
1	Purchase Gold Coast property for desalter and well field expansion	$2,000,000		$2,000,000							
2	Desalter expansion	$11,000,000		$11,000,000							
3	Pipelines for desalter expaned use	$3,000,000		$3,000,000							
4	Well field expansion	$6,000,000		$6,000,000							
6	Desalter 2	$20,000,000					$20,000,000				
		$42,000,000	**$0**	**$22,000,000**	**$0**	**$0**	**$20,000,000**	**$0**	**$0**	**$0**	**$0**
	Concentrate collection pipeline										
1	Concentrate collection system Ph1	$12,724,200			$12,724,200						
2	Concentrate collection system Ph2	$2,967,360					$2,967,360				
		$15,691,560	**$0**	**$0**	**$12,724,200**	**$0**	**$2,967,360**	**$0**	**$0**	**$0**	**$0**
	Treatment wetlands										
1	Brine Treatment	**$3,500,000**		**$2,500,000**				**$1,000,000**			
	ASR/Seawater barrier wells										
1	Phase 1	$2,000,000	1,000,000	$1,000,000							
2	Phase 2	$7,000,000				$7,000,000					
3	Phase 3	$7,000,000							$7,000,000		
		$16,000,000	**$1,000,000**	**$1,000,000**	**$0**	**$7,000,000**	**$0**	**$0**	**$7,000,000**	**$0**	**$0**
	Retrofits										
1	Retrofits Ph1	**$3,000,000**	**$3,000,000**								
	Total Desalter & Water related to FAT	$80,191,560	$4,000,000	$25,500,000	$12,724,200	$7,000,000	$22,967,360	$1,000,000	$7,000,000	$0	$0
	Running Sum		$4,000,000	$29,500,000	$42,224,200	$49,224,200	$72,191,560	$73,191,560	$80,191,560	$80,191,560	$80,191,560

TOTAL FULL ADVANCED TREATMENT (FAT) WATER SYSTEM RELATED REQUIREMENTS

Description	Total	Phase 1			Phase 2			Future Phase 3 & Phase 4		
		thru 11/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18-21/22	2022/23-26/27	2027/28-31/32
TOTAL FAT RELATED	**$313,116,679**	**$109,009,379**	**$60,296,000**	**$15,724,200**	**$26,162,152**	**$22,967,360**	**$6,500,000**	**$30,806,990**	**$22,488,446**	**$19,162,152**
Running Sum		**$109,009,379**	**$169,305,379**	**$185,029,579**	**$211,191,731**	**$234,159,091**	**$240,659,091**	**$271,466,081**	**$293,954,527**	**$313,116,679**

Appendix 2, Table 1C: GREAT Program Capital Improvement Plan Summary (Page 3 of 3)

Desalter System and Water System Components of the GREAT Program Not Related to FAT

	Description	Total	Phase 1			Phase 2			Future Phase 3 & Phase 4		
			thru 11/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18-21/22	2022/23-26/27	2027/28-31/32
1	Desalter system and feed water wells	$30,000,000	$30,000,000								
2	Other water and wastewater system	$33,000,000	$33,000,000								
		$63,000,000	**$63,000,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

TOTAL GREAT PROGRAM

Description	Total	Phase 1			Phase 2			Future Phase 3 & Phase 4		
		thru 11/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18-21/22	2022/23-26/27	2027/28-31/32
TOTAL GREAT PROGRAM	$376,116,679	$172,009,379	$60,296,000	$15,724,200	$26,162,152	$22,967,360	$6,500,000	$30,806,990	$22,488,446	$19,162,152
Running Sum		$172,009,379	$232,305,379	$248,029,579	$274,191,731	$297,159,091	$303,659,091	$334,466,081	$356,954,527	$376,116,679

GREAT Program Potential Retrofit Projects (TO BE PUBLISHED)

	Description	Total	Phase 1			Phase 2			Future Phase 3 & Phase 4		
			thru 11/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18-21/22	2022/23-26/27	2027/28-31/32
	Retrofits										
1	Retrofits Phase 2	$0									
2	Retrofits Phase 3 & 4	$0									
	Total Potential Retrofit	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

TOTAL GREAT PROGRAM PLUS POTENTIAL RETROFITS

Description	Total	Phase 1			Phase 2			Future Phase 3 & Phase 4		
		thru 11/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18-21/22	2022/23-26/27	2027/28-31/32
GRAND TOTAL PLUS RETROFITS	**$376,116,679**	**$172,009,379**	**$60,296,000**	**$15,724,200**	**$26,162,152**	**$22,967,360**	**$6,500,000**	**$30,806,990**	**$22,488,446**	**$19,162,152**
Running Sum		$172,009,379	$232,305,379	$248,029,579	$274,191,731	$297,159,091	$303,659,091	$334,466,081	$356,954,527	$376,116,679

Appendix 3: Advanced Water Purification Facility Cost Allocated by Phase

Appendix 3, Table 1A: Advanced Water Purification Facility (AWPF) Cost Allocated by Phase (Page 1 of 2)

		Unit Cost Calculation						Initial Project Cost (built by 2012) - Allocated by Phase/Increment of Production				
Item	Description	Cost split method	Total 2012 Cost	Cost for Phase 1 Only	Cost Shared by Phase 1-4	Cost Shared by Phase 1-2	Unit Cost ($/mgd)	Phase 1 6.25 mgd Total	Phase 2 12.5 mgd Total	Phase 3 18.75 mgd Total	Phase 4 25 mgd Total	TOTAL Cost as of Dec 2012
1	Preliminmary design	Equally divided	$1,554,801	$0	$1,554,801		$62,192	$388,700	$388,700	$388,700	$388,700	**$1,554,801**
2	Pilot study	Equally divided	$583,371	$0	$583,371		$23,335	$145,843	$145,843	$145,843	$145,843	**$583,371**
3	Design & post design services	By % of const cost	$8,408,288	$2,282,148	$5,729,990	$396,150	$229,200	$3,912,720	$1,630,573	$1,432,498	$1,432,498	**$8,408,288**
4	Construction management & inspection	By % of const cost	$4,164,135	$1,130,215	$2,837,730	$196,190	$113,509	$1,937,742	$807,528	$709,433	$709,433	**$4,164,135**
5	Purchase of AWPF site	Equally divided	$2,500,000	$0	$2,500,000		$100,000	$625,000	$625,000	$625,000	$625,000	**$2,500,000**
6	General conditions - Contractor project management, coordination & quality control	Equally divided	$6,107,693	$1,772,816	$4,016,124	$318,753	$160,645	$2,936,224	$1,163,407	$1,004,031	$1,004,031	**$6,107,693**
7	Submittals - contractor engineering and shop drawings	By % of const cost	$2,255,576	$654,702	$1,483,158	$117,716	$59,326	$1,084,350	$429,647	$370,789	$370,789	**$2,255,576**
8	Areas 5 & 6 Sitework, Yard Piping & Wetland	Equally divided	$4,808,254	$0	$4,808,254		$192,330	$1,202,064	$1,202,064	$1,202,064	$1,202,064	**$4,808,254**
9	Area 10 Lift Pump Station & Electrical Room 1	By component	$3,300,597	$205,137	$3,095,460		$123,818	$979,002	$773,865	$773,865	$773,865	**$3,300,597**
10	Area 20 Micro-filtration (MF)	By component	$5,689,063	$3,391,578	$0	$2,297,485	$0	$4,540,321	$1,148,743	$0	$0	**$5,689,063**
11	Area 30 Reverse osmosis (RO)	By component	$5,512,753	$2,393,169	$3,119,584		$124,783	$3,173,065	$779,896	$779,896	$779,896	**$5,512,753**
12	Area 40 Ultraviolet (UV), Decarbonator, Finished Water Pump Station, Electrical Rm 2, Conf. Rm	By component	$4,623,248	$1,757,562	$2,865,686		$114,627	$2,473,984	$716,422	$716,422	$716,422	**$4,623,248**
13	Area 50 Chemical storage facility	By component	$1,347,961	$135,012	$1,212,949		$48,518	$438,249	$303,237	$303,237	$303,237	**$1,347,961**
14	Area 70 Admin bldg/Science Center	Equally divided	$5,145,000	$0	$5,145,000		$205,800	$1,286,250	$1,286,250	$1,286,250	$1,286,250	**$5,145,000**
15	Photovoltaic system	Equally divided	$923,500	$0	$923,500		$36,940	$230,875	$230,875	$230,875	$230,875	**$923,500**
16	Communication, fire alarm, generator, lighting	Equally divided	$898,000	$0	$898,000		$35,920	$224,500	$224,500	$224,500	$224,500	**$898,000**
17	Checmical pumps, mixers, tanks	Equally divided	$1,364,213	$0	$1,364,213		$54,569	$341,053	$341,053	$341,053	$341,053	**$1,364,213**
18	Process piping	By % of const cost	$2,691,716	$1,036,006	$1,655,710		$66,228	$1,449,934	$413,928	$413,928	$413,928	**$2,691,716**
19	Switchgear, switch board, motor control center	By component	$1,351,000	$1,351,000			$0	$1,351,000	$0	$0	$0	**$1,351,000**
20	Vertical pumps	By component	$1,262,119	$1,262,119			$0	$1,262,119	$0	$0	$0	**$1,262,119**
21	Strainers, valves & decarbonators	By component	$871,408	$871,408			$0	$871,408	$0	$0	$0	**$871,408**
22	Misc. finish work^	Equally divided	$682,761	$0	$682,761		$27,310	$170,690	$170,690	$170,690	$170,690	**$682,761**
23	Controls (SCADA) programming	By # I/Os	$3,075,000	$375,000	$2,700,000		$108,000	$1,050,000	$675,000	$675,000	$675,000	**$3,075,000**
24	Wastewater treatment plant modifications	Equally divided	$50,000	$0	$50,000		$2,000	$12,500	$12,500	$12,500	$12,500	**$50,000**
25	Subcontractor mobilization, and furnishings	By % of const cost	$426,046	$0	$426,046		$17,042	$106,512	$106,512	$106,512	$106,512	**$426,046**
26	Testing	By % of const cost	$186,092	$186,092	$0	$0	$0	$186,092	$0	$0	$0	**$186,092**
27	AWPF change orders*	By % of const cost	$3,736,134	$357,188	$3,378,946		$135,158	$1,201,925	$844,737	$844,737	$844,737	**$3,736,134**
28	Sampling station design*	Equally divided	$220,000	$1,000	$219,000		$8,760	$55,750	$54,750	$54,750	$54,750	**$220,000**
29	Sampling station*	Equally divided	$1,500,000	$0	$1,500,000		$60,000	$375,000	$375,000	$375,000	$375,000	**$1,500,000**
		TOTAL	**$75,238,729**	**$19,162,152**	**$52,750,283**	**$3,326,294**	**$2,110,011**	**$34,012,870**	**$14,850,718**	**$13,187,571**	**$13,187,571**	**$75,238,729**

*Estimated cost

^Includes masonary mockup, wetland liner, landscape, fence, wall & floor tile, signs, dumbwaiter, sheet metal, plumbing, blowers & sealant

Page 1 Notes

1 These costs are based on actual invoice costs and projected change orders as of April 2012

2 All costs are in 2012 dollars. Future costs may increase due to inflation and decrease due to advancements in technology.

3 Phase refers to an increment of capacity. The plant was designed to have 4 increments. The inital plant was built with components that will be used in all phases but with only 6.25 mgd or 7,000AFY (Phase 1) of initial capacity.

4 The AWPF Construction Contract (McCarthy) total is $56,891,505 This does not include items 1, 2, 3, 4, 5, 28 and 29.

5 The total amount spent on the plant as of startup will be approximately $75,238,729

6 The amount spent by Dec 2012 allocated to Phase 1 will be $34,012,870

7 The amount spent by Dec 2012 allocated to Phase 2 will be $14,850,718

8 The amount spent by Dec 2012 allocated to Phase 3 will be $13,187,571

9 The amount spent by Dec 2012 allocated to Phase 4 will be $13,187,571

Appendix 3, Table 1B: Advanced Water Purification Facility (AWPF) Cost Allocated by Phase (Page 2 of 2)

		Future Project Cost					GRAND TOTAL COST (2012 plus Future A, B & C)	Total Project Cost - Allocated by Phase/Increment of Production				GRAND TOTAL COST (Phases 1, 2, 3 & 4)
		Future A	Future B		Future C	A+B+C						
Item	Description	Phase 2 12.5 mgd Total	Phase 3 18.75 mgd Total	Phase 4 25 mgd Total**	Phase 4 25 mgd Total	TOTAL FUTURE COST		Phase 1 6.25 mgd Total	Phase 2 12.5 mgd Total	Phase 3 18.75 mgd Total	Phase 4 25 mgd Total	
1	Preliminmary design	$0	$0	$0	$0	**$0**	**$1,554,801**	$388,700	$388,700	$388,700	$388,700	**$1,554,801**
2	Pilot study	$0	$0	$0	$0	**$0**	**$583,371**	$145,843	$145,843	$145,843	$145,843	**$583,371**
3	Design & post design services	$2,282,148	$2,480,223	$198,075	$2,282,148	**$7,242,593**	**$15,650,881**	$3,912,720	$3,912,720	$3,912,720	$3,912,720	**$15,650,881**
4	Construction management & inspection	$1,130,215	$1,228,310	$98,095	$1,130,215	**$3,586,834**	**$7,750,969**	$1,937,742	$1,937,742	$1,937,742	$1,937,742	**$7,750,969**
5	Purchase of AWPF site	$0	$0	$0	$0	**$0**	**$2,500,000**	$625,000	$625,000	$625,000	$625,000	**$2,500,000**
6	General conditions - Contractor project management, coordination & quality control	$1,772,816	$1,932,192	$159,376	$1,772,816	**$5,637,201**	**$11,744,894**	$2,936,224	$2,936,224	$2,936,224	$2,936,224	**$11,744,894**
7	Submittals - contractor engineering and shop drawings	$654,702	$713,560	$58,858	$654,702	**$2,081,823**	**$4,337,399**	$1,084,350	$1,084,350	$1,084,350	$1,084,350	**$4,337,399**
8	Areas 5 & 6 Sitework, Yard Piping & Wetland	$0	$0	$0	$0	**$0**	**$4,808,254**	$1,202,064	$1,202,064	$1,202,064	$1,202,064	**$4,808,254**
9	Area 10 Lift Pump Station & Electrical Room 1	$205,137	$205,137	$0	$205,137	**$615,411**	**$3,916,008**	$979,002	$979,002	$979,002	$979,002	**$3,916,008**
10	Area 20 Micro-filtration (MF)	$3,391,578	$4,540,321	$1,148,743	$3,391,578	**$12,472,219**	**$18,161,282**	$4,540,321	$4,540,321	$4,540,321	$4,540,321	**$18,161,282**
11	Area 30 Reverse osmosis (RO)	$2,393,169	$2,393,169	$0	$2,393,169	**$7,179,507**	**$12,692,260**	$3,173,065	$3,173,065	$3,173,065	$3,173,065	**$12,692,260**
12	Area 40 Ultraviolet (UV), Decarbonator, Finished Water Pump Station, Electrical Rm 2, Conf. Rm	$1,757,562	$1,757,562	$0	$1,757,562	**$5,272,686**	**$9,895,934**	$2,473,984	$2,473,984	$2,473,984	$2,473,984	**$9,895,934**
13	Area 50 Chemical storage facility	$135,012	$135,012	$0	$135,012	**$405,036**	**$1,752,997**	$438,249	$438,249	$438,249	$438,249	**$1,752,997**
14	Area 70 Admin bldg/Science Center	$0	$0	$0	$0	**$0**	**$5,145,000**	$1,286,250	$1,286,250	$1,286,250	$1,286,250	**$5,145,000**
15	Photovoltaic system	$0	$0	$0	$0	**$0**	**$923,500**	$230,875	$230,875	$230,875	$230,875	**$923,500**
16	Communication, fire alarm, generator, lighting	$0	$0	$0	$0	**$0**	**$898,000**	$224,500	$224,500	$224,500	$224,500	**$898,000**
17	Checmical pumps, mixers, tanks	$0	$0	$0	$0	**$0**	**$1,364,213**	$341,053	$341,053	$341,053	$341,053	**$1,364,213**
18	Process piping	$1,036,006	$1,036,006	$0	$1,036,006	**$3,108,018**	**$5,799,734**	$1,449,934	$1,449,934	$1,449,934	$1,449,934	**$5,799,734**
19	Switchgear, switch board, motor control center	$1,351,000	$1,351,000	$0	$1,351,000	**$4,053,000**	**$5,404,000**	$1,351,000	$1,351,000	$1,351,000	$1,351,000	**$5,404,000**
20	Vertical pumps	$1,262,119	$1,262,119	$0	$1,262,119	**$3,786,357**	**$5,048,476**	$1,262,119	$1,262,119	$1,262,119	$1,262,119	**$5,048,476**
21	Strainers, valves & decarbonators	$871,408	$871,408	$0	$871,408	**$2,614,224**	**$3,485,632**	$871,408	$871,408	$871,408	$871,408	**$3,485,632**
22	Misc. finish work^	$0	$0	$0	$0	**$0**	**$682,761**	$170,690	$170,690	$170,690	$170,690	**$682,761**
23	Controls (SCADA) programming	$375,000	$375,000	$0	$375,000	**$1,125,000**	**$4,200,000**	$1,050,000	$1,050,000	$1,050,000	$1,050,000	**$4,200,000**
24	Wastewater treatment plant modifications	$0	$0	$0	$0	**$0**	**$50,000**	$12,500	$12,500	$12,500	$12,500	**$50,000**
25	Subcontractor mobilization, and furnishings	$0	$0	$0	$0	**$0**	**$426,046**	$106,512	$106,512	$106,512	$106,512	**$426,046**
26	Testing	$186,092	$186,092	$0	$186,092	**$558,276**	**$744,368**	$186,092	$186,092	$186,092	$186,092	**$744,368**
27	AWPF change orders*	$357,188	$357,188	$0	$357,188	**$1,071,564**	**$4,807,698**	$1,201,925	$1,201,925	$1,201,925	$1,201,925	**$4,807,698**
28	Sampling station design*	$1,000	$1,000	$0	$1,000	**$3,000**	**$223,000**	$55,750	$55,750	$55,750	$55,750	**$223,000**
29	Sampling station*	$0	$0	$0	$0	**$0**	**$1,500,000**	$375,000	$375,000	$375,000	$375,000	**$1,500,000**
		$19,162,152	**$20,825,299**	**$1,663,147**	**$19,162,152**	**$60,812,750**	**$136,051,479**	**$34,012,870**	**$34,012,870**	**$34,012,870**	**$34,012,870**	**$136,051,479**
							Cost per acre-ft/yr capacity	$4,858.98	$4,858.98	$4,858.98	$4,858.98	$4,858.98
							Cost per acre-ft produced in 30 yr	$161.97	$161.97	$161.97	$161.97	$161.97

*Estimated cost

^Includes masonary mockup, wetland liner, landscape, fence, wall & floor tile, signs, dumbwaiter, sheet metal, plumbing, blowers & sealant

**The Phase 4 cost in Future B project is for half of the expansion of the microfiltration (MF) building. $1,663,147

The MF will house the filters for Phase 3 and Phase 4. The total MF building cost in Future B will be $3,326,294

Page 2 Notes

6 All costs are in 2012 dollars. Future costs may increase due to inflation and decrease due to advancements in technology.

7 The cost to increase capacity from Phase 1 to Phase 2 (12.5 mgd or 14,000AFY) is $19,162,152

8 The cost to increase capacity from Phase 2 to Phase 3 (18.75 mgd or 21,000AFY) is $22,488,446 Which is $20,825,299 plus $1,663,147

9 The cost to increase capacity from Phase 3 to Phase 4 (25 mgd or 28,000AFY) is $19,162,152

10 The total cost to increase capacity from Phase 1 to Phase 4 is $60,812,750

11 The total cost for each phase is $34,012,870

12 **The total cost of the AWPF will be (in 2012 dollars) $136,051,479**

13 As of 2012 the maximum output of the AWPF is limited to about 14,000 AFY without flow equalization or about 17,000 AFY with flow equalization. This is limited by the amount of waste water treatement plant effluent.

Appendix 4: GREAT Program Pipeline Cost Estimates

Appendix 4, Table 1: GREAT Program Pipeline Cost Estimates

GREAT Program Recycled Water Backbone System Pipelines

	Description	Nom. Size	ID Size	Material	Class	Operating Pressure	Length (ft)	Unit Cost*	Total Project Cost*
	Venutra Rd - Completed in 2011								
1	**Penfield & Smith - VRIP design**								**$850,000**
2	**Ventura Rd Utility Improvement Project (VRIP)**						**8,875**	**$225**	**$2,000,000**
3	**Black & Vetch - RWBS design**								**$1,400,000**
4	**Recycled Water Backbone Project**						**40,000**	**$325**	**$13,000,000**
5	**AECOM project management**								**$2,600,650**
							48,875		**$19,850,650**
	Hueneme Rd -1								
1	Hueneme Rd - Perkins Rd to Edison Rd (in street)	42"	41"	Steel	200	150	5,300	$900	$5,370,000
2	Hueneme Rd - Edison Rd to Rose Ave (ag land)	42"	41"	Steel	200	150	2,300	$900	$2,070,000
3	Hueneme Rd - Rose Ave to Olds Rd (ag land)	36"	35"	Steel	200	100	3,100	$800	$2,480,000
							10,700		**$9,920,000**
	Hueneme Rd -2								
1	Hueneme Rd - Olds Rd to Rice Ave	36"	36"	Steel	200	125	3,700	$610	$2,257,000
2	Hueneme Rd - Rice Ave to Nauman Rd	30"	36"	Steel	200	125	4,300	$610	$2,623,000
3	Hueneme Rd - Nauman Rd to Wood Rd	24"	30"	Steel	200	100	8,000	$486	$3,888,000
4	Nauman Rd & Edding Rd	18"	22"	HDPE	DR13.5	100	5,300	$360	$1,908,000
5	Wood Rd - Hueneme Rd to Laguna Rd	24"	24"	steel	200	100	10,000	$300	$3,000,000
6	Laguna Rd - Wood Rd to PVCWD line	24"	24"	steel	200	100	5,400	$300	$1,620,000
							36,700		**$15,296,000**
	Rose Ave - 1								
4	Rose Ave - Hueneme to end of Rose (ag land)	42"	41"	Steel	200	150	2,600	$900	$2,340,000
5	Rose Ave - end to Pleasant Valley Rd	42"	41"	Steel	200	150	1,300	$900	$1,170,000
6	Rose Ave - Pleasant Valley Rd to Bard Rd	36"	35"	Steel	200	150	1,600	$512	$819,200
7	Rose Ave - Bard Rd to Channel Islands Blvd	36"	35"	Steel	200	150	4,000	$512	$2,048,000
							9,500		**$6,377,200**
	Rose Ave - 2 P&G and PTP								
8	Rose Ave - Channel Islands Blvd to Wooley Rd	36"	35"	Steel	200	125	6,000	$512	$3,072,000
4	Rose - Wooley to Camino del Sol	36"	35"	Steel	200	125	6,520	$512	$3,338,240
5	Camino del Sol Rd - Rose Ave to Elevar St	32"	26.976"	HDPE	DR13.5	125	10,550	$381	$4,019,550
							23,070		**$10,429,790**
	Total GREAT Program Recycled Water Backbone System Pipelines						**128,845**		**$61,873,640**
	24.4 miles of pipeline								

GREAT Program Desalter & Water System Pipelines

	Description	Nom. Size	ID Size	Material	Class	Operating Pressure	Length (ft)	Unit Cost*	Total Project Cost*
	Concentrate collection line Ph 1								
1	Third st from water yard to Rose	22"		HDPE			5,400	$250	$1,350,000
2	Rose Ave - Third St to end of Rose Ave	30"		HDPE			16,500	$426	$7,029,000
3	Rose Ave - end to Hueneme Rd (ag land)	30"		HDPE			7,600	$426	$3,237,600
4	Hueneme - Rose Ave to Perkins Rd	30"		HDPE			2,600	$426	$1,107,600
							32,100		**$12,724,200**
	Concentrate Collection line Ph 2								
1	Rose Ave - Third St to Camino del Sol	18"		PVC			2,112	$250	$528,000
2	Camino del Sol - Rose Ave to Graves Rd	24"		PVC			4,066	$300	$1,219,680
3	Graves Rd - Camino del Sol Rd to Solar Dr	24"		PVC			4,435	$275	$1,219,680
							10,613		**$2,967,360**
	Total GREAT Program Desalter and Water System Pipelines						**42,713**		**$15,691,560**
	8.1 miles of pipeline								

Total GREAT Program Pipelines

	Length (ft)		Total Project Cost*
TOTAL GREAT PROGRAM BACKBONE, DESALTER AND WATER SYSTEM PIPELINES	**171,558**		**$77,565,200**
32.5 miles of pipeline			

*Estimated cost for future projects includes 25% for project development

Appendix 5: AWPF Operations and Maintenance Cost (O&M)

Appendix 5, Table 1: AWPF Operations and Maintenance Cost

AWPF Plant Operations and Maintenance (O&M) Cost

Annual production 7,000 AFY 6.25 mgd 2,281 million gal per yr
Electricity cost $0.100 per kwh
Motor Efficiency 75% Pump Efficiency 95% Pump & Motor Eff. 71.3%

Item No	Description	Life (yr)	#	Pump Size (hp)	Efficiency	Use	Cost ($/unit)	Use per mgd	Operation Cost ($/yr)	Average Annual Maint. Cost ($/yr)	Total Cost ($/yr)
1	**Prechlorination**										
1A	Sodium Hypochlorite					300 gal/day	$0.96	48.01 gal/Mgal	$105,119		$105,119
								ITEM 1 TOTAL ($/yr)	**$105,119**	**$0**	**$105,119**
								ITEM 1 TOTAL ($/AF)	**$15.02**	**$0.00**	**$15.02**
2	**MF/UF**										
2A	Membrane Replacement Cost (1)	7				1 unit	$574,929			$82,133	$82,133
2B	Chemically Enhanced Backwash (CEB)										
	- Sodium Hypochlorite					4,504 gal/yr	$0.96	1.97 gal/Mgal	$4,324		$4,324
	_Citric Acid					50 gal/wk	$5.22	1.14 gal/Mgal	$13,609		$13,609
	- Sodium Bisulfite					696 gal/yr	$1.75	0.31 gal/Mgal	$1,218		$1,218
2C	Clean In Place (CIP)										
	- Sodium Hypochlorite					984 gal/yr	$0.96	0.43 gal/Mgal	$945		$945
	- Sodium Hydroxide					568 gal/yr	$2.30	0.25 gal/Mgal	$1,306		$1,306
	- Citric Acid					1,831 gal/yr	$5.22	0.80 gal/Mgal	$9,558		$9,558
	- Sodium Bisulfite					77 gal/yr	$1.75	0.03 gal/Mgal	$135		$135
2D	Electrical										
	- Feed Pumps		2	150	71%	2,751,562 kwh/yr	$0.100	1,206 kwh/Mgal	$275,156		$275,156
	- Backwash Pumps					$ 18,548	$0.100	8 kwh/Mgal	$1,855		$1,855
	- Blowers & Air Compressors					$ 145,863	$0.100	64 kwh/Mgal	$14,586		$14,586
								ITEM 2 TOTAL ($/yr)	**$322,692**	**$82,133**	**$404,825**
								ITEM 2 TOTAL ($/AF)	**$46.10**	**$11.73**	**$57.83**
3	**RO**										
3A	Membrane Replacement Cost (1)	5				678 elements	$500			$67,800	$67,800
3B	Chemical Addition										
	- Sulfuric Acid					5,200 gal/mo	$2.15	27.74 gal/Mgal	$136,022		$136,022
	- Scale Inhibitor					800 gal/mo	$6.45	4.27 gal/Mgal	$62,780		$62,780
3C	Clean In Place (CIP)										
	- Citrus Acid								$63		$63
	- Sodium Hydroxide								$16		$16
3D	Electrical (3)										
	- Feed Pumps		2	500	71%	9,171,874 kwh/yr	$0.100	4,021 kwh/Mgal	$917,187		$917,187
	- CIP Pumps						$0.100	0 kwh/Mgal	$0		$0
	- Flush Pumps						$0.100	0 kwh/Mgal	$0		$0
								ITEM 3 TOTAL ($/yr)	**$1,116,068**	**$67,800**	**$1,183,868**
								ITEM 3 TOTAL ($/AF)	**$159.44**	**$9.69**	**$169.12**
4	**UV/AOX**										
4A	Annual Maintenance Cost (2)	1				1 LS	$43,818			$43,818	$43,818
4B	Hydrogen Peroxide					1,700 gal/mo	$3.30	9.07 gal/Mgal	$68,255		$68,255
4C	Electrical					810,300 kwh/yr	$0.100	355 kwh/Mgal	$81,030		$81,030
								ITEM 4 TOTAL ($/yr)	**$149,285**	**$43,818**	**$193,103**
								ITEM 4 TOTAL ($/AF)	**$21.33**	**$6.26**	**$27.59**
5	**Degassification**										
5A	Chemical										
	- Liquid Lime					5,000 gal/mo	$1.38	26.67 gal/Mgal	$83,949	$0	$83,949
5B	Electrical (3)										
	- Blowers		2	16	71%	293,500 kwh/yr	$0.100	129 kwh/Mgal	$29,350	$0	$29,350
								ITEM 5 TOTAL ($/yr)	**$113,299**	**$0**	**$113,299**
								ITEM 5 TOTAL ($/AF)	**$16.19**	**$0.00**	**$16.19**
6	**Finished Water**										
6A	Electrical (3)										
	- Finished Water Pumps (105 psi)		2	200 hp	71%	3,668,749 kwh/yr	$0.100	1,608 kwh/Mgal	$366,875	$0	$366,875
	- Finished Water Pumps (155 psi)		0	500 hp	71%	0 kwh/yr	$0.100	0 kwh/Mgal	$0	$0	$0
								ITEM 6 TOTAL ($/yr)	**$366,875**	**$0**	**$366,875**
								ITEM 6 TOTAL ($/AF)	**$52.41**	**$0.00**	**$52.41**
7	**Wetlands**										
7A	Electrical		1	10	71%	91,719 kwh/yr	$0.100	40 kwh/Mgal	$9,172	$0	$9,172
								ITEM 7 TOTAL ($/yr)	**$9,172**	**$0**	**$9,172**
								ITEM 7 TOTAL ($/AF)	**$1.31**	**$0.00**	**$1.31**
								GRAND TOTAL COST ($/yr)	**$2,182,510**	**$193,751**	**$2,376,261**
								GRAND TOTAL COST ($/acre-ft)	**$311.79**	**$27.68**	**$339.47**

Notes:
(1) - Membrane is guaranteed for 10 years
(2) - Annual maintenance cost including lamp, ballast, transformer, quartz sleeve replacements

Appendix 5, Table 2: Equipment Replacement Cost

7,000 AFY Production 30 yr life	AWPF Equipment Replacement Schedule							
Description	5-yr	10-yr	15-yr	20-yr	25-yr	Total	Residual	Net
Vertical Turbine Pumps (10 pumps)			$1,262,119			$1,262,119		$1,262,119
MF Strainers			$114,818			$114,818		$114,818
MF Pneumatic Air System			$268,178			$268,178		$268,178
MF FRP Tanks & CIP Pumps		$150,000		$150,000		$300,000	$99,900	$200,100
MF Water Softener System		$120,676		$120,676		$241,352	$80,370	$160,982
RO CIP System		$278,999		$278,999		$557,998	$185,813	$372,185
UV Pumps			$25,000			$25,000		$25,000
Decarbonators			$329,936			$329,936		$329,936
Decarbonator Blowers		$38,561		$38,561		$77,122	$25,682	$51,440
Chemical Pumps		$459,522		$459,522		$919,044	$306,042	$613,002
Chemical FRP Tanks		$152,181		$152,181		$304,362	$101,353	$203,009
Sulfuric Acid & Hydrogen Peroxide Storage Tanks			$473,511			$473,511		$473,511
Sulfuric Acid Piping Replacement	$150,000	$150,000	$150,000	$150,000	$150,000	$750,000	$99,900	$650,100
Switchgears / Switchboards				$1,000,000		$1,000,000	$666,000	$334,000
VFDs			$260,000			$260,000		$260,000
HVAC			$270,411			$270,411		$270,411
Wetland Blowers & Pumps	$12,548	$12,548	$12,548	$12,548	$12,548	$62,740	$8,357	$54,383
Total	$162,548	$1,362,487	$3,166,521	$2,362,487	$162,548	$7,216,591	$1,573,416	$5,643,175
					Total cost per acre-ft	$34.36		$26.87

Appendix 5, Table 3: AWPF Lab & Facilities O&M Cost

AWPF Lab Cost and Facilities Operations and Maintenance (O&M) Cost

					Phase 1 7,000 acre-ft/yr		Phase 2 14,000 acre-ft/yr		Phase 3 21,000 acre-ft/yr		Phase 4 28,000 acre-ft/yr	
Description	**Qty**	**Unit cost**	**Annual Cost**	**% for AWPF**	**Qty**	**Annual Cost**	**Qty**	**Annual Cost**	**Qty**	**Annual Cost**	**Qty**	**Annual Cost**
Facilities Maintenance, AWPF	1	$100,000	$100,000	100%	1	$100,000	2	$200,000	3	$300,000	4	$400,000
Refuse	1	$5,000	$5,000	100%	1	$5,000	1	$5,000	1	$5,000	1	$5,000
Tech Services	1	$12,000	$12,000	100%	1	$12,000	2	$24,000	3	$36,000	4	$48,000
Other Contractural Services	1	$9,000	$9,000	100%	1	$9,000	2	$18,000	3	$27,000	4	$36,000
Custodial	1	$10,000	$10,000	100%	1	$10,000	1	$10,000	2	$20,000	2	$20,000
Equipment Rental	1	$5,000	$5,000	100%	1	$5,000	2	$10,000	3	$15,000	4	$20,000
Plumbing Materials/Supplies	1	$6,000	$6,000	100%	1	$6,000	2	$12,000	3	$18,000	4	$24,000
Other Building Materials	1	$5,000	$5,000	100%	1	$5,000	2	$10,000	3	$15,000	4	$20,000
Welding Supplies	1	$1,000	$1,000	100%	1	$1,000	2	$2,000	3	$3,000	4	$4,000
Pipes, Valves, Fittings	1	$5,000	$5,000	100%	1	$5,000	2	$10,000	3	$15,000	4	$20,000
Painting & Coating	1	$10,000	$10,000	100%	1	$10,000	2	$20,000	3	$30,000	4	$40,000
Equipment & Furniture	1	$2,000	$2,000	100%	1	$2,000	1	$2,000	2	$4,000	2	$4,000
Computer Supplies	1	$2,000	$2,000	100%	1	$2,000	1	$2,000	2	$4,000	2	$4,000
Landscape	1	$5,000	$5,000	100%	1	$5,000	1	$5,000	2	$10,000	2	$10,000
Lab for wetlands research*	1	$75,000	$75,000	100%	1	$75,000	2	$150,000	3	$225,000	4	$300,000
Contract Lab for RWQB**	1	$75,000	$75,000	100%	1	$75,000	2	$150,000	3	$225,000	4	$300,000
Lab Services for NPDES^	1	$16,000	$16,000	100%	1	$16,000	2	$32,000	3	$48,000	4	$64,000
Total AWPF Staff Cost ($/yr)			**$343,000**			**$343,000**		**$662,000**		**$1,000,000**		**$1,319,000**
				Total AWPF Staff Cost ($/acre-ft)		$49.00		$47.29		$47.62		$47.11

* Required for the brine treatment wetlands
** Required for injection wells
^ Required for CA Dept. of Public Health permits for irrigation

Appendix 5, Table 4: AWPF Staff Cost

GREAT Program Staff Cost

Assumes labor benefits and internal services markup of			92%		Phase 1 7,000 acre-ft/yr		Phase 2 14,000 acre-ft/yr		Phase 3 21,000 acre-ft/yr		Phase 4 28,000 acre-ft/yr	
Classification	**Qty**	**Mid Range Monthly**	**Annual Cost**	**% for AWPF**	**Qty**	**Annual Cost**	**Qty**	**Annual Cost**	**Qty**	**Annual Cost**	**Qty**	**Annual Cost**
Wastewater Personnel												
Scientist -Chemist/Biologist	1	$5,560	$128,092	100%	0	$0	1	$128,092	1	$128,092	1	$128,092
Operator II	2	$4,142	$190,875	100%	1	$95,437	2	$190,875	2	$190,875	2	$190,875
Operator III	1	$4,354	$100,305	100%	1	$100,305	1	$100,305	1	$100,305	1	$100,305
Electrician/Instrumentation Tech	1	$5,067	$116,744	100%	1	$116,744	1	$116,744	1	$116,744	1	$116,744
Groundsworker II	1	$3,328	$76,675	100%	1	$76,675	1	$76,675	1	$76,675	1	$76,675
WW Mechanic II	2	$4,441	$204,644	100%	1	$102,322	2	$204,644	2	$204,644	2	$204,644
Total	8		$817,335		5	$491,483	8	$817,335	8	$817,335	8	$817,335
Wastewater & Water Personnel												
Process Engineer*	1	$7,752	$178,606	33.3%	1	$59,529	1	$59,529	1	$59,529	1	$59,529
Sr Electrical Engineer -Power/controls*	1	$8,837	$203,604	33.3%	1	$67,861	1	$67,861	1	$67,861	1	$67,861
Management Analyst III^	1	$6,558	$151,096	50%	1	$75,548	1	$75,548	1	$75,548	1	$75,548
Total	3		$533,307		3	$202,939	3	$202,939	3	$202,939	3	$202,939
Water Personnel												
Electrician/Instrumentation Tech	1	$5,067	$116,744	100%	1	$116,744	1	$116,744	1	$116,744	1	$116,744
W Mechanic II	1	$4,441	$102,322	100%	0	$0	1	$102,322	1	$102,322	1	$102,322
Distribution Operator II	2	$3,463	$159,576	100%	0	$0	0	$0	1	$79,788	2	$159,576
Regulatory Compliance Technician	2	$4,239	$195,329	100%	1	$97,665	1	$97,665	2	$195,329	2	$195,329
Total	6		$573,971		2	$214,409	3	$316,730	5	$494,183	6	$573,971
Total AWPF Staff Cost ($/yr)						**$908,831**		**$1,337,004**		**$1,514,457**		**$1,594,244**
Total AWPF Staff Cost ($/acre-ft)						**$129.83**		**$95.50**		**$72.12**		**$56.94**

* Staff are split equally between, Water, Wastewater and Recycled Water program

^Staff are split 25% Water, 25% Wastewater and 50% Recycled Water. Additional Management Analyst time is required for the Local Resource Program.

Appendix 6: Projected Future Water Cost

Appendix 6, Table 1A: Projected Future Water Costs (Page 1 of 2)

Year	Discount	Escalation	1 2013	2 2014	3 2015	4 2016	5 2017	6 2018	7 2019	8 2020	9 2021	10 2022	11 2023	12 2024	13 2025	14 2026	15 2027
Calleguas Municipal Water District (CMWD) Rates																	
Projected CMWD Rate Increases				5.30%	5.60%	5.50%	4.69%	4.90%	5.80%	6.30%	5.00%	5.10%	3.00%	3.00%	3.00%	3.00%	3.00%
CMWD Tier 1 Base Rate			$1,119	$1,178	$1,244	$1,313	$1,374	$1,442	$1,525	$1,621	$1,702	$1,789	$1,843	$1,898	$1,955	$2,014	$2,074
CMWD Tier 2 Rate			$1,269	$1,336	$1,411	$1,489	$1,559	$1,635	$1,730	$1,839	$1,931	$2,029	$2,090	$2,153	$2,217	$2,284	$2,352
Combined CMWD Rate			$1,248	$1,314	$1,388	$1,464	$1,533	$1,608	$1,701	$1,808	$1,899	$1,995	$2,055	$2,117	$2,181	$2,246	$2,313
Local Water Cost from City of Oxnard and United Water Conservation District (UWCD)																	
UWCD (Averaged with City cost)			$701	$719	$812	$831	$851	$871	$892	$913	$935	$958	$982	$1,006	$1,031	$1,057	$1,083
City Well Water Cost		3.00%	$600	$618	$637	$656	$675	$696	$716	$738	$760	$783	$806	$831	$855	$881	$908
Additional cost for Desalter System			$101	$101	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175
Local Water Cost			$701	$719	$812	$831	$851	$871	$892	$913	$935	$958	$982	$1,006	$1,031	$1,057	$1,083
City Average Distribution Cost		3.00%	$595	$613	$631	$650	$669	$689	$710	$731	$753	$776	$799	$823	$848	$873	$900
City of Oxnard Rates																	
Landscape Irrigation Water Rate		3.00%	$1,542	$1,588	$1,636	$1,685	$1,736	$1,788	$1,841	$1,896	$1,953	$2,012	$2,072	$2,134	$2,199	$2,264	$2,332
Oceaview Rate		3.00%	$405	$417	$430	$443	$456	$470	$484	$498	$513	$528	$544	$561	$577	$595	$613
Estimated Value of an acre-ft (AF) of Pumping Allocation																	
Allocation value- tier 1 rate			$418	$459	$432	$482	$524	$571	$633	$708	$767	$831	$861	$892	$924	$957	$991
Allocation value- tier 2 rate			$568	$617	$599	$658	$708	$764	$838	$925	$995	$1,071	$1,108	$1,147	$1,186	$1,227	$1,269
Allocation value -combined			$547	$595	$576	$633	$682	$737	$809	$895	$963	$1,037	$1,074	$1,111	$1,150	$1,189	$1,230
Estimated Full Advanced Treatment (FAT) Water Rates ($/acre-ft)																	
RW for Irrigation in Lieu of Potable Water	85%		$1,311	$1,350	$1,391	$1,432	$1,475	$1,519	$1,565	$1,612	$1,660	$1,710	$1,761	$1,814	$1,869	$1,925	$1,983
FATW -outside City without credit	90%		$1,388	$1,429	$1,472	$1,516	$1,562	$1,609	$1,657	$1,707	$1,758	$1,811	$1,865	$1,921	$1,979	$2,038	$2,099
FATW Priority Rate - with credt		3.00%	$425	$438	$451	$464	$478	$493	$507	$523	$538	$555	$571	$588	$606	$624	$643
FATW Exchange Rate -with credit		3.00%	$365	$376	$387	$399	$411	$423	$436	$449	$462	$476	$491	$505	$520	$536	$552
FATW Interruptable rate - United and PV		3.00%	$300	$309	$318	$328	$338	$348	$358	$369	$380	$391	$403	$415	$428	$441	$454
Estimated Full Advanced Treatment (FAT) Water Cost																	
O&M		3.00%	$545	$562	$578	$596	$614	$632	$651	$670	$691	$711	$733	$755	$777	$801	$825
Capital			$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135
FAT Ph 1 Cost			**$1,680**	**$1,697**	$1,714	$1,731	$1,749	$1,767	$1,786	$1,806	$1,826	$1,847	$1,868	$1,890	$1,912	$1,936	$1,960
O&M		3.00%	$509	$524	$540	$556	$573	$590	$608	$626	$645	$664	$684	$705	$726	$748	$770
Capital			$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682
FAT Ph 2 Cost			$1,191	$1,206	**$1,222**	**$1,238**	**$1,255**	**$1,272**	**$1,290**	**$1,308**	**$1,327**	**$1,346**	**$1,366**	**$1,386**	$1,407	$1,429	$1,452
O&M		3.00%	$486	$501	$516	$531	$547	$563	$580	$598	$616	$634	$653	$673	$693	$714	$735
Capital			$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597
FAT Ph 3 Cost			$1,083	$1,098	$1,113	$1,128	$1,144	$1,161	$1,177	$1,195	$1,213	$1,231	$1,250	$1,270	**$1,290**	**$1,311**	**$1,332**
O&M		3.00%	$470	$484	$499	$514	$529	$545	$562	$579	$596	$614	$632	$651	$671	$691	$711
Capital			$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492
FAT Ph 4 Cost			$962	$977	$991	$1,006	$1,021	$1,037	$1,054	$1,071	$1,088	$1,106	$1,124	$1,143	$1,163	$1,183	$1,204
Full Advanced Treatment (FAT) Water Cost with Assumed Phase Schedule																	
			Phase 1 Cost						Phase 2 Cost						Phase 3 Cost		
Capacity (acre-ft/yr)			7,000	7,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	21,000	21,000	21,000
Assumed FAT Water Cost			$1,680	$1,697	**$1,222**	$1,238	$1,255	$1,272	$1,290	$1,308	$1,327	$1,346	$1,366	$1,386	**$1,290**	$1,311	$1,332
Projected Blended (Average) Water Cost (not including distribution cost)	**Baseline**																
City Of Oxnard wells	30%		30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
City-add. pumping with existing credits			15%	15%	15%	15%	15%										
City-Pumping with new credits from FAT						20%	30%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
Future Direct Reuse of FAT																	
United	25%		25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Calleguas	45%		30%	30%	30%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	100%		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Avg. Water Cost without FATW			$892	$931	$975	$1,019	$1,061	$1,106	$1,160	$1,220	$1,272	$1,329	$1,368	$1,409	$1,452	$1,495	$1,540
Avg. Cost with FATW			$865	$898	$985	$1,046	$1,033	$1,142	$1,161	$1,181	$1,202	$1,224	$1,247	$1,270	$1,245	$1,269	$1,294
Savings from FATW			3.0%	3.6%	-1.0%	-2.6%	2.7%	-3.2%	-0.2%	3.1%	5.5%	7.9%	8.9%	9.9%	14.2%	15.1%	16.0%
Data for smooth curve in Fig. 2			$865	$914.60	$966.02	$1,019.47	$1,074.97	$1,132.52	$1,161	$1,173.71	$1,185.97	$1,198.23	$1,210.49	$1,222.75	$1,235.00	$1,247.26	$1,259.52

Appendix 6, Table 1B: Projected Future Water Costs (Page 2 of 2)

Year	Discount	Escalation	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
			2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Calleguas Municipal Water District (CMWD) Rates																	
Projected CMWD Rate Increases			3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
CMWD Tier 1 Base Rate			$2,136	$2,201	$2,267	$2,335	$2,405	$2,477	$2,551	$2,628	$2,706	$2,788	$2,871	$2,957	$3,046	$3,137	$3,232
CMWD Tier 2 Rate			$2,423	$2,496	$2,570	$2,647	$2,727	$2,809	$2,893	$2,980	$3,069	$3,161	$3,256	$3,354	$3,454	$3,558	$3,665
Combined CMWD Rate			$2,383	$2,454	$2,528	$2,604	$2,682	$2,762	$2,845	$2,930	$3,018	$3,109	$3,202	$3,298	$3,397	$3,499	$3,604
Local Water Cost from City of Oxnard and United Water Conservation District (UWCD)																	
UWCD (Averaged with City cost)			$1,110	$1,138	$1,167	$1,197	$1,228	$1,259	$1,292	$1,325	$1,360	$1,395	$1,432	$1,469	$1,508	$1,548	$1,589
City Well Water Cost		3.00%	$935	$963	$992	$1,021	$1,052	$1,084	$1,116	$1,150	$1,184	$1,220	$1,256	$1,294	$1,333	$1,373	$1,414
Additional cost for Desalter System			$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175	$175
Local Water Cost			$1,110	$1,138	$1,167	$1,197	$1,228	$1,259	$1,292	$1,325	$1,360	$1,395	$1,432	$1,469	$1,508	$1,548	$1,589
City Average Distribution Cost		3.00%	$927	$954	$983	$1,013	$1,043	$1,074	$1,106	$1,140	$1,174	$1,209	$1,245	$1,283	$1,321	$1,361	$1,402
City of Oxnard Rates																	
Landscape Irrigation Water Rate		3.00%	$2,402	$2,474	$2,549	$2,625	$2,704	$2,785	$2,869	$2,955	$3,043	$3,135	$3,229	$3,325	$3,425	$3,528	$3,634
Oceaview Rate		3.00%	$631	$650	$669	$689	$710	$731	$753	$776	$799	$823	$848	$873	$900	$927	$954
Estimated Value of an acre-ft (AF) of Pumping Allocation																	
Allocation value- tier 1 rate			$1,026	$1,062	$1,099	$1,138	$1,177	$1,218	$1,259	$1,302	$1,347	$1,392	$1,440	$1,488	$1,538	$1,589	$1,642
Allocation value- tier 2 rate			$1,313	$1,357	$1,403	$1,451	$1,499	$1,550	$1,601	$1,655	$1,710	$1,766	$1,824	$1,884	$1,946	$2,010	$2,075
Allocation value -combined			$1,273	$1,316	$1,361	$1,407	$1,454	$1,503	$1,554	$1,605	$1,659	$1,714	$1,771	$1,829	$1,889	$1,951	$2,015
Estimated Full Advanced Treatment (FAT) Water Rates ($/acre-ft)																	
RW for Irrigation in Lieu of Potable Water	85%		$2,042	$2,103	$2,166	$2,231	$2,298	$2,367	$2,438	$2,511	$2,587	$2,664	$2,744	$2,827	$2,911	$2,999	$3,089
FATW -outside City without credit	90%		$2,162	$2,227	$2,294	$2,363	$2,434	$2,507	$2,582	$2,659	$2,739	$2,821	$2,906	$2,993	$3,083	$3,175	$3,270
FATW Priority Rate - with credt		3.00%	$662	$682	$702	$724	$745	$768	$791	$814	$839	$864	$890	$917	$944	$972	$1,002
FATW Exchange Rate -with credit		3.00%	$569	$586	$603	$621	$640	$659	$679	$699	$720	$742	$764	$787	$811	$835	$860
FATW Interruptable rate - United and PV		3.00%	$467	$481	$496	$511	$526	$542	$558	$575	$592	$610	$628	$647	$666	$686	$707
Estimated Full Advanced Treatment (FAT) Water Cost																	
O&M		3.00%	$849	$875	$901	$928	$956	$985	$1,014	$1,045	$1,076	$1,108	$1,141	$1,176	$1,211	$1,247	$1,285
Capital			$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135	$1,135
FAT Ph 1 Cost			$1,985	$2,010	$2,036	$2,063	$2,091	$2,120	$2,149	$2,180	$2,211	$2,243	$2,277	$2,311	$2,346	$2,383	$2,420
O&M		3.00%	$793	$817	$842	$867	$893	$920	$947	$976	$1,005	$1,035	$1,066	$1,098	$1,131	$1,165	$1,200
Capital			$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682	$682
FAT Ph 2 Cost			$1,475	$1,499	$1,523	$1,548	$1,574	$1,601	$1,629	$1,657	$1,686	$1,717	$1,748	$1,780	$1,812	$1,846	$1,881
O&M		3.00%	$757	$780	$803	$828	$852	$878	$904	$931	$959	$988	$1,018	$1,048	$1,080	$1,112	$1,145
Capital			$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597	$597
FAT Ph 3 Cost			**$1,354**	**$1,377**	**$1,400**	**$1,425**	**$1,449**	**$1,475**	**$1,501**	**$1,528**	**$1,556**	**$1,585**	**$1,615**	**$1,645**	$1,677	$1,709	$1,743
O&M		3.00%	$733	$755	$777	$801	$825	$850	$875	$901	$928	$956	$985	$1,014	$1,045	$1,076	$1,108
Capital			$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492	$492
FAT Ph 4 Cost			$1,225	$1,247	$1,270	$1,293	$1,317	$1,342	$1,367	$1,393	$1,420	$1,448	$1,477	$1,506	**$1,537**	**$1,568**	**$1,601**
Full Advanced Treatment (FAT) Water Cost																	
								Phase 3 Cost							Phase 4 Cost		
Capacity (acre-ft/yr)			21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	28,000	28,000	28,000
Assumed FAT Water Cost			$1,354	$1,377	$1,400	$1,425	$1,449	$1,475	$1,501	$1,528	$1,556	$1,585	$1,615	$1,645	**$1,537**	$1,568	$1,601
	Baseline		**Projected Blended (Average) Water Cost (not including distribution cost)**														
City Of Oxnard wells	30%		30%	30%	30%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
City-add. pumping with existing credits																	
City-Pumping with new credits from FAT			45%	45%	45%												
Future Direct Reuse of FAT						50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
United	25%		25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Calleguas	45%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	100%		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Avg. Water Cost without FATW			$1,586	$1,634	$1,683	$1,733	$1,785	$1,839	$1,894	$1,951	$2,010	$2,070	$2,132	$2,196	$2,262	$2,330	$2,400
Avg. Cost with FATW			$1,320	$1,347	$1,374	$1,187	$1,211	$1,236	$1,267	$1,293	$1,320	$1,348	$1,377	$1,407	$1,323	$1,352	$1,383
Savings from FATW			16.8%	17.6%	18.3%	31.5%	32.2%	32.8%	33.1%	33.7%	34.3%	34.9%	35.4%	35.9%	41.5%	41.9%	42.4%
Data for smooth curve in Fig. 2			$1,271.78	$1,284.04	$1,296.29	$1,308.55	$1,320.81	$1,333.07	$1,345.32	$1,357.58	$1,369.84	$1,382.10	$1,394.36	$1,407	$1,398.72	$1,390.82	$1,383

Appendix 7: Projected Future Revenue Payback Calculation

The cost of local water in these calculations is an average of United Water Conservation District (UWCD) water cost, City of Oxnard water cost and Desalter System cost. These costs are estimates. A consultant is currently performing an analysis to determine the costs, however, the report will not be complete for several weeks.

Appendix 7, Table 1A: Projected Future Water Revenue and Payback (Page 1 of 2)

Year	1 2013	2 2014	3 2015	4 2016	5 2017	6 2018	7 2019	8 2020	9 2021	10 2022	11 2023	12 2024	13 2025	14 2026	15 2027
PHASE 2	**Projected Full Advanced Treatment (FAT) Water sales (acre-ft-yr)**														
RW for Irrigation in Lieu of Potable Water Rate	838	838	838	838	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	4,000	4,000	4,000
Golf Course without credit	459	459	459	459	459	459	459	459	459	459	459	459	459	459	459
Golf Course with credit	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401
FATW -outside City without credit	300	300	300	300	600	600	600	600	600	600	600	600	600	600	600
FATW Priority Rate - with credt	300	300	300	300	600	600	600	600	600	600	600	600	600	600	600
FATW Exchange Rate -with credit	1,600	2,400	3,200	3,600	4,000	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400
FATW Interruptable rate - United and PV	3,102	2,302	8,502	8,102	5,740	5,340	5,340	5,340	5,340	5,340	5,340	5,340	10,540	10,540	10,540
Injection without credit															
Injection with credit															
Direct reuse															
TOTAL SALES (AFY)	7,000	7,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	21,000	21,000	21,000
GMA Credits	6,241	6,241	13,241	13,241	12,941	12,941	12,941	12,941	12,941	12,941	12,941	12,941	19,941	19,941	19,941
Max Eligible for LRP	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310	2,310
Eligible for LRP	1,698	1,698	1,698	1,698	3,060	3,060	3,060	3,060	3,060	3,060	3,060	3,060	4,860	4,860	4,860
	Revenue and Savings from FAT Water ($millions)														
RW for Irrigation in Lieu of Potable Water Rate	$1.098	$1.131	$1.165	$1.200	$3.245	$3.343	$3.443	$3.546	$3.653	$3.762	$3.875	$3.991	$7.475	$7.699	$7.930
Golf Course without credit	$0.251	$0.273	$0.264	$0.291	$0.313	$0.338	$0.371	$0.411	$0.442	$0.476	$0.493	$0.510	$0.528	$0.546	$0.565
Golf Course with credit	$0.120	$0.124	$0.128	$0.131	$0.135	$0.139	$0.144	$0.148	$0.152	$0.157	$0.162	$0.167	$0.172	$0.177	$0.182
FATW -outside City without credit	$0.416	$0.429	$0.442	$0.455	$0.937	$0.965	$0.994	$1.024	$1.055	$1.086	$1.119	$1.153	$1.187	$1.223	$1.260
FATW Priority Rate - with credt	$0.128	$0.131	$0.135	$0.139	$0.287	$0.296	$0.304	$0.314	$0.323	$0.333	$0.343	$0.353	$0.364	$0.374	$0.386
FATW Exchange Rate -with credit	$0.584	$0.902	$1.239	$1.436	$1.643	$1.862	$1.918	$1.975	$2.034	$2.095	$2.158	$2.223	$2.290	$2.358	$2.429
FATW Interruptable rate - United and PV	$0.931	$0.711	$2.706	$2.656	$1.938	$1.857	$1.913	$1.970	$2.029	$2.090	$2.153	$2.218	$4.508	$4.644	$4.783
Injection without credit															
Injection with credit															
Total sales revenue	$3.5281	$3.7021	$6.0792	$6.3083	$8.4995	$8.8004	$9.0875	$9.3883	$9.6889	$10.0003	$10.3027	$10.6142	$16.5230	$17.0211	$17.5341
Average rate ($/AF)	$504.01	$528.87	$434.23	$450.59	$607.10	$628.60	$649.10	$670.59	$692.07	$714.31	$735.91	$758.16	$786.81	$810.53	$834.96
Local Resource Program (LRP) Incentive	$0.4245	$0.4245	$0.4245	$0.4245	$0.5775	$0.5775	$0.5775	$0.5775	$0.5775	$0.5775	$0.5775	$0.5775	$0.5775	$0.5775	$0.5775
TOTAL REVENUE AND INCENTIVE	$3.9526	$4.1266	$6.5037	$6.7328	$9.0770	$9.3779	$9.6650	$9.9658	$10.2664	$10.5778	$10.8802	$11.1917	$17.1005	$17.5986	$18.1116
Average total ($/AF)	$564.66	$589.51	$464.55	$480.92	$648.35	$669.85	$690.35	$711.84	$733.32	$755.56	$777.16	$799.41	$814.31	$838.03	$862.46
Savings from reduction in purchases	$3.4126	$3.7131	$7.6240	$8.3818	$8.8259	$9.5357	$10.4724	$11.5812	$12.4647	$13.4227	$13.8935	$14.3784	$22.9256	$23.7183	$24.5347
Total revenue and savings	$7.3652	$7.8397	$14.1277	$15.1146	$17.9029	$18.9135	$20.1374	$21.5469	$22.7311	$24.0005	$24.7737	$25.5701	$40.0261	$41.3169	$42.6464
Average total ($/AF)	$1,052	$1,120	$2,018	$2,159	$2,558	$2,702	$2,877	$3,078	$3,247	$3,429	$3,539	$3,653	$5,718	$5,902	$6,092
O&M cost	($3.816)	($3.816)	($7.632)	($7.632)	($7.632)	($7.632)	($7.632)	($7.632)	($7.632)	($7.632)	($7.632)	($7.632)	($11.449)	($11.449)	($11.449)
Net cost	$3.5490	$4.0235	$6.4953	$7.4822	$10.2705	$11.2811	$12.5050	$13.9145	$15.0987	$16.3681	$17.1414	$17.9378	$28.5775	$29.8683	$31.1978
	Payback														
Running sum of net cost	$3.5490	$7.572	$14.068	$21.550	$31.821	$43.102	$55.607	$69.521	$84.620	$101.0	$118.1	$136.1	$164.6	$194.5	$225.7
Remaining payback for FAT system	$282.72	$278.69	$272.20	$264.71	$254.44	$243.16	$230.66	$216.74	$201.64	$185.28	$168.14	$150.20	$121.62	$91.75	$60.55
Remaining payback for FAT related	$424.80	$420.77	$414.28	$406.79	$396.52	$385.24	$372.74	$358.82	$343.72	$327.36	$310.21	$292.28	$263.70	$233.83	$202.63
FAT cost minus revenue	$1,116	$1,107	$757	$757	$606	$602	$599	$596	$593	$590	$589	$587	$476	$473	$470
FAT cost minus revenue and savings	$628	$577	($797)	($921)	($1,303)	($1,430)	($1,587)	($1,770)	($1,921)	($2,083)	($2,173)	($2,267)	($4,428)	($4,592)	($4,760)

Appendix 7, Table 1B: Projected Future Water Revenue and Payback (Page 2 of 2)

Year	16 2028	17 2029	18 2030	19 2031	20 2032	21 2033	22 2034	23 2035	24 2036	25 2037	26 2038	27 2039	28 2040	29 2041	30 2042
PHASE 2	**Projected Full Advanced Treatment (FAT) Water sales (acre-ft-yr)**														
RW for Irrigation in Lieu of Potable Water Rate	4,000	4,000	4,000	-	-	-	-	-	-	-	-	-	-	-	-
Golf Course without credit	459	459	459	459	459	459	459	459	459	459	459	459	459	459	459
Golf Course with credit	401	401	401	401	401	401	401	401	401	401	401	401	401	401	401
FATW -outside City without credit	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
FATW Priority Rate - with credt	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
FATW Exchange Rate -with credit	4,400	4,400	4,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
FATW Interruptable rate - United and PV	10,540	10,540	10,540	1,540	1,540	1,540	1,540	1,540	1,540	1,540	1,540	1,540	8,540	8,540	8,540
Injection without credit															
Injection with credit															
Direct reuse				15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
TOTAL SALES (AFY)	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	28,000	28,000	28,000
GMA Credits	19,941	19,941	19,941	4,941	4,941	4,941	4,941	4,941	4,941	4,941	4,941	4,941	11,941	11,941	11,941
Max Eligible for LRP	2,310	2,310	2,310	2,310	2,310	2,310	-	-	-	-	-	-	-	-	-
Eligible for LRP	4,860	4,860	4,860	860	860	860	860	860	860	860	860	860	860	860	860
	Revenue and Savings from FAT Water ($millions)														
RW for Irrigation in Lieu of Potable Water Rate	$8.168	$8.413	$8.666	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Golf Course without credit	$0.584	$0.604	$0.625	$0.646	$0.668	$0.690	$0.713	$0.737	$0.761	$0.787	$0.813	$0.839	$0.867	$0.895	$0.925
Golf Course with credit	$0.187	$0.193	$0.199	$0.205	$0.211	$0.217	$0.224	$0.231	$0.237	$0.245	$0.252	$0.259	$0.267	$0.275	$0.283
FATW -outside City without credit	$1.297	$1.336	$1.376	$1.418	$1.460	$1.504	$1.549	$1.596	$1.643	$1.693	$1.743	$1.796	$1.850	$1.905	$1.962
FATW Priority Rate - with credt	$0.397	$0.409	$0.421	$0.434	$0.447	$0.461	$0.474	$0.489	$0.503	$0.518	$0.534	$0.550	$0.566	$0.583	$0.601
FATW Exchange Rate -with credit	$2.502	$2.577	$2.654	$1.491	$1.536	$1.582	$1.630	$1.679	$1.729	$1.781	$1.834	$1.889	$1.946	$2.004	$2.064
FATW Interruptable rate - United and PV	$4.926	$5.074	$5.226	$0.787	$0.810	$0.834	$0.859	$0.885	$0.912	$0.939	$0.967	$0.996	$5.691	$5.862	$6.038
Injection without credit															
Injection with credit															
Total sales revenue	$18.0626	$18.6069	$19.1675	$4.9801	$5.1319	$5.2883	$5.4493	$5.6152	$5.7861	$5.9621	$6.1434	$6.3301	$11.1871	$11.5252	$11.8733
Average rate ($/AF)	$860.12	$886.04	$912.74	$237.15	$244.38	$251.82	$259.49	$267.39	$275.53	$283.91	$292.54	$301.43	$399.54	$411.61	$424.05
Local Resource Program (LRP) Incentive	$0.5775	$0.5775	$0.5775	$0.2150	$0.2150	$0.2150	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000
TOTAL REVENUE AND INCENTIVE	$18.6401	$19.1844	$19.7450	$5.1951	$5.3469	$5.5033	$5.4493	$5.6152	$5.7861	$5.9621	$6.1434	$6.3301	$11.1871	$11.5252	$11.8733
Average total ($/AF)	$887.62	$913.54	$940.24	$247.38	$254.61	$262.06	$259.49	$267.39	$275.53	$283.91	$292.54	$301.43	$399.54	$411.61	$424.05
Savings from reduction in purchases	$25.3757	$26.2419	$27.1341	$28.0531	$28.9996	$29.9745	$30.9787	$32.0130	$33.0783	$34.1756	$35.3058	$36.4699	$50.8921	$52.5606	$54.2792
Total revenue and savings	$44.0158	$45.4263	$46.8791	$33.2481	$34.3465	$35.4778	$36.4280	$37.6282	$38.8644	$40.1377	$41.4492	$42.8000	$62.0792	$64.0857	$66.1525
Average total ($/AF)	$6,288	$6,489	$6,697	$4,750	$4,907	$5,068	$5,204	$5,375	$5,552	$5,734	$5,921	$6,114	$8,868	$9,155	$9,450
O&M cost	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($11.449)	($15.265)	($15.265)	($15.265)
Net cost	$32.5672	$33.9777	$35.4305	$21.7996	$22.8979	$24.0292	$24.9794	$26.1796	$27.4158	$28.6891	$30.0006	$31.3514	$46.8144	$48.8209	$50.8877
	Payback														
Running sum of net cost	$258.3	$292.3	$327.7	$349.5	$372.4	$396.4	$421.4	$447.6	$475.0	$503.7	$533.7	$565.0	$611.8	$660.7	$711.6
Remaining payback for FAT system	$27.99	($5.99)	($41.42)	($63.22)	($86.12)	($110.15)	($135.13)	($161.31)	($188.72)	($217.41)	($247.41)	($278.76)	($325.58)	($374.40)	($425.29)
Remaining payback for FAT related	$170.07	$136.09	$100.66	$78.86	$55.96	$31.93	$6.95	($19.23)	($46.64)	($75.33)	($105.33)	($136.68)	($183.50)	($232.32)	($283.21)
FAT cost minus revenue	$467	$464	$460	$1,177	$1,195	$1,213	$1,242	$1,261	$1,281	$1,301	$1,322	$1,344	$1,137	$1,157	$1,177
FAT cost minus revenue and savings	($4,934)	($5,112)	($5,297)	($3,325)	($3,457)	($3,593)	($3,703)	($3,847)	($3,996)	($4,149)	($4,307)	($4,469)	($7,332)	($7,587)	($7,850)

Appendix 8: GREAT Program Potential Retrofits

To Be Published.

APPENDIX C – NON-POTABLE REUSE DISCHARGE PERMIT

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. R4-2008-0083
(File No. 08-070)

WATER RECYCLING REQUIREMENTS AND WASTE DISCHARGE REQUIREMENTS FOR CITY OF OXNARD GROUNDWATER ENHANCEMENT AND TREATMENT PROGRAM – NONPOTABLE REUSE PHASE I PROJECT

ISSUED TO

CITY OF OXNARD

The California Regional Water Quality Control Board, Los Angeles Region, (hereinafter, Regional Board), finds:

INTRODUCTION

1. The current water supply sources are insufficient to meet the City of Oxnard's (City's) current and growing demand and have limitations with respect to economics and reliability. The City's total water supply sources in 2008 is approximately 27,000 acre-feet per year (AF/Y), and it is projected that the City's demand will near 44,000 AF/Y over the next 20 years. In order to meet the current and future water demand, the City proposes to produce and distribute treated recycled water produced at the Advanced Wastewater Purification Facility (AWPF) from its Groundwater Enhancement and Treatment (GREAT) Program. The GREAT Program is a water resource project that combines wastewater recycling and reuses; groundwater injection, storage, and recovery; and groundwater desalination to provide more efficient uses of existing local water resources. The GREAT Program would provide regional water supply solutions to western Ventura County, allow the groundwater basin to reach safe yield levels sooner (i.e., reducing the effects of groundwater overdraft conditions), and provide the City with needed local water resources. Additional benefits would include increased spare capacity of the City ocean outfall, which could be used toward other beneficial uses and more reliable irrigation water supplies to growers at equal or better quality than its existing irrigation water supplies.

2. The GREAT Program contains three sub-projects subject to three different permitting activities. These three sub-projects are:

   A. **Nonpotable Recycle Project** (Project) reuses AWPF-treated recycled water (recycled water) including landscape and agricultural irrigation, industrial process water, and recreational purposes. These proposed Waste Discharge Requirements and Water Recycling Requirements regulate this use.

   B. **Groundwater Injection Project** injects recycled water into the aquifers along the coastal area. Groundwater Injection Project will be regulated with a separate future

permit containing the Groundwater Recharge Reuse requirements issued by this Regional Board.

C. **Groundwater Desalination Project** desalts brackish groundwater for potable uses. Groundwater Desalination Project will be regulated with a drinking water permit issued by the California Department of Public Health (CDPH). The discharge of brine from this activity will be covered under a future NPDES permit.

PROJECT SPONSOR

3. The City owns and operates the Oxnard Wastewater Treatment Plant (Oxnard Plant) and the GREAT Program. The City is the primary purveyor of recycled water, distributed both within and outside of the City, for irrigation, industrial, and recreational, and other non-groundwater recharge uses.

REGULATORY AGENCIES

4. The Regional Board is the permitting agency for this Project involving the use of recycled water for nonpotable uses. The Regional Board issues Waste Discharge Requirements (WDRs) and Water Recycling Requirements (WRRs) to assure that this Project does not adversely affect receiving water quality. In addition, the Regional Board is guided by California Department of Public Health's (CDPH's) requirements.

5. On June 12, 2008, the CDPH provided the Regional Board with the comments on the Title 22 Engineering Report. These comments have been incorporated into the Order. The CDPH is the agency with the primary responsibility for establishing criteria, under Title 22 and Title 17 of the Code of Regulations, to protect the health of the public using the recycled water and potable water supplies through control of cross-connections with potential contaminants.

PURPOSE OF ORDER

6. On January 9, 2007, the City submitted a Report of Waste Discharge (ROWD) and applied for Water Recycling Requirements, pursuant to California Water Code Section 13522.5, for the nonpotable reuse of recycled water.

7. This Order is a master water recycling permit issued to the City, pursuant to California Water Code Section 13523.1. This Order prescribes the City responsibilities for the production, distribution and application of recycled water. The City is also responsible for processing individual end-users' applications, inspecting point-of-use facilities, and ensuring end-users' compliance with the water recycling requirements contained in this Order. The actual delivery of recycled water to end-users is subject to approval by the CDPH, and/or its delegated local health agency.

OXNARD WASTEWATER TREATMENT PLANT

8. The City owns and operates the Oxnard Plant, a publicly owned treatment work (POTW). The Oxnard Plant is a secondary treatment facility located at 6001 South Perkins Road, Oxnard, California. Figure 1 provides a map of the area around the Oxnard Plant. The

Oxnard Plant has a dry weather design capacity of 31.7 million gallons per day (mgd). The treatment system consists of bar screening, aerated grit removal, primary clarification, bio-filtration, activated sludge, secondary clarification, flow equalization, chlorine disinfection, and dechlorination. Solid fractions recovered from wastewater treatment processes include screenings, grit, primary sludge and skimmings, thickened waste activated sludge. The fine solids (screenings and grit) which are primarily inorganic materials are hauled away to a landfill. The remaining solid fractions (primary sludge, skimmings, and thickened waste activated sludge) are anaerobically digested at the treatment plant. In addition, the City operates the oil and grease program through which it cleans interceptors for food establishments and uses the oil and grease in its digesters to increase methane production. The methane is then used to generate electricity, which occupies approximately 60% of total electricity uses, for the Oxnard Plant. The digested solids are dewatered using belt filter presses. The dewatered cake contains approximately 20% solids (Class B biosolids). The Oxnard Plant generates approximately 500 wet tons of Class B biosolids per week. The biosolids are managed by composting operations in Kern County. Figure 2 shows a flow schematic of the Oxnard Plant.

9. Treated wastewater is discharged to the Pacific Ocean off Ormond Beach, a water of the United States, under NPDES Order No. R4-2008-0029, adopted by the Regional Board on May 1, 2008.

10. The Oxnard Plant is located at the Oxnard Plain, and the proposed recycled water use areas are the Oxnard Plain and Pleasant Valley located above the Ventura Central Groundwater Basin.

GROUNDWATER ENHANCEMENT AND TREATMENT (GREAT) PROGRAM

11. The City plans to construct an AWPF nearby the Oxnard Plant for the GREAT Program in two phases (See Figure 1), which treats the secondary effluent, for reuse in Nonpotable Reuse and Groundwater Injection Projects. Table 1 presents the proposed quantity of recycled water to be produced for each phase.

Table 1 – Projected Recycled Water Production Capacity

Phase	Secondary Effluent (mgd)	Product Recycled Water (mgd)
I	8 - 9	6.25
II	32 - 36	25

The AWPF is designed to produce 6.25 mgd and 25 mgd of recycled water for Phases 1 and 2, respectively. At buildout (Phase 2), the treatment equipment will consist of four full treatment trains, each capable of producing 6.25 mgd of recycled water. Thus, the operators have the ability to remove trains from service for maintenance or repair. When a train is out of service, less water will be available for recycled use. Flow that is not treated through the AWPF will be discharged through the ocean outfall.

The use of recycled water will replace imported potable water. The City will be actively pursuing additional users for Phase I. Any additional recycled water produced in future phases may be used for various irrigation, industrial uses, and recreational impoundments.

SOURCE AND TREATMENT OF RECYCLED WATER

12. The Oxnard Plant treats wastewater from industrial, commercial and residential sources generated by a population of approximately 220,000 in the City of Oxnard, the City of Port Hueneme, the US Naval Base, Ventura County, and some unincorporated areas of Ventura County. Approximately 20 percent of wastewater comes from industrial source, and the remaining 80 percent from commercial and residential sources. In addition to wastewater, infiltration and inflow of clear water is present in the collection system and is approximately 11 to 20 percent of the total flow depending on the season. In compliance with 40 Code of Federal Regulations part 403 and the NPDES permits for the Oxnard Plant, the City developed and has been implementing a Pretreatment Program. Two of the four primary objectives of the Pretreatment Program are to prevent to pass through of pollutants or to cause interference in the operation of the Oxnard Plant by regulating the discharge of toxic pollutants into the Oxnard Plant. The Pretreatment Program reduces the likelihood of toxic contamination of the effluent and provides reliability in the treatment process.

13. For the GREAT Program – Phase I, approximately 6 - 8 mgd of secondary-treated effluent will flow by gravity to the AWPF lift station wet well where lift pumps will feed to the strainers. The remaining secondary treated effluent will continue to be discharged to the Pacific Ocean. Figure 3 depicts the schematic of Phase I AWPF treatment process. The AWPF is comprised of the following:

    A. **Strainer System:** Strainers installed prior to the microfiltration/ultrafiltration system will remove the fine particles from the secondary effluent.

    B. **Microfiltration/Ultrafiltration (MF/UF) System**: MF/UF is a low-pressure filtration process and will be used to pretreat the secondary effluent prior to reverse osmosis (RO). As results of removing particulate and microbial contaminants, including turbidity, *Giardia*, and *Cryptosporidium*, MF/UF increases system reliability and reduces RO membrane fouling. The MF units will be periodically back washed to clean the membranes. However, the backwash is not 100 percent effective at removing particulates and foulants accumulating on the membrane surface. Therefore, a chemical cleaning process of feeding sodium hypochlorite to MF/UM is also needed. The chemical cleaning interval is 30 days or greater. The backwash will be sent back to the Oxnard Plant's headworks for reprocessing.

    C. **Reverse Osmosis (RO) System**: RO is a pressure-driven membrane-separation process that removes dissolved contaminants (i.e., salts, minerals, metal ions, and organic compounds) and viruses from water. Filtered water will continuously be pumped at elevated pressure to the RO system. RO feed pumps are equipped with variable frequency drives to allow constant flux operation. The RO system will be designed for a finished water production capacity of 6.25 mgd for the AWPF Phase 1 and 25 mgd for Phase 2. It will have three stages to allow water recovery of 80 to 85 percent, where concentrate from the first stage will be applied to a second stage, and concentrate from the second stage will be applied to a third stage. Permeate from the three stages will be blended into a final product water and will constitute the feedwater to the UV/AOX system. Similar to the MF/UF system, the membranes will

foul with accumulation of particulates. Chemicals are used to routinely clean the membranes. Cleaning chemicals are returned to the Oxnard Plant's headworks.

D. **Ultra Violet/Advanced Oxidation and Reduction (UV/AOX) System**: UV/AOX process is used for both disinfection and advanced oxidation and reduction of micropollutants at the AWPF. Recycled water destined for groundwater recharge, and agricultural and landscape irrigation will normally undergo UV/AOX treatment at all times. However, in those instances when only UV light disinfection is required, the AWPF will have the capability to apply a lower UV dose required for disinfection of water for "unrestricted reuse," also referred to as "disinfected tertiary recycled water" or "Title 22 recycled water," as defined by the CDPH.

E. **Post-Treatment Systems**: The post-treatment systems include decarbonator towers and liquid lime injection downstream of the UV/AOX process. Following UV/AOX, the water quality is projected to be very aggressive with an LSI in the range of -3.3 to -2.5; also, the water will have high concentrations of carbon dioxide, up to 50 mg/L. Lime is needed to increase the pH and achieve an Langelier Saturation Index (LSI) of +2. A portion of the carbon dioxide must be removed to reduce the lime dose needed for stabilization. If the water is not stabilized, it will be very corrosive and will not be suitable for recycled water uses or groundwater recharge. In order to remove carbon dioxide, water is distributed over media packed in the decarbonator towers. Air flow through the media strips the carbon dioxide and other volatile compounds. Liquid lime is then dosed to add calcium and alkalinity, thereby increasing the pH.

F. **Chemical Systems**: Chemicals are used throughout the processing of the water. Membrane cleaning systems, water stabilization, and treatment involve chemical usage. Chemicals for this project are split into *continuously fed* chemicals and *batch cleaning* chemicals. Continuously fed chemicals are flow paced. These chemicals include hydrogen peroxide, sulfuric acid, threshold inhibitor, and liquid lime. Batch cleaning chemicals include sodium hypochlorite, sodium hydroxide, citric acid, and sodium bisulfite.

PUMP STATION, AND TRANSMISSION OF RECYCLED WATER

14. The finished water pump station will provide the AWPF-treated water to the recycled water transmission lines. Initially, the finished water pump station will have two duty pumps and one standby pump. Each of the finished water pumps will be provided with variable frequency drives. The finished water pump station discharge header also will be provided with a flow meter to monitor the amount of finished water delivered from the AWPF.

15. Recycled water will be distributed through a combination of existing and new transmission lines. Figures 4 shows existing water facilities in the Oxnard Plain. Figures 5 and 6 show the proposed locations of the recycled water transmission lines for Phase 1 (initial) and Phase 2 (build-out) respectively. All pipelines and valves will be installed with purple identification tapes or purple polyethylene vinyl wraps according to "Guidelines for Distribution of Nonpotable Water - American Water Works Association (AWWA) California-Nevada Section" published in 1992.

A. Transmission Lines of Agricultural Irrigation Uses

The following existing transmission lines will be used to distribute recycled water to agricultural users:

a. Recycled water will be distributed through the existing United Water Conservation District (UWCD) Pumping Trough Pipeline (PTP) and Pleasant Valley County Water District (PVCWD) irrigation networks for agricultural irrigation by growers served by these networks.

b. Recycled water will be distributed through either (1) the existing Ocean View Municipal Water District (OVMWD) potable pipeline for agricultural irrigation by growers along this pipeline, or (2) a new parallel pipeline. The supply to meet the potable demand would be replaced by other means if the existing pipeline is converted to nonpotable use.

c. A transmission system to distribute recycled water to duck clubs has not yet been identified.

For Phase 1 of the GREAT Program, the following recycled water delivery system alternatives are:

a. Establish recycled water delivery system to 6.25-mgd capacity.

b. Convert existing OVMWD pipeline from potable to nonpotable use for delivery of recycled water.

c. Construct new OVMWD potable pipeline – 22,300 feet of 12-inch pipeline.

d. Construct tie-in to former OVMWD pipeline – 2,500 feet of 24-inch pipeline.

e. Construct tie-in to pumping-trough pipeline irrigation system for delivery of recycled water.

Phase 2 of the GREAT Program would expand the recycled water delivery system to a 25-mgd capacity.

a. Construct Phase 2 recycled water delivery system – 25,000 feet of 30-inch pipe, parallel to ocean view pipeline to provide a tie-in to the PVCWD.

b. Construct tie-in to PVCWD irrigation system.

These recycled water delivery systems are still in the planning stages. The UWCD, PVCWD, and OVMWD will maintain their own pipeline systems in different stages.

B. Transmission Lines of Municipal and Industrial Uses

The GREAT Program did not consider municipal and industrial use within the City for the recycled water. However, the City recently abandoned the Redwood Trunk Sewer line that extended from the northwestern portion of the City to the Oxnard Plant. The abandoned sewer line could potentially carry a pipe from the AWPF to the northwestern portion of the City and serve municipal and industrial facilities along its route. The future project is called the Recycled Water Backbone System (RWBS).

The transmission lines for both phases and the RWBS line are shown in Figure 7. The distribution area for each line is identified in Figure 7, as well.

APPLICABLE PLANS, POLICIES AND REGULATIONS

16. ***Basin Plan -*** The Regional Board adopted a revised *Water Quality Control Plan for the Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan) on June 13, 1994, and amended by various Regional Board resolutions. This updated and consolidated plan represents the Board's master quality control planning document and regulations. The Basin Plan (i) designates beneficial uses for surface and groundwater, (ii) sets narrative and numerical objectives that must be attained or maintained to protect the designated (existing and potential) beneficial uses and conform to the State's antidegradation policy, and (iii) includes implementation provisions, programs, and policies to protect all waters in the Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. This Order implements the applicable plans, policies, and provisions of the Board's Basin Plan.

17. The beneficial uses of the Ventura Central Groundwater Basin are municipal and domestic supply, industrial process supply, industrial service supply, and agricultural supply.

18. Section 13523 of the California Water Code provides that a Regional Board, after consulting with and receiving recommendations from CDPH or its delegated local health agency, and after any necessary hearing, shall, if it determines such action to be necessary to protect the health, safety, or welfare of the public, prescribe water recycling requirements for water that is used or proposed to be used as recycled water. Section 13523 further provides that the recycling requirements shall include, or be in conformance with, the statewide water recycling criteria established by CDPH pursuant to Water Code section 13521.

19. The City proposes to use recycled water for irrigation and other industrial uses. All these reuse applications could affect the health, safety, and welfare of the public; therefore requirements are necessary.

20. Pursuant to the California Water Code section 13523, the Regional Board has consulted with the CDPH regarding the proposed recycling project and has incorporated its recommendations in this Order.

21. CDPH adopted revised Water Recycling Criteria (Chapter 3, Division 4, Title 22, California Code of Regulations) that became effective on December 2, 2000. Applicable criteria to

this recycling project are prescribed in this Order. The GREAT Program's recycled water is treated through reverse osmosis and disinfection, and exceeds the quality of recycled water required for the applications proposed in this Order.

22. The City had prepared an Engineering Report on its proposed production, distribution, and use of recycled water for irrigation in March 2008, as required by Section 60323 of Title 22, California Code of Regulations. On June 12, 2008, the CDPH provided the Regional Board with comments on the Title 22 Engineering Report.

23. The requirements contained in this Order are in conformance with the goals and objectives of the Basin Plan and implement the requirements of the California Water Code and Water Recycling Criteria.

24. The City prepared and certified the "Final Program Environmental Impact Report", State Clearinghouse No. 2003011045, in compliance with the California Environmental Quality Act (Public Resources Code Section 21000, et seq.). This report was prepared by CH2MHILL for the City of Oxnard in May 2004. The project consists of upgrades to the Oxnard Plant to achieve water recycling and construction of a backbone recycled water distribution system.

25. This issuance of water recycling requirements by a regulatory agency for the protection of the environment is exempt from the provisions of Chapter 3 [commencing with Section 21100, et seq., Division 13 (California Environmental Quality Act), Public Resources Code] in accordance with Section 15308, Title 14, California Code of Regulations.

26. Pursuant to California Water Code section 13320, any aggrieved party may seek review of this Order by filing a petition with the State Board. A petition must be sent to the State Water Resources Control Board, 1001 I Street, Sacramento, California, 95814, within 30 days of adoption of the Order.

The Regional Board has notified the City of Oxnard, interested agencies and persons of its intent to issue Master Water Recycling Requirements for the production, distribution and use of recycled water, and has provided them with an opportunity to submit their written views and recommendations.

The Regional Board, in a public meeting, heard and considered all comments pertaining to these water recycling requirements.

IT IS HEREBY ORDERED that the City of Oxnard shall comply with the following:

I. AWPF INFLUENT SPECIFICATIONS

For purposes of this Order, the AWPF includes Strainer, Microfiltration/Ultrafiltration, Reverse Osmosis, Ultra Violet/Advanced Oxidation and Reduction, Post-Treatment, and Chemical Systems. The influent to the AWPF is secondary treated effluent from the Oxnard Plant.

The influent shall, at all times, be adequately oxidized. The influent shall be considered adequately oxidized when it meets the following characteristics:

1. The monthly average Biochemical Oxygen Demand (BOD_5 20^0C) value does not exceed 30 mg/L. Compliance shall be determined monthly using the average of the analytical results of all 24-hour composite samples taken at least weekly during the month.

2. The monthly average Total Suspended Solids (TSS) concentration does not exceed 30 mg/L. Compliance shall be determined monthly using the average of the analytical results of all 24-hour composite samples taken daily during the month.

II. RECYCLED WATER LIMITATIONS

1. The AWPF-treated recycled water shall not contain constituents with concentrations in excess of the following limits (Table 2):

Table 2 – Recycled Water Limitations

Constituent	Units	Monthly Average	Daily Maximum
Oil and grease	mg/L	10	15
Total dissolved solids	mg/L	--	700
Chloride	mg/L	--	150
Sulfate	mg/L	--	300
Boron	mg/L	--	1.0
Total nitrogen*	mg/L	--	10

Total nitrogen is sum of nitrite-N, nitrate-N, NH_3-N, and organic-N.

2. The turbidity of the reverse osmosis product water prior to disinfection shall not exceed 0.2 NTU more than 5 percent of the time within a 24-hour period and 0.5 at NTU at any time. The turbidity shall be continuously measured with at least one reading every 1.2 hours and recorded. When the turbidity requirements are exceeded, delivery of recycled water shall be suspended until such time the cause of the exceedance has been identified and corrected. The City shall notify and submit a report according to Provision VII.8. of this Order.

3. Recycled water shall be, at all times, adequately disinfected such that the number of total coliform bacteria shall not exceed any of the following, based on daily grab samples:

   A. A 7-day median of 2.2 most probable number (MPN) per 100 milliliters;

   B. 23 MPN per 100 milliliters in more than one sample in any 30 day period prior to delivery of recycled water; and,

   C. 240 MPN per 100 milliliters in any sample prior to delivery of recycled water.

   By March 31, 2011, the City shall send the report to the Regional Board and the CDPH that demonstrates equivalency of UV/AOX disinfection to chlorine disinfection as used in recycled water treatment plants. Equivalency of UV disinfection to a

conventional process used in wastewater recycling and reuse must be demonstrated by the following criteria:

A. Total coliform count equal to or less than 2.2 MPN/100 ml met with the sample statistical frequency as required for chlorine disinfection; and,

B. Virus inactivation efficiency equivalent to that achieved with chlorine disinfection 4 log of inactivation (i.e., 99.99 percent reduction), based on plaque-forming units of F-specific bacteriophage MS2 or polio virus in wastewater.

4. The pH of the recycled water shall be, at all times, within the range of 6.5 to 8.5 pH units. Excursions from this range shall not be considered a violation provided the duration is not more than 10 minutes in a 24-hour period, and the pH shall at all times be within 6 to 9.

5. The recycled water shall not contain trace, toxic and other constituents in concentrations exceeding:,

A. The current applicable Maximum Contaminant Levels (MCLs) for drinking water established by the CDPH included in the Attachments A-1 to A-5;

B. Any new Federal or State MCL upon adoption; or,

C. At levels that adversely affect the beneficial uses of receiving groundwater.

6. The radioactivity of the recycled water shall not exceed the limits specified in Sections 64441 and 64443, Article 5, Chapter 15, Title 22 of the California Code of Regulations, or subsequent revisions.

7. The recycled water shall not contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect the beneficial uses of the receiving groundwater.

8. The recycled water shall not cause a measurable increase in organic chemical contaminants in the groundwater.

III. SPECIFICATIONS FOR USE OF RECYCLED WATER

1. The AWPF-treated recycled water may be used for the following:

A. Surface irrigation in the following areas:

a. Food crops, including all edible root crops, where the recycled water comes into contact with the edible portion of the crop;

b. Parks and playgrounds;

c. School yards;

d. Residential and freeway landscaping;

e. Unrestricted access golf courses; and

f. Other allowable irrigation applications specified in the Water Recycling Criteria, Chapter 3, Title 22, CCR, provided approval from CDPH and Regional Board Executive Officer are obtained prior to delivery.

B. Industrial or commercial cooling tower;

C. Industrial boiler feed, and;

D. Recreational Impoundments.

2. The recycled water shall not be used for any other uses than those specified in section III.1 unless an engineering report has been submitted for such other uses, except for groundwater recharge reuse, and has been approved in writing by the Executive Officer and CDPH.

3. Recycled water shall not be used for direct human consumption or for the processing of food or drink intended for human consumption.

4. The delivery of recycled water to end-users shall be subject to CDPH approval and/or its delegated local agency.

5. The dual plumped system may be used to deliver recycled water to end-users. The detailed dual plumped system requirements are available at Section V. of this Order.

IV. USE AREA REQUIREMENTS

Use area is an area of recycled water use with defined boundaries, which may contain one or more facilities where recycled water is used. The City shall be responsible to ensure that all users of recycled water comply with the following:

1. All use areas where recycled water is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following wording: “RECYCLED WATER – DO NOT DRINK”. Each sign shall display an international symbol similar to that shown in Figure 8 to alert people who do not read English.

2. No physical connection shall be made or allowed to exist between any recycled water piping and any piping conveying potable water, except as allowed under Section 7604 of Title 17, California Code of Regulations.

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

4. Recycled water use shall not result in earth movement in geologically unstable areas.

5. No impoundment or recycled water holding ponds of disinfected recycled water shall occur within 100 feet of any domestic water wells, potable water reservoirs, and streams used as sources of water supply.

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

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

   B. A chlorine, or other, biocide shall be used to treat the cooling system recirculating water to minimize the growth of *Legionella* and other microorganisms.

7. No irrigation areas with recycled water shall be located within 50 feet of any domestic water supply well unless all of the following conditions have been met:

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

   B. The well contains an annular seal that extends from the surface into the aquitard;

   C. The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities;

   D. The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well; and,

   E. The owner of the well approves of the elimination of the buffer zone requirement.

8. No irrigation shall take place within 50 feet of any reservoir or stream used as a source of domestic water.

9. Use of recycled water shall comply with the following:

   A. Recycled water shall be applied at such a rate and volume as not to exceed vegetative demand and soil moisture conditions. Special precautions must be taken to: prevent clogging of spray nozzles, prevent over-watering, and minimize the production of run-off. Pipelines shall be maintained so as to prevent leakage;

   B. Any irrigation runoff shall be confined to the recycled water use area and shall not be allowed to escape as surface flow, unless the runoff does not pose a public health threat and is authorized under a National Pollutant Discharge Elimination

System (NPDES) permit issued by this Regional Board. For the purpose of this requirement, however, minor amounts of irrigation return water from peripheral areas shall not be considered a violation of this Order;

C. Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities, and shall not contact any drinking water fountain and public present. Drinking water fountains must be equipped with hoods or covers;

D. Recycled water shall not be used for irrigation during periods of rainfall and/or run-off.

E. Recycled water used for irrigation shall not be allowed to run off into recreational lakes unless it meets the criteria for such lakes.

F. Recycled water use should be limited to times when public is not present.

10. All above ground irrigation appurtenances need to be marked appropriately.

11. The area using recycled water shall be inspected annually by the City.

12. Supervisors must be appointed for the recycled water use areas and their staff must be trained on the hazards of working with recycled water and periodically retrained.

13. The City will develop the User Agreements and Ordinances with the potential agricultural, industrial, and recreational users of recycled water. Copies of the User Agreements and Ordinances shall be provided to the Regional Board and the CDPH for review and approval.

14. If the recycled water system lateral pipelines are located along the property lines of homeowners, there may be a potential for cross connections. A buffer zone between the recycled water lines and the property owners is necessary. However, if the City cannot maintain adequate control of the recycled water system pipelines, the pipelines will need to be relocated or a physical barrier needs to be installed to prevent this type of potential problem. The homeowners need to be educated on the use of recycled water in the area. The City shall specify a plan to interface with the homeowners as a part of the Rules of Service Agreement in an adjacent property awareness program. The City shall submit this plan to the Regional Board and the CDPH by March 31, 2009 for review and approval.

V. REQUIREMENTS FOR DUAL PLUMBED SYSTEM

1. The public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed recycled water system unless the connection between the two systems is protected by an air gap separation that complies with the requirements of Sections 7602 (a) and 7603 (a) of Title 17, California Code of Regulations.

   Air gaps shall be at least twice the pipe diameter and be located above ground.

2. The City shall not deliver recycled water for any internal use to any individually-owned residential units, including free-standing structures and multiplexes, with the exception of condominium projects pursuant to Section 13553 of the California Water Code as enacted on October 12, 2007.

3. The City shall not deliver recycled water for internal use, except for fire suppression system, to any facility that produces or processes food products or beverages.

4. The City shall not deliver recycled water to a facility using a dual plumbed system unless the report required under Section 13522.5 of the Water Code, which meets the requirements set forth in section IV.8 and/or IV.9., has been submitted to, and approved by, the Regional Board and CDPH.

5. The City that shall submit a report to CDPH pursuant to Section 13522.5 of the Water Code and Section 60414 of the Health and Safety Code, which shall contain the following information for dual plumbed systems, in addition to the information required by Section 60323 of Title 22 of the California Code of Regulations:

   A. A detailed description of the intended use site identifying the following:

      a. The number, location, and type of facilities within the use area proposing to use dual plumbed systems;

      b. The average number of persons estimated to be served by each facility on a daily basis;

      c. The specific boundaries of the proposed use site including a map showing the location of each facility to be served;

      d. The person or persons responsible for operation of the dual plumbed system at each facility; and

      e. The specific use to be made of the recycled water at each facility.

   B. Plans and specifications describing the following:

      a. Proposed piping system to be used;

      b. Pipe locations of both recycled and potable systems;

      c. Type and location of the outlets and plumbing fixtures that will be accessible to the public; and

      d. The methods and devices to be used to prevent backflow of recycled water into the public water system.

   C. The methods to be used by the City to assure that the installation and operation of the dual plumbed system will not result in cross connections between the recycled water piping system and the potable water piping system. These shall

include a description of pressure, dye or other test methods to be used to test the system every four years.

6. Prior to the initial operation of the dual-plumbed recycled water system and annually thereafter, the dual plumbed system within each facility and use site shall be inspected for possible cross connections with the potable water system. The recycled water system shall also be tested for possible cross connections at least once every four years. The testing shall be conducted in accordance with the method described in section III.5.c. above. The inspections and the testing shall be performed by a cross connection control specialist certified by the California-Nevada section of the American Water Works Association or an organization with equivalent certification requirements. A written report documenting the result of the inspection and testing for the prior year shall be submitted to the CDPH within 30 days following completion of the inspection or testing.

7. Any backflow prevention device installed to protect the public water system serving the dual-plumbed recycled water system shall be inspected and maintained in accordance with Section 7605 of Title 17, California Code of Regulations.

VI. GENERAL REQUIREMENTS

1. Bypass, discharge, or delivery to the use area of inadequately treated wastewater, at any time, is prohibited.

2. The recycling facility shall be adequately protected from inundation and damage by storm flows and run-off.

3. Adequate freeboard and/or protection shall be maintained in the recycled water storage tanks, process tanks, and impoundments to ensure that direct rainfall will not cause overtopping.

4. The wastewater treatment and use of recycled water shall not cause pollution or nuisance.

5. The wastewater treatment and use of recycled water shall not result in problems caused by breeding of mosquitoes, gnats, midges, or other pests.

6. The use of recycled water shall not impart tastes, odors, color, foaming, or other objectionable characteristics to the receiving groundwater.

7. The use of recycled water, which could affect the receiving ground water, shall not contain any substance in concentration toxic to human, animal, or plant life.

8. Odors of sewage origin shall not be perceivable beyond the limits of the property owned or controlled by the City and/or recycled water user.

VII. PROVISIONS

1. This Order includes the attached "Standard Provisions Applicable to Waste Discharge Requirements". If there is any conflict between provisions stated hereinbefore and said "Standard Provisions", those provisions stated hereinbefore prevail.

2. This Order includes the attached Monitoring and Reporting Program. If there is any conflict between provisions stated in the Monitoring and Reporting Program and the Standard Provisions, those provisions stated in the Monitoring and Reporting Program prevail.

3. A copy of these requirements shall be maintained at the water recycling facility so as to be available at all times to operating personnel.

4. The City shall furnish each purveyor and user of recycled water a copy of these requirements and ensure that the requirements are maintained at the purveyor and user's facilities so as to be available at all times to operating personnel.

5. The City shall be responsible to ensure that all users of recycled water comply with the specifications and requirements for such use.

6. The City shall, at all times, properly operate and maintain all treatment facilities and control systems (and related appurtenances) that are installed or used by the City to achieve compliance with the conditions of this Order. Proper operation and maintenance includes: effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls (including appropriate quality assurance procedures).

7. The City shall submit to the Regional Board and CDPH, for approval of the Executive Officer, within 90 days of adoption of this Order an operating and maintenance management plan, including a preventive (fail-safe) procedure and contingency plan for controlling accidental discharge and/or delivery to users of inadequately treated wastewater.

8. For any violation of requirements in this Order, the City shall notify CDPH and the Regional Board within 24 hours of knowledge of the violation either by telephone or electronic mail. This notification shall be followed by a written report within 5 working days of notification, unless otherwise specified in this Order. The report shall include, but not limited to, the following information, as appropriate:

   A. Nature and extent of the violation;

   B. Date and time: when the violation started, when compliance was achieved; and, when delivery was suspended and restored, as applicable.

   C. Duration of violation;

   D. Cause/s of violation;

E. Corrective and/or remedial actions taken and/or will be taken with time schedule for implementation; and

F. Impact of the violation.

9. Supervisors and operators of the wastewater recycling facility shall possess a certificate of appropriate grade as specified in Title 23, California Code of Regulations, Section 3680 or subsequent revisions.

10. In accordance with Section 13522.5 of the California Water Code, and Title 22, Division 4, Chapter 3, Article 7, Section 60323 of the California Code of Regulations, the City shall file an engineering report, prepared by a properly qualified engineer registered in California, of any material change or proposed change in character, location or volume of the recycled water or its uses to the Regional Board and to the CDPH.

11. For any extension or expansion of the recycled water system or use areas, the City shall submit a report detailing the extension or expansion plan for approval of the CDPH. Following construction, as-built drawings shall be submitted to the CDPH for approval prior to delivery of recycled water. The Executive Officer shall be furnished with as-built drawings and a copy of the CDPH approval.

12. The City shall notify the Executive Officer, in writing, at least 30 days in advance of any proposed transfer of ownership and/or operation of the recycling facility and responsibility for complying with this Order. The notice shall include a written agreement between the existing and new recycled water producer indicating the specific date for the transfer of responsibility for compliance with this Order. The agreement shall include an acknowledgement that the City is liable for any violations that occurred up to the transfer date and the new recycled water producer is liable from the transfer date on.

13. The City shall allow the Regional Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

A. Enter upon the City's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;

B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

D. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order, or as otherwise authorized by the California Water Code, any substances or parameters at any location.

14. The City must comply with all conditions of these water recycling requirements. Violations may result in enforcement actions, including Regional Board orders or

court orders, requiring corrective action or imposing civil monetary liability, or in modification or revocation of these requirements.

15. These requirements do not exempt the City from compliance with any other laws, regulations, or ordinances that may be applicable; they do not legalize the recycling and use facilities; and they leave unaffected any further constraint on the use of recycled water at certain site/s that may be contained in other statutes or required by other agencies.

16. This Order does not alleviate the responsibility of the City to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency. Expansion of the recycling facility shall be contingent upon issuance of all necessary requirements and permits, including a conditional use permit.

17. The provisions of these water recycling requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

18. In an enforcement action, it shall not be a defense by the City that it would have been necessary to halt or to reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the City shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided. This provision applies, for example, when the primary source of power of the treatment facility fails, is reduced, or is lost.

19. After notice and opportunity for a hearing, this Order may be modified, revoked and reissued, or terminated for cause, which include but is not limited to: failure to comply with any condition of in this Order; endangerment of human health or environment resulting from the permitted activities in this Order; obtaining this Order by misrepresentation or failure to disclose all relevant facts; acquisition of new information that could have justified the application of different conditions if known at the time of Order adoption.

    The filing of a request by the City for modification, revocation and reissuance, or termination of the Order; or a notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

20. The City shall furnish, within a reasonable time, any information the Regional Board or the CDPH may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The City shall also furnish the Regional Board, upon request, with copies of records required to be kept under this Order.

VIII. EFFECTIVE DATE OF ORDER

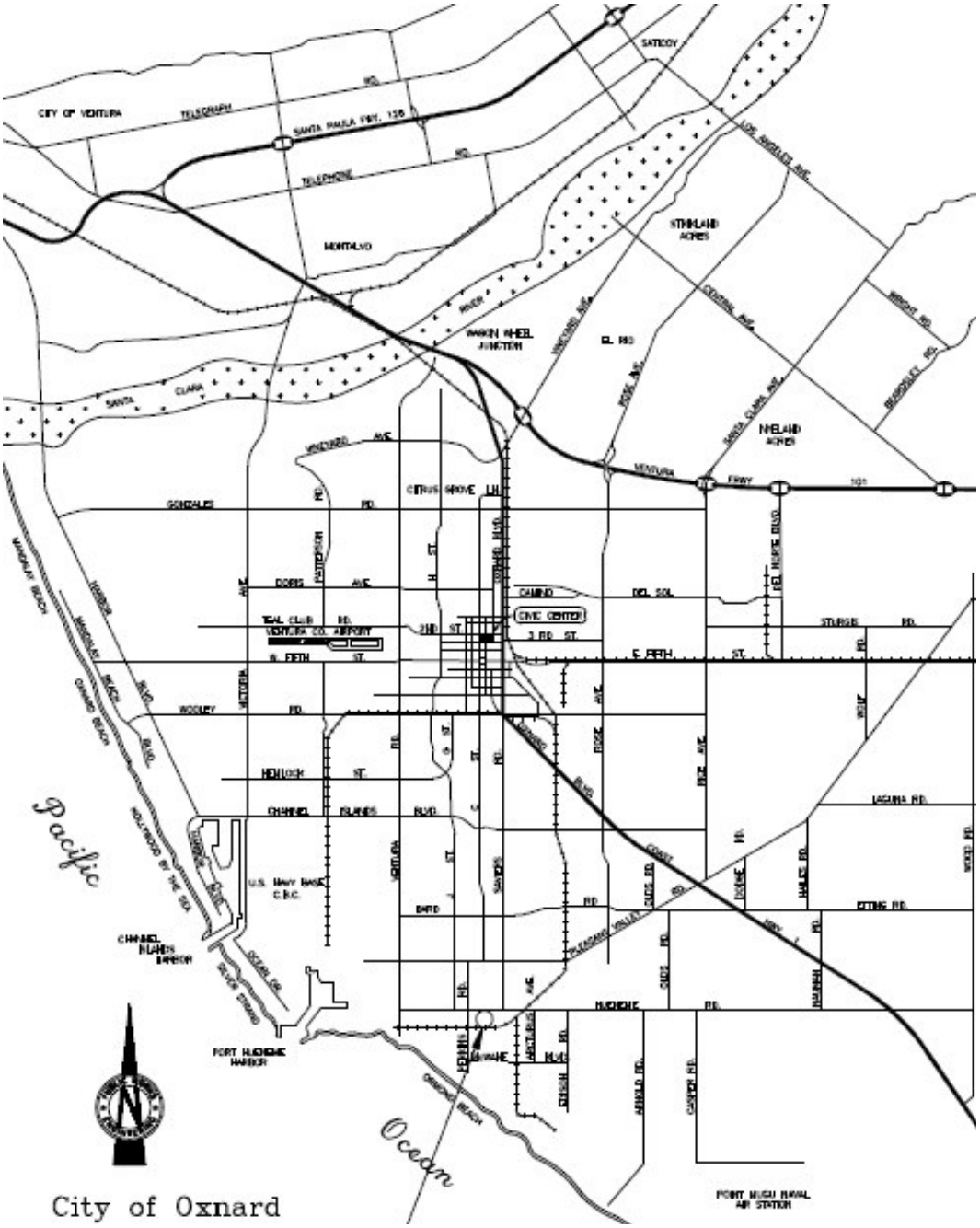
This Order takes effect upon adoption.

I, Tracy J. Egoscue, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region on October 2, 2008.

Tracy J. Egoscue
Executive Officer

/DTSAI

FIGURE 1 – VICINITY MAP



OXNARD WASTEWATER TREATMENT PLANT AND ADVANCED WASTEWATER PURIFICATION FACILITY

FIGURE 2 – FLOW SCHEMATIC AT OXNARD WASTEWATER TREATMENT PLANT

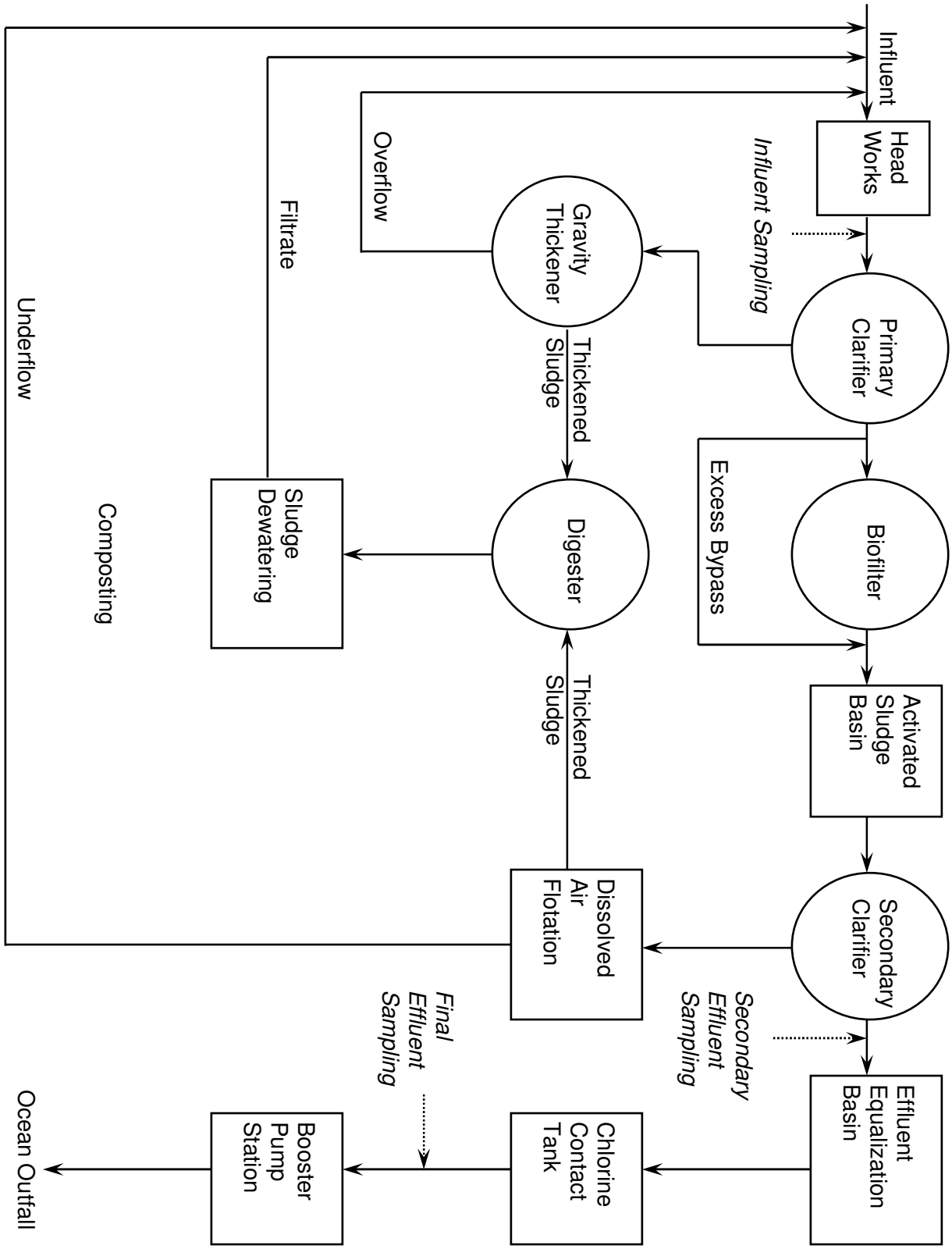


FIGURE 3 – ADVANCED WASTEWATER PURIFICATION PROCESS

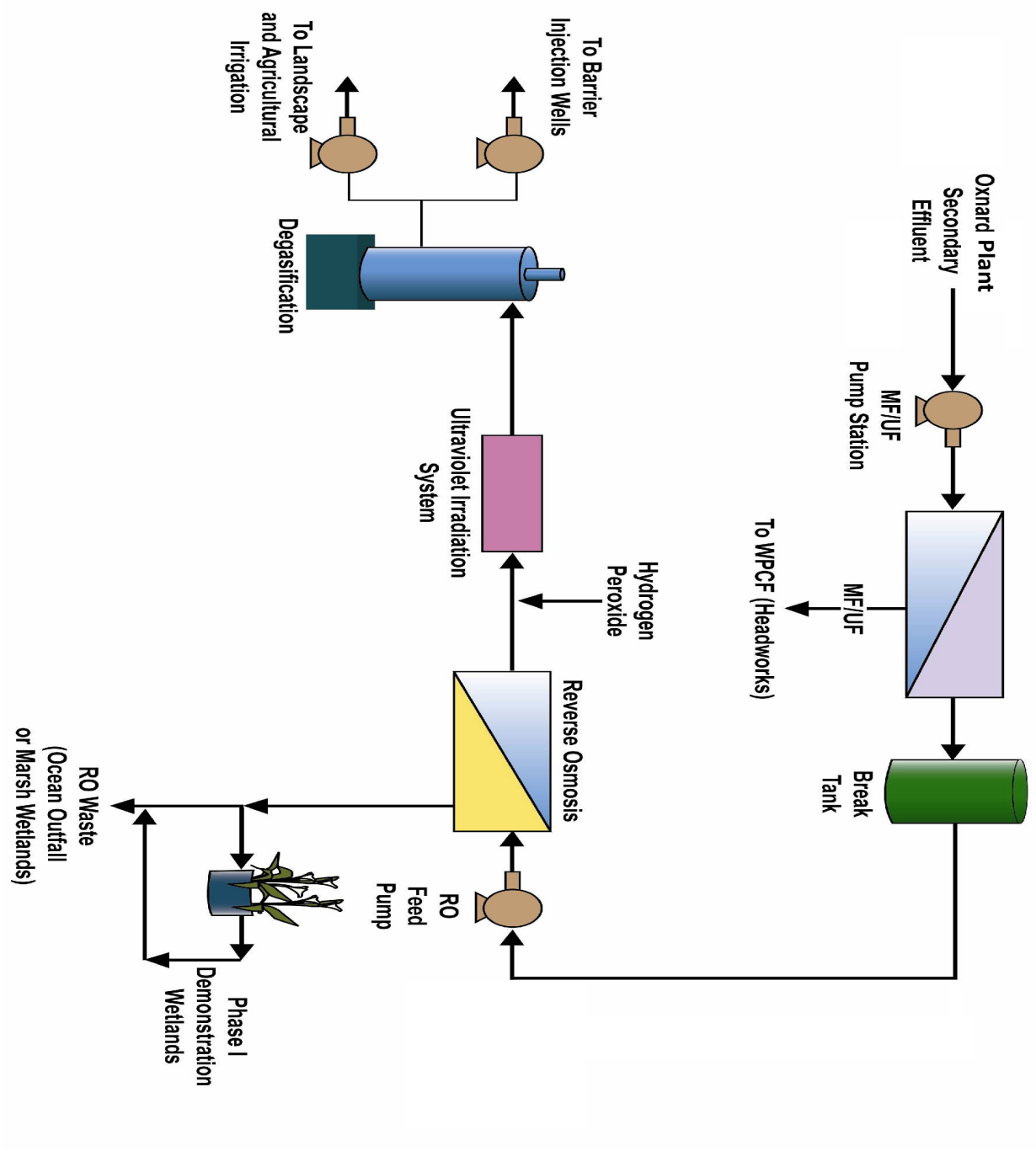


FIGURE 4 – EXISTING WATER FACILITIES IN OXNARD PLAIN

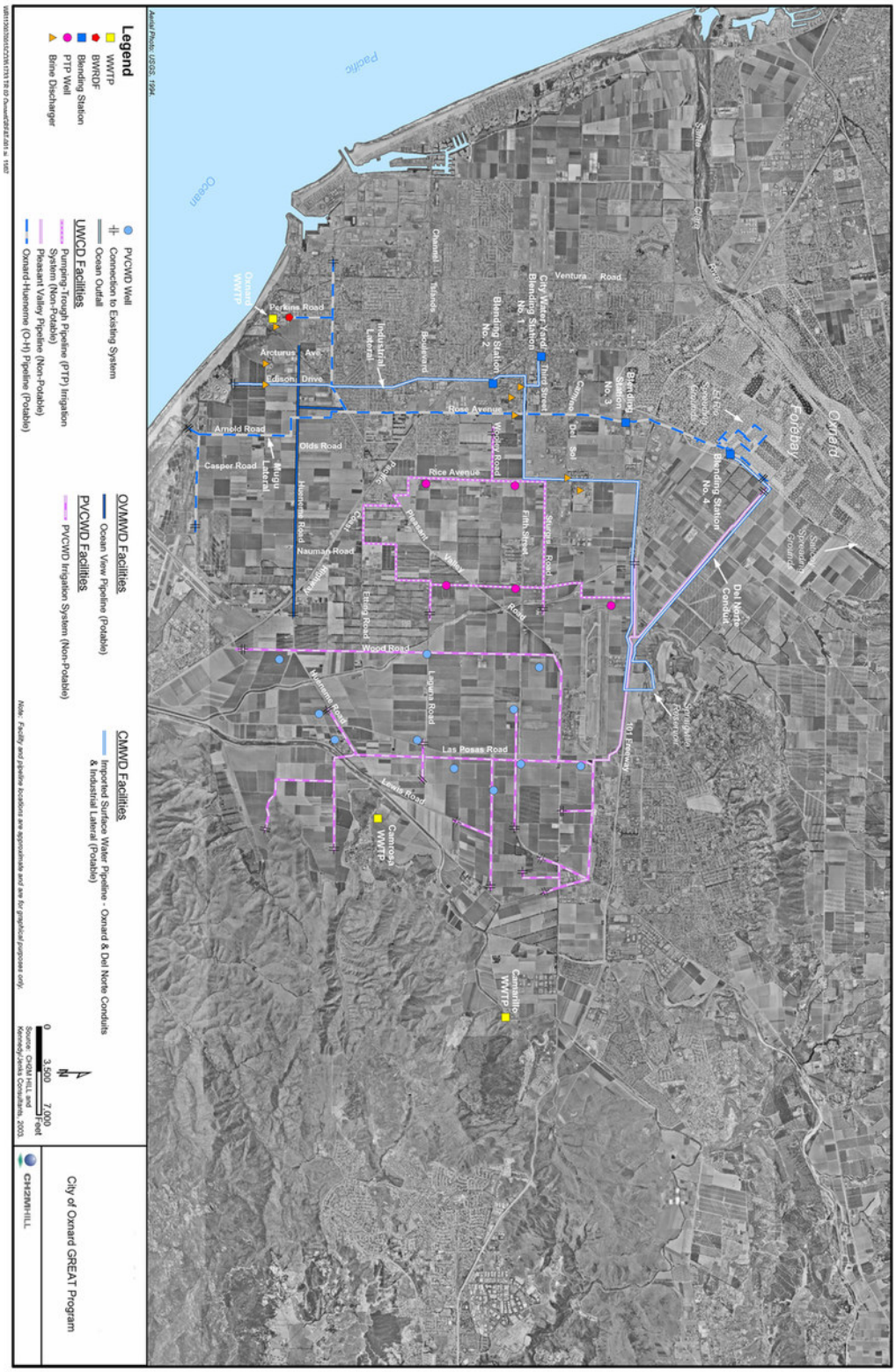


FIGURE 5 – PHASE 1 RECYCLED WATER TRANSMISSION

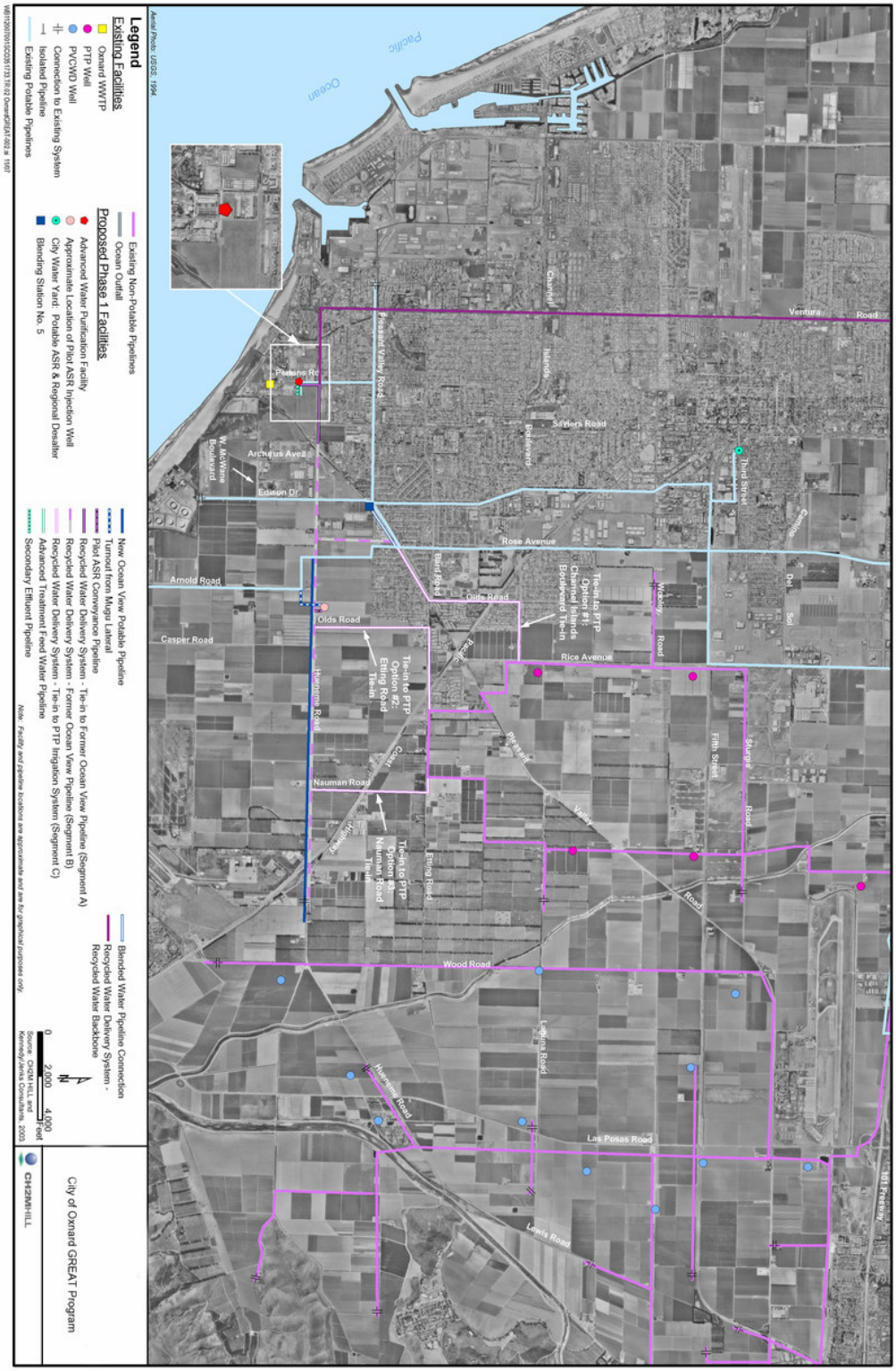


FIGURE 6 – PHASE 2 RECYCLED WATER TRANSMISSION

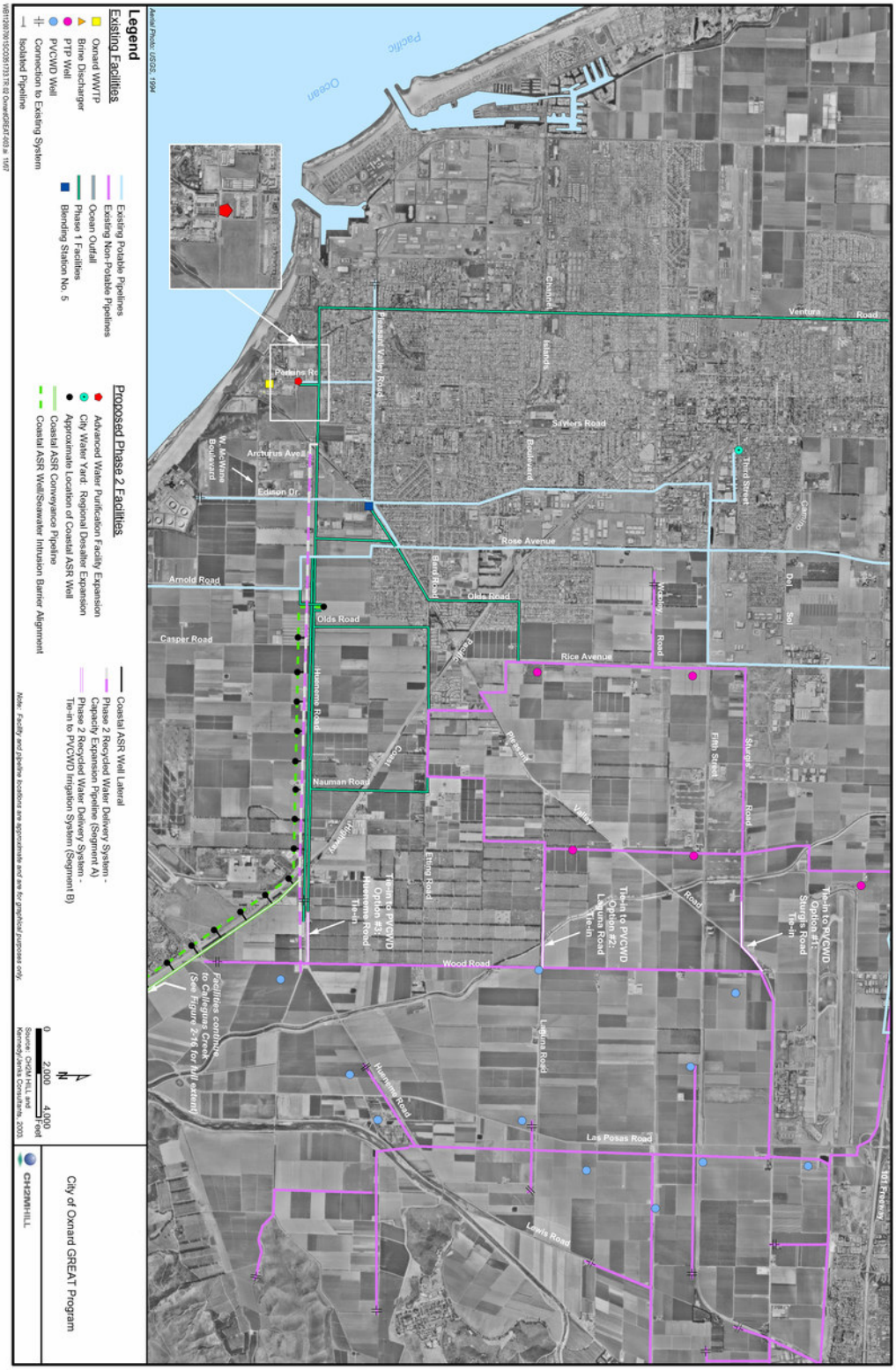
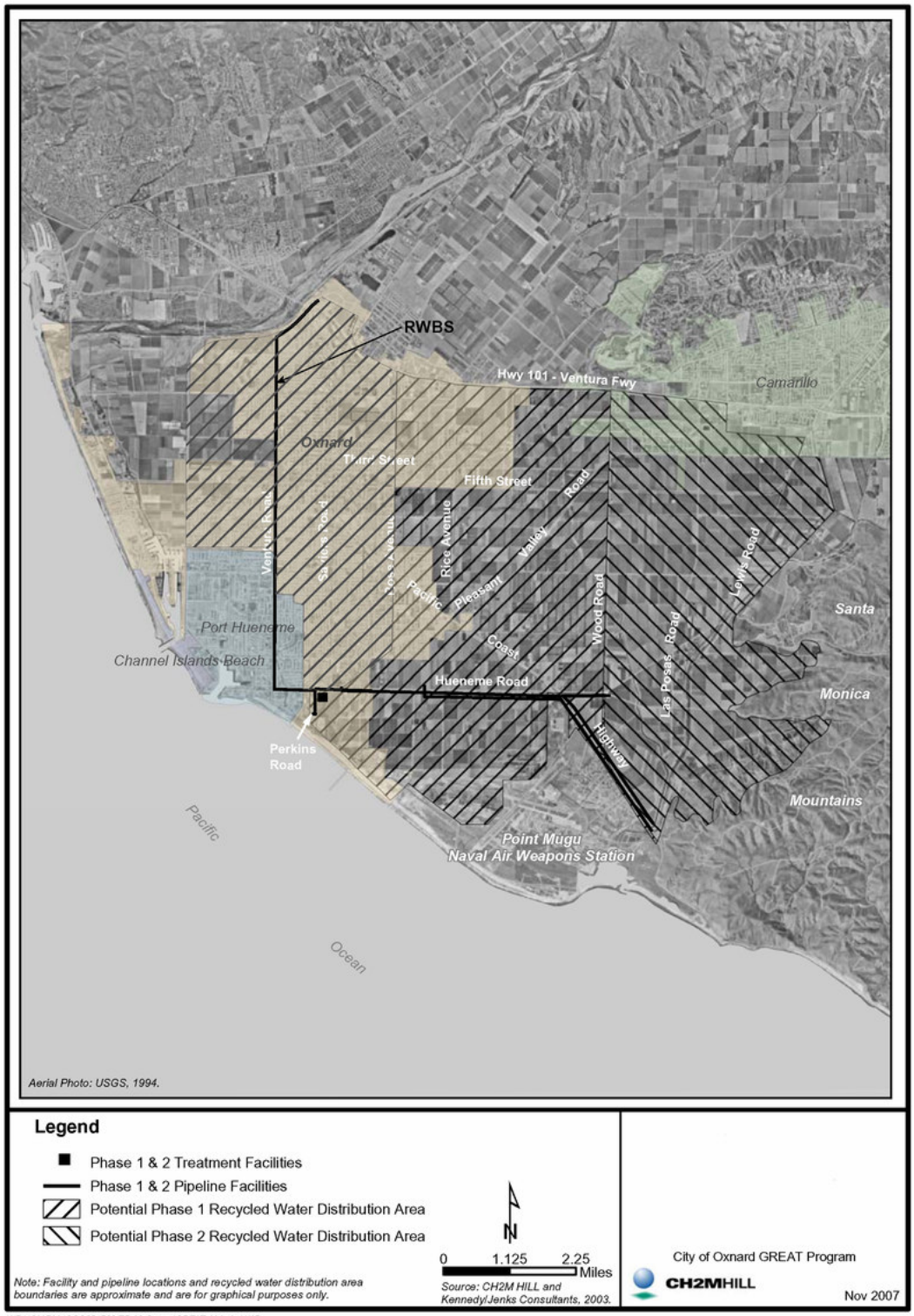


FIGURE 7 – RECYCLED WATER DISTRIBUTION AREA



WB112007001SCO351733.TR.02 OxnardGREAT-004.ai 11/07

FIGURE 8 – EXHIBITION OF "RECYCLED WATER – DO NOT DRINK"

APPENDIX D – RECYCLED WATER ORDINANCE 2728

CITY COUNCIL OF THE CITY OF OXNARD
ORDINANCE NO. 2728

ORDINANCE ESTABLISHING REQUIREMENTS FOR USE OF RECYCLED WATER

WHEREAS, the City of Oxnard ("city") owns and operates its municipal water supply system; and

WHEREAS, the city's mission as a water supplier is to provide a reliable and affordable drinking water supply of good quality; and

WHEREAS, to meet the community's existing demand for water, the city relies on both local and imported water supplies, which include groundwater produced and treated from city facilities, groundwater purchased from the United Water Conservation District, and imported supplies purchased from the Calleguas Municipal Water District, a member agency of the Metropolitan Water District of Southern California; and

WHEREAS, the city, with a current population of over 200,000 residents, is the largest city in Ventura County and is expected to continue to grow; and

WHEREAS, as part of its planning process, the city has determined that the development of additional water supply sources is necessary to continue meeting community water supply needs; and

WHEREAS, limitations on the use of local groundwater resources, the anticipated increase in the cost of imported water, the desire to optimize the use of local water resources, and to improve the overall water supply security and reliability also justify the city's development of additional water supply sources; and

WHEREAS, the water resources division has developed capital facilities projects that involve reconstruction of existing or construction of new facilities, which will allow

the city to continue to provide cost-effective, reliable water service to current and future customers; and

WHEREAS, the water resources division has developed the Groundwater Recovery Enhancement and Treatment Program ("GREAT Program"), which is designed to provide additional local water resources for the benefit of city customers and other regional water users through water recycling and reuse, groundwater injection and recovery, groundwater desalination, and wetlands enhancement to more efficiently utilize existing local water resources; and

WHEREAS, the water resources division prepared the GREAT Program Advanced Planning Study, which concluded that the GREAT Program can provide reliable, cost-effective, and good quality water supplies; and

WHEREAS, the city council has previously adopted a Water Master Plan, which contemplates the development of the GREAT Program; and

WHEREAS, the city council certified the GREAT Program Programmatic Environmental Impact Report ("GREAT Program PEIR"), which analyzed the environmental impacts of the GREAT Program; and

WHEREAS, portions of the GREAT Program are under construction and staff anticipates that advanced treated (highly purified), recycled water will be available for use by late 2009; and

WHEREAS, statewide policy mandates the development of programs and facilities to recycle water to supplement existing water supplies and assist in meeting future water demands (Water Code, § 13510) and the conservation of all available water

resources requires the maximum reuse of water for beneficial uses (Water Code, § 461); and

WHEREAS, by developing and utilizing recycled water, the city can reduce its need for additional imported water supplies and augment local groundwater supplies; and

WHEREAS, with the availability of highly purified recycled water, certain uses of potable water may be considered unreasonable; and

WHEREAS, in implementing the legislative mandates of Water Code sections 13550 and 13551 and Government Code sections 65601 through 65607, recycled water is to be used for suitable, non-potable purposes whenever and wherever it is available, and the city is to plan for its use in areas and instances where recycled water will be available in the future; and

WHEREAS, the city has completed a feasibility study for a municipal and industrial recycled water backbone system ("Recycled Water Study"), which evaluates the alignment of a municipal and industrial recycled water distribution system, along with the most probable customers located along the system alignment that may use material quantities of recycled water; and

WHEREAS, the city has completed the environmental review associated with the Recycled Water Study and the adoption of this ordinance.

NOW, THEREFORE, the City Council of the City of Oxnard does hereby find as follows:

1. Pursuant to California Environmental Quality Act ("CEQA") guidelines section 15164, the adoption of this ordinance requires the preparation and approval of an addendum to the GREAT Program PEIR for the following reasons:

a. An addendum to a certified EIR is appropriate if minor technical changes or modifications to the project occur where the changes or modifications do not result in any new significant impacts or a substantial increase in the severity of previously identified significant impacts.

b. The addendum demonstrates that the environmental analysis, impacts, and mitigation requirements identified in the GREAT Program PEIR remain substantively unchanged as a result of the project modifications contemplated through implementation of this ordinance.

c. This ordinance does not result in any new significant impacts or a substantial increase in the severity of any impacts previously identified in the GREAT Program PEIR.

NOW, THEREFORE, the City Council of the City of Oxnard does ordain as follows:

Part I. The following definitions are added to Section 22-1 of the Oxnard City Code, to be included alphabetically along with the existing provisions of that section:

(A) RECYCLED WATER MASTER PLAN - The plan to be developed and periodically updated by the water resources division manager, which provides detailed procedures, rules and regulations to implement the policies and mandates of this ordinance.

(B) POTABLE WATER - Water that conforms to federal, state, and local standards for human consumption.

(C) RECYCLED WATER - Highly purified water that, as a result of the treatment of wastewater, is suitable for a direct beneficial use, subject to the restrictions in this ordinance and applicable state and federal laws and regulations.

(D) CITY-OWNED RECYCLED WATER FACILITIES - The city-owned facilities intended to provide for the delivery of recycled water only, that are separate from any potable water distribution system, up to and including the point of connection to the customer's on-site recycled water facilities which point of connection is usually the meter assembly at the customer's point of service.

(E) ON-SITE RECYCLED WATER FACILITIES - The customer-owned facilities used to make use of recycled water, that are separate from any potable distribution system, downstream of the point of connection from the city-owned recycled water facilities.

(F) RECYCLED WATER USE AREA - An area identified in the recycled water master plan that can presently or may in the future use recycled water in lieu of potable water.

(G) MANAGER - The manager of the water resources division.

(H) WASTEWATER - Water discharged from city customers into the city wastewater collection system that contains dissolved or suspended matter.

(I) WATER RESOURCES DIVISION - The water resources division of the city.

(J) MANDATORY RECYCLED WATER USE AREA - Any area within each recycled water use area which is designated for mandatory recycled water use by the recycled water master plan.

Part II. Article X ("Wheeling Services") of Chapter 22 of the Oxnard City Code is hereby repealed in its entirety and a new Article X is adopted to read as follows:

"ARTICLE X: RECYCLED WATER USE":

SEC. 22-175. SHORT TITLE.

This article shall be known and cited as the "City of Oxnard Recycled Water Use Ordinance".

SEC. 22-176. FINDINGS.

(A) The people of the State of California have a primary interest in the development of programs and facilities to recycle water to supplement existing water supplies and assist in meeting future water demands. The conservation of all available water resources requires the maximum reuse of water for beneficial uses.

(B) Implementing these state policies is in the best interests of the city and its residents and businesses. This ordinance is necessary to further these policies, to ensure the long-term integrity and reliability of the common water supplies in the region, and to preserve the health, safety and welfare of the community.

(C) The city is developing, and will own and operate recycled water distribution facilities, providing highly purified recycled water for irrigation, groundwater recharge and approved municipal and industrial uses within and adjacent to the city's sphere of influence.

(D) By developing and utilizing recycled water, the city can reduce its need for additional imported water and local groundwater supplies. Where recycled water is available, certain uses of potable water may be considered unreasonable or wasteful.

(E) The purpose of this ordinance is to promote water conservation and recycled water use, to ensure the maximum public benefit from the use of city water supplies.

SEC. 22-177. POLICIES AND PURPOSE

(A) In implementing the mandates of Water Code sections 13550 and 13551 and Government Code sections 65601 through 65607, the policy of the city is that: (1) recycled water shall be used for suitable, non-potable purposes whenever and wherever recycled water is available at a reasonable cost and of an adequate quality, and (2) prior planning for the use of recycled water will enable the city to maximize its reasonable and beneficial use.

(B) The intent of the city council in adopting this ordinance is that recycled water shall be used whenever it is available at a reasonable cost and of an adequate quality because doing so is in the best interests of public health, safety and welfare, and provides a beneficial use to customers and the community. The city council reserves the right to require customers to use recycled water in lieu of potable water for all approved uses, consistent with state law. This mandate applies to existing and potential new customers.

(C) Recycled water shall be used in a manner that complies with all applicable laws, ordinances, and regulations, and in circumstances that will:

(1) Replace the use of potable water supplies in instances where the use of recycled water is available at a reasonable cost and of an adequate quality;

(2) Reduce the discharge of water from city facilities to the ocean;

(3) Prevent direct human consumption of recycled water;

(4) Not result in any material negative impact to the environment; and

(5) Prevent the run-off of recycled water from irrigated areas.

SEC. 22-178. POWERS AND DUTIES OF MANAGER

(A) The manager shall be primarily responsible for implementing this ordinance. The manager may delegate this responsibility to appropriate representatives or agents of the city.

(B) The manager shall set and enforce regulations necessary to implement and enforce this ordinance by developing and periodically updating the recycled water master plan, as provided in section 22-179.

(C) The manager shall coordinate efforts between the city and other local, regional, state, or federal agencies to implement this ordinance, and otherwise ensure that the city maximizes the production and use of recycled water to the extent practical.

SEC. 22-179. RECYCLED WATER MASTER PLAN

(A) Within one year of the effective date of this ordinance, the manager shall prepare and present to the city manager for adoption a recycled water master plan. The recycled water master plan shall be updated periodically, as the manager determines necessary to maintain consistency with local, state and federal laws, regulations and policies with respect to recycled water. The city manager shall approve all substantive updates to the recycled water master plan.

(B) The recycled water master plan shall include, but not be limited to, the following:

(1) Policies encouraging the use of recycled water.

(2) General rules and regulations governing the distribution and use of recycled water.

(3) Standards to which all city owned and on-site recycled water distribution facilities must conform.

(4) An evaluation of the location and size of present and future recycled water treatment facilities, distribution pipelines, pump stations, reservoirs, and other related facilities, including cost estimates and potential financing methods.

(5) Identification of those areas within and adjacent to the city's sphere of influence where recycled water may be used.

(6) For each recycled water use area, or use type within each recycled water use area, identification of those areas within which or types of uses where recycled water use shall be mandatory.

(7) Identification of resources and recommendations of specific measures to assist recycled water users in financing recycled water use projects, including, but not limited to, identifying incentives, discounts in water rates, and other measures.

(8) A public awareness program to educate the public about, and promote the safe use of recycled water.

(9) Best management practices, standards, protocols, and guidelines to ensure that recycled water use at each on-site recycled water facility is conducted safely and consistently with all local, state and federal laws and regulations. These best management practices shall include comprehensive rules and guidelines regarding: operational controls; conversion requirements; cross-connection controls; posting of

notices; worker education and protection; facilities use and maintenance; supervisory controls; and notification requirements.

SEC. 22-180. MANDATORY RECYCLED WATER USE.

Within each mandatory recycled water use area identified in the recycled water master plan:

(A) For suitable uses, no customer shall use water from any other source when recycled water is available. The procedures provided in Section 22-181 shall be utilized to convert existing potable water uses to recycled water, where appropriate; and

(B) The city shall condition the permitting of all new customers to include the construction of on-site recycled water facilities so that recycled water use is maximized.

SEC. 22-181. CONVERSION OF EXISTING POTABLE WATER SERVICE.

(A) Based upon the designation of mandatory water reuse areas, or the commencement of the design of new city owned recycled water facilities, the manager shall make a determination as to which existing potable water uses shall be converted to use recycled water. Each affected customer shall be notified of the basis for the determination to convert to mandatory recycled water service, as well as the proposed conditions and schedule for the conversion.

(B) The notice of the manager's determination, including the proposed conditions and time schedule for compliance, shall be sent to the customer using certified mail.

(C) The customer may file an objection with the manager within thirty days of the delivery of the notice of determination, and may request reconsideration or modification of the determination, proposed conditions or schedule for conversion to

recycled water use. The objection must be in writing and specify the reasons for the objection.

(D) The manager's determination shall be final if the customer does not file an objection within the thirty-day period. The manager shall review the objection, meet with the customer as appropriate, and shall, within thirty days of the filing of the notice of objection, confirm, modify, or abandon the determination. The customer may appeal the manager's determination as provided by Section 22-6.

SEC. 22-182. DEVELOPMENT AND WATER SERVICE APPROVALS.

(A) Upon application for any new industrial, commercial, or residential subdivision or building permit located within a designated recycled water use area, the manager shall, based upon the recycled water master plan, make a determination whether the proposed use of the property shall include the use of recycled water. Based upon this determination, all applicable subdivisions and building permits may include, as a condition of approval, the requirement for construction of: (1) recycled water transmission facilities which shall be dedicated to the city as city-owned recycled water facilities, and (2) on-site recycled water facilities, as may be necessary to allow for the delivery and use of recycled water.

(B) On a case-by-case basis, when a customer applies for a permit for the alteration or remodeling of multi-family, commercial, or industrial structures, the manager shall make a determination whether the project permit shall include, as a condition of approval, the requirement for construction of on-site recycled water facilities necessary to allow for the delivery and use of recycled water.

(C) Any customer may request the manager to make a determination whether recycled water may be used in lieu of potable water for all or some portion of the customer's water uses. The manager shall review such requests on a case-by-case basis and make a determination consistent with the recycled water master plan.

SEC. 22-183. RECYCLED WATER USE; PREVENTION OF IMPROPER USE.

The manager shall implement all appropriate methods of inspection, public education, individual customer on-site training, and monitoring that may be necessary to ensure that recycled water is used in a manner that poses no risk to human health and safety, and no material negative impact to the environment. At a minimum, the manager shall:

(A) As a part of any development or building permit requiring the construction of on-site recycled facilities, impose a condition requiring compliance with all applicable federal, state and local recycled water use laws and regulations.

(B) Review the plans for the on-site recycled facilities and non-recycled water distribution systems and conduct appropriate field inspections during construction.

(C) Ensure that recycled water shall not be supplied to any customer until the customer is in compliance with applicable statutory and regulatory requirements.

SEC. 22-184. SANCTIONS.

(A) Any person who violates any provision of this ordinance shall, for each day of violation, or portion thereof, be subject to a fine not exceeding $1000. In addition, the city may discontinue water service to the customer. Each day that each violation is committed or allowed to continue shall constitute a separate offense.

(B) The use of recycled water in any manner in violation of this ordinance or applicable statutes or regulations is hereby declared a public nuisance and shall be corrected or abated as ordered by the city manager. Any person creating such a public nuisance may be charged with a misdemeanor.

(C) The city may seek to enjoin the use of recycled water in violation of this ordinance or in a manner that otherwise causes or threatens to cause a condition of nuisance.

(D) The enforcement actions authorized by this ordinance are in addition to, and do not supersede, any other remedies available under city, state, or federal laws applicable to activities subject to this ordinance, and any other remedies available under law.

Part III. SEVERABILITY.

If any section, paragraph, sentence, clause, or phrase of this ordinance or any part thereof, is for any reason held unconstitutional, invalid, or ineffective by any court of competent jurisdiction, said decision shall not affect the validity or effectiveness of the remaining portions of this ordinance, or any part thereof.

Part IV. Within fifteen days after passage, the City Clerk shall cause this ordinance to be published one time in a newspaper of general circulation in the City. Ordinance No. 2728 was read on November 21, 2006, and finally adopted on November 28, 2006, to become effective thirty days thereafter.

PASSED AND ADOPTED this 28th day of November, 2006, by the following vote:

AYES: Councilmembers Flynn, Herrera, Holden, Maulhardt and Zaragoza.

NAYS: None.

ABSENT: None.

ABSTAIN: None.

Dr. Thomas E. Holden
Mayor

ATTEST:

Daniel Martinez
City Clerk

APPROVED AS TO FORM:

11-09-06

Gary L. Gillig
City Attorney

APPENDIX E – 2009 STATE OF CALIFORNIA RECYCLED WATER POLICY

Recycled Water Policy

1. *Preamble*

California is facing an unprecedented water crisis.

The collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River and failing levees in the Delta to create a new reality that challenges California's ability to provide the clean water needed for a healthy environment, a healthy population and a healthy economy, both now and in the future.

These challenges also present an unparalleled opportunity for California to move aggressively towards a sustainable water future. The State Water Resources Control Board (State Water Board) declares that we will achieve our mission to "preserve, enhance and restore the quality of California's water resources to the benefit of present and future generations." To achieve that mission, we support and encourage every region in California to develop a salt/nutrient management plan by 2014 that is sustainable on a long-term basis and that provides California with clean, abundant water. These plans shall be consistent with the Department of Water Resources' Bulletin 160, as appropriate, and shall be locally developed, locally controlled and recognize the variability of California's water supplies and the diversity of its waterways. We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and maintenance of supply infrastructure and the use of stormwater (including dry-weather urban runoff) in these plans; these sources of supply are drought-proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater. To this end, we adopt the following goals for California:

- Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.
- Increase the use of stormwater over use in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.
- Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

As modified by
State Water Board Resolution 2013-0003
(January 22, 2013)

The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in Water Code section 13050(n), in a manner that implements state and federal water quality laws. The State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

When used in compliance with this Policy, Title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2. *Purpose of the Policy*

   a. The purpose of this Policy is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

   b. It is the intent of the State Water Board that all elements of this Policy are to be interpreted in a manner that fully implements state and federal water quality laws and regulations in order to enhance the environment and put the waters of the state to the fullest use of which they are capable.

   c. This Policy describes permitting criteria that are intended to streamline the permitting of the vast majority of recycled water projects. The intent of this streamlined permit process is to expedite the implementation of recycled water projects in a manner that implements state and federal water quality laws while allowing the Regional Water Boards to focus their limited resources on projects that require substantial regulatory review due to unique site-specific conditions.

   d. By prescribing permitting criteria that apply to the vast majority of recycled water projects, it is the State Water Board's intent to maximize consistency in the permitting of recycled water projects in California while also reserving to the Regional Water Boards sufficient authority and flexibility to address site-specific conditions.

   e. The State Water Board will establish additional policies that are intended to assist the State of California in meeting the goals established in the preamble to this Policy for water conservation and the use of stormwater.

f. For purposes of this Policy, the term "permit" means an order adopted by a Regional Water Board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements, master reclamation permits, and waste discharge requirements.

3. *Benefits of Recycled Water*

The State Water Board finds that the use of recycled water in accordance with this Policy, that is, which supports the sustainable use of groundwater and/or surface water, which is sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

4. *Mandate for the Use of Recycled Water*

a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 *et seq.*, it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 *et seq*. The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California.

5. *Roles of the State Water Board, Regional Water Boards, CDPH and CDWR*

The State Water Board recognizes that it shares jurisdiction over the use of recycled water with the Regional Water Boards and with CDPH. In addition, the State Water Board recognizes that CDWR and the CPUC have important roles to play in encouraging the use of recycled water. The State Water Board believes that it is important to clarify the respective roles of each of these agencies in connection with recycled water projects, as follows:

a. The State Water Board establishes general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The State Water Board exercises general oversight over recycled water projects, including review of Regional Water Board permitting practices, and shall lead the effort to meet the recycled water use goals set forth in the Preamble to this Policy. The State Water Board is also charged by statute with developing a general permit for irrigation uses of recycled water.

b. The CDPH is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions needed to protect human health.

c. The Regional Water Boards are charged with protection of surface and groundwater resources and with the issuance of permits that implement CDPH recommendations, this Policy, and applicable law and will, pursuant to paragraph 4 of this Policy, use their authority to the fullest extent possible to encourage the use of recycled water.

d. CDWR is charged with reviewing and, every five years, updating the California Water Plan, including evaluating the quantity of recycled water presently being used and planning for the potential for future uses of recycled water. In undertaking these tasks, CDWR may appropriately rely on urban water management plans and may share the data from those plans with the State Water Board and the Regional Water Boards. CDWR also shares with the State Water Board the authority to allocate and distribute bond funding, which can provide incentives for the use of recycled water.

e. The CPUC is charged with approving rates and terms of service for the use of recycled water by investor-owned utilities.

6. *Salt/Nutrient Management Plans*

a. Introduction.

(1) Some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable Water Quality Control Plans (Basin Plans), and not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt or nutrients. These conditions can be caused by natural soils/conditions, discharges of waste, irrigation using surface water, groundwater or recycled water and water supply augmentation using surface or recycled water. Regulation of recycled water alone will not address these conditions.

(2) It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans

rather than through imposing requirements solely on individual recycled water projects.

b. Adoption of Salt/ Nutrient Management Plans.

(1) The State Water Board recognizes that, pursuant to the letter dated December 19, 2008 and attached to the Resolution adopting this Policy, the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff.

(a) It is the intent of this Policy for every groundwater basin/sub-basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality. It is also the intent of the State Water Board that because stormwater is typically lower in nutrients and salts and can augment local water supplies, inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans is critical to the long-term sustainable use of water in California. Inclusion of stormwater recharge is consistent with State Water Board Resolution No. 2005-0006, which establishes sustainability as a core value for State Water Board programs and also assists in implementing Resolution No. 2008-0030, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

(b) Salt and nutrient plans shall be tailored to address the water quality concerns in each basin/sub-basin and may include constituents other than salt and nutrients that impact water quality in the basin/sub-basin. Such plans shall address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects.

(c) Such plans may be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority.

(d) Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.

(e) The requirements of this paragraph shall not apply to areas that have already completed a Regional Water Board approved salt and nutrient plan for a basin, sub-basin, or other regional planning area that is functionally equivalent to paragraph 6(b)3.

(f) The plans may, depending upon the local situation, address constituents other than salt and nutrients that adversely affect groundwater quality.

(2) Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

(3) Each salt and nutrient management plan shall include the following components:

(a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

(i) The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

(ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

(b) A provision for annual monitoring of Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.

(c) Water recycling and stormwater recharge/use goals and objectives.

(d) Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.

(e) Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.

(f) An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

(4) Nothing in this Policy shall prevent stakeholders from developing a plan that is more protective of water quality than applicable standards in the Basin Plan. No Regional Water Board, however, shall seek to modify Basin Plan objectives without full compliance with the process for such modification as established by existing law.

7. *Landscape Irrigation Projects*[1]

a. *Control of incidental runoff.* Incidental runoff is defined as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence. Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a National Pollutant Discharge Elimination System (NPDES) permit, including municipal separate storm water system permits, but regardless of the regulatory instrument, the project shall include, but is not limited to, the following practices:

(1) Implementation of an operations and management plan that may apply to multiple sites and provides for detection of leaks, (for example, from broken sprinkler heads), and correction either within 72 hours of learning of the runoff, or prior to the release of 1,000 gallons, whichever occurs first,

(2) Proper design and aim of sprinkler heads,

(3) Refraining from application during precipitation events, and

(4) Management of any ponds containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and there is notification of the appropriate Regional Water Board Executive Officer of the discharge.

b. *Streamlined Permitting.*

(1) The Regional Water Boards shall, absent unusual circumstances (i.e., unique, site-specific conditions such as where recycled water is proposed to be used for irrigation over high transmissivity soils

---

[1] Specified uses of recycled water considered "landscape irrigation" projects include any of the following:
i. Parks, greenbelts, and playgrounds;
ii. School yards;
iii. Athletic fields;
iv. Golf courses;
v. Cemeteries;
vi. Residential landscaping, common areas;
vii. Commercial landscaping, except eating areas;
viii. Industrial landscaping, except eating areas; and
ix. Freeway, highway, and street landscaping.

over a shallow (5' or less) high quality groundwater aquifer), permit recycled water projects that meet the criteria set forth in this Policy, consistent with the provisions of this paragraph.

(2) If the Regional Water Board determines that unusual circumstances apply, the Regional Water Board shall make a finding of unusual circumstances based on substantial evidence in the record, after public notice and hearing.

(3) Projects meeting the criteria set forth below and eligible for enrollment under requirements established in a general order shall be enrolled by the State or Regional Water Board within 60 days from the date on which an application is deemed complete by the State or Regional Water Board. For projects that are not enrolled in a general order, the Regional Water Board shall consider permit adoption within 120 days from the date on which the application is deemed complete by the Regional Water Board.

(4) Landscape irrigation projects that qualify for streamlined permitting shall not be required to include a project specific receiving water and groundwater monitoring component unless such project specific monitoring is required under the adopted salt/nutrient management plan. During the interim while the salt management plan is under development, a landscape irrigation project proponent can either perform project specific monitoring, or actively participate in the development and implementation of a salt/nutrient management plan, including basin/sub-basin monitoring. Permits or requirements for landscape irrigation projects shall include, in addition to any other appropriate recycled water monitoring requirements, monitoring for priority pollutants in the recycled water at the recycled water production facility once per year, except when the recycled water production facility has a design production flow for the entire water reuse system of one million gallons per day or less. For these smaller facilities, the recycled water shall be monitored for priority pollutants once every five years.

(5) It is the intent of the State Water Board that the general permit for landscape irrigation projects be consistent with the terms of this Policy.

c. *Criteria for streamlined permitting*. Irrigation projects using recycled water that meet the following criteria are eligible for streamlined permitting, and, if otherwise in compliance with applicable laws, shall be approved absent unusual circumstances:

(1) Compliance with the requirements for recycled water established in Title 22 of the California Code of Regulations, including the requirements for treatment and use area restrictions, together with any other recommendations by CDPH pursuant to Water Code section 13523.

(2) Application in amounts and at rates as needed for the landscape (i.e., at agronomic rates and not when the soil is saturated). Each irrigation project shall be subject to an operations and management plan, that may apply to multiple sites, provided to the Regional Water Board that specifies the agronomic rate(s) and describes a set of reasonably practicable measures to ensure compliance with this requirement, which may include the development of water budgets for use areas, site supervisor training, periodic inspections, tiered rate structures, the use of smart controllers, or other appropriate measures.

(3) Compliance with any applicable salt and nutrient management plan.

(4) Appropriate use of fertilizers that takes into account the nutrient levels in the recycled water. Recycled water producers shall monitor and communicate to the users the nutrient levels in their recycled water.

8. *Recycled Water Groundwater Recharge Projects*

a. The State Water Board acknowledges that all recycled water groundwater recharge projects must be reviewed and permitted on a site-specific basis, and so such projects will require project-by-project review.

b. Approved groundwater recharge projects will meet the following criteria:

(1) Compliance with regulations adopted by CDPH for groundwater recharge projects or, in the interim until such regulations are approved, CDPH's recommendations pursuant to Water Code section 13523 for the project (e.g., level of treatment, retention time, setback distance, source control, monitoring program, etc.).

(2) Implementation of a monitoring program for CECs that is consistent with Attachment A and any recommendations from CDPH. Groundwater recharge projects shall include monitoring of recycled water for priority pollutants twice per year.

c. Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, *provided* that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with CDPH, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001.

d. Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater.

e. Projects that utilize surface spreading to recharge groundwater with recycled water treated by reverse osmosis shall be permitted by a Regional Water Board within one year of receipt of recommendations from CDPH. Furthermore, the Regional Water Board shall give a high priority to review and approval of such projects.

9. *Antidegradation*

a. The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the Legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.

b. Activities involving the disposal of waste that could impact high quality waters are required to implement best practicable treatment or control of the discharge necessary to ensure that pollution or nuisance will not occur, and the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

c. Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, the State Water Board finds that groundwater recharge projects using recycled water have the potential to lower water quality within a basin. The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:

(1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall calculate the impacts of the project or projects over at least a ten year time frame.

(2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An

integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

d. Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.

(1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

(2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin).

10. *Constituents of Emerging Concern*

a. General Provisions

(1) Regulatory requirements for recycled water shall be based on the best available peer-reviewed science. In addition, all uses of recycled water must meet conditions set by CDPH.

(2) Knowledge of risks will change over time and recycled water projects must meet legally applicable criteria. However, when standards change, projects should be allowed time to comply through a compliance schedule.

(3) The state of knowledge regarding CECs is incomplete. There needs to be additional research and development of analytical methods and surrogates to determine potential environmental and public health impacts. Agencies should minimize the likelihood of

CECs impacting human health and the environment by means of source control and/or pollution prevention programs.

(4) Regulating most CECs will require significant work to develop test methods and more specific determinations as to how and at what level CECs impact public health or our environment.

b. Research Program

(1) The State Water Board, in consultation with CDPH, convened a "blue-ribbon" advisory panel to guide future actions relating to CECs.

(a) The panel was actively managed by the State Water Board and was composed of the following: one human health toxicologist, one environmental toxicologist, one epidemiologist, one biochemist, one civil engineer familiar with the design and construction of recycled water treatment facilities, and one chemist familiar with the design and operation of advanced laboratory methods for the detection of emerging constituents. Each of these panelists had extensive experience as a principal investigator in their respective areas of expertise.

(b) The panel reviewed the scientific literature and submitted a report to the State Water Board and CDPH that described the current state of scientific knowledge regarding the risks of CECs to public health and the environment. In December 2010, the State Water Board, in coordination with CDPH, held a public hearing to hear a presentation on the report and to receive comments from stakeholders.

(c) The State Water Board considered the panel report and the comments received and adopted an amendment to the Policy establishing monitoring requirements for CECs in recycled water. These monitoring requirements are prescribed in Attachment A.

(2) The panel or a similarly constituted panel shall update the report every five years. The next update is due in June 2015.

(a) Each updated report shall recommend actions that the State of California should take to improve our understanding of CECs and, as may be appropriate, to protect public health and the environment.

(b) The updated reports shall answer the following questions: What are the appropriate constituents to be monitored in recycled water, including analytical methods and method detection limits? What is the known toxicological information for the above constituents? Would the above lists change based on level of treatment and use? If so, how? What are possible indicators that represent a suite of CECs? What levels of CEC's should trigger enhanced monitoring of CEC's in recycled water, groundwater and/or surface waters?

(c) Within six months from receipt of an updated report, the State Water Board shall hold a hearing to consider recommendations from staff and shall endorse the recommendations, as appropriate, after making any necessary modifications.

c. Permit Provisions

Permits for recycled water projects shall be consistent with any CDPH recommendations to protect public health and the monitoring requirements prescribed in Attachment A.

11. *Incentives for the Use of Recycled Water*

a. Funding

The State Water Board will request CDWR to provide priority funding for projects that have major recycling components; particularly those that decrease demand on potable water supplies. The State Water Board will also request priority funding for stormwater recharge projects that augment local water supplies. The State Water Board shall promote the use of the State Revolving Fund (SRF) for water purveyor, stormwater agencies, and water recyclers to use for water reuse and stormwater use and recharge projects.

b. Stormwater

The State Water Board strongly encourages all water purveyors to provide financial incentives for water recycling and stormwater recharge and reuse projects. The State Water Board also encourages the Regional Water Boards to require less stringent monitoring and regulatory requirements for stormwater treatment and use projects than for projects involving untreated stormwater discharges.

c. TMDLs

Water recycling reduces mass loadings from municipal wastewater sources to impaired waters. As such, waste load allocations shall be assigned as appropriate by the Regional Water Boards in a manner that provides an incentive for greater water recycling.

ATTACHMENT A

REQUIREMENTS FOR MONITORING CONSTITUENTS OF EMERGING CONCERN FOR RECYCLED WATER

The purpose of this attachment to the Recycled Water Policy (Policy) is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards) on monitoring requirements for constituents of emerging concern[1] (CECs) in recycled municipal wastewater, herein referred to as "recycled water." The monitoring requirements and criteria for evaluating monitoring results in the Policy are based on recommendations from a Science Advisory Panel[2]. The monitoring requirements pertain to the production and use of recycled water for groundwater recharge reuse[3] by surface and subsurface application methods. The monitoring requirements apply to recycled water producers, including entities that further treat or enhance the quality of recycled water supplied by municipal wastewater treatment facilities, and groundwater recharge reuse facilities.

Groundwater recharge by surface application is the controlled application of water to a spreading area for infiltration resulting in the recharge of a groundwater basin. Subsurface application is the controlled application of water to a groundwater basin or aquifer by a means other than surface application, such as direct injection through a well.

The California Department of Public Health (CDPH) shall be consulted for any additional monitoring requirements for recycled water use found necessary by CDPH to protect human health.

---

[1] For this Policy, CECs are defined to be chemicals in personal care products, pharmaceuticals including antibiotics, antimicrobials; industrial, agricultural, and household chemicals; hormones; food additives; transformation products, inorganic constituents; and nanomaterials.

[2] The Science Advisory Panel was convened in accordance with provision 10.b. of the Policy. The panel's recommendations were presented in the report; *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

[3] As used in this attachment, use of recycled water for groundwater recharge reuse has the same meaning as indirect potable reuse for groundwater recharge as defined in Water Code section 13561(c), where it is defined as the planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system.

As modified by
State Water Board Resolution 2013-0003
(January 22, 2013)

1. CECS AND SURROGATES

Within this Policy, CECs of toxicological relevance to human health are referred to as "health-based CECs."[4] CECs determined not to have human health relevance, but useful for monitoring treatment process effectiveness, are referred to as "performance indicator CECs." A performance indicator CEC is an individual CEC used for evaluating a family of CECs with similar physicochemical or biodegradable characteristics. The removal of a performance indicator CEC through a treatment process provides an indication of removal of CECs with similar properties. A health-based CEC may also serve as a performance indicator CEC.

A surrogate is a measurable physical or chemical property, such as chlorine residual or electrical conductivity, that can be used to measure the effectiveness of trace organic compound removal by treatment process and/or provide an indication of a treatment process failure. A reverse osmosis (RO) treatment process, for example, is expected to substantially reduce the electrical conductivity of the recycled water being treated. This reduction in the level of the surrogate also provides an indication that inorganic and organic compounds, including CECs, are being removed.

Recycled water monitoring programs used for groundwater recharge reuse shall include monitoring for: (1) human health-based CECs; (2) performance indicator CECs; and (3) surrogates. The purpose of monitoring performance indicator CECs and surrogates is to assess the effectiveness of unit processes to remove CECs. For this policy for groundwater recharge reuse, unit processes that remove CECs include RO, advanced oxidation processes (AOPs), and soil aquifer treatment.[5] AOPs are treatment processes involving the use of oxidizing agents, such as hydrogen peroxide and ozone, combined with ultraviolet light irradiation. Soil aquifer treatment is a natural treatment process that removes CECs as water passes through soil, the vadose zone, and within an aquifer.

This Policy provides CEC monitoring requirements for recycled water which undergoes additional treatment by soil aquifer treatment or by RO followed by AOPs. CEC monitoring requirements for groundwater recharge reuse projects implementing treatment processes that provide control of CECs by processes other than soil aquifer treatment or RO/AOPs shall be established on a case-by-case basis by the State Water Board in consultation with CDPH.

---

[4] Heath-based CECs were determined through a screening process that was developed and conducted by the CEC Science Advisory Panel; *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

[5] For evaluating removal of CECs, the treatment zone for soil aquifer treatment is from the surface of the application area through the unsaturated zone to groundwater, including groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

Monitoring of health-based CECs or performance indicator CECs is not required for recycled water used for landscape irrigation due to the low risk for ingestion of the water.[6]

1.1. CECs for Monitoring Programs

This Policy provides requirements for monitoring CECs in recycled water used for groundwater recharge reuse. The Regional Water Boards shall not issue requirements for monitoring of additional CECs in recycled water beyond the requirements provided in this Policy except when recommended by CDPH or requested by the project proponent.

Table 1 provides the health-based CECs and performance indicator CECs to be monitored along with their respective reporting limits. All CECs listed for a recycled water application shall be monitored during an initial assessment monitoring phase, as described in Section 3.1. Based on monitoring results and findings, the list of performance indicator CECs required for monitoring may be refined for subsequent monitoring phases. The health-based CECs listed in Table 1 shall be monitored during the entirety of the initial assessment and baseline monitoring phases (Sections 3.1 and 3.2). Based on the results of the baseline monitoring phase and/or subsequent monitoring, the list of health-based CECs required for monitoring may be revised. The method for evaluation of monitoring results for health-based CECs is provided in Section 4.2.

Quality assurance and quality control measures shall be used for both collection of samples and laboratory analysis work. The project proponent shall develop a quality assurance project plan that includes the appropriate number of field blanks, laboratory blanks, replicate samples, and matrix spikes.

[6] "For monitoring programs to assess CEC threats for urban irrigation reuse, none of the chemicals for which measurement methods and exposure data are available exceeded the threshold for monitoring priority. This is largely attributable to higher Monitoring Trigger Levels (MTLs), because of reduced water ingestion in a landscape irrigation setting compared to drinking water." MTLs are health-based screening level values for CECs for a particular water reuse scenario. MTLs were established in, *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

Table 1 – CECs to be Monitored

Constituent	Constituent Group	Relevance/Indicator Type	Reporting Limit (µg/L)
GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION			
17β-estradiol	Steroid hormones	Health	0.001
Caffeine	Stimulant	Health & Performance	0.05
N-Nitrosodimethylamine (NDMA)	Disinfection byproduct	Health	0.002
Triclosan	Antimicrobial	Health	0.05
Gemfibrozil	Pharmaceutical	Performance	0.01
Iopromide	Pharmaceutical	Performance	0.05
N,N-Diethyl-meta-toluamide (DEET)	Personal care product	Performance	0.05
Sucralose	Food additive	Performance	0.1
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION			
17β-estradiol	Steroid hormones	Health	0.001
Caffeine	Stimulant	Health & Performance	0.05
NDMA	Disinfection byproduct	Health & Performance	0.002
Triclosan	Antimicrobial	Health	0.05
DEET	Personal care product	Performance	0.05
Sucralose	Food additive	Performance	0.1

µg/L – Micrograms per liter

Analytical methods for laboratory analysis of CECs shall be selected to achieve the reporting limits presented in Table 1. The analytical methods shall be based on methods published by the United States Environmental Protection Agency, methods certified by CDPH, or peer reviewed and published methods that have been reviewed by CDPH, including those published by voluntary consensus standards bodies such as the Standards Methods Committee and the American Society for Testing and Materials International. Any modifications to the published or certified methods shall be reviewed by CDPH and subsequently submitted to the Regional Water Board in an updated quality assurance project plan.

1.2. Surrogates for Monitoring Programs

Table 2 presents a list of surrogates that shall be considered for monitoring treatment of recycled water used for groundwater recharge reuse. Other surrogates not listed in Table 2 may also be considered.

Table 2: Surrogates

GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION
Ammonia
Total Organic Carbon (TOC)
Nitrate
Ultraviolet (UV) Light Absorption
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION
Electrical Conductivity
TOC

The project proponent shall propose surrogates to monitor on a case-by-case basis appropriate for the treatment process or processes. The Regional Water Board shall review and approve the selected surrogates in consultation with CDPH.

Where applicable, surrogates may be measured using on-line or hand-held instruments provided that instrument calibration procedures are implemented in accordance with the manufacturer's specifications and that calibration is documented.

2. MONITORING LOCATIONS

Monitoring locations for CECs and surrogates are described in this section.

2.1. Health-Based CEC Monitoring Locations

2.1.1. Groundwater Recharge Reuse - Surface Application

For groundwater recharge reuse projects implementing surface application of recycled water, health-based CECs shall be monitored at these locations:

(1) Following tertiary treatment[7] prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels downgradient from the application site in 30 days.

[7] Standards for disinfected tertiary recycled water presented in California Code of Regulations, Title 22, section 60301.230 and 60301.320.

Monitoring locations for health-based CECs for the phases of monitoring are presented in Tables 3 through 5.

2.1.2. Groundwater Recharge Reuse - Subsurface Application

For groundwater recharge reuse projects implementing subsurface application of recycled water, health-based CECs shall be monitored at a location following treatment prior to release into an aquifer.

2.2. Performance Indicator CEC and Surrogate Monitoring Locations

To allow evaluation of individual unit processes or a combination of unit processes that provide removal of CECs, performance indicator CECs and surrogates shall be monitored at the locations described below and presented in Tables 3 through 5.

2.2.1. Groundwater Recharge Reuse - Surface Application

For groundwater recharge reuse projects using surface application of recycled water, performance indicator CECs and surrogates shall be monitored at these locations:

(1) Following tertiary treatment prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels downgradient from the application site in 30 days.

Monitoring locations for performance indicator CECs and surrogates for the phases of monitoring are presented in Tables 3 through 5.

2.2.2. Groundwater Recharge Reuse - Subsurface Application

For groundwater recharge reuse projects using subsurface application of recycled water, performance indicator CECs shall be monitored in recycled water at these locations:

(1) Prior to treatment by RO; and

(2) Following treatment prior to release to the aquifer.

If the project proponent can demonstrate that the RO unit will not substantially remove a CEC, the Regional Water Board may allow monitoring for that CEC prior to the AOPs, instead of prior to the RO unit.

For groundwater recharge reuse projects using subsurface application of recycled water, surrogates shall be monitored at locations proposed by the project proponent and approved by the Regional Water Board in consultation with CDPH.

3. PHASED MONITORING REQUIREMENTS

The Regional Water Board shall phase the monitoring requirements for CECs and surrogates for groundwater recharge reuse projects. The purpose of phased monitoring is to allow monitoring requirements for health-based CECs, performance indicator CECs and surrogates to be refined based on the monitoring results and findings of the previous phase. An initial assessment monitoring phase, followed by a baseline monitoring phase, shall be conducted to determine the project-specific monitoring requirements for standard operations. The initial assessment and baseline monitoring phases shall be conducted after CDPH approval for groundwater recharge reuse project operation.

3.1. Initial Assessment Monitoring Phase

The purposes of the initial assessment phase are to: (1) identify the occurrence of health-based CECs, performance indicator CECs, and surrogates in recycled water and groundwater;[8] (2) determine treatment effectiveness; (3) define the project-specific performance indicator CECs and surrogates to monitor during the baseline phase; and (4) specify the expected removal percentages for performance indicator CECs and surrogates. The monitoring requirements for the initial assessment monitoring phase shall apply to the start-up of new facilities, piloting of new unit processes at existing facilities, and existing facilities where CECs and surrogates have not been assessed equivalent to the requirements of this Policy. Data from prior assessment need not replicate the exact frequency and duration of the initial assessment phase requirements specified in Table 3, if the overall robustness and size of the data are sufficient to adequately characterize the CECs, surrogates, and treatment performance. The initial assessment monitoring phase shall be conducted for a period of one year.

During the initial assessment monitoring phase for the applicable recycled water application method, each of the health-based CECs and performance indicator CECs listed in Table 1 and appropriate surrogates (see Section 1.2) shall be monitored. Surrogates shall be selected to monitor individual unit processes or combinations of unit processes that remove CECs. Performance indicator CEC and surrogate monitoring results that demonstrate measurable removal for a given unit process shall be candidates for use in the monitoring programs for the baseline and standard operation phases. Monitoring requirements for the initial assessment phase are summarized in Table 3.

For existing groundwater recharge reuse projects, historic monitoring data may be used to assess the occurrence and removal of CECs and surrogates. Existing projects demonstrating prior assessment of CECs and surrogates equivalent to the initial

[8] The identification of the occurrence of health-based CECs, performance indicator CECs, and surrogates in groundwater only applies to groundwater recharge reuse by surface application.

assessment phase requirements of this Policy may skip the initial monitoring phase and initiate the baseline monitoring phase requirements in Section 3.2.
Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern, such as finding a concentration of a health-based CEC above the thresholds described in Table 7, more frequent monitoring may be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operations. If additional monitoring is required, the Regional Water Board shall consult with CDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on the monitoring results are presented in Section 4.

Following completion of the initial assessment monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the baseline monitoring phase shall be determined on a project-specific basis.

3.2. Baseline Monitoring Phase

Based on the findings of the initial assessment monitoring phase, project-specific performance indicator CECs and surrogates shall be selected for monitoring during the baseline monitoring phase. The purpose of the baseline monitoring phase is to assess and refine which health-based CECs, performance indicator CECs and surrogates are appropriate to monitor the removal of CECs and treatment system performance for the standard operation of a facility. Performance indicator CECs and surrogates that exhibited reduction by unit processes and/or provided an indication of operational performance shall be selected for monitoring during the baseline monitoring phase. Surrogates not reduced through a unit process are not good indicators of the unit's intended performance. For example, soil aquifer treatment may not effectively lower electrical conductivity. Therefore, electrical conductivity may not be a good surrogate for soil aquifer treatment. The baseline monitoring phase shall be conducted for a period of three years following the initial assessment monitoring phase. Monitoring requirements for the baseline phase are summarized in Table 4. If a performance indicator CEC listed in Table 1 is found not to be a good indicator, the project proponent shall propose an alternative performance indicator CEC representative of the constituent group to monitor. This performance indicator CEC shall be subject to approval by the Regional Water Board in consultation with CDPH.

For existing groundwater recharge reuse projects, historic monitoring data may be used to assess removal of health-based CECs, performance indicator CECs and surrogates. Existing projects that can demonstrate prior assessment of CECs and surrogates equivalent to the initial assessment phase and baseline phase requirements of this Policy may be eligible for the standard operation monitoring requirements.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern, such as finding a concentration of a health-based CEC above the thresholds described in Table 7, more frequent monitoring may be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operation. If additional monitoring is required, the Regional Water Board shall consult with CDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on the monitoring results are presented in Section 4.

Following the baseline operation monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the standard operation of a project shall be determined on a project-specific basis.

Table 3: Initial Assessment Phase Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse- Surface Application	Health-Based CECs and Performance Indicator CECs: All listed in Table 1.	Quarterly[1]	- Following tertiary treatment prior to application to surface spreading area. - At monitoring well locations designated in consultation with CDPH.[2]
	Surrogates: To be selected on a project-specific basis.[5]	1st 3 months: To be determined on a project-specific basis.[3]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[2]
		3-12 months: To be determined on a project-specific basis.[3]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[2]
Groundwater Recharge Reuse -Subsurface Application	Health-Based CECs: All listed in Table 1.	Quarterly[1]	Following treatment prior to release to the aquifer.
	Performance Indicator CECs: All listed in Table 1.	Quarterly[1]	- Prior to RO treatment.[4] - Following treatment prior to release to the aquifer.
	Surrogates: To be selected on a project-specific basis.[5]	To be determined on a project-specific basis.	- At locations approved by the Regional Water Board.[6]

1 – This is the initial monitoring frequency for the monitoring and reporting program. The Regional Water Board may require additional monitoring to respond to a concern as stated in Section 3.1.
2 – Groundwater within the distance groundwater travels downgradient from the application site in 30-days.
3 – The monitoring frequency shall be determined by the Regional Water Board in consultation with CDPH. The intent is to have an increased monitoring frequency during the first three months and a decreased monitoring frequency after three months.
4 – If the project proponent can demonstrate that the RO unit will not substantially remove a CEC, the Regional Water Board may allow monitoring for that CEC prior to the AOP, instead of prior to the RO unit.
5 – See Section 1.2 for guidance on selection of surrogates.
6 – See Section 2.2.2 for information on surrogate monitoring locations for subsurface application.

As modified by
State Water Board Resolution 2013-0003
(January 22, 2013)

Table 4: Baseline Phase Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse – Surface Application	Health-Based CECs: All listed in Table 1. Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually[1]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[2]
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase.	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[2]
Groundwater Recharge Reuse – Subsurface Application	Health-Based CECs: All listed in Table 1.	Semi-Annually[1]	Following treatment prior to release to the aquifer.
	Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually[1]	- Prior to RO treatment.[3] - Following treatment prior to release to the aquifer.
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase.	- At locations approved by the Regional Water Board.[4]

1 – More frequent monitoring may be required to respond to a concern as stated in Section 3.2.
2 – Groundwater within the distance groundwater travels downgradient from the application site in 30-days.
3 – If the project proponent can demonstrate that the RO unit will not substantially remove a CEC, the Regional Water Board may allow monitoring for that CEC prior to the AOP, instead of prior to the RO unit.
4 – See Section 2.2.2 for information on surrogate monitoring locations for subsurface application.

As modified by
State Water Board Resolution 2013-0003
(January 22, 2013)

3.3. Standard Operation Monitoring

Based on the findings of the baseline monitoring phase, monitoring requirements for health-based CECs, performance indicator CECs and surrogates may be refined to establish project-specific requirements for monitoring the standard operating conditions of a groundwater recharge reuse project. Monitoring requirements for the standard operation phase are summarized in Table 5. The list of health-based CECs may be revised to remove a health-based CEC from the list if monitoring results meet the conditions of the minimum threshold level presented in Table 7. Performance indicator CECs and surrogates that exhibited reduction by a unit process and/or provided an indication of operational performance shall be selected for monitoring of standard operations. If a performance indicator CEC is found to be a poor indicator, the project proponent shall propose an alternative performance indicator CEC representative of the constituent group to monitor. This performance indicator CEC shall be subject to approval by the Regional Water Board in consultation with CDPH.

Monitoring locations for the standard operation phase shall be the same as the locations used for the baseline monitoring phase.

Monitoring for health-based CECs and performance indicator CECs shall be conducted on a semi-annual basis, unless the project demonstrates consistency in treatment effectiveness in removal of CECs, treatment operational performance, and appropriate recycled water quality. These projects may be monitored for CECs on an annual basis. Monitoring frequencies for CECs and surrogates for standard operation monitoring are presented in Table 5.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern, such as finding a health-based CEC above the thresholds described in Table 7 or a decline in removal of a performance indicator CEC from the performance levels established during the initial and baseline monitoring phases, more frequent monitoring may be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operation. If additional monitoring is required, the Regional Water Board shall consult with CDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on the monitoring results are presented in Section 4.

Table 5: Standard Operation Monitoring Requirement

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse - Surface Application	Health-Based CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually[1]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[2]
	Performance Indicator CECs: Selected based on the findings of the baseline phase.		
	Surrogates: Selected based on the findings of the baseline phase.	Based on findings of the baseline assessment phase.	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[2]
Groundwater Recharge Reuse - Subsurface Application	Health-Based CECs: Selected based on the findings of the baseline phase	Semi-Annually or Annually[1]	-Following ~~RO/AOPs~~ treatment prior to release to the aquifer.
	Performance Indicator CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually[1]	- Prior to RO treatment.[3] - Following treatment prior to release to the aquifer.
	Surrogates: Selected based on the findings of the baseline phase,	Based on findings of the baseline assessment phase.	At locations approved by the Regional Water Board.[4]

1 – More frequent monitoring may be required to respond to a concern as stated in Section 3.3.
2 – Groundwater within the distance groundwater travels downgradient from the application site in 30-days.
3 – If the project proponent can demonstrate that the RO unit will not substantially remove a CEC, the Regional Water Board may allow monitoring for that CEC prior to the AOP, instead of prior to the RO unit.
4 – See Section 2.2.2 for information on surrogate monitoring locations for subsurface application.

As modified by
State Water Board Resolution 2013-0003
(January 22, 2013)

4. EVALUATION OF CEC AND SURROGATE MONITORING RESULTS

This section presents the approaches for evaluating treatment process performance and health-based CEC monitoring results. Monitoring results for performance indicator CECs and surrogates shall be used to evaluate the operational performance of a treatment process and the effectiveness of a treatment process in removing CECs. For evaluation of health-based CEC monitoring results, a multi-tiered approach of thresholds and corresponding response actions is presented in Section 4.2. The evaluation of monitoring results shall be included in monitoring reports submitted to the Regional Water Board and CDPH.

4.1 Evaluation of Performance Indicator CEC and Surrogate Results

The effectiveness of a treatment process to remove CECs shall be evaluated by determining the removal percentages for performance indicator CECs and surrogates. The removal percentage is the difference in the concentration of a compound in recycled water prior to and after a treatment process (e.g., soil aquifer treatment or RO followed by AOPs), divided by the concentration prior to the treatment process and multiplied by 100.

$$\text{Removal Percentage} = ([X_{in} - X_{out}]/X_{in})\ (100)$$

X_{in} - Concentration in recycled water prior to a treatment process
X_{out} - Concentration in recycled water after a treatment process

During the initial assessment, the recycled water project proponent shall monitor performance to determine removal percentages for performance indicator CECs and surrogates. The removal percentages shall be confirmed during the baseline monitoring phase. One example of removal percentages from Drews et. al. (2008) for each application scenario and their associated processes (i.e. soil aquifer treatment or RO/AOPs) is presented in Table 6. The established removal percentages for each project shall be used to evaluate treatment effectiveness and operational performance.

4.1.1. Groundwater Recharge Reuse – Surface Application

For groundwater recharge reuse by surface application, the removal percentage shall be determined by comparing the quality of the recycled water applied to a surface spreading area to the quality of groundwater at monitoring wells. The distance between the application site and the monitoring wells shall be no more than the distance the groundwater travels in 30 days downgradient from the application site. The location of the monitoring wells shall be designated in consultation with CDPH. The removal percentage shall be adjusted to account for dilution from potable water applied to the application site, storm water applied to the application site, and native groundwater. The removal percentage shall also be adjusted to account for CECs in these waters. The project proponent shall submit a proposal to the Regional Water Board and CDPH as part of its operation plan on how it will perform this accounting.

4.1.2. Groundwater Recharge Reuse – Subsurface Application

For groundwater recharge reuse using subsurface application, the removal percentage shall be determined by comparing recycled water quality before treatment by RO/AOPs and after treatment prior to release to the aquifer.

Table 6: Monitoring Trigger Levels and Removal Percentages

Constituent/ Parameter	Relevance/Indicator Type/Surrogate	Monitoring Trigger Level (micrograms/liter)[1]	Removal Percentages (%)[2]
GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION[3]			
17β-estradiol	Health	0.0009	--[4]
Caffeine	Health & Performance	0.35	>90
NDMA	Health	0.01	--
Triclosan	Health	0.35	--
Gemfibrozil	Performance	--	>90
Iopromide	Performance	--	>90
DEET	Performance	--	>90
Sucralose	Performance	--	<25[5]
Ammonia	Surrogate	--	>90
TOC	Surrogate	--	>30
Nitrate	Surrogate	--	>30
UV Absorption	Surrogate	--	>30
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION[6]			
17β-estradiol	Health	0.0009	--
Caffeine	Health & Performance	0.35	>90
NDMA	Health & Performance	0.01	25-50, >80[7]
Triclosan	Health	0.35	--
DEET	Performance	--	>90
Sucralose	Performance	--	>90
Electrical Conductivity	Surrogate	--	>90
TOC	Surrogate	--	>90

1 – Monitoring trigger levels for groundwater recharge reuse and landscape irrigation applications were established in *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.
2 –The removal percentages presented in this table are from work by Drewes et.al. (2008) and provide an example of performance for that specific research. Project specific removal percentages will be developed for each groundwater recharge reuse project during the initial and baseline monitoring phases.
3 – Treatment process: Soil aquifer treatment. The stated removal percentages are examples and need to be finalized during the initial and baseline monitoring phases for a given site.
4 – Not applicable
5 – Sucralose degrades poorly during soil aquifer treatment. It is included here mainly as a tracer.
6 – Treatment process: Reverse osmosis and advanced oxidation process.
7 – For treatment using reverse osmosis, removal percentage is between 25 and 50 percent. For treatment using reverse osmosis and advanced oxidation processes, removal percentage is greater than 80 percent.

As modified by
State Water Board Resolution 2013-0003
(January 22, 2013)

4.2. Evaluation of Health-Based CEC Results

The project proponent shall evaluate health-based CEC monitoring results. To determine the appropriate response actions, the project proponent shall compare measured environmental concentrations (MECs) to their respective monitoring trigger levels[9] (MTLs) listed in Table 6 to determine MEC/MTL ratios. The project proponent shall compare the calculated MEC/MTL ratios to the thresholds presented in Table 7 and shall implement the response actions corresponding to the threshold.

For surface application, the results shall be evaluated for groundwater collected from the monitoring wells. For subsurface application projects, results shall be evaluated for the recycled water released to the aquifer.

Table 7: MEC/MTL Thresholds and Response Actions

MC/MTL Threshold	Response Action
If greater than 75 percent of the MEC/MTL ratio results for a CEC are less than or equal to 0.1 during the baseline monitoring phase and/or subsequent monitoring -	A) After completion of the baseline monitoring phase, consider requesting removal of the CEC from the monitoring program.
If MEC/MTL ratio is greater than 0.1 and less than or equal to 1 -	B) Continue to monitor.
If MEC/MTL ratio is greater than 1 and less than or equal to 10 -	C) Check the data. Continue to monitor.
If MEC/MLT ratio is greater than 10 and less than or equal to 100 -	D) Resample immediately and analyze to confirm CEC result. Continue to monitor.
If MEC/MLT ratio is greater than 100 -	E) Resample immediately and analyze to confirm result. Continue to monitor. Contact the Regional Water Board and CDPH to discuss additional actions. (Additional actions may include, but are not limited to, additional monitoring, toxicological studies, engineering removal studies, modification of facility operation, implementation of a source identification program, and monitoring at additional locations.)

[9] Monitoring Trigger Level (MTL): Health-based screening level value for a CEC for a particular water reuse scenario. MTLs were established in, *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

APPENDIX F – RECYCLED WATER USER AGREEMENT FOR PHASE 1A/B

Brownstein Hyatt
Farber Schreck

Memorandum

Robert J. Saperstein
Attorney at Law
805.882.1417 tel
805.965.4333 fax
RSaperstein@bhfs.com

DATE: August 27, 2014

TO: Rob Roshanian
Dan Rydberg

FROM: Robert J. Saperstein

RE: **Summary: Full Advanced Treatment Recycled Water Management and Use Agreement**

The following is an updated summary of the key terms of the "Full Advanced Treatment Recycled Water Management and Use Agreement" proposed for the distribution and use of the City's GREAT Program recycled water, along with charts showing the pricing and major open issues.

Item	Description / Comments
Initial Quantity	• 7,000 acre-feet per year (AFY) of recycled water (RW). Expansion and rights to additional GREAT Program yield is not limited in this agreement.
Term	• 10 years. • If either Replenishment Authority financing or in-City ASR is delayed, the City may re-evaluate GREAT Program operations.
Termination	• City may unilaterally terminate agreement with 18 months notice to users. • City may terminate with material change in GMA policy impacting GREAT Program.
Parties	• Initial parties: Pleasant Valley County Water District (PV), United Water Conservation District (UWCD), and three agricultural entities. • New parties may be added.
Allocation of RW	• Yield allocated as defined below. City's priority is referred to as Priority 1; the other users' priorities are referred to as Priority 2-4 (see below).

Item	Description / Comments
Groundwater Pumping Exchange	• City will receive a Recycled Water Pumping Allocation (RWPA) for each acre-foot of RW delivered that offsets groundwater pumping. • City is currently limited (GMA Resolution 2013-02) in when it can use the RWPA. • RWPA accrues if not used – RWPA never goes away until used.
Priority Between Uses	• Non-city users will receive RW subject to a three tier priority system (Priority 2-4). Pricing (see below) is also graduated to reflect the 3 tiers. • Priority 2 users pay a higher price in exchange for a reliability commitment. This priority will include those users obtaining direct delivery of RW with a capacity commitment (i.e., Houweling, Reiter and Southland). Priority 2 users must set a Second Priority Use Commitment annually. Priority 2 users may not purchase lower cost RW until they purchase the entirety of this annual use amount. • Priority 3 users receive unblended RW on an as available basis. • PV and UWCD receive Priority 4 RW into their distribution systems as end-users of any excess RW beyond the Priority 2 and 3 users.
Pricing	• See pricing table below. Each category will have a higher price when no RWPA is returned to the City, and a lower price that includes the exchange of a RWPA.
Operations	• The City, PV and UWCD will coordinate the management of RW deliveries to agricultural users and ongoing regulatory compliance. UWCD and PV will have primary day-to-day management obligations and will also use their distribution systems for storage and use of RW to the extent Priority 2 and 3 users do not take all the RW.
Permanent Basin Recharge	• UWCD / GMA / or Replenishment Authority (Replenishment Authority) may purchase RWPA from the City for permanent recharge (no pumpback). To purchase RWPA, the Replenish Authority must make a purchase commitment with the City that may be adjusted each year based on hydrologic conditions. (See pricing below.)
AWPF Expansion: Capital	• City will be responsible for the capital costs of any future expansion of and will own and operate the AWPF.
AWPF Expansion: Yield	• Additional yield will be allocated among direct uses within and outside the City, ASR to support the overall program and in-direct potable reuse, and groundwater recharge, and any other allowed uses based on then existing regulatory framework and availability of funds.

Item	Description / Comments
Facilities and Points of Delivery (POD)	• City shall be responsible for any permanent main pipeline extension from the AWPF to individual users, PV and UWCD, along E. Hueneme Rd. • City shall also provide each individual direct user with a single POD, provided it is conveniently located along the main distribution pipeline. Any additional POD's will be at the user's expense. • UWCD shall be responsible for any permitting and capital costs for extension of the current City pipeline in the RiverPark area, to UWCD spreading grounds. City shall make available to UWCD any excess pipeline that might facilitate UWCD's POD in the Forebay.
Permitting	• City shall be responsible for regulatory permitting for use of RW, with the exception of: a) permitting associated with pipeline extensions in the Forebay associated with the UWCD POD in the Forebay, and b) any mitigation associated with recharge of RW in the Forebay. • The City shall prepare the Title 22 report for surface uses of the RW and UWCD shall be responsible for supplementing that report for any recharge activities in the Forebay.
Mitigation in Forebay	• UWCD shall be responsible for any and all mitigation that may be required as a result of use of RW in the Forebay, whether a result of recharge through UWCD's percolation basins, UWCD ASR or direct delivery through any UWCD system in the Forebay. • UWCD shall be responsible for any additional treatment that may be required for direct recharge of RW (i.e., chlorine residual or other requirements).

RW Pricing

RW sales price is established either based on the City Municipal Code recycled water rates, or a rate set in 2014 dollars that is then adjusted annually based on changes in the consumer price index and local GMA and UWCD pump charges.

Priority (1-4)	Initial Price ($/af) (No groundwater pumping allocation exchange – NO pumpback allowed)	Initial Price ($/af) (With 1:1 groundwater pumping allocation exchange)	Comments
1	~$1,350 (based on City Code RW rate)	N/A	In city uses.

Priority (1-4)	Initial Price ($/af) (No groundwater pumping allocation exchange – NO pumpback allowed)	Initial Price ($/af) (With 1:1 groundwater pumping allocation exchange)	Comments
2	Calleguas Tier 1 Rate	$650	Capacity guarantee for direct users making a minimum purchase commitment.
3	Calleguas Tier 1 Rate	$500	As available to direct RW customers.
4	Calleguas Tier 1 Rate	$325 (includes "management discount" of $175)	As available to PTP and PV systems.
RWPA Purchase	Calleguas Tier 1 rate minus Priority 4 with 1:1 rate* (Approx. $900)		Available to Replenishment Authority to purchase RWPA from the City for permanent replenishment.

The following are the major open issues that must resolved before the agreement can be finalized.

Key Open Issues	Description / Comments
Minimum City RWPA Use	• GMA Resolution 2013-02 must be modified to allow the City to pump a minimum amount of RWPA each year. • The proposed "Minimum RWPA" is the quantity of RWPA accrued from offset of groundwater pumping in the Oxnard Plain and Forebay subbasins. • This Minimum RWPA -- presumed to be approximately 2,000 – 5,000 AFY – must be available for City use irrespective of basin conditions. • The Replenishment Authority may purchase of all or some of this Minimum RWPA as described above. • RWPA accrued for groundwater pumping offset in the Pleasant Valley subbasin will accrue until basin conditions allow for pumping. • Once the Replenishment Authority financing is in place, a minimum of 5,000 AFY of RWPA shall be available for City use or sale for permanent recharge.
Timing	• If the SMP is available, RW may be capable of being delivered for direct use within 9 -12 months of confirmation of these terms. A permanent pipeline will likely require 12-18 months or more from confirmation of an agreement. • Until a Replenishment Authority is established, the City shall be allowed to use the Minimum RWPA under all basin conditions.

Key Open Issues	Description / Comments
	• Once the Replenishment Authority is established, the RWPA will be managed through use or RWPA purchase as described above. • Once the in-City ASR facilities are established, the City may rely on ASR for RWPA accrual and use irrespective of basin conditions.
RWPA Purchase Price	• The Replenishment Authority may purchase RWPA from the City for Calleguas Tier 1 rate minus the Priority 4 with 1:1 RWPA rate (about $900/af).
SMP Use	• Calleguas and City must confirm the SMP can be engineered to deliver RW to some direct users, PV and UWCD (PTP).
In-City ASR	• The City will receive 1:1 RWPA for RW injected through its in-City ASR wells, irrespective of groundwater conditions. The City will have discretion to use ASR-stored RW for direct use within the City, sale to RW users under the RW Management Agreement, or sale of the RWPA to the Replenishment Authority for permanent recharge.
GMA Resolution 2013-02	• Resolution 2013-02 provides the City with a RWPA for each AF of RW delivered to an agricultural user who then reduces its groundwater pumping by an equivalent amount (1:1 RWPA for reduced groundwater pumping because of RW use). • Resolution 2013-02 must be revised consistent with the above Minimum RWPA conditions.
RW Contractors	• The 5 entities which whom the City intends to contract must approve modifications to the agreement, since each had last approved (and signed) the contract.
City Council	• The Oxnard City Council must consider the agreement.

CITY OF OXNARD CALIFORNIA

Meeting Date: 01/13/15

ACTION	TYPE OF ITEM
☐ Approved Recommendation	☐ Info/Consent
☐ Ord. No(s). _____	■ Report
☐ Res. No(s). _____	☐ Public Hearing (Info/consent)
☐ Other _____	☐ Other _____

Prepared By: Jay Duncan, Contract & Grant Coordinator Jay Duncan Agenda Item No. K-2

Reviewed By: City Manager DM City Attorney SMF Finance JC Other *(Specify)*

DATE: December 29, 2014

TO: City Council

FROM: Daniel Rydberg, Interim Utilities Director DM
Utilities Department

SUBJECT: **Full Advanced Treatment Recycled Water Management and Use Agreement No. A-7651**

RECOMMENDATION

That City Council approve and authorize the Mayor to execute the Full Advanced Treatment Recycled Water Management and Use Agreement between the City of Oxnard and United Water Conservation District, Pleasant Valley County Water District, Houweling Nurseries, Southland Sod, and Reiter Affiliated Companies (Agreement No. A-7651).

DISCUSSION

The Advanced Water Purification Facility (AWPF) is undergoing its final commissioning process and is anticipated to begin full time operation by Spring 2015. The Phase 1 recycled water (RW) production capacity is 6.25 million gallons per day (mgd) or 7,000 acre-feet per year (AFY). Approximately, 1,500 AFY to 1,800 AFY of this will be delivered directly to existing customers in-lieu of potable water and to the River Ridge Golf Club. The remaining RW will be delivered to agricultural customers and to an aquifer storage and recovery (ASR) well that the City will construct this year. A pipeline is being designed to carry water to the agricultural customers and is anticipated to be completed in late 2017. In the meantime, staff is pursuing temporary use of the Calleguas Mutual Water District (CMWD) Salinity Management Pipeline (SMP). If the State permits this use, the SMP may be used for RW delivery to agricultural customers as soon as Spring 2015.

Future phases of the AWPF may expand its capacity to as much as 25 mgd or 28,000 AFY. Future uses will include: direct delivery to customers in-lieu of potable water, agricultural irrigation, direct and indirect reuse, and groundwater aquifer recharge.

SUMMARY

The Agreement provides for the sale of the full capacity of the Phase 1 GREAT Program. The following is a summary of the key terms of the Agreement.

Issue	Description / Comments
Quantity	7,000 AFY of RW. Right to additional GREAT Program yield is not covered.
Allocation of RW	City has exclusive and highest priority rights to 1,800 AFY. The agricultural entities have rights to the remaining yield (5,200 AFY). City's priority is referred to as Priority 1; the other users' priorities are referred to as Priority 2-4 (see below).
Term	10 years, with certain performance based early termination provisions.
Parties	Initial parties: Pleasant Valley County Water District (PV), United Water Conservation District (UWCD), and three agricultural entities. New parties may be added.
Priority Between Agricultural Uses	Agricultural users to receive RW subject to a three tier priority system (Priority 2-4). Pricing (see below) is also graduated to reflect the 3 tiers. Priority 2 users pay a higher price in exchange for a reliability commitment. Priority 3 users receive unblended RW on an as available basis. PV and UWCD receive Priority 4 RW into their main distribution systems as end-users of any excess RW beyond that used through Priorities 1-3.
Pricing	City (Priority 1) recycled water rate is set by the City Municipal Code. Priority 2-4 pricing is set at the Calleguas Tier 2 imported water rate if the City does not receive a right to pump an equivalent amount of groundwater to the RW delivered. If the City receives a 1:1 groundwater pumping allocation, Priority 2-4 rates are set in the Agreement, subject to annual adjustment. See pricing table below.
Operations	The City will coordinate the management of RW deliveries to agricultural users and ongoing regulatory compliance with PV and/or UWCD.

RW PRICING SUMMARY

RW sales price is presented below. All rates are adjusted annually as provided in the Agreement.

Priority (1-4)	Initial Price ($/af) (No groundwater pumping allocation exchange)	Initial Price (2015) ($/af) (With 1:1 groundwater pumping allocation exchange)
1	~$1,413/af (based on City Resolution 2859 adjusted for 2015 Calleguas rate increase pass through)	n/a
2	$1,340 (Calleguas Tier 2 rate)	$650
3	$1,340 (Calleguas Tier 2 rate)	$500
4	$1,340 (Calleguas Tier 2 rate)	$325 ($500 minus "management discount" of $175)

FOX CANYON GROUNDWATER MANAGEMENT AGENCY (GMA) RESOLUTION SUMMARY 2013-02

The Fox Canyon Groundwater Management Agency (GMA) has already approved Resolution 2013-02, which provides the City with a Recycled Water Pumping Allocation (RWPA) for each AF of RW

delivered to an agricultural user who then reduces its groundwater pumping by an equivalent amount (1:1 RWPA for reduced groundwater pumping because of RW use).

Issue	Description / Comments
Recycled Water Pumping Allocation	City receives 1:1 RWPA for RW that reduces use of groundwater. City receives no RWPA for pumping subject to GMA surcharge. Instead, the City receives payment at the higher price.
Annual Report	Parties must deliver to GMA annual compliance report (comprehensive) each April.
Temporary Suspension of RWPA Use	Temporary suspension is based on low Forebay water levels. RWPA accrues until fully used. RWPA may be pumped up to maximum of 8,000 AFY.
Coordination Meetings	Parties meet annually in May to set RWPA levels for coming year.
Revision to Policy	Minimum 6 months advance notice for any material changes to GMA policy.
User compliance	All RW users must maintain compliance with GMA.

AGREEMENT PARTIES

United Water Conservation District (UWCD) board has approved this agreement pending completion of discussions between UWCD and Pleasant Valley County Water District (PVCWD) on operational issues involving the two agencies. Participation in the agreement by UWCD will have no immediate effect because a pipeline connecting UWCD system to PVCWD system will need to be constructed before their system can receive recycled water.

RECYCLED WATER CONVEYANCE FACILITIES

The Agreement provides for delivery of RW through either the existing Calleguas Salinity Management Pipeline or a permanent pipeline which the City would construct. The authorization requested in this action does not approve the construction of the permanent pipeline.

FINANCIAL IMPACT

The RW rates are structured to recognize the value of groundwater pumping allocations that will accrue to the City in addition to cash payments. Recycled water revenues are estimated to cover operation and maintenance costs. Groundwater pumping allocations will provide a long-term benefit of reduced water purchases in the future to offset the capital costs of the recycled water system.

Attachments
#1 - Agreement No. A-7651

ORIGINAL

Agreement No. A-7651

FULL ADVANCED TREATMENT RECYCLED WATER MANAGEMENT AND USE AGREEMENT

CITY OF OXNARD ("City"), UNITED WATER CONSERVATION DISTRICT ("UWCD"), PLEASANT VALLEY COUNTY WATER DISTRICT ("PVCWD"), HOUWELING NURSERIES OXNARD, INC. ("Houweling"), SOUTHLAND SOD ("Southland"), and REITER BROTHERS, INC., SOUTHERN PACIFIC FARMING, INC. and SOUTHERN PACIFIC FARMING II, LLC, (together with their partners and affiliates, collectively hereinafter "Reiter") enter into this Full Advanced Treatment Recycled Water Management and Use Agreement ("Agreement") on this _____ day of _____, 2014, in Ventura County, California.

RECITALS

THIS AGREEMENT is entered into with reference to the following facts:

A. The City is a general law city authorized to provide retail water service pursuant to the California Constitution, Article XI, section 9, and California Government Code section 38730 et seq.

B. UWCD is formed pursuant to the Water Conservation District Law, California Water Code section 74000 et seq. UWCD, among other things, makes groundwater and surface water available to agricultural and municipal and industrial users within its jurisdiction. In part, this water is derived from groundwater wells in the Fox Canyon Groundwater aquifer and surface water supplies obtained from the Santa Clara River.

C. PVCWD is a municipal corporation formed pursuant to the County Water District Law, California Water Code section 30000 et seq. PVCWD is authorized to provide retail water service to approximately ten thousand five hundred and fifty (10,550) irrigable acres of agricultural land on the Oxnard Plain. The water supplied by PVCWD is, in part, groundwater extracted from wells drawn from the Fox Canyon Groundwater aquifer and, in part, surface water supplied by UWCD.

D. Houweling owns and operates a commercial agricultural business located in the unincorporated area of Ventura County.

E. Southland owns and operates a commercial agricultural business located in the unincorporated area of Ventura County.

F. Reiter owns and operates a commercial agricultural business located in the unincorporated area of Ventura County.

G. The City has developed a multi-faceted recycled water supply program, referred to as the Groundwater Recovery Enhancement and Treatment Program ("GREAT Program"). The City's GREAT Program produces full advanced treatment recycled water ("FATW") at its Advanced Water Purification Facility ("AWPF"). The AWPF uses reverse osmosis and advanced oxidation to generate FATW that, in accordance with applicable law, may be purchased by end-users located both within and outside the City's territorial boundaries.

H. The FATW which is the subject matter of this Agreement is that which is to be produced through the first phase of the AWPF facilities ("P1 FATW"). The City projects that approximately 7,000 AFY (acre-feet per year), or 6.25 MGD (million gallons per day), of P1 FATW will be produced.

I. In recognition of the need to protect, conserve and replenish the underground water supplies of the region, the Parties desire to enter into this Agreement providing for the delivery of P1 FATW to the Parties and other future customers located within the groundwater sub-basins in Ventura County, California commonly known as the Oxnard Plain, Forebay and Pleasant Valley.

J. In executing this Agreement, the governing body of PVCWD finds that the Agreement's terms and conditions are necessary and essential to PVCWD carrying out its legislative purpose. Moreover, the governing body of PVCWD finds that it is necessary for PVCWD, UWCD and the City to jointly coordinate and manage the day-to-day delivery of P1 FATW so that PVCWD may, in furtherance of its statutory purpose, accomplish the following: (1) the performance of acts necessary to furnish sufficient water in the PVCWD service area for present or future beneficial use; and, (2) the protection, conservation and replenishment of PVCWD's underground water supplies.

K. In executing this Agreement, the governing body of UWCD finds that the Agreement's terms and conditions are necessary and essential to UWCD carrying out its legislative purpose. Moreover, the governing body of UWCD finds that it is necessary for PVCWD, UWCD and the City to jointly coordinate and manage the day-to-day delivery of P1 FATW so that UWCD may, in furtherance of its statutory purpose, accomplish the following: (1) the performance of acts necessary to furnish sufficient water in the UWCD service area for present or future beneficial use; and, (2) the protection, conservation and replenishment of UWCD's underground water supplies.

L. On June 26, 2013, the Fox Canyon Groundwater Management Agency ("GMA") approved Resolution 2013-02, approving a Recycled Water Management Impact Analysis Plan, granting the City access to Recycled Water Pumping Allocation and adopting a program through which this Agreement may be implemented consistent with the "FATW Management Plan" contemplated in subsection 4.1 below. GMA Resolution 2013-02 and its findings are incorporated herein by this reference.

M. On April 11, 2014, the GMA adopted Emergency Ordinance E ("Ord E"), imposing certain restrictions on groundwater pumping that impact the anticipated implementation of Resolution 2013-02. During the period in which Ord E or other similar restrictions on groundwater pumping are in effect, the City may require modifications to Resolution 2013-02 to meet the requirements of subsection 4.1 below.

N. The GREAT Program Final Environmental Impact Report (SCH #2003011045) assessed the potential environmental impacts associated with this phase of the GREAT Program and the program approved through GMA Resolution 2013-02, and was certified in September 2004, concurrent with the City's approval of the construction of the Phase 1 GREAT Program.

O. The Parties intend that this Agreement shall establish terms and conditions by which:

1. The City will deliver P1 FATW to City Customers in lieu of potable water to meet their water demands;
2. The City will deliver P1 FATW to the Parties; and,
3. The City, UWCD and PVCWD shall, to the extent permitted by law, jointly coordinate and manage the delivery of P1 FATW to the P1 FATW Users.

NOW, THEREFORE, THE PARTIES HEREBY MUTUALLY AGREE as follows:

1. Recitals and Exhibits.

1.1 The Recitals set forth above are true and correct and are incorporated in and made a part of this Agreement.

1.2 The following Exhibits are attached to and incorporated in this Agreement:

1.2.1 Exhibit A: Table of initial allocations of P1 FATW among the First, Second, Third and Fourth Priority Users.

1.2.2 Exhibit B: GMA Resolution 2013-02; "A Resolution Concerning the Implementation of the First Phase of the City of Oxnard's GREAT Program and the Associated Recycled Water Management Plan."

2. Purpose. The purpose of this Agreement is to set forth the terms and conditions by which:

2.1 The Parties will utilize the SMP, to the extent feasible, to obtain delivery of P1 FATW;

2.2 Subject to the conditions and exceptions noted herein, the City will construct the P1 FATW Facilities necessary to sell and deliver P1 FATW to the Parties;

2.3 The City will deliver P1 FATW to City Customers, as well as the Parties; and

2.4 The City, UWCD and PVCWD will, to the fullest extent permitted by law, jointly coordinate and manage the delivery of P1 FATW to FATW Users.

3. Definitions. This Agreement refers to the following terms:

3.1 **"Annual Capacity"** shall mean the estimated annual production capability, expressed in AFY, of the P1 FATW Facilities as further defined in section 8.2 below.

3.2 "**AF**" shall mean acre-feet; "**AFY**" shall mean acre-feet per year.

3.3 **"AWPF"** shall mean the City's Advanced Water Purification Facility.

3.4 "Calleguas Municipal Water District" or "Calleguas" shall mean the municipal water district organized under the Municipal Water District Act of 1911 of the State of California. Calleguas is a member agency of the Metropolitan Water District of Southern California ("MWD"). Calleguas provides wholesale potable water service to the City, primarily selling water imported from outside the region. Calleguas owns and operates its water distribution system in Ventura County, and the SMP (defined below).

3.5 "Calleguas Wheeling Charge" shall mean the per acre-foot fee or charge Calleguas will impose on the City for use of the SMP for delivery of FATW to FATW Users.

3.6 "CEQA" shall mean the California Environmental Quality Act, Public Resources Code section 21000 et seq.

3.7 "City Customers" shall mean those persons or entities receiving potable water service directly from the City for uses other than commercial agriculture and who use P1 FATW to offset a portion of that potable water supply. City Customers do not include FATW Users, irrespective of whether they had or continue to receive potable water service from the City.

3.8 "City Use" shall mean the amount of P1 FATW required to serve City Customers in lieu of the use of the City's potable water.

3.9 "DPH" shall mean the California Department of Public Health, one of the entities with regulatory oversight and permit authority over the use and disposition of FATW.

3.10 "Effective Date" shall mean the date upon which the City provides written notice to the Parties that the conditions precedent set forth in section 4 below have been satisfied or waived.

3.11 "FATW" shall mean Full Advanced Treatment Recycled Water; FATW is tertiary treated recycled water that is subject to advance treatment by reverse osmosis, advanced oxidation and ultra-violet light.

3.12 "FATW User(s), or P1 FATW User(s)" shall mean any person or entity that uses P1 FATW for commercial agricultural use, whether directly as a Party, or indirectly through receipt of water service from UWCD or PVCWD, or as a lessee, tenant, or renting entity of a Party or property receiving P1 FATW. City Customers are not considered FATW Users for the purpose of this definition. By entering into this Agreement, UWCD, PVCWD, Houweling, Southland and Reiter, as well as the PVCWD and UWCD customers who receive P1 FATW are the initial P1 FATW Users.

3.13 "First Priority Use" shall mean the allocation and use of P1 FATW as set forth in section 8.3 below.

3.14 "First Priority User(s)" shall mean City Customers who purchase P1 FATW from the City for First Priority Use.

3.15 "Fourth Priority Use" shall mean the allocation and use of P1 FATW as set forth in section 8.6 below.

3.16 "Fourth Priority User(s)" shall mean FATW Users who have contracted to purchase, in accordance with the terms and conditions of this Agreement, P1 FATW for Fourth Priority Use.

3.17 "GMA" means the Fox Canyon Groundwater Management Agency, established pursuant to Water Code Appendix, Chapter 121.

3.18 "Houweling Facilities" shall mean nursery, greenhouse and other agricultural production facilities owned, leased or otherwise operated by Houweling in the unincorporated area of Ventura County, California, at 645 Laguna Road (Ventura County assessor parcel number 230-0-071-135), at which P1 FATW will be put to reasonable and beneficial use. The Houweling Facilities are located within PVCWD's service area. Absent any other source of water for its operations, the Houweling Facilities rely on groundwater extracted from Houweling's own wells or water delivered by PVCWD.

3.19 "Houweling POD" shall mean the POD (defined below) to the Houweling Facilities.

3.20 "Minimum Second Priority Use Commitment" shall mean the commitment to purchase a certain quantity of Second Priority Use FATW as defined in section 8.4 below.

3.21 "Oxnard Plain" shall mean the region of the coastal valleys and plains of the Santa Clara River and Calleguas Creek watersheds in Ventura County, California, that overlies the Oxnard Plain, Forebay and Pleasant Valley groundwater subbasins as identified and described by the GMA.

3.22 "P1" shall mean the first phase of the AWPF and associated City-owned facilities that are designed and constructed to produce up to 7000 AFY, or 6.25 MGD, of FATW.

3.23 "P1 FATW" shall mean any FATW produced by P1 FATW Facilities.

3.24 "P1 FATW Facilities" shall mean the recycled water delivery system consisting of pipelines and related appurtenances required for the delivery of P1 FATW to the Parties, including, without limitation, PODs as defined in subsection 3.28 below. The P1 FATW Facilities are anticipated to extend along East Hueneme Road from the pipeline endpoint of the AWPF at the City-limits, then eastward along E. Hueneme Road to Wood Road, then north along Wood Road to Laguna Road, then east along Laguna Road and shall terminate at the PVCWD POD located at or near the intersection of Las Posas Road and Laguna Road. An additional extension of the P1 FATW Facilities will extend north from E. Hueneme Road, to a connection with the Pumping Trough Pipeline west of the intersection of Etting and Nauman Roads, along Etting Road (the UWCD POD). The P1 FATW Facilities may include POD connections to additional Parties along

the alignment described above, which connections shall be constructed in accordance with the terms and conditions set forth in this Agreement, including, without limitation, those terms and conditions set forth in section 26 below. The City and UWCD may elect to establish an additional POD in the Forebay as described in 5.4.2 below.

3.25 "Party(ies)" shall mean the City and FATW Users who hold a contract to receive P1 FATW through the P1 FATW Facilities, who are collectively referred to as the Parties, and individually, as a Party. Initially, the Parties include the City, UWCD, PVCWD, Houweling, Southland, and Reiter. As each new FATW User is added, that entity shall be a Party. The terms Parties does not refer to City Customers who receive FATW through City water service, UWCD customers who receive FATW through UWCD water service, nor PVCWD customers who receive FATW as a customer of PVCWD.

3.26 "Peak Capacity" shall mean the volumetric flow production capacity of the P1 FATW Facilities, expressed in gallons per minute, as further provided in section 8.2 below.

3.27 "Peak Capacity Reservation" shall mean the allocation of Second Priority Use as defined in section 8.4 below.

3.28 "POD" shall mean the point of delivery through which each Party receives P1 FATW through the P1 FATW Facilities. Each POD shall include valves, meter, backflow prevention, pressure control device and any other facilities that may be necessary to connect the P1 FATW Facilities properly to each Party's facilities. Absent an extraordinary circumstance, PODs shall be located at the edge of the Party's property line, in the public right-of-way.

3.29 "PTP" and **"PTP Facilities"** shall mean the Pumping Trough Pipeline, and related piping and associated facilities owned, leased or otherwise operated by United to provide water service to United's PTP customers.

3.30 "PVCWD Facilities" shall mean the reservoirs, piping, and associated facilities owned, leased or otherwise operated by PVCWD to provide water service to its customers.

3.31 "PVCWD POD(s)" shall mean the point where the P1 FATW Facilities enter PVCWD's service area at or near the intersection of Wood Road and Hueneme Road and/or the point at which the P1 FATW Facilities connect to PVCWD's existing delivery system at or near the intersection of Las Posas Road and Laguna Road.

3.32 "Reiter Facilities" shall mean agricultural production facilities owned, leased or otherwise operated by Reiter in the unincorporated area of Ventura County at which P1 FATW will be put to reasonable and beneficial use. Depending on their location, Reiter Facilities rely on groundwater extracted from Reiter's own wells, water delivered to Reiter by PVCWD, or by UWCD. Consistent with Section 4.2 below, prior to the Effective Date, the City and Reiter shall designate in writing signed by both the two entities the Reiter Facilities to be served under this Agreement.

3.33 "Reiter POD(s)" shall mean the POD(s) to the Reiter Facilities.

3.34 "RWQCB" shall mean the Los Angeles Regional Water Quality Control Board, one of the entities with regulatory oversight and permit authority over the use and disposition of FATW.

3.35 "Salinity Management Pipeline," or "SMP" shall mean the Calleguas pipeline ultimately intended to dispose of brine wastes from various locations in Ventura County to the Pacific Ocean. The Parties and Calleguas may use the SMP for a temporary period to deliver P1 FATW to some or all the FATW Users.

3.36 "Second Priority Use" shall mean the allocation and use of P1 FATW as set forth in section 8.4 below.

3.37 "Second Priority User(s)" shall mean Parties who have contracted to purchase, in accordance with the terms and conditions of this Agreement, P1 FATW for Second Priority Use.

3.38 "SMP POC(s)" shall mean the point of connection for each Party through which that Party obtains P1 FATW through the SMP.

3.39 "SMP Agreement" shall mean an agreement between the City and Calleguas for the use of the SMP to deliver P1 FATW to all or some of the Parties. The SMP Agreement shall include provision for the cost of each SMP POC, the Calleguas Wheeling Charge, and provision of advance notice of any planned discharges into the SMP beyond those occurring on the date at which the P1 FATW is introduced into the SMP. The City shall make every reasonable effort to include in the SMP Agreement a maximum period for advance notice of new discharges into the SMP.

3.40 "Southland Facilities" shall mean agricultural production facilities owned, leased, or otherwise operated by Southland in the unincorporated area of Ventura County at which P1 FATW will be put to reasonable and beneficial use. The Southland Facilities rely on groundwater extracted from Southland's own wells. Consistent with Section 4.2 below, prior to the Effective Date, the City and Southland shall designate in writing signed by both the two entities the Southland Facilities to be served under this Agreement.

3.41 "Southland POD(s)" shall mean the POD(s) to the Southland Facilities.

3.42 "Storage" shall mean placement of P1 FATW in surface or subsurface storage in anticipation of subsequent beneficial use.

3.43 "Third Priority Use" shall mean the allocation and use of P1 FATW as set forth in section 8.5 below.

3.44 "Third Priority User(s)" shall mean Parties who have contracted to purchase, in accordance with the terms and conditions of this Agreement, P1 FATW for Third Priority Use.

3.45 "UWCD Facilities" shall mean the reservoirs, piping, and associated facilities owned, leased or otherwise operated by UWCD to provide water service to its customers.

3.46 "UWCD POD(s)" shall mean the point where the P1 FATW Facilities connect to UWCD's Facilities. Consistent with Section 4.2 below, prior to the Effective Date, the City and UWCD shall designate in writing signed by both the two entities the UWCD PODs.

3.47 "Year" shall mean the 12-month period from August 1 to July 31 of the following calendar year.

3.48 "Yearly Second Priority Use Commitment" shall mean the commitment to purchase a certain quantity of Second Priority Use FATW as defined in section 8.4 below.

4. Conditions Precedent. All of the following conditions must be satisfied before this Agreement shall be enforceable and implemented. The City shall provide written notice to all Parties when the City, in its sole and absolute discretion, determines all of the following conditions have been satisfied or otherwise waived.

4.1 Recycled and Groundwater Management Plan. The City and FATW Users shall cooperate in good faith in the development of the FATW Management Plan for presentation to the GMA. The GMA shall approve a "FATW Management Plan" that grants the City the right to obtain groundwater from the United Water Conservation District Oxnard-Hueneme Pipeline System and/or City-owned wells in a volume (in AF) consistent with GMA Resolutions 1999-3, 2003-4 and 2003-5, or in such other amount acceptable to the City. Prior to the City's final acceptance of the FATW Management Plan, the FATW Users shall provide written notice to the City that each FATW User shall provide water use, crop data and other related information to the extent required to facilitate compliance with the FATW Management Plan. The Parties acknowledge that the GMA has adopted Resolution 2013-02 as the operative FATW Management Plan. However, the City may seek an adjustment to Resolution 2013-02 given the subsequent GMA adoption of Ord E. As of the date of signing this Agreement, the condition precedent set forth in this subsection 4.1 has not yet been satisfied.

4.2 Facility Design. Prior to receipt of P1 FATW, each Party must provide written notice to the City agreeing on the design and location of the Party's: a) SMP POCs and b) POD(s), including, without limitation, the location(s) of any required appurtenant facilities and easements necessary to provide P1 FATW to its facilities, and cost allocation for the construction of these facilities.

4.3 Pipeline Easements. The City shall obtain the easements and rights-of-way necessary, at a cost and subject to terms agreeable to the City in its sole discretion, to construct, operate, maintain, repair and replace the P1 FATW Facilities to deliver P1 FATW to the Parties.

4.4 RWQCB and DPH. RWQCB (and DPH if necessary) must approve the changes to the City's and other relevant permits that allow for the operations contemplated in this Agreement and which make clear that existing agricultural irrigation practices do not violate the incidental runoff restrictions, and allow education and outreach to reduce signage requirements.

4.5 Regulatory Approvals. The City shall receive all regulatory approvals necessary to operate the AWPF as required to deliver P1 FATW consistent with this Agreement.

4.6 LAFCO. To the extent required, if any, approval of the Ventura County Local Agency Formation Commission is obtained for the FATW service provided in this Agreement.

4.7 CEQA. The City will be the lead agency, responsible for CEQA compliance for the implementation of this Agreement, including all costs associated with its actions as lead agency. Both UWCD and PVCWD shall be responsible agencies and each shall be responsible for its CEQA compliance for the implementation of this Agreement, including all costs associated with its actions as a responsible agency. The obligations of the Parties under this Agreement are expressly conditioned upon: (i) compliance with CEQA and all other applicable environmental laws with respect to the actions contemplated by this Agreement; and (ii) the receipt of all necessary governmental and third party consents and approvals for those actions. CEQA compliance must be complete, with the City, UWCD and PVCWD capable and willing to accept all operational limitations, conditions, mitigation and monitoring requirements which may be necessary before this Agreement is effective. The City shall promptly prepare all appropriate environmental documents, if any are required, for it to evaluate the environmental impacts associated with the actions contemplated in this Agreement. The Parties shall cooperate to diligently complete all environmental review required to implement this Agreement, and shall use reasonable efforts to reduce any overlap in analyzing, mitigating, or studying environmental impacts associated with the actions proposed in this Agreement. Notwithstanding any other provision of this Agreement, no action shall be taken to effect the actions contemplated by this Agreement, and no other action shall be taken that commits any material resources of any Party, until all required environmental review is completed and all Parties have independently made all findings required by CEQA and other applicable environmental laws, to consider properly the implementation of this Agreement. If, upon completion of such environmental review, a Party finds one or more significant, unmitigated environmental impacts resulting from the actions contemplated by this Agreement and cannot make a finding that the benefits of the proposed project outweigh the impact or impacts, or that the impacts cannot be mitigated to a level below significance, then this Agreement shall terminate without further obligation or liability of any Party. Neither the execution of this Agreement, nor any preliminary steps taken to implement this Agreement, shall be taken into account in determining whether mitigating or avoiding any significant impact is feasible.

4.8 UWCD and PVCWD Coordination and Management. UWCD and PVCWD shall provide written notice to the Parties when the two entities have agreed

upon their respective responsibilities in undertaking the cooperative management responsibilities contemplated in Sections 10 and 11, below, including but not limited to, the coordinated use of the UWCD Facilities and PVCWD Facilities and allocation of Fourth Priority FATW. An agreement between UWCD and PVCWD is a condition precedent to their respective obligations under this Agreement. Either or both UWCD or PVCWD may waive the condition precedent provided in this subsection 4.8 by providing written notice to the City of such waiver.

4.9 SMP Agreement. The City and Calleguas have entered into the SMP Agreement and each Party intending to obtain P1 FATW through a SMP POC shall assent in writing to the terms of the SMP Agreement.

4.10 Water Quality. The Parties shall agree upon the anticipated P1 FATW water quality constituent profile. The Parties shall document this agreement in writing.

4.11 Signing Parties. At a minimum, the following Parties must have properly executed this Agreement: the a) City, b) at least one of the following entities: (i) Southland, (ii) Reiter, or (iii) Houwelling, and c) either UWCD or PVCWD. The waiver shall be effective only as to the entity providing the written notice. Any non-signing Party may elect to sign and join the Agreement after the Effective Date, with the City's prior written approval.

5. Construction of P1 FATW Facilities and the SMP.

5.1 SMP. To the extent reasonably practical and for the time period until either: a) Calleguas provides notice to the Parties that the SMP is no longer available, or b) the quality of P1 FATW becomes unacceptable when distributed through the SMP, the City intends to deliver P1 FATW to the Parties through the SMP. The City shall provide each Party as much advance written notice as reasonably practical of: a) any anticipated changes in the quality of the P1 FATW being distributed through the SMP as a result of any anticipated changes in Calleguas' use of the SMP, and b) notice from Calleguas that the SMP will not be available for distribution of P1 FATW. The City shall absorb the costs of and work with Calleguas to prepare the design of each SMP POC for each Party. The Parties acknowledge that Calleguas may not allow as many SMP POC's to its SMP as the City may provide to the P1 FATW Facilities contemplated in section 5.2 below. The City shall also cover the cost of construction of one SMP POC for each Party, based upon a design and cost estimate prepared by the City and Calleguas and preapproved in writing by that Party. To the extent a SMP POC must be located on the property of a Party, that Party shall provide appropriate easements for the construction, operation, maintenance, repair and replacement of the SMP POC at no cost. The City and Calleguas shall manage the construction of each SMP POC in coordination with each Party.

5.2 The City shall be solely responsible for the design, permitting, construction, maintenance and repair of the P1 FATW Facilities, including, without limitation, acquisition of all required easements and right-of-ways, and shall bear all costs and expenses related thereto. To the extent a POD must be located on the property of a Party, that Party shall provide appropriate easements for the construction, operation,

maintenance, repair and replacement of the P1 FATW Facilities at no cost to the City. Notwithstanding the foregoing, the City shall obtain the consent of PVCWD's or UWCD's governing body prior to constructing, maintaining or repairing any facilities for the delivery of FATW that are located within PVCWD's or UWCD's service area, which approval shall not be unreasonably withheld and, where granted, shall be granted at no cost to the City and on reasonable terms and conditions. Given the expectation that the Parties may receive P1 FATW through the SMP for an extended period and the imposition of Ord E and other potential limitations on the use of local groundwater, the election to construct the P1 FATW Facilities shall be in the City's sole discretion.

5.3 PVCWD POD(s) and SMP POC(s). The City shall design, permit and construct two (2) PVCWD POD(s), and shall bear all costs and expenses related thereto. Should the City and PVCWD be unable to locate either or both the PVCWD PODs in the public right of way or on PVCWD property, the two entities agree to consider a reasonable cost allocation for the incremental increase in cost to locate the PVCWD PODs. The City and PVCWD agree that if additional POD(s) are required to facilitate or maximize the delivery of P1 FATW, the City and PVCWD shall arrange for the design and construction of those POD(s) on reasonable terms and conditions mutually satisfactory to both parties. The City, PVCWD and Calleguas shall develop appropriate locations for and design of the SMP POCs for PVCWD use.

5.4 UWCD POD(s) and SMP POC(s).

5.4.1 The City shall design, permit and construct one UWCD POD to the PTP, and shall bear all costs and expenses related thereto. Should the City and UWCD be unable to locate the UWCD POD in the public right of way or on UWCD property, the two entities agree to consider a reasonable cost allocation for the incremental increase in cost to locate the UWCD POD. The City and UWCD agree that if additional POD(s) are required to facilitate or maximize the delivery of P1 FATW to the PTP, the City and UWCD shall arrange for the design and construction of those POD(s) on reasonable terms and conditions mutually satisfactory to both parties. The City, UWCD and Calleguas shall develop appropriate locations for and design of the SMP POCs for UWCD use.

5.4.2 UWCD, PVCWD and the City acknowledge that it may be desirable and feasible to establish additional POD's to UWCD Facilities in the Forebay subbasin through which P1 FATW may be delivered directly for use within PVCWD Facilities, and/or PTP Facilities.

5.4.2.1 The City and UWCD shall be solely responsible for all costs associated with the POD in the Forebay subbasin to provide P1 FATW to PTP Facilities, including but not limited to permitting, regulatory compliance, mitigation, design, construction and operations of such facilities. The City's and UWCD's obligations, cost allocation and oversight responsibility for all or any aspect of the POD for delivery of P1 FATW to the PTP Facilities shall be the subject of a separate agreement between the City and UWCD.

5.4.2.2 The City, PVCWD and UWCD shall be solely responsible for all costs associated with the POD to UWCD Facilities in the Forebay subbasin to provide P1 FATW to PVCWD Facilities, including but not limited to permitting, regulatory compliance, mitigation, design, construction and operations of such facilities. The City's, PVCWD's and UWCD's obligations, cost allocation and oversight responsibility for all or any aspect of the POD for delivery of P1 FATW to the PVCWD Facilities shall be the subject of a separate agreement between the City, PVCWD and UWCD.

5.5 Houweling POD and POC. The City shall design, permit and construct the Houweling POD, and shall bear all costs and expenses related thereto. The City and Houweling anticipate that a single ten (10) inch diameter POD will be adequate to provide P1 FATW service to the Houweling Facilities. The Houweling POD will be located in a public right-of-way or on Houweling controlled property. If additional or larger POD(s) are required to facilitate or maximize the delivery of P1 FATW to the Houweling Facilities, the City and Houweling shall share the incremental increase in cost to design and construct such POD(s) on reasonable terms and conditions. The City, Houweling and Calleguas shall develop appropriate locations for and design of the SMP POC for Houweling use.

5.6 Southland POD and POC. The City shall design, permit and construct a single Southland POD, and shall bear all costs and expenses related thereto. The City and Southland anticipate that the POD shall be up to ten (10) inches in diameter. The Southland POD(s) will be located in the public right-of-way or on Southland controlled property. If additional or larger POD(s) are required to facilitate or maximize the delivery of P1 FATW to the Southland Facilities, the City and Southland shall share the incremental increase in cost to design and construct such POD(s) on reasonable terms and conditions. The City, Southland and Calleguas shall develop appropriate locations for and design of the SMP POCs for Southland use.

5.7 Reiter POD and POC. The City shall design, permit and construct a single Reiter POD, and shall bear all costs and expenses related thereto. The City and Reiter anticipate that the POD shall be up to ten (10) inches in diameter. The Reiter POD(s) will be located in the public right-of-way or on Reiter controlled property. If additional or larger POD(s) are required to facilitate or maximize the delivery of P1 FATW to the Reiter Facilities, the City and Reiter shall share the incremental increase in cost to design and construct such POD(s) on reasonable terms and conditions. The City, Reiter and Calleguas shall develop appropriate locations for and design of the SMP POCs for Reiter use.

6. Ownership of P1 FATW Facilities, POD(s), and POC(s). The City shall own all P1 FATW Facilities constructed under this Agreement, including, without limitation, P1 FATW Facilities required to deliver P1 FATW to the Parties. The City's ownership of P1 FATW Facilities shall extend up to and include the PODs and POCs.

7. Reservation of Rights.

7.1 The City, UWCD and PVCWD each reserve all rights and remedies they each may have in law and in equity in the event that the City directly delivers FATW to any person or entity located within the jurisdictional boundaries of PVCWD or UWCD.

7.2 Each Party reserves all rights and remedies they may have in law and in equity to participate in the development of, influence, contest, or challenge through any administrative proceeding or litigation, any groundwater replenishment fees, or any comparable fee or charge, to be imposed on groundwater pumping within the GMA, that may be used to purchase RWPA or direct use of P1 FATW for permanent recharge. Such actions shall not be considered a breach of this Agreement.

8. Priority Uses of P1 FATW.

8.1 General. P1 FATW shall be distributed for First, Second, Third and Fourth Priority Uses, as those terms are more particularly described in subsections 8.3, 8.4, 8.5, and 8.6 below. First Priority Uses are those uses of P1 FATW which the City delivers to City Customers. Second, Third and Fourth Priority Uses are those commercial agricultural uses which occur on the Oxnard Plain that would be irrigated with local groundwater, and/or water purchased from UWCD and/or PVCWD. The Parties acknowledge and agree that there may be periods (e.g., overnight and during some rainfall events) when the City is producing more P1 FATW than there is demand from First through Third Priority Uses. To the extent that demand from First through Third Priority Uses is insufficient to use all the available P1 FATW at any given time, the City may place that amount of P1 FATW in Storage for any and all beneficial uses irrespective of the First through Fourth Priorities established herein.

8.2 P1 FATW Capacity. As noted above, the P1 FATW Facilities are expected to produce 7,000 AFY of FATW ("Annual Capacity") at an average capacity of 6.25 MGD and an instantaneous capacity ("Peak Capacity") of 4,340 gallons per minute (GPM). Depending upon the availability of storage, the Peak Capacity may be 8,600 GPM or greater during some periods of each day. Current and future allocation of the First, Second, Third and Fourth Priority Uses are and will be based on these anticipated capacity limitations. The actual operational capability of the P1 FATW Facilities for instantaneous and annual deliveries may be increased with the addition of storage capacity, management of the timing of FATW deliveries, and optimization of operations once the AWPF is in use. The initial allocation to each priority, and the overall assumed limitations described above, may be altered over the term of this Agreement to ensure that the entirety of the P1 FATW is put to reasonable and beneficial use each Year, while preserving the relative reliability of the First, Second, Third, and Fourth Priority Uses.

The available and initial allocations of P1 FATW are listed in the table attached and incorporated herein as Exhibit "A". The initial allocations of P1 FATW are subject to the express terms and conditions set forth throughout this Agreement.

8.3 First Priority Use. P1 FATW may be purchased by current and future City Customers at the "First Priority Use Rate" set forth in subsection 8.3.2 below. Purchasers of P1 FATW at the First Priority Use Rate shall be deemed to have a "First Priority Use." A First Priority Use takes priority over Second, Third and Fourth Priority

Uses, which means that the flow of P1 FATW for a First Priority Use may not be interrupted, reduced, suspended or terminated to satisfy Second, Third or Fourth Priority Uses.

8.3.1 Amount of P1 FATW Dedicated for First Priority Use. The amount of P1 FATW dedicated for First Priority Use shall be up to 1,800 AFY, at a Peak Capacity of 1,200 GPM. The First Priority Use is presumed to be relatively continuous because the City intends to balance its daytime demands with off peak use at the River Ridge Golf Course and other City parks and greenbelts. This dedicated amount may be adjusted during the term of and subject to the conditions in this Agreement.

8.3.2 First Priority Use Rate. The rate for a First Priority Use of P1 FATW ("First Priority Use Rate") shall be established by the City from time to time through its usual and customary rate-making process.

8.4 Second Priority Use. Each Second Priority User shall have the right to purchase P1 FATW not otherwise committed to First Priority Use. A P1 FATW User who commits to purchase a specified amount of P1 FATW at the Second Priority Use Rate set forth in subsection 8.4.7 below, is deemed to have a "Second Priority Use" for that amount of FATW. A Second Priority Use takes priority over Third and Fourth Priority Uses, which means that the flow of P1 FATW for a Second Priority Use may not be interrupted, reduced, suspended or terminated to satisfy Third or Fourth Priority Uses. Second Priority Users are entitled to and shall take Second Priority Use P1 FATW subject to the following:

8.4.1 The City agrees that it shall not enter into agreements for First Priority Use and Second Priority Use that cumulatively exceed the Peak Capacity or Annual Capacity. To implement this obligation, the City shall limit its commitment of cumulative Peak Capacity to deliver P1 FATW for Second Priority Use to an amount smaller than the Peak Capacity of the P1 FATW Facilities less the amount of Peak Capacity reserved for First Priority Use. In complying with this obligation, the City shall also consider the potential fluctuations in diurnal demands, availability of storage capacity and the variations in each Second Priority User's capability of altering its delivery schedule. The Parties expect that the City will be capable of reliably delivering greater than 3,140 GPM for Second Priority Uses by optimizing the P1 FATW Facilities Annual and Peak Capacities by, among other things, coordinating the timing of Second Priority Users' demands and exercising the use of available storage. The City in its sole, reasonable discretion, shall be responsible for fulfilling its obligations under this subsection.

8.4.2 The Second Priority Use category is intended to provide each Second Priority User with reliable access to P1 FATW, with the recognition that Second Priority Users require delivery of P1 FATW during certain periods at or near a designated Peak Capacity ("Peak Capacity Reservation") specified for each Second Priority User. However, each Second Priority User is not expected to take continuous delivery of P1 FATW at its Peak Capacity Reservation. Actual use is anticipated to vary based on availability of storage at the Second Priority User's facilities, growing conditions, crop

type, weather conditions, and crop maturity. Each Second Priority User shall have an expressly designated Yearly P1 FATW Second Priority Use purchase commitment ("Yearly Second Priority Use Commitment"), a Peak Capacity Reservation, and a minimum purchase commitment ("Minimum Second Priority Use Commitment"). Unless the Second Priority User and the City agree otherwise, the Yearly Second Priority Use Commitment shall be calculated with a 0.8 conversion factor against the Peak Capacity Reservation and the Minimum Second Priority Use Commitment with a 0.35 conversion factor against the Peak Capacity Reservation. The Yearly Second Priority Use Commitment and Minimum Second Priority Use Commitment shall be expressed in AFY and the Peak Capacity Reservation in GPM. By way of example, unless otherwise specified, a Second Priority User with a Peak Capacity Reservation of 1,000 GPM would have a Yearly Second Priority Use Commitment of 800 AFY and a Minimum Second Priority Use Commitment of 350 AFY.

8.4.3 Unless the City can accommodate higher flows at any given time, each Second Priority User shall limit its delivery rate to no more than its Peak Capacity Reservation. Each Second Priority User must take delivery of its Yearly Second Priority Commitment before it is entitled to purchase water at a Third or Fourth Priority Use Rate. Second Priority Use P1 FATW is subject to further terms and conditions described herein.

8.4.4 Initial Allocation of P1 FATW to Second Priority Use. The City commits to deliver and the Second Priority Users commit to purchase the following amounts of P1 FATW for Second Priority Use subject to the terms of this Agreement.

8.4.4.1 Houweling. Houweling agrees to a Peak Capacity Reservation of 1,000 GPM, a Yearly Second Priority Use Commitment 800 AFY, and a Minimum Second Priority Use Commitment of 350 AFY. Houweling shall take delivery of this Second Priority Use P1 FATW through the Houweling POD for use at the Houweling Facility. To maximize the availability of Second Priority Use P1 FATW, Houweling agrees to take delivery of its Second Priority Use P1 FATW during the off-peak use periods whenever reasonably practical.

8.4.4.2 Southland. Southland agrees to a Peak Capacity Reservation of 500 GPM, a Yearly Second Priority Use Commitment 400 AFY, and a Minimum Second Priority Use Commitment of 175 AFY. Southland shall take delivery of this Second Priority Use P1 FATW through the Southland POD for use at the Southland Facilities. The Parties acknowledge that Southland's intended use of Second Priority Use P1 FATW requires peak rate deliveries during the daytime irrigation periods and its demands are particularly time sensitive.

8.4.4.3 Reiter. Reiter agrees to a Peak Capacity Reservation of 1,000 GPM, a Yearly Second Priority Use Commitment 800 AFY, and a Minimum Second Priority Use Commitment of 350 AFY. Reiter shall take delivery of this Second Priority Use P1 FATW through the Reiter POD for use at the Reiter Facilities. The Parties acknowledge that Reiter's intended use of Second Priority Use P1 FATW requires

peak rate deliveries during the daytime irrigation periods and its demands are particularly time sensitive.

8.4.5 Allocation of P1 FATW to Second Priority Use. Second Priority Users may, in accordance with the terms and conditions of this Agreement, commit or adjust the purchase of P1 FATW for Second Priority Use subject to the following:

8.4.5.1 Total P1 FATW Available for Second Priority Use. The City, UWCD and PVCWD shall use reasonable best efforts to determine the cumulative Peak Capacity Reservation and Yearly Second Priority Use Commitment of P1 FATW that may be committed to all Second Priority Uses based on factors including, without limitation, the capacity of the P1 FATW Facilities, the Peak Capacity associated with Second Priority Users, the timing of those demands during daily and seasonal periods, and the amount of P1 FATW committed to First Priority Use. UWCD, PVCWD and the City shall use their reasonable best efforts to maximize the availability of P1 FATW while limiting the cumulative amount of P1 FATW committed to all Second Priority Users so that an adequate amount of P1 FATW is available to provide a reliable supply of P1 FATW to each Second Priority User. To the extent the Parties cannot timely agree on the management of P1 FATW available to the Second Priority Users, the City in its sole and reasonable discretion shall make any and all final determinations as may be necessary.

8.4.5.2 Adjustment in Second Priority Use.

8.4.5.2.1 Each Second Priority User may adjust its Peak Capacity Reservation, and associated Yearly Second Priority Use and Minimum Second Priority Use Commitments by providing the City, UWCD and PVCWD with a written request, on or before May 1 of each Year. Timely notice (notice received on or before May 1) shall be effective for the Year following the Year in which the notice is given. Late notice shall be effective as though given on May 1 of the following Year. By way of example, written notice provided on June 1, 2014, shall be deemed given on May 1, 2015, and the associated reduction in Peak Capacity Reservation shall be effective for the year beginning August 1, 2015.

8.4.5.2.2 If a Second Priority User fails to purchase its Minimum Second Priority Use Commitment in a given Year, the City may unilaterally decrease a Second Priority User's Peak Capacity Reservation and associated Yearly Second Priority Use and Minimum Second Priority Use Commitments beginning the Year following the Year of under-use. Prior to implementing the unilateral decrease, on or before August 31 of the Year following the under-use, the City shall provide the Second Priority User with written notice of the adjusted Peak Capacity Reservation and associated Yearly Second Priority Use Commitment and Minimum Second Priority Use Commitment. The City shall base its adjustment on the Second Priority User's actual use during the Year at issue. The Second Priority User may propose an alternative adjusted Peak Capacity Reservation and associated Yearly Second Priority Use Commitment and Minimum Second Priority Use Commitment, based on such Second Priority User's unique circumstances, by providing the City with a written response within thirty (30)

days of the City's notice. The City shall make a final determination of the applicable Peak Capacity Reservation based upon the information available and the exercise of its reasonable discretion. The City shall provide such Second Priority User with written notice of the applicable Peak Capacity Reservation and associated Yearly Second Priority Use Commitment and Minimum Second Priority Use Commitment on or before October 31, to apply beginning in that Year.

8.4.6 Management of Second Priority Use. Notwithstanding any other provision in this Agreement, Second Priority Use shall be subject to the management authority of PVCWD, UWCD and/or the City as more particularly described in sections 10 and 11 below. In exercising that authority, PVCWD, UWCD and the City may, through the exercise of their collective reasonable discretion, modify the terms and conditions governing the delivery of P1 FATW for Second Priority Use. PVCWD, UWCD and/or the City shall exercise this discretion reasonably. Where feasible, PVCWD, UWCD and/or the City shall provide each Second Priority User a reasonable opportunity to provide sufficient information to argue that the proposed modification is not required. Such modifications shall be made to facilitate and maximize the use of P1 FATW for Second Priority Use. Modifications may include, without limitation, temporary reductions or interruptions of service to Second, Third, or Fourth Priority Uses. Modifications may also include the reduction or termination of Second Priority Uses where required to meet First Priority Use or where a Second Priority User has failed to make full use of the P1 FATW Second Priority Use to which that user has committed. To the extent the Parties cannot timely agree on the management of P1 FATW available to the Second Priority Users, the City in its sole and reasonable discretion shall make any and all final determinations as may be necessary.

8.4.7 Second Priority Use Rates. Second Priority Use Rates shall be calculated based on metered use for P1 FATW delivered through the Second Priority User's POD as follows:

8.4.7.1 For that portion of the volume of water delivered through the Second Priority User's POD for which the City does not receive in exchange a right to pump local groundwater pursuant to the FATW Management Plan approved as provided in section 4.1 above, the Second Priority User shall be charged and pay to the City the then applicable Calleguas Tier 2 rate. The Parties acknowledge and agree that this rate shall be renegotiated to a rate that reflects the City's cost to purchase water from Calleguas, should there be a material change in either: a) the rate structure applicable to the City for the purchase of Tier 2 water from Calleguas, or any component thereof, including the Calleguas "capacity reservation charge," existing at the Effective Date; or b) the City's rights to purchase Tier 2 water from Calleguas in lieu of the use of the associated RWPA.

8.4.7.2 For that portion of the volume of water delivered through the Second Priority User's POD for which the City receives in exchange a right to pump local groundwater pursuant to the FATW Management Plan approved as provided in section 4.1 above, the Second Priority User shall be charged and pay to the City $650.00 per AF ("Second Priority Use Rate"), subject to the annual modification provided in

subsection 8.4.7.2.1 below. The Second Priority Use Rate ($650.00 per AF) set forth in this section is referred to as the "Original Second Priority Use Rate" when applying the CPI Adjustment provided in subsection 8.4.7.2.1 below.

8.4.7.2.1 The Second Priority Use Rate shall be adjusted annually on July 1st of each Year ("Adjustment Date") beginning in 2015. The adjustment shall be calculated as the sum of the following two calculations (See "CPI Adjustment" and "Pump Charge Adjustment" defined below), each of which determines a dollar per AF adjustment ("Adjustment"). The Second Priority Use Rate applicable for water deliveries following the Adjustment Date shall be calculated as the Second Priority Use Rate in the Year just prior to the Adjustment Date plus the sum of the "CPI Adjustment" and the "Pump Charge Adjustment."

(a) The "CPI Adjustment" shall be calculated based upon changes in the Consumer Price Index ("CPI") for All Urban Consumers for Los Angeles – Riverside – Orange County CA for all items, base period 1982-84 = 100, as published by the U.S. Department of Labor, Bureau of Labor Statistics. The CPI Adjustment shall be the percent change in CPI for the month of April immediately preceding the Adjustment Date compared to the CPI for the month of April 2012, multiplied by the Original Second Priority Use Rate (See "Example One," below).

(b) The "Pump Charge Adjustment" shall be calculated based upon the sum of the annual change in three charges imposed on regional groundwater use: a) the United Water Conservation District ("UWCD") Water Conservation Fund Groundwater Extraction Charge (Zone A) applicable to agriculture use ("Zone A Charge"), b) the UWCD Freeman Diversion Extraction Charge (Zone B) applicable to agriculture use ("Zone B Charge"), and c) the GMA Groundwater Extraction Charge ("GMA Charge"). The change in the Zone A Charge shall be the Zone A Charge applicable for the Year immediately following the Adjustment Date minus the Zone A Charge applicable for the Year immediately preceding the Adjustment Date. The change in the Zone B Charge shall be the Zone B Charge applicable for the Year immediately following the Adjustment Date minus the Zone B Charge applicable for the Year immediately preceding the Adjustment Date. The change in the GMA Charge shall be the sum of any incremental changes in the GMA Charge that were authorized during the Year immediately preceding the Adjustment Date (See Example One, below).

EXAMPLE ONE

The following Adjustment calculation is provided as an example only. The first Adjustment to the Second Priority Use Rate shall be calculated and applicable for the Adjustment Date in 2013. This example assumes for illustrative purposes only the CPI for April 2013 is 239.989; the Zone A Charge after the 2013 Adjustment Date is $49.75; and there is no change to both the GMA and Zone B Charges. The April 2012 CPI is 236.866, as currently published. The Zone A Charge applicable before the 2013 Adjustment Date is $39.75, as currently published.

Step 1: The CPI Adjustment that would be applicable for the 2013 Adjustment Date, would be calculated as the CPI for April 2013 minus the CPI for April 2012, divided by the CPI for April 2012 times the Original Second Priority Use Rate; or [(239.989– 236.866) / 236.866) * $650.00 = $8.57].

Step 2: The Pump Charge Adjustment that would be applicable for the 2013 Adjustment Date, would be calculated as the Zone A Charge applicable after the 2013 Adjustment Date ($49.75 / AF) minus the Zone A Charge applicable for the Year before the 2013 Adjustment Date ($39.75) or (49.75 – 39.75 = $10.00). Since there was no change to either the GMA Charge or the Zone B Charge during this period, the total Pump Charge Adjustment is equal to $10.00.

Step 3: Given the above, if an Adjustment was to be applied and implemented with these example numbers on the 2013 Adjustment Date, the Adjustment applicable on the 2013 Adjustment Date would the CPI Adjustment plus the Pump Charge Adjustment, or $8.57 + $10.00 = $18.57.

(c) The Pump Charge Adjustment shall be modified to include any new groundwater pumping charge or fee that UWCD, the GMA or any court or regulatory agency with jurisdiction over groundwater pumping on the Oxnard Plain may impose in the future. Any additional pump charge shall be incorporated into the Pump Charge Adjustment using the same methodology applied to the existing charges; that is, the Pump Charge Adjustment shall include the Year over Year changes in the new pump charge.

(d) The Parties acknowledge that UWCD is involved in litigation over its methodology used to calculate its Zone A and Zone B Charges (*City of San Buenaventura v. United Water Conservation District* (Santa Barbara County Superior Court Case Nos. VENCI00401714 and Ventura County Superior Court Case No. 56-2012-00422218-CU-WM-VTA)). The Parties agree to negotiate in good faith, as provided in section 32.2 below, a methodology to implement the Pump Charge Adjustment if, as a result of that litigation, UWCD materially modifies the methodology UWCD uses to calculate the Zone A or Zone B Charges.

8.4.8 The Parties acknowledge that Houweling does not have a GMA pumping allocation for approximately fifty percent (50%) of Houweling's anticipated Yearly Second Priority Use Commitment, and thus, the City will not seek a right from the GMA to pump that amount of groundwater in exchange for that amount of P1 FATW delivered through the Houweling POD pursuant to section 4.1 above. As a result, the City shall charge and Houweling shall pay the Second Priority Use Rate set forth in subsection 8.4.7.2 above for that amount of Second Priority Use P1 FATW delivered through the Houweling POD for which the City does receive a right to pump groundwater pursuant to section 4.1 above, and the Second Priority Use Rate set forth in subsection 8.4.7.1 above for the remainder of the Second Priority Use P1 FATW delivered through the Houweling POD each Year.

8.4.8.1 The City shall invoice and each Second Priority User shall promptly pay each invoice pursuant to section 14 below.

8.5 Third Priority Use. Third Priority Users may purchase P1 FATW not otherwise committed for First and Second Priority Uses at the "Third Priority Use Rate" set forth in subsection 8.5.3 below. Purchasers of P1 FATW at the Third Priority Use Rate shall be deemed to have a "Third Priority Use." A Third Priority Use takes priority over a Fourth Priority Use, which means that the flow of P1 FATW for a Third Priority

Use may not be interrupted, reduced, suspended or terminated to satisfy Fourth Priority Use.

8.5.1 Management of Third Priority Use. Notwithstanding any other provision in this Agreement, Third Priority Use shall be subject to the management authority of UWCD, PVCWD and/or the City as more particularly described in sections 10and 11 below. In exercising that authority, UWCD, PVCWD and the City may, through the exercise of their collective reasonable discretion, modify the terms and conditions governing the delivery of P1 FATW for Third Priority Use. PVCWD, UWCD and the City shall exercise this discretion reasonably and shall, where feasible, provide each Third Priority User a reasonable opportunity to provide PVCWD, UWCD and/or the City with sufficient information to argue that the proposed modification is not required. Such modifications shall be made to facilitate and maximize the use of P1 FATW for First, Second and Third Priority Use. Modifications may include, without limitation, temporary reductions or interruptions of service to Third or Fourth Priority Use. Modifications may also include the termination of P1 FATW service to Third Priority Users where that termination is required to meet First and Second Priority Use demand. To the extent the Parties cannot timely agree on the management of P1 FATW available to the Third Priority Users, the City in its sole and reasonable discretion shall make any and all final determinations as may be necessary.

8.5.2 Purchase of P1 FATW for New Third Priority Use. The City shall not provide P1 FATW for a Third Priority Use to any new user or for use at an additional property for an existing Party without first making reasonable best efforts to confer with all the Second Priority Users, Third Priority Users, UWCD and PVCWD. Based upon the input received on the following factors, along with any other information deemed relevant by the City, the City may, in its sole and reasonable discretion, elect to extend service to a new Third Priority Use for a new Party or at a new property for an existing Party.

8.5.2.1 Whether the amount of P1 FATW requested for the Third Priority Use is likely to cause the total amount of P1 FATW committed to Third Priority Uses to consistently exceed the total amount of P1 FATW available for Third Priority Uses.

8.5.2.2 The quantity of P1 FATW used as a Fourth Priority Use.

8.5.2.3 The quantity of P1 FATW that has not been put to use because of limited demand.

8.5.2.4 Any anticipated changes in availability of temporary, seasonal or long term storage of P1 FATW.

8.5.2.5 Any unique demand characteristics of the new or expanded use proposed for a Third Priority Use.

8.5.2.6 Whether the amount of P1 FATW requested for the Third Priority Use may materially reduce, impede or impair the availability of P1 FATW to

Third Priority Users based on historic and anticipated the cropping patterns and seasonal water demands.

8.5.3 Third Priority Use Rate. Third Priority User rates shall be calculated based on metered use for P1 FATW delivered through such Third Priority User's PODs as follows:

8.5.3.1 For that portion of the volume of water delivered through the Third Priority User's POD for which the City does not receive in exchange a right to pump local groundwater pursuant to the FATW Management Plan as provided in section 4.1 above, the Third Priority User shall be charged and pay to the City the then applicable Calleguas Tier 2 rate. The Parties acknowledge and agree that this rate shall be renegotiated to a rate that reflects the City's cost to purchase water from Calleguas, should there be a material change in either: a) the rate structure applicable to the City for the purchase of Tier 2 water from Calleguas, or any component thereof, including the Calleguas "capacity reservation charge," existing at the Effective Date; or b) the City's rights to purchase Tier 2 water from Calleguas in lieu of the use of the associated RWPA..

8.5.3.2 For that portion of the volume of water delivered through the Third Priority User's POD for which the City does receive in exchange a right to pump local groundwater pursuant to the FATW Management Plan as provided in section 4.1 above, Third Priority Users shall be charged and pay to the City $500.00 per AF ("Third Priority Use Rate"), subject to the annual adjustments set forth in subsection 8.4.7.2.1 above. The Third Priority Use Rate of $500.00 per AF shall be referred to as the "Original Third Priority Use Rate" and in applying subsection 8.4.7.2.1 above, the Original Third Priority Use Rate shall be used in place of the Original Second Priority Use Rate whenever applicable.

8.5.3.3 The City shall invoice and each Third Priority User shall promptly pay each invoice pursuant to section 14 below.

8.6 Fourth Priority Use. P1 FATW not otherwise committed to First, Second or Third Priority Uses, or for Storage, may, in accordance with the terms and conditions of this Agreement, be purchased by UWCD and PVCWD at the "Fourth Priority Use Rate" set forth in subsection 8.6.2 below. For that portion of P1 FATW purchased by UWCD or PVCWD at the Fourth Priority Use Rate, UWCD and PVCWD shall be deemed to have a "Fourth Priority Use." PVCWD and UWCD shall take delivery of P1 FATW for Fourth Priority Use at PVCWD's PODs and UWCD's PODs.

8.6.1 Purchase for Fourth Priority Use. To the extent determined feasible by UWCD and PVCWD, given the considerations and operational limitations described in this subsection, UWCD and PVCWD intend to purchase the entire amount of P1 FATW which is not committed to First, Second or Third Priority Uses. However, notwithstanding anything in this Agreement to the contrary,neither this expression of intent, nor any provision in this Agreement shall be construed as a guarantee or commitment by UWCD or PVCWD to purchase any P1 FATW or minimum volume

thereof. The Parties recognize that UWCD's and PVCWD's ability to purchase P1 FATW for Fourth Priority Use is limited by UWCD's and PVCWD's seasonal and diurnal customer demand, other sources of water which now or in the future may become available to UWCD and PVCWD, the cost of P1 FATW, and the use of P1 FATW for Storage. UWCD and PVCWD recognize that the demand for First, Second and Third Priority Uses, and Storage, may, over time, cause the amount of P1 FATW available to UWCD and PVCWD for Fourth Priority Use to decrease. The availability, if any, in the amount of P1 FATW available to UWCD or PVCWD for Fourth Priority Use shall not relieve PVCWD or UWCD of the operational and management obligations under this Agreement. To the extent UWCD and PVCWD cannot agree upon the distribution between the two entities of available Fourth Priority P1 FATW, and an equal distribution of Fourth Priority P1 FATW to UWCD and PVCWD is not practical, the City in its sole and reasonable discretion shall make any and all final determinations as may be necessary to make available the Fourth Priority P1 FATW to UWCD and PVCWD.

8.6.2 Fourth Priority Use Rate. Fourth Priority User Rates shall be calculated based on metered use for P1 FATW delivered for Fourth Priority Use through the PVCWD's PODs and UWCD's PODs as follows:

8.6.2.1 PVCWD and UWCD shall be charged and pay to the City the Fourth Priority Use Rate, calculated as the Third Priority Use Rate minus a "Management Discount," as described in section 9 below. The Fourth Priority Use Rate shall be subject to the annual adjustments set forth in subsection 8.4.7.2.1 above. The Original Third Priority Use Rate minus the then applicable Management Discount shall be referred to as the "Original Fourth Priority Use Rate" and shall be used in applying the annual adjustments to Fourth Priority Use Rate whenever applicable.

8.6.2.2 PVCWD and UWCD acknowledge that the Fourth Priority Use Rate is established with the presumption that the City receives in exchange for the P1 FATW delivered for Fourth Priority Use a right to pump local groundwater pursuant to the FATW Management Plan as provided in section 4.1 above. UWCD and PVCWD agree that the provisions of section 23 below shall apply if the FATW Management Plan is altered in a way that materially reduces the City's right to pump local groundwater in exchange for delivery P1 FATW for Fourth Priority Use.

8.6.2.3 The City, UWCD, and PVCWD acknowledge that the method of establishing the Fourth Priority Use Rate (based on the Third Priority Use Rate minus the Management Discount) is intended to ensure that UWCD and PVCWD pay a fair share of the costs of the P1 FATW Facilities in addition to recognizing the benefits received by all Parties through UWCD's and PVCWD's extraordinary management obligations provided in this Agreement.

8.6.2.4 The City shall invoice and each Fourth Priority User shall promptly pay each invoice pursuant to section 14 below.

8.6.3 Storage. PVCWD, UWCD and the City acknowledge and agree that additional capability to store P1 FATW, both for temporary and seasonal periods, will

provide the Parties with the facilities needed to maximize the beneficial use of P1 FATW. PVCWD, UWCD and the City agree that (i) the City may store P1 FATW during periods when PVCWD or UWCD may not be capable of taking delivery of P1 FATW, and that stored P1 FATW may subsequently be used to supply First, Second, or Third Priority Uses; or (ii) the City may store some portion of the available Fourth Priority Use P1 FATW to gather data sufficient to obtain permits for certain methods of storage of P1 FATW.

8.7 Calleguas Wheeling Rate. To the extent Calleguas imposes a fee ("Calleguas Wheeling Rate") for use and delivery of P1 FATW through the SMP, the City shall include that Calleguas Wheeling Rate as a component of any charge imposed on and payable by Second, Third and Fourth Priority P1 FATW Users, as set forth above. The Parties anticipate that the Calleguas Wheeling Rate will be imposed on a per acre-foot basis.

9. Special Consideration for UWCD's and PVCWD's Operational and Management Obligations. For so long as UWCD and PVCWD continue to fulfill the special obligations provided in sections 10 and 11 below, each shall receive the following "Management Discount" for its purchases of P1 FATW:

9.1 The initial Management Discount shall be one hundred and seventy five dollars per acre foot ($175/AF) of P1 FATW delivered through the UWCD POD and SMP POC, or the PVCWD POD and SMP POC, and shall be referred to as the "Original Management Discount". The Management Discount shall be adjusted annually on the Adjustment Date beginning in 2015, using the CPI Adjustment provided in subsection 8.4.7.2.1(a) above, with the Original Management Discount used where applicable.

9.2 The Management Discount shall be applicable to any P1 FATW purchased by PVCWD or UWCD for a Second, Third or Fourth Priority Use, subject to the annual adjustments set forth in subsection 8.4.7.2.1 above. However, those annual adjustments shall be based not on the applicable rate, but on the applicable rate less the Management Discount.

10. Operation of AWPF and P1 FATW Facilities.

10.1 The City shall be responsible for delivery of P1 FATW from the AWPF into the P1 FATW Facilities.

10.2 To the extent feasible, and in accordance with the terms and conditions set forth in this Agreement, the City shall ensure that the amount of P1 FATW available for distribution through the P1 FATW Facilities shall be sufficient to meet First, Second and Third Priority Use demand, as that demand may exist at any point in time. When PVCWD, UWCD and the City, through the exercise of their collective reasonable discretion, determine that all available P1 FATW is committed to First and Second Priority Uses, no P1 FATW shall be delivered to any Third or Fourth Priority Use. PVCWD, UWCD and the City shall exercise this discretion reasonably.

10.3 The City shall, to the extent feasible, refrain from storing, discharging or otherwise disposing of P1 FATW in any manner that reduces, impedes or prevents

distribution of the maximum amount of P1 FATW to First or Second Priority Users as required under this Agreement. However, this restriction shall not apply to the extent the City must comply with third party regulatory requirements, or in conducting those studies necessary to obtain regulatory approval to: (i) use the local groundwater basin for temporary, seasonal or long term storage of the P1 FATW, or (ii) expand the use of the FATW Facilities for subsequent phases of the GREAT Program. In complying with these regulatory requirements, the City will make every reasonable effort to minimize any impact on First or Second Priority Users.

10.4 The City, UWCD and PVCWD shall, to the fullest extent permitted by law, jointly coordinate and manage the day-to-day delivery of P1 FATW to the Parties.

10.5 The City, UWCD and PVCWD shall, to fullest extent permitted by law, consistent with their rights and obligations under Section8.6.1 above, make every reasonable effort to jointly coordinate and manage delivery of P1 FATW into the P1 FATW Facilities, storage of P1 FATW in UWCD Facilities and PVCWD Facilities and scheduling use of the P1 FATW among the Parties to achieve the following objectives:

10.5.1 Maximize the reasonable and beneficial use of P1 FATW between and among the Parties, while, to the extent feasible, delivering to those users an amount of P1 FATW that reflects and is commensurate with their respective priorities as First, Second, Third or Fourth Priority Users.

10.5.2 Coordinate, to the extent feasible, the scheduling of the deliveries of P1 FATW among the Parties so that each receives the maximum amount of P1 FATW that is practical, reasonable and consistent with each user's status as First, Second, Third or Fourth Priority Users.

10.6 To the extent feasible and consistent with the agreement between UWCD and PVCWD referenced in Section 4.8 above, above, and consistent with their rights and obligations under Section 8.6.1 above, UWCD and PVCWD shall manage storage levels in the UWCD and PVCWD Facilities which they operate to maximize the ability to receive and store any P1 FATW that may be delivered to UWCD and PVCWD in accordance with this Agreement. This obligation includes: a) PVCWD coordinating its use of P1 FATW within the PVCWD Facilities operated by PVCWD along with PVCWD's other water supplies, and b) UWCD coordinating its use of P1 FATW within UWCD Facilities along with UWCD's other water supplies. UWCD and PVCWD shall accomplish the requirements of this subsection 10.6 while also preserving UWCD's ability to maximize groundwater recharge with surface water available to UWCD. This obligation also includes PVCWD and UWCD making every reasonable effort to encourage each of their respective customers to rely on PVCWD water supplies or UWCD water supplies, as applicable, in lieu of the customer's groundwater wells.

10.7 In the event PVCWD or UWCD elect, each in its sole and absolute discretion, to cede its specific management and operational obligations under this section 10, or the City and United and/or PVCWD agree the City shall assume these responsibilities, UWCD and/or PVCWD, as the case may be, shall be immediately

relieved of, and the City shall assume full responsibility for, those obligations. The City's assumption of UWCD's or PVCWD's obligations pursuant to this provision shall not in any manner affect UWCD's or PVCWD's right to receive P1 FATW for Fourth Priority Use, but the Management Discount to which UWCD or PVCWD is entitled pursuant to subsection 9.1 above shall be reduced by forty-five percent (45%), unless the City, UWCD and PVCWD agree to an alternative percentage.

10.8 To the extent UWCD, the City and PVCWD do not agree upon the distribution of available P1 FATW, or any other activity requiring their coordinated efforts, the City in its sole and reasonable discretion shall make any and all final determinations as may be necessary.

11. Further Coordination and Management of FATW Use. In addition to the coordination and management of the operation of the FATW described in section 10 above, the City, UWCD and PVCWD shall have the following coordination and management responsibilities:

11.1 UWCD and PVCWD shall, to the fullest extent allowed by law, ensure that each Party, other than the City, and each of UWCD's and PVCWD's customers, to the extent required under applicable regulations, have a designated and trained FATW site supervisor, who is capable of ensuring the proper implementation of any and all permit requirements for FATW use (signage, etc.), responding to information requests, routine site visits, and emergency conditions.

11.2 As a matter of efficiency and convenience, UWCD and PVCWD may, to the fullest extent allowed by law, assume the site supervisor responsibilities for a UWCD customer, PVCWD customer, and/or any Party other than the City. UWCD's or PVCWD's assumption of any of its customer's or any Party's site supervision responsibilities shall be at UWCD's and PVCWD's sole and absolute discretion, and shall be contingent upon PVCWD or UWCD obtaining written consent of the Party or customer.

11.3 The City shall ensure that UWCD and PVCWD has available all the information and training opportunities necessary to meet its obligations under this Agreement.

11.4 PVCWD and UWCD shall otherwise work with the City to manage all aspects of compliance with the RWQCB and DPH regulatory requirements applicable to FATW use for the purposes contemplated in this Agreement.

11.5 In the event PVCWD or UWCD elects, each in its sole discretion, to cede its specific management and operational obligations under this section 11, or the City, on the one hand, and PVCWD or UWCD, on the other hand as applicable, agree the City shall assume these responsibilities, UWCD and/or PVCWD, as applicable, shall be immediately relieved of, and the City shall assume full responsibility for, those obligations. The City's assumption of UWCD's or PVCWD's obligations pursuant to this provision shall not in any manner affect UWCD's or PVCWD's right to receive P1

FATW for Fourth Priority Use, but the Management Discount to which UWCD or PVCWD is entitled pursuant to subsection 9.1 above shall be reduced by forty-five percent (45%), unless the City, UWCD and PVCWD agree to an alternative percentage reduction.

11.6 To the extent UWCD, the City and PVCWD do not agree upon the distribution of available P1 FATW, or any other activity requiring their coordinated efforts, the City in its sole and reasonable discretion shall make any and all final determinations as may be necessary.

12. UWCD, PVCWD and City Authority.

12.1 The Parties agree that the City, UWCD and PVCWD have the legal authority to manage and operate the P1 FATW Facilities as generally contemplated in this Agreement. Further, the Parties expressly submit to the City's, UWCD's and PVCWD's oversight and authority as expressed in this Agreement, particularly with respect to sections 10and 11 above, and waive any right to object or contest the exercise of such authority and oversight, provided it is exercised reasonably. As a condition of receiving P1 FATW, each Party (other than the City, UWCD and PVCWD) expressly agrees to and waives any right to contest, the City's, UWCD's and PVCWD's legal authority to manage, operate and oversee the delivery and use of P1 FATW as provided in this Agreement.

12.2 To the extent either UWCD or PVCWD elect not to become a Party to this Agreement, or terminate their participation in this Agreement while it otherwise remains in effect as to the other Parties including either PVCWD or UWCD, then the remaining Party (either PVCWD or UWCD) and the City shall make their reasonable best efforts to fulfill the obligations set forth in sections 10 and 11 above. If both UWCD and PVCWD both elect not to become Parties to this Agreement or terminate their participation in this Agreement while it otherwise remains in effect as to the other Parties, then the City shall undertake the obligations under this Agreement without Fourth Priority Users.

13. Regulatory Fees and Charges. The City shall be responsible for obtaining, including all associated costs, the necessary regulatory approvals and permits required to deliver P1 FATW to the Parties Users as set forth in this Agreement. Each Party shall be responsible for any and all ongoing regulatory costs, including ongoing inspections, permit renewals, and enforcements actions, including penalties, associated with delivery or use of P1 FATW from such Party's POD and on such Party's property or facilities.

14. FATW Billing and Payment.

14.1 The City shall provide each Party with a written invoice monthly, including the amount of P1 FATW delivered through such Party's POD(s), or SMP POC, for the applicable billing period, the applicable rates, the total amount due for that invoice period, and any accrued balance. All invoices shall be paid within thirty (30) days of receipt.

14.2 If a Party disputes any portion of an invoice, it shall provide the City prompt notice of the details of the dispute, and otherwise shall pay any undisputed portion of the invoice. Disputes shall be resolved as promptly as practical.

14.3 Notwithstanding any other remedies available at law or equity, the City may impose a late penalty for any portion of an amount due and payable, but not satisfied by the due date. The late penalty shall be 1.5 percent (1.5%) per month.

15. P1 FATW Water Quality and Testing.

15.1 Water Quality. The City will deliver P1 FATW that is directly suitable for commercial agricultural irrigation, meeting all RWQCB and DPH regulatory and permitting requirements. The water quality profile will be that documented pursuant to 4.10 above. Each Party shall be responsible for any treatment required from that Party's POD (maintaining the disinfection residual, if any, along with any other treatment it may elect to use); provided however, the City makes no warranty regarding the quality of the P1 FATW beyond that specified in this Agreement.

15.2 Water Testing. The City shall be responsible for all water quality testing that is required up to each Party's POD and POC and each Party shall be responsible for any water quality testing beyond its PODs, if any is required.

16. End Use of FATW.

16.1 Each Party agrees to abide by and comply with the operational and management authority exercised by UWCD, PVCWD and the City under this Agreement.

16.2 Each Party acknowledges and confirms that its agricultural operations are not dependent upon the delivery of P1 FATW and that those operations have ready access to alternative water resources in the event that access to P1 FATW is, with or without notice, reduced, temporarily suspended or terminated.

16.3 Each Party understands and agrees that use of P1 FATW is subject to DPH and RWQCB regulations and shall use the P1 FATW only for uses consistent with and in accordance with all applicable laws, regulations and rules.

16.4 Subject to subsection 11.2 above, to the extent required under applicable regulations each Party, including UWCD, PVCWD and each of their respective customers, shall designate a representative to be the "Site Supervisor" for any P1 FATW used within their respective facilities or service area. The Site Supervisor shall represent the Party as a liaison with UWCD, PVCWD and the City, and shall have the authority to carry out the appropriate use of P1 FATW and any related activities at the Party's facilities or in its service area. Each Party shall be primarily responsible for on-site supervision, training, and the general handling of the P1 FATW distributed or stored within its facilities or service area. The City, UWCD, and PVCWD shall collaborate and coordinate any needed training, signage, monitoring and reporting for each Party, and UWCD and PVCWD customers in a manner that is least intrusive to the associated

business and/or farming practices, and otherwise meet any RWQCB and DPH requirements.

16.5 Each Party acknowledges and agrees that P1 FATW shall only be used on the property expressly designated for use and that the P1 FATW shall not be transferred or sold to any third party or any property other than those designated through this Agreement. Provided, however, the Parties acknowledge that PVCWD and UWCD intend to commingle the P1 FATW with its other water supplies and deliver that comingled supply to their customers within their designated service areas.

17. Reduction of Groundwater Use. The Parties, other than the City, acknowledge and agree that they will make every reasonable business effort to use P1 FATW in lieu of their reliance on groundwater. In addition, PVCWD and UWCD shall each make a reasonable effort to encourage their customers to do the same.

18. Priority of Delivery. The City, in accordance with the terms and conditions set forth in this Agreement, shall control the quantity of and rate (GPM) at which P1 FATW will be made available. The Parties acknowledge that the City intends to maximize the use of the P1 FATW to offset in-City potable water demands. However, the Parties also expect that, in accordance with the terms and conditions set forth in this Agreement, a significant majority of the anticipated volume of P1 FATW will be available for the Parties other than the City.

19. FATW Delivery Date. The City expects to be capable of delivering P1 FATW by April of 2015, provided there is no legal challenge or other delay(s) impacting the initiation of delivery and the SMP is available for use. The Parties shall make every reasonable effort to have all necessary facilities and approvals in place so that P1 FATW may be delivered concurrent with the completion of the P1 FATW Facilities and any associated permitting and regulatory compliance measures.

20. City Access to P1 FATW User Facilities.

20.1 Noticed Access. The City, UWCD and PVCWD, or their agents shall have reasonable access to the Parties' facilities subject to the terms and conditions of this Agreement, to verify compliance with this Agreement and all applicable laws regarding the use of P1 FATW under this Agreement. Inspections shall occur during normal business hours. The City shall, in any reasonable manner, give a minimum of forty-eight (48) hours advance notice of an intended inspection, and shall coordinate any inspection to minimize disruption of that Party's business activities.

20.2 Emergency Access. To the extent required to respond to an emergency related to the delivery of P1 FATW, the City shall have unqualified access to each Party's' facilities. For purposes of this provision, the term "emergency" means any event involving P1 FATW that presents an immediate threat to public health and safety.

21. Disruption; Modifications.

21.1 Users acknowledge that P1 FATW will be subject to occasional disruptions due to AWPF plant outages, repairs, maintenance and emergencies. The City will make every reasonable effort to maintain P1 FATW available and otherwise provide all Parties with a minimum of forty-eight (48) hours advance notice of anticipated limitations on the availability of P1 FATW. Under no circumstance shall the City, UWCD, or PVCWD be responsible, or held liable for any Party's or P1 FATW User's real or personal property damages, crop damages, lost profits or lost revenue that may result or arise from any disruption in the availability or delivery of P1 FATW to the Party's facilities.

21.2 Users further acknowledge that the use of P1 FATW may be subject to modification as more particularly described in subsections 8.4.6 and 8.5.1 above. PVCWD, UWCD and/or the City will make every reasonable effort under the circumstances to provide the Parties with the maximum advance notice of anticipated modifications related to the provision of P1 FATW. Under no circumstance shall the City, UWCD, or PVCWD be responsible, or held liable, for any Party's or P1 FATW User's real or personal property damages, crop damages, lost profits, lost revenue, consequential, or punitive damages that may result or arise from any modifications or limitations in the availability or delivery of P1 FATW to the User's facilities.

22. Liability and Indemnification.

22.1 The City shall hold harmless, defend and indemnify the other Parties, and their directors, officers, agents, and employees from and against all liabilities, obligations, claims, damages, losses, actions, judgments, suits, regulatory compliance fees, penalties and charges, or other costs and expenses that any User may incur or suffer, excluding lost profits, lost revenue, consequential or punitive damages, resulting from, arising out of, or in connection with the following:

22.1.1 Any negligent act or omission or willful misconduct on the part of the City, its officers, agents, and employees, in the performance of this Agreement; or

22.1.2 Any personal injury or property damage resulting from the failure of the City to provide P1 FATW of a quality meeting the minimum applicable federal, state and local standards for agricultural use; or

22.1.3 Any challenge to the approval of this Agreement arising out of compliance with the CEQA; or

22.1.4 Any act or omission relating to the City's handling, distribution, use or contact with the P1 FATW up to and including the each Party's PODs.

22.2 PVCWD shall hold harmless, defend and indemnify the City, Council members, officers, agents, and employees ("City Indemnified Parties") from and against

all liabilities, obligations, claims, damages, losses, actions, judgments, suits, regulatory compliance fees, penalties and charges, or other costs and expenses the City or any City Indemnified Party incurs or suffers resulting from, arising out of, or in connection with the following:

22.2.1 Any negligent act or omission or willful misconduct on the part of PVCWD, its governing members, officers, agents, and employees, in the performance of this Agreement; or

22.2.2 Any act or omission on the part of PVCWD relating to the handling, distribution, use or contact with the P1 FATW distributed through PVCWD PODs.

22.3 UWCD shall hold harmless, defend and indemnify the City, Council members, officers, agents, and employees ("City Indemnified Parties") from and against all liabilities, obligations, claims, damages, losses, actions, judgments, suits, regulatory compliance fees, penalties and charges, or other costs and expenses the City or any City Indemnified Party incurs or suffers resulting from, arising out of, or in connection with the following:

22.3.1 Any negligent act or omission or willful misconduct on the part of UWCD, its governing members, officers, agents, and employees, in the performance of this Agreement; or

22.3.2 Any act or omission on the part of UWCD relating to the handling, distribution, use or contact with the P1 FATW distributed through UWCD PODs.

22.4 Each Party, other than the City, UWCD and PVCWD, shall hold harmless, defend and indemnify the City, UWCD, and/or PVCWD, their Council members, Directors, officers, agents, and employees ("City, UWCD and PVCWD Indemnified Parties") from and against all liabilities, obligations, claims, damages, losses, actions, judgments, suits, regulatory compliance fees, penalties and charges, or other costs and expenses the City, UWCD, or PVCWD or any City, UWCD and PVCWD Indemnified Party incur or suffer resulting from, arising out of, or in connection with the following:

22.4.1 Any negligent act or omission or willful misconduct on the part of the User, its officers, agents, and employees, in the performance of this Agreement; or

22.4.2 Any act or omission on the part of the Party, other than the City, UWCD, or PVCWD, relating to the handling, distribution, use or contact with the P1 FATW distributed through the Party's POD.

22.5 Promptly following notice of any claim, the indemnified party shall provide written notice to the indemnifying party of such claim. The indemnifying party shall thereafter defend against such claim. The indemnifying party shall select counsel of its choice. If, following notice of a claim by the indemnified party, the indemnifying party fails to promptly defend such claim, the indemnified party may defend the claim as it deems appropriate and with counsel of its choice, including without limitation,

settlement of the claim on terms the indemnified party deems appropriate, and may pursue remedies as may be available to the indemnified party against the indemnifying party.

22.6 The City's responsibility under section 22.1.3 is limited to providing common legal counsel and defense for all real parties in interest that may be named in a CEQA challenge, or the City's election to settle any such CEQA challenge, in the City's sole discretion. Any party may elect, in its sole discretion, defend itself in such CEQA challenge, at its sole cost and expense.

22.7 The indemnification requirements of this section 22 shall survive the termination of this Agreement.

22.8 Notwithstanding any term or condition set forth in this section 22, under no circumstances shall the City, UWCD or PVCWD, members of their governing bodies, officers, agents, or employees, be liable to any Party, or each or any of them, UWCD customers, or PVCWD customers, for their lost profits, lost revenues, consequential or punitive damages.

23. GMA Regulatory Changes. Subsequent to the City providing notice of the satisfaction or waiver of the condition precedent provided in subsection 4.1 above, should the GMA alter the FATW Management Plan such that the City's right to pump groundwater is materially altered, or the GMA restricts the rate the City may extract groundwater in a manner that imposes a material burden on the City, either financially or in its ability to provide water service to its customers, the Parties shall either develop a prompt, mutually acceptable accommodation, or the City may terminate this Agreement pursuant to section 25.3.2 below.

24. Default. A Party shall be in default if it fails to perform any of its obligations under this Agreement at the time performance is due. The defaulting Party shall have thirty (30) days from receipt of a written demand to cure such non-performance or to notify the non-defaulting Party of the existence of, and basis for, a good faith dispute. If the default is curable but cannot be cured within the 30-day period for reasons beyond the control of the defaulting Party, and the defaulting Party is diligently pursuing reasonable efforts to cure such default, the cure period shall be extended as reasonably necessary to permit performance.

25. Term and Termination.

25.1 Term. This Agreement shall remain in full force and effect from the Effective Date, and for ten (10) years following the Effective Date unless terminated pursuant to this Agreement.

25.2 Renewal. The Parties may, either collectively, individually or in any combination, renew this Agreement for an additional ten (10) year term by providing the City with advance written notice of its election to renew between six (6) and twelve (12) months prior to the end of the term provided in subsection 25.1 above. Any renewal shall be subject to good faith negotiations between the City and those Parties seeking renewal

over: (a) any amendments, modifications or accommodations desired by the negotiating parties; (b) any amendments, modifications or accommodations reflecting material changes to regulations governing the allowed uses of FATW; and, (c) the magnitude of the then applicable priority use rates and the methodology of adjusting those priority use rates from year to year.

25.3 Termination.

25.3.1 Termination by Mutual Consent. This Agreement may be terminated in its entirety by unanimous written consent of the Parties, including current Users;

25.3.2 Termination under Specified Conditions. Upon one (1) year prior written notice by the City to all other Parties, this Agreement may be terminated in its entirety based upon the conditions set forth in section 23 above.

25.3.3 Termination by Party Other Than City. Upon one (1) year prior written notice by the Party electing to terminate its participation (other than the City) to all other Parties, each Party other than the City may terminate its participation in this Agreement at its sole discretion. Such termination shall be effective upon the later of a) full payment to the City of all outstanding amounts due and payable, or b) one year from the date of the written notice of termination.

25.3.4 City Termination.

25.3.4.1 With as much advance written notice provided to each Party as reasonably practical, this Agreement may be terminated in its entirety if: a) the City has elected not to construct the P1 FATW Facilities provided in Section 5.2 above, and b) Calleguas has provided notice to the City that the SMP will no longer be available to transmit P1 FATW. If terminated pursuant to this provision, the Agreement shall terminate on the date upon which the SMP is no longer available to transmit P1 FATW.

25.3.4.2 The City may terminate this Agreement with 60 days advance written notice if the total use (in AF) of Second through Fourth Priority P1 FATW drops below 50% (fifty percent) of the P1 FATW capacity for longer than 90 (ninety) days, based on the average use over that 90 (ninety) day period.

25.3.5 Termination due to Breach. If one or more of the Parties to this Agreement is in breach of a material provision of this Agreement, and the breach has not been (i) cured within the cure period provided in section 24 above, or (ii) waived in writing by the non-breaching Parties, then this Agreement shall terminate only with respect to the Party in breach, but remain in full force and effect with respect to those not in breach.

25.4 Effect of Termination. The right to terminate as set forth in this section shall be in addition to any other rights that may be available to the City, any other Party to this Agreement, at law or in equity and shall not be construed as an election of

remedies. The termination of this Agreement shall not relieve any Party of any liability that accrued prior to such termination. Upon the termination of this Agreement, all of the provisions of this Agreement shall terminate except the indemnity provisions set forth in Section 22 above and any continuing responsibility for payment required hereunder.

26. New Parties. Prior to receiving delivery of P1 FATW, a person or entity that is not Party to this Agreement must agree to be bound by the terms and conditions of this Agreement and signify in a writing approved by each of the Parties to this Agreement or their respective counsel that such person or entity is subject to all of the terms and conditions of this Agreement as if an original signatory to this Agreement.

27. Expansion of AWPF Treatment Capacity.

27.1 The City acknowledges that AWPF is constructed so that it can generate additional FATW with the addition of certain treatment and appurtenant equipment. The City agrees to work with the Parties to develop funding sources to expand the FATW generating capacity of the AWPF, along with adequate storage capability, to make more complete use of the potential capacity of the AWPF. The Parties acknowledge that the material terms and conditions provided in this Agreement are not be applicable, in whole or in part, to additional FATW generated from expansion of the AWPF treatment capability.

27.2 This Agreement is limited to the P1 FATW. However, the installation of additional FATW production capability at the AWPF shall not, under any circumstances, relieve the Parties of their rights and obligations under this Agreement.

27.3 If, during the term of this Agreement, P1 FATW Facilities become non-operational for an extended period and additional FATW generating capability has been installed at the AWPF, the City will make reasonable efforts to utilize the additional FATW as a source of P1 FATW to the Parties to the extent practical given the then existing City obligations to deliver both P1 FATW to the Parties and non-P1 FATW dedicated to other users. The intent of this provision is to ensure, to the extent reasonably practical, that the availability of FATW to Parties under this Agreement will continue even where P1 FATW is no longer available as a result of a P1 FATW Facilities failure or non-operation.

28. Water Rights. The City expressly warrants that it owns all necessary rights in the P1 FATW that is the subject of this Agreement, including, without limitation, the right to distribute that P1 FATW to the Parties as specified herein. The Parties expressly acknowledge that this Agreement is intended to provide a management plan for the use of P1 FATW and the associated groundwater pumping for which the use of P1 FATW offsets, within the construct of the GMA regulatory oversight within the region. This Agreement does not convey title to or ownership of the P1 FATW or any water rights which the Parties may individually possess or otherwise be entitled, except as expressly provided in this Agreement. This Agreement is not intended to, nor shall it be interpreted to, give up any rights the City holds pursuant to Water Code section 1210, except as may be expressly provided in this Agreement.

29. Modification. This Agreement may be modified or amended only by a written instrument signed by all Parties.

30. Metropolitan Water District. The Parties acknowledge that the City is a party to an agreement between it, Metropolitan Water District of Southern California ("MWD") and Calleguas through which the City may receive certain contributions from MWD to offset the cost to the City to produce FATW. During the term of this Agreement, the City may also seek to obtain additional contributions from MWD and Calleguas to offset the cost to produce FATW. The Parties acknowledge and agree that these cost offsets are exclusive rights held by the City and no Party, other than the City, is entitled to any current or future contributions from MWD or Calleguas associated with the cost of construction or ongoing operation of the AWPF or the P1 FATW Facilities. The Parties agree that if the City obtains a future cost offset from Calleguas or MWD that is based upon City deliveries of P1 FATW to P1 FATW Users, the Parties shall negotiate in good faith a fair sharing of the cost offset.

31. Authority to Execute. All Parties warrant and represent that they have the power and authority to enter into this Agreement in the names, titles, and capacities herein stated and on behalf of any entities, persons, or firms represented or purported to be represented by such entity (ies), person(s), or firm(s) and that all formal requirements necessary or required by any state and/or federal law to enter into this Agreement have been fully complied with. Furthermore, by entering into this Agreement, the each Party hereby warrants that it shall not have breached the terms or conditions of any other contract or agreement to which a Party is obligated, which breach would have a material effect hereon.

32. Further Assurances and Cooperation.

32.1 Each Party to this Agreement shall at its own expense perform all acts and execute all documents as may be necessary or appropriate to fulfill its obligations under this Agreement. The Parties shall cooperate and take all such actions as may be reasonably necessary to carry out the purposes of this Agreement.

32.2 In particular, the Parties acknowledge that the Pump Charge Adjustments referenced in this Agreement are predicated on UWCD and GMA current business methods and practices. Should either the GMA or UWCD materially modify the method of developing and imposing any of the three groundwater extraction charges that compose the Pump Charge Adjustment, the Parties agree to negotiate in good faith a functionally equivalent method of calculating an annual adjustment to Priority User Rates that includes the annual changes in cost of producing groundwater as a result of pump charges imposed by regional entities.

33. Binding Effect. This Agreement shall be binding on and inure to the benefit of the Parties, and their respective successors and assigns.

34. Separability. If any provision of this Agreement is finally determined by a court to be invalid or unenforceable as written, the provision shall, if possible, be enforced to

the extent reasonable under the circumstances and otherwise shall be deemed deleted from this Agreement. The other provisions of this Agreement shall remain in full force and effect so long as the material purposes of the Agreement and understandings of the Parties are not impaired.

35. Headings; Paragraph References. Captions and headings appearing in this Agreement are inserted solely as reference aids and they shall not be deemed to define or limit the scope or substance of the provisions they introduce, nor shall they be used in construing the intent or effect of such provisions.

36. Uncontrollable Forces and Emergencies. The City may curtail or reduce the amount of P1 FATW delivered through the P1 FATW Facilities or any POD, if by reason of acts of God, earthquakes, droughts, floods, storms, explosion, fires, labor troubles, strikes, insurrection, riots, acts of the public enemy, or federal, state, or local law, order, rule or regulation, or any public emergency or disaster, the City is prevented from delivering, in whole or in part, P1 FATW to any or all of the Parties.

37. Opinions and Determinations; Good Faith. Where the terms of this Agreement provide for action to be based upon opinion, judgment, approval, review or determination of a Party, such terms are not intended to and shall never be construed to permit such opinion, judgment, approval, review or determination to be arbitrary, capricious or unreasonable. The Parties shall each act in good faith in performing their respective obligations as set forth in this Agreement

38. Exclusive Use of P1 FATW. The P1 FATW delivered to each Party shall be used exclusively on and for the benefit of each Party's property as specified herein.

39. Governing Law. This Agreement shall be deemed a California contract and construed according to California law, regardless of whether this Agreement is executed by any Party in another state or otherwise.

40. Entire Agreement. This Agreement contains the entire understanding between the Parties with respect to its subject matter, and supersedes all prior agreements, oral or written, and all prior or contemporaneous discussions or negotiations between the Parties.

41. Rules of Interpretation. The terms of this Agreement have been negotiated by the Parties and the language used in this Agreement shall be deemed to be the language chosen by the Parties to express their mutual intent. This Agreement shall be construed without regard to any presumption or rule requiring construction against the Party causing such instrument to be drafted, or in favor of the Party receiving a particular benefit under this Agreement. No rule of strict construction shall be applied against any Party to this Agreement.

42. Assignment. With the prior written consent of the City, each Party may assign its rights under this Agreement provided:

42.1 The assignee agrees to be bound by all of the obligations set forth herein.

42.2 No assignment shall permit the delivery of P1 FATW to any property other than the assignor's facilities and for commercial agricultural uses consistent with applicable laws and regulations.

42.3 Without the prior written consent of the City, any assignment shall be ineffective, null and void and shall entitle the City to any and all remedies at law or in equity.

43. Semi-Annual Meetings. Commencing with the execution of this Agreement by all Parties, and semi-annually, or as frequently as necessary thereafter, the Parties shall hold joint meetings to review the status and operation of the P1 FATW Facilities.

44. Attorneys Fees and Costs. The prevailing party in any dispute arising out of this Agreement may recover its reasonable costs and attorney's fees and costs, including expert witness fees and costs, expended in connection with such an action.

45. Counterparts. This Agreement may be executed in multiple counterparts, each of which shall, for all purposes, be deemed an original, but which together shall constitute one and the same instrument.

46. Communications. All notices, demands, requests and other communications required or permitted by or provided for in this Agreement shall be given in writing to the Parties at their respective addresses set forth below, or at such address as a Party shall designate for itself in writing. Communications may be transmitted: (i) by personal delivery, (ii) by messenger, express, air courier or similar courier service, or (iii) by facsimile. Delivery or service of any communication shall be deemed effective upon receipt. The date of receipt shall be the date shown as the date of delivery in the written proof of delivery by personal, express mail or courier service, or the electronic confirmation sheet for a facsimile. Any communication received after 5:00 p.m. local time, or on a day other than a business day, shall be deemed received on the next business day.

To City:

City of Oxnard
c/o Utilities Director
305 West Third St, 3rd Floor
Oxnard, CA 93030

To PVCWD:

Pleasant Valley County Water District
c/o General Manager
154 South Las Posas Rd.
Camarillo, CA 93010-8570

To UWCD:

United Water Conservation District
c/o General Manager
106 North 8th Street
Santa Paula, CA 93060

To Houweling:

Houweling Nurseries
c/o President
645 W. Laguna Road
Camarillo, CA 93012

To Southland:

Southland Sod
c/o President
PO Box 579
Port Hueneme, CA 93044-0579

To Reiter:

Reiter Affiliated Companies
c/o Strategic Projects Manager
730 South A St.
Oxnard, CA 93030

47. Incorporation by Reference. All exhibits and attachments to this Agreement are expressly made a part of this Agreement as though fully set forth herein.

48. No Waiver. Any failure or delay on the part of any Party to exercise any right under this Agreement shall not constitute a waiver of the right, and shall not preclude such Party from exercising or enforcing the right, or any other provision of this Agreement, on any subsequent occasion.

++++++++*Signatures on following pages*++++++++

IN WITNESS WHEREOF, this Agreement has been executed by the Parties hereto:

SIGNATURES

CITY OF OXNARD

By_____
Tim Flynn, Mayor

ATTEST:

By_____
Daniel Martinez, City Clerk

APPROVED AS TO FORM:

By_____
Stephen M. Fischer, Interim City Attorney

APPROVED AS TO INSURANCE:

By_____
James Cameron, Risk Manager

APPROVED AS TO CONTENT:

By_____
Daniel Rydberg, Interim Utilities Director

APPROVED AS TO AMOUNT:

By_____
Greg Nyhoff, City Manager

++++++++*Signatures continue on following pages*++++++++

UNITED WATER CONSERVATION
DISTRICT

By_____

Approved as to Form:

By_____
Anthony Trembley,
General Counsel

++++++++*Signatures continue on following pages*++++++++

ORIGINAL

PLEASANT VALLEY COUNTY WATER DISTRICT

By_____

Approved as to Form:

By_____
John Mathews
General Counsel

++++++++*Signatures continue on following pages*++++++++

ORIGINAL

HOUWELING NURSERIES OXNARD, INC.

By_____
Chris Brocklesby, CFO & Secretary

++++++++*Signatures continue on following pages*++++++++

ORIGINAL

SOUTHLAND SOD

By _____ Pres
Jurgen Gramckow, President

++++++++*Signatures continue on following pages*++++++++

REITER BROTHERS, INC.,

By_____
Garland Reiter, President

ORIGINAL

SOUTHERN PACIFIC FARMING, INC.

By_____
Garland Reiter, President

SOUTHERN PACIFIC FARMING II, LLC,
By its Manager
Southern Pacific Farming, Inc.

By_____
Garland Reiter, President

EXHIBIT A

INITIAL P1 FATW ALLOCATIONS

Priority	**Entity**	**Annual Use or Yearly Second Priority Commitment (AFY)**	**Minimum Second Priority Commitment (AFY)**	**Daytime GPM Capacity or Peak Capacity Reservation (GPM)**	**Nighttime GPM Capacity or Peak Capacity Reservation (GPM)**
First Priority	City	1,800		390	1,845
Second Priority	Houweling	800	350		1,000
	Southland	400	175	500	
	Reiter	800	350	1,000	
Third Priority		1,500		1,500	620
Fourth Priority		3,000		1,000	875
Initial Capacity Available (Total)		7,000		4,340	4,340

Exhibit "B"

Fox Canyon Groundwater Management Agency
Resolution 2013-02

Resolution No. 2013-02
of the
Fox Canyon Groundwater Management Agency

A RESOLUTION CONCERNING THE IMPLEMENTATION OF FIRST PHASE OF THE CITY OF OXNARD'S GREAT PROGRAM AND THE ASSOCIATED RECYCLED WATER MANAGEMENT PLAN

WHEREAS, the Fox Canyon Groundwater Management Agency ("Agency") was established to preserve the integrity of the quality and quantity of groundwater resources within its boundaries; and

WHEREAS, the Agency exercises its regulatory authority through ordinances, resolutions, and implementation of its adopted groundwater management plan; and

WHEREAS, the current Agency groundwater management plan ("GMA Management Plan") was updated and adopted in May 2007; and

WHEREAS, the GMA Management Plan provides an extensive evaluation of the varying conditions in aquifers within the Agency, and an assessment of the water management strategies that various entities propose for implementation within the Agency; and

WHEREAS, the City of Oxnard ("City") is in the final stages of constructing the first phase of its Groundwater Recovery Enhancement and Treatment Program ("GREAT Program"), through which the City will make available approximately 7,000 acre-feet per year ("AFY") of advanced treated recycled water ("RW") for use within the City, the Oxnard Plain and Pleasant Valley area; and

WHEREAS, the GMA Management Plan describes the use of RW generated from the GREAT Program as an important management strategy that will result in improvements to water supply reliability and water quality conditions within the Agency; and

WHEREAS, the primary benefits of the GREAT Program include: (a) generation of approximately 7,000 AFY of new water supplies for the region; (b) increased use of supplemental water supplies and the concomitant reduced groundwater pumping in the areas of the Oxnard Plain and Pleasant Valley subbasins; (c) introduction of RW into the Pumping Trough Pipeline ("PTP") and Pleasant Valley County Water District ("PVCWD") systems which will increase United Water Conservation District's ("UWCD") ability to recharge surface water to the Forebay under certain conditions; (d) shifting groundwater pumping from the coastal and Pleasant Valley areas that are most difficult to recharge, to the Forebay/Near Forebay, which is easily recharged; (e) overall increase in groundwater recharge; and (f) the removal of tons of salts from the Oxnard Plain and Forebay groundwater; and

WHEREAS, the Agency adopted Resolutions Nos. 2003-4, and 2003-5 in support of the implementation of the GREAT Program; and

WHEREAS, UWCD's mission is to manage, protect, conserve and enhance the water resources of the Santa Clara River, its tributaries, and associated aquifers; and

WHEREAS, UWCD has and continues to serve an integral role in evaluating groundwater conditions within the Agency jurisdiction and developing strategies to optimize the management and use of water resources within the region. United's efforts in this regard are documented in the GMA Management Plan and its ongoing responsibilities in monitoring aquifer conditions and regularly operating and updating Ventura Regional Groundwater Model; and

WHEREAS, UWCD, PVCWD and the City have developed a plan to utilize RW within the UWCD PTP and PVCWD ("PV") distribution systems, along with direct delivery of RW to agricultural users along the pipeline alignment (collectively, "RW users"). Certain RW users have documented this plan to use RW through an agreement titled, "Full Advanced Treatment Recycled Water Management and Use Agreement" entered into by and between the City, PVCWD, UWCD, Houweling Nurseries, Reiter Affiliated Companies and Southland Sod ("RW Agreement"). The RW Agreement is an attachment to the Agency staff report accompanying this Resolution; and

WHEREAS, the City, UWCD and PVCWD will oversee and coordinate the ongoing delivery of RW to agricultural users in the Pleasant Valley and Oxnard Plain subbasins; and

WHEREAS, as a component of the RW Agreement, the City, UWCD and PVCWD have developed a "Recycled Water Management Impact Analysis Plan" ("RWIA Plan") pursuant to which basin conditions will be monitored and analyzed, and criteria set under which the City will be able to pump groundwater from City owned wells and the UWCD Oxnard-Hueneme system ("OH System"). The RWIA Plan is set forth in this Resolution and its attachments; and

WHEREAS, the use of RW and the implementation of the RWIA Plan will contribute to the improvement of groundwater supply and quality issues within the Agency; and

WHEREAS, from 2006 to present the City, UWCD and PVCWD collaborated on the implementation of the Conejo Creek – Supplemental M&I Water Program. This program provided PVCWD approximately 6,000 AFY of additional surface water supplies. All or some portion of the groundwater pumping by PVCWD displaced by this additional surface water was then transferred to the Forebay through groundwater delivered to UWCD's Oxnard-Hueneme Pipeline customers, including the City. The intent of this program was to shift groundwater pumping from the Pleasant Valley subbasin to the Forebay; and

WHEREAS, the data obtained from the implementation of the Supplemental M&I Water Program is valuable in assessing the capabilities and impacts of shifting additional pumping to the Forebay as documented in the RWIA Plan (Attachment A); and

WHEREAS, the GREAT Program Final Environmental Impact Report (SCH #2003011045) assessed the potential environmental impacts associated with Phase 1 of the GREAT Program and this RWIA Plan, and was certified in September, 2004, concurrent with the City's approval of the construction of Phase 1 of the GREAT Program; and

WHEREAS, the Agency Ordinance Code provides for adjustments to extraction allocations; and

WHEREAS, the Agency has considered the environmental effects of the RWIA Plan as shown in the GREAT Program Final Environmental Impact Report and made the findings required by California Environmental Quality Act Guidelines section 15091.

NOW, THEREFORE, IT IS HEREBY PROCLAIMED AND RESOLVED AS FOLLOWS: The Agency grants its approval of the RWIA Plan subject to the following conditions:

1. This Resolution supersedes and restates in its entirety Resolution No. 2003-5.

2. The UWCD has provided the RWIA Plan and Monitoring Plan for the proposed groundwater pumping allowed pursuant to this Resolution. This Resolution and the RWIA Plan contain the following (the RWIA and Monitoring Plan are included as Attachment A and B to this Resolution):

    a. A description of groundwater monitoring program consisting of water level and water quality monitoring that is designed to detect ongoing conditions within the West Las Posas Basin, Pleasant Valley subbasin, the Oxnard Plain subbasin, and the Forebay. Water level and quality data shall be collected on an ongoing basis for use to assess basin conditions and provide for the ongoing use of the Ventura Regional Groundwater Model in evaluating basin conditions.
    b. An assessment of historic and current conditions in the Forebay, Oxnard Plain and Pleasant Valley subbasins and anticipated impacts to those subbasins associated with the implementation of the RWIA Plan.
    c. Limitations or restrictions on Forebay pumping based upon groundwater level triggers and hydrologic conditions.
    d. Annual, or more frequent, coordination meetings and reporting between the City, UWCD, PVCWD and the Agency regarding the annual report and implementation of the RWIA.
    e. All monitoring and reporting shall be overseen and approved by a State of California Licensed Professional Geologist or Engineer.

3. The City shall accrue a Recycled Water Pumping Allocation ("RWPA") (up to 5,200 AFY per year), which allows the City to obtain groundwater in a volume and subject to the conditions provided in this Resolution.

4. The City will receive 1 acre-foot of RWPA for each acre-foot of RW use that results in 1 acre-foot decrease in groundwater pumping by RW users. Further, the City will receive RWPA only in the instance that the reduced groundwater pumping by RW users was

groundwater that would have been pumped based upon a Historical Allocation or Irrigation Efficiency/Allowance Allocation.

5. To the extent practical, PVCWD shall prioritize its water use as follows, from highest to lowest priority: (a) Conejo Creek Project supplemental water: (b) RW; (c) surface water from UWCD; and (d) groundwater. However, the Agency acknowledges that Camrosa Water District and PVCWD are currently reevaluating the future availability of water from the Conejo Creek Project. This Resolution creates no obligation for PVCWD to continue purchasing water through the Conejo Creek Project; provided however, if PVCWD does continue to have access to that supply, it should rely on it as a first priority. Further, the Agency recognizes that Camrosa Water District has relied and may continue to rely on the Conejo Creek Project supplies for use within its district. The volume of water available to PVCWD has been and may continue to be reduced as Camrosa uses more and more of that supply within the Camrosa service area. This prioritization of use under this provision shall be documented through the Annual Report required under Section 13.

6. No RWPA will accrue to the City for RW use that displaces groundwater pumping that would have been subject to Agency surcharges.

7. No RWPA shall accrue to the City for RW use that displaces UWCD surface water deliveries to those same users, when and if UWCD is concurrently physically not capable of diverting that volume of surface water to UWCD recharge basins because the recharge basins and the Forebay are full.

8. RW users shall not earn conservation credits on unused Historical Allocation associated with reduced groundwater pumping resulting from use of RW.

9. The City will report annually to the Agency and UWCD the quantity of RW delivered to each RW user. Prior to receipt of any RW, each RW user shall develop a protocol and format acceptable to the RW user, the Agency and the City, to account for the RW user's annual water use, including RW.

10. The City and RW users will report their water use to the Agency on semi-annual extraction reports as required under Agency rules and procedures, and otherwise consistent with the requirements provided in Section 9 above.

11. City shall pump the RWPA from City owned wells and UWCD's O-H system.

12. The Agency, the City, UWCD, and PVCWD shall meet during the first week of May of each year ("Coordination Meeting"), and more frequently as necessary, to discuss any needed refinements to the implementation of the RWIA Plan, the current accounting of RWPA, and any expected limitations on the City's use of RWPA because of Forebay water levels and then existing hydrologic conditions. As a result of these annual meetings, the Agency, the City and UWCD shall establish the locations and volume of

RWPA that shall be available to the City for pumping through the following year, subject to the following conditions:

a. The volume of RWPA that the City is allowed to extract shall be set between 0 and 8,000 AFY (this volume limitation shall include the volume of M&I Supplemental Program water UWCD will pump during the same period as provided in Section 20, below); and
b. To the extent the City is not allowed to pump the cumulative RWPA it has earned, all accrued RWPA shall carry forward until the City is allowed to use the RWPA in its entirety, subject to the conditions of this Resolution; and
c. To the extent the Agency, the City and UWCD do not agree on restrictions on the use of RWPA for any given year, based on the then existing and anticipated hydrologic circumstances, the City shall use the RWPA consistently with UWCD Board of Directors' determination in consultation with the Agency.
d. This provision shall not prevent the parties from meeting more frequently to consider alterations to the implementation of the RWIA Plan given changing hydrologic conditions.

13. In preparation for the Coordination Meeting, the City, UWCD and PVCWD will provide the Agency with an Annual Report by April 1st. The report shall include an assessment of conditions, including water level/water quality data and analysis in the Forebay, Oxnard Plain and Pleasant Valley subbasins and an evaluation of any impacts directly associated with the pumping approved under this Resolution. GMA staff will annually review and report to the Agency Board on compliance and effectiveness of this Resolution.

14. Unless otherwise authorized pursuant to the Coordination Meetings, the City shall not pump its RWPA from the Forebay when evacuated groundwater from storage in the Forebay reaches 80,000 acre-feet (as regularly determined by UWCD), or groundwater levels in the Forebay reach 19 feet above mean sea level. Resumption of pumping of RWPA from the Forebay shall occur as authorized pursuant to the Coordination Meetings as provided in Section 12.

15. City shall be deemed to pump its RWPA before its Historical Allocation.

16. The City may not transfer or assign all or any portion of its RWPA, except to facilitate its use of the RWPA in coordination with UWCD so that RWPA may be pumped from either City owned wells or UWCD's O-H Pipeline facilities.

17. Except as expressly provided in this Resolution, the RWPA does not create a new Agency allocation or credit.

18. Only RW delivered to RW users who have filed all required extraction reports with and have paid all required fees, charges and penalties due and payable to the Agency and UWCD shall be eligible to generate a RWPA for the benefit of the City.

19. The Agency Board may reconsider and modify any provision of this Resolution under the following circumstances: (a) concurrently with the expiration of the "Performance Test" (no later than 2 years after 1st RW Delivery) as provided and as defined in the RW Agreement; (b) a material modification in the terms and conditions set forth in the RW Agreement; (c) to make this Resolution consistent with provisions of any update to the GMA Management Plan that has been approved by the Agency Board; or (d) a finding by the Agency Board that the implementation of this Resolution is having a detrimental impact on the water resources in either the Forebay, Oxnard Plain or Pleasant Valley subbasins. The Agency shall provide a minimum of six months advance notice to the RW users before implementing any material change to this Resolution.

20. Based upon the RWIA provided in Attachment A, 8,000 AFY of RW and M&I Supplemental Program groundwater extraction can be accommodated in the Forebay with little, if any effect on Forebay depletion. 5,200 AFY of RW pumping is proposed as a substitute to the M&I Supplemental Program as part of this Resolution. Therefore, to remain below this impact threshold, no more than 2,800 AFY of groundwater pumping in any one year can be utilized by UWCD from the M&I Supplemental Program account.

21. The City shall cease accruing RWPA on the date in which the first 10-year term of the RW Agreement terminates. Subsequent to the termination of the RW Agreement, the City shall pump its remaining RWPA pursuant to the terms and conditions of this Resolution.

On motion by Director Naumann, seconded by Director Kelley, the foregoing resolution was passed and adopted on this 26th day of June 2013.

By: Charlotte Crave
Charlotte Crave, Vice-Chair, Board of Directors
Fox Canyon Groundwater Management Agency

ATTEST: I hereby certify that the above is a true and correct copy of Resolution 2013-02.

By: Miranda Nobriga
Miranda Nobriga, Clerk of the Board

Attachment A – Recycled Water Management Plan Impact Analysis (RWIA) Plan
Attachment B – Monitoring Plan for GREAT Program Forebay and Oxnard Plain Extractions, dated May 2013

Recycled Water Management Impact Analysis (RWIA) Plan

Prepared by UWCD – Dr. Steve Bachman
April 2013

Proposed Extraction Locations and Pumping Schedules: The pumping is proposed to be shared between three sites - UWCD's El Rio facility, Oxnard's Water Yard, and Oxnard's Rice Avenue facility. The El Rio facility is in the Forebay basin and pumps largely from the Upper Aquifer. The Water Yard and Rice Ave facilities are located in the Oxnard Plain basin, near the boundary with the Forebay basin. The Oxnard facilities pump largely from the Upper Aquifer.

Potential Impacts from Pumping: Although the Forebay basin can tolerate significant pumping because it is easily recharged during wet periods, decreased water levels in the Forebay basin and adjacent portions of the Oxnard Plain basin can create temporary impacts. Because Oxnard's facilities are between the Forebay and the coast, there could be potential impacts at the coastline. These impacts can be divided into local and regional effects. Local effects include lowered groundwater levels and/or water quality changes in nearby wells. For instance, nitrates commonly increase at El Rio during dry periods when there is less recharge and groundwater elevations drop in the Forebay. Regional effects include overall lowered groundwater levels that could extend to the coastline and affect seawater intrusion, which is most likely during successive dry years, when Forebay recharge is significantly reduced while pumping continues. In particular, care must be taken not to pull the Hueneme plume of salty groundwater further inland.

The Fox Canyon Groundwater Management Agency ("FCGMA") has previously approved two programs which authorized increased reliance on Forebay pumping. The results of these programs – the Conejo Creek / Supplemental M&I Program and the Ferro Pit recharge basin acquisition program (FCGMA Resolution No. 2010-08) – have demonstrated that increased pumping from the Forebay can be managed successfully and without any negative consequences.

It is important to note that Oxnard has eliminated its use of the Conejo Creek / Supplemental M&I Program, so much of the pumping in the Forebay that is part of that program will be eliminated. Whereas PVCWD may continue to receive some water from the Conejo Creek project, the transfer of pumping to the Forebay will be significantly decreased. Historically, the Conejo Creek project has produced approximately 6,000 AFY of yield with that groundwater pumping shifted to the Forebay. This program has demonstrated that the Forebay can accommodate this level of increased pumping without negative consequences.

It is also important to note that whereas the GREAT Program will deliver approximately 5,200 AFY of advanced treated recycled water ("RW") which will be eligible for a Recycled Water Pumping Allocation ("RWPA"), the availability of RW for use within PVCWD and the PTP system will enable UWCD to retain some additional surface water to recharge the Forebay. Hence, the impact of pumping the RWPA from the Forebay and the adjacent areas of the Oxnard Plain basin will be mitigated to some extent by the enhanced recharge of the Forebay.

Analysis of Potential Impacts: UWCD has evaluated various pumping scenarios based on historic water uses. In particular, the implementation of the Conejo Creek / Supplemental M&I Program and the Ferro Pit recharge basin acquisition program provide very recent data regarding the Forebay's ability to accommodate various pumping stresses. Attachment A indicates that as much as 8,000 AFY of additional Forebay pumping under these programs has had minimal effect on the strong correlation between river flow/diversions and groundwater elevations. The Forebay has historically accommodated cycles of lowering water levels during drier years and recharge and rebound of water levels during wetter years.

Thus, the Forebay appears to be able to accommodate RWPA pumping of the magnitude of the supplemental water programs.

Despite the historical accommodation of the Forebay to dry periods, groundwater elevations reach sea level during these periods. Thus, potential impacts of low groundwater elevations during dry periods must be monitored carefully. For instance, if groundwater elevations in the Forebay reach critical depletion levels (80,000 AFY of available storage or 19 feet above sea level), the low groundwater elevations could potentially create a landward gradient that pulls seawater further into the aquifers. It would be prudent to reduce pumping of RWPA water during this time of low water levels.

The regional groundwater gradient in the vicinity of the Forebay is towards the west, parallel to the Santa Clara River. Data evaluation does not indicate discernable changes in this gradient caused by any increase in Forebay pumping. The Forebay and adjacent areas already have significant pumping as a background. The added anticipated pumping associated with this project should impose only a relatively small incremental change.

Material local effects, including lowered groundwater levels and/or water quality changes in nearby wells, are not expected to result from the proposed pumping. UWCD has a long history of operations at the El Rio facility which has been accommodated by other pumpers in the area. The high transmissivity of the aquifers in the Forebay tends to mute cones of depression, with the effects of current pumping in the El Rio wellfield only evident during very dry periods. The other mitigating factor is that surface water is spread at El Rio, creating a recharge mound that at times overwhelms and completely masks any cone of depression from the El Rio wells. As described below, UWCD carefully monitors groundwater conditions near the El Rio facility and will be able to detect unexpected effects before causing undesirable consequences. Localized effects would occur in the aquifer due to the increased pumping at the Water Yard and Rice Avenue facilities, but those effects are not likely to impact other currently active production wells that are located over 4,000 feet and over 1,600 feet away.

Monitoring: UWCD currently monitors dozens of wells in the Forebay, Pleasant Valley, and Oxnard Plain subbasins. The monitoring points are a combination of production wells and dedicated monitoring wells, which are generally monitored on a quarterly schedule for groundwater elevations. A portion of these monitoring points also have recording transducers in the wells to measure groundwater levels, with sampling intervals varying from several minutes to several hours. In some producing wells with transducers, real-time data transfer is accomplished through a SCADA system, whereas data from the other transducers are manually downloaded regularly. The groundwater elevation data are regularly entered into UWCD's groundwater elevation database for analysis.

Groundwater quality is sampled from a subset of these wells, generally on a quarterly basis, and entered into UWCD's water quality database for analysis. In addition, the results of water quality sampling from other public water supply wells are downloaded regularly from California Department of Public Health digital records into UWCD's water quality database. UWCD regularly adjusts its monitoring program to address differing conditions, and will continue to do so with this project.

Mitigation of Potential Effects: Given that the reduction in the pumping resulting from the decrease in the Supplemental M&I Program may partially or fully offset anticipated RWPA pumping, aquifer conditions may not change as a result of this project. Forebay groundwater elevations will likely continue to cycle through wet and dry conditions, with full recovery coming when wet-period recharge fills the Forebay subbasin. An uncertainty, however, is the effect of reduced diversions during some years because of future fish flow requirements. The increased recharge to the Forebay from flows diverted from the PV and PTP pipelines to Forebay spreading basins may partially or wholly mitigate this loss to fish flows.

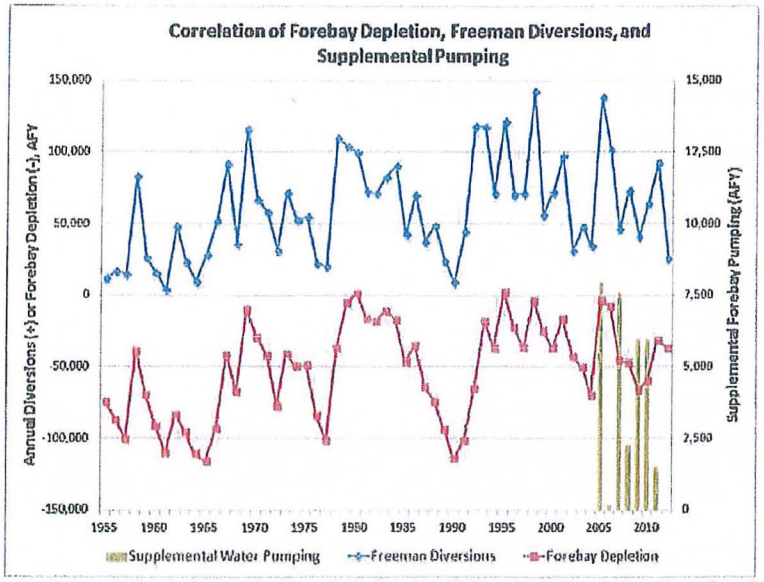
UWCD will continue to pump the Forebay consistent with its historical operations in the Forebay. That is, when Forebay levels are materially depressed and it appears that dry conditions will persist such that Forebay water levels may decline below UWCD's threshold low water level trigger, pumping of supplemental water such as RWPA may be reduced or suspended until UWCD determines the low water level conditions are or will be ameliorated. As with the M&I Supplemental Water program, UWCD will determine in April-May of each year the amount of RWPA that can be pumped in the following water year (October 1 to September 30) at the three extraction locations. This decision will be based on trends of groundwater elevations and other factors that could influence groundwater elevations, in consultation with FCGMA and the City of Oxnard. Of prime concern in this determination is whether RWPA pumping in the following year could lower groundwater elevations below those that correspond to 80,000 AF of available storage or 19 feet above sea level (measured as an average at two wells - Well Nos. 02N22W12R01S and 02N22W22RO2S). However, if groundwater elevations drop further than expected during the year and threaten to go below the 80,000 AF depletion level or 19 feet above sea level, then mid water-year meeting(s) among parties will be held to determine whether the RWPA pumping schedule should be modified.

To monitor and potentially mitigate any impact of pumping RWPA water from the facilities outside the Forebay (Water Yard and Rice Ave) during a dry period that could pull salty water inland from the Hueneme seawater plume, the Upper Aquifer groundwater gradient between these facilities and the coast will be calculated after each monitoring event of the coastal monitoring wells, but not less than semiannually. If it is established that there is a landward gradient that could pull the Hueneme plume further landward, then UWCD, FCGMA, and Oxnard will meet to discuss altering pumping locations and/or pumping amounts until a seaward gradient is re-established.

Groundwater elevations and water quality will continue to be monitored on the existing schedules by UWCD and the County of Ventura. The monitoring results will be analyzed by UWCD at least twice a year for unexpected effects of the pumping. If unexpected effects are detected that could produce undesirable consequences in the basin, UWCD, FCGMA, and Oxnard will meet to discuss how pumping patterns/amounts will be adjusted to prevent the potential undesirable consequences. Because the pumping will be distributed among several wells within three separate locations, there is significant ability to alter pumping patterns. Undesirable consequences are considered to include drawdown below historical low groundwater elevations at the pumping location, interference with other pumping wells that exceeds normal levels and could cause nearby well owners to lower pump bowls in their well(s), and unexpected water quality changes that impact beneficial uses of the groundwater.

Monitoring Results and Reporting: The results of the project monitoring will be summarized following the end of each calendar year by UWCD. Water level and water quality results will be graphed and mapped for ease of examination. The results will be summarized in the Annual Report and circulated to FCGMA and Oxnard by April 1st.

Attachment A



There is a strong correlation between Forebay depletion (available storage) and diversion of surface water at the Freeman Diversion. Thus, Forebay groundwater elevations are largely driven by climatic factors. When as much as 8,000 AFY of pumping was added to the Forebay as part of the M&I Supplemental and Ferro programs (shown as columns), there was little if any effect on Forebay depletion.

Monitoring Plan for
GREAT Project Forebay and Oxnard Plain Extractions

May 2013

Proposed Extraction Locations and Pumping Schedules: The pumping is proposed to be shared between three sites – UWCD's El Rio facility, Oxnard's Water Yard, and Oxnard's Rice Ave. facility. The combined Program is limited to pumping amounts up to 8,000 AFY.

Monitoring: United Water currently monitors scores of wells in the Forebay (45 wells for water quality, and 46 wells for water level) and Oxnard Plain (70 wells for water quality and 110 wells for water level) basins (Figures 1 and 2). The monitoring points are a combination of production wells and dedicated monitoring wells. The frequency of monitoring depends upon the location of the well and the aquifer penetrated. The maps indicate the current frequency of monitoring. In addition, the maps also indicate the wells in which transducers are installed. These transducers are generally set to monitor water levels about every four hours. In the producing wells with transducers, real-time data transfer is accomplished through a SCADA system, whereas data from the other transducers are stored and manually downloaded regularly. The groundwater elevation data and water quality analyses are regularly entered into United Water's groundwater elevation and water quality databases for analysis. In addition, the results of water quality sampling from other public water supply wells are downloaded regularly from California Department of Public Health digital records into United's water quality database. United Water regularly adjusts its monitoring program to address differing conditions, and will continue to do so during this project. The trigger of 19 feet above sea level in the Forebay will be measured as an average of two wells (Well Nos. 02N22W12R01S and 02N22W22RO2S). Water levels in the western portion of the West Las Posas Basin will be monitored. In addition, when nearby monitoring wells are available, water levels and extractions from individual RW Agreement operators on the Oxnard Plain and Pleasant Valley Basins will be measured.

Monitoring Results and Reporting: The results of the project monitoring will be summarized at the end of each calendar year by United Water, and submitted by April 1st to the Agency as part of the Annual Report. Water level and water quality results will be graphed and mapped for ease of examination. This analysis will be an integral part of the Annual Report required for the GREAT project.

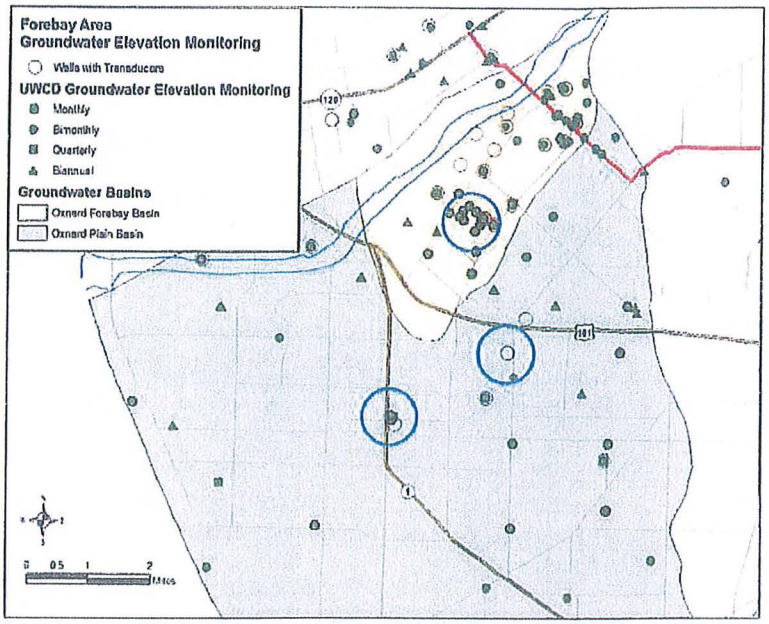


Figure 1. Current United Water groundwater elevation monitoring program. Blue circles indicate locations of pumping for the GREAT project.

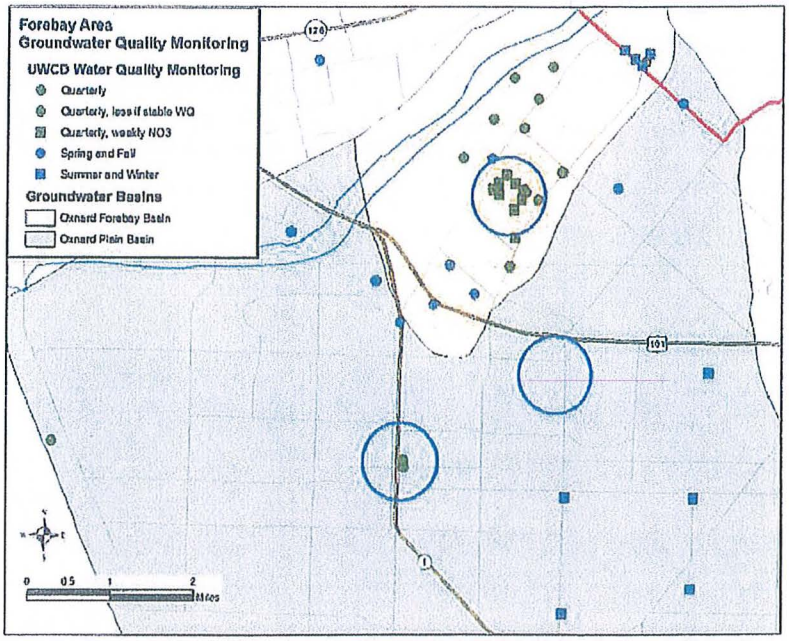


Figure 2. Current United Water groundwater quality monitoring program. Additional data are obtained regularly from California Department Public Health for public drinking water wells in the area. Blue circles indicate locations of pumping for the GREAT project.