Palmdale Water District

Strategic Water Resources *Plan*

Final Report
March 2010

RMC
Water and Environment

Strategic Water Resources Plan
Final Report

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List of Abbreviations

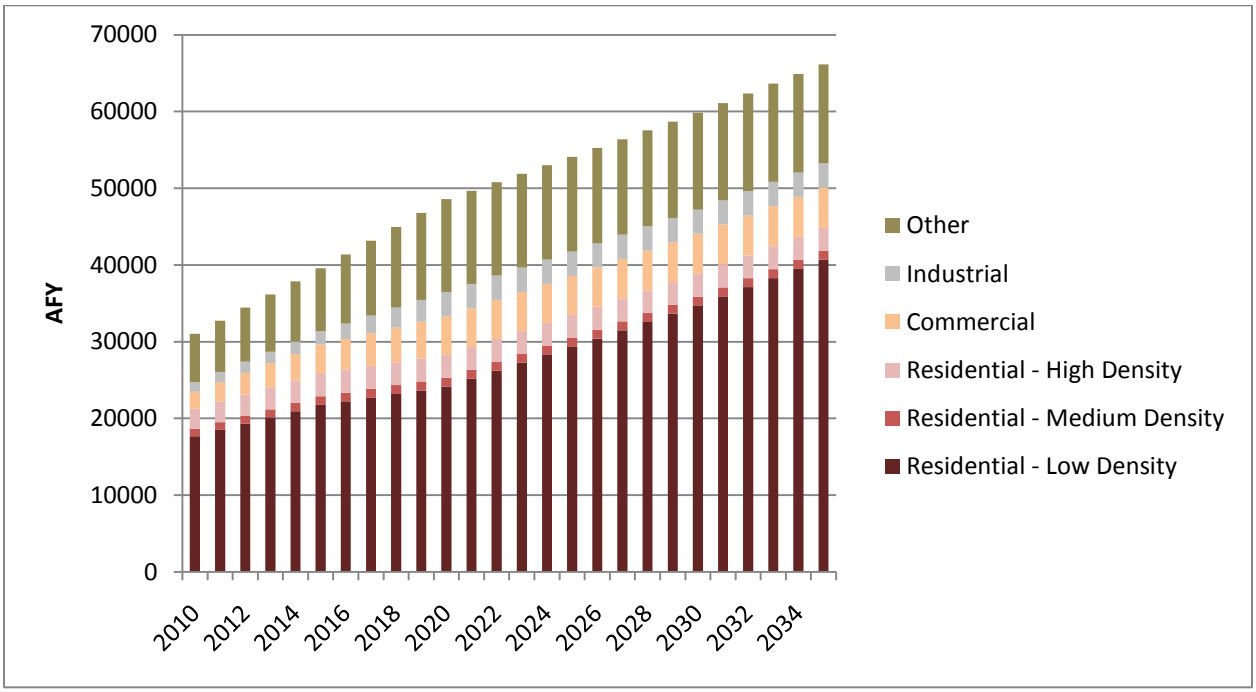
afy	acre-feet per year
ASR	aquifer storage recovery
AVEK	Antelope Valley-East Kern
AVSWCA	Antelope Valley State Water Contractors Association
BMP	Best Management Practice
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CUWCC	California Urban Water Conservation Council
DWR	Department of Water Resources
EIR	Environmental Impact Report
ES	Executive Summary
gpd	gallons per day
gpm	gallons per minute
GW	Groundwater
GWR	Groundwater Recharge
GWR-RW	Recycled Water Groundwater Recharge
IW	Imported Water
LACSD	Los Angeles County Sanitation District
LADWP	Los Angeles Department of Water and Power
mgd	million gallons per day
MWD	Metropolitan Water District of Southern California
NPV	Net Present Value
O&M	Operations & Maintenance
OWUE	Office of Water Use Efficiency
PWD	Palmdale Water District
RW	Recycled Water
RWQCB	Regional Water Quality Control Board
SAT	Soil-Aquifer Treatment
SRF	State Revolving Fund
SWP	State Water Project
SWRCB	State Water Resources Control Board
SWRP	Strategic Water Resources Plan
SWRP	Strategic Water Resources Plan
TM	Technical Memorandum
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan

Executive Summary

ES-1 Overview

Palmdale Water District (PWD) has prepared this Strategic Water Resources Plan (SWRP) to establish guiding objectives and identify necessary steps in order to meet the projected future needs of its customers. Over the next 25 years, the population residing within PWD's current service area is expected to more than double. Correspondingly, anticipated supply needs to meet the water demands of these customers is expected to more than double as illustrated in **Figure ES-1** below.

Figure ES-1-1: Projected PWD Supply Needs from 2010 to 2035



Palmdale Water District has a number of water resource options available to it in order to meet these needs as illustrated in **Figure ES-2**. These include imported water, groundwater, local runoff, recycled water, conservation and water banking. To understand where PWD should be placing its emphasis, PWD has developed this plan that considered all the different options available to it, evaluated these options with respect to a variety of factors including cost, reliability, flexibility, implementability and sustainability. Through this evaluation process, PWD has developed the following recommended water resource strategy.

Figure ES-1-2: Mixture of Water Resource Options for Palmdale Water District

ES-2 Recommended Strategy

The recommended strategy for the SWRP is summarized as follows:

- Acquire and/or develop new imported supplies
- Create a combination of local surface spreading facilities to percolate untreated State Water Project (SWP) water and Aquifer Storage Recovery (ASR) wells to inject potable water
- Add additional pumping capacity to achieve a target of delivering 70 percent of supply to customers through groundwater pumping.
- Pursue a recycled water exchange program with nearby agriculture in-lieu of groundwater pumping

In addition, PWD will begin to embark on a strategy to diversify its supplies and provide for near-term drought reliability with the following steps:

- Expand conservation programs
- Recover storage capacity in Littlerock Reservoir through sediment removal
- Implement a recycled water system for non-potable uses (e.g. primarily irrigation but possibly some industrial uses)
- Further research using treated recycled water to replenish the groundwater basin as is now being done in Orange County through advanced water treatment processes, blending with SWP water, and surface spreading and percoloation

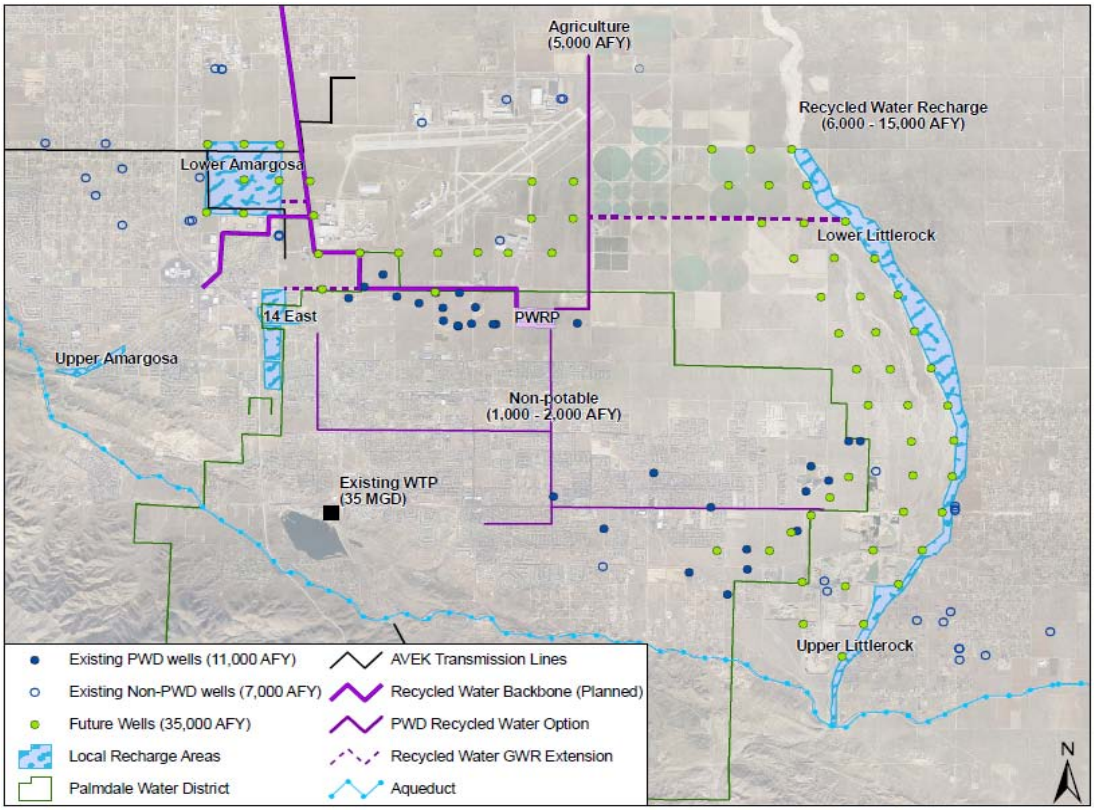
The specific targets for which PWD should strive are summarized in **Table ES-1**. **Figure ES-2** illustrates what future facilities may look like under this recommended strategy.

Table ES-1-1: Water Resource Targets for Recommended Local Storage Strategy

Water Supply Elements	Current	Target for 2035
Imported Water	12,000 afy (average)	36,000 to 47,000 afy (average)[1]
Groundwater Pumping	12,000 afy (average)	47,000 afy (average)
Surface Water Treatment Capacity	35 mgd	35 mgd
ASR Injection Capacity	None	6,000 gpm (800 AF/month)
Surface Recharge Capacity	None	35,000 afy (average)
Local Storage Capacity	None	120,000 af
Recycled Water		1,800 afy
- Non-potable	None	
- Exchange with agriculture	None	0 to 5,000 afy[1]
- Groundwater recharge	None	0 to 15,000 afy[1]
Active Conservation Programs	250 afy	2,600 afy
Passive Conservation Programs	None[2]	3,600 afy
Littlerock Reservoir	4,000 afy (average)	4,500 afy (average)
External Water Banking	None	Consider on an opportunistic basis

[1] The volume of imported water used will depend on how much recycled water is used for in-lieu groundwater exchange with agriculture and/or groundwater recharge.
[2] Prior passive conservation measures (e.g. plumbing code changes) were not evaluated but have been taken into account in future demand projections.

Figure ES-1-3: Proposed Future Facilities



To help guide PWD in achieving these targets, the following strategic objectives have been established. (**Table ES-2**).

Table ES-1-2: Recommended Strategic Objectives for PWD

Water Resource Element	Strategic Objective
Imported Water	• Firm up existing Table A supplies so that imported water is available at historical average levels • Create and maintain options for future acquisition of imported water as need arises • Protect both existing supplies and future opportunities by being proactive and a leader as operation and management of the SWP system continues to evolve
Groundwater Pumping and Recharge	• Be able to meet 70 percent of demands through pumping within ten years (i.e. by 2020). • Do not further draft the local groundwater basin • Establish and operate recharge facilities to offset both proposed pumping increases and potential loss of groundwater pumping due to adjudication
Water Banking	• Establish ability to bank available imported water as soon as possible • Focus first on developing storage within the groundwater basin local to PWD • Pursue partners to participate in developing PWD storage facilities including other AVSWCA members and other entities (e.g. MWD, LADWP) • Consider water banking in locations outside PWD if cost effective AND the project produces a value-added benefit (such as additional aqueduct delivery capacity)
Recycled Water	• Maximize the use of recycled water within PWD's service area to limit the need for more imported water • Develop a non-potable distribution system to be able to deliver tertiary treated recycled water for irrigation and, where feasible, industrial and commercial uses. • Develop and implement ways to use recycled water to increase available groundwater supply
Littlerock Reservoir	• Create and maintain additional storage capacity for water resource and recreational benefit through sediment removal • Maintain the quality of water in Littlerock Reservoir • Continue to explore ways to use Littlerock Reservoir for water supply reliability, power generation, and other benefits
Conservation	• Implement conservation programs to achieve savings that at least match the cost offset of acquiring, transporting and treating new supplies • Continue to expand conservation efforts on a regular basis (e.g. every 3-5 years), attracting outside funding to help expand programs • Achieve the conservation targets that are expected to be established through the proposed "20 x 2020" program (i.e. 20 percent per capita reduction in water use statewide by 2020) • Maintain and update policies as needed to reduce water waste and preserve PWD's ability to achieve sufficient conservation savings in the event of a water shortage emergency • Provide leadership to other Antelope Valley water purveyors in crafting consistent regional conservation programs and messaging

ES-3 Recommended Implementation Plan

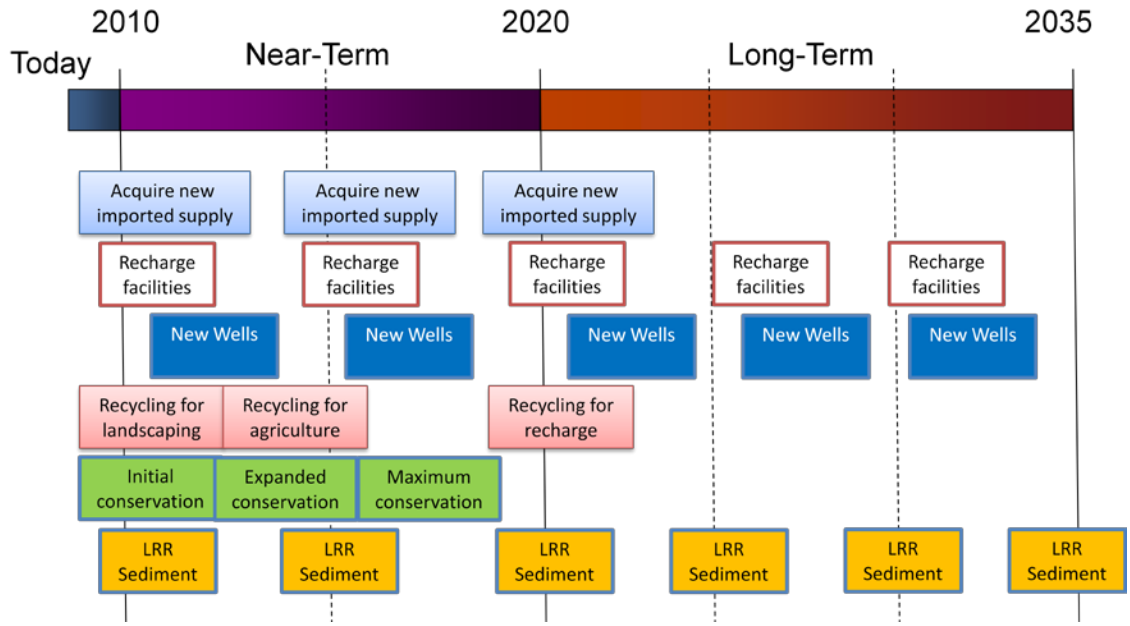
For each water resource element, implementation actions have been identified and are summarized in **Table ES-3**. The full schedule for implementation is outlined in detail in Chapter 3.

Table ES-1-3: Implementation Actions by Water Resource Element

Water Resource Element	Implementation Actions
Imported Water	1. Acquire new imported supplies 2. Be proactive with State Water Project system management and operation 3. Negotiate for additional conveyance capacity 4. Maintain flexibility for future water treatment facilities
Groundwater Pumping and Recharge	1. Install new wells, including ASR wells in the North Well Field area 2. Install surface recharge facilities
Water Banking	1. Develop local recharge and recovery capabilities 2. Develop partnership strategy 3. Explore added benefits of outside banking opportunities
Recycled Water	1. Secure recycled water agreement 2. Participate in developing a salt and nutrient management plan 3. Implement non-potable recycled water system 4. Implement agriculture reuse/groundwater exchange project 5. Conduct further research for using recycled water for groundwater recharge
Littlerock Reservoir	1. Remove sediments as previously evaluated 2. Take measures to prevent Quagga mussel infestation 3. Further evaluation of storage and power options
Conservation	1. Implement and consistently expand targeted conservation programs 2. Continue program of water budgets for customers 3. Monitor and report effectiveness of conservation programs 4. Regularly review and coordinate PWD and City of Palmdale ordinances and policies 5. Coordinate communications with other Antelope Valley water purveyors 6. Pursue grant funding to improve program cost effectiveness

Figure ES-4 below summarizes the proposed implementation schedule for the recommended stragey. In general, the bulk of new activity is expected to take place between 2010 and 2020 as a means to shore up existing supplies, meet projected near-term future demands, and lay the groundwork for meeting long-term demands.

Figure ES-1-4: Summarized Implementation Schedule



Note: PWD has the option to either acquire new imported supplies in 2021 or to implement groundwater recharge with recycled water.

In addition to these specific implementation actions, PWD should undertake a series of global action items including:

1. Prepare a programmatic Environmental Impact Report (EIR) for the Strategic Water Resources Plan
2. Implement a water resource developer fee to fund capital development costs of new supplies
3. Update water rates in five years to incorporate changes in O&M costs

ES-4 Costs and Financing

Table ES-4 below summarizes the costs associated with the proposed facilities. These costs are based on use of imported water for groundwater recharge rather than recycled water. If recycled water is to be used instead, for planning purposes the costs could be considered the same.

Table ES 1-4: Summary of Costs for Recommended Strategy by Water Resource Element

Water Resource Element	Capital Costs	O&M Costs	Total Costs	Net Present Value
Imported Water	$347 million	$12-19 million/yr	$757 million	$426 million
Groundwater Pumping	$109 million	$1-6 million/yr	$227 million	$119 million
Groundwater Recharge	$34 million	$0.2-1 million/yr	$49 million	$32 million
Recycled Water	$49 million	$0.4-0.9 million/yr	$66 million	$42 million
Conservation	$0	$0.5-1.1 million/yr	$11 million	$4.1 million
Littlerock Reservoir	$6 million	$0.5-$1.4 million/yr	$23 million	$14 million
Total	$545 million	$14-29 million/yr	$1,130 million	$665 million

Notes: Costs are in 2008 dollars. Costs are based upon strategy IW70 which relies largely on new imported supplies. Overall costs are similar if utilizing recycled water instead. O&M costs shown illustrate the range of costs between 2011 and 2035. NPV is based upon a 5% annual discount rate.

In order to fund the costs of facilities and acquisitions of new water supplies, the principles followed by this plan are as follows:

- New customers establishing new connections must pay for new supplies and the infrastructure to deliver those supplies. This includes funding new imported water acquisition, recharge and recovery facilities, and recycled water facilities.
- Current and future customers must pay for reliability of current supply up to budgeted allotments for indoor and outdoor usage. This would include the costs of improvements to maintain Littlerock Reservoir, of PWD's share of improvements to the Delta, and of improvements needed to meet water quality standards.
- Those customers choosing to use more than their allotment need to contribute more to help fund water reliability projects including conservation and recycling.
- Current and future customers are to pay for all O&M costs as well as fixed costs of existing systems.
- Other system enhancements, such as possible hydropower generation from Littlerock Reservoir, need to be able to pay for themselves without subsidy from other revenue sources.
- Financing strategy needs to provide for supply reliability assuming no future development or delayed future development.

Based on these principles, the recommended financing strategy includes the following elements:

- Implement a water supply connection fee for new connections of $16,005 to $17,607 beginning as soon as possible and escalated every year by the rate of inflation.
- Use a combination of municipal debt financing, SRF loans, and collected water supply connection fees to fund capital projects identified in the SWRP.

- Continue to maintain current approach to setting water rates in order to continue to cover O&M expenses associated with the SWRP.
- Further evaluate using property tax assessment(s) to fund potential future fixed costs associated with SWP improvements if and when the improvements become more likely.
- Pursue grant funding for conservation, water recycling, and groundwater storage projects.
- Further evaluate partnership opportunities and engage with potential partners for recycling and groundwater storage projects as these projects evolve.

Chapter 1 Introduction

1.1 Purpose of the Strategic Water Resources Plan

The purpose of the Palmdale Water District (PWD) Strategic Water Resources Plan (SWRP) is to develop a sound water supply strategy to meet the demands of both current and future customers through the year 2035. The development of the SWRP is consistent with the mission, vision and core values of PWD which are:

- ***Mission****: The Mission of the Palmdale Water District is to provide high quality water to our current and future customers at a reasonable cost.*
- ***Vision:*** *The PWD will strive for excellence in providing high quality, reasonably priced water in a growing Antelope Valley by being a strong advocate for our customers in local water issues, public education, asset management, water conservation, planning and securing additional water supplies, continuing our commitment to operate efficiently with the help of emerging technologies, challenging, motivating and rewarding our employees and offering premium customer service in all that we do.*
- ***Core Values:*** *Efficiency, fiscal responsibility, natural resource management, integrity, customer service, water conservation, continuous improvement, stakeholder trust, a safe, productive and rewarding workplace.*

Key questions to which this SWRP provides answers include the following:

- ✓ How much water will we need?
- ✓ Where will water come from?
- ✓ What facilities will be needed?
- ✓ What will it cost and where will money come from?
- ✓ What happens when circumstances change?

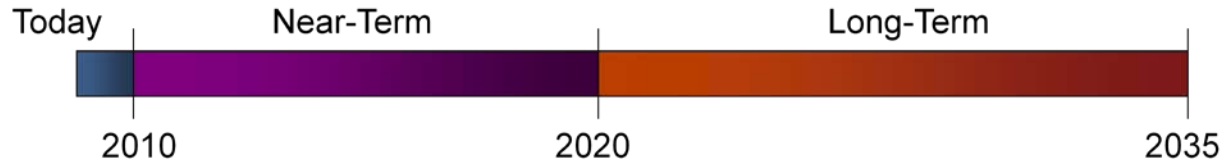
1.2 Overview

The SWRP includes the following three key elements:

- **Recommended Water Resource Strategy**: Provides future vision for how PWD will meet its water supply needs through 2035
- **Implementation Plan**: Provides an outline and schedule of the activites that will need to take place
- **Financing Plan**: Provides an outline for how funding will be provided to make the necessary improvements

The planning timeline for this study focuses on three fundamental timeframes: today, near-term, and long term as illustrated below in **Figure 1-1**.

Figure 1-1: Strategic Water Resource Plan Timeline

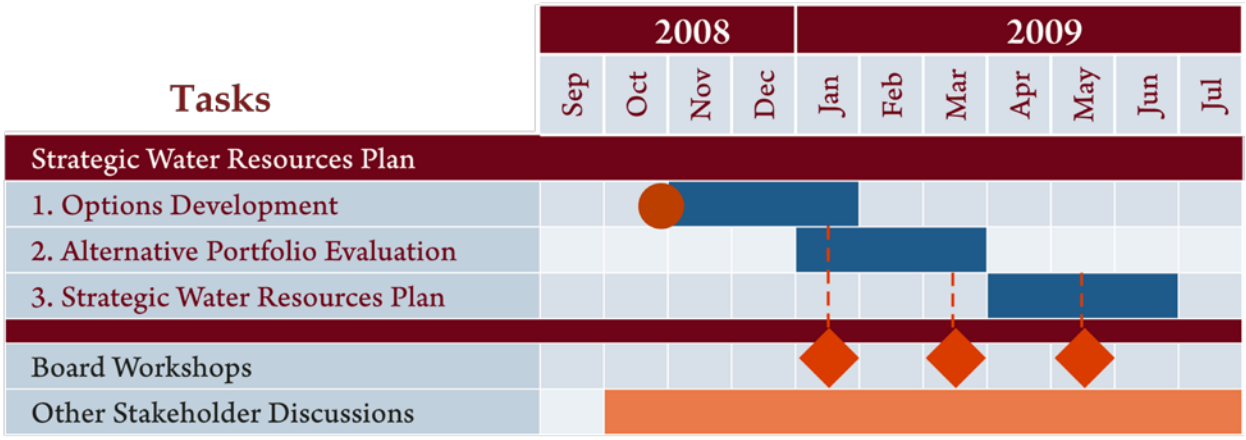


In developing the SWRP, a number of activities were undertaken between October 2008 and July 2009 as illustrated in **Figure 1-2**. These included:

- Data compiliation and review
- Demand modeling analysis
- Options development
- Conservation modeling
- Groundwater modeling
- Alternatives development
- Water resource and hydrologic modeling
- Cost development
- Alternatives evaluation
- Strategic plan development
- Staff and board briefings
- Board workshops
- Discussions with involved stakeholders

Results from these activities are summarized in three documents: the Options Report, the Alternatives Evaluation Technical Memorandum, and the Strategic Water Resources Plan.

Figure 1-2: Strategic Water Resources Plan Development Activities



1.3 Using and Updating the SWRP

The SWRP is meant to serve as a guide to the PWD Board and staff as it develops and updates a variety of other planning documents including its urban water management plan, water system master plan, financial plans, and other planning documents. The scope of this plan is far-reaching and is based upon the best available information at this time. However, it is not meant to be a static document and should be revisited regularly and formally updated every 5 years prior to the preparation of the PWD's Urban Water Management Plan (UWMP).

Chapter 2 Recommended Water Resource Strategy

2.1 Projected Water Supply Needs

Based on projected growth from population projections and land use build-out, supply needs for the PWD system are expected to increase from approximately 30,000 afy in 2010 to 65,000 afy in 2035 as illustrated in **Figure 2-1**. The main driver for these needs is presumed to be single-family residential development. However, projected future needs, particularly those in the near-term, should continue to be monitored and adjusted in response to changes in the rate of housing development as well as major new industrial customers such as solar and other power facilities.

Figure 2-1: Projected PWD Supply Needs from 2010 to 2035

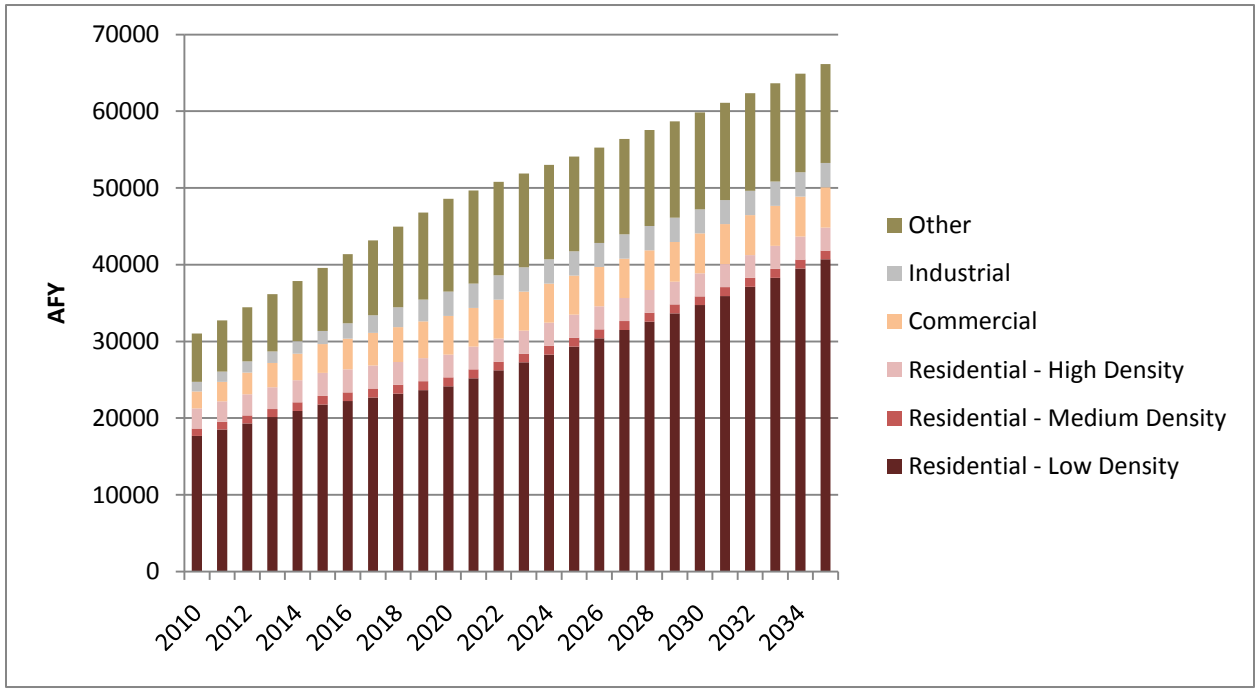


Figure 2-2 illustrates the assumed projected growth in housing used in the demand analysis. At this time, population and housing growth is flat due to the current economic recession and it may be multiple years before growth returns to recent historical levels. For planning purposes, this SWRP assumes that growth will return to the trend line shown in **Figure 2-2**, recognizing that there will be fluctuations in housing growth rates through the planning horizon of 2035.

Figure 2-2: Projected Housing Growth for PWD – 1990 to 2035

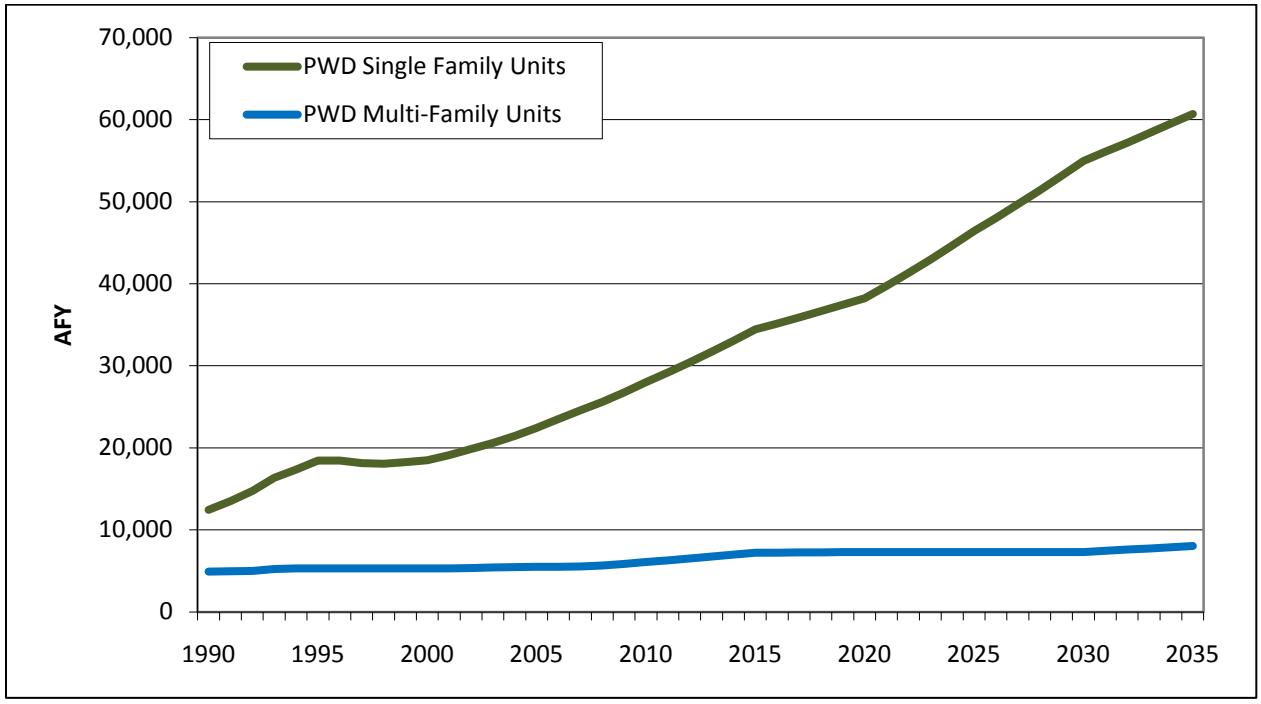
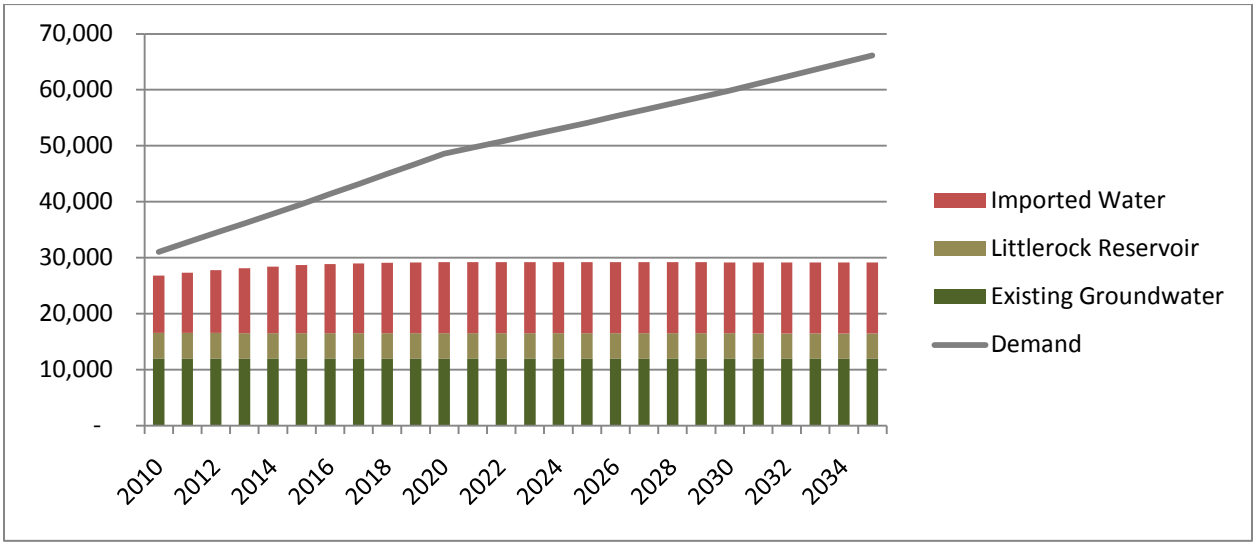


Figure 2-3 shows illustrates PWD's current available supplies under average water supply conditions. With a projected system demand of approximately 30,000 afy in 2010, even PWD's average supplies will be insufficient to meet the projected level of demand. The condition will be even worse if current drought conditions continue. Also, if growth were to return quickly to the area served by PWD, there is currently insufficient supply available to meet these new demands.

The result of this analysis is that PWD must begin to develop new water supplies immediately to provide a reliable water supply for its existing customers. In addition, these results also highlight the need for PWD to establish an aggressive water resource development program to be able to meet the needs of future residents and business interests.

Figure 2-3: Current Supplies Available to Meet Demands Under Average Conditions



2.2 Recommended Water Resource Strategy

2.2.1 Process for Developing Recommended Strategy

In order to meet the projected future supply need of an additional 35,000 to 40,000 afy in 2035, and to meet immediate supply needs and near-term supply needs, PWD must undertake the following measures:

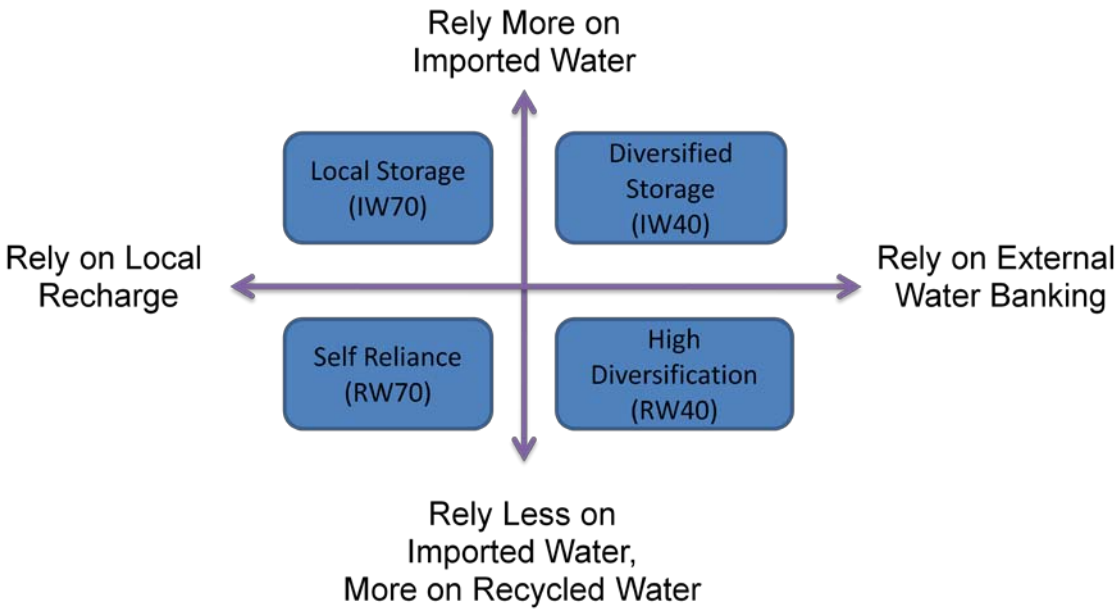
- Acquire new imported supplies
- Develop banking and storage
- Maximize recycled water

Other important conclusions to boost near-term supply reliability and maintain resources long-term are:

- Continue to expand conservation efforts as aggressively as possible
- Maintain Littlerock Reservoir through sediment removal

To develop a recommended water resource strategy for PWD, four general alternatives were evaluated, each providing a different emphasis on either more imported water versus less imported water, and more local groundwater storage versus groundwater banking outside of PWD's service area. **Figure 2-4** illustrates the four alternatives relative to these different endpoints. Each alternative is described in more detail in the Alternatives Evaluation Technical Memorandum (TM).

Figure 2-4: Water Resource Alternatives Considered



Based on the evaluation presented in the Alternatives Evaluation TM and preferences expressed by the PWD Board of Directors and staff, the recommended alternative consists of the following directions:

- Pursue local groundwater storage and recovery (i.e. Local Storage alternatives, or IW70)
- Take steps to limit PWD's dependence on imported water by maximizing use of recycled water
- Continue to expand conservation efforts and maintain Littlerock Reservoir through sediment removal

2.2.2 Description of Recommended Strategy

The recommended strategy for the SWRP is summarized as follows:

- Acquire and/or develop new imported supplies
- Create a combination of local surface spreading facilities to percolate untreated State Water Project (SWP) water and ASR wells to inject potable water
- Add additional pumping capacity to achieve a target of delivering 70 percent of supply to customers through groundwater pumping.
- Pursue a recycled water exchange program with nearby agriculture in-lieu of groundwater pumping.

In addition, PWD will begin to embark on a strategy to diversify its supplies and provide for near-term drought reliability with the following steps:

- Expand conservation programs
- Recover storage capacity in Littlerock Reservoir through sediment removal
- Implement a recycled water system for non-potable uses (e.g. primarily irrigation but possibly some industrial uses)
- Further research using treated recycled water to replenish the groundwater basin as is now being done in Orange County through advanced water treatment processes, blending with SWP water, and surface spreading and percoloation.

Table 2-1 summarizes the current supplies and future targets associated with different elements of this recommended strategy.

Table 2-1: Water Resource Targets for Recommended Local Storage Strategy

Water Supply Elements	Current	Target for 2035
Imported Water	12,000 afy (average)	36,000 to 47,000 afy (average)[1]
Groundwater Pumping	12,000 afy (average)	47,000 afy (average)
Surface Water Treatment Capacity	35 mgd	35 mgd
ASR Injection Capacity	None	6,000 gpm (800 AF/month)
Surface Recharge Capacity	None	35,000 afy (average)
Local Storage Capacity	None	120,000 af
Recycled Water		
- Non-potable	None	1,800 afy
- Exchange with agriculture	None	0 to 5,000 afy[1]
- Groundwater recharge	None	0 to 15,000 afy[1]
Active Conservation Programs	250 afy	2,600 afy
Passive Conservation Programs	None[2]	3,600 afy
Littlerock Reservoir	4,000 afy (average)	4,500 afy (average)
External Water Banking	None	Consider on an opportunistic basis

[1] The volume of imported water used will depend on how much recycled water is used for in-lieu groundwater exchange with agriculture and/or groundwater recharge.
[2] Prior passive conservation measures (e.g. plumbing code changes) were not evaluated but have been taken into account in future demand projections.

2.2.3 Schedule of Implementation

The figures below illustrate the schedule for how supplies and facilities are to be expanded over time to deliver water to meet water supply needs. **Figure 2-5** illustrates the delivery mechanisms while **Figure 2-6** illustrates the acquisition and storage of supplies over time. Further details about implementation are provided in Chapter 3.

Figure 2-5: Implementation Schedule for Delivering Supplies

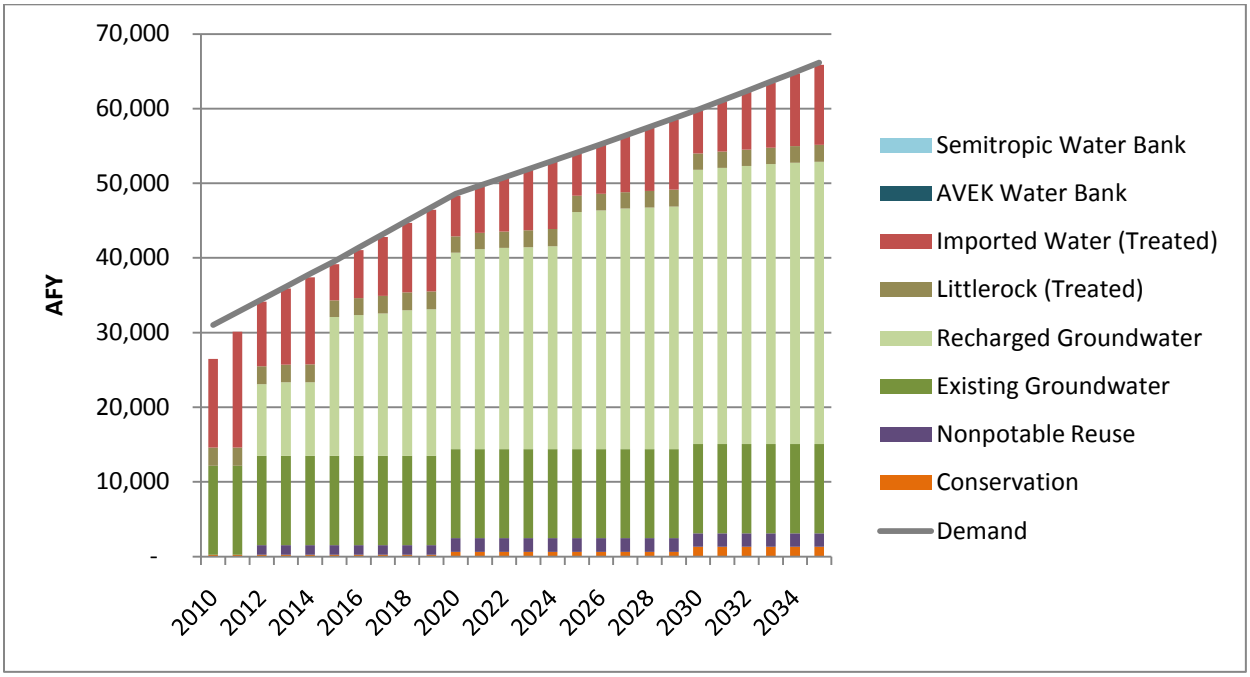
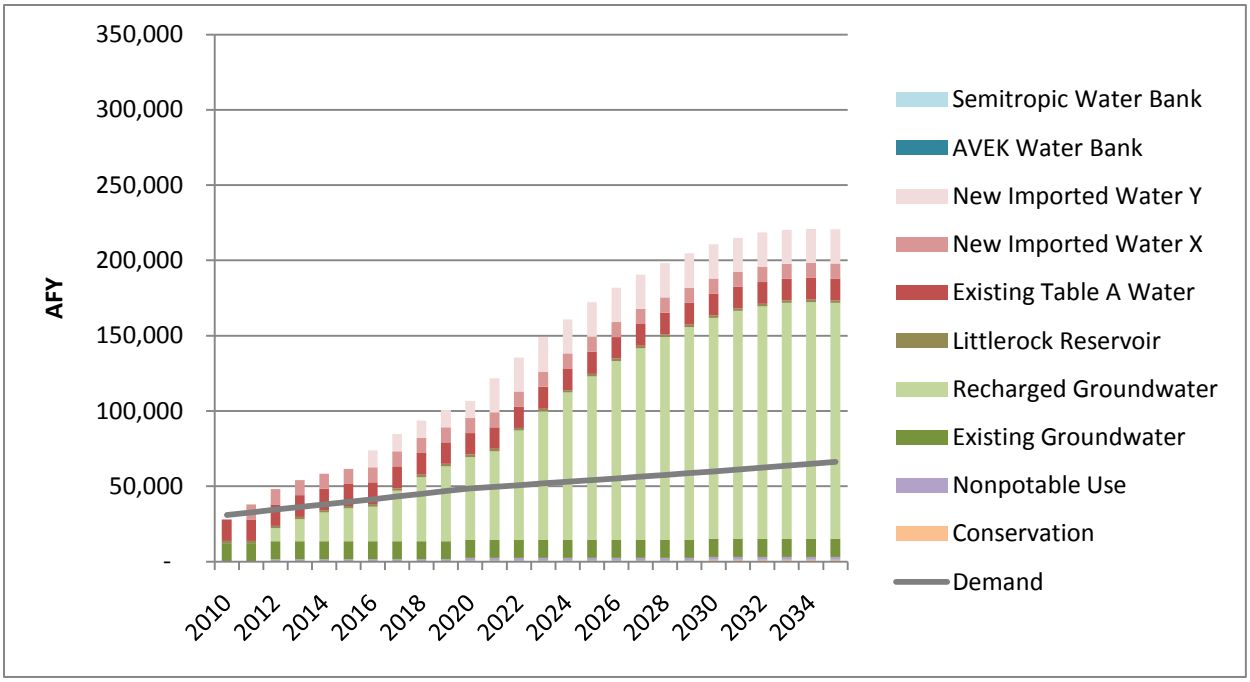


Figure 2-6: Implementation Schedule for Acquiring and Storing Supplies



Chapter 3 Implementation Plan

3.1 Introduction

This section outlines an implementation plan for the SWRP. The purpose for this implementation plan includes the following:

- Articulate the objectives to be achieved with each water resource strategy
- Identify what activities need to take place to achieve those objectives and when they need to be implemented
- Identify what decisions need to be made and when to commit PWD resources
- Summarize the costs associated with these activities and decisions
- Identify what uncertainties may lie out in the future and how PWD will address (i.e. adjudication)

This implementation plan is designed to serve as a guide for PWD as it proceeds with developing new water resource capabilities. The strategies addressed include the following elements:

- Imported water
- Groundwater
- Recycled water
- Water banking
- Conservation
- Littlerock Reservoir

3.2 Imported Water

3.2.1 Strategic Objective

PWD's strategic objective with regard to managing and acquiring imported water is:

- Firm up existing Table A supplies so that imported water is available at historical average levels
- Create and maintain options for future acquisition of imported water as need arises
- Protect both existing supplies and future opportunities by being proactive and a leader as operation and management of the SWP system continues to evolve

3.2.2 Strategies to Implement

To achieve these strategic objectives, PWD will need to pursue the following four strategies:

1. Acquire New Imported Water Supplies

PWD will need to acquire new imported water supplies two to three more times within the next 15 years. When acquiring those supplies, recommendations for PWD are:

- Acquire and/or develop permanent supplies and avoid (when possible) short-term or fixed duration contracts for dry year supplies.
- When acquiring new permanent supplies, focus on those that develop new supplies (as opposed to a re-allocation of an existing supply) and ensure that the supply is tied to a senior water right.
- Develop recharge and/or storage in parallel with any future imported water acquisition (addressed in more detail in Section 3.3).
- Once recharge facilities are on-line, acquire wet year/excess supplies for storage when available in the near-term to build up storage account(s).

2. Be Proactive with State Water Project System Management and Operation

The planning, operation and management of the SWP system is continuing to evolve as plans and contingencies are made for conveyance improvement to the Delta, new surface storage, changes to water exchange/transfer policy and oversight, and expiration of current SWP contracts in 2035. It is incumbent on PWD to be closely involved in discussions and decisions that may affect either the reliability or cost of imported water to PWD.

3. Negotiate for Additional Conveyance Capacity

Within 10 years, annual average delivery of imported water to PWD will exceed the capacity to which PWD has a right to in the SWP system. Currently, California Department of Water Resources (DWR) policy is to allow contractors to transport water through the system if capacity is available. However, capacity currently available in the system may not be in the future as contractors use their capacity to transport water to and from various water banks and storage areas. As such, PWD should begin working now to develop agreements to utilize available capacity of other contractors. Mechansims for doing this may include partnerships on storing water or possibly on acquiring new supplies.

4. Maintain Flexibility for Future Surface Water Treatment

While the recommended strategy utilizes groundwater pumping to meet future delivery needs rather than surface water treatment, PWD should nevertheless maintain its ability to implement water treatment in the future. This capability may be needed due to changes in water quality regulations, deterioration in imported water quality, or a possible future shift in PWD's water resource strategy for other reasons. This would include maintaining land owned by PWD for a future treatment plant.

3.2.3 Uncertainties

Despite taking steps to limit its reliance on imported water, PWD will nevertheless remain heavily dependent on imported water for a significant and irreplaceable portion of its water supply. As such, PWD must continue to follow and be prepared to respond to uncertainties that may limit PWD's access to imported water or result in excessive new costs. These uncertainties and PWD's recommended responses are outlined in **Table 3-1**.

Table 3-1: Recommended Responses to Uncertainties with Imported Water

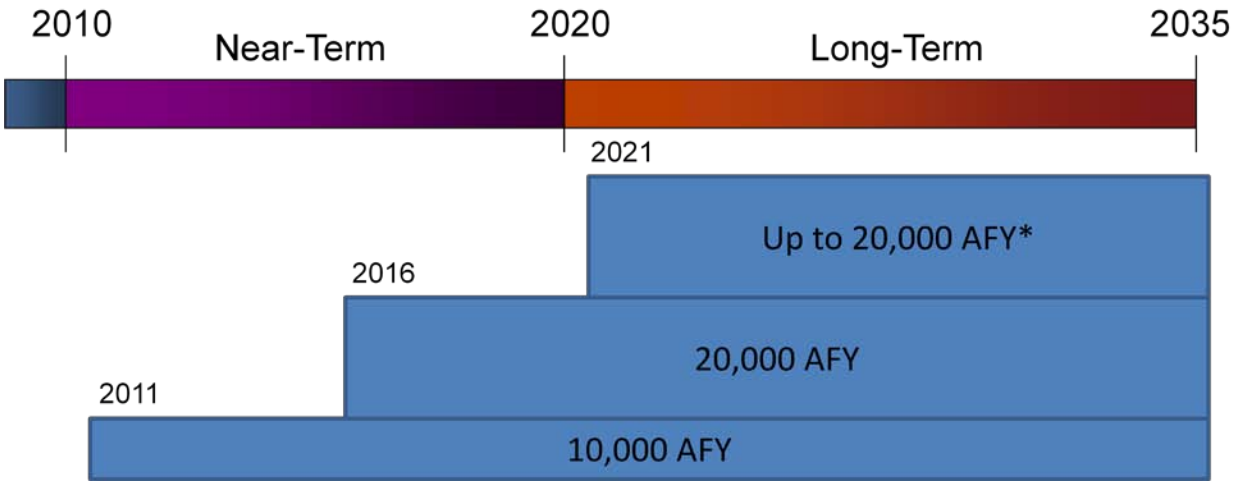
Element	Uncertainties and Impact	PWD Response
1. Delta Environmental Issues	Ongoing issues of water quality and ecological impacts may further restrict Delta exports. While plans are being discussed about how to mitigate these issues and restore conveyance capacity, there is currently no evidence to suggest that a solution can be reached.	Pursue strategy to limit reliance on imported water to current levels.
2. Infrastructure Improvements to the SWP System	Addition of new storage facilities and conveyance facilities will improve reliability but increase cost.	Continue to monitor the costs associated with these improvements in comparison to other non-SWP supplies PWD may acquire.
3. Climate Change	Predicted climate change may further reduce reliability of imported supplies.	Advocate for system improvements necessary to maintain reliability at current levels. Pursue strategy to limit reliance on imported water to current levels.
4. Population Growth	Currently, population growth in PWD's service area would be considered flat by historical measures. Near-term demand projections presume growth will return to historical growth rates within the next 5 years. However, given the depth of the current economic downturn, it is not clear when the region will see a return to growth.	Proceed with plans to acquire new imported supplies but incorporate strategies to delay acquisition if necessary until projected demand reaches needed levels.

3.2.4 Schedule

Figure 3-1 illustrates the implementation schedule for imported water. Prior to completing each acquisition, PWD will need to undertake the following actions that, together, may take between 2 and 5 years to complete:

- Opportunity identification
- Development, planning and engineering
- CEQA documentation preparation
- Financing

Figure 3-1: Imported Water Implementation Schedule for Securing Firm-Yield Supplies



* depends on volume of recycled water used for groundwater recharge.

3.2.5 Imported Water Costs

Project imported water costs (in 2008 dollars) are as follows:

Capital costs:	$347 million
O&M costs (per year):	$12 million (2011) to $19 million (2035)
Total costs:	$757 million
Net present value:	$426 million

Costs include cost to acquire or develop new supplies and costs to deliver new supplies. Under the recommended strategy, no additional water treatment facilities are needed.

3.3 Groundwater

3.3.1 Strategic Objective

PWD's strategic objectives with regard to managing and developing groundwater are:

- Be able to meet 70 percent of demands through pumping within ten years (i.e. by 2020)
- Do not further draft the local groundwater basin
- Establish and operate recharge facilities to offset proposed pumping increases and potential loss of groundwater pumping due to adjudication

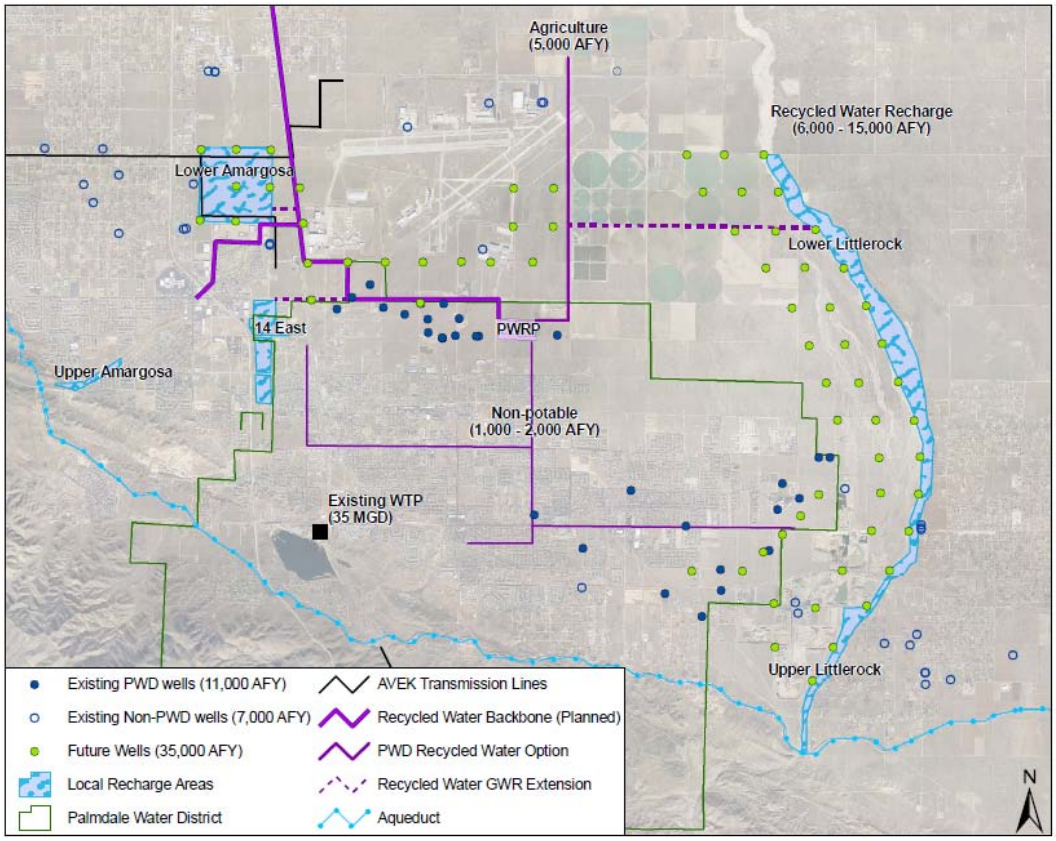
3.3.2 Strategies to Implement

There are two basic strategies to be implemented in order to achieve the groundwater strategic objectives.

1. Install New Wells, Including ASR

To meet future demands, PWD should proceed with a schedule of installing additional well capacity, focusing initially in their North Wellfield area and then expanding to the East Wellfield area (**Figure 3-2**). In addition, each new well installed in the North Wellfield should have the capability for both extraction and injection (i.e. aquifer storage and recovery, or ASR). This will allow PWD to take advantage of available well capacity during the winter months for injection when excess surface water and treatment capacity may be available.

Figure 3-2: Proposed Well and Groundwater Recharge Siting



2. Install Surface Recharge Facilities

In addition to ASR, PWD should proceed with developing surface recharge facilities for recharging the local groundwater basin. Surface recharge facilities allow the groundwater basin to be recharged at a higher rate when larger quantities of imported water are available. In addition, water recharged via surface spreading and percolation precludes the need for treatment to potable standards, thus saving treatment costs and chemical usage. Lastly, surface spreading facilities provide the opportunity to blend imported water with recycled water for percolation, a general requirement by the California Department of Public Health (CDPH).

3.3.3 Uncertainties

The recharge and recovery of water into the local groundwater basin will require further analysis but, based upon studies and operating experience, appears highly feasible. Remaining uncertainties thus include the outcome of the ongoing adjudication process and the ultimate approach the RWQCB will take to manage salt in the region. These uncertainties and PWD's recommended responses are outline in **Table 3-2**.

Table 3-2: Recommended Responses to Uncertainties with Groundwater

Element	Uncertainties and Impact	PWD Response
1. Adjudication	The outcome of the adjudication may limit how much PWD can pump due to natural replenishment.	Develop recharge facilities so that PWD can replenish the groundwater basin and allow PWD to maintain current pumping.
2. Salt Management	Importing more water from the Delta will increase the salt load on the groundwater basin. For recycling projects, the SWRCB has requested development of salt management plans for affected basins. At a minimum, the importation of water will need to be included in such plans.	Work with the Lahontan RWQCB to craft an appropriate salt management approach to the local basin. Maintain possible strategies to remove salt (e.g. reverse osmosis treatment of recycled water).

3.3.4 Schedule

Figure 3-3 outlines the implementation schedule for the installation of new wells. When installing new wells, activities which PWD will need to undertake include the following:

- Well siting and new land acquisition (if needed)
- Planning, CEQA documentation and permitting for ASR
- Design, construction and testing

PWD should allow for 3 years of preparatory work before facilities can be fully operational. One particular issue may be obtaining a permit from the RWQCB for ASR. Los Angeles County Waterworks District No. 40 experienced some difficulty in obtaining a permit for their ASR facilities due to concern from the RWQCB about disinfection by-products in drinking water, in particular trihalomethanes.

Figure 3-3: New Well Installation Implementation Schedule

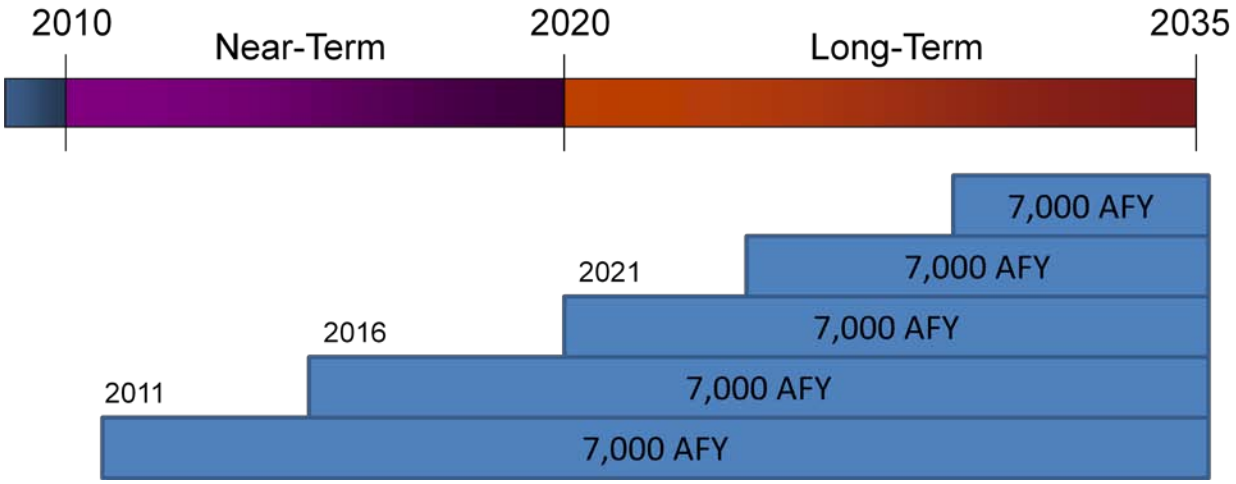


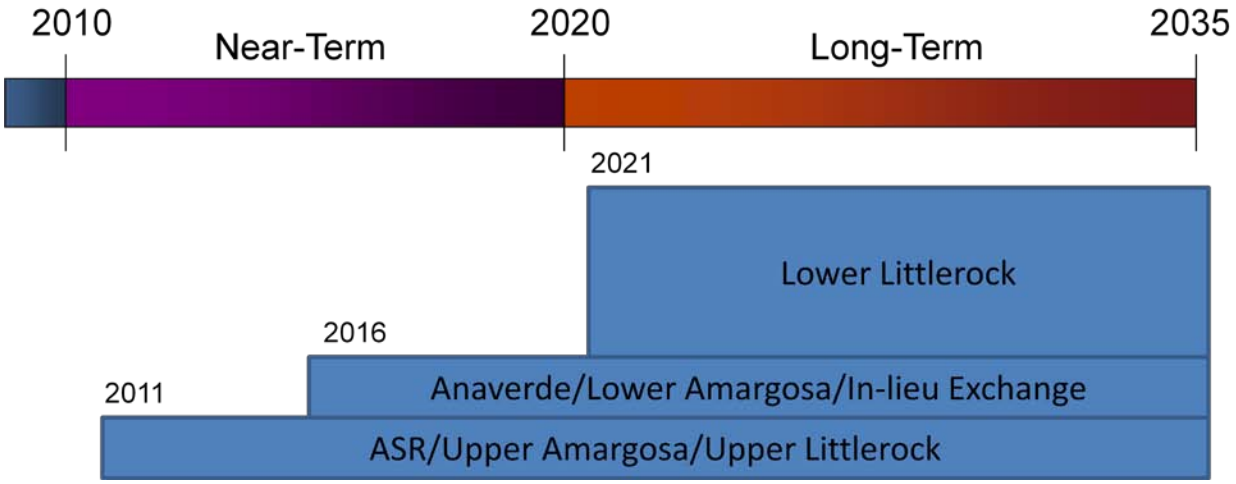
Figure 3-4 illustrates the implementation schedule for creating new recharge facilities. The initial focus of surface recharge facilities should be those close to the aqueduct, on sites that are more readily available and recharge the North Well Field area. Steps which PWD will need to proceed through to develop recharge facilities include:

- More refined siting analysis and new land acquisition (where needed)
- Exchange agreement(s) with AVEK for delivery of SWP water outside the PWD service area
- Recharge feasibility studies, including groundwater monitoring and percolation tests, site facility plans and more refined groundwater modeling and an operating plan
- Outreach, CEQA documentation and permitting
- Design and construction

PWD should estimate between 2 to 4 years to complete these steps and have facilities on line. Opportunities that PWD should try to capitalize on include the City of Palmdale's Upper Amargosa Creek recharge project and property which PWD currently owns or could readily acquire.

At this time, the City of Palmdale has been developing a 20-acre project in the Upper Amargosa Creek area. The project is estimated to be able to recharge 14,720 afy. Currently the City has completed a draft EIR and facility site plan, and will soon be installing groundwater monitoring wells.

Figure 3-4: Recharge Facilitiy Implementation Schedule



3.3.5 Groundwater Costs

Projected groundwater development costs (in 2008 dollars) are as follows:

Groundwater Pumping

Capital costs: $109 million

O&M costs (per year): $1.6 million (2011) to $6.1 million (2035)

Total costs: $227 million

Net present value: $119 million

Costs include installation of new wells (including ASR capabilities) and related infrastructure including pumping, piping and wellhead chlorination.

Groundwater Recharge

Capital costs: $34 million

O&M costs (per year): $0.2 million (2012) to $0.9 million (2035)

Total costs: $49 million

Net present value: $32 million

Costs include cost to acquire land, construction and operation of recharge basins, and new turnouts and conveyance facilities to deliver water to recharge basins.

3.4 Recycled Water

3.4.1 Strategic Objective

PWD's strategic objectives with regard to recycled water are:

- Maximize the use of recycled water within PWD's service area to limit the need for more imported water
- Implement a non-potable distribution system to be able to deliver tertiary treated recycled water for irrigation and, where feasible, industrial and commercial uses
- Pursue delivery of recycled water to nearby agriculture as an in-lieu supply for pumped groundwater
- Continue to research the use of recycled water for groundwater recharge and salt removal (when coupled with advanced treatment)

3.4.2 Strategies to Implement

To achieve these strategic objectives, PWD will need to implement the following strategies.

1. Secure Agreement for Recycled Water

Recycled water is currently provided by the Sanitation Districts of Los Angeles County (LACSD) as the owner and operator of the Palmdale Water Reclamation Plant (as well as the Lancaster Water Reclamation Plant). In order to have access to recycled water, PWD will need to obtain an agreement from LACSD. **Table 3-3** below lists those who currently have agreements with LACSD for recycled water.

Table 3-3: Parties with Current Agreements with LACSD for Recycled Water

Party	Amount
Los Angeles County Waterworks District No. 40	13,500 afy
City of Lancaster	950 afy
City of Palmdale	2,000 afy
Total	**16,450 afy**

Alternatively, PWD may also obtain access as a third party through already existing agreements. Currently Los Angeles County Waterworks District No. 40 has an agreement with LACSD for 13,500 afy of recycled water. The City of Lancaster has an agreement for 950 afy and the City of Palmdale has an agreement for 2,000 afy. At this time, none of these parties have the facilities in place to utilize all of this recycled water and no guarantees that they will in the future. In addition, some of the demands to be supplied by the various parties have been double-counted, which artificially increases total demand on recycled water from LACSD.

2. Participate in Developing a Salt and Nutrient Management Plan

Recently approved SWRCB policy requires the development of salt and nutrient management plans for basins that will be using recycled water. The purpose of this requirement is to address environmental concerns associated with the concentration of salts and nutrients as the use of recycled water expands. Because the Antelope Valley is a closed hydrologic basin, essentially all salts transported to the valley remain whether through wastewater, imported water, fertilizer, water softeners, or other sources of salt. In order to secure a permit from the RWQCB to use recycled water, permittees must commit to either developing, or participating in, the development of salt and nutrient management plans for the basin, culminating in the necessary Basin Plan amendments by 2014.

Because this SWRP involves the increased use of two salt-bearing water supplies—imported water and recycled water—PWD will need to be involved in both the development and implementation of a salt management plan. At this time, each RWQCB and parties within affected basins are beginning to work together to determine the scope of these salt and nutrient management plans.

3. Develop Non-Potable System

PWD should proceed with developing a non-potable delivery system for recycled water and raw water from Lake Palmdale as potential supplemental supply. While the yield of such a system is relatively low compared to PWD's larger future supply needs, such as system can be readily implemented to provide near-term supply reliability and ensure large landscaped areas, such as City parks and schools, can continue to be irrigated even under to most of severe drought conditions so that the investment in landscaping is maintained.

To implement a non-potable system, PWD will need to accomplish the following:

- Complete recycled water master/facilities plan
- Prepare CEQA documentation and permitting
- Prepare recycled water use resolution
- Commit to and participate in developing a salt management plan
- Pursue grant and loan funding to help finance construction of the system
- Design and construct Phase 1 facilities

4. Develop Agriculture Reuse

To help improve groundwater storage in the basin area near its wells, PWD should pursue implementing a recycled water exchange program with local agriculture interests to provide in-lieu groundwater recharge. To implement this program, PWD should immediately proceed with the following:

- Obtain interest from local agricultural parties
- Develop necessary agreement(s) between agricultural parties, PWD and LACSD
- Prepare facilities plan, CEQA documentation and permitting
- Design and construct facilities.

5. Further Research Groundwater Recharge with Recycled Water

The most significant and most reliable use for recycled water for PWD is groundwater recharge with recycled water. Because PWD will be constructing facilities for recharging imported water via surface spreading, facilities and blend supplies will already be in place to be used for recharge with recycled water.

That said, the process for obtaining regulatory and public approval is lengthy and frequently complicated. Recharge with recycled water has been successfully implemented in many places in Southern California and is being considered in many more places because of its reliability, demonstrated performance, and its relative cost effectiveness and environmental footprint as compared to imported water. However, public opposition has led to the rejection of groundwater recharge with recycled water in a handful of locations and should not be underestimated.

Because both research and public outreach in the Antelope Valley on the topic has been minimal, it will be necessary for PWD, in combination with partners, to embark on thoughtful and comprehensive investigation of groundwater recharge with recycled water. The objective of this process will be to prove the science and technology, gain approval from regulators, and gain acceptance from the public.

To proceed with this investigation, PWD will need to accomplish the following:

- Participate in recycled water recharge pilot study with Lancaster and other partners
- Continue to research latest technology and issues associated with groundwater recharge
- Proceed with pilot testing of advanced treatment processes
- Evaluate hydrogeology at possible recharge sites to assess travel times to nearby wells and effectiveness of soil-aquifer treatment (SAT), if needed
- Have research results reviewed by industry experts
- Regularly brief the Lahontan RWQCB and the public

If the outcome of this research is successful, subsequent steps will be:

- Develop regional partnership strategy to achieve water supply and salt management goals
- Continue to conduct public outreach
- Pursue external grant funding
- Prepare detailed facility plans
- Prepare necessary CEQA documentation and permitting
- Design and construct facilities
- Perform start up and monitoring

3.4.3 Uncertainties

Recycled water will be a new supply for PWD. As such, there are a number of uncertainties which PWD will need to address. Key uncertainties are outlined in **Table 3-4**.

Table 3-4: Recommended Responses to Uncertainties with Recycled Water

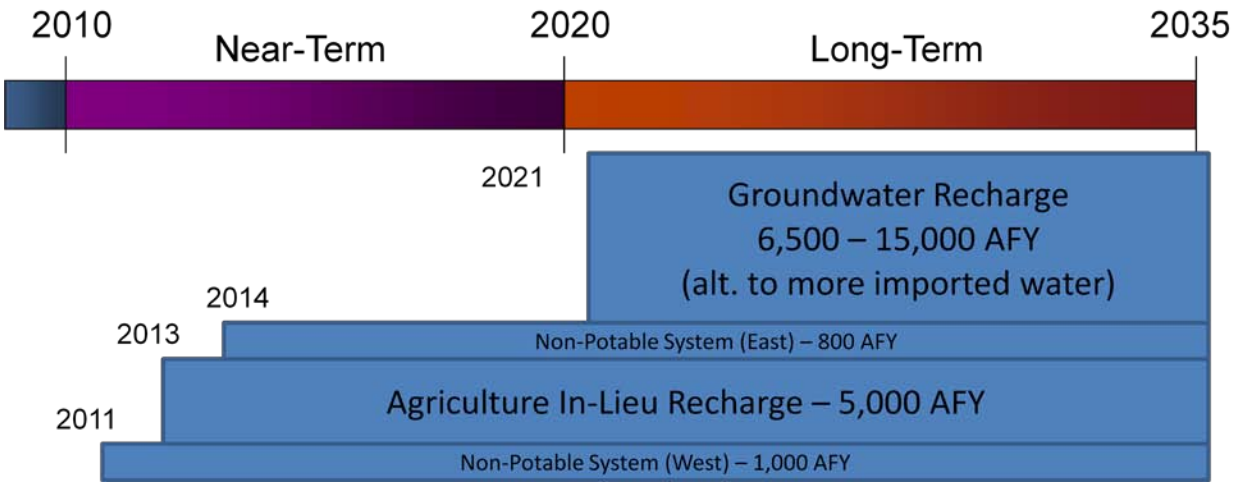
Element	Uncertainties and Impact	PWD Response
1. Ability to Secure Recycled Water	LACSD may not provide PWD with a recycled water agreement citing that current supplies may already committed, though future supply increases are yet to be subscribed for.	Work with the City of Palmdale, LA County Waterworks District No. 40 and City of Lancaster to develop a strategy for using or sharing a portion of their contracted amounts. Unsubscribed future amounts should be contracted for use by PWD.
2. Public Perception	The public commonly has health and safety concerns with the use of recycled water—particularly for groundwater recharge—despite well established regulation and use of recycled water for non-potable and indirect potable uses.	Create a public communication plan to obtain comments and feedback, and to address concerns.
3. Agricultural Interest	Nearby agriculture may not be interested in exchanging recycled water for groundwater for multiple reasons including perception and protection of groundwater rights. In addition, it is unclear what rights PWD may have in an in-lieu exchange prior to settling the adjudication.	Pursue groundwater recharge strategies.
4. Salt Management	Importing more water from the Delta will increase the salt load on the groundwater basin. For recycling projects, the SWRCB has requested development of salt management plans for affected basins. At a minimum, the importation of water will need to be included in such plans.	Work with the Lahontan RWQCB to craft an appropriate salt management approach to the local basin. Maintain possible strategies to remove salt (e.g. reverse osmosis treatment of recycled water).

3.4.4 Schedule

Figure 3-5 illustrates the implementation schedule for water recycling facilities. The initial focus of recycled water will be for non-potable use and for agriculture in-lieu recharge. The process for completing the design, environmental clearance, permitting and construction of these facilities is estimated to take 2-3 years.

Subsequent focus of recycled water will be on expanding the non-potable system to serve additional customers and, if determined feasible, groundwater recharge. The process needed to obtain both the regulatory approval and public acceptance of groundwater recharge with recycled water is expected to take 10 years based on similar experience in other Southern California settings including Orange County, Inland Empire, and the Central and West basin areas of southern Los Angeles County.

Figure 3-5: Recycled Water Implementation Schedule



3.4.5 Projected Cost

Projected costs for developing a non-potable system are as follows:

Non-Potable System Only

Capital costs: $49 million

O&M costs (per year): $0.4 million (2012) to $0.9 million (2035)

Total costs: $66 million

Net present value: $42 million

Costs include installation of new recycled water pipelines and laterals, pumping facilities, storage, and retrofits.

If groundwater recharge with recycled water were to proceed to implementation, the projected costs are as follows:

Groundwater Recharge with Recycled Water and Non-Potable System

Capital costs: $219 million

O&M costs (per year): $0.5 million (2012) to $5.5 million (2035)

Total costs: $311 million

Net present value: $171 million

Costs include cost to build advanced treatment facilities, process brine from reverse osmosis treatment, and pipelines to convey recycled water to surface spreading facilities.

Costs for agriculture in-lieu recharge have not been provided due to the current uncertainty of how such a project would be implemented.

3.5 Water Banking

3.5.1 Strategic Objectives

PWD's strategic objectives with regard to water banking are:

- Establish ability to bank available imported water as soon as possible
- Focus first on developing storage within the groundwater basin local to PWD
- Pursue partners to participate in developing PWD storage facilities including other AVSWCA members and other entities (e.g. MWD, LADWP)
- Consider water banking in locations outside PWD if cost effective AND the project produces a value-added benefit (such as additional aqueduct delivery capacity)

3.5.2 Strategies to Implement

To achieve these strategic objectives, PWD will need to implement the following three strategies.

1. Develop Local Recharge and Recovery Capabilities

In order to firm up near-term supplies, it is critical that PWD establish facilities to recharge and bank available imported water as soon as possible, ideally within two years. This will allow PWD to take advantage of wet year or any excess water that may be available through the SWP or through a new imported water exchange agreement. The implementation plan for these facilities is provided in Section 3.3.

2. Develop Partnership Strategy

With proposed recharge and recovery facilities now identified to meet PWD's future needs, PWD should develop a partnership strategy to reach out to outside parties who may have a need to bank water. These could include other entities in the Antelope Valley (e.g. AVEK) or entities to the South of PWD (e.g. MWD). The purpose of engaging outside partners would be to help offset capital and operating costs, gain economies of scale, further increase water levels in the groundwater basin, and/or allow PWD to exchange storage capacity for aqueduct delivery capacity.

Subsequent to implementing this partnership strategy, PWD should develop a proposal that can be readily shared with potential partners that describes the project.

3. Explore Added Benefits of Outside Banking

While the primary recommended direction for PWD is to establish water banking within its local groundwater basin, opportunities may be presented to PWD that it should consider on a case-by-case basis. These opportunities could include banking water north of the Delta as part of an imported water acquisition/exchange program or banking water elsewhere in the Antelope Valley such as with an AVEK-developed bank. While the cost and value of other banking facilities need to be taken into account, PWD should also look for and be able to quantify other benefits associated with these opportunities.

3.5.3 Uncertainties

As with recycled water, PWD currently does not operate or participate in any kind of banking operation. As such, there are potentially a number of uncertainties with which PWD may need to deal. These are outlined in **Table 3-5**.

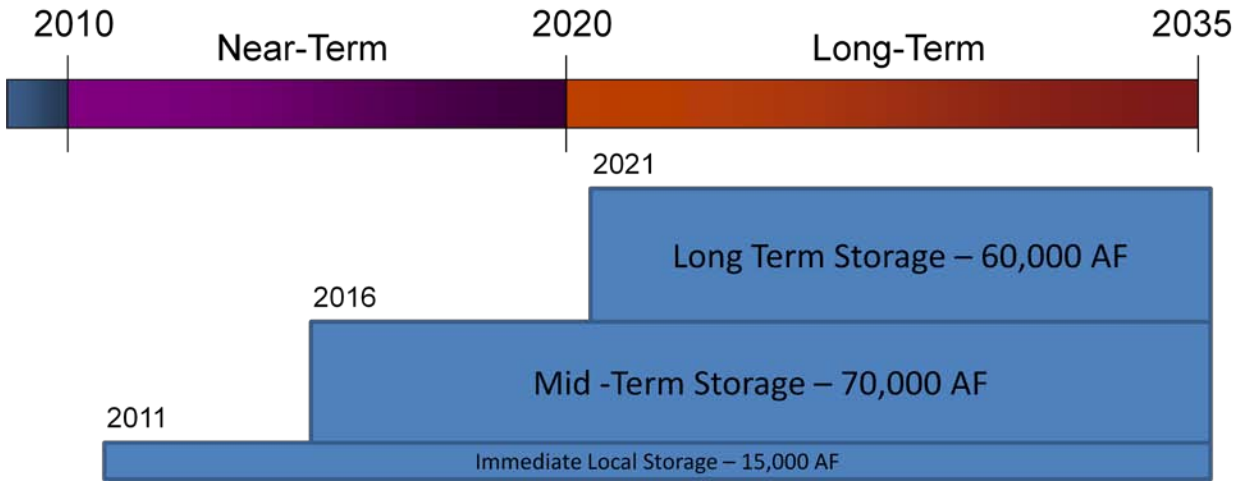
Table 3-5: Recommended Responses to Uncertainties with Water Banking

Element	Uncertainties and Impact	PWD Response
1. Getting local recharge facilities up and operating	Despite best efforts, PWD may not be able to have recharge facilities in place if excess water is available through either its existing SWP entitlement or new exchange.	Develop contingency plans to store excess water (e.g. have exchange partner carryover to next year) and/or use excess water in-lieu of water from Littlerock Reservoir.
2. Working with AVSWCA to develop joint banking facilities	The AVSWCA has been discussing developing joint water banking facilities but to date has not proposed how it would develop, own, and/or operate such facilities. As such, it remains difficult to evaluate what the benefit(s) would be.	Assist AVSWCA with developing a plan for shared development, ownership and operation of banking facilities.
3. Availability of imported supplies for banking	While important to store imported water for future use, there remains concern about the reliability of imported supplies. While current restricitions have been taken into account for this plan, new environmental issues in the Delta may arise which may further restrict imported deliveries. In addition, there are no clear indications that the recent lack of success of State government to implement comprehensive solutions for the Delta will be overcome in the near-future.	Closely monitor environmental developments in the Delta. Work with AVSWCA and other State Water Contractors to advocate for solutions that maintain and/or improve SWP reliability. Continue to research ways to maximize using recycled water to limit reliance on imported water.

3.5.4 Schedule

Figure 3-6 illustrates the recommended water banking targets for PWD in order to provide sufficient supplies to meet single-dry year and multiple dry year demands. The increases in storage targets coincide with proposed supply increases due to new imported water transfers and possibly groundwater recharge with recycled water.

Figure 3-6: Water Banking Implementation Schedule



3.5.5 Projected Cost

The costs associated with local water banking have been incorporated into the groundwater implementation plan (see Section 3.3.5). Because no external water banking is proposed at this time, there is no added cost projected.

3.6 Conservation

3.6.1 Strategic Objective

PWD's strategic objectives with regard to conservation are:

- Implement conservation programs to achieve savings that at least match the cost offset of acquiring, transporting and treating new supplies
- Continue to expand conservation efforts on a regular basis (e.g. every 3-5 years), attracting outside funding to help expand programs
- Achieve the conservation targets that are expected to be established through the proposed "20 x 2020" program (i.e. 20 percent per capita reduction in water use statewide by 2020)
- Maintain and update policies as needed to reduce water waste and preserve PWD's ability to achieve sufficient conservation savings in the event of a water shortage emergency
- Be a leader of conservation in the Antelope Valley in crafting consistent regional conservation programs and messaging

3.6.2 Strategies to Implement

As presented in the Options Report, passive conservation measures due to plumbing and building code changes, as well as the City of Palmdale's Ordinance 1362 (limiting installation of grass and requiring native landscaping) are expected to yield a significant conservation savings (approximately 3,600 afy by 2035). Nevertheless, additional savings are possible through an active conservation program and very well may be necessary to meet pending 20 x 2020 conservation requirements. In addition, by implementing conservation measures, PWD may be able to delay the need to acquire new supplies, saving millions of dollars in financing costs.

To achieve the five strategic objectives listed above, PWD should implement the following strategies:

1. Implement and Consistently Expand Targeted Conservation Programs

Given that the current and future demands of PWD customers are and will be largely from single-family residential development and large landscaped areas (e.g. parks and schools), PWD should implement targeted conservation programs focused toward these customers. **Table 3-6** lists three proposed levels of effort for conservation programs, each achieving increased savings but at increased cost. As success of programs is demonstrated at the current level, the program should be expanded to subseqeuent levels.

Table 3-6: Active Conservation Measures

Current		Expanded		Maximum	
ET Controller					
• Start with existing pilot survey, controllers • HydroPoint WeatherTRAK Irrigation Survey Controller installation	19afy $347/af	• Customer cost $14.99/month for 5 years	38afy $380/af	• No fees to customer	122afy $1297/af
Landscape Management					
• Start with existing Smart Controller Rebate	30afy $429/af	• Reduce fee to $2.00/mo	30afy $1044/af	• Eliminate fees	44afy $1731/af
Large Landscape					
• Continue information & contact at schools and parks • Add all other large landscape sites • Add incentives for retrofits	13afy $277/af	• Increase incentive • Add landscape design services	38afy $954/af	• Increase incentive	134afy $1062/af
Turf Replacement					
• Continue new program at $.40/sq ft	62afy $188/af	• Increase to $1.00/sq ft • Add substantial advertising	123afy $470/af	• Increase to $2.00/sq ft	265afy $939/af
High Efficiency Toilets					
• Offer $60 per HE toilet, all eligible • Targeted marketing: Multi-family, old housing stock (pre-1992)	76afy $126/af	• Add direct installation of confirmed old toilets	380afy $565/af	• Add commercial sector	520afy $587/af
High Efficiency Clothes Washers					
• Offer $100 rebate per washer sold, no confirmation	9afy $616/af	• Offer $150 rebate per washer sold, w/ confirmation • With elec., gas, and wastewater increase rebate	17afy $975/af	• Offer $200 rebate per washer sold, w/ confirmation • With elec., gas, and wastewater increase rebate	85afy $1284/af
MP Rotator Nozzles					
• Offer $4 rebate per installed nozzle • Landscape contractor training	8afy $79/af	• Offer free nozzles w/ confirmed installation and tracking • Landscape contractor certification	23afy $79/af	• Direct install to increase participation	75afy $79/af
CII Audits and Incentives					
• Offer survey and $400/af incentive	1afy $385/af	• Offer survey and $700/af incentive	2afy $673/af	• Offer survey and $1200/af incentive	17afy $1154/af

2. Continue Program of Water Budgets for Customers

Establishing customer water budgets has been shown to achieve as much as 10 percent savings through behavior modification and price effects. The current water budget which PWD has established for its customers is based on land use type (i.e. residential, commercial or industrial use), and the amount estimated to be used indoors and outdoors.

3. Monitor and Report Effectiveness of Conservation Programs

With the recent implementation of water budgets, conservation ordinances and policies, and passive conservation measures, PWD should begin to systematically track and report conservation savings on an annual basis. PWD is a signatory to the California Urban Water Conservation Council (CUWCC) and, as a signatory to the Memorandum of Understanding, has committed to reporting progress in implementing 14 "best management practices" (BMPs) identified for conserving water. In addition to these reporting requirements, PWD should track the installation of conservation devices (both from passive and active programs) and the penetration and results of other programs.

By tracking and reporting this information, PWD will be able to accomplish a number of things including:

- Evaluate the effectiveness of programs so that resources can be better targeted
- Monitor progress toward potential 20 x 2020 conservation targets
- Develop a conservation track record for use when pursuing grant funds
- Benchmark progress as compared to other water districts

4. Regularly Review and Coordinate PWD and City of Palmdale Ordinances and Policies

The City of Palmdale is an active partner with PWD in conservation efforts and has implemented its own measures to save water at its parks and other facilities. In addition, the City has taken a lead role in creating land use ordinances that restrict outdoor landscaping to reduce water consumption. PWD should regularly review with the City its conservation targets and programs to identify areas where the City and PWD can work together to produce more effective measures, messaging and enforcement of conservation ordinances.

5. Coordinate Communications with Other Antelope Valley Water Purveyors

PWD, working through the Antelope Valley Integrated Regional Water Management (IRWM) Program or other collective forum, should coordinate its conservation efforts with others to make sure messaging, materials, effectiveness reporting and other communication efforts are consistent and supportive of each others' programs.

6. Pursue Grant Funding to Improve Program Cost Effectiveness

To expand implementation by improving cost effectiveness, PWD should routinely pursue grant funding for conservation programs that are regularly offered through the Department of Water Resources (DWR) Office of Water Use Efficiency (OWUE) and the U.S. Bureau of Reclamation (USBR). Many water agencies in California who are viewed as leaders in conservation are consistently successful in obtaining grant funding for as much as 50 percent of their programs. By developing a consistent program and demonstrated track record, PWD will be able to establish a positive relationship with these potential funding agencies as new grants funds become available.

3.6.3 Uncertainties

Conservation effectiveness is directly related to consumer behavior and penetration of conservation devices. However, both are difficult to predict without a long local track record and thus are difficult to rely upon. Table 3-7 lists the uncertainties related to conservation.

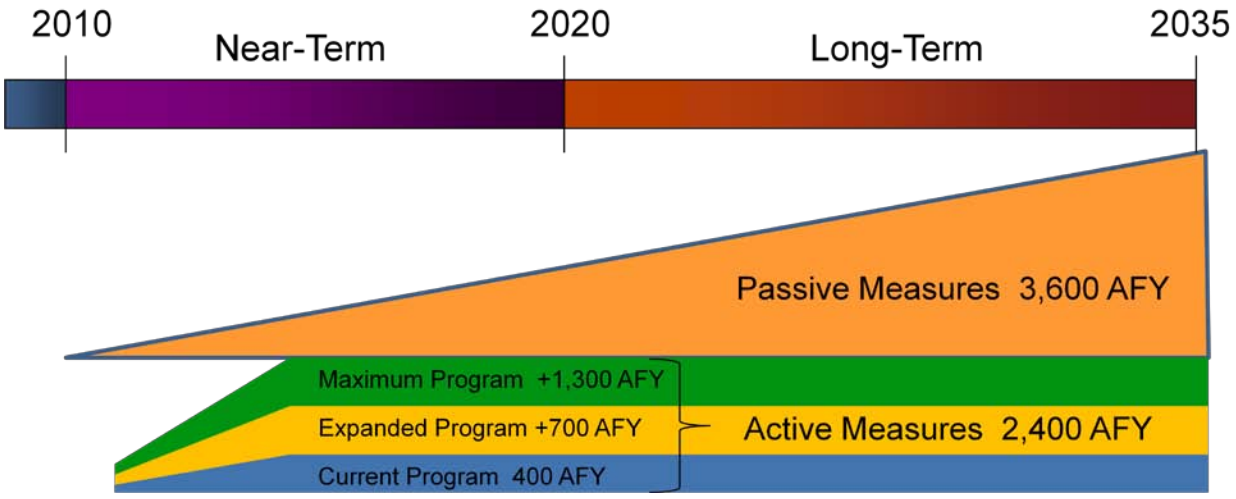
Table 3-7: Recommended Responses to Uncertainties with Conservation

Element	Uncertainties and Impact	PWD Response
1. Consumer behavior and device penetration	Conservation effectiveness is directly related to consumer behavior and penetration of conservation devices. However, both are difficult to predict without a long local track record and thus are difficult to rely upon.	Take a measured approach to developing a conservation program, monitoring performance on a regular basis to make program adjustments.
2. Availability of grant funding	In recent years, grant funds for conservation have been available through State Propositions 50 and 84, through the CALFED program and USBR. However, future funding sources are not guaranteed and, if available, are often highly competitive to obtain.	Be prepared to pursue grant funding when available but make plans to continue implementing programs assuming no outside funding.

3.6.4 Schedule

Figure 3-7 illustrates the proposed implementation schedule for conservation measures. One key assumptions in the schedule is the penetration of measures associated with new development. In addition, the schedule recognizes that each set of measures generally takes 3 to 5 years to reach full effectiveness. Given the lack in time to see results, the schedule shows a 2 year evaluation period before expanding the conservation program to the subsequent level.

Figure 3-7: Conservation Implementation Schedule



3.6.5 Projected Cost

Table 3-8 summarizes the projected annual costs associated with implementing active conservation measures at the three identified levels.

Table 3-8: Conservation Program Projected Costs

	Net Yield (afy)	Marginal Unit Cost	Estimated Annual Total Program Cost[1]
Current Program	40	$250	$105,000
Expanded Program	1,100	$560	$490,000
Maximum Program	2,400	$850	$1,550,000

[1] Does not include costs associated with conservation coordinator, marketing, education programs or added enforcement measures. Includes programs and costs identified in Table 3-6.

3.7 Littlerock Reservoir

3.7.1 Strategic Objective

PWD's strategic objectives with regard to maintaining Littlerock Reservoir are:

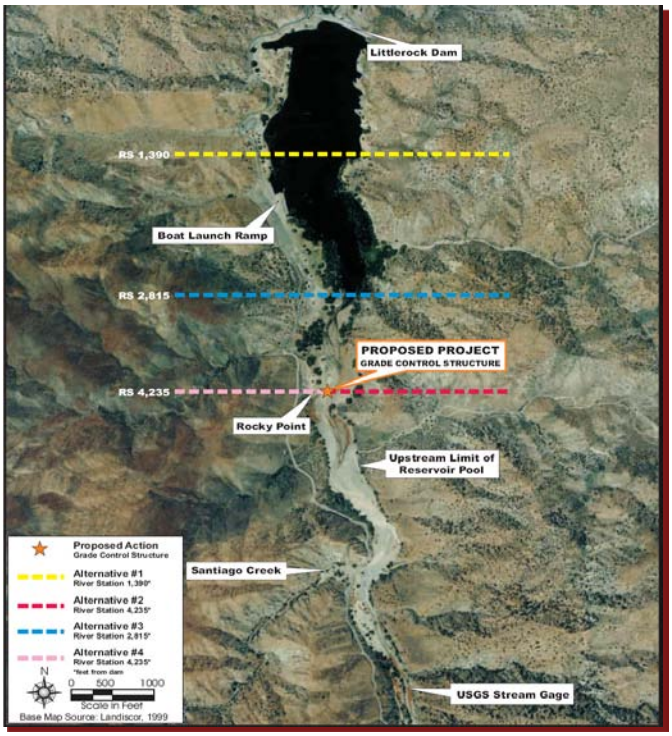
- Create and maintain additional storage capacity for water resource and recreational benefit through sediment removal
- Maintain the quality of water in Littlerock Reservoir
- Continue to explore ways to use Littlerock Reservoir for water supply reliability, power generation, and other benefits

3.7.2 Strategies to Implement

To achieve these objectives, the following strategies are proposed:

1. Remove Sediment as Previously Evaluated

PWD should proceed as soon as possible with one of the proposed sediment removal plans identified in the EIR prepared for the project. Without removing and mitigating the build up of sediment, it is estimated that Littlerock Reservoir will lose 1,000 af of storage by 2035 (a third of its current storage capacity) and the annual cost to purchase additional water to make up for this lost yield will be $2.5 million. In addition to the added cost, the loss of local reservoir capacity reduces PWD's flexibility to manage imported water deliveries and to have local surface supply available in case imported supplies are curtailed.



2. Take Measures to Prevent Quagga Mussel Infestation

The value of supply from Littlerock Reservoir is significant to PWD and, as such, adequate measures need to be taken to protect it. Because recreational boating is currently allowed on the reservoir, there exists the possibility of infestation of Quagga mussels. This invasive species was recently introduced to the United States and has subsequently taken hold in the Great Lakes and in reservoirs along the Colorado River system. The mussels attached to submerged structures including outlet towers, gates, and other facilities, requiring routine and expensive underwater cleaning and disruption to operations. They are spread from one water body to another by attaching to the hull of boats or residing in other submerged portions of boats. The only known effective way to eradicate the Quagga mussels is to completely drain facilities for a minimum of 7 days in order to kill the larvae.

To prevent infestation of Lake Palmdale, PWD recently implemented a program that requires the inspection and, in some case, quarantine of boats prior to allowing them onto the lake. PWD has recently discussed working with the National Forest Service, which maintains access to Littlerock Reservoir, to develop a similar inspection program. PWD should conclude those efforts as soon as possible.

3. Further Evaluate Storage and Power Options

Littlerock Reservoir has the opportunitiy to provide additional benefits. The strategic plan conceptually consideres using Littlerock Reservoir for possible storage of excess SWP water when available. In addition, the strategic plan also consideres the possibility of generating hydropower. The cursory evaluation performed suggested that both concepts have both cost and water supply merit and should be considered further, particularly in light of the need for storage when wet year water is available through the SWP system, the opportunity to mitigate seepage losses by enclosing the entire Palmdale Ditch, ongoing increases in power costs, and the opportunity to create a "green" power generation project.

Uncertainties

Table 3-9 outlines key uncertainties to be addressed with improvements to Littlerock Reservoir.

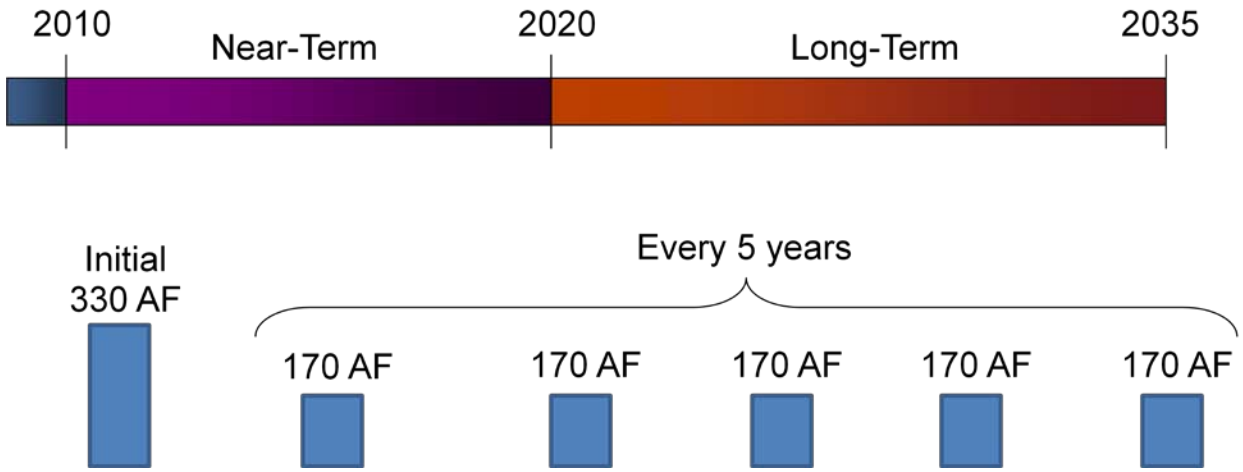
Table 3-9: Recommended Responses to Uncertainties with Littlerock Reservoir

Element	Uncertainties and Impact	PWD Response
1. Sediment disposal	To date, it has been presumed that sediment dredged from Littlerock Reservoir could be disposed of in spent gravel pits in the upper reach of Littlerock Creek at no additional cost to PWD. If an agreement to dispose of sediment cannot be reached, PWD will need to explore more costly disposal options elsewhere.	Negotiate and secure an agreement as soon as possible with gravel pit owner to dispose of dredged sediment.
2. Contamination	Contamination from Quagga mussels or other sources would require that PWD take Littlerock Reservoir offline to avoid contaminating Lake Palmdale. In addition, Little rock Reservoir would probably need to be drained (if even possible) to remove them.	Have sufficient groundwater pumping capacity available to make up for lost water from Littlerock Reservoir in the event it must be taken off line.

3.7.3 Schedule

Figure 3-8 below illustrates the proposed implementation schedule for removing sediment from Littlerock Reservoir.

Figure 3-8: Sediment Removal Schedule for Littlerock Reservoir



3.7.4 Projected Cost

The projected costs for sediment removal from Littlerock Reservoir are summarized below.

Capital costs: $6 million

O&M costs (per year): $0.5 million (for treatment) to $1.4 million (includes sediment removal)

Total costs: $23 million

Net present value: $14 million

Costs include construction of grade control structure, initial sediment removal, ongoing sediment removal every 5 years, and annual costs to treat water at the Palmdale Water Treatment Plant.

3.8 Implementation Plan Summary

This implementation plan outlines an ambitious plan to meet the needs of its customers through a combination of new supplies, local groundwater storage, water recycling and conservation. **Table 3-10** outlines the strategic objectives PWD should use to guide its future decision-making.

Table 3-10: Recommended Strategic Objectives for PWD

Water Resource Element	Strategic Objective
Imported Water	• Firm up existing Table A supplies so that imported water is available at historical average levels • Create and maintain options for future acquisition of imported water as need arises • Protect both existing supplies and future opportunities by being proactive and a leader as operation and management of the SWP system continues to evolve
Groundwater Pumping and Recharge	• Be able to meet 70 percent of demands through pumping within ten years (i.e. by 2020) • Do not further draft the local groundwater basin • Establish and operate recharge facilities to offset both proposed pumping increases and potential loss of groundwater pumping due to adjudication.
Water Banking	• Establish ability to bank available imported water as soon as possible • Focus first on developing storage within the groundwater basin local to PWD • Pursue partners to participate in developing PWD storage facilities including other AVSWCA members and other entities (e.g. MWD, LADWP) • Consider water banking in locations outside PWD if cost effective AND the project produces a value-added benefit (such as additional aqueduct delivery capacity)
Recycled Water	• Maximize the use of recycled water within PWD's service area to limit the need for more imported water • Develop a non-potable distribution system to be able to deliver tertiary treated recycled water for irrigation and, where feasible, industrial and commercial uses • Develop and implement ways to use recycled water to increase available groundwater supply
Littlerock Reservoir	• Create and maintain additional storage capacity for water resource and recreational benefit through sediment removal • Maintain the quality of water in Littlerock Reservoir • Continue to explore ways to use Littlerock Reservoir for water supply reliability, power generation, and other benefits
Conservation	• Implement conservation programs to achieve savings that at least match the cost offset of acquiring, transporting and treating new supplies • Continue to expand conservation efforts on a regular basis (e.g. every 3-5 years), attracting outside funding to help expand programs • Achieve the conservation targets that are expected to be established through the proposed "20 x 2020" program (i.e. 20 percent per capita reduction in water use statewide by 2020) • Maintain and update policies as needed to reduce water waste and preserve PWD's ability to achieve sufficient conservation savings in the event of a water shortage emergency • Provide leadership to other Antelope Valley water purveyors in crafting consistent regional conservation programs and messaging

To achieve these strategic objectives, **Table 3-11** summarizes the recommended implementation actions to be taken.

Table 3-11: Recommended Implementation Actions by Water Resource Element

Water Resource Element	Implementation Actions
Imported Water	1. Acquire new imported supplies 2. Be proactive with State Water Project system management and operation 3. Negotiate for additional conveyance capacity 4. Maintain flexibility for future water treatment facilities
Groundwater Pumping and Recharge	1. Install new wells, including ASR wells in the North Well Field area 2. Install surface recharge facilities
Water Banking	1. Develop local recharge and recovery capabilities 2. Develop partnership strategy 3. Explore added benefits of outside banking opportunities
Recycled Water	1. Secure recycled water agreement 2. Participate in developing a salt and nutrient management plan 3. Implement non-potable recycled water system 4. Implement agriculture reuse/groundwater exchange project 5. Conduct further research for using recycled water for groundwater recharge
Littlerock Reservoir	1. Remove sediments as previously evaluated 2. Take measures to prevent Quagga mussel infestation 3. Further evaluate storage and power options
Conservation	1. Implement and consistently expand targeted conservation programs 2. Continue program of water budgets for customers 3. Monitor and report effectiveness of conservation programs 4. Regularly review and coordinate PWD and City of Palmdale ordinances and policies 5. Coordinate communications with other Antelope Valley water purveyors 6. Pursue grant funding to improve program cost effectiveness

Based upon the recommended strategy (IW70), the estimated costs to implement this strategy are summarized in **Table 3-12**. It should be noted that the overall cost between strategies IW70 (which emphasizes more imported water) and RW70 (which emphasizes more recycled water) are essentially the same for planning purposes. As such, by using IW70 as a guide to develop a financing strategy, PWD will be able to use the same (or very similar) financing strategy to fund RW70. The financing plan is discussed in further detail in Chapter 4.

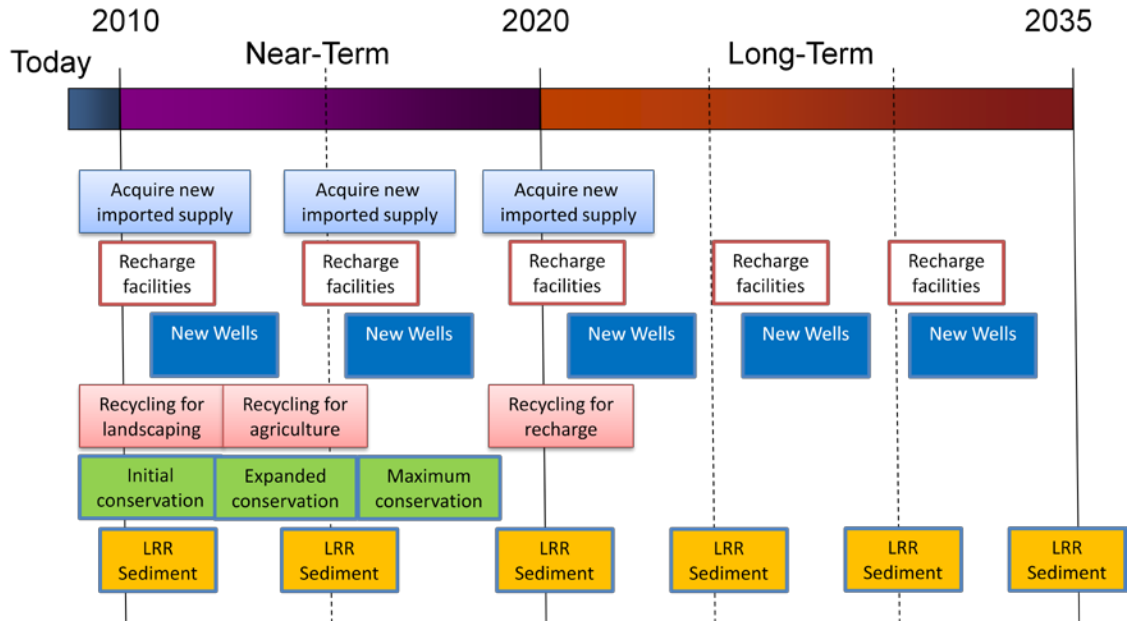
Table 3-12: Summary of Costs for Recommended Strategy by Water Resource Element

Water Resource Element	Capital Costs	O&M Costs	Total Costs	Net Present Value
Imported Water	$347 million	$12-19 million/yr	$757 million	$426 million
Groundwater Pumping	$109 million	$1-6 million/yr	$227 million	$119 million
Groundwater Recharge	$34 million	$0.2-1 million/yr	$49 million	$32 million
Recycled Water	$49 million	$0.4-0.9 million/yr	$66 million	$42 million
Conservation	$0	$0.5-1.1 million/yr	$11 million	$4.1 million
Littlerock Reservoir	$6 million	$0.5-$1.4 million/yr	$23 million	$14 million
Total	$545 million	$14-29 million/yr	$1,130 million	$665 million

Notes: Costs are in 2008 dollars. Costs are based upon strategy IW70 which relies largely on new imported supplies. Overall costs are similar if utilizing recycled water instead. O&M costs shown illustrate the range of costs between 2011 and 2035. NPV is based upon a 5% annual discount rate.

Figure 3-9 below illustrates the proposed schedule for when facilities will be brought on-line or other actions taken.

Figure 3-9: Schedule for Implementing Water Resource Elements of the Plan



Chapter 4 Financing Plan

4.1 Introduction

The purpose of the financing plan for the Strategic Water Resources Plan is to clarify the principles by which PWD will use to guide future financing measures needed to implement the plan and to outline a proposed funding strategy.

4.1.1 SWRP Financing Principles

The costs associated with implementing the SWRP are significantly higher than the costs to develop the current PWD system. As such, it is important to develop a set of guiding principles for PWD to use to ensure equitable and appropriate allocation of costs.

For this SWRP, the proposed financing principles are:

- New customers establishing new connections must pay for new supplies and the infrastructure to deliver those supplies. This includes funding new imported water acquisition, recharge and recovery facilities, and recycled water facilities.
- Current and future customers must pay for reliability of current supply up to budgeted allotments for indoor and outdoor usage. This would include the costs of improvements to maintain Littlerock Reservoir, of PWD's share of improvements to the Delta, and of improvements needed to meet water quality standards.
- Those customers choosing to use more than their allotment need to contribute more to help fund water reliability projects including conservation and recycling.
- Current and future customers are to pay for all O&M costs as well as fixed costs of existing systems.
- Other system enhancements, such as possible hydropower generation from Littlerock Reservoir, need to be able to pay for themselves without subsidy from other revenue sources.
- Financing strategy needs to provide for supply reliability assuming no future development or delayed future development.

4.1.2 Financing Options

PWD has the following financing options available to fund improvements recommended in the SWRP. These options are:

- **Water Supply Connection Fee**: Connection fees are generally associated with the need to develop new facilities to meet new system demands. Currently PWD assesses a capital improvement project (CIP) connection fee that is designed to pay for new distribution system infrastructure. This fee, however, does not take into account the costs to acquire and deliver new water supplies to PWD. A new water supply connection fee would serve this purpose.
- **Water Rates**: Water rates are designed to produce revenues to cover a variety of costs. These include ongoing operation and maintenance costs to deliver water, administrative costs, conservation costs and the cost to obtain supplemental water supplies to maintain system reliability, and the costs to meet new water quality requirements. Water rates are also used to provide funds to various reserve accounts and to help fund debt repayment.
- **Municipal Debt**: Municipal debt instruments (bonds, certificates of participation, etc.) are commonly used to finance major capital projects. Terms generally range from 5 to 30 years with low to moderate interest rates depending upon PWD's credit rating at the time.

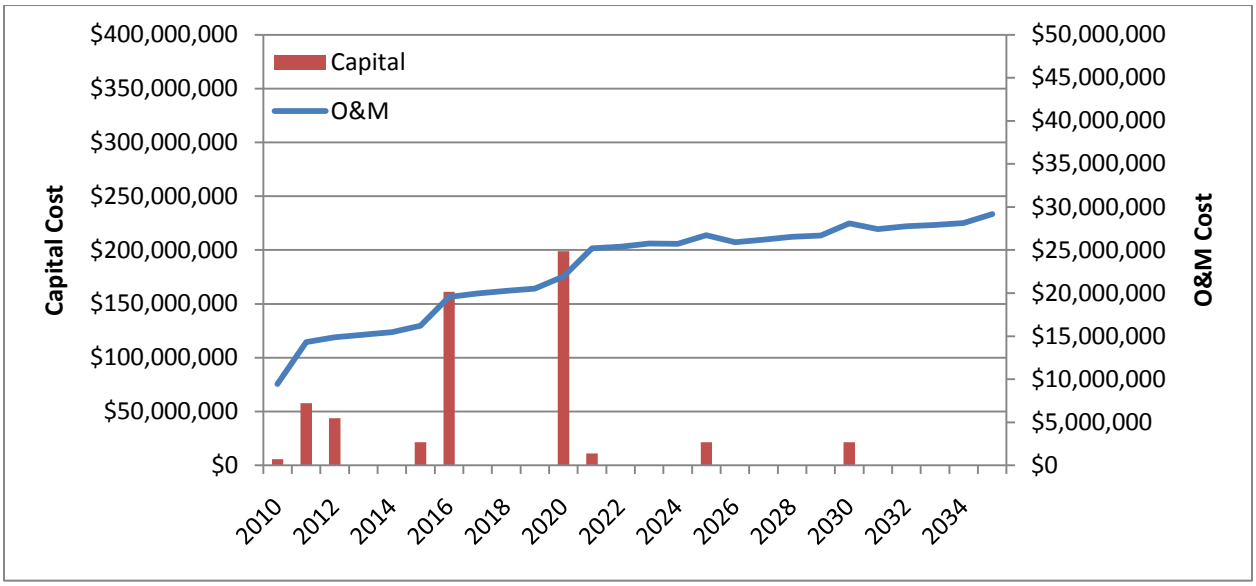
- **State Revolving Fund (SRF) Loan**: The USEPA provides states with funding for the SRF loan program to provide low-interest loans for clean water improvement (i.e. wastewater) and drinking water programs. Historically, loans for the drinking water program are limited to low-income communities facing public health threats to their water supplies and thus is not a likely source of funding for PWD's SWRP. However, loans (and occasionally grants) are available from the clean water program for water recycling projects.
- **Property Tax Assessment**: Property tax assessments can be used to help cover the fixed costs associated with water supply facilities. Currently, PWD utilizes a tax assessment to fund fixed costs associated with the State Water Project. A similar assessment could be used to fund PWD's portion of the fixed costs associated with modifications to the Delta or new storage projects implemented by DWR to improve the reliability of the SWP.
- **Grants**: Grants are made available through various State, Federal, and non-profit organizations to provide funding for specific programs. At the State level, grants are generally made available through voter-approved initiatives (e.g. Proposition 50 and 84) or through grants from the Federal government funneled through State agencies. Meanwhile, grants at the federal level are made through legislative appropriation to federal agencies such as the USEPA, the USBR and the USACE. In general, grants are highly competitive and should not be considered reliable sources of funding for long-term planning. That said, PWD should actively pursue grants to fund multiple elements of this SWRP including conservation, water recycling, and groundwater storage.
- **Partnership Opportunities**: Partnership opportunities on groundwater storage and recycled water should be explored as potential ways to help finance projects. Potential partners may include both parties within the Antelope Valley (e.g. AVEK, City of Palmdale, and Waterworks District No. 40) as well as parties outside (e.g. Metropolitan Water District, Los Angeles Department of Water and Power). However, given the specific nature of these opportunities, these will need to be approached on an opportunistic basis and are not assumed as part of the financing plan for the SWRP.

In PWD's setting, because the vast majority of the water supply need is expected to be driven by new development, the most appropriate financing mechanisms for PWD to rely upon are water supply connection fees, municipal and SRF loans, and water rates. While PWD should aggressively pursue grants, and possibly consider using a property tax assessment to fund additional fixed costs associated with acquiring new imported supplies, neither of these will be significant to cause a substantial change in financing approach.

4.2 Projected Cash Flow Requirements

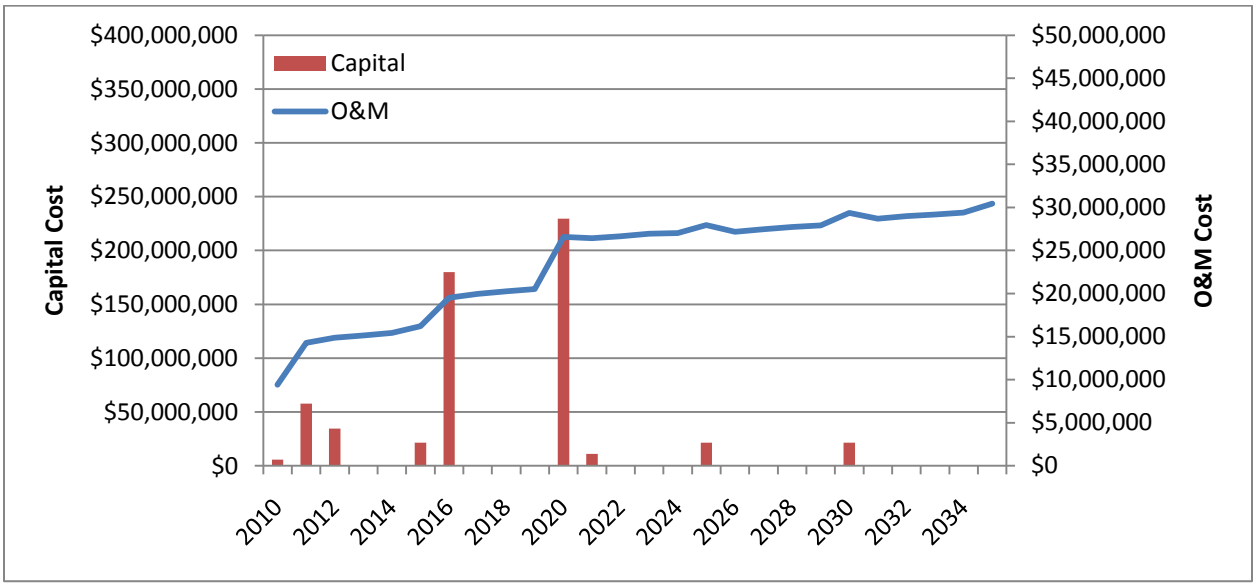
Projected cash flows for the recommended strategy (IW70) are illustrated in **Figure 4-1** below. It is important to note that the bulk of capital expenditures occur over the next 10 to 12 years.

Figure 4-1: Project Capital Outlays and O&M Costs for Imported Water Strategy (IW70)



If PWD were instead to pursue a strategy that maximized the use of recycled water primarily through groundwater recharge with advanced water treatment (i.e. strategy RW70), the projected cash flow and O&M costs would be similar to those for IW70 as illustrated in **Figure 4-2** below.

Figure 4-2: Project Capital Outlays and O&M Costs Recycled Water Strategy (RW70)



4.3 Financing Strategies

This section outlines proposed financing strategies for the recommended local storage strategy (IW70) and the alternative recycled water strategy (RW70).

4.3.1 Water Supply Connection Fee

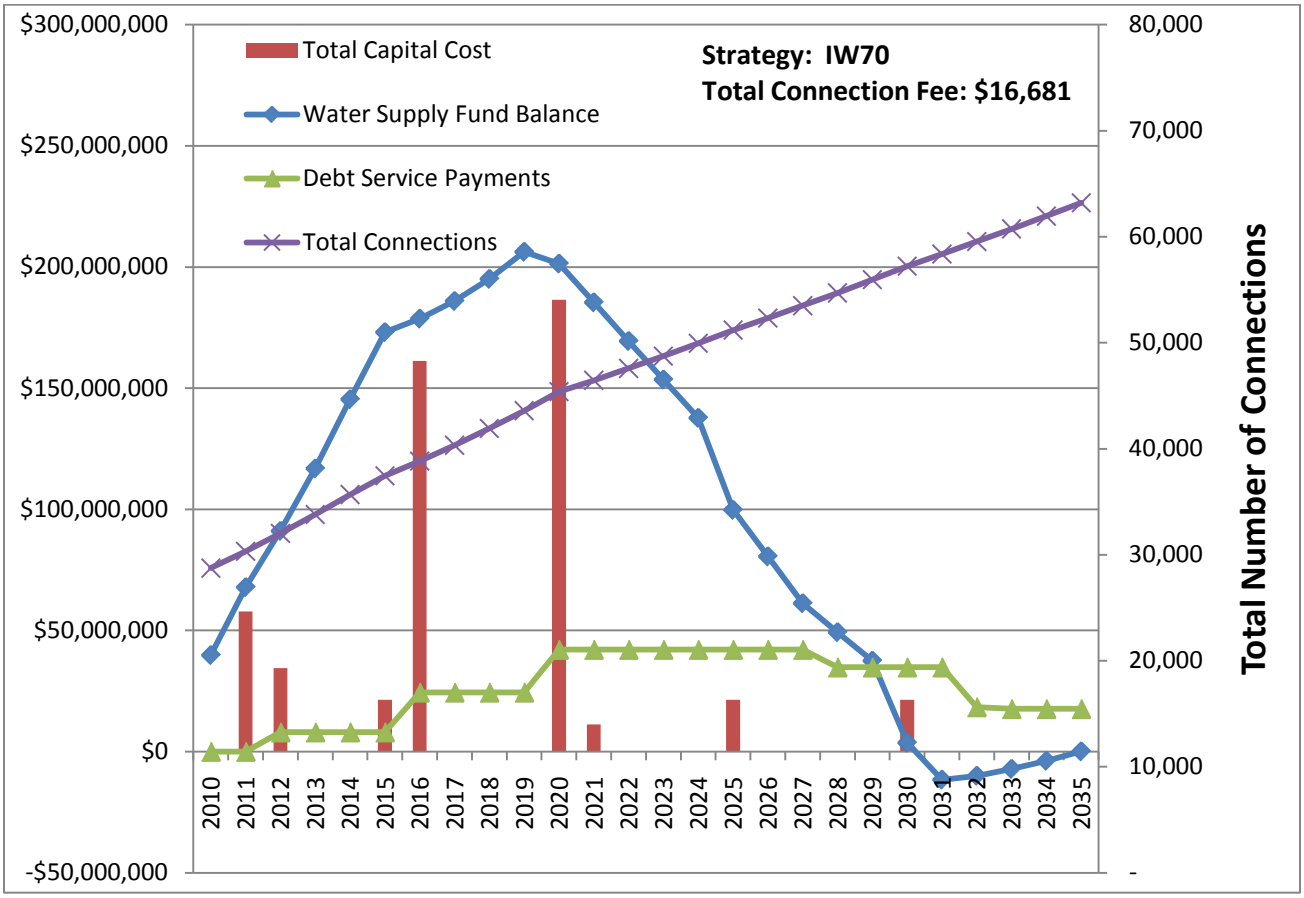
The analysis below has been used to identify at what level water supply connection fees should be set to recover capital and financing costs with the development of new water supplies.

Local Storage Strategy (IW70)

In order to meet these projected capital needs for this strategy, a model was prepared to evaluate a proposed combination of connection fee and debt to finance these capital outlays. Information and results from this model are provided in detail in **Appendix A**. The results of this evaluation indicate that a water supply connection fee of $16,681 per connection would be needed to fund the capital and debt service costs through 2035. The relationship between capital costs, debt service, connection fees and growth in connections is illustrated below in **Figure 4-3**. The connection fee was set such that a Water Supply Fund would achieve a near-zero balance by 2035.

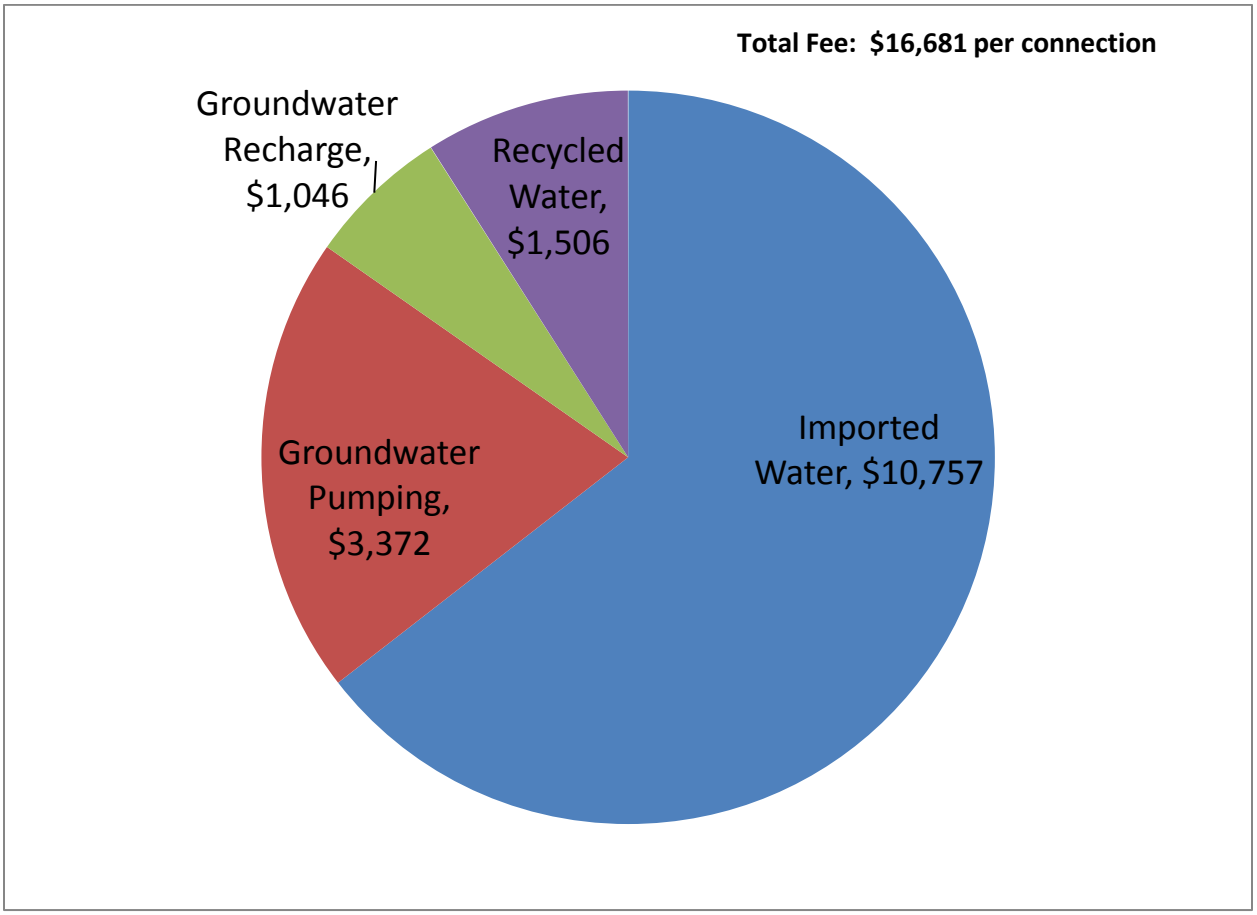
For planning purposes, this analysis was designed to identify an appropriate connection fee. It should be noted that the precise mixture of debt to cash expenditures for capital outlays shown in **Figure 4-3** has not been optimized to ensure that the water supply fund balance is always positive and sufficient to meet debt coverage ratio requirements (generally 150% of annual debt service).

Figure 4-3: Relationship Between Number of Connections and Financing Elements for Strategy IW70



In terms of the relationship between capital costs, **Figure 4-4** below illustrates what portion of each connection fee is related to particular capital improvements. For strategy IW70, nearly two-thirds of the cost is associated with acquiring new imported supplies.

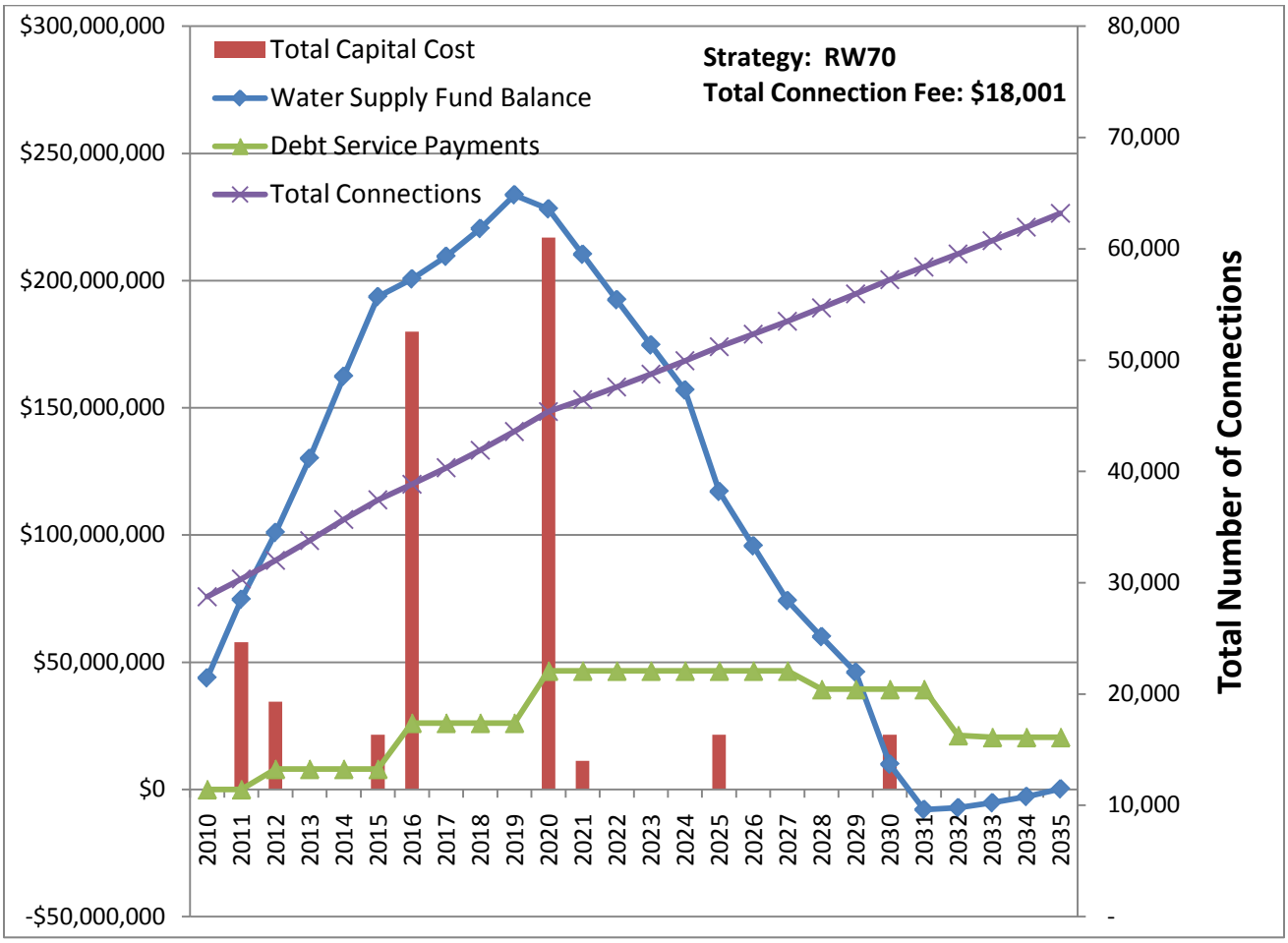
Figure 4-4: Breakdown of Water Supply Connection Fee by Water Resource Capital Cost (IW70)



Self-Reliance Strategy (RW70)

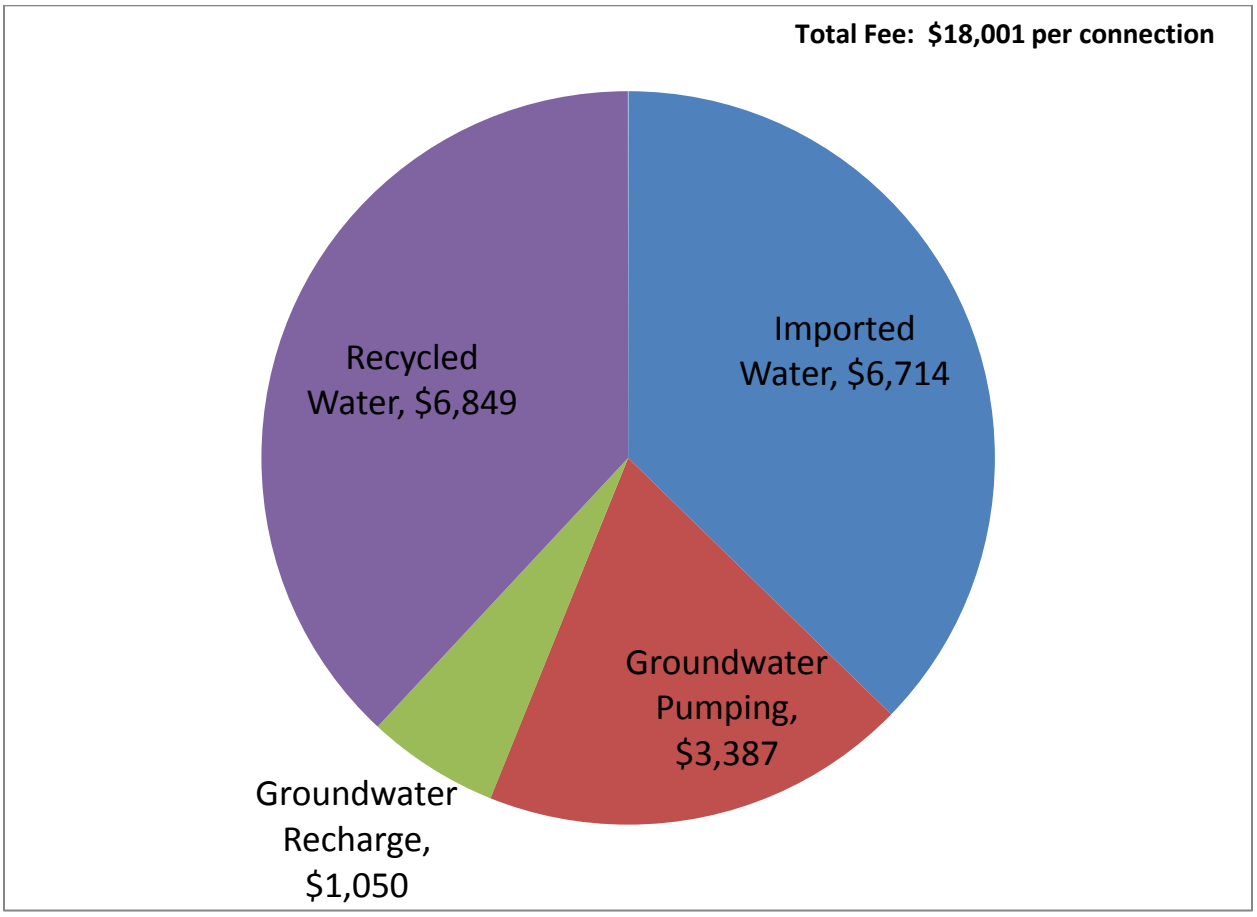
In order to meet these projected capital needs for this strategy, a water supply connection fee of $18,001 per connection would be needed to fund the capital and debt service costs through 2035. The relationship between capital costs, debt service, connection fees and growth in connections for this strategy is illustrated in **Figure 4-5**. As with the previous analysis, the connection fee was set such that a Water Supply Fund would achieve a near-zero balance by 2035 and the precise mix of debt to cash outlays has not been optimized.

Figure 4-5: Relationship Between Number of Connections and Financing Elements for Strategy RW70



In terms of the relationship between capital costs, **Figure 4-6** illustrates what portion of each connection fee is related to particular capital improvements. Not surprisingly, the breakdown between imported water and recycled water in this strategy (RW70) is nearly equivalent.

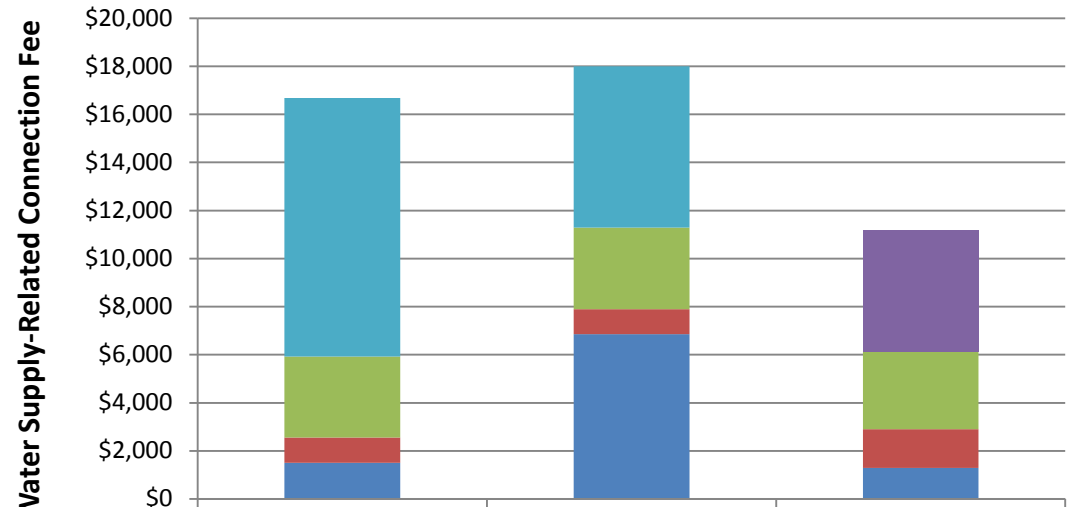
Figure 4-6: Breakdown of Water Supply Connection Fee by Water Resource Capital Cost (RW70)



Comparison to Other Connections Fees

To provide perspective as to the significance of these proposed connection fees, similar fees currently charged by Waterworks District No. 40 and AVEK were reviewed. **Figure 4-7** below shows a comparison of the proposed PWD water supply connection fees to these fees. While these other fees are currently lower than the proposed PWD fees, these costs do not include costs associated with acquiring new water supplies. In addition, the fee charged to recover costs for recycled water development may be low as the analysis used to determine this fee did not take into account the costs to construct lateral pipelines or facility retrofits. Given these caveats, the proposed connection fees to fund capital costs of PWD's SWRP appear to be reasonable and consistent with costs charged elsewhere in the Antelope Valley.

Figure 4-7: Comparison of Proposed PWD Water Supply Connection Fee to AVEK and Waterworks District No. 40 Water Supply-Related Connection Fees



	PWD (IW70)	PWD (RW70)	WWD40
imported water acquisition	$10,757	$6,714	$0
imported water delivery	$0	$0	$5,064
groundwater facilities	$3,372	$3,387	$3,222
water banking/recharge	$1,046	$1,050	$1,611
recycled water	$1,506	$6,849	$1,289

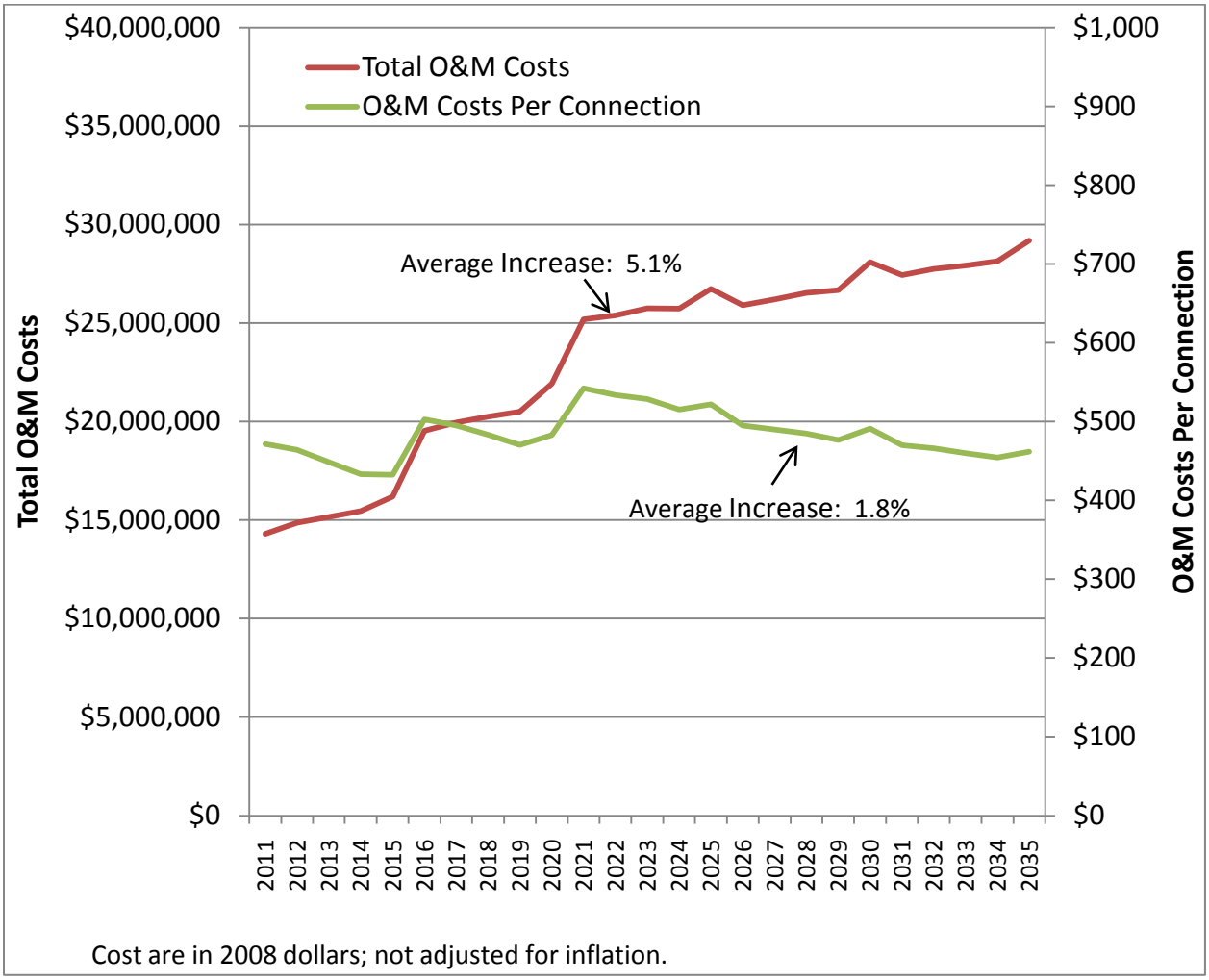
Notes:
1. Imported water acquistion: not included in WWD40 or AVEK fee.
2. Imported delivery fee: Connection fee charge by AVEK. For PWD, imported delivery fee is included in cost of groundwater and recharge fee.
3. WWD40 recycled water fee does not include costs for laterals or retrofits. For RW70, bulk of recycled fee designed to cover advance treatment costs for groundwater recharge.

4.3.2 Water Rates

The SWRP presumes that water rates will be used to cover ongoing O&M costs associated with new supplies. For the SWRP, an analysis was performed to examine the O&M costs to evaluate the projected annual cost increase and the increase in cost per connection. The analysis did not attempt to determine what future water rates should be but rather if the expected increase in O&M costs were reasonable and could be expected to be covered by reasonable rate increases.

Figure 4-8 below illustrates projected average O&M costs (in 2008 dollars) from 2011 to 2035 and projected costs per connection. Results show that while O&M costs increase on average at 5.1% annually, the cost per connection increases on average 1.8% annually.

Figure 4-8: Projected O&M Costs and Costs Per Connection for Recommended Strategy (IW70)



4.4 Financing Plan Summary

To summarize, the recommended financing strategy for the SWRP involves the following steps:

- Implement a water supply connection fee for new connections of $16,881 to $18,001 beginning as soon as possible and escalated every year by the rate of inflation.
- Use a combination of municipal debt financing, SRF loans, and collected water supply connection fees to fund capital projects identified in the SWRP.
- Continue to maintain current approach to setting water rates in order to continue to cover O&M expenses associated with the SWRP.
- Further evaluate using property tax assessment(s) to fund potential future fixed costs associated with SWP improvements if and when the improvements become more likely.
- Pursue grant funding for conservation, water recycling, and groundwater storage projects.
- Further evaluate partnership opportunities and engage with potential partners for recycling and groundwater storage projects as these projects evolve.

Appendix A - Financing Model Results

Table A-1

Strategic Water Resource Plan Cash Flows

Based on Strategy IW70

	Total Costs			Imported Water			Groundwater Pumping			Groundwater Recharge			Water Banking			Recycled Water			Conservation			Littlerock Reservoir		
Year	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total
2010	$5,901,638	$9,444,578	$15,346,216	$0	$7,245,339	$7,245,339	$0	$1,605,370	$1,605,370	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$56,007	$56,007	$5,901,638	$537,862	$6,439,500
2011	$57,900,086	$14,304,552	$72,204,637	$46,667,419	$12,106,537	$58,773,956	$0	$1,605,370	$1,605,370	$11,232,667	$0	$11,232,667	$0	$0	$0	$0	$0	$0	$0	$56,007	$56,007	$0	$536,637	$536,637
2012	$43,792,600	$14,858,616	$58,651,216	$0	$10,761,808	$10,761,808	$22,880,000	$2,850,691	$25,730,691	$0	$232,818	$232,818	$0	$0	$0	$20,912,600	$432,300	$21,344,900	$0	$56,007	$56,007	$0	$524,992	$524,992
2013	$0	$15,154,414	$15,154,414	$0	$11,034,147	$11,034,147	$0	$2,869,168	$2,869,168	$0	$236,676	$236,676	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$526,117	$526,117
2014	$0	$15,457,938	$15,457,938	$0	$11,336,602	$11,336,602	$0	$2,870,271	$2,870,271	$0	$236,906	$236,906	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$525,853	$525,853
2015	$21,450,000	$16,196,531	$37,646,531	$0	$10,023,115	$10,023,115	$21,450,000	$3,866,157	$25,316,157	$0	$446,771	$446,771	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$1,372,180	$1,372,180
2016	$161,232,667	$19,537,064	$180,769,731	$150,000,000	$14,202,822	$164,202,822	$0	$3,896,023	$3,896,023	$11,232,667	$453,007	$11,685,673	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$496,905	$496,905
2017	$0	$19,956,640	$19,956,640	$0	$14,575,795	$14,575,795	$0	$3,921,292	$3,921,292	$0	$458,282	$458,282	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$512,964	$512,964
2018	$0	$20,258,679	$20,258,679	$0	$14,806,724	$14,806,724	$0	$3,968,314	$3,968,314	$0	$468,100	$468,100	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$527,233	$527,233
2019	$0	$20,510,248	$20,510,248	$0	$15,033,741	$15,033,741	$0	$3,983,278	$3,983,278	$0	$471,224	$471,224	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$533,698	$533,698
2020	$199,062,000	$21,917,688	$220,979,688	$150,000,000	$13,952,249	$163,952,249	$21,450,000	$4,748,262	$26,198,262	$0	$630,939	$630,939	$0	$0	$0	$27,612,000	$851,600	$28,463,600	$0	$363,822	$363,822	$0	$1,370,816	$1,370,816
2021	$11,232,667	$25,185,948	$36,418,615	$0	$18,039,778	$18,039,778	$0	$4,804,959	$4,804,959	$11,232,667	$642,777	$11,875,443	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$483,012	$483,012
2022	$0	$25,398,582	$25,398,582	$0	$18,225,774	$18,225,774	$0	$4,822,763	$4,822,763	$0	$646,494	$646,494	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$488,129	$488,129
2023	$0	$25,755,290	$25,755,290	$0	$18,556,619	$18,556,619	$0	$4,835,480	$4,835,480	$0	$649,149	$649,149	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$498,621	$498,621
2024	$0	$25,739,259	$25,739,259	$0	$18,515,024	$18,515,024	$0	$4,848,196	$4,848,196	$0	$651,804	$651,804	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$508,813	$508,813
2025	$21,450,000	$26,727,892	$48,177,892	$0	$18,004,281	$18,004,281	$21,450,000	$5,375,230	$26,825,230	$0	$761,839	$761,839	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$1,371,119	$1,371,119
2026	$0	$25,902,933	$25,902,933	$0	$18,033,899	$18,033,899	$0	$5,402,935	$5,402,935	$0	$767,624	$767,624	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$483,053	$483,053
2027	$0	$26,208,140	$26,208,140	$0	$18,305,789	$18,305,789	$0	$5,430,467	$5,430,467	$0	$773,372	$773,372	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$483,089	$483,089
2028	$0	$26,526,410	$26,526,410	$0	$18,598,255	$18,598,255	$0	$5,445,362	$5,445,362	$0	$776,482	$776,482	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$490,889	$490,889
2029	$0	$26,675,284	$26,675,284	$0	$18,715,520	$18,715,520	$0	$5,458,555	$5,458,555	$0	$779,236	$779,236	$0	$0	$0	$0	$851,600	$851,600	$0	$363,822	$363,822	$0	$506,551	$506,551
2030	$21,450,000	$28,095,384	$49,545,384	$0	$17,935,697	$17,935,697	$21,450,000	$5,950,366	$27,400,366	$0	$881,918	$881,918	$0	$0	$0	$0	$851,600	$851,600	$0	$1,104,460	$1,104,460	$0	$1,371,343	$1,371,343
2031	$0	$27,444,249	$27,444,249	$0	$18,135,812	$18,135,812	$0	$5,980,834	$5,980,834	$0	$888,279	$888,279	$0	$0	$0	$0	$851,600	$851,600	$0	$1,104,460	$1,104,460	$0	$483,263	$483,263
2032	$0	$27,752,913	$27,752,913	$0	$18,407,610	$18,407,610	$0	$6,011,302	$6,011,302	$0	$894,640	$894,640	$0	$0	$0	$0	$851,600	$851,600	$0	$1,104,460	$1,104,460	$0	$483,301	$483,301
2033	$0	$27,917,783	$27,917,783	$0	$18,535,578	$18,535,578	$0	$6,041,769	$6,041,769	$0	$901,001	$901,001	$0	$0	$0	$0	$851,600	$851,600	$0	$1,104,460	$1,104,460	$0	$483,374	$483,374
2034	$0	$28,142,277	$28,142,277	$0	$18,730,431	$18,730,431	$0	$6,061,962	$6,061,962	$0	$905,217	$905,217	$0	$0	$0	$0	$851,600	$851,600	$0	$1,104,460	$1,104,460	$0	$488,607	$488,607
2035	$0	$29,191,302	$29,191,302	$0	$18,861,849	$18,861,849	$0	$6,076,470	$6,076,470	$0	$908,246	$908,246	$0	$0	$0	$0	$851,600	$851,600	$0	$1,104,460	$1,104,460	$0	$1,388,677	$1,388,677
Totals	$543,471,657	$590,260,595	$1,133,732,252	$346,667,419	$410,680,794	$757,348,213	$108,680,000	$118,730,849	$227,410,849	$33,698,000	$15,462,801	$49,160,801	$0	$0	$0	$48,524,600	$17,084,000	$65,608,600	$0	$10,825,053	$10,825,053	$5,901,638	$17,477,098	$23,378,736

Table A-2

Developer Fee Assessment

Based on Strategy IW70 — 2007 Connections: 26,351 — Inflation Rate: 3%

Estimated Capital Expenditures — Conn Fee Factor: 1.143 (to cover capital cost + interest on debt)

Year	Capital Expenditures to Be Covered: Imported Water	Groundwater Pumping	Groundwater Recharge	Recycled Water	Total Capital Cost	Projected Total Connections	Projected New Connections Annually	Cummulative New Connections	Proposed Water Supply Conn Fee	Water Supply Conn Fee Collected Annually	Total Cummulative Water Supply Fees	Proposed Water Supply Conn Fee (inflated)
2010	$0	$0	$0	$0	$0	28,745	2394	2394	$16,681	$39,933,907	$39,933,907	$16,681
2011	$46,667,419	$0	$11,232,667	$0	$57,900,086	30,334	1589	3983	$16,681	$26,499,893	$66,433,800	$17,182
2012	$0	$22,880,000	$0	$20,912,600	$43,792,600	32,015	1682	5664	$16,681	$28,055,609	$94,489,409	$17,697
2013	$0	$0	$0	$0	$0	33,796	1781	7445	$16,681	$29,706,872	$124,196,281	$18,228
2014	$0	$0	$0	$0	$0	35,682	1886	9331	$16,681	$31,459,826	$155,656,107	$18,775
2015	$0	$21,450,000	$0	$0	$21,450,000	37,446	1764	11095	$16,681	$29,423,128	$185,079,235	$19,338
2016	$150,000,000	$0	$11,232,667	$0	$161,232,667	38,844	1397	12493	$16,681	$23,311,726	$208,390,961	$19,918
2017	$0	$0	$0	$0	$0	40,328	1485	13977	$16,681	$24,763,574	$233,154,535	$20,516
2018	$0	$0	$0	$0	$0	41,907	1579	15556	$16,681	$26,334,771	$259,489,305	$21,131
2019	$0	$0	$0	$0	$0	43,588	1681	17237	$16,681	$28,038,277	$287,527,583	$21,765
2020	$150,000,000	$21,450,000	$0	$27,612,000	$199,062,000	45,379	1792	19028	$16,681	$29,886,977	$317,414,559	$22,418
2021	$0	$0	$11,232,667	$0	$11,232,667	46,458	1078	20107	$16,681	$17,990,700	$335,405,259	$23,091
2022	$0	$0	$0	$0	$0	47,577	1119	21226	$16,681	$18,673,673	$354,078,933	$23,783
2023	$0	$0	$0	$0	$0	48,739	1161	22388	$16,681	$19,375,193	$373,454,125	$24,497
2024	$0	$0	$0	$0	$0	49,944	1205	23593	$16,681	$20,104,373	$393,558,499	$25,232
2025	$0	$21,450,000	$0	$0	$21,450,000	51,195	1251	24844	$16,681	$20,862,313	$414,420,811	$25,989
2026	$0	$0	$0	$0	$0	52,325	1131	25974	$16,681	$18,860,311	$433,281,122	$26,768
2027	$0	$0	$0	$0	$0	53,493	1167	27142	$16,681	$19,474,973	$452,756,095	$27,572
2028	$0	$0	$0	$0	$0	54,698	1206	28347	$16,681	$20,110,414	$472,866,509	$28,399
2029	$0	$0	$0	$0	$0	55,943	1245	29592	$16,681	$20,767,533	$493,634,042	$29,251
2030	$0	$21,450,000	$0	$0	$21,450,000	57,229	1286	30878	$16,681	$21,447,075	$515,081,117	$30,128
2031	$0	$0	$0	$0	$0	58,374	1145	32023	$16,681	$19,093,641	$534,174,759	$31,032
2032	$0	$0	$0	$0	$0	59,541	1167	33190	$16,681	$19,473,558	$553,648,317	$31,963
2033	$0	$0	$0	$0	$0	60,732	1191	34381	$16,681	$19,864,760	$573,513,077	$32,922
2034	$0	$0	$0	$0	$0	61,946	1215	35595	$16,681	$20,263,484	$593,776,561	$33,910
2035	$0	$0	$0	$0	$0	63,185	1239	36834	$16,681	$20,665,971	$614,442,532	$34,927
Totals	$346,667,419	$108,680,000	$33,698,000	$48,524,600	$537,570,019		36,834			$614,442,532		
Unburdened Cost/Conn	$9,412	$2,951	$915	$1,317	$14,594							
Burdened Cost/Conn	$10,757	$3,372	$1,046	$1,506	$16,681							
% Total Fee	64%	20%	6%	9%	100%							

Note: All costs and developer fees are in 2008 dollars. Developer fee established to recover capital and debt service costs. Fee would be escalated annually for inflation (3%) as shown to far right.

Assumes no net new connections between end of 2007 and start of 2010.

Table A-3

Debt Financing and Payback Summary

Based on strategy IW70

Municipal Debt Financing
Rate: 4%
Term (yrs): 15

SRF Loan Financing (for recycled water)
Rate: 2.50%
Term (yrs): 20 Debt 1
Term (yrs): 15 Debt 2
RW Commodity Rate: $1,000 AF

Interest on Fund Balance
Rate: 4%

	Capital Expenditures				Muni 1 Debt		Muni 2 Debt		Muni 3 Debt		SRF		Total					
Year	Imported Water	Groundwater Pumping	Groundwater Recharge	Recycled Water	Debt	Debt Service	Debt	Debt Service	Debt	Debt Service	Debt	Debt Service	Debt	Debt Service	Developer Fee Collected Annual	Recycled Water Delivered (AF)	Recycled Water Revenues	Water Supply Fund Net Balance w/Interest
2010	$0	$0	$0	$0								$0		$0	$39,933,907	-		$41,531,264
2011	$46,667,419	$0	$11,232,667	$0	$80,780,086							$0	$80,780,086	$0	$26,499,893	-		$70,752,403
2012	$0	$22,880,000	$0	$20,912,600		$7,265,450					$20,912,600	$1,341,483	$20,912,600	$8,606,933	$28,055,609	800	$800,000	$94,641,122
2013	$0	$0	$0	$0		$7,265,450						$1,341,483		$8,606,933	$29,706,872	800	$800,000	$121,202,703
2014	$0	$0	$0	$0		$7,265,450						$1,341,483		$8,606,933	$31,459,826	800	$800,000	$150,649,820
2015	$0	$21,450,000	$0	$0		$7,265,450	$182,682,667					$1,341,483	$182,682,667	$8,606,933	$29,423,128	800	$800,000	$179,156,656
2016	$150,000,000	$0	$11,232,667	$0		$7,265,450		$16,430,680				$1,341,483		$25,037,613	$23,311,726	800	$800,000	$185,359,999
2017	$0	$0	$0	$0		$7,265,450		$16,430,680				$1,341,483		$25,037,613	$24,763,574	800	$800,000	$193,321,398
2018	$0	$0	$0	$0		$7,265,450		$16,430,680				$1,341,483		$25,037,613	$26,334,771	800	$800,000	$203,235,298
2019	$0	$0	$0	$0		$7,265,450		$16,430,680	$182,682,667			$1,341,483	$182,682,667	$25,037,613	$28,038,277	800	$800,000	$215,317,400
2020	$150,000,000	$21,450,000	$0	$27,612,000		$7,265,450		$16,430,680		$16,430,680	$27,612,000	$3,571,607	$27,612,000	$43,698,417	$29,886,977	800	$800,000	$210,398,199
2021	$0	$0	$11,232,667	$0		$7,265,450		$16,430,680		$16,430,680		$3,571,607		$43,698,417	$17,990,700	1,700	$1,700,000	$193,846,102
2022	$0	$0	$0	$0		$7,265,450		$16,430,680		$16,430,680		$3,571,607		$43,698,417	$18,673,673	1,700	$1,700,000	$177,342,213
2023	$0	$0	$0	$0		$7,265,450		$16,430,680		$16,430,680		$3,571,607		$43,698,417	$19,375,193	1,700	$1,700,000	$160,907,749
2024	$0	$0	$0	$0		$7,265,450		$16,430,680		$16,430,680		$3,571,607		$43,698,417	$20,104,373	1,700	$1,700,000	$144,574,254
2025	$0	$21,450,000	$0	$0		$7,265,450		$16,430,680		$16,430,680		$3,571,607		$43,698,417	$20,862,313	1,700	$1,700,000	$106,067,676
2026	$0	$0	$0	$0		$7,265,450		$16,430,680		$16,430,680		$3,571,607		$43,698,417	$18,860,311	1,700	$1,700,000	$86,246,753
2027	$0	$0	$0	$0		$7,265,450		$16,430,680		$16,430,680		$3,571,607		$43,698,417	$19,474,973	1,700	$1,700,000	$66,272,242
2028	$0	$0	$0	$0				$16,430,680		$16,430,680		$3,571,607		$36,432,967	$20,110,414	1,700	$1,700,000	$53,715,677
2029	$0	$0	$0	$0				$16,430,680		$16,430,680		$3,571,607		$36,432,967	$20,767,533	1,700	$1,700,000	$41,340,253
2030	$0	$21,450,000	$0	$0				$16,430,680		$16,430,680		$3,571,607		$36,432,967	$21,447,075	1,700	$1,700,000	$6,868,535
2031	$0	$0	$0	$0				$16,430,680		$16,430,680		$3,571,607		$36,432,967	$19,093,641	1,700	$1,700,000	($9,121,622)
2032	$0	$0	$0	$0						$16,430,680		$3,571,607		$20,002,287	$19,473,558	1,700	$1,700,000	($8,268,364)
2033	$0	$0	$0	$0						$16,430,680		$2,230,123		$18,660,803	$19,864,760	1,700	$1,700,000	($5,578,984)
2034	$0	$0	$0	$0						$16,430,680		$2,230,123		$18,660,803	$20,263,484	1,700	$1,700,000	($2,367,355)
2035	$0	$0	$0	$0						$16,430,680		$2,230,123		$18,660,803	$20,665,971	1,700	$1,700,000	$1,391,324
Totals	$346,667,419	$108,680,000	$33,698,000	$48,524,600	$80,780,086	$116,247,197	$182,682,667	$262,890,881	$182,682,667	$262,890,881	$48,524,600	$63,853,122	$494,670,019	$705,882,081	$614,442,532	32,700	$32,700,000	

Notes:
Target is to achieve zero balance in Water Supply Fund by 2035.
Assumes recycled water sales return to water supply fund.
Groundwater pumping capital expenditures in 2025 and 2030 are paid from water supply fund reserves; not debt financed.

Table A-4

SRF Financing for Recycled Water Program

Based on strategy IW70

Rate: 2.50%

Term (yrs): 20 Debt 1

15 Debt 2

Year	Capital Cost: Recycled Water	Debt Service 1	Debt Service 2	Total Debt Service w/SRF
2010	$0			$0
2011	$0			$0
2012	$20,912,600	$1,341,483		$1,341,483
2013	$0	$1,341,483		$1,341,483
2014	$0	$1,341,483		$1,341,483
2015	$0	$1,341,483		$1,341,483
2016	$0	$1,341,483		$1,341,483
2017	$0	$1,341,483		$1,341,483
2018	$0	$1,341,483		$1,341,483
2019	$0	$1,341,483		$1,341,483
2020	$27,612,000	$1,341,483	$2,230,123	$3,571,607
2021	$0	$1,341,483	$2,230,123	$3,571,607
2022	$0	$1,341,483	$2,230,123	$3,571,607
2023	$0	$1,341,483	$2,230,123	$3,571,607
2024	$0	$1,341,483	$2,230,123	$3,571,607
2025	$0	$1,341,483	$2,230,123	$3,571,607
2026	$0	$1,341,483	$2,230,123	$3,571,607
2027	$0	$1,341,483	$2,230,123	$3,571,607
2028	$0	$1,341,483	$2,230,123	$3,571,607
2029	$0	$1,341,483	$2,230,123	$3,571,607
2030	$0	$1,341,483	$2,230,123	$3,571,607
2031	$0	$1,341,483	$2,230,123	$3,571,607
2032	$0	$1,341,483	$2,230,123	$3,571,607
2033	$0		$2,230,123	$2,230,123
2034	$0		$2,230,123	$2,230,123
2035	$0		$2,230,123	$2,230,123
Totals	$48,524,600	$28,171,148	$35,681,974	$63,853,122

Table A-5

Operating and Maintenance Costs Evaluation

Based on Strategy IW70

Year	Total O&M Costs	% change	Imported Water	Groundwater Pumping	Groundwater Recharge	Water Banking	Recycled Water	Conservation	Littlerock Reservoir	Total Connections	Annual Cost/Conn	% change
2010	$9,444,578		$7,245,339	$1,605,370	$0	$0	$0	$56,007	$537,862	28,745	$329	
2011	$14,304,552	51%	$12,106,537	$1,605,370	$0	$0	$0	$56,007	$536,637	30,334	$472	44%
2012	$14,858,616	4%	$10,761,808	$2,850,691	$232,818	$0	$432,300	$56,007	$524,992	32,015	$464	-2%
2013	$15,154,414	2%	$11,034,147	$2,869,168	$236,676	$0	$432,300	$56,007	$526,117	33,796	$448	-3%
2014	$15,457,938	2%	$11,336,602	$2,870,271	$236,906	$0	$432,300	$56,007	$525,853	35,682	$433	-3%
2015	$16,196,531	5%	$10,023,115	$3,866,157	$446,771	$0	$432,300	$56,007	$1,372,180	37,446	$433	0%
2016	$19,537,064	21%	$14,202,822	$3,896,023	$453,007	$0	$432,300	$56,007	$496,905	38,844	$503	16%
2017	$19,956,640	2%	$14,575,795	$3,921,292	$458,282	$0	$432,300	$56,007	$512,964	40,328	$495	-2%
2018	$20,258,679	2%	$14,806,724	$3,968,314	$468,100	$0	$432,300	$56,007	$527,233	41,907	$483	-2%
2019	$20,510,248	1%	$15,033,741	$3,983,278	$471,224	$0	$432,300	$56,007	$533,698	43,588	$471	-3%
2020	$21,917,688	7%	$13,952,249	$4,748,262	$630,939	$0	$851,600	$363,822	$1,370,816	45,379	$483	3%
2021	$25,185,948	15%	$18,039,778	$4,804,959	$642,777	$0	$851,600	$363,822	$483,012	46,458	$542	12%
2022	$25,398,582	1%	$18,225,774	$4,822,763	$646,494	$0	$851,600	$363,822	$488,129	47,577	$534	-2%
2023	$25,755,290	1%	$18,556,619	$4,835,480	$649,149	$0	$851,600	$363,822	$498,621	48,739	$528	-1%
2024	$25,739,259	0%	$18,515,024	$4,848,196	$651,804	$0	$851,600	$363,822	$508,813	49,944	$515	-2%
2025	$26,727,892	4%	$18,004,281	$5,375,230	$761,839	$0	$851,600	$363,822	$1,371,119	51,195	$522	1%
2026	$25,902,933	-3%	$18,033,899	$5,402,935	$767,624	$0	$851,600	$363,822	$483,053	52,325	$495	-5%
2027	$26,208,140	1%	$18,305,789	$5,430,467	$773,372	$0	$851,600	$363,822	$483,089	53,493	$490	-1%
2028	$26,526,410	1%	$18,598,255	$5,445,362	$776,482	$0	$851,600	$363,822	$490,889	54,698	$485	-1%
2029	$26,675,284	1%	$18,715,520	$5,458,555	$779,236	$0	$851,600	$363,822	$506,551	55,943	$477	-2%
2030	$28,095,384	5%	$17,935,697	$5,950,366	$881,918	$0	$851,600	$1,104,460	$1,371,343	57,229	$491	3%
2031	$27,444,249	-2%	$18,135,812	$5,980,834	$888,279	$0	$851,600	$1,104,460	$483,263	58,374	$470	-4%
2032	$27,752,913	1%	$18,407,610	$6,011,302	$894,640	$0	$851,600	$1,104,460	$483,301	59,541	$466	-1%
2033	$27,917,783	1%	$18,535,578	$6,041,769	$901,001	$0	$851,600	$1,104,460	$483,374	60,732	$460	-1%
2034	$28,142,277	1%	$18,730,431	$6,061,962	$905,217	$0	$851,600	$1,104,460	$488,607	61,946	$454	-1%
2035	$29,191,302	4%	$18,861,849	$6,076,470	$908,246	$0	$851,600	$1,104,460	$1,388,677	63,185	$462	2%
Totals	$590,260,595		$410,680,794	$118,730,849	$15,462,801	$0	$17,084,000	$10,825,053	$17,477,098			

Avg. annual increase: 5.1%

Avg. annual increase 1.8%

Table A-6

Strategic Water Resource Plan Cash Flows

Based on Strategy RW70

	Total Costs			Imported Water			Groundwater Pumping			Groundwater Recharge			Water Banking			Recycled Water			Conservation			Littlerock Reservoir		
Year	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total
2010	$5,901,638	$9,418,997	$15,320,635	$0	$7,245,995	$7,245,995	$0	$1,605,370	$1,605,370	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$56,007	$56,007	$5,901,638	$511,625	$6,413,263
2011	$57,900,086	$14,283,723	$72,183,808	$46,667,419	$12,108,669	$58,776,088	$0	$1,605,370	$1,605,370	$11,232,667	$0	$11,232,667	$0	$0	$0	$0	$0	$0	$0	$56,007	$56,007	$0	$513,676	$513,676
2012	$34,617,700	$14,856,706	$49,474,406	$0	$10,782,636	$10,782,636	$22,880,000	$2,850,478	$25,730,478	$0	$232,773	$232,773	$0	$0	$0	$11,737,700	$432,300	$12,170,000	$0	$56,007	$56,007	$0	$502,512	$502,512
2013	$0	$15,151,789	$15,151,789	$0	$11,053,802	$11,053,802	$0	$2,869,168	$2,869,168	$0	$236,676	$236,676	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$503,836	$503,836
2014	$0	$15,447,886	$15,447,886	$0	$11,348,562	$11,348,562	$0	$2,870,271	$2,870,271	$0	$236,906	$236,906	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$503,840	$503,840
2015	$21,450,000	$16,193,052	$37,643,052	$0	$10,042,399	$10,042,399	$21,450,000	$3,864,857	$25,314,857	$0	$446,500	$446,500	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$1,350,989	$1,350,989
2016	$179,982,667	$19,533,888	$199,516,554	$168,750,000	$14,221,956	$182,971,956	$0	$3,894,429	$3,894,429	$11,232,667	$452,674	$11,685,341	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$476,522	$476,522
2017	$0	$19,954,961	$19,954,961	$0	$14,592,767	$14,592,767	$0	$3,921,292	$3,921,292	$0	$458,282	$458,282	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$494,314	$494,314
2018	$0	$20,257,510	$20,257,510	$0	$14,824,072	$14,824,072	$0	$3,967,535	$3,967,535	$0	$467,937	$467,937	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$509,659	$509,659
2019	$0	$20,505,109	$20,505,109	$0	$15,052,570	$15,052,570	$0	$3,980,646	$3,980,646	$0	$470,675	$470,675	$0	$0	$0	$0	$432,300	$432,300	$0	$56,007	$56,007	$0	$512,910	$512,910
2020	$229,476,000	$26,584,795	$256,060,795	$0	$13,949,207	$13,949,207	$21,450,000	$4,776,390	$26,226,390	$0	$636,812	$636,812	$0	$0	$0	$208,026,000	$5,508,600	$213,534,600	$0	$363,822	$363,822	$0	$1,349,964	$1,349,964
2021	$11,232,667	$26,434,763	$37,667,429	$0	$14,649,393	$14,649,393	$0	$4,807,228	$4,807,228	$11,232,667	$643,250	$11,875,917	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$462,470	$462,470
2022	$0	$26,647,692	$26,647,692	$0	$14,838,202	$14,838,202	$0	$4,822,763	$4,822,763	$0	$646,494	$646,494	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$467,812	$467,812
2023	$0	$26,964,009	$26,964,009	$0	$15,128,967	$15,128,967	$0	$4,835,480	$4,835,480	$0	$649,149	$649,149	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$477,992	$477,992
2024	$0	$27,008,623	$27,008,623	$0	$15,147,907	$15,147,907	$0	$4,848,196	$4,848,196	$0	$651,804	$651,804	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$488,294	$488,294
2025	$21,450,000	$27,958,122	$49,408,122	$0	$14,597,069	$14,597,069	$21,450,000	$5,375,230	$26,825,230	$0	$761,839	$761,839	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$1,351,561	$1,351,561
2026	$0	$27,174,025	$27,174,025	$0	$14,667,224	$14,667,224	$0	$5,402,935	$5,402,935	$0	$767,624	$767,624	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$463,820	$463,820
2027	$0	$27,453,258	$27,453,258	$0	$14,912,877	$14,912,877	$0	$5,430,467	$5,430,467	$0	$773,372	$773,372	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$464,119	$464,119
2028	$0	$27,743,192	$27,743,192	$0	$15,174,367	$15,174,367	$0	$5,445,362	$5,445,362	$0	$776,482	$776,482	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$474,559	$474,559
2029	$0	$27,910,676	$27,910,676	$0	$15,312,027	$15,312,027	$0	$5,458,555	$5,458,555	$0	$779,236	$779,236	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$363,822	$363,822	$0	$488,435	$488,435
2030	$21,450,000	$29,348,201	$50,798,201	$0	$14,550,195	$14,550,195	$21,450,000	$5,950,366	$27,400,366	$0	$881,918	$881,918	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$1,104,460	$1,104,460	$0	$1,352,661	$1,352,661
2031	$0	$28,696,546	$28,696,546	$0	$14,748,972	$14,748,972	$0	$5,980,834	$5,980,834	$0	$888,279	$888,279	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$1,104,460	$1,104,460	$0	$465,400	$465,400
2032	$0	$28,983,351	$28,983,351	$0	$14,995,909	$14,995,909	$0	$6,011,302	$6,011,302	$0	$894,640	$894,640	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$1,104,460	$1,104,460	$0	$468,440	$468,440
2033	$0	$29,165,077	$29,165,077	$0	$15,143,662	$15,143,662	$0	$6,041,769	$6,041,769	$0	$901,001	$901,001	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$1,104,460	$1,104,460	$0	$465,584	$465,584
2034	$0	$29,390,797	$29,390,797	$0	$15,339,777	$15,339,777	$0	$6,061,962	$6,061,962	$0	$905,217	$905,217	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$1,104,460	$1,104,460	$0	$470,782	$470,782
2035	$0	$30,449,988	$30,449,988	$0	$15,481,853	$15,481,853	$0	$6,076,470	$6,076,470	$0	$908,246	$908,246	$0	$0	$0	$0	$5,508,600	$5,508,600	$0	$1,104,460	$1,104,460	$0	$1,370,359	$1,370,359
Totals	$583,460,757	$613,516,737	$1,196,977,494	$215,417,419	$359,911,036	$575,328,455	$108,680,000	$118,754,727	$227,434,727	$33,698,000	$15,467,786	$49,165,786	$0	$0	$0	$219,763,700	$91,596,000	$311,359,700	$0	$10,825,053	$10,825,053	$5,901,638	$16,962,135	$22,863,773

Table A-7

Developer Fee Assessment

Based on RW70 Strategy | 2007 Connections: 26,351 | Inflation Rate: 3%

Estimated Capital Expenditures | Conn Fee Factor: 1.148 (to cover capital cost + interest on debt)

Year	Capital Expenditures to Be Covered					Projected Total Connections	Projected New Connections Annually	Proposed Water Supply Conn Fee	Water Supply Conn Fee Collected Annually	Total Cummulative Water Supply Fees	Proposed Water Supply Conn Fee (inflated)
	Imported Water	Groundwater Pumping	Groundwater Recharge	Recycled Water	Total Capital Cost						
2010	$0	$0	$0	$0	$0	28,745	2394	$18,001	$43,092,220	$43,092,220	$18,001
2011	$46,667,419	$0	$11,232,667	$0	$57,900,086	30,334	1589	$18,001	$28,595,729	$71,687,950	$18,541
2012	$0	$22,880,000	$0	$11,737,700	$34,617,700	32,015	1682	$18,001	$30,274,485	$101,962,435	$19,097
2013	$0	$0	$0	$0	$0	33,796	1781	$18,001	$32,056,344	$134,018,779	$19,670
2014	$0	$0	$0	$0	$0	35,682	1886	$18,001	$33,947,936	$167,966,715	$20,260
2015	$0	$21,450,000	$0	$0	$21,450,000	37,446	1764	$18,001	$31,750,159	$199,716,874	$20,868
2016	$168,750,000	$0	$11,232,667	$0	$179,982,667	38,844	1397	$18,001	$25,155,415	$224,872,289	$21,494
2017	$0	$0	$0	$0	$0	40,328	1485	$18,001	$26,722,088	$251,594,377	$22,138
2018	$0	$0	$0	$0	$0	41,907	1579	$18,001	$28,417,548	$280,011,925	$22,803
2019	$0	$0	$0	$0	$0	43,588	1681	$18,001	$30,255,782	$310,267,707	$23,487
2020	$0	$21,450,000	$0	$208,026,000	$229,476,000	45,379	1792	$18,001	$32,250,693	$342,518,400	$24,191
2021	$0	$0	$11,232,667	$0	$11,232,667	46,458	1078	$18,001	$19,413,558	$361,931,958	$24,917
2022	$0	$0	$0	$0	$0	47,577	1119	$18,001	$20,150,546	$382,082,503	$25,664
2023	$0	$0	$0	$0	$0	48,739	1161	$18,001	$20,907,547	$402,990,051	$26,434
2024	$0	$0	$0	$0	$0	49,944	1205	$18,001	$21,694,398	$424,684,449	$27,227
2025	$0	$21,450,000	$0	$0	$21,450,000	51,195	1251	$18,001	$22,512,281	$447,196,731	$28,044
2026	$0	$0	$0	$0	$0	52,325	1131	$18,001	$20,351,945	$467,548,675	$28,886
2027	$0	$0	$0	$0	$0	53,493	1167	$18,001	$21,015,220	$488,563,895	$29,752
2028	$0	$0	$0	$0	$0	54,698	1206	$18,001	$21,700,916	$510,264,811	$30,645
2029	$0	$0	$0	$0	$0	55,943	1245	$18,001	$22,410,006	$532,674,817	$31,564
2030	$0	$21,450,000	$0	$0	$21,450,000	57,229	1286	$18,001	$23,143,292	$555,818,109	$32,511
2031	$0	$0	$0	$0	$0	58,374	1145	$18,001	$20,603,729	$576,421,838	$33,486
2032	$0	$0	$0	$0	$0	59,541	1167	$18,001	$21,013,693	$597,435,531	$34,491
2033	$0	$0	$0	$0	$0	60,732	1191	$18,001	$21,435,834	$618,871,365	$35,526
2034	$0	$0	$0	$0	$0	61,946	1215	$18,001	$21,866,093	$640,737,458	$36,591
2035	$0	$0	$0	$0	$0	63,185	1239	$18,001	$22,300,411	$663,037,869	$37,689
Totals	$215,417,419	$108,680,000	$33,698,000	$219,763,700	$577,559,119		36,834		$663,037,869		
Unburdened Cost/Conn	$5,848	$2,951	$915	$5,966	$15,680						
Burdened Cost/Conn	$6,714	$3,387	$1,050	$6,849	$18,001						
% Total Fee	37%	19%	6%	38%	100%						

Note: All costs and developer fees are in 2008 dollars. Developer fee established to recover capital and debt service costs. Fee would be escalated annually for inflation (3%) as shown to far right.

Assumes no net new connections between end of 2007 and start of 2010.

Table A-8

Debt Financing and Payback Summary

Based on strategy RW70

Municipal Debt Financing
Rate: 4%
Term (yrs): 15

SRF Loan Financing (for recycled water)
Rate: 2.50%
Term (yrs): 20 Debt 1
Term (yrs): 15 Debt 2
RW Commodity Rate: $1,000 AF

Interest on Fund Balance
Rate: 4%

	Capital Expenditures				Muni 1 Debt		Muni 2 Debt		Muni 3 Debt		SRF		Total					
Year	Imported Water	Groundwater Pumping	Groundwater Recharge	Recycled Water	Debt	Debt Service	Debt	Debt Service	Debt	Debt Service	Debt	Debt Service	Debt	Debt Service	Developer Fee Collected Annual	Recycled Water Delivered (AF)	Recycled Water Revenues	Water Supply Fund Net Balance w/Interest
2010	$0	$0	$0	$0								$0		$0	$43,092,220	-		$44,815,909
2011	$46,667,419	$0	$11,232,667	$0	$80,780,086							$0	$80,780,086	$0	$28,595,729	-		$76,348,104
2012	$0	$22,880,000	$0	$11,737,700		$7,265,450					$11,737,700	$752,940	$11,737,700	$8,018,390	$30,274,485	800	$800,000	$103,380,368
2013	$0	$0	$0	$0		$7,265,450						$752,940		$8,018,390	$32,056,344	800	$800,000	$133,347,055
2014	$0	$0	$0	$0		$7,265,450						$752,940		$8,018,390	$33,947,936	800	$800,000	$166,479,665
2015	$0	$21,450,000	$0	$0		$7,265,450	$201,432,667					$752,940	$201,432,667	$8,018,390	$31,750,159	800	$800,000	$198,651,892
2016	$168,750,000	$0	$11,232,667	$0		$7,265,450		$18,117,076				$752,940		$26,135,465	$25,155,415	800	$800,000	$206,410,716
2017	$0	$0	$0	$0		$7,265,450		$18,117,076				$752,940		$26,135,465	$26,722,088	800	$800,000	$216,109,232
2018	$0	$0	$0	$0		$7,265,450		$18,117,076				$752,940		$26,135,465	$28,417,548	800	$800,000	$227,958,967
2019	$0	$0	$0	$0		$7,265,450		$18,117,076	$240,708,667			$752,940	$240,708,667	$26,135,465	$30,255,782	800	$800,000	$242,194,456
2020	$0	$21,450,000	$0	$208,026,000		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$32,250,693	800	$800,000	$236,558,484
2021	$0	$0	$11,232,667	$0		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$19,413,558	1,700	$1,700,000	$218,282,453
2022	$0	$0	$0	$0		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$20,150,546	1,700	$1,700,000	$200,041,849
2023	$0	$0	$0	$0		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$20,907,547	1,700	$1,700,000	$181,858,902
2024	$0	$0	$0	$0		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$21,694,398	1,700	$1,700,000	$163,766,962
2025	$0	$21,450,000	$0	$0		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$22,512,281	1,700	$1,700,000	$123,493,943
2026	$0	$0	$0	$0		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$20,351,945	1,700	$1,700,000	$101,671,253
2027	$0	$0	$0	$0		$7,265,450		$18,117,076		$21,649,602		$752,940		$47,785,068	$21,015,220	1,700	$1,700,000	$79,665,461
2028	$0	$0	$0	$0				$18,117,076		$21,649,602		$752,940		$40,519,618	$21,700,916	1,700	$1,700,000	$65,048,630
2029	$0	$0	$0	$0				$18,117,076		$21,649,602		$752,940		$40,519,618	$22,410,006	1,700	$1,700,000	$50,584,579
2030	$0	$21,450,000	$0	$0				$18,117,076		$21,649,602		$752,940		$40,519,618	$23,143,292	1,700	$1,700,000	$13,996,583
2031	$0	$0	$0	$0				$18,117,076		$21,649,602		$752,940		$40,519,618	$20,603,729	1,700	$1,700,000	($4,388,078)
2032	$0	$0	$0	$0						$21,649,602		$752,940		$22,402,542	$21,013,693	1,700	$1,700,000	($4,240,005)
2033	$0	$0	$0	$0						$21,649,602				$21,649,602	$21,435,834	1,700	$1,700,000	($2,863,924)
2034	$0	$0	$0	$0						$21,649,602				$21,649,602	$21,866,093	1,700	$1,700,000	($985,331)
2035	$0	$0	$0	$0						$21,649,602				$21,649,602	$22,300,411	1,700	$1,700,000	$1,420,097
Totals	$215,417,419	$108,680,000	$33,698,000	$219,763,700	$80,780,086	$116,247,197	$201,432,667	$289,873,211	$240,708,667	$346,393,638	$11,737,700	$15,811,735	$534,659,119	$768,325,780	$663,037,869	32,700	$32,700,000	

Notes:
Target is to achieve zero balance in Water Supply Fund by 2035.
Assumes recycled water sales return to water supply fund.
Groundwater pumping capital expenditures in 2025 and 2030 are paid from water supply fund reserves; not debt financed.

Table A-9

SRF Financing for Recycled Water Program

Based on strategy RW70

Rate: 2.50%

Term (yrs): 20 Debt 1

15 Debt 2

Year	Capital Cost: Recycled Water	Debt Service 1	Debt Service 2	Total Debt Service w/SRF
2010	$0			$0
2011	$0			$0
2012	$11,737,700	$752,940		$752,940
2013	$0	$752,940		$752,940
2014	$0	$752,940		$752,940
2015	$0	$752,940		$752,940
2016	$0	$752,940		$752,940
2017	$0	$752,940		$752,940
2018	$0	$752,940		$752,940
2019	$0	$752,940		$752,940
2020	$0	$752,940	$0	$752,940
2021	$0	$752,940	$0	$752,940
2022	$0	$752,940	$0	$752,940
2023	$0	$752,940	$0	$752,940
2024	$0	$752,940	$0	$752,940
2025	$0	$752,940	$0	$752,940
2026	$0	$752,940	$0	$752,940
2027	$0	$752,940	$0	$752,940
2028	$0	$752,940	$0	$752,940
2029	$0	$752,940	$0	$752,940
2030	$0	$752,940	$0	$752,940
2031	$0	$752,940	$0	$752,940
2032	$0	$752,940	$0	$752,940
2033	$0		$0	$0
2034	$0		$0	$0
2035	$0		$0	$0
Totals	$11,737,700	$15,811,735	$0	$15,811,735