CITY OF POMONA

INTEGRATED WATER SUPPLY PLAN

2011

City of Pomona
Integrated Water Supply Plan

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2011

Table of Contents

List of Tables

List of Figures

Appendices

List of Abbreviations

AEP	Anion Exchange Plant
afy	acre feet per year
AWWA	American Water Works Association
bgs	below ground surface
CDPH	California Department of Public Health
CII	commercial/industrial/institutional
CPHG	California Public Health Goal
CPI	consumer price index
CVWD	Cucamonga Valley Water District
DBP	disinfection byproducts
DBPR	Disinfection Byproducts Rule
DWR	California Department of Water Resources
DYY	Dry Year Yield Conjunctive Use Project
FY	fiscal year
GAC	granular activated carbon
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GSWC	Golden State Water Company
HAA	haloacetic acids
HGWTF	Harrison Groundwater Treatment Facility
IWSP	Integrated Water Supply Plan
kWh	Kilowatt hours
LT2	EPA Long-term 2 Enhanced Surface Water Treatment Rule
MCL	Minimum Contaminant Level
MFR	multifamily residential demands
mgd	million gallons per day
MTBE	methyl tertiary butyl ether
MTP	Miramar Treatment Plant
MWD	Metropolitan Water District of Southern California
NDMA	*N*-Nitrosodimethylamine
NPR	non-potable reuse
NTU	Nephelometric Turbidity Units

O&M	operations and Maintenance
OSY	Operating Safe Yield
PCE	Tetrachloroethylene
PFP	Pedley Filtration Plant
PHG	public health goal
PWRJWL	Pomona-Walnut-Rowland Joint Waterline
PWRP	Pomona Water Reclamation Plant
RWD	Rowland Water District
RWMP	Recycled Water Master Plan
SAWC	San Antonio Water Company
SB7	Senate Bill 7
SCAG	Southern California Association of Governments
SDLAC	Sanitation Districts of Los Angeles County
SFR	single family residential
TCE	trichloroethylene
TDS	total dissolved solids
THM	Trihalomethanes
TVMWD	Three Valleys Municipal Water District
UWMP	Urban Water Management Plan
VOC	volatile organic carbons
WMP	Metropolitan Water District Water and Recycled Water Master Plan
WSA	Water Supply Assessment
WSAP	Water Supply Allocation Plan
WVWD	Walnut Valley Water District

Executive Summary

The City of Pomona (City) began its Integrated Water Supply Plan (IWSP) in May 2010 to develop a strategy to meet near- and long-term water demands through the use of the most beneficial and cost-effective supplies. This plan was developed at a time when many new challenges to the State's, and in particular Southern California's, water resources had occurred.

This IWSP will serve as a framework for future water resources planning by the City through 2035. It is anticipated that over the next 25 years, there will be many changes relative to the City's resources and needs and, therefore, the IWSP has been created as a foundation that can be readily updated to respond to these changes by employing adaptive management strategies.

The IWSP was developed as a result of collaboration between the consultant team lead by RMC Water and Environment and City staff.

ES-1 IWSP Goal and Objectives

The purpose of the IWSP is to examine alternatives as to how the City can best achieve all of the following goals:

- Meet potable and non-potable demand through 2035
- Meet State required potable demand reduction targets
- Improve cost-effectiveness and reliability of supply profile
- Identify potential for water service funding or project cost offset

Currently, the City has unused available supply rights that could be produced to improve reliability of the City's supplies as well as a source of revenue by providing additional supplies to neighboring agencies. The City will also need to consider the supply implications of meeting potable demand reduction targets through development of both recycled water supplies and conservation programs.

ES-2 IWSP Process

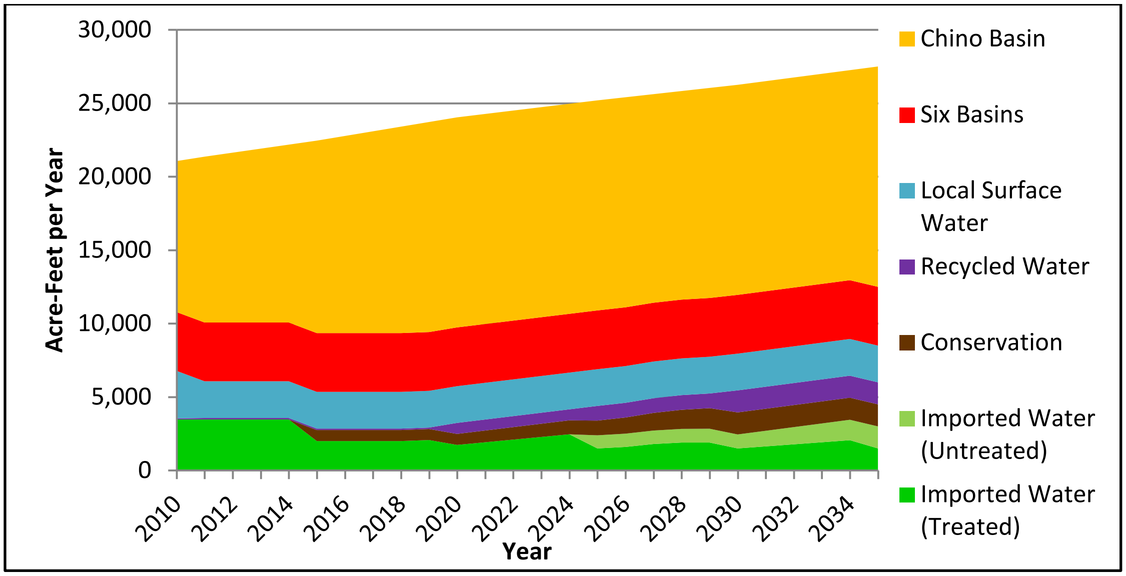
The development of the City's IWSP is a multiple step process that begins with an assessment of the current system to determine a baseline for current and projected future supply and demand. Once the baseline assessment is completed, options for altering or building upon the baseline scenario are identified and characterized. The options developed are not meant to be stand alone full water supply strategies but rather specific projects or programs that would be developed within each water resource category such as imported, recycled, local surface, ground, and conserved water supplies.

Once a comprehensive list of potential project options is developed, it is screened down to consider only those options that are viable for inclusion in larger full system alternatives. Each of the alternatives developed provide a complete and distinct water resources story for the City by combining different options into one system. Once the alternatives are evaluated, the City selects a Preferred Alternative. As a final step in the IWSP process, a Preferred Alternative implementation plan is completed.

ES-3 IWSP Preferred Alternative

The Preferred Alternative selected by City staff includes water resource options which expand Chino Basin production capacity, maximize use of the existing Pedley Filtration Plant (PFP) to treat both local surface water and raw imported water, decrease purchase of treated imported water, implement a conservation program, and expand upon the non-potable/recycled water system. **Figure ES-1** shows how the City will begin integrating in these new supplies and projects between 2010 and 2035.

Figure ES - 1: Preferred Alternative Supplies



In order to better understand the impact of implementing the Preferred Alternative, it is helpful to compare it against how the City might have operated in 2035 had it not implemented this or any other alternative. A Baseline scenario assumes that no additional City supply or facility developments would be completed. As a result, it is assumed under the Baseline that the City would have reached the limits of its ability to produce (or conserve) local supplies and would therefore need to rely on larger purchases of imported water to meet growing demand.

In addition to the cost of the Baseline scenario being higher than the total capital and O&M costs of the Preferred Alternative, the City would experience less reliability given its dependence on imported and current groundwater supply facilities; would not be eligible for State funding, given that it would not have met the requirements of the Water Conservation Act of 2009; and would not have the flexibility to participate in regional programs that could further reduce these overall costs.

Table ES-1: Baseline versus Preferred Alternative Supplies (2035)

	Yield (Acre-Feet per Year)	
Water Supply Sources	**Baseline**	**Preferred Alternative**
Imported Water (Treated)	11,120	1,500
Imported Water (Untreated)	0	1,500
Six Basins	4,001	4,000
Chino Basin	10,279	15,000
Local Surface Water	2,000	2,500
Recycled Water	100	1,500
Conservation	0	1,500
Total Supply	**27,500**	**27,500**
Base Unit Cost	**$590/af**	**$560/af**
Unit Cost with Funding Offset	**$590/af**	**$520/af**

1. All costs are in 2010 dollars
2. Baseline supplies are based upon 2010 production and purchase from the ten year period of 2000-2009

ES-4 Implementation

The City's IWSP Preferred Alternative is comprised of several components, and was selected based on many assumptions and variables including the potential for changes in public or political sentiment, funding opportunities, climate, resource productivity, regulations, and water demand patterns.

Given that the implementation schedule for the program is over 20 years, it is likely that changes will occur that could impact the effectiveness of the program within that time. Incorporating an adaptive management strategy will allow the City to keep on-track and cost-effectively meet the needs of its customers by allowing for the flexibility to be responsive to changes and new information. Key decision points and actions to happen along the implementation pathway may include:

- Implementation of the 2005 Water Master Plan will need to occur to allow for current facilities to maintain current operational capacity.
- It will be imperative that additional funding be obtained to afford capital expenses relative to the recycled water system expansion, PFP upgrades and conservation program implementation.
- If the City's water rates are increased (currently under study), it is likely that initial funding will be available if the funds are maintained for the water utility's future needs.
- Future studies/plans will need to be conducted to conclude that certain aspects of the IWSP program are implemented including:
    - Rialto Feeder connection plan to bring raw imported supplies to the PFP
    - Building upon the PFP Expansion Study to examine PFP treatment upgrades
    - Facility plan for recycled water expansion
    - Regional project studies with neighboring agencies like CVWD, WVWD and RWD
- Changes in water quality regulations could necessitate either increases in other supplies to offset unusable groundwater or increases in groundwater treatment facilities.
- Changes in groundwater quality may also necessitate shifting production from current wells or increase the need for additional groundwater treatment facilities.

Chapter 1 Overview

The City of Pomona (City) began its Integrated Water Supply Plan (IWSP) in May 2010 to develop a strategy to meet near and long-term water demands through the use of the most beneficial and cost-effective supplies. This plan was developed at a time when many new challenges to the State's, and in particular Southern California's, water resources had occurred including:

- Decreases in imported water supplies from the State Water Project due to judgments protecting species in the San Francisco Bay-Delta;
- Significant drought conditions and depletion of state-wide and local water storage;
- New legislation requiring the identification and compliance with new water use reduction targets (Water Conservation Act of 2009); and
- Economic recession reducing funds available for resource development projects and water conservation program implementation.

This IWSP will serve as a framework for future water resources planning by the City through 2035. It is anticipated that over the next 25 years, there will be many changes relative to the City's resources and needs and, therefore, the IWSP has been created as a foundation that can be readily updated to respond to these changes by employing adaptive management strategies.

The IWSP was developed as a result of collaboration between the consultant team lead by RMC Water and Environment and City staff.

1.1 Background

1.1.1 Setting

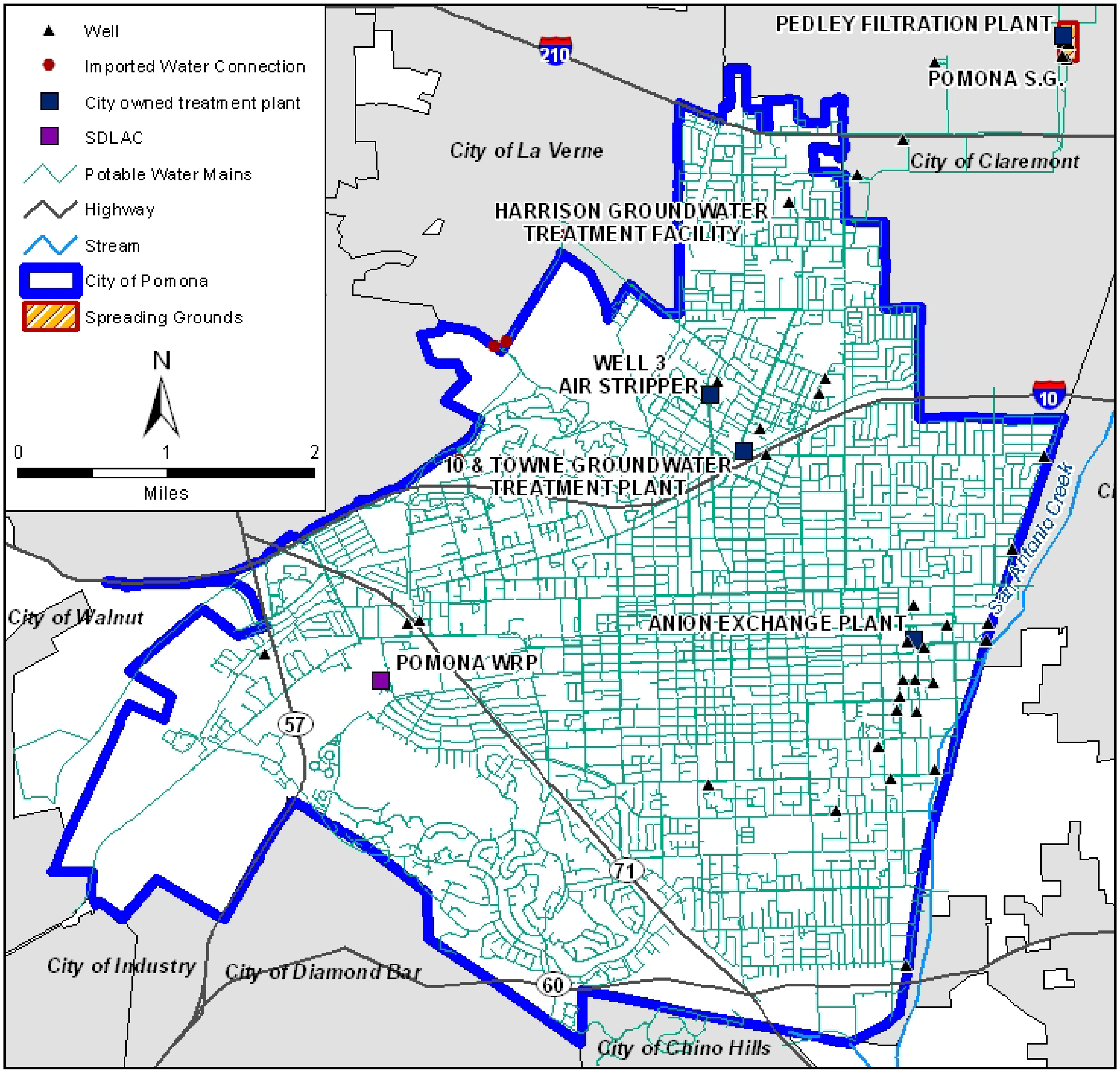
Located in eastern Los Angeles County, the City is 23 square miles and was incorporated in January 1888. The City provides water services to all residential, commercial and industrial customers and for environmental and fire protection within the City, with the exception of three areas. These areas are:

- An irregular area of approximately 40 acres south of Foothill Boulevard and west of Towne Avenue served by Golden State Water Company (GSWC);
- An area of about 20 acres north of Foothill Boulevard and west of Garey Avenue served by the GSWC;
- A small portion of the City located north of Valley Boulevard and west of Temple Avenue served by the Walnut Valley Water District (WVWD).

The City also serves about 275 acres of residential property and open space area outside of the City limits including approximately 98 percent of the Rolling Ridge Estates south of the Pomona Freeway and west of the Corona Expressway. Additionally, the City serves recycled water to Cal Poly Pomona and Pomona Parks Department, Bonelli Park, and Cal Trans.

Water demands within the City's service area are met through a variety of sources including groundwater, local surface water, imported water and non-potable (including recycled) water supplies. These various sources and the City's topography require a complicated water system. The existing potable water system consists of eleven pressure zones and has 22 storage reservoirs, 15 active booster pumping stations, 41 groundwater wells, three imported water connections, two inter agency connections, seven California Department of Public Health (CDPH) permitted water treatment facilities, one spreading ground and 28 pressure regulating stations. The potable water distribution system has about 6,000 fire hydrants and approximately 421 miles of pipelines. The non-potable system consists of Sanitation Districts of Los Angeles County (SDLAC)'s Pomona Water Reclamation Plant (PWRP), three non-potable water wells within the Spadra Basin, two reservoirs, six booster pumps, two pressure zones and two transmission lines. **Figure 1** shows the City's service area and major facilities.

Figure 1: City Water Service Area Boundary and Facilities



1.1.2 Previous Studies and Plans

The various sources of water available to the City create a complex system with many opportunities as well as potential for issues which led the City to undertake a number of studies and plans to examine the many sources available. However, there was still a need for a comprehensive, integrated assessment of the supply options available to the City to define the optimal approach for management of the City's water supply future.

In developing the IWSP, existing information was relied upon to the maximum extent to minimize duplication efforts. Previous studies and reports that were used through the IWSP process include the following:

- Recycled Water Master Plan Update (RWMP) (November 2009)

- Pedley Filter Plant Feasibility Study (April 2009)
- Water Supply Assessment for the proposed Pomona Valley Hospital Medical Center (March 2009)
- Water and Recycled Water Master Plan (WMP) (May 2005)
- 2005 & 2008 (updated) Urban Water Management Plan (UWMP)
- City of Pomona Water Supply Assessment for the Proposed Pomona Valley Hospital Medical Center – Specific Plan and Phase I Development (March 2009)
- Regional Water Transfer Conceptual Alternatives (2002)
- Chino Basin Optimum Basin Management Program – State of the Basin Report (2006)

1.2 Integrated Water Supply Plan Approach

1.2.1 Goals and Objectives

The purpose of the IWSP is to examine alternatives as to how the City can best achieve all of the following goals:

- Meet potable and non-potable demand through 2035
- Meet State required potable demand reduction targets
- Improve cost-effectiveness and reliability of supply profile
- Identify potential for water service funding or project cost offset

Currently, the City has unused available supply rights that could be produced to improve reliability of the City's supplies as well as serve as a source of revenue by providing additional supplies to neighboring agencies. Current production limitations on the City's resources include pumping, conveyance and water treatment. The City will also need to consider the supply implications of meeting potable demand reduction targets through development of both recycled water supplies and conservation programs.

1.2.2 Issues and Challenges

There were several issues and challenges identified during development of the IWSP that would need to be addressed in order to meet the goals and objectives. These issues and challenges were addressed as part of the evaluation of alternatives as well as within the implementation of the IWSP. The following is a list of some of those key issues:

- Articulating the impacts to supply and demand given the recent economic downturn
- Responding to changes in water quality
- Addressing projected changes in groundwater quality regulations
- Accounting for possible reduction of imported water supply reliability
- Identifying potentially feasible options for leasing excess supplies from the City to nearby agencies
- Meeting regulations to reduce potable demand given the Water Conservation Act of 2009
- Financing existing system and potential system upgrades and supply development

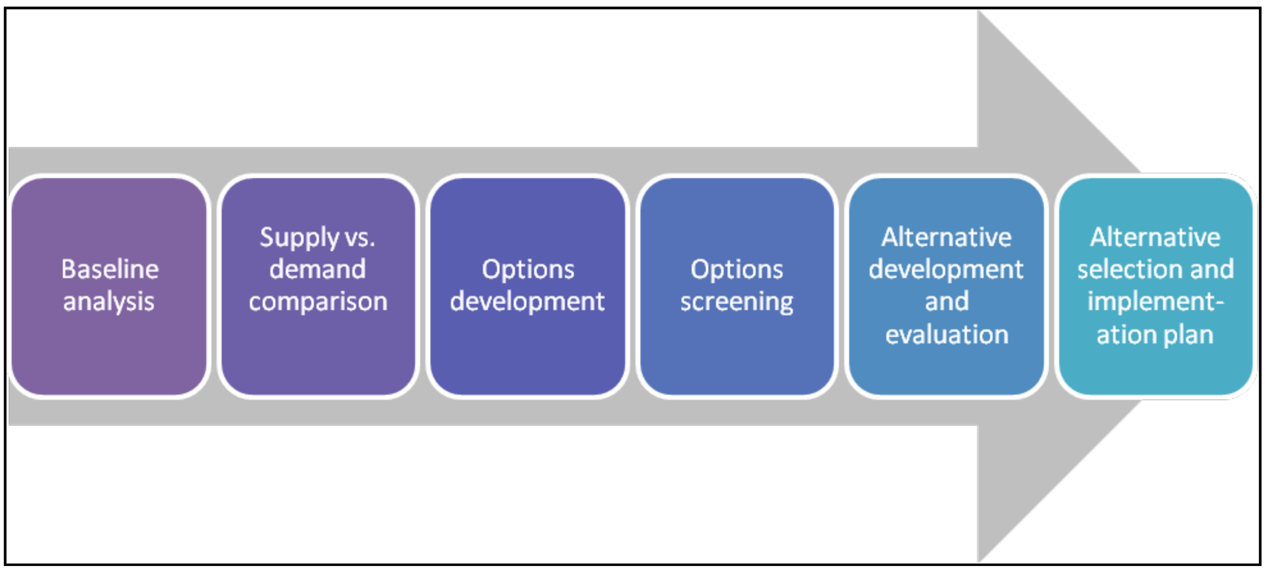
1.2.3 IWSP Process

The development of the City's IWSP is a multiple step process (**Figure 2**) that begins with an assessment of the current system to determine a baseline for current and projected future supply and demand. Once the baseline assessment is completed, options for altering or building upon the baseline scenario are identified and characterized. The options developed are not meant to be stand alone full water supply strategies but rather specific projects or programs that would be developed within each water resource category such as imported, recycled, local surface, ground, and conserved water supplies.

Once a comprehensive list of potential project options is developed, it is screened down to consider only those options that are viable for inclusion in larger full system alternatives. Each of the alternatives developed provide a complete and distinct water resources story for the City by combining different options into one system. The alternatives are created with different management goals in mind, and then evaluated using a set of criteria selected by the City.

Once the alternatives are evaluated, the City selects a Preferred Alternative. As a final step in the IWSP process, a Preferred Alternative implementation plan is completed.

Figure 2: IWSP Development Process



Chapter 2 Baseline Assessment

2.1 Demand Assessment

The baseline demand assessment provides an examination of historical demand trends as well as a future forecasting of demand projections. For the purposes of this assessment, the term demand refers to the overall demand that will need to be met by the City – including metered customer use, production system demands and unaccounted for water (water that is lost through distribution system leaks, fire hydrant flushing, fire fighting, water theft, or not counted due to customer meter error).

The demand forecast provided in this section serves as the baseline of current and projected demand that is anticipated to occur if the City made no changes to its current operations, conservation programs or rates. It is the benchmark by which baseline supplies are compared against to identify any gaps or need for further supply development or demand management.

2.1.1 Historical Demand

In order to better forecast a baseline demand for the City, an analysis of historical demand must be conducted. Recent and past trends in demand were examined relative to the conditions within which these demands were generated. An understanding of past conditions relative to current and future anticipated conditions helps in determining a more accurate forecast. The historical demand portrayed within this section includes both potable and non-potable demands.

Water Use

Historical demand for the past six years was compiled from annual reporting of public water system statistics to the California Department of Water Resources (DWR). As seen in **Table 1**, overall potable demand has decreased from 2004 to 2009 by about 6,300 acre-feet per year (afy). The trend shows some fluctuation until it takes a rapid decline after 2007. This recent trend of decreasing demand can most likely be attributed to conservation measures implemented during drought years, the reduction in service connections and an increase in price sensitivity given the recent economic downturn.

Table 1: Historical Potable Water Demand and Service Connections

Use Type	2004	2005	2006	2007	2008	2009
Potable Demand (afy)						
Single Family Residences	13,234	11,911	12,504	12,696	11,568	10,441
Multi-Family Residences	7,342	4,179	4,365	4,710	4,352	4,019
Commercial/Industrial/Institutional	5,586	6,320	6,777	6,844	4,679	5,599
Landscape Irrigation	1,522	1,315	1,490	1,724	1,592	1,255
Total Demand	**27,684**	**23,725**	**25,137**	**25,974**	**22,192**	**21,314**
Active Potable Service Connections						
Total Connections	**27,279**	**28,876**	**29,422**	**30,451**	**29,115**	**29,351**

There are currently three non-potable customers within the City: Caltrans, City Parks Department, and Robertson's Ready Mix. The City also exports a portion of its recycled water allotment from the SDLAC's PWRP supplemented with water pumped from the Spadra Basin to customers outside the City. The total historical non-potable demand for City supplies can be seen in **Table 2**. Non-potable demand within the City was drastically reduced after 2007, due to the closure of two paper mills. Since this demand assessment is only focused on demands within the City's service area, the non-City demands shown in **Table 2** are not considered in this IWSP. Non-City recycled water demand includes Cal Poly and Bonelli Park.

Table 2: Historical Non-Potable Water Demand by Calendar Year (afy)

Use Area	2004	2005	2006	2007	2008	2009
City of Pomona	3,806	3,539	3,427	597	33	96
Non-City of Pomona	1,941	2,059	2,015	2,307	2,200	2,200
Total	**5,747**	**5,598**	**5,442**	**2,904**	**2,233**	**2,296**

Pomona Recycled Water Master Plan, 2009

Unaccounted for Water

Unaccounted for water has been documented by the City as a calculation of the difference between water produced and the water used within the City's production and distribution systems (i.e. filter backwash and firefighting) and water supplied to customers (water use). This section reports on historical unaccounted for water (as a percentage of water produced) reported by the City.

Historical

Historical unaccounted for potable water is on average 7% of the City's production. As seen in **Table 3**, unaccounted for water is calculated as production minus metered use and system use. A 7% unaccounted for water rate is considered to be within acceptable limits for a water supply agency.

Table 3: Historical Unaccounted for Potable Water (afy)

	Average 2003-2009
Production	26,450
Metered Use	24,540
System Use	11
Unaccounted for water	1,899
Percent unaccounted for water	7%

Validation and Findings

Although unaccounted for water can be a result of leaks within a supplier's distribution system and fire hydrant flushing, it can also be the result of meter error. Given the age of many of the meters used by the City to measure water demand for its customers, it can be assumed that there is a great deal of unaccounted for water that occurs due to meter error. As meters age, their ability to measure all of the water flowing through a connection decreases, resulting in meter readings that report artificially low consumption.

The City has begun a program to replace older meters, however, out of the City's 29,351 connections (as of 2009); only about 1,000 per year have been replaced over the past few years (approximately 4,000 meters, assuming the replacement program began in 2006). The 2005 WMP recommended that the City replace its water meters every 10 years per American Water Works Association (AWWA) standards, which equals approximately 2,900 meters/year. Applied to the period of 2006-2010, 11,600 meters are estimated to have needed replacement. Accounting for the approximately 4,000 meters replaced since 2006, this leaves 7,600 meters which are due to be replaced.

During the early stages of the conversion program, the City conducted accuracy testing between the old and new meters in 2006. An estimate of the amount of unaccounted for water that could still be due to meter error can be calculated using the results of that accuracy testing. It was found that the City's older meters had accuracy levels ranging from an average of 46% to 8%, depending on the flow. This means that older meters were under-reporting consumption by 54% to 92%. **Table 4** gives the average meter accuracy according to meter age. For the purposes of the following calculations, the 1 gpm (78%) accuracy is used.

It is estimated that 7,600 customer meters within the City are older models that are under reporting consumption by 22%. Average demand per meter is estimated at 0.7 afy/meter (calculated using the 2009 consumption of 21,314 af divided by 29,351 meters). If those meters are replaced, actual metered demand for the City could increase by 0.15 afy per meter and by 1,200 afy (or 4.9%) for all meters due to be replaced. The 1,200 afy is about 63% of the total unaccounted for water of 1,900 afy shown in **Table 3**. It is assumed that the remaining amount of unaccounted for water (700 afy) can be attributed to distribution system losses, fire hydrant flushing, water theft, and fire fighting.

Table 4: 2006 Meter Accuracy Study Results (percent of flow measured vs. actual flow)

Meter Age	¼ GPM	1 GPM	15 GPM
10-15 Years	63%	76%	87%
16-20 Years	48%	78%	92%
21-27 Years	61%	80%	99%
Average	**54%**	**78%**	**92%**

2.1.2 Demand Forecast

This section provides the demand forecast generated for 2010 through 2035 as well as the process used to prepare the forecast relative to the previous historical demand trends. The demand forecasting process conducted for the IWSP includes the following steps:

1. Review previous demand forecasts
2. Review recent projected growth data from the Southern California Association of Governments (SCAG)
3. Re-project demand forecast using actual 2009 demand from historical use and SCAG growth projections
4. Modify based upon City expectation of nearer-term population trends and potential demand increases

1. Review Previous Demand Forecasts

For the IWSP demand assessment, demand projections provided in the following planning documents completed since 2005 were reviewed:

- 2009 Recycled Water Master Plan Update (RWMP)
- 2009 Water Supply Assessment for the Proposed Pomona Valley Hospital Medical Center (WSA)
- 2005 Water and Recycled Water Master Plan (WMP)
- 2005 & 2008 (updated) Urban Water Management Plan (UWMP)

As shown in **Table 5**, it was found that all of the projections provided in these documents can be traced back to the initial forecast completed for the 2005 WMP, which was based upon 2003 actual demand data. A comparison of the projections for 2005 and 2010 from these forecasts against actual City demand data for the years 2005 and 2009 is also shown **Table 5**. The comparison shows that these forecasts were over-estimating demand in 2005 (by 15%) and 2009/2010 (by 30%). This difference in projected versus actual demand can be explained by unexpected factors such as the drought and recent economic downturn discussed in Section 2.1.1.

Table 5: Previous Demand Forecasts versus Actual Demand (afy)

Document	2005	2009 (actual) 2010 (proj.)	2015	2020	2025	2030	Basis
Previous Forecasts							
2005 WMP	28,414	29,882	31,181	32,715	34,283	n/a	2003 actual demand, 2001 SCAG growth rate
2005 UWMP		29,882	31,181	32,715	34,283	35,750	2005 WMP
2008 UWMP update	28,089	29,881	31,181	32,714	34,284	33,853	2005 UWMP, revised recycled water estimates
2009 PVHMC WSA		29,690	30,449	32,024	33,586	35,043	2005 UWMP, revised recycled water estimates, projected PVHMC demand
Actual Demand[1]	**23,725**	**21,314**					

1. Based upon actual production data and assumed system loss.

2. Review Recent SCAG Growth Projections

The City's 2005 WMP included a demand forecast using 2001 SCAG historical and projected population and employment growth rate data for the City, modified using actual population from the 2000 census count and using the SCAG 2025 population estimate as the maximum population. For the IWSP, the 2005 WMP growth rates were compared to the more recent 2008 SCAG projection growth rates and were shown to follow nearly the same rate of growth for both population and employment over time. Population between 2010 and 2025 was estimated to increase by 25% in the 2005 WMP projections, and 24% in the 2008 SCAG projections. Employment was estimated to increase by 11% in the 2005 WMP projections, and 10% in the 2008 SCAG projections. Since there is very little difference between the 2005 WMP and 2008 SCAG growth rates, it was determined that the demand trend (based upon 2001 SCAG) that was developed for the 2005 WMP still applies and is used for the IWSP forecast.

3. Demand Re-projections Using 2009 Demand

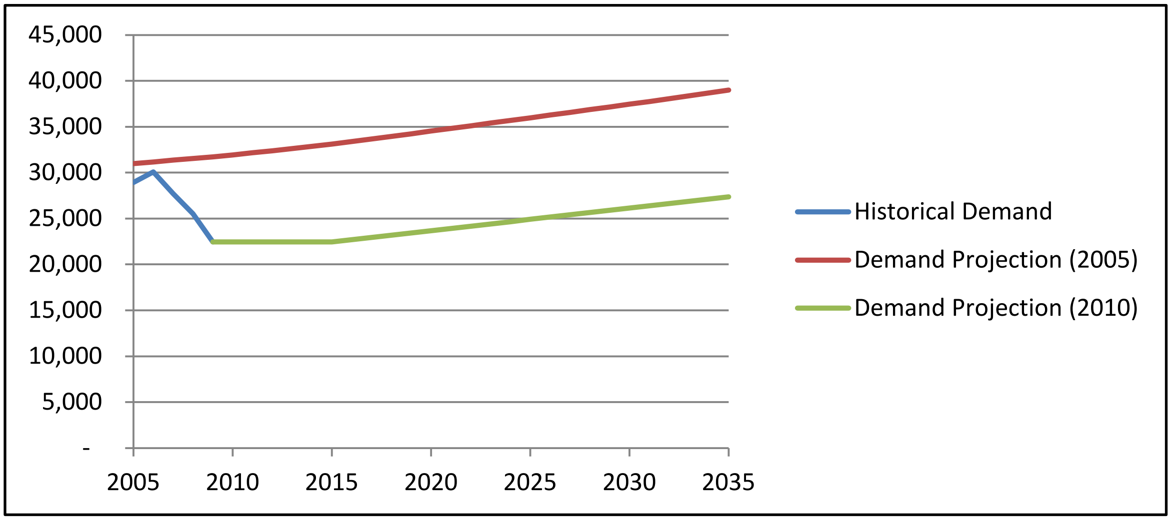
The 2005 WMP demand trend was then re-projected based on 2009 demand. Demand for 2010 was set at the 2009 demand of 21,410 afy, and was projected using the 2005 WMP growth rate. This process mirrors the use of the SCAG data in the 2005 WMP where single family residential (SFR) and multifamily residential demands (MFR) were increased by the population growth projection rate, while commercial/industrial/institutional (CII) and landscape demands were increased by the employment growth rate. The year 2009 was chosen as the year to begin the trend since it is the most recent year and its low demand reflects the drought induced conservation and economic downturn mentioned previously.

4. City Modifications to Account for Current Setting

In addition, it was assumed that for the first five years, the City would not experience any real growth in population or economy, and so the demand is held at the 2009 level through 2015. It is assumed that future demand will be similar to that shown as the 2010 projection in **Figure 3**.

Table 6 shows how the total demand forecast is broken into user classes - residential accounting for 65% total demand, commercial/industrial/institutional at 25%, and landscape and unaccounted for water each at 5% of total demand. A portion of total demand was identified in the 2009 RWMP for potential non-potable demand. Baseline non-potable demand is held steady at the current demand level of 96 afy. Unaccounted for water estimates are taken from the 2005 UWMP updated in 2008.

Figure 3: 2010 Total Demand Projection versus 2005 Total Demand Projection



Appendix A further details the steps used in making the projections. The assumptions used in creating the demand projections are listed here.

- Demand growth is based on the modified 2001 SCAG population growth projection rates for the City. These were also used in the 2005 WMP.
- The population and employment growth rate will be flat from 2010-2015 and then increase at an annual population growth rate of 1.2%, and an employment growth rate of 0.5%.
- The City's build out date will most likely be pushed out past 2035 to account for recent economic downturn.

Table 6: Demand Forecast by Use Type (afy)

Use Type	2010[1]	2015	2020	2025	2030	2035
Single Family Residential	9,788	10,441	10,936	11,427	12,113	12,840
Multi Family Residential	3,931	4,019	4,224	4,440	4,552	4,667
Commercial/Industrial/Institutional	3,766	5,684	5,974	6,279	6,437	6,599
Landscape	417	1,266	1,331	1,399	1,433	1,468
Unaccounted-for Water	2,467	1,043	1,573	1,648	1,717	1,790
Total Demand	**20,369**	**22,453**	**24,038**	**25,193**	**26,252**	**27,364**
Non-Potable Demand	73	100	100	100	100	100
Potable Demand	20,296	22,353	23,938	25,093	26,152	27,264

1. 2010 is actual demand

2.2 Supply Assessment

The baseline supply assessment conducted for the IWSP examines the source, facilities and life-cycle costs (unit costs) for producing the City's current water supply portfolio. This baseline assessment assumes that no changes in operations or new supplies will occur over the next 25 years (so as to create a neutral foundation for future alternatives). It does, however, take into account activities and conditions that would logically be assumed to occur in order to maintain those supplies at current production levels.

2.2.1 Supply Sources

For the purposes of this baseline supply assessment, the City's total supply is broken into separate assessments for imported water, groundwater (treated and untreated), local surface water and recycled water.

Imported Water

The City obtains its imported supply from Three Valleys Municipal Water District (TVMWD) which receives its supply as a contractor to the Metropolitan Water District of Southern California (MWD). Imported supplies are treated at MWD's Weymouth Treatment Plant (Weymouth WTP) and TVMWD's Miramar Treatment Plant (Miramar WTP) before reaching the City. The City's imported supply is chloraminated so it contains both residual chlorine and residual ammonia.

Figure 4 shows how imported water is introduced to the City's distribution system. Four imported water supply connections have the capability of continuously supplying imported water to the City. The two connections that provide most of the City's imported water are located on the Pomona-Walnut-Rowland Joint Waterline (PWRJWL), a treated water pipeline that is jointly owned by the City, Walnut Valley Water District (WVWD), and Rowland Water District (RWD). The imported water system also contains emergency connections with WVWD that, based on conversations with City staff, have never been used except for testing purposes. The location of the imported water connections are shown in **Figure 5**.

Figure 4: Imported Water Supply Flow Chart

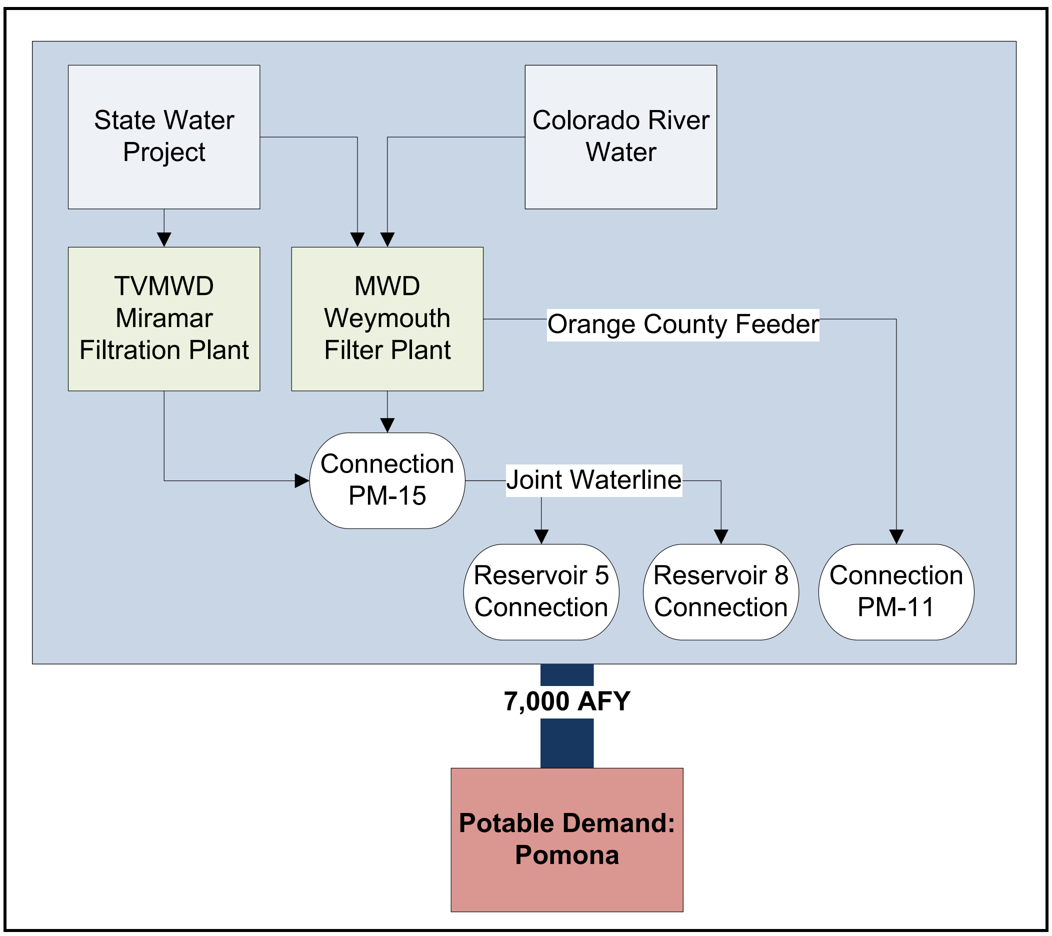
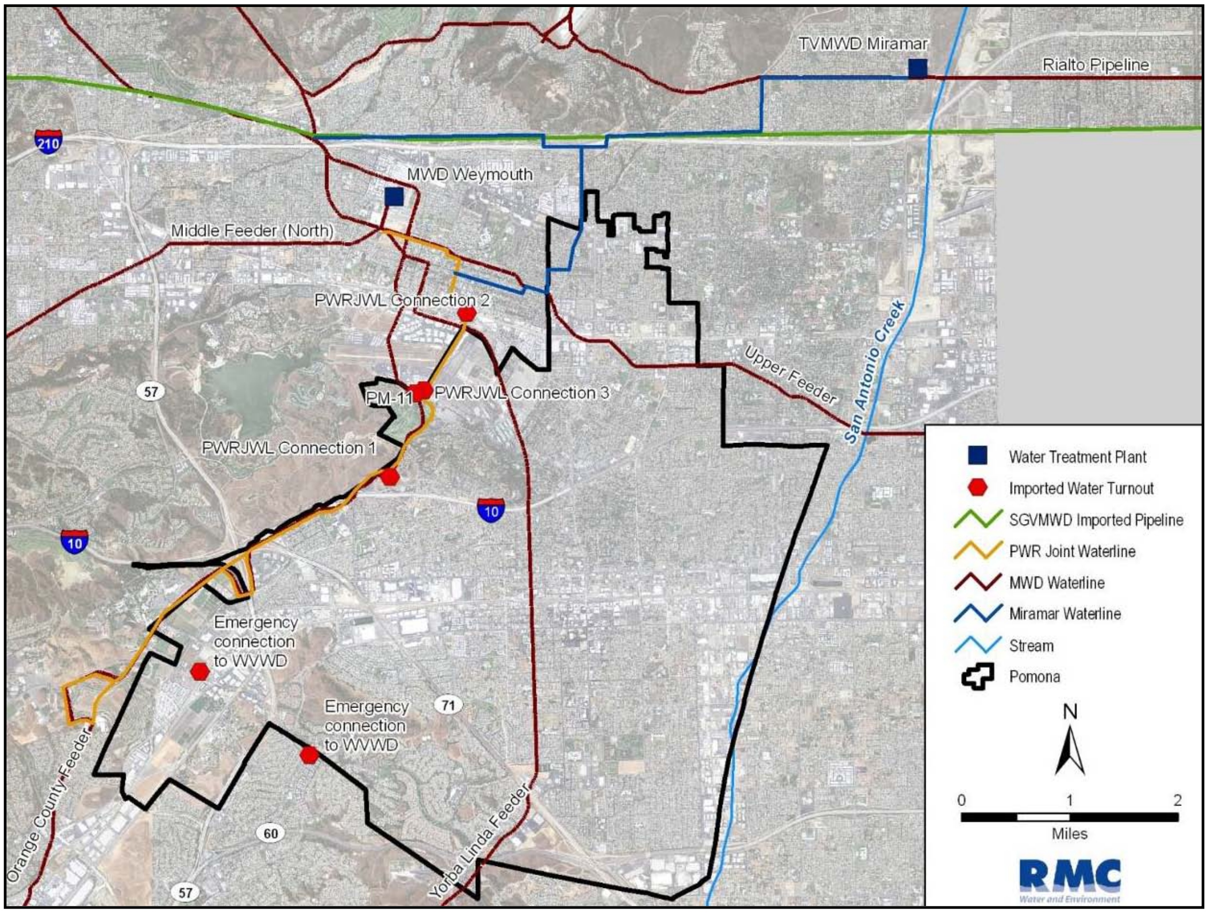


Figure 5: Location of Imported Water Facilities



Quantity

The total volume of imported water received by the City during the 12-month period between January 2009 and December 2009 was 3,121 af, which corresponds to an annual average flow rate of 2.8 mgd. The annual average volume of imported water for the ten-year period between 2000 and 2009 was 6,956 afy (6.2 mgd). The 2009 volume received was less than this ten-year average, likely because of MWD's Water Supply Allocation Plan (WSAP) and Dry Year Yield (DYY) Conjunctive Use Program, house foreclosures, business closures, and recent increases in conservation. For the purposes of the baseline supply assessment, it is assumed that the historical average annual supply will be maintained at 6,956 afy through the 2035 and averages out the effects of protracted wet periods and dry periods on supply. According to MWD's recently released Draft 2010 Regional Urban Water Management Plan, there will be sufficient supply to meet MWD's overall system demand through 2035; so it can be assumed that the City's baseline imported water supplies will be reliably met every year. Supplies under development may be available in the future, but are not considered firm supplies, and so are not considered in this analysis.

Though projections indicate MWD supply will be sufficient to meet firm demand in average years as shown in **Table 7**, under extreme shortage conditions, MWD will implement its WSAP and DYY Program which allocates available water to MWD member agencies. TVMWD will be subject to the minimum wholesale percentage and the City should be prepared to be allocated less than the percentage allocated to TVMWD by MWD.

Table 7: Average MWD Supply (afy)

	2015	2020	2025	2030	2035
Available Supply	2,423,000	3,805,000	4,050,000	3,905,000	3,771,000
Firm Demands	1,908,000	1,797,000	1,806,000	1,846,000	1,895,000
Surplus	515,000	2,008,000	2,244,000	2,059,000	1,876,000

MWD, 2010 Draft Regional Urban Water Management Plan, Tables 2-9, 2-10, 2-11

Quality

The imported water received by the City meets all California Department of Public Health (CDPH) mandated drinking water standards. The only major water quality constituent of concern for imported water is taste and odor, which is normally attributed to algae growth within the imported water supply. Taste and odor is a subjective measure of customer comments and is a recurring issue for MWD's wholesale water.

Groundwater

The City produces groundwater from five groundwater basins: The Chino Basin, three individual basins within the Six Basins area (Pomona Basin, Upper Claremont Heights Basin, Lower Claremont Heights Basin), and the Spadra Basin (**Figure 6**). Groundwater pumping within Chino and Six Basins areas is based on established groundwater rights. The Spadra Basin is not adjudicated and water rights in this basin have not been established.

Chino Basin

The Chino Basin is an alluvial groundwater basin that extends from the San Jose Fault and San Gabriel Mountains on the north to the Santa Ana River on the south and from the Chino Hills on the west to the Rialto Colton Fault and Jurupa Mountains on the east. The City pumps from the upper and lower aquifer systems within the basin. The upper aquifer system is unconfined to semi-confined and yields more water but is subject to water quality impacts from surface sources. The deeper aquifer system is confined and yields less water due to the higher percentage of silt and clay.

Groundwater rights within the Chino Basin have been established based on a basin-wide Operational Safe Yield (OSY) of 54,834 afy. The City's share of the OSY is fixed at 20.454 percent or 11,216 afy. In years with higher precipitation, the City is eligible for up to 2,454 AF of water rights associated with the Chino Basin enhanced stormwater capture program. The City can also receive up to 6,709 af of water rights associated with an early transfer of Agricultural Pool pumping rights related to the reduction in agricultural pumping in the basin. Finally, the City claims approximately 220 afy of additional rights as a result of the Peace II negotiation process which is in place from 2007 to 2017. In 2010, the City's total water right was 17,567 af, however these rights are variable as described above, and on average it is estimated that the City will have 16,900 afy.

Previous studies have shown a groundwater level depression in the northwestern portion of the Chino Basin. While increased artificial recharge and decreased pumping since 2005 have allowed groundwater levels to recover, future groundwater level trends will depend on the balance of recharge and discharge in this area allowing for mitigation of the depression. Current static groundwater levels range from approximately 200 to 450 ft below ground surface (bgs).

A majority of the groundwater pumped by the City from the Chino Basin currently is blended or treated at the Anion Exchange Plant (AEP) to reduce nitrate concentrations. Additionally, the City is beginning construction of a new perchlorate treatment facility adjacent to the AEP facility to enable production from some wells that were previously inoperable due to the contaminant, thereby maximizing the use of the City's existing wells in the Chino Basin. Groundwater that does not require extensive treatment is disinfected at the wellhead prior to being placed into the distribution system.

Figure 6: City Groundwater Facilities

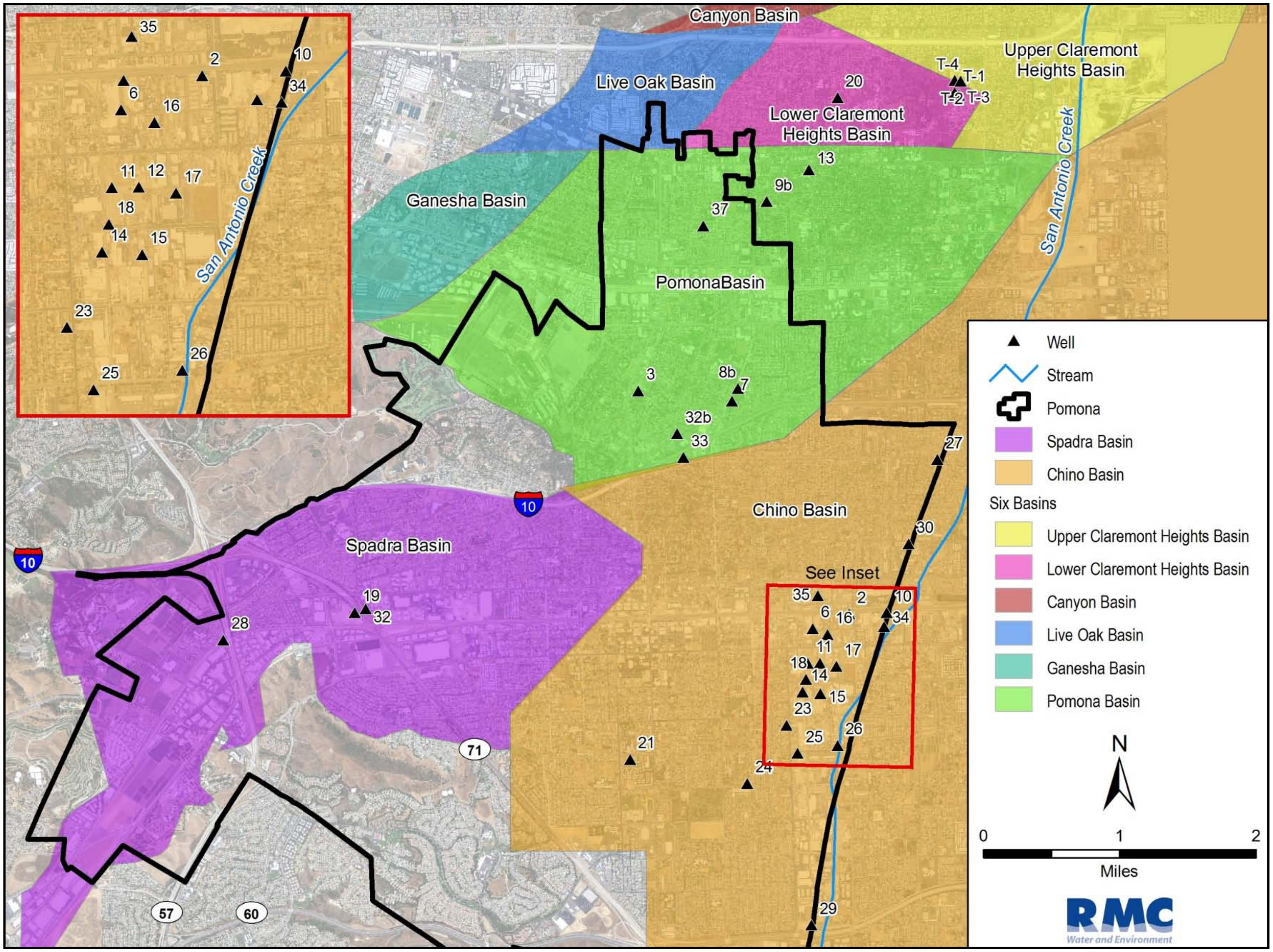
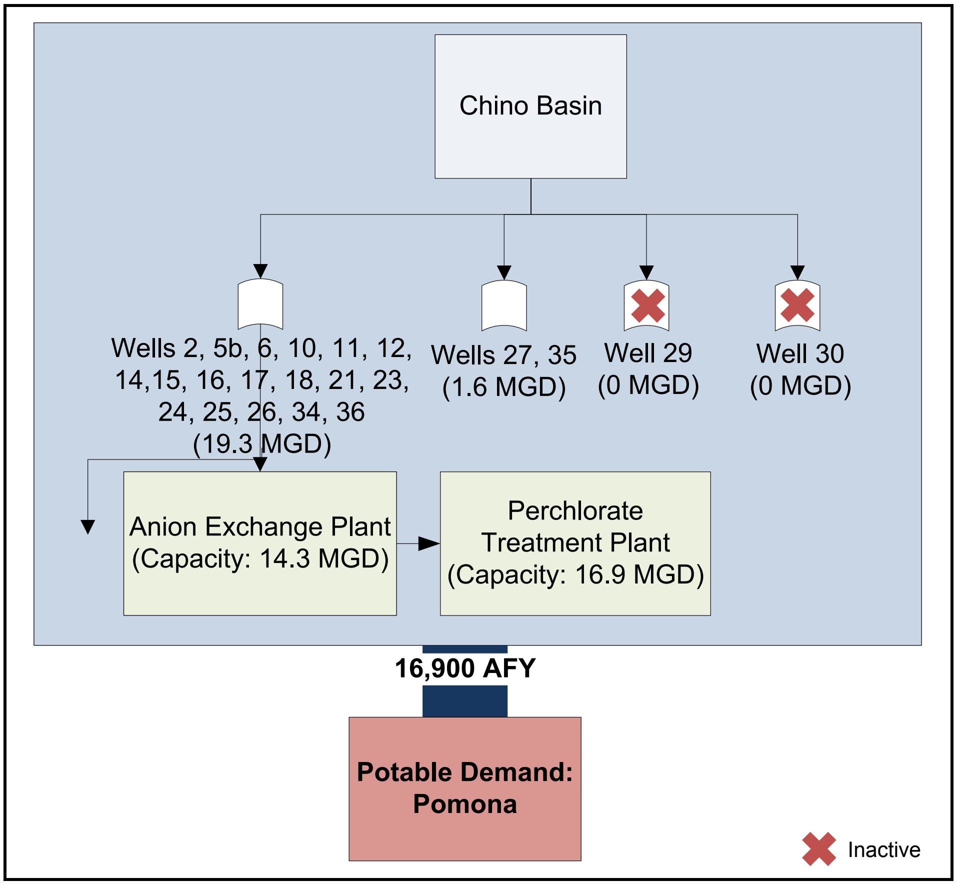


Figure 7 shows a flowchart of the City's Chino Basin supplies from facilities currently or planned to be in operation.

Figure 7: Chino Basin Groundwater Supply Flow Chart



Six Basins

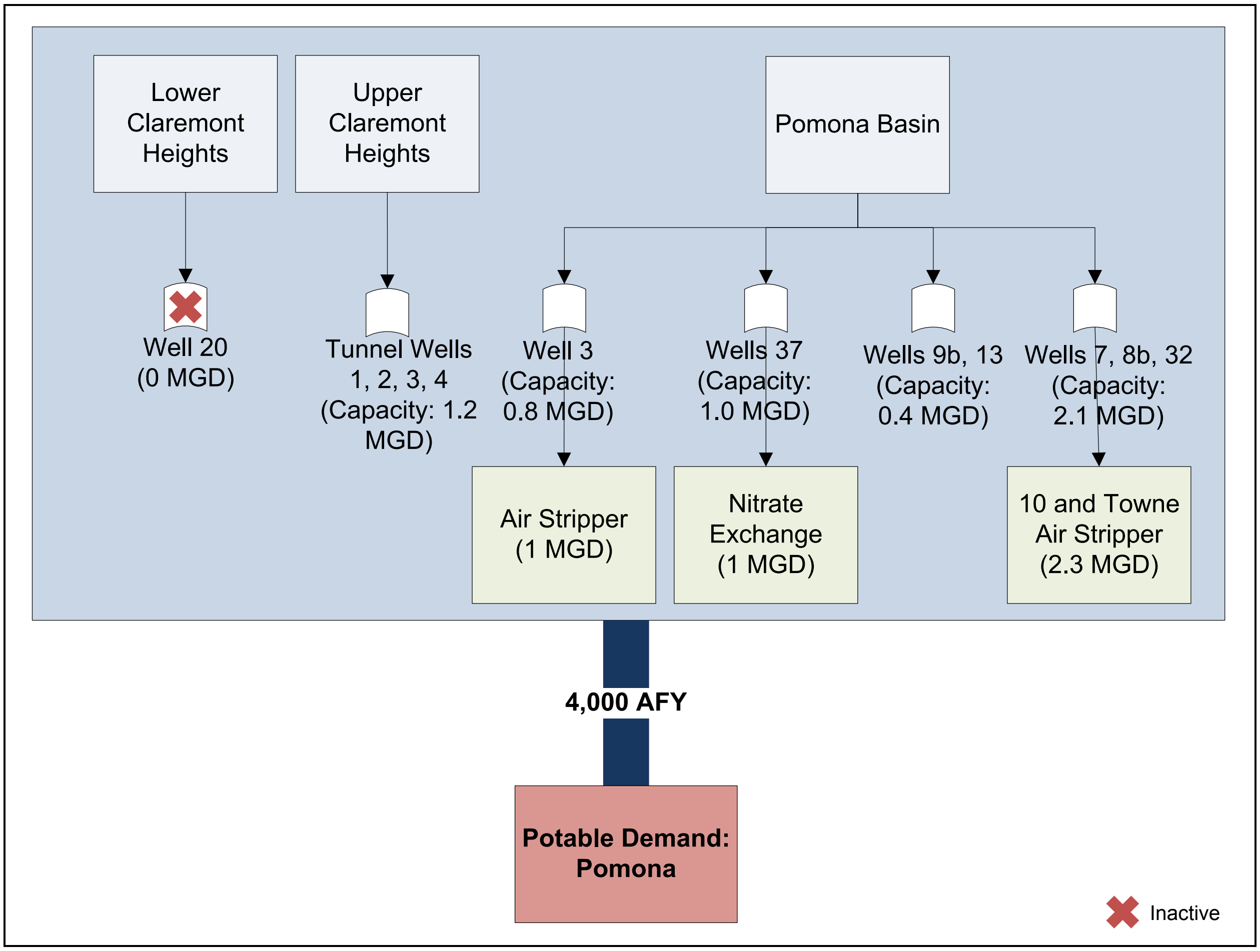
Six Basins consists of six individual groundwater basins within the jurisdiction of the Six Basins adjudication. The City has water rights and production facilities in Pomona, Lower Claremont Heights, and Upper Claremont Heights basins. Aquifers in the basins located at the base of the San Gabriel Mountains (i.e. the Upper and Lower Claremont Heights Basins) tend to be relatively permeable and unconfined. Two aquifers have been identified in the Pomona Basin: an upper unconfined aquifer and a lower semi-confined aquifer. Although the boundary between the upper and lower aquifer is vague, most of the groundwater production in the Pomona Basin is believed to be from the lower aquifer (*PBS&J, 2009*).

Groundwater levels in the Pomona Basin range from approximately 230 ft bgs in the north to 2 ft bgs in wells along the San Jose Fault to the south. Levels are variable depending on precipitation and recharge at spreading grounds. Significant rainfall coupled with artificial recharge can significantly raise groundwater levels in the basin. Shallow groundwater levels along the San Jose Fault east of the San Jose Hills have been an issue for structures in the past (*Slade, 2001)*.

The safe yield of Six Basins was originally established as 19,300 afy. The annual OSY of Six Basins is determined based on groundwater level conditions within the individual basins and can vary widely (16,000 to 24,500 afy historically). The City's allocation of the OSY is 20.8 percent, which on average equals 4,014 af. In 2009, the OSY of Six Basins was 17,500 af and the City's allocation was approximately 3,640 af. The City can also carry over unused water rights, water spread and storage water with certain restrictions. **Figure 8** shows a flowchart of the City's Six Basins facilities.

A majority of the groundwater pumped by the City from the Pomona Basin is treated with a combination of blending and treatment plants for nitrate and VOCs. The Harrison Groundwater Treatment Facility treats water from Well 37 for nitrate using ion exchange. The 10 and Towne Groundwater Treatment Plant treats three wells for VOCs through air stripping, as does the Well 3 air stripping facility. Perchlorate and nitrate levels within the Six Basins are reduced through blending with treated imported water supplies.

Figure 8: Six Basins Groundwater Supply Flow Chart

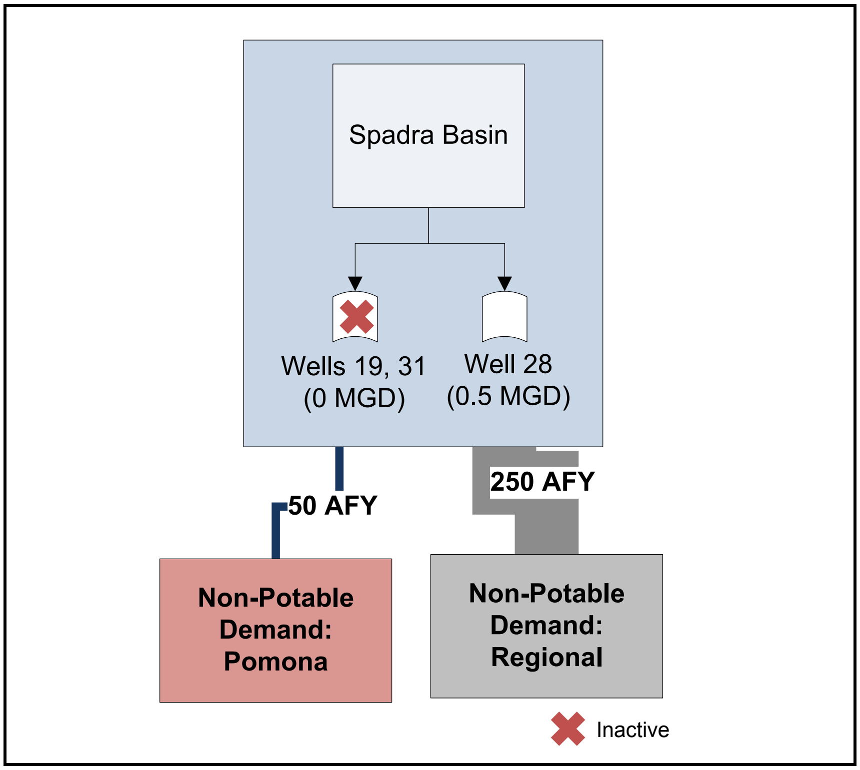


Spadra Basin

The Spadra Basin is an alluvial groundwater basin located in the western portion of the City. The OSY of this basin has been estimated to be approximately 1,500 afy although urbanization of the area and lining of San Jose Creek have limited the amount of natural and return flow recharge to the aquifer system. The Spadra Basin has not been adjudicated and there is no formal groundwater management structure in place for the area. The basin is not considered to be in overdraft. The wells the City currently has in place in this basin have a capacity of 1 mgd. Limited natural recharge of the basin and water quality constraints restricts the Spadra Basin's ability to support additional wells.

Though supply from this basin has primarily been used to supplement the recycled water system, there is potential for the use of Spadra Basin as a potable source of supply. In 2011, the City restarted Well 28 which produced approximately 150 af of potable over a three month period, however, groundwater quality, specifically the total dissolved solids level and VOC levels, have been variable.

Figure 9: Spadra Basin Groundwater Supply Flow Chart



Volume breakdown estimated based on total non-potable reuse in 2009 proportioned between City demand and regional demand.

Total Groundwater Quantity

The Chino Basin is the largest source of groundwater supply to the City. In Fiscal Year (FY) 2008/09, the City pumped approximately 13,732 af from the Chino Basin, which was 78.8 percent of the total groundwater supply for that year. By comparison, the City pumped approximately 3,377 af from the Six Basins (19.4 percent), and 317 af from the Spadra Basin (1.8 percent). **Table 8** shows annual production for each basin.

Groundwater production has remained well below the City's combined groundwater rights. Since 2003/04, annual groundwater production in the Chino Basin has ranged from 9,946 af to 13,732 af. At least some of the unused water right has been leased to other appropriators within the Chino Basin. The City's combined annual production in the Six Basins has ranged from approximately 1,518 to 5,537 af. Production in the Pomona Basin has increased substantially since 2005-06 with increased pumping from Wells 7 and 8 and initiation of pumping from Well 37 in 2008. Although the City has an average of 21,900 afy of rights in both Chino and Six Basins, in 2009 it only used about 17,500 afy or 80% for supply.

Since this is a baseline supply assessment, groundwater production is projected to remain the same as 2009 production levels through 2035 except for the addition of already planned facilities. These facilities include the addition of Well 32b in the Pomona Basin, which was recently brought online at a rate of approximately 700 afy, and the perchlorate treatment facility in the Chino Basin which will soon be brought online at a rate of approximately 19,000 afy (**Table 9**) and is in keeping with production that can be expected from the maintenance of current facilities. For Pomona Basin, this brings projected available production up to 2,900 afy from 2,200 afy, and for Chino basin, this brings projected available production up to 16,900 afy from 13,700 afy.

Table 8: Historical Groundwater Basin Production (afy)

Fiscal Year	Groundwater Basin Production			Annual Production Total
	Chino	Six Basins	Spadra	
98-99	16,524	2,492	383	19,849
99-00	18,972	2,274	466	21,712
00-01	17,453	2,170	1,085	20,707
01-02	17,667	1,871	1,101	20,639
02-03	17,574	933	797	19,304
03-04	16,111	1,518	949	18,579
04-05	15,982	1,773	904	18,659
05-06	9,946	5,058	620	15,624
06-07	10,894	5,537	544	16,975
07-08	13,189	3,822	545	17,556
08-09	13,732	3,377	317	17,425

Table 9: Projected Available Groundwater for Production (afy)

Groundwater Basin[1]	2010[2]	2015	2020	2025	2030	2035
Chino	10,279	16,900	16,900	16,900	16,900	16,900
Six Basins	4,001	4,000	4,000	4,000	4,000	4,000
Spadra	10	300	300	300	300	300
Total	**14,290**	**21,200**	**21,200**	**21,200**	**21,200**	**21,200**

1. Projections rounded to the nearest hundred afy
2. 2010 is actual production for the calendar year

Quality

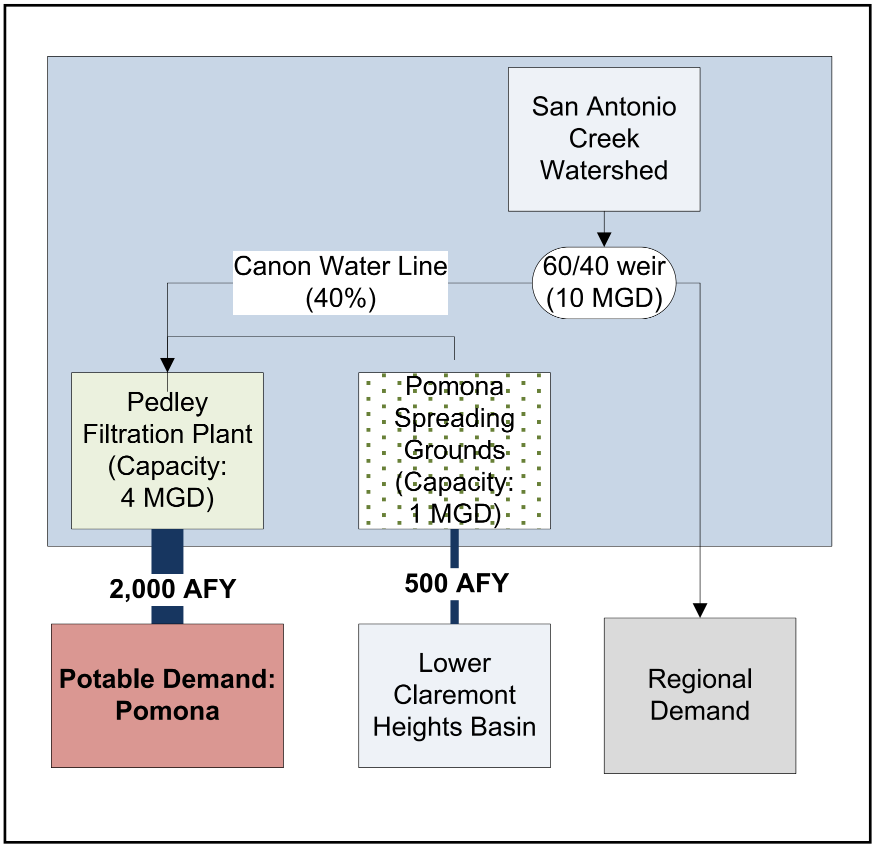
As discussed previously within the basin descriptions, most of the City's wells have water quality problems that require treatment of the discharge. Nitrate is the most prevalent contaminant, with concentrations exceeding the 10 mg/L MCL (as nitrogen) in 25 of the City's 38 wells. The nitrate is attributable to historical agricultural land use practices in the area (*Wildermuth, 2007)*. Many of the wells with high nitrate in the discharge also have perchlorate concentrations that exceed the California Minimum Contaminant Level (MCL) of 6 µg/L.

VOCs, including trichloroethylene and perchloroethylene, have also been detected in the discharge at concentrations above their respective MCLs. Finally, hexavalent chromium (Chromium VI) has been detected in many wells at concentrations that exceed the current CPHG of 0.06 µg/L. The water quality of the aquifers in the Upper Claremont Heights Basin tends to be better than the more southerly Pomona Basin.

Local Surface Water

The City is situated at the base of San Antonio Canyon and Evey Canyon watersheds which discharge runoff from the San Gabriel Mountains into the City's service area. The City has the infrastructure to produce up to 4,000 afy (4 mgd) of that local surface water for supply. **Figure 10** is a schematic of the City's surface water treatment and delivery system.

Figure 10: Local Surface Water Supply Flow Chart

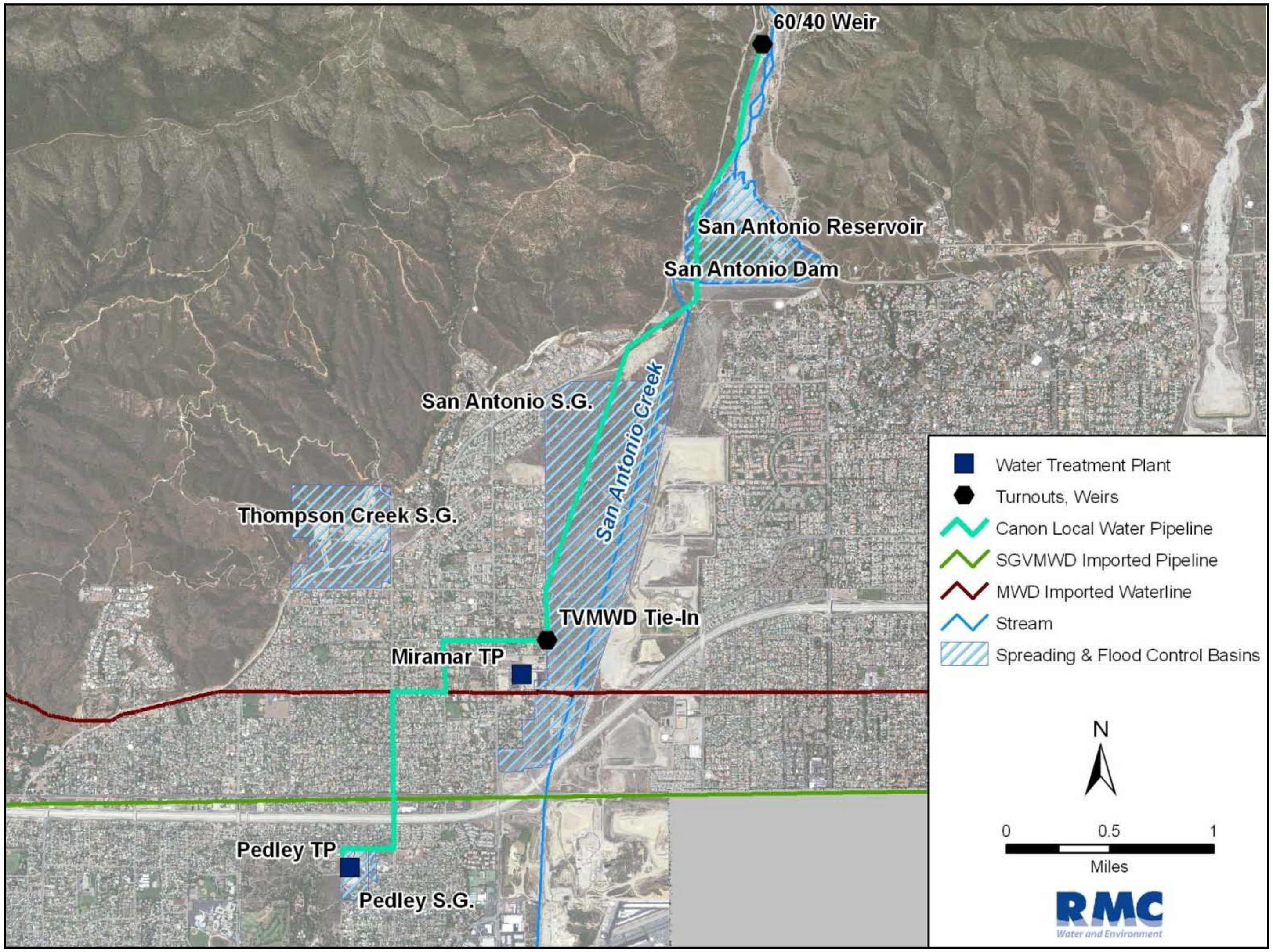


The City's local surface water facilities include a intake/weir structure in San Antonio Canyon (north of the San Antonio Dam), PFP (owned by the City but located in City of Claremont), and the Canon Waterline connecting San Antonio and Evey Canyons (shown together as the San Antonio Watershed) with PFP. The intake/weir structure in San Antonio Canyon apportions flow between San Antonio Water Company (SAWC) and the City, where 40% of average flows are diverted to the City, and the remaining flows are diverted to San Antonio Water Company. The Canon pipeline begins at the intake/weir structure, collects additional surface water at Evey Canyon, and supplies the PFP with raw surface water for treatment. The Canon Waterline discharges into a diversion structure at the PFP which conveys all instantaneous flows less than or equal to 4 mgd into the treatment plant; any excess flow above 4 mgd is diverted to a large spreading/infiltration basin located immediately adjacent to PFP referred to as the Pomona Spreading Grounds (**Figure 11**).

Quantity

The PFP was originally constructed and permitted in 1962 for a capacity of 5 mgd, but filter backwash improvements in 1997 required the facility to be downgraded to a capacity of 4 mgd. The City has treated a total annual average flow of 2,500 afy (2.3 mgd) of local raw surface water over the past ten years and, therefore, is only operating at 58% of its capacity. Annual average production of treated supply at the PFP for the period between 2000 and 2009 was approximately 2,000 afy (1.8 mgd). Historical production at the PFP is shown in **Table 10**. For the purposes of the baseline supply

Figure 11: Surface Water Facilities



assessment, it is assumed that the historical average annual supply will be maintained through the 2035 averaging out the effects of protracted wet periods and dry periods on supply. **Table 11** shows expected local surface water supplies from the PFP for normal years (*PBS&J, 2009*).

Table 10: Historical PFP Production (afy)

Fiscal Year	Annual Production Total
98-99	3,368
99-00	1,598
00-01	1,918
01-02	2,011
02-03	991
03-04	1,482
04-05	1,942
05-06	2,710
06-07	2,970
07-08	2,292
08-09	2,603

Table 11: Projected Local Surface Water Production (afy)

	2015	2020	2025	2030	2035
Average Year Production	2,000	2,000	2,000	2,000	2,000

The primary factor causing low utilization of capacity at the PFP, is low surface runoff during dry periods. A secondary factor is the inability of the PFP to meet its finished water turbidity requirement when the raw water turbidity is too high. Treatment performance only curtails production for an average of two weeks per year. The main factor causing low production is low volume of surface runoff.

The PFP is in continuous operation throughout the year except during periods when the raw water turbidity is too high for the filters to meet the permitted raw water turbidity requirement of 10 Nephelometric Turbidity Units (NTU), or during the latter part of summer in dry years when surface runoff may approach levels too low to treat. Apart from the dry weather shutdowns, City staff estimates that PFP is also shut down an average of two weeks per year as the result of high raw water turbidity during rainy periods. The annual wet-weather shutdown time varies from year to year depending on the amount of rainfall received and the intensity of the rainfall events. **Figure 12** shows the variation of flows treated at PFP from 2002 through 2008.

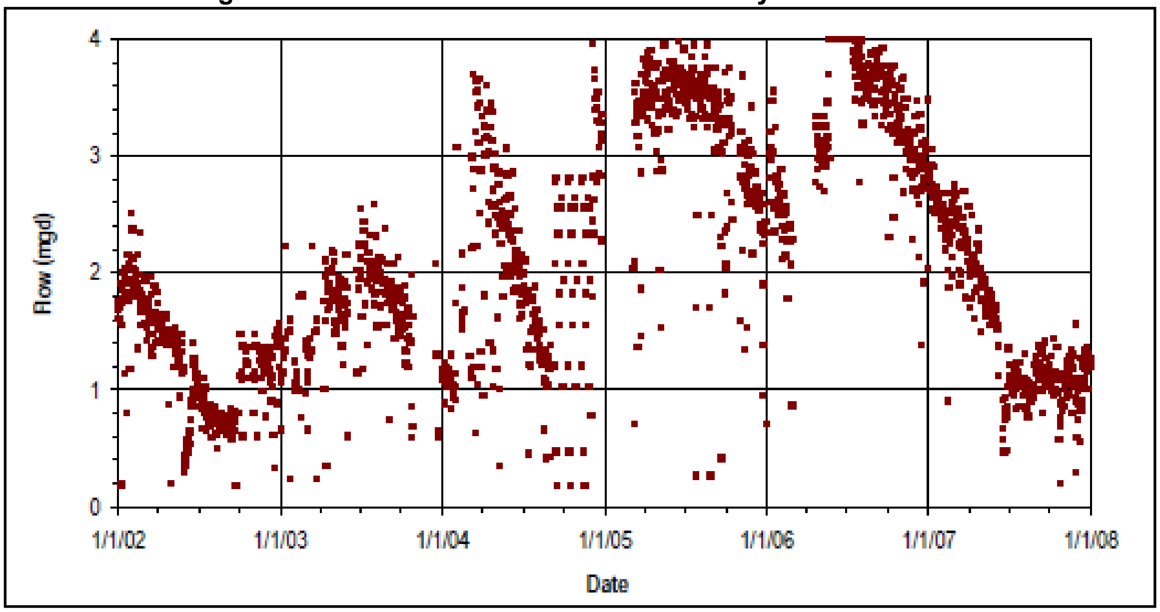
The maximum observed instantaneous surface water flow ever routed to the PFP was between 8 and 9 mgd during rare wintertime rainfall events. PFP is typically shut down at flows below 400 gpm (0.58 mgd). Based on the peak flows of 8-9 mgd and the PFP's capacity of 4 mgd, there is a significant volume of untreated surface water that is delivered to the recharge/spreading basin adjacent to PFP during wet weather events[1]. A portion of this recharged water is eventually captured by City-owned wells, including the nearby Tunnel Wells.

[1] There are no estimates available for the overall percentage of this recharged water that is re-captured by City-owned wells.

Quality

The only recurring water quality issue with local surface water is raw water turbidity. Full PFP shutdowns are initiated when the raw water NTU is too high (>10 NTU) for the plant to comply with its finished water turbidity permit requirements. When operating, PFP produces finished water that complies fully with CDPH-mandated drinking water standards. The plant was upgraded in 1997 to improve the filter-to-waste performance associated with filter backwash and increase chlorine contact time to improve disinfection by providing higher log removals for *Giardia* and viruses. PFP currently provides 5-log virus removal and 4-log *Giardia* removal. The PFP is considered "alternate" technology by CDPH and is consequently not considered state of the art. CDPH has required that the filter technology be replaced as soon as possible.

Figure 12: Variation of Influent Flow at Pedley Filtration Plant



Carollo, 2009b, Pedley Filtration Plant Feasibility Study, Figure 1.5

Non-Potable/Recycled Water

Tertiary treated recycled water is wholesaled to the City by the SDLAC from its PWRP. The City supplements its PWRP recycled water supply with non-potable groundwater pumped out of the Spadra Basin from wells 19, 28 and 31. Wells 19 and 31 are currently inactive due to a reduction in demand, though Well 19 can be operated if demand requires. The Spadra Basin wells have the combined capability of providing up to 1.0 mgd of non-potable water to the recycled water distribution system.

The City's recycled water distribution system was initially built to serve customers both inside and outside of the City's service area. Since that time, most of the City's internal recycled water customers have left the area, and now the only customers located within the City limits are the City Parks Department, Robertson's Ready Mix and Caltrans. **Figure 13** is a simple schematic of the City's recycled water delivery system.

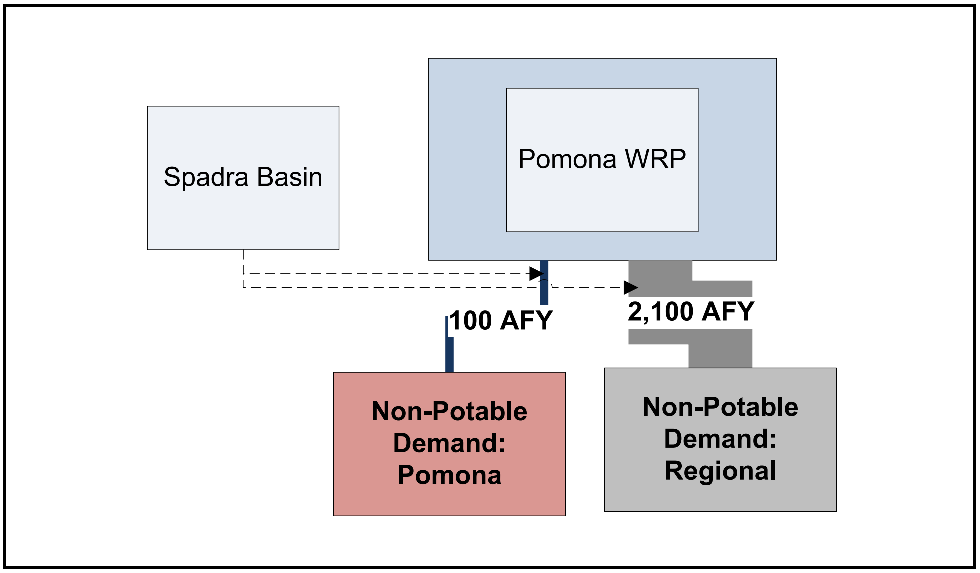
Quantity

The City is allocated up to two-thirds of the average 10,100 afy (9 mgd) supply generated at PWRP or about 6,700 afy (6 mgd). This available supply, combined with the 1.0 mgd average non-potable supply from Spadra Basin, amounts to a total available supply of 7 mgd. However, the City only uses about 100 afy to meet in-City demand and exports about 2,100 afy to customers outside the City.

Quality

The recycled water supplied to the City meets all requirements for State of California Title 22 Regulations for landscape irrigation and industrial use. These are requirements enforced by CDPH that set Statewide recycled water constituent limits for turbidity, bacteria (total fecal coliform), and viruses. The primary constituent of concern for landscape irrigation customers is total dissolved solids (TDS). Average observed recycled water TDS is approximately 540 mg/L.

Figure 13: Non-Potable Water Supply Flow Chart



Volume breakdown estimated based on total non-potable reuse in 2009 proportioned between City demand and regional demand

2.2.2 Facilities Assessment

The City-owned infrastructure supporting the development and distribution of these sources of supply include wells, pipelines, booster pump stations, reservoirs, groundwater treatment facilities, a surface water treatment plant, pressure reducing stations, imported water connections receiving water from neighboring water agencies, and emergency connections with neighboring water agencies. The facilities assessment in this section describes how the projected life cycle costs of baseline water production for each one of the principal sources of supply were developed.

- Imported Water
- Groundwater Wells With Treatment
- Groundwater Wells Without Treatment
- Local Surface Water

The life cycle costs developed include capital, facility, commodity, and operation/maintenance costs associated with water production only. The analysis does not include life cycle costs of distribution, conveyance, and storage following treatment or import.

Remaining Useful Life and Future Capital Investment

In order to develop unit costs of production for each main source of supply, it is important to define the remaining useful life for each major type of production facility. Remaining useful life is a key factor used to predict future capital investment in replacement infrastructure, which influences the overall life cycle cost of water production for each source of supply.

Table 12 lists the major facilities which constitute the bulk of the City's water production infrastructure. The table summarizes information on facility age, upgrades, predicted remaining service life, and maintenance activities for each major category of water production facilities owned by the City.

Imported Water

The costs of full replacements occurring within the 25-year time horizon of analysis (2010 to 2035) will figure into the overall life-cycle cost for this source.

Typical contract maintenance activity by non-City staff on the turnouts and emergency connections is limited. The regular turnouts are maintained by PWRJWL. As such, the periodic contract maintenance activity devoted to turnouts is considered negligible.

Groundwater With Treatment

Table 13 is a summary of the remaining service life of wells that produce groundwater requiring treatment and associated treatment infrastructure. The costs of full replacements occurring within the 25-year time horizon of analysis (2010 to 2035) will figure into the overall life-cycle cost for this source. It is assumed the total service life of a well is 70 years and the total replacement cost including new pumps, above-grade piping/valves, and electrical/telemetry/controls equipment is about $1,500,000. **Appendix B** shows a cost breakdown for the below-grade and wellhead improvements, which total $555,000. The remainder of the $1,500,000 consists of above-grade piping, pumping equipment, valves, and electrical/instrumentation.

During the course of well operation, the specific capacities of a well will decline due to clogging of the perforations which will increase the cost of production. In order to restore the specific capacity, it will be necessary to periodically rehabilitate the well through a process of physical and chemical development. Based on a review of the historical specific capacity data for the City's wells and interviews with City staff, it is apparent that the specific capacities of many of the wells have not declined significantly over time and rehabilitation is necessary only occasionally. As a general rule, rehabilitation should be performed when the well yield or specific capacity is 80 percent of the original value.

For planning purposes, a rehabilitation frequency of 10 years is assumed for the City's production wells. The cost of rehabilitation, which includes primarily mechanical means with minor chemical treatment, is approximately $134,000/well per event.

Each of the treatment facilities will have to calibrate analyzers and instrumentation, purchase parts, and perform control valve maintenance annually. At the AEP, anion exchange resin must be replaced every 10 years at a cost of approximately $400,000. At the Perchlorate Treatment Facility, resin will need to be replaced annually at a cost of approximately $870,000.

Table 12: Facility Service Life and Maintenance Activities

Year of oldest built	Year of newest built / upgrade	Average year built	Notes	Estimated Avg. Service Life
Anion Exchange Plant				
1992 [1]	2008 [3]	n/a	AEP 1 and AEP 2	30 years
Recurring Costs: • Resin replacement every 10 years • Calibrate analyzers & instrumentation • Parts purchase • Control valve maintenance • Salt/chemical costs				
Pedley Filtration Plant				
1962 [1]	1997 [1]	n/a		70 years [2]
Recurring Costs: • Filter media replacement (silica sand and anthracite) every 10 years • Calibrate analyzers & instrumentation • Parts purchase • Chemical costs				
10 & Towne Air Stripper				
~2000 [3]	~2009 [3]	n/a	Original + 4 additional towers	30 years
Recurring Costs: • Calibrate analyzers & instrumentation • Parts purchase • Chemical costs				
Harrison Groundwater Treatment Facility (at Well 37)				
2008 [3]		n/a		30 years
Recurring Costs: • Resin replacement and regeneration • Salt/chemical costs				
Wells				
1926 [1]	1997 [1]	1963 [1]		70 years [1]
Recurring Costs: • Pump replacement • Well rehabilitation				

1. MWH, 2005. Water and Recycled Water Master Plan.
2. Carollo, 2009. Pedley Filter Plant Feasibility Study.
3. Staff communications, 2010

Table 13 : Remaining Service Life for Wells Producing Groundwater Requiring Treatment

Facility	Year of Installation	Total Service Life (yrs)	Remaining Service Life[1] (yrs)	Service Life Expires[2]	Replacement Cost[3]	Year of Replacement
Well # 2	1967	70	27	No	$0	2037
Well # 3	1954	70	14	Yes	$1,500,000	2024
Well # 5b	1991	70	51	No	$0	2061
Well # 6	1933	70	-7	Yes	$1,500,000	2003
Well # 7	1957	70	17	Yes	$1,500,000	2027
Well # 8b	1993	70	53	No	$0	2063
Well # 9b	1991	70	51	No	$0	2061
Well # 10	1965	70	25	yes	$1,500,000	2035
Well # 11	1947	70	7	Yes	$1,500,000	2017
Well # 12	1947	70	7	Yes	$1,500,000	2017
Well # 13	1961	70	21	Yes	$1,500,000	2031
Well # 14	1951	70	11	Yes	$1,500,000	2021
Well # 15	1951	70	11	Yes	$1,500,000	2021
Well # 16	1953	70	13	Yes	$1,500,000	2023
Well # 17	1951	70	13	Yes	$1,500,000	2023
Well # 18	1954	70	14	Yes	$1,500,000	2024
Well # 20	1927	70	-13	Yes	$1,500,000	1997
Well # 21	1926	70	-14	Yes	$1,500,000	1996
Well # 23	1964	70	24	Yes	$1,500,000	2034
Well # 24	1990	70	50	No	$0	2060
Well # 25	1968	70	28	No	$0	2038
Well # 26	1971	70	31	No	$0	2041
Well # 29	1975	70	35	No	$0	2045
Well # 32b	1996	70	56	No	$0	2066
Well # 34	1993	70	53	No	$0	2063
Well # 36	1996	70	56	No	$0	2066
Well # 37	1997	70	57	No	$0	2067
AEP-1	1992	30	12	Yes	$7,700,000	2022
AEP-2	2008	30	25	Yes	$2,830,000	2035
Harrison GWTF	2008	30	25	Yes	$6,490,000	2035
10 & Towne	2000	30	20	Yes	$1,560,000	2030

1. A negative value in remaining service life indicates service life has been exceeded.
2. Service life expires prior to 2035
3. Cost in 2010 dollars
4. The year of installation may differ from the year the well first went into operation, but for this analysis the year of installation is assumed to be a reasonable approximation of the year each well went into service.
5. The analysis does not differentiate between full time or part time well use to determine remaining service life.

Groundwater Without Treatment

Table 14 is a summary of the remaining service life of wells producing groundwater that doesn't require treatment. Wells that require blending or treatment are not included this category, but wells with chlorine disinfection only are included in this category. The costs of full replacement occurring within the 25-year time horizon of analysis (2010 to 2035) will figure into the overall life-cycle cost for this source. It is assumed the total service life of a well is 70 years and the total replacement cost including new pumps, above-grade piping/valves, and electrical/telemetry/controls equipment is about $1,500,000.

From reviewing the well performance (i.e. specific capacity) data for the City's wells and information provided by the City's operations staff, a 10-year rehabilitation frequency for the wells is assumed. It is also assumed that well performance holds up consistently over time. The cost of rehabilitation, which includes primarily mechanical means with minor chemical, is approximately $134,000/well per event.

Table 14: Remaining Service Life for Wells Producing Groundwater Not Requiring Treatment

Facility	Year of Installation	Total Service Life (yrs)	Remaining Service Life (yrs)[1]	Service Life Expires[2]	Replacement Cost[3]	Year of Replacement
Well # 27	1973	70	33	No	$0	2043
Well # 28	1973	70	33	No	$0	2043
Well # 30	1977	70	35	No	$0	2045
Well # 35	1993	70	53	No	$0	2063
Well # TW-1	1926	70	-14	Yes	$1,500,000	1996
Well # TW-2	1986	70	46	No	$0	2056
Well # TW-3	1926	70	-14	Yes	$1,500,000	1996
Well # TW-4	1989	70	49	No	$0	2059

1. A negative value in remaining service life indicates service life has been exceeded.
2. Service life expires prior to 2035
3. Cost in 2010 dollars
4. The year of installation differ from the year the well first went into operation, but for this analysis the year of installation is assumed to be a reasonable approximation of the year each well went into service.
5. The analysis does not differentiate between full time or part time well use to determine remaining service life.

Local Surface Water

Table 15 is a summary of the remaining service life of surface water piping infrastructure and PFP. The costs of full replacements taking place within the 25-year time horizon of analysis (2010 to 2035) will figure into the overall life-cycle cost for this source. Filter media at the PFP will most likely need to be replaced every 10 years at a material cost of about $85,000, which includes replacement of both sand and anthracite filters. There is no added labor cost associated with this expense, because the City performs the filter media replacement with its in-house operations staff during normal work schedules. Maintenance activity outside of normal labor expense includes instrument recalibration and purchase of parts.

Table 15: Remaining Service Life for Surface Water Treatment Facilities

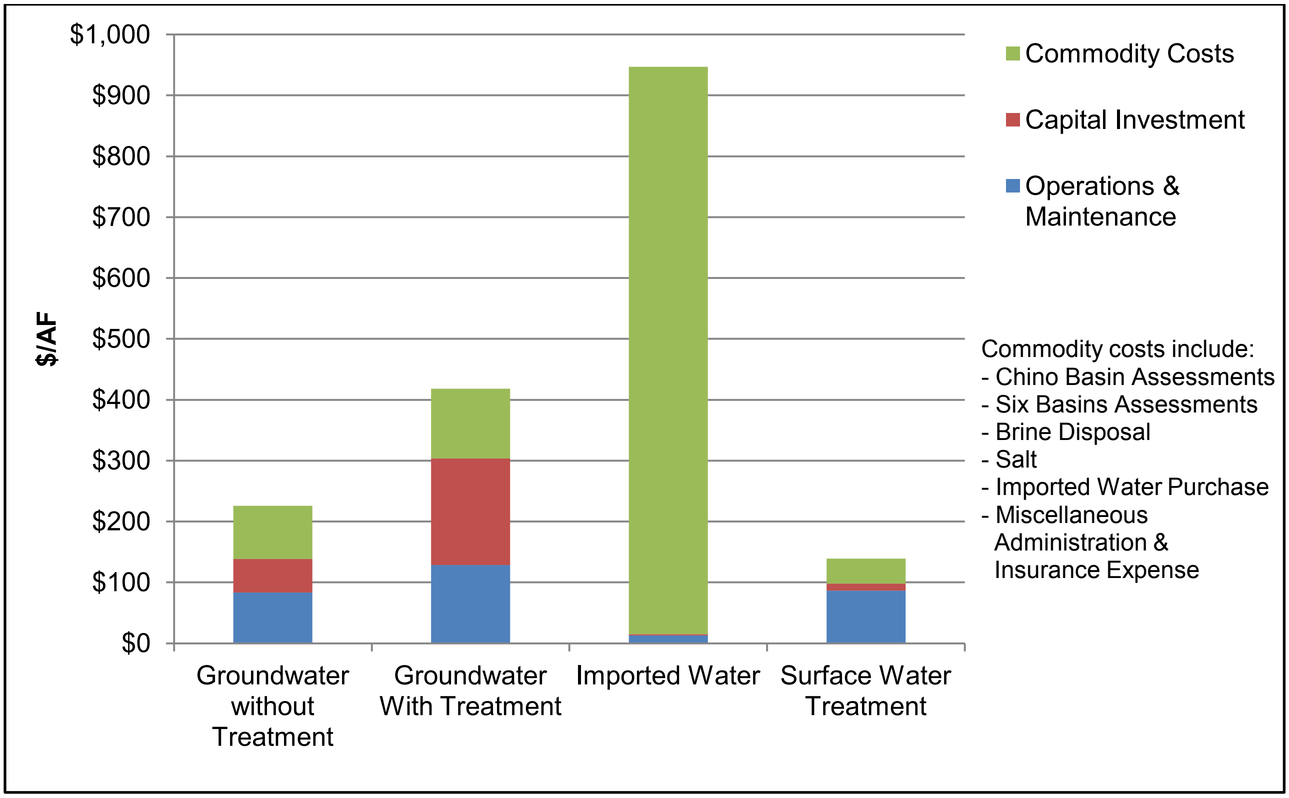
Facility	Year of Installation	Total Service Life	Remaining Service Life	Replacement Cost (2010 $s)	Year of Replacement
Pedley Filtration Plant	1962	75 years	27 years	$19.0 M	2037
Canon Raw Waterline	1900-2010[2]	75 years	~35 years	$5.0 M	1975-2085

1. A negative value in remaining service life indicates service life has been exceeded.
2. Various sections of the waterline have been replaced since 1900.

Unit Cost of Production

This section provides the methodologies, assumptions and calculations used to prepare unit costs to produce each of the City's supplies. This section does not include recycled water supplies, since the City does not produce that supply. A summary of the life cycle unit costs is provided in **Figure 14** and detailed in **Appendix C.** This chart shows that imported water has the highest lifecycle cost, followed by groundwater with treatment, groundwater without treatment and finally surface water treatment with the lowest unit cost.

Figure 14: Life Cycle Costs in 2010 Dollars



Methodology

Unit costs of production (life-cycle costs) were developed for each significant water supply source using a standard process. For each source, all known future production costs were catalogued into one of three categories: operation and maintenance cost, commodity cost and future capital investments. The operation and maintenance costs consist of labor, chemicals, electricity, energy and other utility costs. Commodity costs consist of imported water purchase, salt purchase, Chino Basin groundwater assessments, Six Basins groundwater assessments, and debt service on water capital infrastructure. One-time and recurring capital investments within the 25-year time horizon of analysis between 2010 and 2035 were identified. Capital investment can be divided into periodic rehabilitation (refurbishment) and full replacement of individual facilities that have a service life expiring prior to 2035.

Assumptions

- **Assumed annual production:** For imported water and local surface water, the annual amount of water purchased or produced was based on the 10-year average between 2000 and 2009. This averaging method approximates an average rainfall condition for the base supply year. For groundwater, the annual amount of water pumped was assumed to be the 12-month period during fiscal year 2009/2010. For the groundwater analysis, pumping volumes prior to 2009 were not used because they do not reflect the latest system conditions including the following:

  - **Number of wells off-line versus on-line:** The quantity and location of wells currently out of service is highly dependent on the latest regulatory developments.
  - **Location, capacity, and production of groundwater treatment facilities:** The City's groundwater treatment infrastructure is in a continual state of development as regulations and treatment objectives change.

- **Production cost:** The unit cost of production is assumed to include imported water purchase, surface water conveyance, groundwater extraction, and treatment for both groundwater and surface water. The costs of booster pumping, transmission, storage, and distribution were not included in the analysis. Transmission costs are considered to be offsetting costs for the purposes of this analysis, because all of the different sources utilize the same transmission system.
- **Labor costs:** Labor costs associated with the analysis are based on actual FY 09-10 costs to compensate and provide benefits to the existing 15-person water production group, minus the time allotted to reservoir maintenance. Weekly labor hours total 600 hours, assuming each staff member works approximately 40 hours per week. Reservoir maintenance is assumed to use 110 of these hours, leaving 490 hours for remaining labor tasks. The costs include all labor, benefits and administrative costs in Items 51001 through 51800 in the City's water production group accounting ledger dated June 22, 2010.

  Debt service: This number is expressed as the system-wide cost devoted to debt service on water production. The equivalent annual cost for debt service, as referenced from the 2007 Series AZ Taxable revenue Refunding Bonds (Water Facilities Project), is a total annual payment of $583,000 through 2029

Table 16: Allocation of Debt Service on Capital Infrastructure for Water Production

Debt Service Per Year on Series AZ Bond Issue	**$583,000/ year**
Estimated Percentage of Debt Service Allocated to Water Production	**13%**
Current Annual Debt Service for Water Production	**$75,800**
Year Debt Service Ends	**2029**
Equivalent Uniform Annual Cost of Debt Service	**$61,468/year**[1]

1. Number was divided between four sources according to production

- **Opportunity cost of capital:** The analysis assumes an opportunity cost of capital of 2.4%. This is the current City opportunity cost of capital as reported by the City Treasurer. Opportunity cost of capital is defined as the estimated annual percentage rate of return that a municipality could obtain on an alternate investment (i.e. an investment in something else other than water production facilities). The opportunity cost of capital is not a debt financing rate, loan interest rate, or bond yield paid by the City to bondholders. Rather, it is a benchmark for defining the present value and equivalent annual value of capital outlays that will take place in the future. For the economic analysis in this IWSP, the opportunity cost of capital is used to convert one-time future capital investments such as infrastructure replacements into equivalent annual costs over the 25 year time horizon of analysis (2010 to 2035).
- **25 year time horizon:** A 25-year time horizon of analysis is typical for water-related infrastructure; cash flows beyond 25 years have a diminishing influence on present worth cost and are more difficult to predict. Furthermore, the basic facility assumptions for the sources of supply in 2010 are likely to have changed by 2035, to the extent that annual cash flows occurring between 2010 and 2035 are not likely to be relevant to the overall water infrastructure situation after 2035.

- **Inflation:** All costs, both current and future, are expressed in 2010 dollars. This removes inflation from the economic analysis as costs for maintenance, labor, salt, groundwater assessments, and surface water treatment are assumed to increase on an annual percentage basis that is tied closely to the overall prevailing economic conditions. Expressing all of these costs in the same base year (2010) is an appropriate assumption. The annual cost of imported water and electricity, however, are projected to increase at a much faster rate than the cost of other goods and services. Imported water purchase costs are assumed to increase from $703 in 2010 to $4,366 in 2035. $4,366 is equal to about $2,312 in 2010 dollars when discounted annually by the average consumer price index (CPI) of 2.7%. Furthermore, the cost of electricity in California is projected to increase at an annual inflation rate of 7%, which exceeds the CPI by 4.3%.

Imported Water

In addition to the previously discussed capital infrastructure costs commodity and O&M costs are described here.

Commodity Costs

- **Production Cost:** The 2010 aggregate cost of imported water paid by the City is $701 per acre-foot per year. Based on imported water projections, this cost is projected to increase to $1,971 per acre-foot in 2035, assuming an annual increase of 6.5% until 2015 followed by annual increases of 6% until 2020, then an annual increase of 3% until 2035. $1,971 in 2035 dollars is equal to about $1,063 in 2010 dollars. The life cycle cost analysis normalizes all costs to 2010 dollars.
- **Miscellaneous administration & insurance expense:** This expense is split amongst all the water sources according to the percentage of labor costs applied to the source, and amounts to approximately $61,828 per year.
- **Debt service:** This expense is split among all the water sources according to average production, and amounts to approximately $12,427 (where imported water makes up approximately 20% of average production, and total debt service for all supplies is $61,468).

O&M Costs

- **Labor costs:** Of the 490 person-hours expended every week as labor within the water production group, it is assumed based on discussions with Operations Management and Staff that 40 of these hours are devoted to imported water infrastructure.

Groundwater with Treatment

In addition to the previously discussed capital infrastructure costs, commodity and O&M costs are described here.

Commodity Costs

- **Salt purchase:** Annual salt purchase of $680,000 for the AEP and Harrison GWT is required.
- **Groundwater assessments:** According to the FY 09/10 Ledger, approximately $1.4 million is spent on assessments for Chino Basin. The assessment cost is apportioned based on the wells in the Chino Basin that require treatment; this amounts to $1 million. In FY 09-10 the City spent about $40,000 on Six Basins assessments. For Six Basins, the assessment cost is apportioned equally among wells in the Six Basins that have treatment and those that have no treatment; this amounts to approximately $20,000 per year for groundwater with treatment.
- **Brine Disposal:** The approximate annual cost of brine disposal from the groundwater treatment facilities is $31,000 per year.
- **Debt Service:** This expense is split among all the water sources according to average production, and amounts to approximately $35,616 (where groundwater with treatment makes up approximately 58% of average production, and total debt service for all supplies is $61,468).

- **Miscellaneous administration & insurance expense:** This expense is split among all the water sources according to the percentage of labor costs applied to the source, and amounts to approximately $551,817 per year.

O&M Costs

- **Electricity:** Total estimated annual electrical expenditure of $1,701,000/year was based on current production, including the soon to be built perchlorate treatment facility, and current electrical costs ranging from $0.08/kWh to $0.11/kWh. Electricity is projected to increase at an annual inflation rate of 7% in future dollars. Annual costs were normalized to 2010 dollars using an average annual CPI of 2.7%.
- **Chemicals:** Hypochlorite cost is apportioned based on production volume for each water source and is estimated to be approximately $48,000 per year.
- **Labor costs:** Of the 490 person-hours expended every week in labor within the water production group, it is assumed based on discussions with operations management and staff that 357 of these hours are devoted to infrastructure for contaminated wells and associated treatment.

Groundwater without Treatment

In addition to the previously discussed capital infrastructure costs, commodity and O&M costs are described here.

Commodity Costs

- **Groundwater assessments:** According to the FY 09/10 Ledger, approximately $1.4 million is spent on Chino Basin assessments and about $40,000 on Six Basins assessments. For Chino Basin, the assessment cost is apportioned based on the wells in the Chino Basin that have no treatment; this amounts to approximately $400,000 per year. For Six Basins, the assessment cost is apportioned equally among wells in the Six Basins that have treatment and those that have no treatment; this amounts to approximately $20,000 per year for groundwater without treatment.
- **Debt service:** This expense is split among all the water sources according to average production, and amounts to approximately $9,518 (where groundwater without treatment makes up approximately 16% of average production, and total debt service for all supplies is $61,468).
- **Miscellaneous administration & insurance expense:** This expense is split amongst all the water sources according to the percentage of labor costs applied to the source, and amounts to approximately $54,100 per year.

O&M Cost

- **Electricity:** Total estimated annual electrical expenditure of $340,000/yr was based on current production and current electrical cost ranging from $0.08/ kWh to $0.15/kWh. Electricity is projected to increase at an annual inflation rate of 7% in future dollars. Annual costs were normalized to 2010 dollars using an average annual CPI of 2.7%.
- **Chemicals:** Hypochlorite cost is apportioned based on production volume for each water source and is estimated to be approximately $20,000 per year.
- **Labor costs:** Of the 490 person-hours expended every week in labor within the water production group, it is assumed based on discussions with operations management and staff that 35 of these hours is devoted to infrastructure for wells that do not require treatment.

Local Surface Water

In addition to the previously discussed capital infrastructure, costs commodity and O&M costs are described here.

Commodity Costs

- **Debt Service:** This expense is split among all the water sources according to average production, and amounts to approximately $3,907 (where local surface water makes up approximately 6% of average production, and total debt service for all supplies is $61,468).
- **Miscellaneous administration & insurance expense:** This expense is split amongst all the water sources according to the percentage of labor costs applied to the source, and amounts to approximately $89,651 per year.

O&M Cost

- **Electricity:** Total estimated annual electrical expenditure of $28,000/yr was based on current production and current electrical cost ranging from $0.08 kWh to $0.11kWh. Electricity is projected to increase at an annual inflation rate of 7% in future dollars. Annual costs were normalized to 2010 dollars using an average annual CPI of 2.7%.
- **Chemicals:** Hypochlorite cost is apportioned based on production volume for each water source and is estimated to be approximately $12,000 per year. Alum is used at the plant and costs about $12,000 annually.
- **Labor costs:** Of the 490 person-hours expended every week in labor within the water production group, it is assumed based on discussions with operations management and staff that 58 of these hours is devoted to local surface water.

2.2.3 Water Quality and Treatment Assessment

This section provides a baseline understanding and assessment of the City's existing water quality and treatment setting and issues. Information provided in this section includes an overview of constituents of concern, summarizes regulatory changes for each of these constituents, and identifies the impacts of these constituents and their associated regulatory framework on the City's existing treatment facilities.

Water Quality Constituents of Concern

Water quality constituents of concern are defined as those constituents which have historical or current concentrations that result in any of the following for the City's water supply:

- Exceedance of the existing or anticipated California drinking water MCLs or PHGs
- Constituent concentrations that historically have required supplementary groundwater treatment following pumping, prior to delivery of the groundwater to the distribution system
- Constituent concentrations that have created a need for future supplementary groundwater treatment
- Constituent concentrations that have led to protracted or recurring facility shutdowns

All of the City's wells and treatment facilities are subject to regular water quality sampling mandated by CDPH. **Table 17** provides a summary of constituents of concern in the City's water sources based upon the results of sampling and subsequent studies and investigation by the City as well as typical sources for each contaminant of concern. All of the constituents of concern listed in **Table 17** occur within groundwater, with the exception of surface water turbidity which is an issue at PFP. **Appendix C** contains recent water quality data (2007 through 2010) for the constituents of concern as well as a summary of this data by treatment facility.

Table 17: Drinking Water Contaminants of Concern

Contaminant of Concern	Location With Elevated Levels	Current Range in Concentrations (Untreated)	Issue/Observation
Nitrate (as NO_3)	AEP Feed Wells 10 & Towne Air Stripper Feed Wells	34 – 100 mg/L (average 61 mg/L)	• AEP reduces nitrates to 20-35 mg/L through anion exchange and blending with untreated wells • Blending reduces NO_3 levels • CA MCL is 45 mg/L
Chromium VI	Common in many wells throughout the City	3 – 15 ug/L	• Potential adoption of CA MCL as low as 0.02 ug/L. • No CA MCL currently • AEP removals approaching 100% for Chromium VI
Trichloro-ethylene (TCE)	AEP Feed Wells 10 & Towne Air Stripper Feed Wells (7 and 8b)	0.5 – 46 ug/L (avg 4.9 ug/L)	• Current CA MCL of 5 ug/L met at AEP through blending • CA PHG of 1.7 ug/L met at 10 & Towne by air stripping • Recent change of PHG to 1.7 ug/L could change CA MCL to 1.7 ug/L resulting in significant impact
Perchloro-ethylene (PCE) or Tetrachloro-ethylene	AEP Feed Wells	5 – 10 ug/L	• Current CA MCL of 5 ug/L met at AEP through blending
1-1 Dichloroethylene (DCE)	10 & Towne Air Stripper Feed Wells (7 and 8b)	23 – 49 ug/L	• Air stripper easily meets CA MCL of 6 ug/L
Perchlorate	AEP Feed Wells 10 & Towne Air Stripper Feed Wells (7 and 8b)	2 – 15 ug/L 5 – 13 ug/L	• Recent CA MCL is 6 ug/L • AEP production is low due to shutdowns of wells • 10 & Towne meets CA MCL through blending with imported water
Arsenic	One recent sample at Well 3 of 9.9 ug/L	ND – 1.2 ug/L(one Well 3 sample of 9.9 ug/L	• Recent CA MCL is 10 ug/L • Currently, no wells exceed CA MCL, but there have been historical exceedances in Wells 3, 24, 30, and 35
Surface Water Turbidity	Pedley Filtration Plant	0.3 to 5.0 NTU (avg 0.5)	When raw water turbidity exceeds 10 NTU during wet weather, plant is shut down
Methyl Tertiary Butyl Ether (MTBE)	Well 29	7 – 15 ug/L	• CA MCL is 13 ug/L • Well is shut down indefinitely due to MTBE exceedance

For the other constituents on CDPH's or EPA's list of regulated drinking water contaminants, there are no current or anticipated water quality issues. As part of the analysis for this IWSP, data for TDS and disinfection byproducts (DBPs) including trihalomethanes (THMs) and haloacetic acids (HAAs) was also analyzed. TDS and DBP levels are well within permitted levels for all the City's water sources.

The City solved an issue with *N*-Nitrosodimethylamine (NDMA) exceedances in some of its well samples. A study was conducted analyzing NDMA precursors within the source water, and the City later discovered that NDMA concentrations were being caused by pump lineshaft lubrication with potable chlorinated water. The City has since corrected this issue, and observed NDMA levels for wells have dropped to below permitted levels.

Regulatory Changes Affecting Constituents of Concern

This section documents recent, pending, and anticipated changes to drinking water regulations which may impact the City's approach to addressing the constituents of concern.

Nitrate

There are no pending or anticipated changes to the existing California MCL (45 mg/L) or California PHG (45 mg/L). For Nitrate, the California MCL and PHG are the same value.

Chromium VI

Currently there is no California MCL for this contaminant, but the December 2010 draft publication of a California PHG of 0.02 ug/L could signal the forthcoming adoption of a statewide MCL. This draft lowered the PHG of 0.06 ug/L suggested in a 2009 draft. Once the PHG is set, the state will begin work to set an MCL for Chromium VI. In addition to the setting of the California PHG and MCL, in January 2011 the United States Environmental Protection Agency (USEPA) released draft recommendations for enhanced monitoring for Chromium VI in drinking water which describes how water systems should collect and test samples for Chromium VI.

Although it is difficult to predict what the MCL would be, the adopted MCL could be as low as 0.02 ug/L. Since Chromium VI occurs in concentrations between 3 and 15 ug/L in the City's groundwater supply, it is likely that compliance with a new MCL would require new treatment facilities. Currently Chromium VI has no direct impacts on production in the City, because no MCL has been adopted. Should an MCL be adopted, a number of wells are expected to be shut down throughout the City.

TCE

In 2009, CDPH raised the PHG for TCE to 1.7 ug/L while maintaining the MCL at 5.0 ug/L. It is possible that adjustment of the PHG could lead to reduction of the MCL. If a new MCL were adopted, the MCL could conceivably be lowered from 5.0 ug/L to the adjusted PHG of 1.7 ug/L. The presence of TCE requires the City to blend or invest capital in air stripping. Unlike perchlorate, the presence of TCE does not have any serious impact on water production. If the MCL is lowered, the City would find itself in a situation in which air stripping or some other form of VOC removal would be required for most of the Chino Basin wells.

PCE

There are no recent or anticipated changes to the CDPH MCL of 5 ug/L and PHG of 1.7 ug/L. PCE has no serious impacts on groundwater production for the City.

DCE

There are no recent or anticipated changes to the CDPH MCL of 6 ug/L and PHG of 10 ug/L. DCE is the primary constituent of concern at Wells 7, 8, and 32. The air stripping facilities at 10 & Towne currently remove DCE, and therefore the presence of DCE has no serious impacts on water production for the City. All blending with imported water, however, raises the cost and limits the operation of some facilities to periods of high demand.

Perchlorate

CDPH adopted an MCL of 6 ug/L for perchlorate in October 2007. The observed ranges of 2 to 15 ug/L in affected wells pose an operational issue for the City. Currently there are 9 AEP feed wells that have been shut down as the result of elevated perchlorate levels. Because of these shutdowns, total blended production at the AEP has declined to approximately 10.8 mgd, which is well below the theoretical AEP blended design production of approximately 21 mgd. The new perchlorate treatment facility will treat Wells 12, 15 and 17 for perchlorate prior to treatment at the AEP.

Arsenic

In November 2008, the California MCL for arsenic was lowered from 50 ug/L to 10 ug/L. Within the last decade, wells 24, 30 and 35 have had measured arsenic concentrations that exceed 10 ug/L, but these exceedances occurred prior to 2008. Typically observed levels are in the range of nondetectable up to 1.2 ug/L. This range is well below the MCL. There has been only one recent sampling event that showed an arsenic concentration close to the MCL: 9.9 ug/L at Well 3.

In general, arsenic does not pose a large regulatory risk for the City. Arsenic levels can be unpredictable because they vary based on changes in the rate of subsurface erosion of naturally occurring mineral deposits. A rare occurrence of an elevated level should not be cause for concern, but repeated occurrences of elevated levels would be cause for concern.

Surface Water Turbidity

The source of raw water to PFP is local surface runoff from the San Gabriel Mountains. There are no anticipated forthcoming changes to the finished water turbidity requirement of 0.2 NTU, but the plant is generally unable to meet this requirement when the raw water turbidity exceeds 10 NTU. Elevated raw water turbidity causes extended shutdowns for a total of 2 weeks per year on average, although this duration varies widely from year to year based on rainfall.

MTBE

California adopted an MCL for MTBE of 13 ug/L in 2000. Well 29 has been shut down indefinitely as the result of sampling results which show MTBE levels in this well ranging between 7 and 15 ug/L. There are no foreseeable or anticipated changes to the current California MCL.

Performance of Existing Treatment and Blending Facilities

This section summarizes the performance of existing City-owned treatment facilities and their ability to meet treatment requirements governed by the latest regulatory framework.

Anion Exchange Plant

Current Operating Scenario

Table 18 summarizes the performance of the AEP as it is currently operated. The AEP is underutilized, mostly because of perchlorate. The treatment facility has the theoretical capability of operating at a blended production of 21 mgd. The wells connected to the AEP have an average estimated current production capacity of 19.3 mgd. For most of 2009, the AEP was operating at a blended production between 12.7 and 13.5 mgd. In November 2009, two additional wells with elevated perchlorate (Wells 18 and 34) were shut down, and since then the AEP has been operating at a blended production of 10.8 mgd.

Regulatory Impacts on Future Treatment Goals

The 6 ug/L MCL for perchlorate has the largest regulatory impact on the AEP and has resulted in a drastic decline in production. The City is in the process of assembling a design-build package for a downstream perchlorate treatment facility to address this issue, and is estimated to be online in 2012. The new treatment facility will not increase the overall flow capacity of the AEP, but it will increase production by placing additional source wells back in service.

The other constituent affecting production at the AEP is TCE. The new perchlorate treatment facility will not influence TCE levels. A strong possibility exists that even after the perchlorate treatment facility is placed into service, high TCE levels in Wells 11 and 12 could reduce the available well production from 19.3 mgd to 17.9 mgd. This scenario assumes that Wells 11 and 12 are turned off and that the remaining contributing wells have a blended average TCE of 3.7 ug/L, which is just below the 80% notification level for the MCL of 5 ug/L. It also assumes that no additional wells will be developed in the Chino Basin.

Table 18: Current AEP Operating Criteria

Main Constituent Removed: Nitrate	
Current Average Well Feed Flow rate to AEP and Bypass Line	10.8 mgd
Current Average AEP Treated Flow rate	7.6 mgd
Current Average Bypass Flow rate	3.2 mgd
Drinking Water MCL for Nitrate	45 mg/L
Typical Blended Concentration of Nitrate	21 mg/L
Other Blended Effluent Targets	
Perchlorate	4.9 ug/L
Chromium VI	5.0 ug/L
TCE	3.3 ug/L
DCE	1.2 ug/L
PCE	2.7 ug/L

A more dire scenario for TCE MCL impacts would ensue if the TCE MCL were reduced from 5 ug/L to 1.7 ug/L. In this scenario, the new notification level for TCE would be 80% of the MCL, or about 1.4 ug/L. To stay below this level without additional treatment, AEP production would be reduced from 19 mgd of available production to about 8 mgd, as the result of the higher TCE wells being taken out of service. Before resorting to such a drastic loss in production, the City could choose to implement a VOC removal technology such as air stripping or granular activated carbon (GAC) adsorption to keep the higher TCE wells in service.

The AEP provides high removals of Chromium VI, although it is unclear if removals would be high enough to meet a hypothetical MCL of 0.06 ug/L that matches the current PHG.

Air Strippers and Reservoir 5 Blending

Current Operating Scenarios

Table 19 provides the current operation parameters for the VOC air stripping facility at 10 & Towne, the VOC air stripping facility at Well 3, and the imported water blending operation at Reservoir 5.

Groundwater Contribution and Well 32

Since Well 32 has recently been approved for operation, the City has the option of increasing well deliveries while reducing imported water blending flow. The current blended nitrate concentration of 25 mg/L is lower than required. The City has the flexibility to decrease imported water and raise the target nitrate concentration to the range of 30-36 mg/L, which is closer to the MCL of 45 mg/L. Wells 7 and 8B are chlorinated immediately downstream of the air stripper, but the water in Reservoir 5 receives ammonia only through blending with imported water. A significant reduction in imported water would create the need to continuously add ammonia at the blending site to create chloramines. Ammonia injection equipment has been installed to allow for this.

Regulatory Impacts on Future Treatment Goals

There are no anticipated regulatory changes that would impact the ability of these blending and treatment facilities to meet nitrate and VOC reduction goals. Even if the MCL for TCE was reduced to 1.7 ug/L, the existing air strippers are easily capable of meeting that MCL. There are no anticipated regulatory changes pertaining to DCE.

Table 19: Air Stripping and Reservoir 5 Operating Criteria

Air Stripping Facility – Well 3	
Primary Constituent Being Removed	DCE
Average DCE Influent Concentration	4.5 ug/L
Average DCE Influent Concentration	1.0 ug/L
Current Average Flow rate through Air Stripper	0.7 mgd
Air Stripping Facility – Wells 7 & 8b	
Primary Constituent Being Removed	DCE
Average DCE Influent Concentration	36 ug/L
Average DCE Influent Concentration	1.0 ug/L
Current Average Flow rate through Air Stripper	1.1 mgd
Reservoir 5 – Blending of Imported Water with Air Stripper Effluent	
Primary Constituent Requiring Reduction	Nitrate as NO_3
Current Average Blending Flow rate of Imported Water	2.7 mgd
Current Average Well Contributions (Wells 3, 7, 8b)	1.8 mgd
Ratio of Imported Water Volume to Well Production	1.5 : 1
Average Nitrate Concentration in Wells	60 mg/L
Average Nitrate Concentration in Imported Water	2.9 mg/L
Average Blended Nitrate Concentration	25 mg/L

Pedley Filtration Plant

Current Operating Scenario
Table 20 provides the current operating parameters for the PFP. Raw water supplying PFP is considered "pristine" water with low nitrate and generally low turbidity (except during periods of high flows). The plant capacity is normally underutilized, with an annual average production of 2.4 mgd despite its flow capacity of 4.0 mgd.

Table 20: Pedley Filtration Plant – Operating Criteria

Parameter	Typical Range
Flow	0.2 – 4.0 mgd (average 2.4 mgd)
Raw Water Diverted to On-site Spreading Basin	0 – 0.5 mgd
Raw Water Turbidity	0.3 – 1.0 NTU wet weather excursions > 10 NTU
Alum Dose	2.0 – 3.0 mg/L
Disinfectant CT Value	230 mg/L*min
Chlorine Residual	2.0 – 2.5 mg/L
Finished Water Conductivity	average 2.0 mg/L
Finished Water Nitrate (as NO_3)	average 2.0 mg/L
Finished Water Turbidity Permit Limit	0.3 NTU
Observed Finished Water Turbidity	average 0.05 NTU observed rage (0.01 - 0.2) NTU

Regulatory Impacts on Future Treatment Goals

The only regulatory limit on achieving treatment goals is the requirement that the PFP must shut down when raw water turbidity exceeds 10 NTU. The regulatory context for the facility in light of recently-promulgated drinking water regulations are described here.

EPA Long-term 2 Enhanced Surface Water Treatment Rule (LT2): The LT2 was promulgated by EPA in 2002 with initial compliance dates occurring in 2006. The overall purpose of the rule was to improve drinking water disinfection practices nationwide to prevent human illness from aggressive waterborne organisms such as *Cryptosporidium* and *Giardia*. The rule has resulted in disinfection upgrades to several water treatment plants throughout the United States.

PFP complies with LT2 based on the absence of *Cryptosporidium* oocysts demonstrated by sampling of the San Antonio Creek source water. The level of disinfection provided through chlorination at PFP is 5 log virus removal and 4 log *Giardia* removal, which is provided by supplying an appropriate amount of contact time in the chlorine contact basin, along with a CDPH designated log removal credit for the sand filters. Near-term future changes to the disinfection system are not likely.

EPA Stage 2 Disinfection Byproducts Rule (Stage 2 DBPR): The Stage 2 DBPR was promulgated in 2006 with the intent of improving the effectiveness of monitoring for disinfection byproducts within drinking water distribution systems. PFP has no issues meeting the requirements for trihalomethanes (THMs) and haloacetic acids (HAAs) of <0.08 mg/L and <0.06 mg/L, respectively.

There is a long-term possibility that EPA will lower the MCL for bromate, due in part to some newsworthy bromate violations resulting in CDPH-mandated draining of large reservoirs in the Los Angeles area. PFP currently meets the State MCL of 10 ug/L, but lowering of the MCL may be an issue because of the use of sodium hypochlorite at PFP. This, however, is a longer-term issue that would not impact short-term treatment strategies. PFP is in full compliance with other recently adopted EPA rules including the 2006 lowering of the arsenic MCL from 50 ug/L to 10 ug/L.

Harrison Groundwater Treatment Facility

Current Operating Scenario

Table 21 provides the current operation parameters for the HGWTF. The HGWTF is an ion exchange facility that was installed in 2008 to remove nitrates from Well 37. The facility treats the entire well flow rate, and there is no untreated bypass of flow around the ion exchange vessels.

Table 21: Harrison Groundwater Treatment Facility – Operating Criteria

Parameter	Value
Water Source	Well 37
Source Water Nitrate Level (as NO_3)	50 – 60 mg/L
Treated Water Nitrate Level (as NO_3)	average 25 mg/L
Typical Feed Rate/Ion Exchange Flow rate	750 gpm

Regulatory Impacts on Future Treatment Goals

There are no regulatory complications affecting the facility. Well 37 has had no historical water quality issues with VOCs, arsenic, or MTBE.

2.3 Supply and Demand Comparison

As stated previously, baseline supply volumes for imported water, groundwater and local surface water are projected to remain equal to production volumes from 2000-2009. **Table 22** and **Figure 15** show projected supply and demand out to 2035.

The supply projection assumes that these levels of production are sustainable over the next 25 years, and that there will be no expansion of production facilities. Non-potable supply is equal to existing non-potable demand as this is the maximum level of non-potable supply that can be delivered.

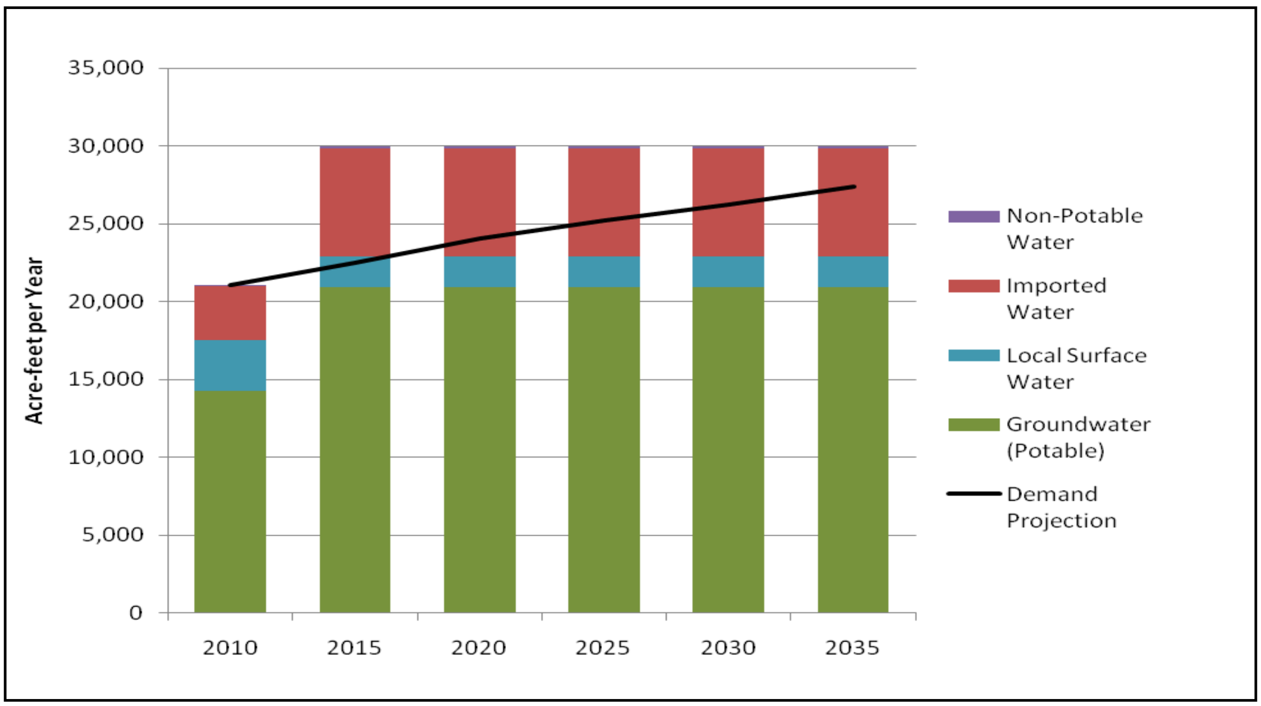
The demand projection includes all customer demand as well as unaccounted for water. Demand growth is assumed to remain flat out to 2015, and then grow in-line with 2001 SCAG population and employment growth trends of 1.2% annually and 0.5% annually, respectively. According to these supply and demand projections, the total supply exceeds demand out to 2035.

Table 22: Supply and Demand Projections (afy)

	2010[1]	2015	2020	2025	2030	2035
Imported[2]	3,471	6,956	6,956	6,956	6,956	6,956
Groundwater (Potable)[2, 3]	14,280	20,900	20,900	20,900	20,900	20,900
Local Surface[2]	3,237	2,000	2,000	2,000	2,000	2,000
Non-Potable[4]	73	100	100	100	100	100
Total Supply	**29,952**	**29,952**	**29,952**	**29,952**	**29,952**	**29,952**
Total Demand[5]	**22,453**	**22,453**	**24,038**	**25,194**	**26,253**	**27,500**

1. 2010 values are actual supply and demand
2. Equal to average production or purchase from the ten year period of 2000-2009
3. Total production projection for Chino Basin and Six Basins. Does not include Spadra Basin
4. Equal to existing non-potable demand and includes recycled water and Spadra Basin production
5. Assumes 2009 demand is constant through 2015, then increases in-line with 2001 SCAG growth projection rate

Figure 15: Annual Supply Versus Demand Projections



1. Non-potable water supply projections are too low to be visible at this scale (100 afy).
2. 2010 is actual production and demand without additional available supply above demand.
3. This baseline projection does not include conservation.

Chapter 3 Options

Options for altering or building upon the baseline scenario projections described in Chapter 2 are identified and characterized in Chapter 3. The options identified are not meant to be stand alone full water supply strategies but rather specific projects or programs that could be developed within each water resource category such as imported, recycled, local surface, ground, and conserved water supplies.

As part of the IWSP process, a comprehensive list of potential project options was developed. These options were then screened down to consider only those that are viable for inclusion in larger full system alternatives. The following sections provide a description of the City's supply and demand management options as well as a description of the methodologies used to obtain the options and the results of the options screening.

3.1 Options Identification and Screening

The options identified and described in this section may result in an increase, decrease or maintenance of baseline supply levels from each of the City's potential resources. Given that there are several neighboring agencies that have expressed an interest in a possible project with the City, the water resources options identified may also provide opportunities for the City to leverage its water assets.

The goal of the options identification process is to be thorough and allow for all potential projects or ideas to be identified and considered in the IWSP. As a result, a lengthy list of options was compiled and reviewed. A three step screening process was applied in order to remove any options that should not be considered further given that they did not meet basic threshold criteria. These steps are detailed in the following sections.

3.1.1 Initial Options List

An initial list of options was identified from review of previous studies on the region's water supply, discussions with City staff, discussions with neighboring agency staff, and project team ideas. The water supply studies reviewed by the project team include:

- Regional Water Transfer Conceptual Alternatives (2002)
- 2005 & 2008 (updated) Urban Water Management Plan (UWMP)
- Recycled Water Master Plan (RWMP) (November 2009)
- Pedley Filter Plant Feasibility Study (April 2009)

The list of options was further enhanced after discussions with City staff and neighboring agencies such as City of Upland, WVWD, RWD, TVMWD and Cucamonga Valley Water District (CVWD). Additional new options developed by the IWSP project team were added to the list. This identification process yielded over 60 unique options that were then divided into imported water, local surface water, groundwater, recycled water and conservation options. Given the length and content of the initial options list, it was determined that the team should implement a screening process to further focus the list. **Figure 16** is a flow chart of the general options development process.

3.1.2 Screening Process

The options screening process was implemented in three steps, or levels, summarized in **Table 23**.

Figure 16: Options Development Flow Chart

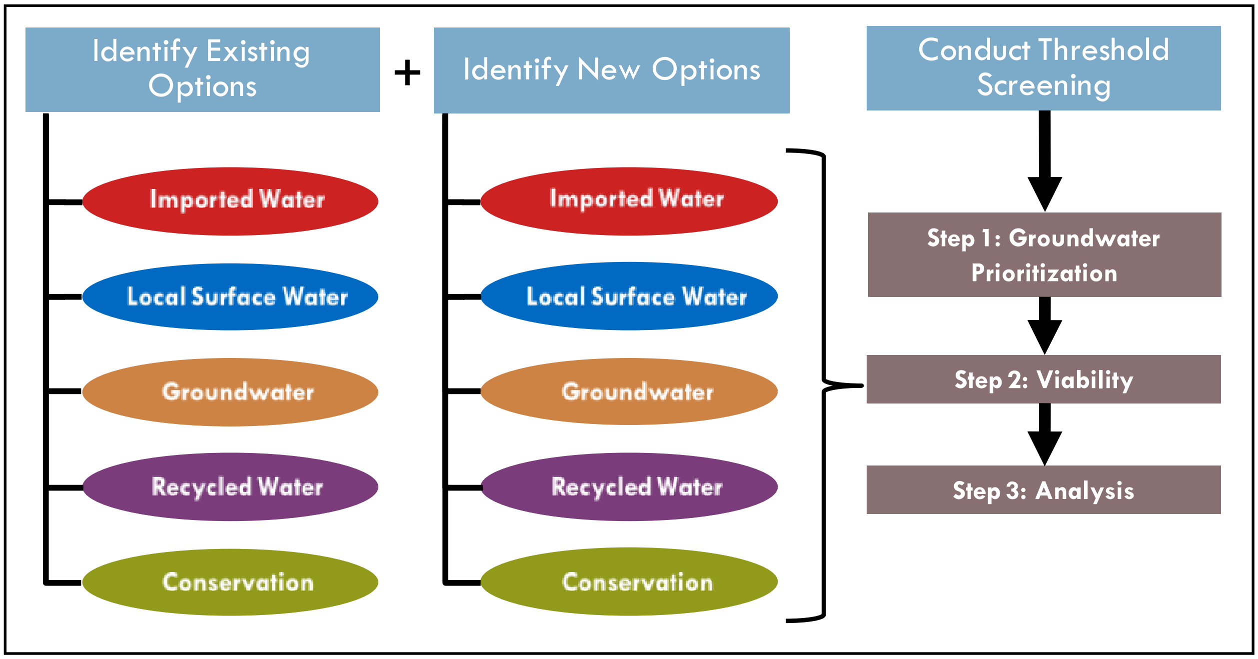


Table 23: Options Screening Levels

Level 1 **Groundwater Prioritization**	**Level 2** **Viability**	**Level 3** **Analysis**
Includes groundwater production options that use: • Existing facilities with available life that are not currently in use • Existing facilities that could be optimized • New or replacement wells in areas not requiring treatment • New or replacement wells in areas where production could be increased, but treatment is required *Includes groundwater recharge options that use:* • Existing wells that might be used as ASR wells • Existing areas that could be used for recharge via surface spreading	*Removes any option that is:* • Already assumed for baseline • Not technically or institutionally feasible • Not a long term option (opportunistic) • Contrary to City's goals o No sale of assets o No increased reliance on imported water	*Narrows to best options within a subcategory based upon:* • Quantity • Quality • Sustainability • Adaptability/Flexibility • O&M needs

- **Step 1 Groundwater Prioritization:** Given the numerous groundwater wells and facilities owned by the City, it was not feasible to consider individual options for each facility. The Level 1 screening occurred during the initial list development so as to only list options that could be used to maximize the City's pumping right in the most cost-effective way. Although specific costs were not developed for each option, the project team's experience was able to determine which well facilities would most likely to be cost-effective opportunities for the City. The options that made it through the Level 1 screening generally focused on existing facilities that can be optimized, if possible, as opposed to new facilities, which will require additional study.
- **Step 2 Viability:** The project team consulted the City staff on specific concepts or goals that needed to be met by each option in order for it to even be considered further. The resulting "viability" criteria were applied to the project list and several options were screened out. These criteria are described below.
    - Already assumed in the baseline: Some options identified in previous studies may have already been implemented by the City or are just a slight variation of what is already in the baseline analysis.
    - Not technically or institutionally feasible: Some options were already known to be infeasible either technically or given institutional constraints.
    - Not a long-term option: Some options identified couldn't be implemented within the IWSP's planning horizon (2035) or are opportunistic management strategies that would only occur under temporary conditions and could not be considered as a long-term option.
    - Contrary to City's goals: Some options did not meet two main goals of the City identified by staff: 1) no increased reliance on imported water and 2) no permanent sale of City assets.
- **Step 3 Analysis:** Since a significant number of options still remained, a final screening step was necessary. However, in order to ensure that good options were not discarded too early in an effort to narrow the field, some level of analysis was conducted for each of the remaining options after the Level 2 screening. Given that these options are not to be considered as stand-alone alternatives, the project team carefully selected criteria that could be used in advance of a full alternative evaluation. Each option was then considered relative to these select criteria to determine if some of the options that were closely related could be reduced to only the best example of that group. The criteria used for the Level 3 screening are show in **Table 23**.

3.2 Feasible Options

The options that were analyzed as part of the Level 3 screening are described in this section and presented in tables in **Appendix D** for each of the five resource types: groundwater, local surface water, imported water, recycled water, and conservation. These options are described and then analyzed using the Level 3 screening criteria. As a result, the following information was developed for each alternative.

- **Facilities:** Lists the basic existing or new facilities that will be required for the option to be realized
- **Quantity:** Describes the rough estimate (or range) of change in supply that would result if the option were implemented
- **Quality:** Describes the quality of the supply and any potential limitations this will put on the use of the supply
- **Sustainability:** Describes considerations that may impact the long term reliability or ability to sustain the production of the supply

- **Adaptability/flexibility:** Describes the ability of the project to be phased, scaled or altered as necessary to meet the potential range of demands in the future
- **Operations and maintenance:** Describes the specific O&M needs that should be considered in the implementation of the option
- **Considerations and screening results:** Describes other notable considerations such as major issues, ties to other options, required partnerships and then whether the option should be kept or screened out based on these considerations.

3.2.1 Groundwater

Groundwater options were developed with a focus on maximizing basin production up to the City's groundwater rights. With this goal in mind, options were developed for each of the basins where the City has rights and current facilities - Chino Basin, Six Basins and Spadra Basin. These groundwater options are shown in **Appendix D's Table D-1**. Generally these options fall into the categories that would increase production or maintain/reduce current production. Increasing production would allow for a greater water supply, and would allow for the phasing of projects to meet changing demand. Maintaining current or reducing production would allow for revenue generation through the leasing of rights or selling of supplies, or would allow for greater reliability of supply through the storage of water in groundwater basins.

Chino Basin

Chino Basin options were first divided into those that increase production with treatment, increase production without treatment, and maintain or reduce production levels. Options which increase production involve either rehabilitating or modifying existing wells or the replacement of existing non-functioning wells. Wells that produce supplies requiring treatment in the area generally have issues with Chromium VI, nitrate, perchlorate and/or VOCs, and could possibly be treated at the existing AEP or through wellhead treatment. It should be noted that in combination, all options listed under Chino Basin options in the options list in **Appendix D's Table D-1** that increase production will exceed the City's average Chino Basin right of 16,900 afy.

Options which maintain or reduce production involve either the lease of rights to neighboring water districts or utilization of groundwater storage. The lease of rights to neighboring water agencies would decrease the amount of water the City could draw from the basin, but would also provide revenue for the City. Utilization of groundwater storage would allow for a more sustainable water supply in times of drought but since these storage options are opportunistic and would be employed as temporary measures based upon current conditions, it is advised that they be screened out for further analysis in the IWSP.

Six Basins – Pomona Basin (Palomares Cienega area)

Since Pomona's production areas within the Six Basins do not have the same issues or opportunities, the options developed for increasing the production in these areas were developed separately. Options for the Palomares Cienega portion of the Pomona Basin are first divided into those which will increase production in the area, or will lease rights to other water agencies. There are several options for increasing production which involve both existing and new wells.

The Palomares Cienega area has known water quality issues with high nitrate, perchlorate and VOC levels, meaning all options to increase production in the area will require a treatment or blending component. The area is, however, advantageous for production given that the groundwater table can be high and it is proximate to many existing facilities and neighboring agency facilities.

The supplies produced in this area could either be used for the City itself or be leased for use by neighboring agencies. Previous regional supply analyses have identified this area as a potential source of supply for agencies like WVWD or RWD since it could be routed into the PWRJWL line. The option to lease rights or sell supplies would allow these agencies to pay for the production, treatment and use of supplies still owned by the City. Any projects that would require the use of increased rights in the basin, could be considered as a "Special Project" under the terms laid out in the Six Basins adjudication agreement.

Six Basins – Pomona Basin (North Pomona area)

North Pomona area options apply to the northern portion of the Pomona Basin of the Six Basins. This area has deep groundwater levels, which do not make it an ideal location for constructing new production wells. Instead, options have been considered which would rehabilitate the Pomona Spreading Grounds.

The option to reduce pumping in this area was also identified. This option would involve increasing pumping in another portion of the basin where groundwater levels are shallower in order to reduce overall pumping costs.

Six Basins – Claremont Heights Basins

Options for the Upper and Lower Claremont Heights Basins are divided into those that increase production in the area, or decrease production through the lease of pumped water or rights. These basins are not currently used to a large extent by the City, but can supply high quality water that doesn't require treatment. Current wells could be reactivated or replaced to increase production, though there is a small area with nitrate issues that would require blending or treatment.

Options which would maintain or decrease production in the Claremont Heights Basins involve either selling pumped water to other pumpers or leasing City water rights. The City has the capability to pump up to its water right and sell the surplus water to other pumpers in the region, or simply lease its unused right to other pumpers. It may also be possible for the City to pump more than its right in the basin, but lease water from other pumpers to reduce the cost of makeup water.

Spadra Basin

Spadra Basin options are grouped into those options that increase production for non-potable use, and options that treat the water for potable use. Options that increase production for non-potable use involve installing new wells. Options that involve treatment of the groundwater will either use blending or desalter facilities to bring the water to potable standards.

3.2.2 Local Surface Water

Local surface water options are divided by how the PFP would be used. The spectrum of options shown in **Appendix D's Table D-2** ranges from completely shutting the PFP down to significantly expanding the plant. These options are described further here.

No Pedley WTP

Options that involve shutting down the PFP are divided into those that use the local surface flows for recharge (to be coupled with expanded groundwater production); treat the surface flows elsewhere for direct use or lease surface rights to neighboring water agencies. Recharging the raw water would allow for more flexibility in terms of storage and would allow the City to maintain the use of the water rights. Leasing the rights to neighboring water districts would create a revenue stream that may be used for other projects. The City may also choose to treat the water from San Antonio Canyon at TVMWD's Miramar treatment plant to allow it to use the water immediately.

Same Pedley WTP

Options that involve using the PFP while maintaining its current plant capacity are divided into three categories: maintaining the current operating conditions, implementing process upgrades, or raw water blending. The option list includes maintaining baseline operations that will restrict production to its current annual average of 4 mgd. Although the PFP's current production is mainly supply limited, there are, however, process upgrades or blending options that could be made to capture seasonal turbid supplies currently going untreated.

Expanded Pedley WTP

Options that expand the capacity of the PFP to 6 mgd and 10 mgd are also listed. The process upgrade options came primarily from the PFP Feasibility Study completed in 2009. Capacity upgrades are, however, irrelevant unless they are coupled with methods for increasing average monthly supplies available for treatment going into the PFP. Options for obtaining incremental supplies to meet a 6 mgd or 10 mgd capacity involve the use of seasonal storage, untreated imported water, or further routing of storm flows to PFP.

3.2.3 Imported Water

Imported water options shown in **Appendix D's Table D-3**were developed with the with the goal of not increasing the City's purchases of and reliance upon imported water, while at the same time providing regional benefits through the leasing of supplies and increasing system flexibility.

Same Purchase

The City is not currently purchasing its full Tier 1allocation of imported supply due to both decreased demand and to avoid incurring MWD's DYY and WSA program penalties; however, the supply still is made available for its use if the City chooses. The majority of current imported purchases are routed through the PWRJWL line to blend with lower quality groundwater supplies for use by the City. The City could opt to continue this purchase and either use the supplies or lease them to RWD or WVWD if coupled with other options that would replace these supplies. The City could also opt to instead purchase raw imported supplies, in lieu of treated supplies, and treat the supplies at the PFP (if coupled with the appropriate local surface water option).

Decrease Purchase

An option to lease the City's allocations of imported water to neighboring agencies is also listed.

3.2.4 Recycled Water

The City is not fully utilizing its available supply of recycled water from the PWRP. As a result, the City developed a Recycled Water Master Plan in 2009 to provide several non-potable reuse options to meet potential non-potable demands. The IWSP project team also explored the potential for indirect potable reuse options through groundwater recharge of recycled supplies as well as the leasing of those rights at PWR. These options are listed in **Appendix D's Table D-4**.

Non-Potable Reuse

Non-potable reuse (NPR) options were developed using the recommended alternative from the City's RWMP to create three levels of implementation. The options that involved the use of extra recycled water supplies from the Inland Empire Utilities Agency were disregarded in the IWSP given that those supplies are no longer considered viable by the City.

City staff provided feedback that the recommended NPR project described in the RWMP was no longer feasible given changes to potential customers and other modifications that were needed to the 2009 RWMP. It was also determined that Segment 1 should not be included because it would serve customers outside of Pomona's service area and would therefore not contribute to meeting City demands. To redefine the project, a review of the City's projected non-potable supply surplus was conducted and is summarized in **Table 24**.

The redefined NPR project was created by removing customers no longer operating in the City and re-evaluating the total demands that could be assigned to each of the segments identified in the RWMP. The resulting option includes implementation of the recommended segments 7 and 9 as proposed in the

RWMP with slight modification to segment 9, in addition to development of segments 2, 3, 4, and 6 with the addition of Braun Linen Service. Segment 9 was modified after discussion with the City to remove customers at higher elevations which would result in increased pumping costs. **Table 25** shows the redefined NPR option, along with the incremental cost of implementing each segment.

Table 24: Non-Potable Supply Availability

	Average Annual (afy)	Maximum Monthly (mgd)
Non-potable Available Supply (PWRP & Spadra Basin)	**7,000**	**7.0**
Existing Pomona Demand (Current)	96	0.3
Existing Pomona Demand (Additional Future)	0	0
Existing Export Demand (Current)	2,095	4.0
Existing Export Demand (Additional Future)	645	0.7
Total Existing System Demand (Current and Future)	**2,836**	**4.97**
Surplus Non-potable Supply	**4,164**	**2.03**

Table 25: Redefined In-City Recycled Water Expansion Option

NPR Segment from Pomona RWMP	Average Annual Demand (afy)	Unit Cost ($/afy)	Cumulative (afy)	Cumulative Unit Cost ($/afy)
Segment 7	210	$3,444	210	$3,444
Segment 9	239	$1,443	449	$2,379
Segment 2	107	$2,655	556	$2,432
Segment 3	282	$3,060	838	$2,643
Segment 4a	135	$2,144	973	$2,574
Segment 6 (Braun Linen Service connect onto Segment 6 instead of Segment 5)	550	$1,088	1,523	$2,207
Total	**1,523**	**$2,207**	**-**	**-**

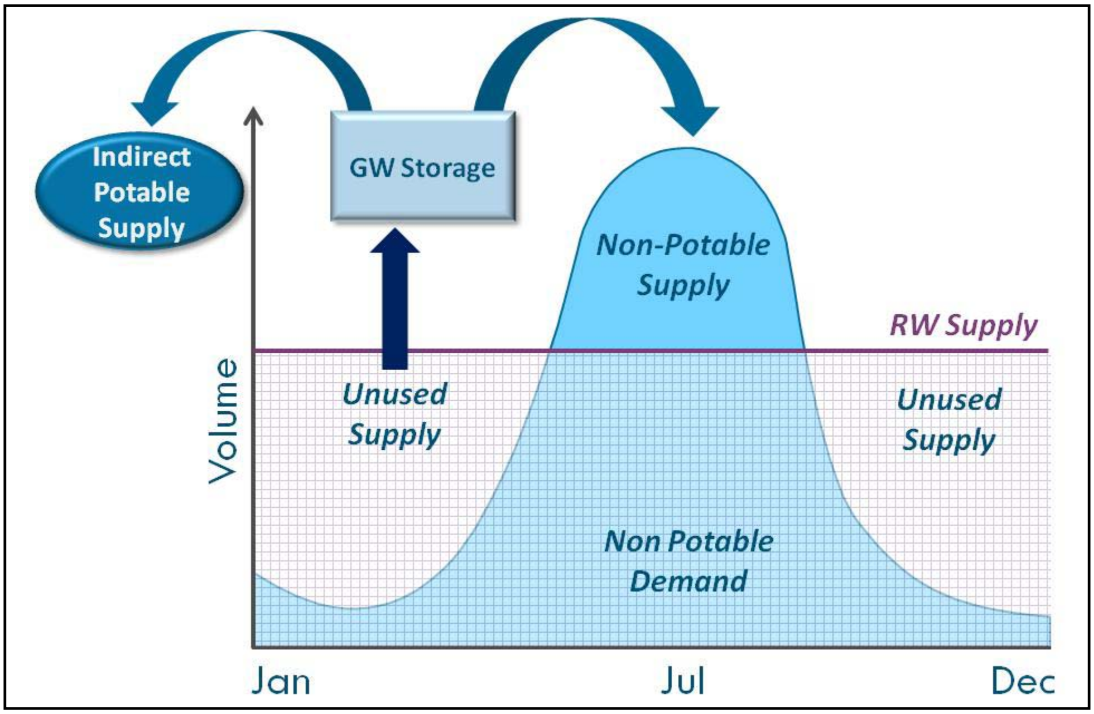
At about 1,500 afy, the redefined recommended NPR recycled water alternative will deliver enough supplies to meet summer peak demand and will not require supplemental potable supplies. All of the City's remaining recycled water allocation from PWRP will be available for lease/use to downstream agencies. Pomona would continue to supply non-potable supplies from Spadra Basin as well as flows from the PWRP to existing export customers – projected to be 2,740 afy given an anticipated increase in future demand (see **Table 24**).

Indirect Potable Reuse Through Groundwater Recharge

According to the 2009 RWMP, implementation of the full NPR system would require supplemental supplies to meet peak demand in summer months. **Figure 17** shows a typical supply and demand profile for recycled water where the constant supply is in excess of demand in winter and insufficient to meet demand in the summer. By storing surplus winter supplies in groundwater basins, the resource is conserved and becomes available as an indirect potable supply or a supplement to the non-potable supplies delivered in the summer.

Groundwater recharge using recycled water can be done either though spreading or through injection, however, the permitting requirements differ and therefore the amount of surface or imported blending water differs. There are also options as to what level the recycled supply should be treated either through tertiary treatment or through advanced treatment. The options also considered the areas most feasible for groundwater recharge. All indirect potable reuse options presented would need to be coupled with a complementary groundwater option to pump the new supply back out of the basin for use, as well as sufficient blend water.

Figure 17: Recycled Water Supply and Use During Peak and Non-Peak Months



Sell/Lease Recycled Water Allocation

The City also has the option of leasing its recycled water allocation to neighboring water districts. The allocation could be leased either to WVWD (who has the other 30% allocation at PWRP) or to agencies downstream of the PWRP outfall. Agencies operating within the Central Basin area are also exploring options for increasing groundwater recharge and how to amass more supply at other SDLAC operated plants downstream of PWR.

3.2.5 Conservation

For the IWSP, conservation is considered a form of supply (conserved supply) so that it can be evaluated as part of full water resource alternatives implemented to meet overall projected demand. The conserved supply options shown in **Appendix D's Table D-5** are based on different levels of generic conservation program packages that the City could implement. The actual programs identified as part of the options listed in the IWSP are somewhat interchangeable to get to the volumes of conserved supply typified by each option and are not selected or detailed as part of the IWSP.

Level 1

The Level 1 option sets a goal of maintaining the 2007 gallons per capita day (gpcd) by continuing with the City's current conservation program. This will assume that the abnormally low demands of the past two years would eventually be reversed once the economic conditions are improved and normal climate patterns return. This level of conservation however will not meet Water Conservation Act of 2009 conservation goals so would need to be combined with a recycled water option that would increase non-potable use.

Level 2

The Level 2 option was developed to provide enough conserved supply to be able to meet the projected conservation targets that are described in the City's 2010 Urban Water Management Plan regardless of recycled water use. This option would need to use additional conservation programming to "replace" some of the unintentional demand reductions experienced over the past two years with programs that will ensure that the Water Conservation Act of 2009 targets identified can be met in 2015 and 2020. **Table 26** shows the potential projects and associated water savings to be included in the Level 2 conservation programming option.

Table 26: Conservation Program

Conservation Project	Potential Water Savings[1]
Automatic meter reading (AMR)/Advanced metering infrastructure (AMI) phased project	Savings not quantified
Outdoor water surveys for single family customers with weather based irrigation controllers and nozzle give-a-ways	37 gpd per WBIC 12.2 gpd per outdoor survey
Residential plumbing retrofits	5.2-5.8 gpd per showerhead 1.5 gpd per aerator 4.2 gpd per toilet dam
System water audits, leak detection, and repair	Variable
Large landscape conservation programs and incentives	19-35% savings
Turf removal rebates	Up to 70% savings per household
High efficiency washing machine rebate program	14.4-28.7 gpd per machine (single family) 53.8-107.7 gpd per machine (multi- family)
School education	Savings not quantified
Public education	Savings not quantified
Advertising	Savings not quantified

1. California Urban Water Conservation Council BMP Costs and Savings Study (A&N, 2005)

Level 3

The Level 3 option sets a goal of maintaining the current 2009 per capita demand since it is actually lower than what would be required by conservation targets. This option will offset the largest amount of water supply and will be highly flexible. The Level 3 option would include the conservation program described under Level 2, but with the expectation that the projects would be expanded to include more customers.

Chapter 4 Alternative Development and Evaluation

The alternative development and evaluation process described in this section builds upon the baseline analysis and the options identification and screening. The process includes the following steps:

- Determine initial guiding assumptions for alternative development (Section 4.1.1)
- Create an initial alternatives list (Section 4.1.2)
- Review and modify initial assumptions and alternatives list (Section 4.1.2)
- Develop detailed descriptions of remaining alternatives (Section 4.2)
- Evaluate final alternatives list (Section 4.3)

4.1 Alternative Development

4.1.1 Initial Alternatives Development

To begin compiling the options described in Section 3 into full alternatives, the following assumptions developed by City staff and the IWSP project team were applied:

- All alternatives will assume 5,000 afy of imported water in order to meet blending requirements and to maintain a certain level of Tier 1 allocation over the 10-year rolling average used by TVMWD.
- All existing City Six Basin groundwater rights will be maximized prior to Chino Basin, and the well options prioritized according to the method described in Section 3.
- All alternatives will use the same level of conservation – which is sufficient to meet Conservation target requirements as defined in the City's 2010 Urban Water Management Plan (initially roughly estimated as 2,000 af).
- The groundwater recharge with recycled water option would not be considered further given that sufficient supplies of proximate blend water could not be identified.
- The highest capacity option for the PFP expansion will be 6 mgd given the lack of local surface flows available for routing at a reasonable cost for treatment at the PFP.

Using these basic assumptions, an initial list of alternatives was developed to meet the 2035 demand of 27,500 afy. Supply volumes for each source were determined as well as relative unit costs to supply those volumes. Any of the City's remaining rights not included in the alternatives were assumed to be available for regional supply. The build-up of each alternative began with those components that were static in all alternatives - treated imported water and conservation. This base was then built upon using the variable options of local surface water and groundwater. Since further development of the City's recycled water system was limited to only one feasible option, it was included as an extra option to each alternative. Therefore, each alternative developed had a basic version without NPR and one with NPR. The initial 14 alternatives and the process used to develop these alternatives are described here.

Addition of Local Surface Water Options

Once the base was developed with treated imported water and conservation, alternatives were structured around seven local surface water options that centered on the sizing and operation of the PFP. These options were:

- **No Pedley 1:** Decommission the PFP and negotiate a long-term lease of the entire local surface water supply with neighboring agencies.
- **No Pedley 2:** Decommission the PFP and route all raw local surface supplies to Pomona Spreading Grounds for Six Basin spreading credits.

- **No Pedley 3:** Decommission the PFP and route all raw local surface supplies to TVMWD for treatment at their Miramar WTP.
- **Same Pedley 4:** Maintain current PFP operations, including the current replenishment of 500 afy of local surface supplies at Pomona Spreading Grounds.
- **Mid Pedley 5:** Maximize the current PFP through process upgrades to allow it to operate at its maximum capacity of 4 mgd. This option requires an augmentation with 1,500 afy of raw imported water, but eliminates current replenishment of 500 afy in Six Basins. Total imported water purchases would equal 6,500 afy.
- **Big Pedley 6:** Increase the capacity and production of the current PFP facility to 6 mgd. This option requires augmentation with 3,500 afy of raw imported water and eliminates any replenishment at Pomona Spreading Grounds. With the additional raw imported water, total imported water purchases would be 8,500 afy
- **Big Pedley 7:** Increase the capacity and production of the current PFP to 6 mgd. Like Big Pedley 6, this option requires augmentation with 3,500 afy of raw imported water and eliminates any replenishment at Pomona Spreading Grounds. In difference to all previous alternatives, this alternative would instead purchase only 1,500 afy of treated imported supply equaling 5,000 afy of total imported supply.

Addition of Six Basins Options

Once a PFP option is in place, it could be seen how much groundwater would be necessary to meet the projected demand of 27,500 afy under each alternative. The amount of groundwater supplied in a given year is very flexible since wells can be readily turned off or on and pumped at a variety of rates. This flexibility will afford the City the ability to respond to annual fluctuations in supplies – but the longer-term groundwater supply options developed here are based upon average operations and will help guide decisions on future investments.

The Six Basins options were prioritized into three stages of incremental supply to take full advantage of the City's average pumping rights (assumed to be 4,000 afy) plus those options where spreading credits are generated through groundwater recharge. An additional 1,700 afy of groundwater cold also be made available through the construction of a Special Project in the Palomares Cienega area that is assumed to not count against pumping rights. These stages of groundwater use were developed as follows:

- **Baseline (Stage 1):** Baseline facilities using existing wells to yield 4,000 afy (Wells 3, 7, 8b, 9b, 13, 37, and TW-1 through TW-4)
- **Stage 2:** Maximize production at Wells 9b and 32b to yield an additional 750 afy. This stage requires replenishment of 750 afy at the Pomona spreading grounds, which is about 250 afy more than current average of 500 afy.
- **Stage 3:** Maximize production at Wells 7, 8b, 13, 37 and TW-1 through TW-4, and rehabilitate and activate Well 20 to yield an additional supply of 1,750 afy in addition to Stage 2. This stage requires a total replenishment of 2,500 afy at the Pomona Spreading Grounds.
- **Stage 4:** Construct a Special Project in which three wells would be built in the Palomares Cienega area to pump and then treat water previously unavailable for use given high contaminant levels. The 1,700 afy of supply generated is assumed to not impact Six Basins water rights use.

As noted above, Stage 1 is baseline and, therefore, was assumed to be in place in every alternative. Stages 2 and 3 require additional replenishment at the Pomona spreading grounds with any local surface water rights maintained by the City, but not treated at the PFP. Therefore, Stages 2 and 3 can only be used with the No Pedley 2 and Same Pedley 4 options.

Addition of Chino Basin Options

Similar to Six Basin options, Chino Basin options were divided into incremental stages of groundwater use to take advantage of the City's average water right of 17,600 afy. There is one further stage of groundwater development past the baseline that was identified so as not to exceed the City's rights. There were no options considered for the Chino Basin that would use replenishment supplies to further increase pumping in the basin because there were no local surface or recycled water supplies that could cost-effectively be used.

- **Stage 1:** Baseline facilities using existing wells and treatment facilities to yield 16,900 afy.
- **Stage 2:** Rehabilitate Wells 27 and 30 to yield an additional 700 afy.

Non-Potable Reuse Option

For the initial alternative development, selected segments from the City's 2009 RWMP were used as the only non-potable option. The recommended project includes segments 2, 3, 4, 6, 7, and 9, plus Braun Linen Service with a total estimated supply of 1,500 afy. If this option is included in an alternative it results in a reduction in groundwater supplies since imported water, conservation, and local surface water were already determined for each alternative.

4.1.2 Initial Alternatives and Modifications

As a result of the steps outlined above, an initial list of 14 general alternatives (with general supply levels) were compiled as shown in **Table 27.** This list and the guiding assumptions were reviewed by City staff and discussed at an alternatives development workshop.

Table 27: Alternative Supplies to Meet Projected City Demand of 27,500 afy (afy)

Alternative	Treated Imported	Raw Imported	Conser-vation	Local Surface	NPR	Six Basins	Chino Basin
No Pedley 1	5,000	0	2,000	0	0	4,000	16,500
No Pedley 1 (NPR)	5,000	0	2,000	0	1,500	4,000	15,000
No Pedley 2	5,000	0	2,000	0	0	6,500	14,000
No Pedley 2 (NPR)	5,000	0	2,000	0	1,500	6,500	12,500
No Pedley 3	5,000	0	2,000	2,500	0	4,000	14,000
No Pedley 3 (NPR)	5,000	0	2,000	2,500	1,500	4,000	12,500
Same Pedley 4	5,000	0	2,000	2,000	0	4,500	12,500
Same Pedley 4 (NPR)	5,000	0	2,000	2,000	1,500	4,500	11,000
Mid Pedley 5	5,000	1,500	2,000	2,500	0	4,000	12,500
Mid Pedley 5 (NPR)	5,000	1,500	2,000	2,500	1,500	4,000	11,000
Big Pedley 6	5,000	3,500	2,000	2,500	0	4,000	10,500
Big Pedley 6 (NPR)	5,000	3,500	2,000	2,500	1,500	4,000	9,000
Big Pedley 7	1,500	3,500	2,000	2,500	0	4,000	14,000
Big Pedley 7 (NPR)	1,500	3,500	2,000	2,500	1,500	4,000	12,500

As a result of City staff input at this workshop, several key changes to the initial assumptions and 14 alternatives were determined, and the following modifications to the alternatives shown in **Table 27** were made:

- **Limiting treated imported water to 1,500 afy:** It was decided that maintaining 5,000 afy of treated imported supply was unnecessary given the availability of a variety of local supplies at lower costs and greater reliability.
- **Refining conservation option:** It was determined that the conservation option should be held to the minimum needed to meet the Water Conservation Act of 2009 requirements. This is equated to 7 gallons per capita per day (gpcd) or an estimated 1,500 afy (down from the overly conservative 2,000 afy). It was also determined that at least one alternative would be modified to remove the conservation option for comparison purposes. The conservation program selected is described later in this section.
- **Further refinement of individual values for groundwater supplies:** Once the other supplies were defined, then the remaining groundwater supply needed was divided between Six Basins and Chino Basin to optimize the alternatives.
- **Removal of alternatives from further consideration:** Three alternatives were also removed from further consideration for the following reasons:
    - **No Pedley 1:** The City decided that is does not want an option that will render the PFP unusable in the future. Since the City maintains its water rights under No Pedley 2, the ability to again route flows through the PFP would be available for the City at any time in the future and was kept.
    - **No Pedley 3:** The City is not interested in decommissioning the PFP and then paying for treatment at TVMWD's Miramar WTP.
    - **Big Pedley 6:** Big Pedley 7 is similar to Big Pedley 6 but is more in-line with the decision to reduce the treated volume to 1,500 afy.

Refined Conservation Option

A conservation option of 1,500 afy was included in all of the final alternatives except for a variation on Mid Pedley 5 that was developed for comparison purposes. As part of the City's 2010 Urban Water Management Plan update process, a year 2020 demand reduction target of 141 gpcd was determined to be necessary for compliance with requirements. However, when compared to the City's 2007 gpcd of 148 gpcd, a decrease of 7 gpcd would be necessary. It is assumed that given the recent decrease in demand due to the economic downturn and drought patterns, the more recent demand pattern was artificially low and that 2007 presented a more realistic picture of normal use that would likely be re-instated once the economy turns around.

To be conservative, the 7 gpcd was assumed – which translated to about a 1,500 afy demand reduction (based upon an assumed projected average population of 200,000). To meet the 1,500 afy reduction target, the Level 2 program option described in Chapter 3 is assumed.

4.2 Final Alternative Descriptions

After the modifications to assumptions and alternatives were completed, a final list of alternatives was crafted for more detailed development. A summary of these alternatives is shown in **Table 29** and **Figure 18.** The cost of each alternative was also estimated along with the potential revenue that could be generated by the City if they produced and sold or leased any unused water rights for regional use. **Appendix F** shows a more detailed break-down of each alternative's supplies and estimated unit costs.

Table 28: Final Alternative Supplies to Meet City Demand (afy)

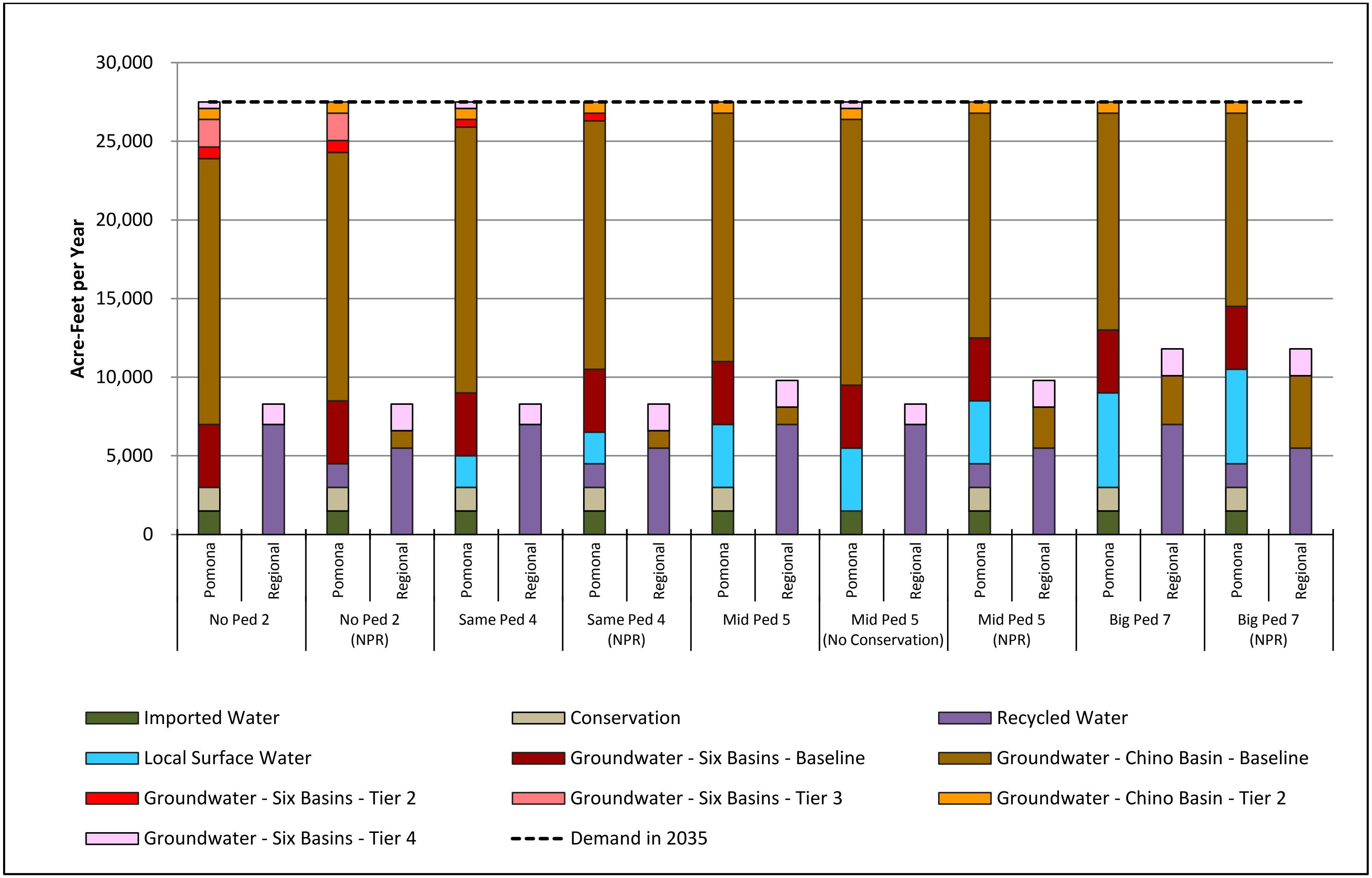
Alternative	Treated Imported	Raw Imported	Conser-vation	Local Surface	NPR	Six Basins	Chino Basin
No Pedley 2	1,500	0	1,500	0	0	6,900	17,600
No Pedley 2 (NPR)	1,500	0	1,500	0	1,500	6,500	16,500
Same Pedley 4	1,500	0	1,500	2,000	0	4,900	17,600
Same Pedley 4 (NPR)	1,500	0	1,500	2,000	1,500	4,500	16,500
Mid Pedley 5	1,500	1,500	1,500	2,500	0	4,000	16,500
Mid Pedley 5 (NPR)	1,500	1,500	1,500	2,500	1,500	4,000	15,000
Mid Pedley 5 (no conservation)	1,500	1,500	0	2,500	0	4,400	17,600
Big Pedley 7	1,500	3,500	1,500	2,500	0	4,000	14,500
Big Pedley 7 (NPR)	1,500	3,500	1,500	2,500	1,500	4,000	13,000

4.2.1 Overall Assumptions

The final list of alternatives uses many assumptions to determine their system functionality, supply volumes and estimated costs. Each alternative would be fully implemented by 2035 and therefore, the assumptions and descriptions relate to the full alternative as it would be in 2035. The following overall assumptions apply to all of the major alternatives:

- **Volume of Treated Imported Water:** Each water supply alternative assumes an average annual import volume of 1,500 afy of treated imported water, purchased from TVMWD through existing turnouts. 1,500 afy is the anticipated volume required to maintain the existing blending operation at Reservoir 5 located at Interstate 10 and Towne Avenue. This blending operation currently provides nitrate reduction for Six Basins groundwater, to reduce nitrate levels below the California drinking water MCL of 45 mg/L as NO_3.
- **Chino Basin Existing Production and Water Right:** All of the alternatives assume that the baseline production capability for Chino Basin is 16,900 afy. The baseline consists of the annual average production from fiscal year 2008/2009 (13,700 afy) plus an additional 3,200 afy of production that is projected to be made available once the perchlorate treatment facility is added to the AEP. It is projected that the perchlorate treatment facility will go on-line in late 2012. The baseline is defined as the average annual production in Chino Basin that can reasonably be anticipated from the available water production facilities as they will exist in 2012. The anticipated Chino Basin production for 2035 varies between alternatives, but all alternatives assume an available Chino Basin water right of 17,600 afy. This basin right varies from year to year, but 17,600 afy is considered a long-term average based on the current adjudication within the Chino Basin Watermaster.
- **Six Basins Existing Production and Water Right:** All of the alternatives assume that the baseline production capability for Six Basins is 4,000 afy which is Pomona's current water right for Six Basins. The anticipated Six Basins production for 2035 varies between alternatives, but all the alternatives assume a minimum production of 4,000 afy. Any amount of 2035 production above 4,000 afy is assumed to require the same amount of replenishment water at the Pomona Spreading Grounds. As an example, an alternative with 4,500 afy of Six Basins production would require 500 afy of replenishment water to be spread at the Pomona Spreading Grounds. The exception to this rule is that the 1,700 afy of water made available by the Palomares Cienega Special Project option, consisting of new wells and treatment in North Pomona, would not require replenishment. This project is assumed (but not guaranteed) to have special exemption within the

Figure 18: Final Alternatives for City and Regional Use



Six Basins adjudication, based on demonstration of a regional benefit. Regional benefits could include mitigation of shallow groundwater levels beneath homes and other structures and/or prevention of potential liquefaction hazards in the event of an earthquake.

- **Imported Water Costs:** Imported water costs for Tier 1 Treated and Tier 1 Untreated water are assumed to increase according to MWD's latest projections as follows: 6% annual increase between 2010 and 2020, and a 3% annual increase thereafter until 2035.
- **Economic Criteria:** The assumed opportunity cost of capital for the City is assumed to be 2.4%[2] which is the current standard rate of return. This percentage is used to convert all costs. The equivalent uniform annual cost in dollars per year (2010 dollars) is then divided by the overall annual yield in afy to obtain a life-cycle cost in dollars per acre-foot for each alternative.
- **Other Cost Assumptions:** More specific cost assumptions can be found in **Appendix G**.

4.2.2 No Pedley 2 Alternative

Description

This alternative consists of discontinuing operation of the PFP, recharging the additional local surface water made available by ceasing local surface water treatment, expanding groundwater production capability in Chino Basin and Six Basins, and implementing new conservation projects within the City. This alternative assumes that the City's purchase of treated imported water is reduced to 1,500 afy. **Appendix H** shows a flow chart of how this alternative changes the baseline system.

Supply Strategy and Facilities

This alternative involves the following water supply strategy to meet projected demand of 27,500 afy:

- **Chino Basin Wells:** 16,900 afy of Chino Basin water is pumped by the City using the existing Chino Basin wells, the AEP, improvements to existing wells, and the perchlorate treatment facility, scheduled to go on-line in 2012. The planned production of 17,600 afy would consist of 16,900 afy using existing wells, the AEP, and the perchlorate treatment facility; and 700 afy of new well production consisting of modifying and rehabilitating Wells 35 and/or 30. The modifications would most likely consist of a liner in Well 30 to mitigate sand production.
- **Six Basins Wells:** The existing baseline production of 4,000 afy is increased to 6,900 afy by implementing the following stages of increased production. The first 2,500 afy increase in pumping right from 4,000 afy to 6,500 afy is achieved by recharging all of the local surface water (or 2,500 afy) routed to the Pomona Spreading Grounds via the Canon Water Line. Further studies as to the ability of the Pomona Spreading Grounds to recharge this volume of water may need to be conducted.
    - *Stage 2* – Increase the utilization of Wells 9b and 32b to achieve an additional 750 afy of production.
    - *Stage 3* – Increase the utilization of Wells 7, 8b, 13, 37, and Tunnel Wells 1 through 4 to achieve an additional 1,750 afy of production.
    - *Stage 4* – Without the NPR option, No Pedley 2 will need to implement the Special Project to produce an additional 400 afy to fully meet the City's anticipated demand. Given that the project is sized to produce a total of 1,700 afy, the remaining production could be sold as a regional supply.
- **Pedley Filtration Plant:** The PFP ceases operation, and the 2035 production at the PFP is assumed to be zero. The local surface water runoff that flows from San Antonio and Evey canyons into the Canon Water Line is assumed to be recharged at the Pomona Spreading

[2] Percentage per Doug Peterson, City Treasurer and 2010 dollars are used as the basis of comparison since the baseline cost analysis began in 2010

Grounds. It should be noted that since the City maintains its water rights under this alternative, any surface water flows could still be routed to the PFP if the plant is maintained and the City so decides at a later date.

- **Imported Water:** 1,500 afy of treated imported water will be purchased from TVMWD through the existing turnouts. This represents a significant reduction in the average annual volume of the City's baseline treated imported water currently purchased.
- **Conservation:** Pomona would implement 1,500 afy of conservation programs as described in Section 3.2.5.

Non-Potable Option

If the 1,500 afy non-potable option is implemented, then the need for the Six Basins Special Project to meet City demands is removed. Also, 1,100 afy of the Chino Basin supplies produced at the perchlorate facility could be made available for sale by the City for regional supplies.

Yields and Costs

The build-up of supply source yields and total unit costs for this alternative are shown in **Table 29.** A more detailed cost estimate is provided in **Appendix C.**

Table 29: No Pedley 2 Yields and Costs

Supply Source	Yield (afy)	
	No NPR	NPR
Treated Imported Water	1,500	1,500
Untreated Imported Water	0	0
Local Surface Water[1]	0	0
Six Basins Groundwater	6,900	6,500
Chino Basin Groundwater	17,600	16,500
Conservation	1,500	1,500
Non-Potable	0	1,500
TOTAL	**27,500**	**27,500**
Unit Cost	**$406/AF**	**$520/AF**

Note: Local surface water is spread at the Pomona Spreading Grounds so is counted as Six Basins groundwater supply given that it is made available through groundwater pumping.

4.2.3 Same Pedley 4 Alternative

Description

This alternative consists of maintaining the existing production volume at the PFP, expanding groundwater production capability in Chino Basin and Six Basins, and implementing new conservation projects within the City. This alternative assumes that the City's purchase of treated imported water is reduced to 1,500 afy. **Appendix B** shows a flow chart of how this alternative changes the baseline system.

Assumptions

This alternative involves the following water supply strategy to meet the Year 2035 projected demand of 27,500 afy:

- ***Chino Basin Wells*:** 16,900 afy of Chino Basin water is pumped by the City using the existing Chino Basin wells, the AEP, improvements to existing wells, and the perchlorate treatment facility, scheduled to go on-line in 2012. The planned production of 17,600 afy would consist of

16,900 afy using existing wells, the AEP, and the perchlorate treatment facility; and 700 afy of new well production consisting of modifying and rehabilitating Wells 35 and/or 30. The modifications would most likely consist of a liner in Well 30 to mitigate sand production.

- ***Six Basins Wells*:** The existing baseline production of 4,000 afy is kept as well as the additional 500 afy of additional pumping allowed as a result of the 500 afy of spreading credit and 400 afy of "Special Project" pumping, as follows:
    - *Stage 2* – Utilization of Wells 9b and 32b to achieve an additional 500 afy of production.
    - *Stage 4* – Without the NPR option, No Pedley 2 will need to implement the Special Project to produce an additional 400 afy to fully meet the City's anticipated demand. Given that the project is sized to produce a total of 1,700 afy – the remaining production could be sold as a regional supply.
- ***Pedley Filtration Plant*:** The plant continues to operate at its existing long-term average production of approximately 2,000 afy, using local surface water from San Antonio Canyon and Evey Canyon as source water for the plant. The existing plant infrastructure and mode of operation would remain the same.
- ***Conservation*:** Pomona would implement 1,500 afy of conservation programs as described in Section 3.2.5.
- ***Imported Water*:** 1,500 afy of treated imported water will be purchased from TVMWD through the existing turnouts. This represents a significant reduction in the average annual volume of the City's baseline treated imported water currently purchased.

Non-Potable Option

If the 1,500 afy non-potable option is implemented, then the need for the Six Basins Special Project to meet City demands is removed as well as 1,100 afy of the Chino Basin supplies produced at the perchlorate facility could be made available for sale by the City for regional supplies.

Yields and Costs

The build-up of supply source yields and total unit costs for this alternative are shown in **Table 30**. A more detailed cost estimate is provided in **Appendix G.**

Table 30: Same Pedley 4 Yields and Costs

Supply Source	Yield (afy)	
	No NPR	NPR
Treated Imported Water	1,500	1,500
Untreated Imported Water	0	0
Local Surface Water	2,000	2,000
Six Basins Groundwater	4,900	4,500
Chino Basin Groundwater	17,600	16,500
Conservation	1,500	1,500
Non-Potable	0	1,500
TOTAL	**27,500**	**27,500**
Unit Cost	**$412/AF**	**$526/AF**

4.2.4 Mid Pedley 5 Alternative

Description

This alternative consists of increasing production at the PFP with a raw (untreated) imported water supplement, expanding groundwater production capability in Chino Basin and Six Basins, and implementing new conservation projects within the City. This alternative assumes that the City's purchase of treated imported water is reduced to 1,500 afy. **Appendix H** shows a flow chart of how this alternative changes the baseline system.

Assumptions

This alternative involves the following water supply strategy to meet the Year 2035 projected demand of 27,500 afy:

- ***Chino Basin Wells*****:** 15,800 afy of Chino Basin water is pumped by Pomona using the existing Chino Basin wells, the AEP, improvements to existing wells, and the perchlorate treatment facility, scheduled to go on-line in 2012. The planned total production of 16,500 afy includes an additional 700 afy of new well production from modifying and rehabilitating Wells 35 and/or 30. The modifications would most likely consist of a liner in Well 30 to mitigate sand production.
- ***Six Basins Wells*****:** The existing baseline production of 4,000 afy remains at 4,000 afy, and existing well infrastructure in Six Basins is maintained to sustain this level of production. No replenishment water will be made available (and therefore no additional groundwater pumping) since all local surface supplies are to be treated at the PFP.
- ***Pedley Filtration Plant*****:** The existing plant production is increased from 2,000 afy to 4,000 afy by diverting the current 500 afy of surface water currently recharged at the Pomona Spreading Grounds to treatment at the PFP and also by supplementing the PFP with 1,500 afy of raw water purchased from TVMWD and delivered via a new connection to MWD's Rialto Feeder, which is a pipeline located near the PFP. In order to increase production to this level at the PFP, the following process improvements may be necessary:
    - Create a presedimentation basin by partitioning part of the spreading grounds
    - Install new flocculators inside the existing Superpulsator
    - Deepen existing filter beds
    - Install new ultraviolet reactors
    - Upsize inlets to allow for higher flows to enter plant

  As such, the plant's source water would be approximately 63% local surface water and 37% raw water on a long-term average basis. However, the percentage of surface water will fluctuate from year to year based on rainfall and availability of local surface water. During extended dry periods, as much as 100% of the source water for the plant would be supplied as raw water from the Rialto Feeder. Equalization storage is not expected to be necessary as the plant improvements will allow for the treatment of surface water with high turbidity that is currently diverted to the Pomona Spreading Grounds.
- ***Imported Water*****:** 1,500 afy of treated imported water will be purchased from TVMWD through the existing turnouts. This represents a significant reduction in the average annual volume of the City's baseline treated imported water currently purchased. As described above an additional 1,500 afy of untreated imported water will be purchased and delivered through a new connection to the Rialto Feeder.
- ***Conservation:*** Pomona would implement 1,500 afy of conservation programs as described in Section 3.2.5.

Non-Potable Option

If the 1,500 afy non-potable option is implemented, then 2,600 afy of the Chino Basin supplies produced at the perchlorate facility could be made available for sale by the City for regional supplies.

No Conservation Option

If the 1,500 afy conservation and the 1,500 NPR options are not implemented, then the City will need to implement the Six Basins Special Project to meet the extra 400 afy of unmet City demands. All 17,600 afy of supplies from Chino Basin will also be needed, leaving no Chino Basin supplies available for sale or lease by the City for regional supplies.

Yields and Costs

The build-up of supply source yields and total unit costs for this alternative are shown in **Table 31.** A more detailed cost estimate is provided in **Appendix G.**

Table 31: Mid Pedley 5 Yields and Costs

Supply Source	Yield (afy)		
	No NPR	NPR	No NPR, No Conservation
Treated Imported Water	1,500	1,500	1,500
Untreated Imported Water	1,500	1,500	1,500
Local Surface Water	2,500	2,500	2,500
Six Basins Groundwater	4,000	4,000	4,400
Chino Basin Groundwater	16,500	15,000	17,600
Conservation	1,500	1,500	0
Non-Potable	0	1,500	0
TOTAL	**27,500**	**27,500**	**27,500**
Unit Cost	**$443/AF**	**$563/AF**	**$415/AF**

4.2.5 Big Pedley 7 Alternative

Description

This alternative consists of expanding the treatment capacity at the PFP, maximizing PFP production with a raw water supplement, expanding groundwater production capability in Chino Basin and Six Basins, and implementing new conservation projects within the City. This alternative assumes that the City's purchase of treated imported water is reduced to 1,500 afy. **Appendix H** shows a flow chart of how this alternative changes the baseline system.

Assumptions

This alternative involves the following water supply strategy to meet the Year 2035 projected demand of 27,500 afy:

- ***Chino Basin Wells*:** 13,800 afy of Chino Basin water is pumped by the City using the existing Chino Basin wells, the AEP, improvements to existing wells, and the perchlorate treatment facility, scheduled to go on-line in 2012. The total planned production of 14,500 afy includes an additional 700 afy of new well production consisting of modifying and rehabilitating Wells 35 and/or 30. The modifications would most likely consist of a liner in Well 30 to mitigate sand production.

- ***Six Basins Wells*:** The existing baseline production of 4,000 afy remains at 4,000 afy, and existing well infrastructure in Six Basins is maintained to sustain this level of production. No replenishment water will be made available (and therefore no additional groundwater pumping) since all local surface supplies are to be treated at the PFP.
- ***Pedley Filtration Plant*:** The plant is expanded in capacity from 4 mgd to 6 mgd, as described in Alternative 2 of the Pedley Feasibility Study (Carollo, 2009b). In order to increase production to this level at the PFP, the following process improvements may be necessary:
    - Create a presedimentation basin by partitioning part of the spreading grounds
    - Install new flocculators inside the existing Superpulsator
    - Deepen existing filter beds
    - Install new ultraviolet reactors
    - Upsize inlets to allow for higher flows to enter plant

  The plant production would be increased from 2,000 afy to 6,000 afy by diverting the current 500 afy of surface water currently recharged at Pomona Spreading Grounds to treatment at the PFP and also by supplementing the PFP with 3,500 afy of raw water purchased from TVMWD and delivered through a new connection to MWD's Rialto Feeder. As such, the plant's source water would be approximately 42% local surface water and 58% raw water on a long-term average basis. However, the percentage of surface water will fluctuate from year to year based on rainfall and availability of local surface water. During extended dry periods, as much as 100% of the source water for the plant would be supplied as raw water from the Rialto Feeder. Equalization storage is not expected to be necessary as the plant improvements will allow for the treatment of surface water with high turbidity that is currently diverted to the Pomona Spreading Grounds.
- ***Imported Water*:** 1,500 afy of treated imported water will be purchased from TVMWD through the existing turnouts. This represents a significant reduction in the average annual volume of the City's baseline treated imported water currently purchased. As described above an additional 3,500 afy of untreated imported water will be purchased and delivered through the new connection to the Rialto Feeder.
- ***Conservation*:** Pomona would implement 1,500 afy of conservation programs as described in Section 3.2.5.

Non-Potable Option

If the 1,500 afy non-potable option is implemented, then 4,600 afy of Chino Basin supplies are available for sale and/or lease for regional use. This means all Chino Basin supplies routed through the perchlorate facility will be available for sale (or 3,200 afy). Assuming that the perchlorate facility has a capacity of 3,200 afy then the remaining 1,400 afy of available Chino Basin rights can be leased on a longer-term basis.

Yields and Costs

The build-up of supply source yields and total unit costs for this alternative are shown in **Table 32.** A more detailed cost estimate is provided in **Appendix G.**

Table 32: Big Pedley 7 Yields and Costs

Supply Source	Yield (afy)	
	No NPR	NPR
Treated Imported Water	1,500	1,500
Untreated Imported Water	3,500	3,500
Local Surface Water	2,500	2,500
Six Basins Groundwater	4,000	4,000
Chino Basin Groundwater	14,500	13,000
Conservation	1,500	1,500
Non-Potable	0	1,500
TOTAL	**27,500**	**27,500**
Unit Cost	**$502/AF**	**$621/AF**

4.2.6 Regional Supplies

All of the alternatives described above meet the City's projected 2035 demand of 27,500 afy. There are, however, remaining City rights or access to additional supplies that can be produced and sold or leased to external agencies as a regional supply. Each alternative results in differing arrays of potential regional supplies. The intent of this analysis is to show that the production or lease of excess supplies to provide regional benefits would also result in a source of funding for the projects needed to implement the City's supply alternatives described previously. These potential funding values were calculated by the following process:

1. **Calculate Pomona's unit cost to acquire and treat supply:** This unit cost was already developed as a result of the cost estimates conducted for each alternative's source of supply.
2. **Determine external agency customers:** The list of agency customers was developed for each supply and was narrowed based on proximity to supply and ability to access existing infrastructure to deliver supplies.
3. **Calculate transmission costs:** The unit costs developed for the City to acquire and treat supply did not include the cost to distribute those supplies since it is assumed that existing City distribution facilities would be used. If the same supplies are developed and then delivered to an external agency, then those transmission costs would need to be added. Given that the volume of supply varies between each alternative, a unit cost curve was developed to provide variable transmission costs relative to volume.
4. **Determine additional administrative and operational costs to the City:** It is assumed that the cost to take on the overproduction of supplies to meet regional needs would also need to include the additional City administration and operational costs. These City costs would also need to be compensated to make it cost neutral for the City to reliably export these supplies. Administrative and operational costs were calculated as an additional 5% of the supply acquisition and treatment costs.
5. **Determine lease value:** If Pomona did not produce and sell the remaining water rights, it could lease rights at a reduced rate to allow for the external agencies to incur the cost and responsibility of producing the supply. This lease is assumed to be a long-term agreement (potentially 20-30 years) as that is the only way to ensure a set source of revenue for the City and a source of supply for the agency paying for the leased rights. The lease rates that were used in this analysis were based upon existing rates for annual agreements plus a mark-up for the access to a longer-term and therefore more reliable supply. This is a very general estimate based on no information from

external agencies as to the terms or price they would be willing to pay – so it is recommended that further investigations be completed to fully determine potential revenue.

6. **Determine maximum price external agencies might pay:** It is assumed that an external agency would only be interested in buying or leasing rights if they are less expensive than their current most expensive supply. In order to provide context as to whether the City would be able to produce any supplies that could potentially meet this assumption, a maximum unit price was established. Imported water is a common source of expensive supply that has a uniform cost to most agencies in the region. The unit cost projections for Tier 1 and 2 imported water generated in the alternatives analysis was used as the base. These unit costs were decreased by 10% to provide the maximum unit cost at which an agency might determine that the City's excess supply would be cost effective to purchase.
7. **Calculate potential funding on each supply:** If the total unit cost of supply acquisition, treatment and transmission plus Pomona's administrative and operational costs was less than the 90% of Tier 2 supplies, then the supply is more likely to be sold and the maximum potential funding would be the difference between the two unit costs multiplied by the number of afy available to be sold or leased. Obviously this represents a maximum potential funding and it can be assumed that the actual sell or lease price would be negotiated to a point somewhere between Pomona's costs and the buyers current highest cost supply.

Based upon the volume of excess supplies available and the proximity of that supply to potential external agency buyers, five potential regional supply options were examined using the above process. The excess supplies for each alternative were applied to each of these options using the process described above. The results of these calculations for each alternative are shown in **Appendix I** and summarized in **Table 33**. The regional supply options are described below.

Table 33: Summary of Potential Regional Supply Funding

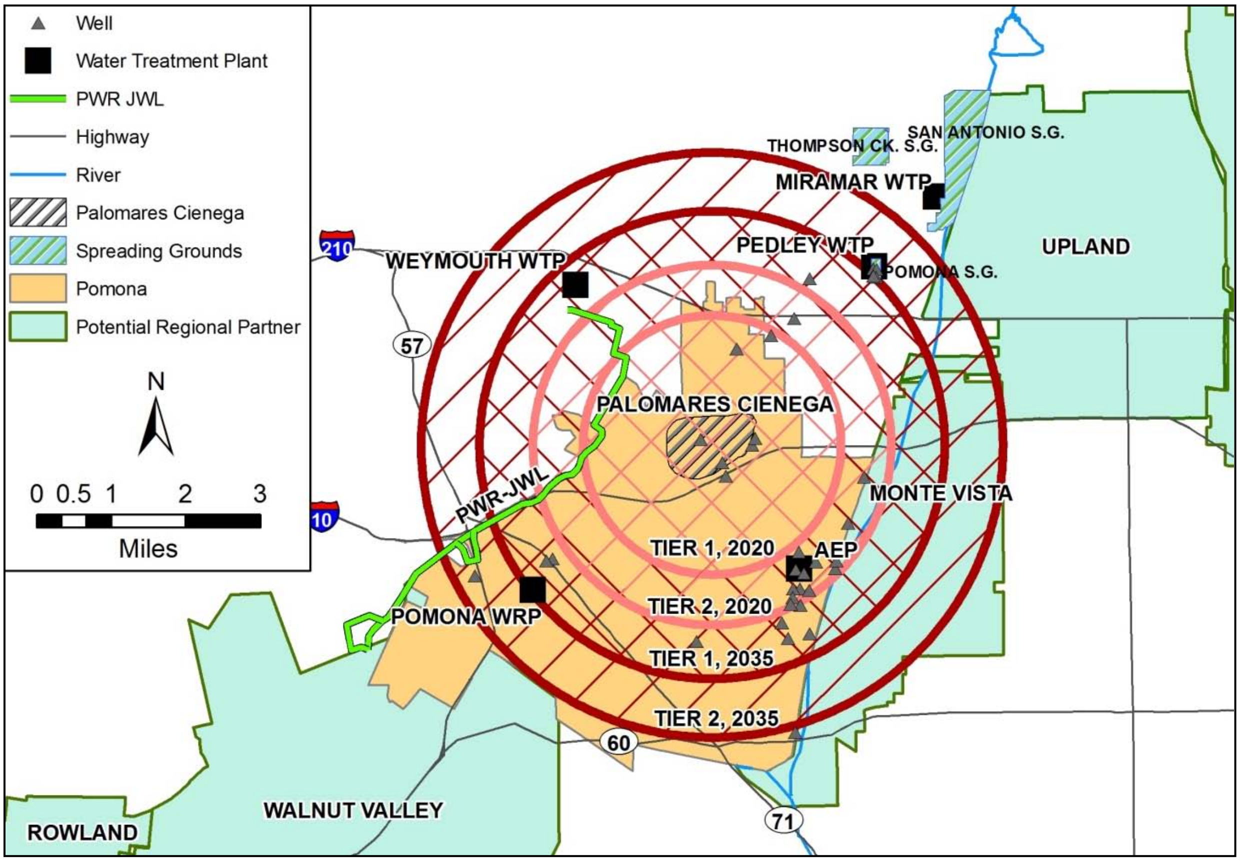
Alternative	Six Basins	Chino Basin MV	Chino Basin U/SA	Chino Lease	Non Potable Lease
No Pedley 2	$0	$0	$0	$0	$820,000
No Pedley 2 (NPR)	$0	$273,570	$0	$0	$520,000
Same Pedley 4	$0	$0	$0	$0	$820,000
Same Pedley 4 (NPR)	$0	$273,570	$0	$0	$520,000
Mid Pedley 5	$0	$273,570	$0	$0	$820,000
Mid Pedley 5(NPR)	$0	$0	$0	$0	$820,000
Mid Pedley (No Cons)	$0	$828,620	$0	$0	$520,000
Big Pedley 7	$0	$1,018,970	$88,970	$0	$820,000
Big Pedley 7 NPR	$0	$1,051,840	$59,840	$460,600	$520,000

Six Basins Special Project to Joint Water Line

An additional 1,700 afy of production could be achieved by implementing the Palomares Cienega Special Project, consisting of new wells and treatment in the northernmost part of the City. The special project water is only necessary to supply 400 afy to meet City demands under the No Pedley 2, Same Pedley 4 with no NPR and Mid Pedley 5 alternatives with no NPR nor conservation options. Under those alternatives, the regional supply generated would be 1,300 afy. The regional supply of 1,300 or 1,700 afy is then assumed to be delivered to the PWRJWL for use by either WVWD or RWD. The transmission costs assumed include a connection to the PWRJWL. The use of this option will require a re-permitting of the PWRJWL to allow for mixed water quality.

In order to determine the feasibility of such a project, it will have to be cost-effective to a purchasing agency. The cost of the Special Project was compared to the cost of imported water (assumed to be an agency's alternative source of supply). **Figure 19** shows the distance from the Palomares Cienega area at which the cost of the Special Project is estimated to be equivalent to both Tier 1 and Tier 2 imported water rates in 2020 and 2035. This figure shows that facilities could be built to produce and carry water to the PWRJWL for the projected cost of Tier 1 treated imported water in 2020.

Figure 19: Palomares Cienega "Special Project" Cost versus Imported Water Costs



Chino Basin Perchlorate Treated Supply to Monte Vista and Upland/SAWC

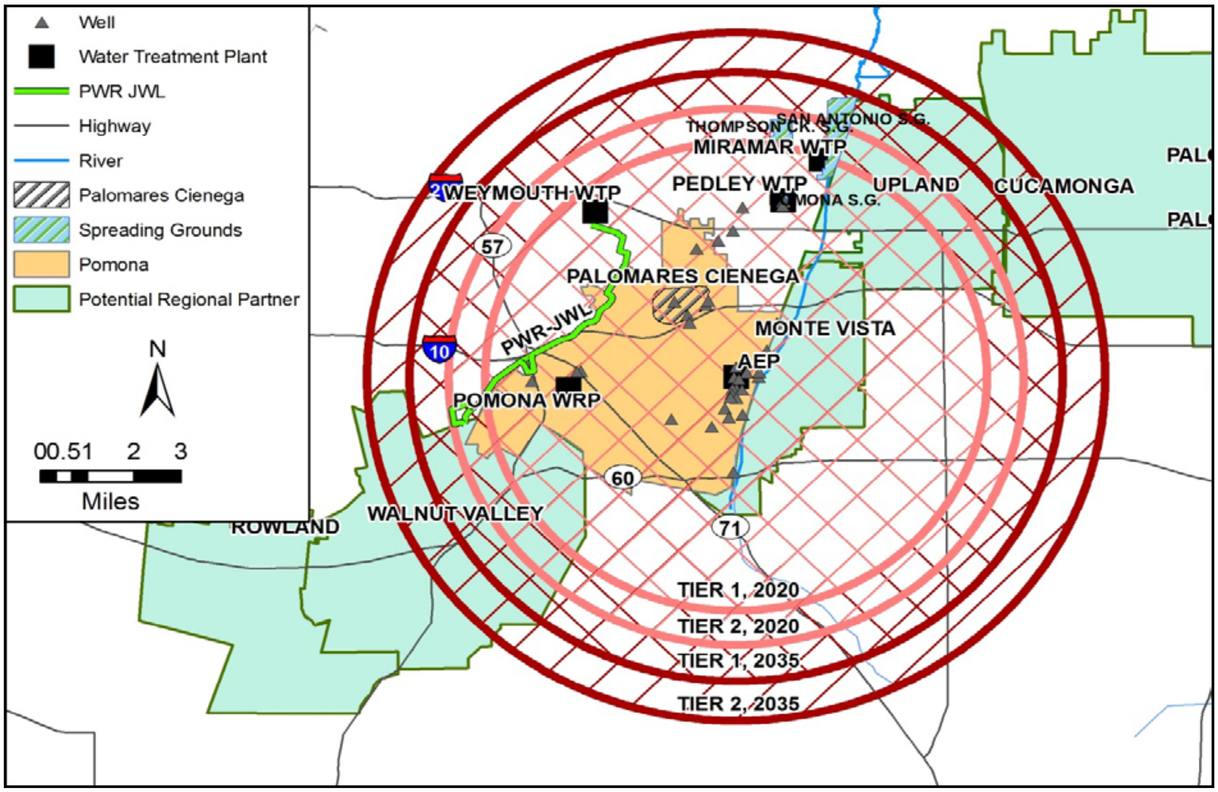
Given that some alternatives would result in the City not needing to use all of the production capacity afforded by the new perchlorate treatment module, the City could produce the excess supply for sale to external agencies. Two potential agency customers were identified based on differences in the length and therefore cost to transmit water from the AEP. Monte Vista is lower in cost given its very close proximity, and City of Upland/San Antonio Water Company (SAWC) were also considered as the next proximate agencies.

Chino Basin Rights Lease

This option was used only in Big Pedley 7 since the amount of available Chino Basin Supplies exceeded the additional production afforded by the perchlorate treatment module (3,200 afy). The remaining excess Chino Basin supply was then assumed to be leased at the current annual rate plus a long-term mark up. Any external agencies with current rights and facilities with unused production capacity could be potential buyers of this lease arrangement.

The cost of producing and exporting treated water from the AEP was compared to the cost of imported water. **Figure 20** shows the distance that the water could be transported to a purchasing agency to be equivalent to that same agency purchasing imported supply at both Tier 1 and Tier 2 rates in 2020 and 2035. This figure shows that given the long distances of surrounding agencies, and therefore the high transmission costs, it would probably be more feasible to lease Chino Basin rights to water agencies such as the City of Upland and Cucamonga Valley Water District who could purchase Tier 1 treated imported water for less than the cost of purchasing treated AEP water.

Figure 20: AEP Treated Groundwater Export Cost versus Imported Water Costs



Unused Recycled Water Lease

The City's projected unused non-potable supply could be leased on a long-term basis to an outside agency. The City is currently not using this supply, but since there is no long term agreement for the lease of the right to the supply, the City is not benefiting from its PWRP recycled water allocation. Under this option, Pomona would simply lease the rights to the recycled water and would not need to provide new facilities to convey or distribute it. Several planning efforts are being conducted that would seek to maximize SDLAC's production capacity at Los Coyotes Water Reclamation Plant for further groundwater recharge in the Central Basin. Since the PWRP is upstream of Los Coyotes, the recycled water not used by the City could be leased to downstream users for increasing supplies for such projects. The value of these supplies would be impossible to determine in the context of this IWSP, so a lower value of $200/AF is assumed. This is slightly above the $150/afy the City currently pays for PWR supply.

4.3 Alternative Evaluation

The final alternatives were evaluated based on criteria previously developed with City staff. The evaluation process used both quantitative methods such as cost estimating and system modeling as well as qualitative methods that are described in the following sections.

4.3.1 Evaluation Criteria

Seven criteria were developed for use in the evaluation of each alternative. These criteria were developed with input from City staff and the Environmental Committee of the City Council. These criteria are described in **Table 34** relative to the questions they ask and examples of how they relate to the alternatives. In order to evaluate each alternative relative to each criterion, potential answers to the questions posed in **Table 34** were put into three classification ranges relative to each other. **Table 35** shows the classification ranges that were specifically developed for the IWSP alternatives.

Table 34: Evaluation Criteria Descriptions

Criterion	Description	Example
Reliability	How many years out of 100 will this alternative not meet demand? When demand is unmet – how severe is the shortage?	Some alternatives are more dependent on variable surface water and imported supplies. A change in groundwater regulations could decrease reliability.
Unit Cost	How much will the capital and OM cost be per af of water?	Alternatives with excessively high capital and O&M costs are not desired.
Cost to Pomona	What is the potential for leveraging remaining surface and groundwater rights to offset unit costs? How competitive will this alternative be for funding programs?	Some alternatives have more resources remaining to leverage as regional supply. NPR and conservation components increase the potential funding.
Ability to Implement	How many permits will you need? How easy will it be to phase and therefore finance implementation?	Complicated alternatives may be more difficult to permit and finance.
Institutional Independence	How many agreements/negotiations are necessary to implement the alternative?	Alternatives that require more purchase of supplies will result in less institutional independence.
Adaptability	How diversified, flexible and scalable is this alternative to adapt to potential changes?	More diversified alternatives can be easily scaled and phased throughout implementation.
Environmental	Are there any significant foreseeable environmental impacts and what is the energy footprint of the alternative?	Some alternatives provide benefits by treating wastewater to higher levels; imported water is considered to have greater impacts.

4.3.2 Reliability

The Water Evaluation and Planning (WEAP) model was used to evaluate reliability between alternatives. WEAP is a tool used for integrated water resources planning by evaluating water development and management options using detailed supply and demand inputs.

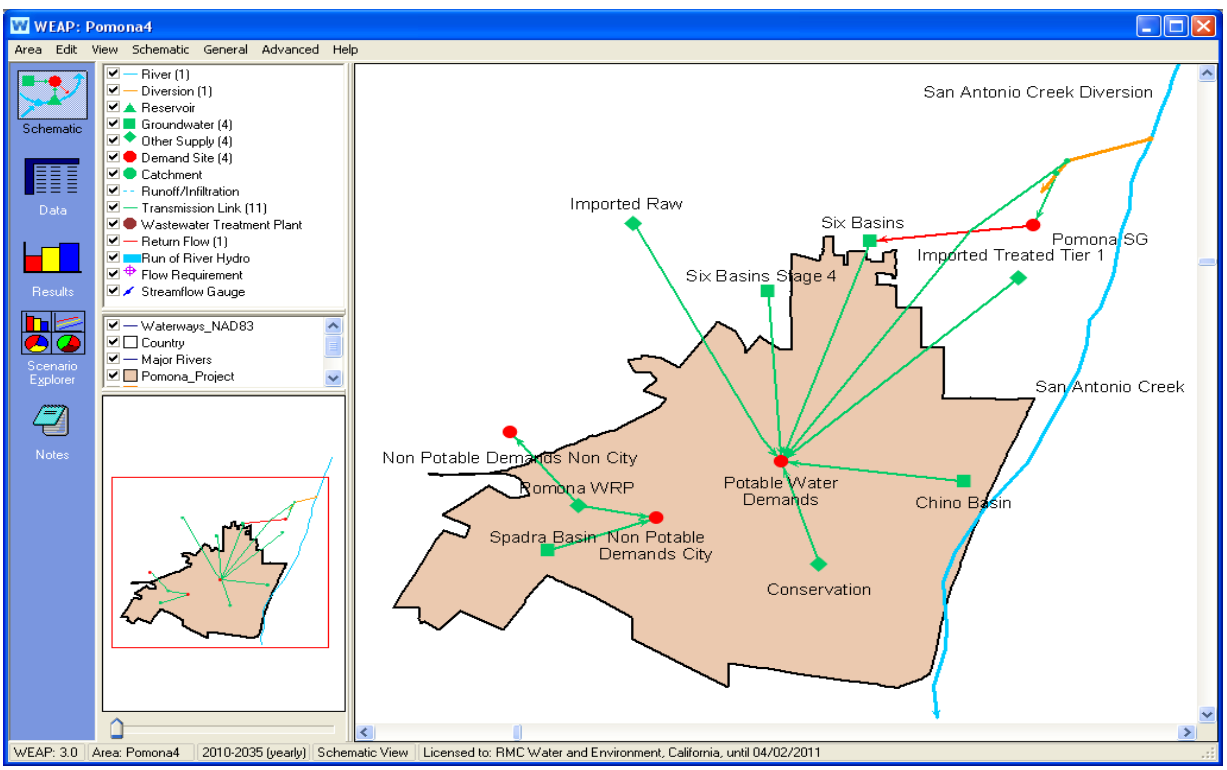
A WEAP model was developed for the City's service area from a composite baseline that incorporates existing and future available supplies with facility and system constraints (e.g. treatment facility and pipeline capacities). Baseline facilities and capacities as described in Chapter 2 were input into the model, in addition to groundwater rights, and historical supply from San Antonio Creek and imported water projected imported water reliability. The main supply sources that were assumed to have variations in reliability are local surface water and imported water. Alternatives using these supplies would then reflect these variabilities in the output provided from the WEAP model.

A screenshot of the baseline WEAP model is shown in **Figure 21**. The WEAP model interface shows the basic linkages between supplies (in green) and demands (in red). The actual supply volumes, facility capacities, natural flows, and operational strategies are used as inputs to characterize each of the supplies, demands and facility nodes and lines.

Table 35: Evaluation Criteria Classifications

Criterion	Classifications		
	Best	Mid	Least
	●	◐	○
Reliability	>95%	Frequency: 85-94% Magnitude: 1-3%	Frequency: 85-99% Magnitude: >3%
Unit Cost	$400-$499/AF	$500-$599/AF	$600-699/AF
Potential Funding	High grant eligibility and external funding >$1Million	Low grant eligibility or external funding <$1Million	Low grant eligibility and external funding <$1Million
Ability to Implement	Simple permitting and phased financing	More complex permitting and phased financing	Complicated permitting and one-time financing
Institutional Independence	No external agreements	1-2 external agreements	>2 external agreements
Environmental	Can mitigate all impacts, lowest energy use	Can mitigate all impacts, higher energy use	Can mitigate some impacts, high energy use
Adaptability	Most supply sources can easily be modified	Fewer supply sources that can be modified	Least number of supply sources

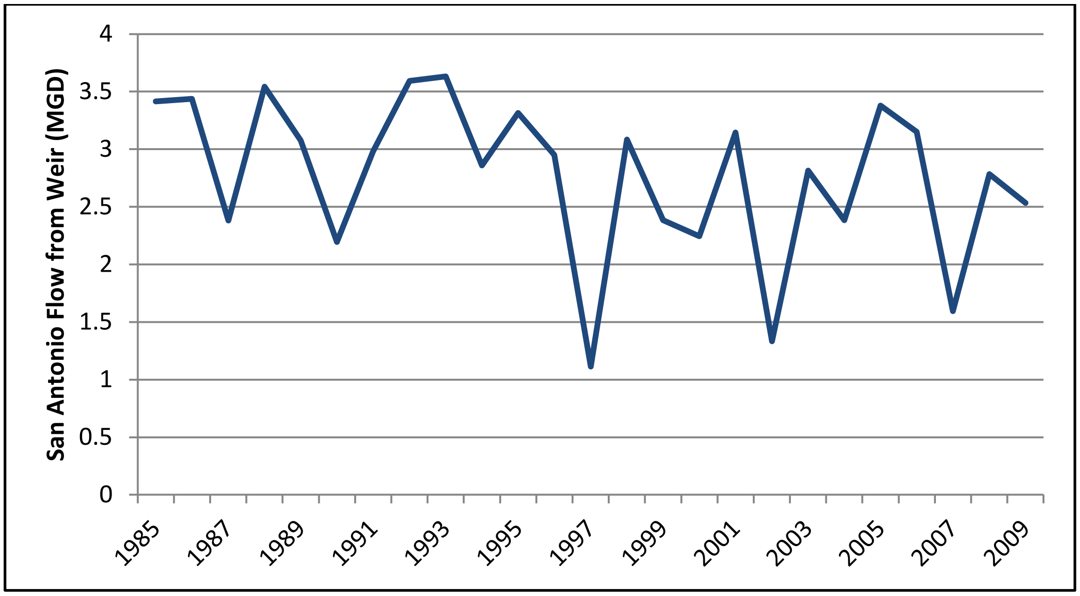
Figure 21: Baseline WEAP Screenshot



Local Surface Reliability Assumptions

Historical supply to the City from San Antonio Creek (after the weir) is shown in **Figure 22.** As can be seen, there are cycles of wet and dry years that can affect the water supply available from the PFP. These historical annual patters were then applied to the model by using 25 years (1985-1999) of annual flows as input for model to find the range of potential surface flows that could be expected in the year 2035.

Figure 22: Average Annual Local Surface Flows to City



Imported Water Reliability Assumptions

MWD as the local imported water provider to TVMWD has been unable to meet 100% of demand three of the last 100 years. MWD's 1991 shortage was as a result of multiple years of severe drought conditions. The other two years were 2009 and 2010 which were a result of both sustained drought but more importantly due to required cut-backs in the State Water Project (SWP) supplies originating from the San Francisco Bay Delta. As a result, MWD imported supplies have been under shortage allocation and are anticipated to remain that way until a Bay-Delta fix is in place, or other supplies can be generated to offset those losses. According to MWD's 2010 Integrated Regional Plan, this will result in the expected shortage rates shown in **Table 35.** Given that these are the assumptions used by MWD, it is assumed that TVMWD supplies would also reflect this frequency of shortage. Therefore, the WEAP model assumes that there is a 4% chance that imported supplies would be short in 2035 (4 of every 100 years or 1 every 25 years).

Table 36: Metropolitan Water District Shortage Frequency and Magnitude Projections

	2015	2025	2035
Frequency of Shortage	12%	4%	5%
Magnitude of Shortages	659,000 AF (12%)	350,000 AF (6% of demand)	191,000 AF (3% of demand)

MWD, 2010. Table 2.8.

All supply sources and facility components of the City's existing water supply system were characterized in the model according to existing constraints. It should be noted that the model does not include the constraints of the delivery system. **Appendix H** shows a flow chart of the baseline system.

System Operation Assumptions

WEAP also uses operational rules which define the order in which supplies were used to meet demand. For the baseline, these supply priorities for were as follows:

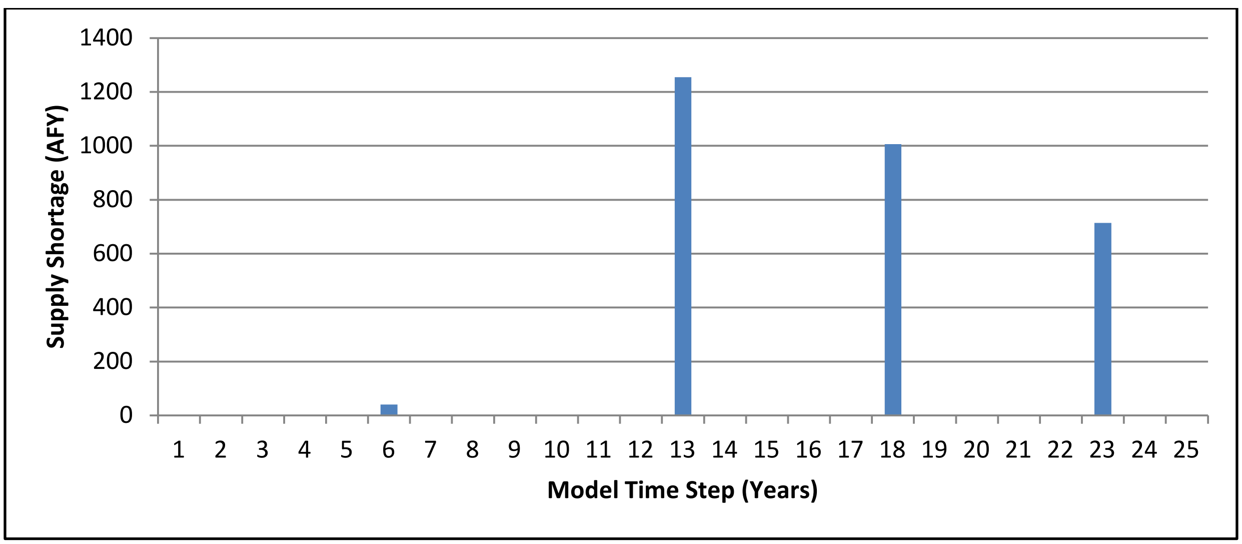
1. Non-potable supplies
2. PFP (Treatment of San Antonio Creek and raw imported water)
3. Treated imported water
4. Six Basins (Stages 1 through 3)
5. Chino Basin
6. Six Basins (Stage 4)

Once the baseline scenario was completed, the supply system required for the implementation of each alternative was entered into the WEAP model. The results of the WEAP analysis were used to evaluate reliability of each alternative in two ways - the likelihood of a shortage year and the likely magnitude of those shortages. To determine the potential that 2035 could experience a shortage, the model produces the total average supply available assuming that 2035 exhibits the same hydrologic conditions for each of the 25 years of historical hydrology.

Figure 23 is a sample of the model output of supply shortage for the Mid Pedley 5 alternative. As shown in this figure, shortages only occur 3 out of 25 of the hydrologies modeled, ranging from 700 afy (2.5% of demand) to 1,250 afy (4.5% of demand). These predicted shortages can be attributed to the hydrologies associated with the local surface supply during the years of 1997, 2002 and 2007, as seen in **Figure 23.**

Reliability for each alternative is shown in **Table 37.** The analysis shows that as alternatives become increasingly reliant on local surface water supplies, they also become less reliable. It should, however, be noted that these shortages on average account for less than 4% of demand, which is not a high magnitude shortage. **Table 37** also shows the resulting classification of each alternative relative to their reliability as instructed in **Table 35.**

Figure 23: Supply Shortage WEAP Output for Mid Pedley 5



Impact from Potential Chromium VI MCL

Concentrations of Chromium VI in the City's wells typically range from 3 to 15 parts per billion (ppb). Observed levels are the highest in the Chino Basin wells in the vicinity of the AEP. Two of the Chino

Basin wells with the highest historically measured Chromium VI levels (approaching or exceeding 100 ppb) are not operating at the time of this writing.

Table 37: Alternative Reliability Evaluation

Alternative	Reliability Frequency	Average Shortage Magnitude	Classification
No Pedley 2	100%	0%	●
No Pedley 2 (NPR)	100%	0%	●
Same Pedley 4	96%	180 afy (<1%)	◐
Same Pedley 4 (NPR)	88%	490 afy (2%)	◐
Mid Pedley 5	88%	750 afy (3%)	◐
Mid Pedley 5 (No Conservation)	88%	820 afy (3%)	◐
Mid Pedley 5 (NPR)	88%	750 afy (3%)	◐
Big Pedley 7	88%	750 afy (3%)	◐
Big Pedley 7(NPR)	88%	750 afy (3%)	◐

● Best ◐ Mid ○ Least

There is no EPA MCL for Chromium VI, but the significant amount of media attention devoted to this constituent, along with statements published by CDPH, indicate that a State MCL could very likely be promulgated as early as 2012. While it is difficult to predict what numeric MCL will be adopted, it is reasonable to assume that the most stringent MCL applied by California would be 0.06 ppb, which is the PHG for Chromium VI currently published by CDPH. It is also possible that the adopted MCL could be higher than 0.06 ppb.

Clearly all of Pomona's wells in both Six Basins and Chino Basin exceed the 0.06 ppb threshold. Because of the City's heavy reliance on groundwater, treatment for removal of Chromium VI could very likely be required to avoid loss of a significant percentage of the City's groundwater supply. If this occurs, there will be obvious impact to the reliability of alternatives that rely heavily on Chino Basin supplies and less on an expanded PFP. In order to assist the City with quantifying these potential impacts, it is assumed that the City will increase treatment (and therefore unit cost) to remove Chromium VI levels, instead not using the supply and thereby decreasing reliability. The impacts are therefore described as potential increases in unit costs in the following section.

4.3.3 Cost

The net present value unit costs were calculated for each alternative these costs are detailed in **Appendix G**. Alternative costs were all very similar with the least and highest unit costs differing by only about $220/FY ($406/AF to $621/afy).

When the NPR option was included, each alternative's unit cost increased from the original by about $120/afy. The removal of conservation from the Mid Pedley 5 alternative does reduce the overall unit cost of the alternative, but by only around $30/AF. Big Pedley 7 is the only alternative over $600/AF since it requires the largest facility costs and imported water purchases.

Impact from Potential Chromium VI MCL

As indicated in the Reliability section above, the potential adoption of a Chromium VI MCL could impact the reliability and cost of any alternative. In order to help determine the potential costs, a level of treatment is assumed. Treatment technologies commonly associated with removal of Chromium VI are as follows:

- Ion exchange

- Adsorption (e.g. Granular Activated Carbon adsorption)
- Membrane filtration (e.g. Nanofiltration)

While these and other treatment methods are viable, perhaps the most likely candidate for treatment in a future scenario requiring Chromium VI removal is ion exchange, because it represents the best combination of high percent removals and reasonable capital cost.

While the existing AEP provides significant reduction of Chromium VI levels, it is likely that an adopted MCL of 0.06 ppb would necessitate additional treatment for a significant percentage of the City's wells in both Six Basins and Chino Basin. It can be estimated that this treatment would cost somewhere between $100 and $200 per acre-foot, provided that the treatment was constructed in a consolidated manner that allowed pumped flows from multiple wells to be treated at a single location.

The $100 to $200 per acre-foot number does not include the cost of new piping and pumping that would be required to collect and convey untreated well flows to common treatment facilities. Land acquisition for new treatment facilities is also an additional cost to consider.

Table 38: Alternative Cost Evaluation

Alternative	Unit Cost	Classification
No Pedley 2	$406/AF	●
No Pedley 2 (NPR)	$520/AF	◐
Same Pedley 4	$412/AF	●
Same Pedley 4 (NPR)	$526/AF	◐
Mid Pedley 5	$443/AF	●
Mid Pedley 5 (No Conservation)	$415/AF	●
Mid Pedley 5 (NPR)	$563/AF	◐
Big Pedley 7	$502/AF	◐
Big Pedley 7(NPR)	$621/AF	○

● Best ◐ Mid ○ Least

4.3.4 Potential Funding

Although the overall unit cost to implement the alternative is important, the potential to offset those costs is equally critical. For this analysis, the potential funding from two sources was examined:

1. Funding generated from the sale or long-term lease of the "regional supplies" described in Section 3.6
2. Grant or loans from Federal, State or local sources

The alternative with the highest potential for funding from the sale of produced water supply or through the leasing of unused water rights is Big Pedley 7 - this is because it also has the greatest purchase of imported supply which allows for more local rights to be used to generate revenue. With the addition of the NPR option, even more treated supply is available for external use and the potential for funding is greater. As pointed out in Section 4.2 these estimated sources of revenue for the City really represent the maximum that could be anticipated given that the unit price would be negotiated to somewhere between these values and $923/AF (which is 90% of treated Tier 2 MWD supply).

Given the current State and Federal funding priorities, it is assumed that those alternatives that included the NPR and conservation are more likely to receive funding.

Table 39: Alternative Potential Funding Evaluation

Alternative	Sales or Lease (annual $s)	Grant Eligibility	Classification
No Pedley 2	$820,000	Lower	○
No Pedley 2 (NPR)	$793,570	Higher	◐
Same Pedley 4	$820,000	Lower	○
Same Pedley 4 (NPR)	$793,570	Higher	◐
Mid Pedley 5	$1,093,570	Lower	◐
Mid Pedley 5 (No Conservation)	$820,000	Lowest	○
Mid Pedley 5 (NPR)	$1,348,620	Higher	●
Big Pedley 7	$908,970 - $1,838,970	Lower	◐
Big Pedley 7(NPR)	$1,040,440 - $2,032,440	Higher	●

● Best ◐ Mid ○ Least

4.3.5 Ability to Implement

All of the alternatives will be fairly easy to implement since the majority of the alternatives do not require new facilities. The most challenging alternative will be Big Pedley 7 given the large PFP upgrade that will require a larger initial capital outlay. The alternatives that are dependent on the Special Project supplies from Six Basins (No Pedley 2, Same Pedley 4, and Mid Pedley 5 No Conservation) will also be challenging given that the connection of a new source of supply to the PWRJWL will require re-permitting. All NPR projects will require a Title 22 permit.

4.3.6 Independence

This analysis includes the number of new or changed agreements with external entities that will be required to implement the alternative. The fewer agreements that are required, the more independent the City will be in its ability to avail supplies. This assessment assumes that agreements needed to sell or lease regional supplies are not included in **Table 41.**

Table 40: Alternative Ability to Implement Evaluation

Alternative	New Permits	Need for Upfront Capital	Classification
No Pedley 2	JWL	Least	◐
No Pedley 2 (NPR)	Title 22	Mid	◐
Same Pedley 4	None	Least	●
Same Pedley 4 (NPR)	Title 22	Mid	●
Mid Pedley 5	Process Upgrade	Mid	◐
Mid Pedley 5 (No Conservation)	None	Mid	◐
Mid Pedley 5 (NPR)	Title 22	Highest	◐
Big Pedley 7	Pedley Upgrade	Highest	○
Big Pedley 7(NPR)	RW Use & Pedley Upgrade	Highest	○

● Best ◐ Mid ○ Least

Table 41: Alternative Independence Evaluation

Alternative	Agreements	Classification
No Pedley 2	JWL and Special Project	◐
No Pedley 2 (NPR)	None	●
Same Pedley 4	JWL and Special Project	◐
Same Pedley 4 (NPR)	None	●
Mid Pedley 5	Rialto	◐
Mid Pedley 5 (No Conservation)	Rialto JWL and Special Project	○
Mid Pedley 5 (NPR)	Rialto	◐
Big Pedley 7	Rialto	◐
Big Pedley 7(NPR)	Rialto	◐

● Best ◐ Mid ○ Least

4.3.7 Adaptability

The City's IWSP is a long range planning exercise with a horizon of 25 years. Since much can change in 25 years, it is important to evaluate an alternatives ability to adapt to those potential changes. In general, those alternatives with multiple smaller projects are more diversified and a higher level of diversification is correlated to a higher level of adaptability. The City's baseline supply is already highly diversified and the alternatives under evaluation in this Section, as a group, reflect a high level of diversification relative to other suppliers in Southern California. Therefore, the evaluation of the adaptability of each alternative was done in relation to each other - so even though all have the potential to be highly adaptable, some alternatives are more than others.

As **Table 42** indicates, those alternatives with NPR increase the adaptability since it allows for greater use of the under used recycled water supply available to the City. If the recycled water supplies were to change these same customers could still be served with potable supplies using the same infrastructure. The two alternatives ranked the lowest in adaptability are Mid Pedley 5 (w/o conservation) since conservation is a highly flexible and adaptable form of supply and Big Pedley 7 – since it is heavily dependent on imported supplies to maximize the unit costs of a large plant upgrade and would most likely sell or lease a large portion of the City's Chino Basin supplies over a longer term – thus limiting the flexibility the City would have in meeting its demands.

4.3.8 Environmental

Table 43 shows the environmental evaluation for each alternative. Since none of the projects will result in significant new infrastructure needs in new areas, there is minimal potential construction related environmental concerns that can be anticipated.

The most prevalent environmental indicator is the need for energy to be used to operate the facilities necessary to produce and deliver the water supplies called out in each alternative. The use of SWP imported water supplies in Southern California that originate from the San Francisco Bay-Delta require an incredible amount of energy to transport on top of treatment needs and are therefore widely considered to be supplies with the highest energy footprint under any context outside of desalination. Conservation is considered to be the most energy efficient supply since it actually reduces energy use to zero – so Mid Pedley 5 without conservation reflects this assessment. NPR alternatives also get high marks since it is improving the overall water quality of a supply and using it for a higher beneficial use. No Pedley 2 also scores higher since it does not require the use of surface water treatment.

Table 42: Adaptability Evaluation

Alternative	Adaptability	Classification
No Pedley 2	No surface water treatment is limiting	◐
No Pedley 2 (NPR)	More diversified with NPR	●
Same Pedley 4	Highly diversified	◐
Same Pedley 4 (NPR)	Highly diversified	●
Mid Pedley 5	No extra use of Six Basins storage	◐
Mid Pedley 5 (No Conservation)	Low diversification	○
Mid Pedley 5 (NPR)	Highly diversified	●
Big Pedley 7	Less diversified – reliance on import treatment at Pedley no use of Perchlorate plant or Six Basins Storage	○
Big Pedley 7(NPR)	More diversified with NPR	◐

● Best ◐ Mid ○ Least

Table 43: Environmental Evaluation

Alternative	Environmental	Classification
No Pedley 2	Lowest energy footprint	●
No Pedley 2 (NPR)	Low Energy footprint Higher WQ - NPR	●
Same Pedley 4	Medium energy footprint	◐
Same Pedley 4 (NPR)	Medium energy footprint Higher WQ - NPR	●
Mid Pedley 5	Medium energy footprint	◐
Mid Pedley 5 (No Conservation)	Medium energy footprint and no Conservation	○
Mid Pedley 5 (NPR)	Medium energy footprint and no Conservation Higher WQ - NPR	●
Big Pedley 7	Highest energy footprint	○
Big Pedley 7(NPR)	Highest energy footprint Higher WQ - NPR	○

● Best ◐ Mid ○ Least

4.3.9 Evaluation Summary

As **Table 44** shows, each alterative is unique in its evaluation and no two exhibit the same level of superiority in every criteria. A few key observations about the evaluation summary are provided below:

- In general those alternatives that used less imported and surface supplies performed better under most criteria.

- Alternatives with the NPR option trade off higher costs for better performance in all other criteria.
- No Pedley 2 and Same Pedley 4 perform very similar to each other except that No Pedley 4 will be easier to implement, given that it deviated very little from the City's current baseline operation, but will be harder to generate outside funding because there is little excess supply available for external use and no projects that could be easily funded unless the NPR option is included.
- Mid Pedley 5 without NPR or conservation is cost competitive and easy to implement but is one of the worst performers in all other categories.
- Overall, Big Pedley 7 without NPR scores the worst of all alternatives due to the combination of a high imported water use and a large facility upgrade with no added diversity through NPR to offset the reliance on PFP treatment.

It is difficult to pin-point a clear winner because taken together, this alterative suite exhibits real-world trade-offs between criteria. This evaluation process made no determination as to which criteria were more important (through a weighted analysis) since priorities can sometimes be more easily decided after these trade-offs can be seen.

Table 44: Evaluation Summary

Alternative	Reliability	Cost	Funding	Ability to Implement	Indepen-dence	Adapta-bility	Environ-mental
No Pedley 2	●	●	○	◐	◐	◐	●
No Pedley 2 (NPR)	●	◐	◐	◐	●	●	●
Same Pedley 4	◐	●	○	●	◐	◐	◐
Same Pedley 4 (NPR)	◐	◐	◐	●	●	●	●
Mid Pedley 5	◐	●	◐	◐	◐	◐	◐
Mid Pedley 5 (No Conserv)	◐	●	○	◐	○	○	○
Mid Pedley 5 (NPR)	◐	◐	●	○	◐	●	●
Big Pedley 7	◐	◐	◐	○	◐	○	○
Big Pedley 7 (NPR)	◐	○	●	○	◐	◐	○

● Best ◐ Mid ○ Least

4.4 Alternative Comparison

As previously discussed, the evaluation process made no determination as to which criteria were more important. By performing side-by-side comparisons between alternative pairs that are most similar, it is possible to see the tradeoffs between alternatives.

4.4.1 No Pedley 2 versus Same Pedley 4

Figure 24 compares No Pedley 2 versus Same Pedley 4, the two alternatives that rely the least on imported supplies or on the PFP.

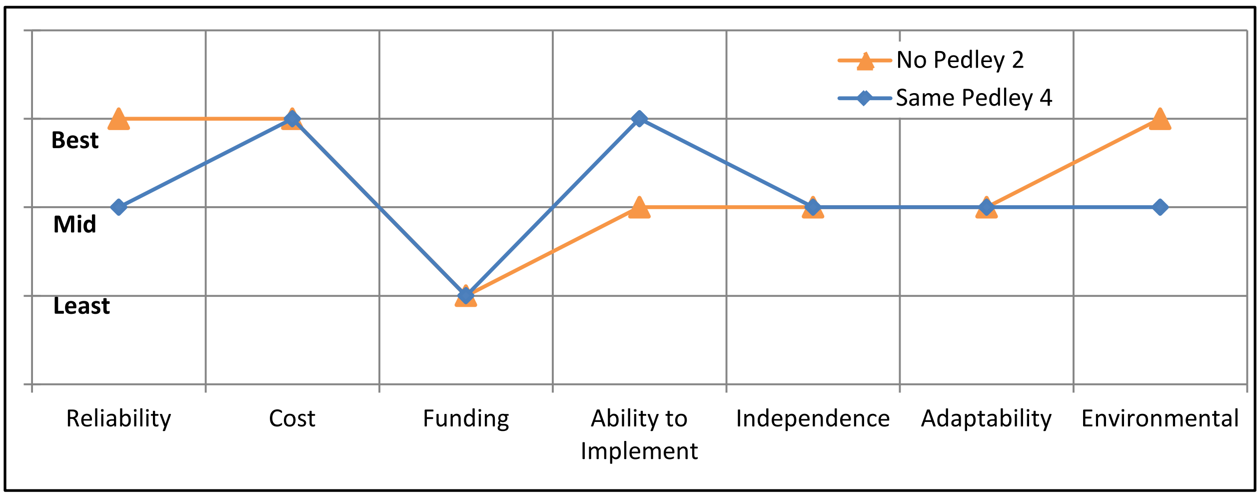
No Pedley 2

- Pros: Maximizes local surface water supply and use of Chino and Six Basins, which allows for higher reliability and lower environmental impact as imported water dependence is decreased
- Cons: No regional revenue potential, requires study of Pomona Spreading Grounds, doesn't capitalize on existing facilities since PFP will not be utilized

Same Pedley 4

- Pros: Similar to current operations and therefore fewer projects to build, uses PFP
- Cons: Higher environmental impact, higher dependence on imported water, and lower use of Six Basins

Figure 24: No Pedley 2 versus Same Pedley 4



4.4.2 Same Pedley 4 versus Mid Pedley 5

Figure 25 compares Same Pedley 4 versus Mid Pedley 5, the two alternatives that are most similar in terms of supplies and maintaining a similar level of diversity.

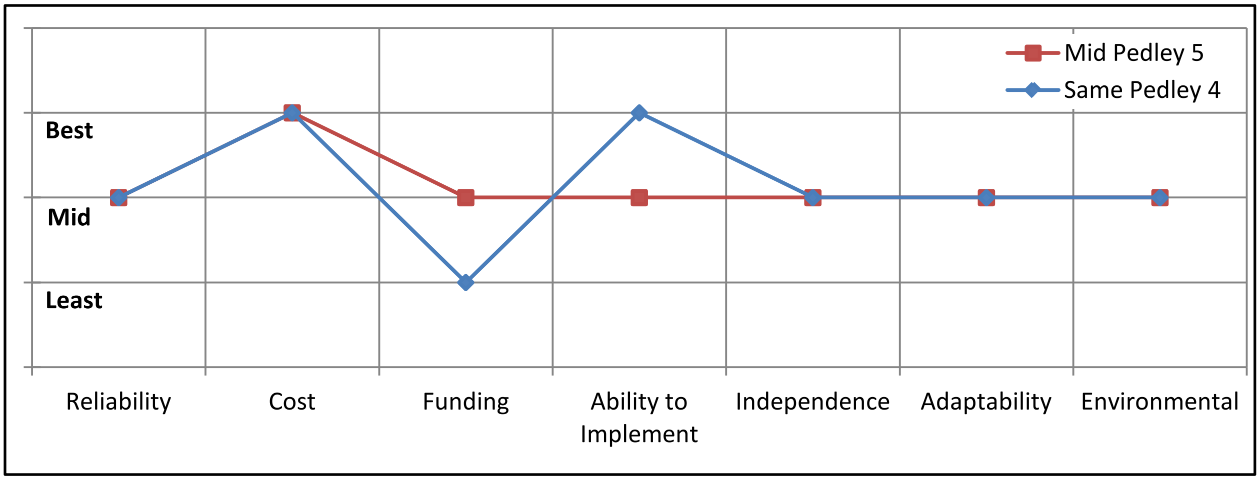
Same Pedley 4

- Pros: Lower dependence on imported supplies, continued use of Six Basins storage
- Cons: Less opportunity for funding and revenue, less access to imported supplies, more susceptible to the effects of local drought

Mid Pedley 5

- Pros: More flexible due to higher imported water access and greater PWP capacity, more projects give more opportunity to fund and provide regional revenue
- Cons: Not taking advantage of Six Basins storage, more susceptible to the effects of local drought, more projects to implement

Figure 25: Same Pedley 4 versus Mid Pedley 5



4.4.3 Mid Pedley 5 versus Big Pedley 7

Figure 26 compares Mid Pedley 5 versus Big Pedley 7, the two alternatives that rely the most on imported supplies.

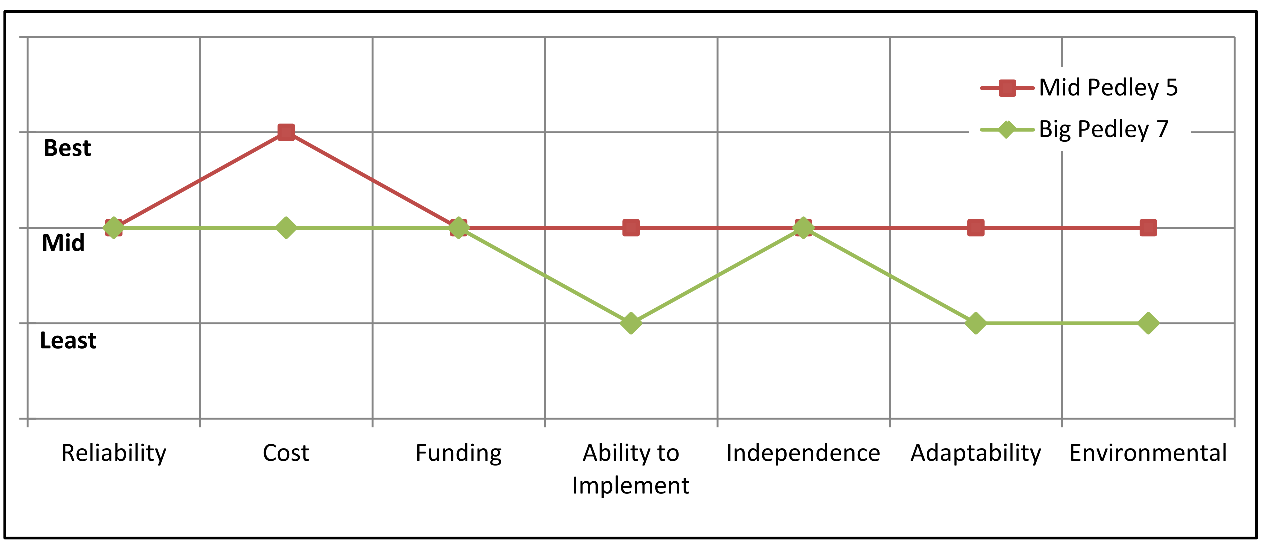
Mid Pedley 5

- Pros: Very flexible and diversified, less expensive and easier to implement, less dependence on imported supply, more adaptable (less regional commitments)
- Cons: Less ability to generate revenue

Big Pedley 7

- Pros: Revenue generated from Chino Basin supplies will help pay for PWP upgrade
- Cons: Most imported water, most expensive, limited Chino Basin use and least diversification, scores lower than Mid Pedley 5 for all criteria

Figure 26: Mid Pedley 5 versus Big Pedley 7



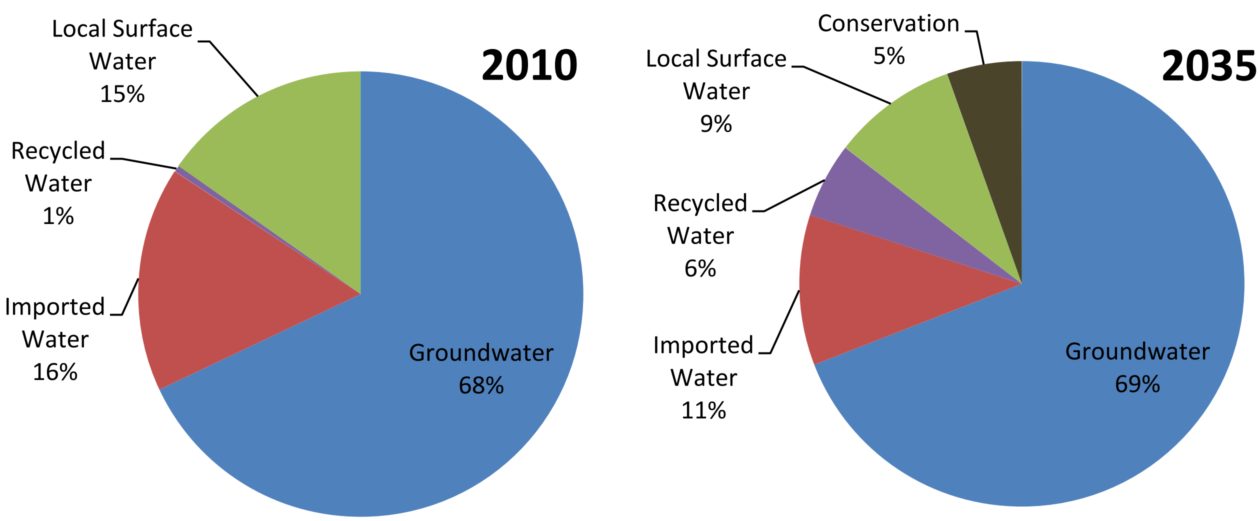
Chapter 5 Preferred Alternative

The City selected the Mid-Pedley 5 with NPR as its Preferred Alternative. Mid-Pedley 5 was selected given its balanced approach that seeks to use all of the resources available to the City without investing too heavily in one area. The Preferred Alternative will allow for a more economical near-term resource strategy that can seek to further diversify and develop new supplies such as recycled water, conservation and the local treatment of raw imported water when financing and funding is available. This chapter includes a description of the components, costs and yields of the Preferred Alternative, as well as a plan that will provide a pathway to implementation for the City now that the IWSP process is complete.

5.1 Alternative Description

The Preferred Alternative includes water resource options which expand Chino Basin production capacity, maximize use of the existing PFP, decrease purchases of treated imported water, implement a more robust conservation program, and expand the non-potable/recycled water system. **Figure 27** shows the proportion of supply sources used to meet demand currently (2010) and then once the full Preferred Alternative is implemented (2035). With implementation of the IWSP Preferred Alternative, the City will have access to a more diversified supply portfolio to meet increasing future demand.

Figure 27: Current and Preferred Alternative Supplies (average year)



Note: 2035 includes additional conservation as a form of supply to meet demand.

5.1.1 Groundwater

The City's production of groundwater from the Chino Basin will be significantly enhanced once the new perchlorate treatment plant comes on-line in 2012. However, the new facility would not need to be maximized to meet City demands through 2035. The increase of treatment potential in the near-term will allow the City greater flexibility in how it operates and, therefore, greater reliability and cost-effectiveness. It will also allow for the near-term potential to either produce or sell Chino Basin supplies (if the buyer is proximate to the facilities) or lease rights until demand increases and those supplies become more critical.

Eventually, new wells would need to come on-line to pump further supplies for treatment to meet City needs. The Preferred Alternative calls for the rehabilitation of Well 35 which is currently offline, and the modification of Well 30 through the installation of a liner to mitigate sand production, both of which are assumed to begin operation by 2035. It is assumed that 15,000 afy of the City's Chino Basin rights of

17,600 afy would be required to meet 2035 demand, which makes 2,600 afy of Chino Basin groundwater rights still available for lease in the long-term. Because PFP production will also be maximized as part of the Preferred Alternative, there will be little flow available for Pomona Basin recharge at the Pomona Spreading Grounds once this occurs. Production within Six Basins would be expected to increase from recent years to maximize the City's average share of the OSY (or 4,000 afy). This can be done through the use of the City's existing wells as long as they are maintained.

5.1.2 Local Surface Water

The Preferred Alternative will eventually maximize use of the current PFP facility through the treatment of all local surface water (whereas, on average, 500 afy have historically been directed to the Pomona Spreading Grounds), and treat up to 1,500 afy of raw imported water with a new connection to the Rialto Feeder. This would bring production at the PFP to 4,000 afy by 2035.

In order to maximize the PFP, the following treatment upgrades will likely need to take place based upon the PFP Feasibility Study (Carollo, 2009b) as well some additional upgrades based upon the analysis conducted through the IWSP.

- Create a pre-sedimentation basin by partitioning part of the spreading grounds
- Construct sludge drying beds
- Install new flocculators inside the existing Superpulsator
- Deepen existing filter beds
- Install new ultraviolet reactors
- Upsize inlets to allow for higher flows to enter plant

These improvements are necessary to treat local surface water with turbidity levels higher than 10 NTU (which normally require a shutdown of the plant) and can be assumed to be in operation by 2025. Also critical to maximizing the PFP is to route more flows for treatment. These flows will be supplied as raw imported water to the PFP by constructing an intertie to the current Rialto Feeder that brings untreated imported supply into the TVMWD system. Again, having a connection to raw imported supply increases flexibility (and long-term reliability) of the City's water supply by maintaining its current Tier 1 allocation without paying for higher treatment costs.

The seasonality of both local surface and imported flows means that there is excess supply in the winter and less supply available in the drier summer months. In order to maintain the average annual 2,500 afy assumption of local surface water treated at the PFP, equalization storage is not, however, expected to be necessary. To confirm this, a rough analysis was completed to estimate the potential flow which may need to be diverted during a storm event given an estimated individual storm event peaking constraints. It was estimated that only about 200 afy of flow would ever need to be diverted to the Pomona Spreading Grounds during a season of peaking events and so the annual average of 2,500 af of flow to the PFP could be achieved without storing that supply. Local storage would minimally increase the overall amount of flow that would be eventually treated at the PFP, but it would probably not be cost-effective.

While surface water production will be increased from 2,000 afy to 2,500 afy under the Preferred Alternative, the share of surface water relative to the City's total supply will decrease from 15% (2010) to 9% (2035) (as shown in **Figure 27)** given the increase in other supplies to meet emerging demand.

5.1.3 Imported Water

The Preferred Alternative assumes that total imported water purchase would decrease to 3,000 afy from an average of 7,000 afy. In order to maintain a high enough Tier 1 allocation of imported supply to meet the 3,000 afy future need, the City will need to keep imported water purchases to at least 3,000 afy throughout the next 25 years. This is based upon the way that MWD (and therefore TVMWD) allocates imported supplies, if the City's use drops consistently over time, then future "unused" imported supplies may be re-allocated to other agencies that show a greater need.

In the near term, the full 3,000 afy would be treated imported water to maintain current blending needs as well as overall supply needs, but would phase to 50/50 mix of raw and treated imported water by 2035 once the PFP upgrades have been completed to treat the raw supplies. The percentage of imported water, as a share of total supply, will be decreased from 15 percent (2010) to 11 percent (2035) under the Preferred Alternative.

The unit cost to purchase Tier 1 (or initial allocation) treated imported water is assumed to increase from the 2010 rate of $701/af to $2,000/af in 2035, assuming an annual increase of 6.5% until 2015 followed by annual increases of 6% until 2020 and then 3% through 2035. The same percentage increases are expected for raw imported water from a 2010 rate of $484/af to $1,400/af in 2035.

5.1.4 Recycled Water

The recycled water portion of the Preferred Alternative was modified from the recommended project in the 2009 RWMP, and assumes that recycled water use will increase in phases beginning in 2020. The use of recycled water will substantially increase under the Preferred Alternative from less than 100 afy (2010) to an estimated 1,500 afy by 2035, which will represent 6% of the total supply in 2035 as shown in **Figure 27**.

However, the design and construction of further NPR infrastructure is strictly dependent upon the availability of funding to offset the increased costs of maximizing existing and cheaper ground and surface water resources. This funding will also serve to bring down the overall unit cost of the Preferred Alternative implementation. To allow ample time to take advantage of funding opportunities, the implementation of recycled water planning is phased. Phase 1 will focus on applying for funding opportunities and feasibility planning. Phase 2 will include facilities planning and pre-design of the recycled water system.

The recycled water portion of the Preferred Alternative considers City demands only and not exports since exported supply can't help the City increase its own demands nor will it help meet the Water Conservation Act of 2009 per capita demand reduction targets. The additional recycled water supply of 1,500 afy will serve non-potable customers to offset large scale irrigation and some industrial use needs. The implementation of the increased NPR under the Preferred Alternative and their unit capital costs are shown in **Table 45**.

Table 45: Recommended Recycled Water System Segments

	Operation Start	Average Annual Demand (afy)	Cumulative (afy)
Segment 7	2020	210	210
Segment 9[1]	2020	239	449
Segment 2	2020	107	556
Segment 3	2020	282	838
Segment 4a	2025	135	973
Segment 6[2]	2030	550	1,523

1. Segment 9 has been modified from the 2009 RWMP to only include the following customers: Country Park Villas, Phillips Meadow, Phillips Ranch – Rio Rancho Rd, 60 & Phillips Ranch Rd, Phillips Ranch – Village L Rd (30-70), and Phillips Ranch – Village L Rd (70-100).
2. Segment 6 includes Braun Linen Service which was previously to be included with Segment 5 in the 2009 RWMP.

5.1.5 Conservation

The Preferred Alternative includes a conservation program that will meet the per capita demand reduction targets identified in the City's 2010 UWMP. These measures should be implemented in concert with the expanded NPR system described above to ensure that Water Conservation Act of 2009 compliance can be achieved by 2015 and 2020. The purpose of the IWSP was to define the most appropriate level of conservation programming (an estimated unit cost to achieve conserved supply) but not to define the exact programs the City will actually implement. It is assumed that the increased conservation program implementation will begin immediately but will also phase in programs as needed to achieve an annual savings of 1,500 af by 2030 or sooner if the recycled water program does not come on-line by 2020. The unit cost of this conservation program is estimated at $1,000/af based upon the general cost to audit and replace enough household fixtures within the City to meet 1,500 afy by 2030.

The City has recently completed its 2010 UWMP and has identified several more specific programs that will either expand existing programs or begin new program to achieve demand reductions. These programs were not used to develop the unit costs in the IWSP, but should be further examined relative to the $1,000/af unit cost estimate used here.

5.2 Schedule of Implementation

The Preferred Alternative is defined by its components, supplies and costs in 2035 once it is fully implemented. However, the actual implementation of the full alternative will need to be conducted in phases beginning in 2011 to meet changing needs and allow for new supply projects to be designed and funded to be obtained prior to coming on-line. **Table 46** and **Figure 28** shows the anticipated schedule of supplies becoming on-line and available for use by the City.

Table 46: Preferred Alternative – Average Year Supplies (afy)

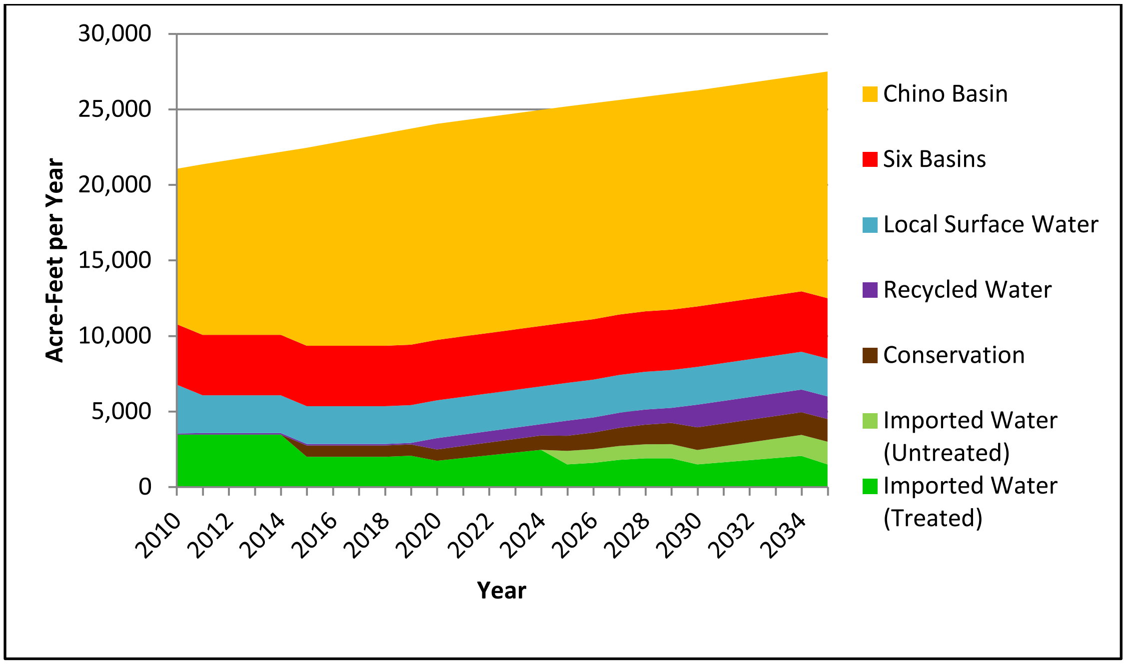
Water Supply Sources	2010	2015	2020	2025	2030	2035
Total Demand	**21,061**	**22,453**	**24,038**	**25,193**	**26,252**	**27,500**
Imported Water (Treated)	3,471	2,000	1,738	1,500	1,500	1,500
Imported Water (Untreated)	0	0	0	893	952	1,500
Six Basins	4,001	4,000	4,000	4,000	4,000	4,000
Chino Basin	10,279	13,103	14,300	14,300	14,300	15,000
Local Surface Water	3,237	2,500	2,500	2,500	2,500	2,500
Recycled Water	73	100	750	1,000	1,500	1,500
Conservation	0	750	750	1,000	1,500	1,500
Total Supply	**21,061**	**22,453**	**24,038**	**25,193**	**26,252**	**27,500**

Implementation of the Preferred Alternative project and programs can be divided into planning, design, and construction (as appropriate) phases. Depending on the complexity of the project or program, the time it takes to complete these phases of implementation can vary greatly.

Table 47 shows the timing of the implementation phases necessary to meet the schedule shown in **Table 46**. The timing of implementation phases was determined by using the following assumptions:

- Since the City currently has an excess of supply to meet demand, it is recommended that any regional supply projects that could result in early funding for the construction of the Preferred Alternative components take place as soon as possible to maximize the amount of funding that could be generated. If these projects involve leasing of supplies, they can be done rapidly and the term of the lease can be set to expire once it will be needed again by the City.

Figure 28: Preferred Alternative Total Supply Composition (afy)



- The City will be compliant with the Water Conservation Act of 2009 – meaning that conservation programming and/or recycled water use to achieve a 750 afy savings must be in place by 2015 and an additional 750 afy must be in place by 2020.
- The conservation program is assumed to require two to three years of planning to allow for the development of a full conservation plan that includes anticipated increases in conserved savings if the City's current rate study recommends and implements increased conservation pricing.
- The additional NPR system expansion to offset potable supply can also be used to meet potable demand reduction targets. The design and construction of the additional NPR system will not be able to begin immediately since facility planning and design would need to be conducted as well as funding identified, applied for and awarded in order to begin construction.
- To allow time for these activities to happen, the NPR system will take a phased approach and won't be assumed to serve new customers until 2020.
- For NPR implementation, it is assumed that a planning/permitting period of five years would be desired, followed by one year of design and one year of construction. Actual design and construction could also be spread over ten years to allow for funding a phased system.
- The PFP upgrades will result in two main projects: treatment upgrades and the raw imported water connection. Planning for these projects could start by 2013, followed by design, but the ability to construct these upgrades will be dependent upon funding. It is assumed that the increased supply will not need to be on-line until 2025.
- The development of Chino Basin supplies beyond the baseline system will include the rehabilitation/modification of Wells 30 and 35 by 2035 to meet increasing demand. Planning, design and construction of these improvements are assumed to require one year each. It is already assumed that the new perchlorate plant will come on-line in 2012 as part of the baseline supply (not as part of the Preferred Alterative components).

Table 47: Implementation Planning

	Near-Term					Mid-Term										Long-Term									
Project/ Program	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Regional Partnership																									
Conservation																									
Non-potable Reuse		Phase 1			Phase 2																				
PFP Upgrade																									
Rialto Feeder																									
Chino Development																									

Planning	Design	Construction	Operation

5.3 Implementation Yield and Costs

5.3.1 WEAP Modeling

Figure 29 is a representation of the WEAP model scenario developed for the IWSP Preferred Alternative, and shows the linkages between supplies (colored squares) and both potable and non-potable demands (gray circles). Using the phased implementation schedule in conjunction with cost reporting tools within the WEAP model, it was possible to develop annualized costs for the Preferred Alternative. The Preferred Alternative and associated implementation schedule was also run in the WEAP model to confirm annual and seasonal supply reliability and identify any constraints or issues. The WEAP model was previously used during alterative evaluation for the Mid-Pedley 5 alternative but only in terms of 2035 annual supplies, demands and total costs. The results of the final Preferred Alternative WEAP model run generated the more refined annual costs and yields described here.

5.3.2 Yield and Reliability

WEAP used a monthly time step to reflect supply variability over the course of a year. In addition, the historical hydrology for San Antonio Creek, Six Basins OSY, and estimated availability of imported water were used as inputs for the model to reflect supply variations relative to historical climate patterns. In order to predict climate based hydrologic patterns, the WEAP model was set up to simulate different portions of the historic hydrologic sequence in an iterative fashion.

To show how average monthly demand might be met in 2035, the hydrology from a wet year (like 1986) was assumed in a WEAP model run with the results shown in **Figure 30**. **Figure 31** shows how demand might be met if a dry year (like 1997) occurred in 2035. A comparison of the figures show that in a wet year, the modeled system utilizes a higher level of local surface water (making up 14% of supply in that year), while in a dry year, local surface water only makes up 6% of supplies. These figures also show that to compensate, a higher level of groundwater is used in dry years, making up 73% of supplies in that year, versus a wet year where groundwater makes up 65% of supplies.

Figure 29: WEAP Preferred Alternative Scenario Flow Diagram

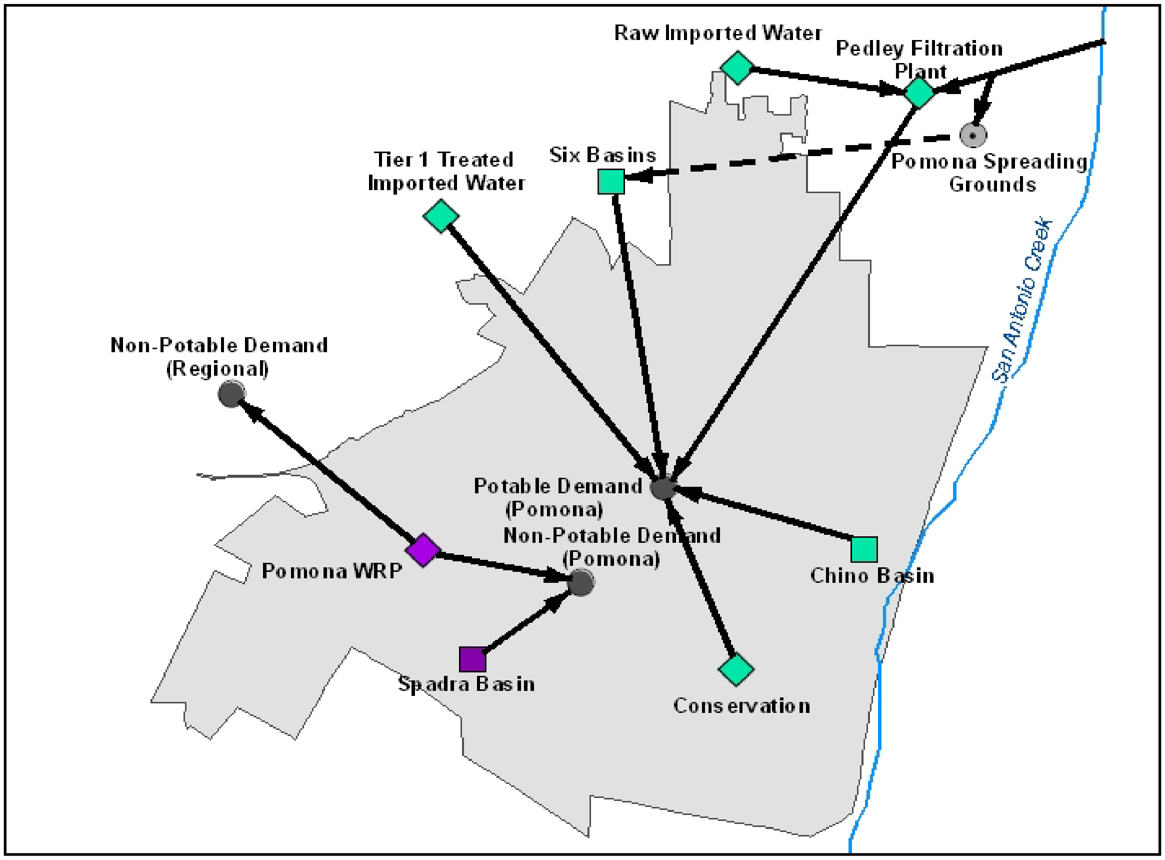


Diagram is not to scale

Figure 30: Supply Delivered to Meet City Demands in 2035, Wet Year

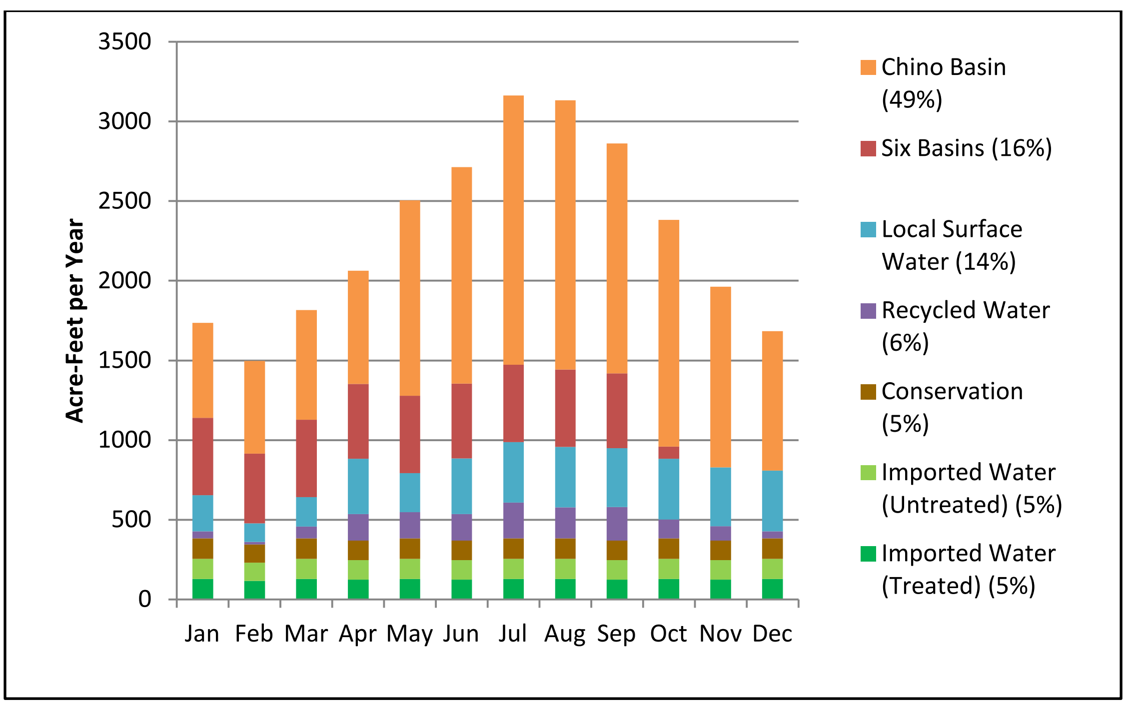
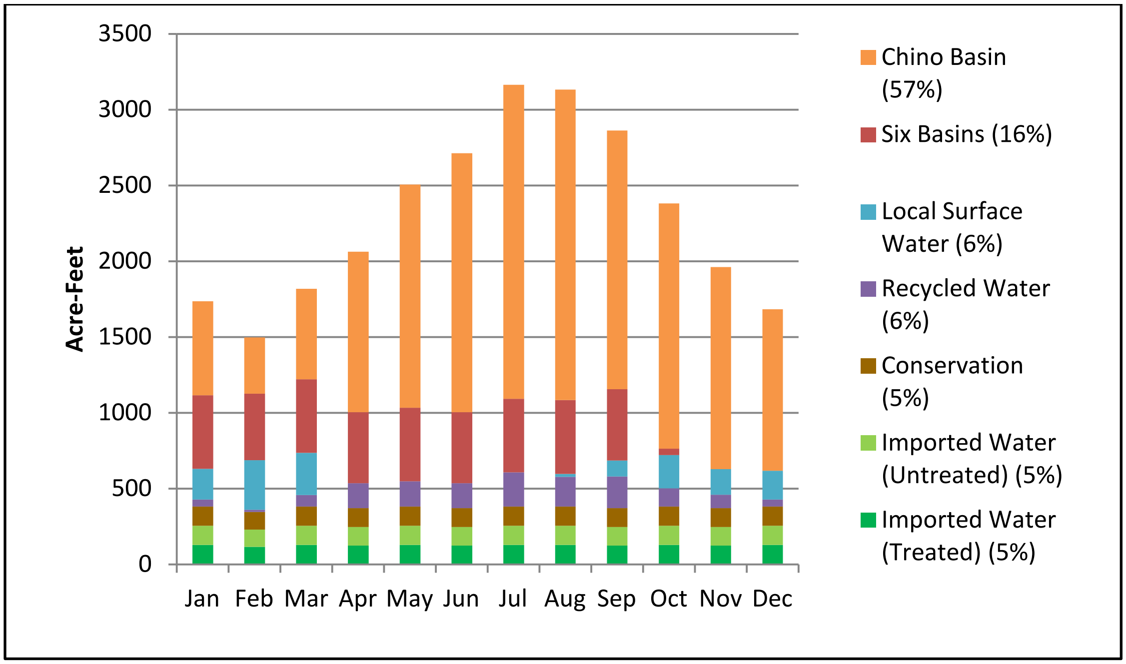


Figure 31: Supply Delivered to Meet City Demands in 2035, Dry Year



After analyzing the Preferred Alternative using the schedule shown in **Table 46**, the WEAP model results showed that on average, shortages occurred less than 1% of the time, with an average shortage of less than 100 afy. This indicates that the flexibility of the Preferred Alternative would be sufficient to meet demand under various hydrologic scenarios.

Cost Modeling

Capital and annual cost assumptions for each supply type used in the Preferred Alternative are summarized in **Table 48**. The costs in **Table 48** show capital costs for those supply sources that require facility expansion, and show annual O&M costs for those facilities as well as annual imported water purchase costs to meet the supply levels in 2035 as shown in **Table 46**.

Table 48: Preferred Alternative – Cost Assumptions

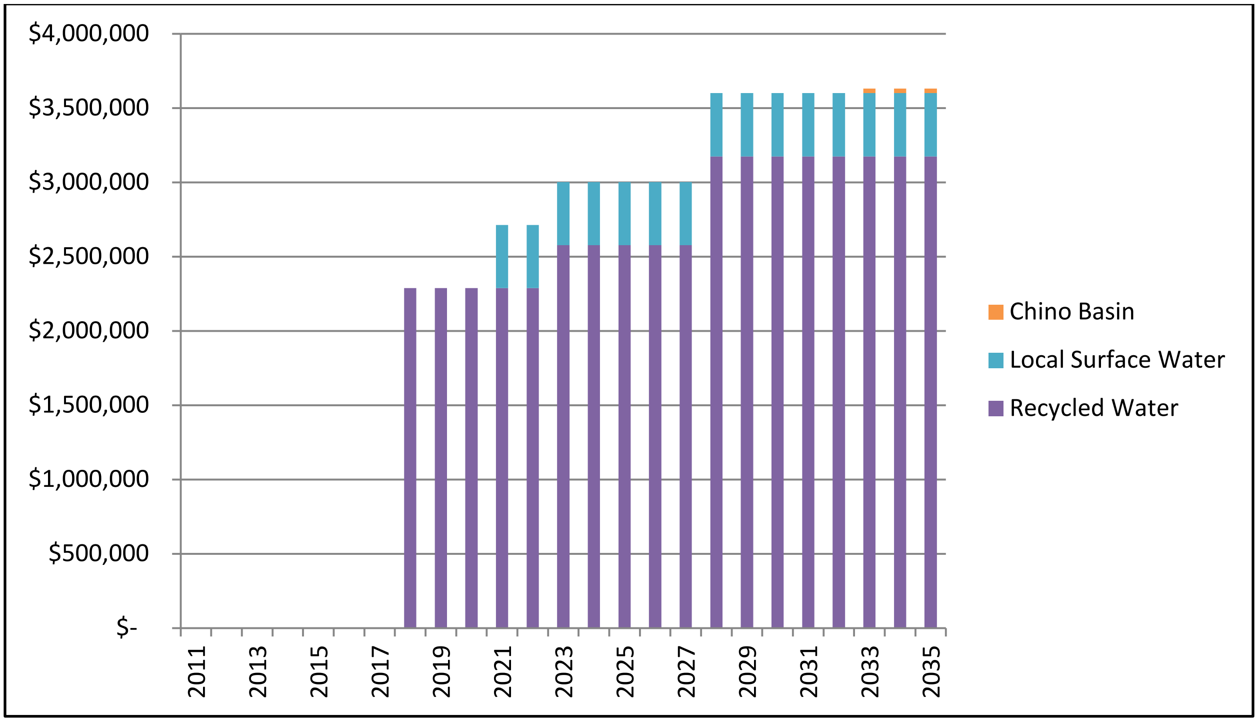
Water Supply Sources	Capital Costs[1]	Annual O&M Costs[1]
Imported Water (Untreated)[2]	n/a	$649/af
Six Basins	n/a	$300/af
Chino Basin	$0.6M	$312/af
Local Surface Water[3]	$7.8M	$183/af
Recycled Water	$51M	$150/af
Conservation	n/a	$1,000/af

Notes:
1. Capital and O&M costs are for full alternative and reported in 2010 dollars.
2. O&M costs for imported water are averaged across the project lifetime.
3. Local surface water O&M costs include cost of the Rialto connection and treating raw imported water.

The overall and annual costs projected in WEAP were based on when the design phase of the project was scheduled to begin (as shown in **Table 47**) and are presented in the following figures:

- **Annualized Capital Costs (Figure 32)**: Based on cost estimates prepared for each option as described in Chapters 3 and 4 of this IWSP, costs are annualized over 25 years at a rate of 2.4% and brought back to 2010 dollars at a rate of 2.7%, and are shown for the length of the implementation plan horizon of 2035. Capital costs are assumed to be incurred beginning two years prior to operation of the project.
- **Annual O&M Costs (Figure 34)**: For annual facilities O&M and water purchase, costs are estimated based on average historical supplies. Costs are shown through the planning horizon of 2035 but will be expected to continue past that time for as long as program components are operational.
- **Total Annual Preferred Alternative Costs (Figure 34)**: Both annualized capital costs and annual O&M costs are combined to provide an estimate of total costs each year for program implementation.

Figure 32: Annualized Capital Costs



Note: Chino Basin project annualized capital costs are approximately $30,000 per year beginning in 2033.

Figure 33: Annual O&M Costs

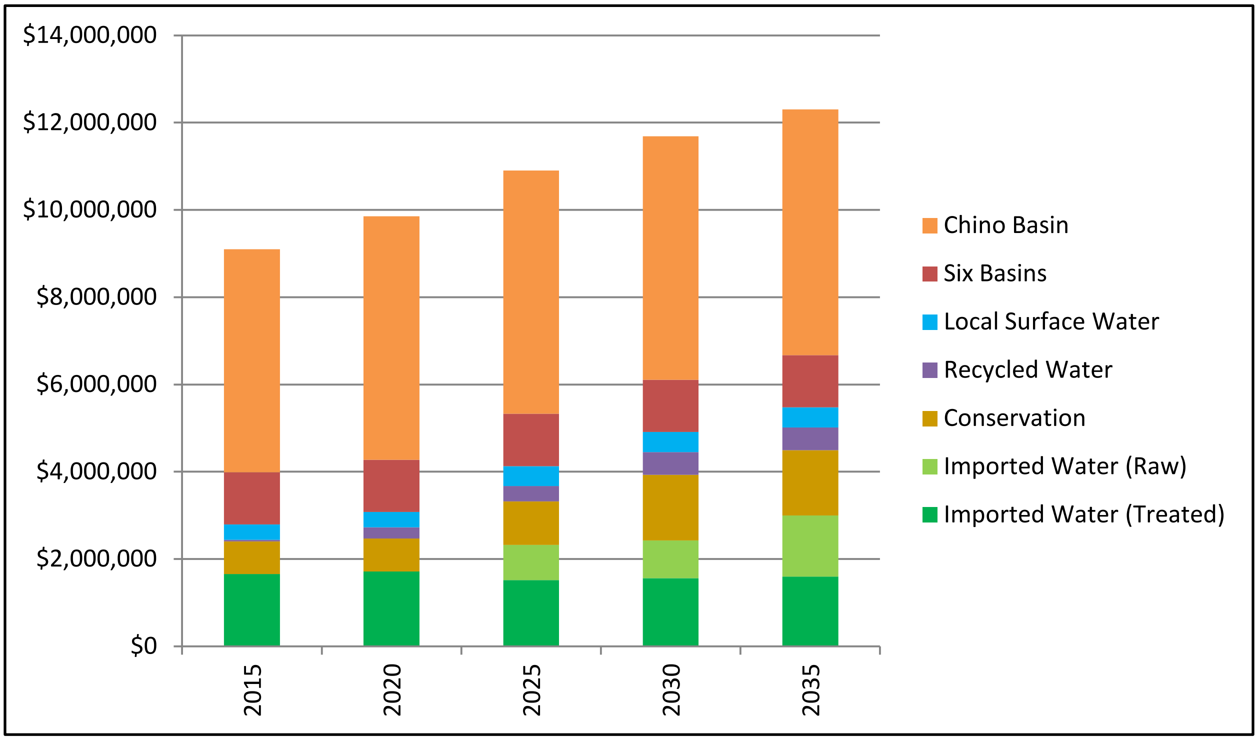
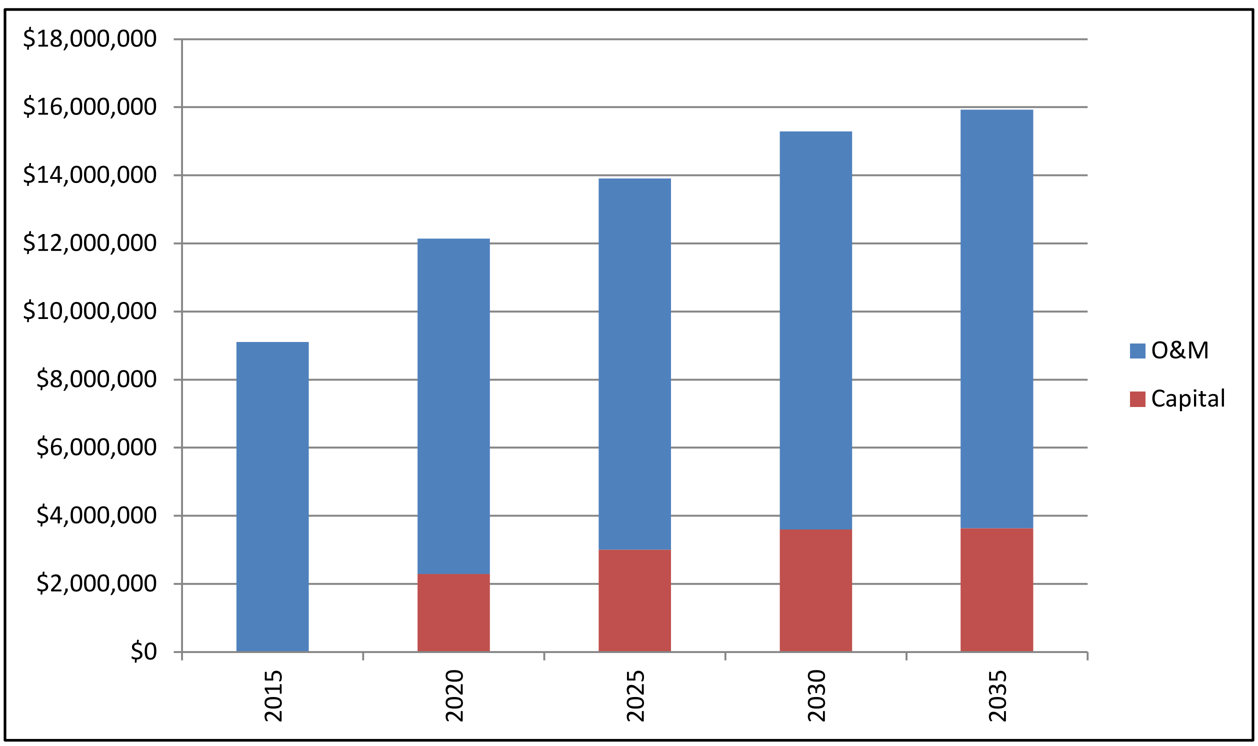


Figure 34: Total Annual Preferred Alternative Costs



5.4 Baseline Comparison

In order to better understand the impact of implementing the Preferred Alternative, it is helpful to compare it against how the City might have operated in 2035 had it not implemented this or any other alternative. The baseline condition described in Chapter 2 did not fully examine what the cost and supply strategy would have been if current status quo was maintained through 2035. To project that baseline into the future, it would need to be assumed that no additional City supply or facility developments would be completed. No replacement of wells or ability to maximize existing treatment facilities would also impact the City's ability to respond to future stringent water quality rules. As a result, it is assumed under Baseline that the City would have reached the limits of its ability to produce (or conserve) local supplies and would therefore need to rely on larger purchases of imported water to meet growing demand.

Table 49 shows a supply comparison between the projected baseline scenario described above and the Preferred Alternative. In addition to the cost of the Baseline scenario being higher than the total capital and O&M costs of the Preferred Alternative, the City would experience less reliability given its dependence on imported and current groundwater supply facilities; would not be eligible for State funding, given that it would not have met the requirements of the Water Conservation Act of 2009; and would not have the flexibility to participate in regional programs that could further reduce these overall costs (see Appendix I for a more detailed Baseline cost estimate).

Table 49: Baseline versus Preferred Alternative Supplies (2035)

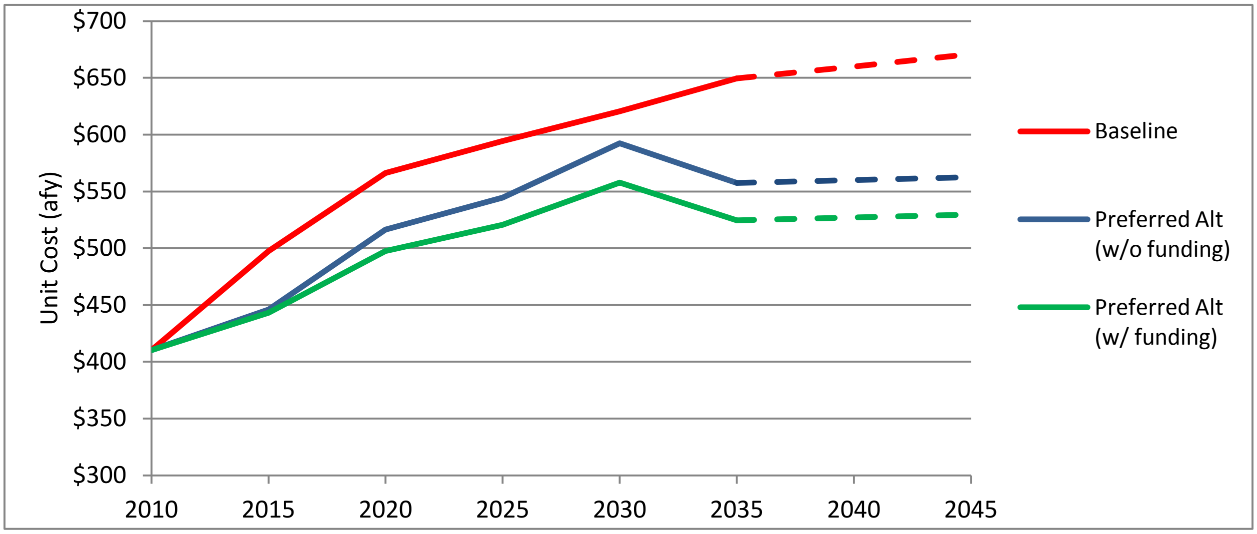
	Yield (afy)	
Water Supply Sources	**Baseline**	**Preferred Alternative**
Imported Water (Treated)	11,120	1,500
Imported Water (Untreated)	0	1,500
Six Basins	4,001	4,000
Chino Basin	10,279	15,000
Local Surface Water	2,000	2,500
Recycled Water	100	1,500
Conservation	0	1,500
Total Supply	**27,500**	**27,500**
Base Unit Cost	**$590/AF**	**$560/AF**
Unit Cost with Funding Offset	**$590/AF**	**$520/AF**

1. All costs are in 2010 dollars
2. Baseline supplies are based upon 2010 production and purchase from the ten year period from 2000-2009, increased out to 2035 to fill increasing demand

Figure 35 shows how the Baseline and Preferred Alternative costs compare over time, with Baseline costs increasing more quickly than Preferred Alternative costs due to the rapidly increasing price of imported water. The more conservative Preferred Alternative cost increases are due to investing in City owned assets increasing the ability to produce local supplies. Because the City can't control the cost or availability of imported supplies, the Baseline scenario is expected to have a much greater degree of variability relative to the Preferred Alternative – making it more difficult for the City to plan ahead and maintain consistent rates over time.

Additionally, the Preferred Alternative cost does not yet include funding opportunities which could decrease the cost of expanding the recycled water system and the cost of implementing the conservation program. It can be assumed that the City would not be able to find funding for the baseline scenario since it involves increased purchases of imported supply and no new investment in facilities or potable offset projects and programs.

Figure 35: Unit Costs of Baseline versus Preferred Alternative



Several funding opportunities are available, as described in Section 5.6. If the City takes advantage of only two of the funding sources listed, the cost of implementing the Preferred Alternative will decrease even further as shown in **Figure 35**. In this example, the MWD Local Resources Program could provide a $250/af rebate for the use of local recycled water supply instead of imported supply. This rebate could reduce the overall Preferred Alternative cost by about $15/af. Obtaining additional grant funds of $5 million through the SWRCB Recycled Water Funding Program and/or the USBR Title XVI Program for construction could reduce the costs of the Preferred Alternative by another $25/af.

5.5 Adaptive Management Strategy

It is recommended that the City incorporate an adaptive management strategy throughout implementation of the program.

> *Adaptive management is a structured, iterative process of optimal decision-making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. In this way, decision-making simultaneously maximizes one or more resource objectives and accrues information needed to improve future management.*

The Preferred Alternative is comprised of several components, and was selected based on many assumptions and variables. These variables include the potential for changes in public or political sentiment, funding opportunities, climate, resource productivity, regulations, and water demand patterns. Given that the implementation schedule for the program is over 20 years, it is likely that changes in these variables will occur that could impact the effectiveness of the program within that time. The amount of data and information available to make decisions regarding the City's water resources will also increase and provide an opportunity to refine the program.

Incorporating an adaptive management strategy will allow the City to keep on-track and cost-effectively meet the needs of its customers by allowing for the flexibility to be responsive to changes and new information. There are several key decision points that have been identified where it is recommended that the City re-examine the current and relevant information available to determine the best course of action. Key decision points and actions to happen along the implementation pathway may include:

- Implementation of the 2005 Water Master Plan will need to occur to allow current facilities to maintain current operational capacity. If this does not happen, many of the future IWSP programs will not be able to be implemented as they are dependent on those facilities.
- Given the near-term economic climate, it will be imperative that additional funding be obtained to afford capital expenses relative to the recycled water system expansion, PFP upgrades and conservation program implementation.
- If the City's water rates are increased (currently under study), it is likely that initial funding will be available if the funds are maintained for the water utility's future needs.
- Future studies/plans will need to be conducted to conclude that certain aspects of the IWSP program are implemented. These studies/plans could include:
  - Construction of a Rialto Feeder connection to bring raw imported supplies to the PFP
  - Build upon PFP Expansion Study to examine additional PFP treatment upgrades
  - Facility plan for recycled water expansion that would include customer coordination and market assurances
  - Regional project studies with neighboring agencies like CVWD, WVWD and RWD
- Changes in water quality regulations, such as a Chromium VI MCL, could necessitate either increases in other supplies to offset unusable groundwater or increases in groundwater treatment facilities (in-lieu of other expenditures like a PFP upgrade) to further treat current supplies

5.6 Potential Funding and Financing

Successful implementation of the Preferred Alternative will require adequate financing and funding from a variety of potential sources.

5.6.1 Grant or Loan Funding

Table 50 provides an overview of the potential grant or loan programs available from federal, state and local sources. For example, if the City were to participate in MWD's Local Resource Program, then there would be an automatic rebate of $250/af for the use of local recycled water supply instead of imported supply. Generally, projects that will offset the use of imported supplies or potable supplies will receive the highest chance for funding and will be needed to fund the conservation and recycled water development projects in the Preferred Alternative.

Table 50: Potential Grant and Loan Funding Sources

Funding Program	Type of Program	Amount Available	Comments
Grant Sources			
SWRCB Recycled Water Funding Program	Construction Grant	25% of construction cost up to $5 million	No construction grant funds currently available, but expect program to be active in the future
SWRCB Recycled Water Funding Program	Planning Grant	50% cost share funding up to $75,000	These are readily available and have a streamlined application process
Bureau of Reclamation Title XVI	Implementation Grant	25% of total project cost up to $20 million	Funding dependant on earmarks by congress
Bureau of Reclamation – WaterSMART Grant	Implementation Grant	50% cost share funding up to $300,000	Two categories of grants: 1) System Optimization Review – broad look at system–wide efficiently focused on improving efficiency and operations of a water delivery system; 2) Water Marketing and Efficiency Grants – construction projects that will create water markets and make more efficient use of existing water supplies.
DWR IRWMP Grant Program, Prop 84 Round 2	Implementation Grant	Regional funding up to $24 million	Need to provide multiple benefits and recommended collaboration with neighboring agencies
DWR Water Use Efficiency Grant Program	Implementation Grant	20% cost share funding up to $4 million	No implementation grant funds currently available, but expect program to be active in the future
MWD Local Resources Program	Rebate Program	$250/AF of imported water offset	Funding available only after project implementation
Loan Sources			
SWRCB State Revolving Fund Loan Program	Recycled Water Construction Loan	Up to $50 million	Total Amount available $200-300 million. Applications accepted on a continuous basis, loan available once per recipient per year
Safe Drinking Water State Revolving Fund	Conservation Loan	Unknown	Applicant submits pre-application before submitting full application, next pre-application period is unknown.
Municipal Bonds	Bonds could supplement other funding sources for project capital costs. Different types of bonds (e.g. revenue bonds, general obligation bonds, certificate of participation) should be considered.		

5.6.2 Rate Increases

The City is currently engaging in a rate study to examine current water (including recycled water) and wastewater (sewer) rates. Based on the City's 2005 Water and Sewer Master Plans and subsequent updates, the study will help determine requirements and subsequent water and wastewater rates, including a multi-year rate adjustment scenario. The overall goal of this review is to develop appropriate individual rate structures for the City's water and wastewater utilities that:

- Reflects the City policies regarding effective and efficient use of water services and wastewater collection services;
- Generates sufficient and stable revenues to pay for current and future water and wastewater services and related expenses;
- Encourages reduction in water consumption through appropriate pricing strategies;
- Provides an overview of the City's water and wastewater capital and infrastructure programs and proposes funding mechanisms to fund replacement of aging infrastructure;
- Proposes rate options that allow for the full funding (100%) or partial funding (50%) of annual depreciation expense from the water and sewer funds, to be accumulated in a capital and infrastructure replacement fund - alternatively, recommends another reserve policy procedure for establishing operations, capital replacement, contingency and emergency reserves;
- Provides for an emergency rate structure to address loss of water supply through disaster, infrastructure failure, or drought; and
- Provides for three different funding levels for Capital Improvement Plan for both water and sewer.

5.6.3 Potential Regional Projects

The City also has an opportunity to work with surrounding agencies in the near-term to leverage the City's unused supplies and provide those supplies regionally while increasing the funding for future IWSP implementation. The City currently engages in annual rights leasing that has generated some revenue, but a great benefit could be achieved if these supplies were perceived to be more reliable to partnering agencies over a longer period of time. These projects could also improve the reliability of the City's existing supplies as well. Current projects and programs that are being examined by the City include:

- **Pomona Basin (Palomares Cienega) Regional Groundwater Project:** This project is different than the one examined under the IWSP alternatives analysis. This project would partner with WVWD and RWD to examine the potential of creating a regional groundwater treatment facility to treat groundwater from the Palomares Cienega area for distribution in the PWRJWL to WVWD and RWD. The treatment facility would include the potential for additional Chromium VI treatment and be supplied through spreading credits achieved by increased imported water spreading by WVWD and RWD at the San Antonio Spreading Grounds. The City could benefit by being able to use the facility to also treat City groundwater supplies that would minimize the need for imported water blending as well as potential funding for participating.
- **Mid-term surface water leases:** The City may chose to lease surface water rights to agencies east of the 40/60 weir (like CVWD) over several years to generate funding for future project development that will be needed when demand increases and those supplies are needed at the future upgraded PFP.

5.7 Near-term Action Plan

As **Table 47** indicates, there are near term (2011-2015) activities that can begin immediately. It is recommended that the near-terms goals for the City focus on generating funding to implement projects in the mid- and long–term (when the supplies are needed) as well as to begin the planning necessary for further program implementation. It is expected that the perchlorate treatment facility will come on-line in 2012 and so the City will be financially and resource limited until it is fully constructed. Based upon these factors the following actions are recommended in the near-term.

2011

- Conduct Rate Study
- Begin partnership on Pomona Basin Regional Groundwater Project Plan
- Construct perchlorate facility

2012

- Bring perchlorate facility on-line
- Implement rate-study recommendations
- Submit regional project to Greater Los Angeles County Integrated Regional Water Management Program for Round 2 implementation funding
- Begin Phase 1 recycled water funding and feasibility planning such as applying for SWRCB Water Recycling Planning Grant
- Begin conservation program planning

2013

- Continue conservation planning and begin implementation of certain programs
- Complete design of regional projects(s)

2014

- Bring full Phase 1 conservation program on-line
- Begin construction of regional projects
- Begin 2015 Urban Water Management Plan

2015

- Assess reductions in gpcd demands
- Begin Phase 2 recycled water facilities planning and pre-design

Chapter 6 References

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Appendix A - Demand Calculations

Pomona Integrated Water Supply Plan
Appendix A: Demand Projection Calculations

A-1: 2005 UWMP demand projections

	2005	2010	2015	2020	2025	2030	2035	Notes
Single Family Residential	14,927	15,263	15,816	16,566	17,310	18,349	19,450	2005 UWMP tables updated in 2008, Table 15
Multi Family Residential	5,784	6,079	6,389	6,715	7,058	7,236	7,418	2005 UWMP tables updated in 2008, Table 15
Commercial	6,121	6,433	6,761	7,106	7,469	7,657	7,850	2005 UWMP tables updated in 2008, Table 15
Industrial	741	778	818	860	904	926	949	2005 UWMP tables updated in 2008, Table 15; includes Table 16 non-potable demand
Institutional/Governmental	79	83	88	92	97	99	101	2005 UWMP tables updated in 2008, Table 15
Landscape	1,185	1,245	1,309	1,375	1,446	1,482	1,519	2005 UWMP tables updated in 2008, Table 15
Total Demand	**28,837**	**29,881**	**31,181**	**32,714**	**34,284**	**35,749**	**37,287**	
Potential Non-Potable Demand	**1400**	**200**	**200**	**200**	**200**	**200**	**200**	2005 UWMP tables updated in 2008, Table 16
Potable Demand	**27,437**	**29,681**	**30,981**	**32,514**	**34,084**	**35,549**	**37,087**	
Unaccounted-For	2,148	2,035	1,922	1,809	1,696	1,696	1,696	2005 UWMP tables updated in 2008, Table 16
Total Demand + Unaccounted	**30,985**	**31,916**	**33,103**	**34,523**	**35,980**	**37,445**	**38,983**	

*2035 extrapolated

A-2: 2005 UWMP demand projections increase rate per year

	2005	2010	2015	2020	2025	2030	2035	Notes
Single Family Residential	-	0.5%	0.7%	0.9%	0.9%	1.2%	1.2%	2005 UWMP tables updated in 2008, Table 15
Multi Family Residential	-	1.0%	1.0%	1.0%	1.0%	0.5%	0.5%	2005 UWMP tables updated in 2008, Table 15
Commercial	-	1.0%	1.0%	1.0%	1.0%	0.5%	0.5%	2005 UWMP tables updated in 2008, Table 15
Industrial	-	1.0%	1.0%	1.0%	1.0%	0.5%	0.5%	2005 UWMP tables updated in 2008, Table 15; includes Table 16 non-potable demand
Institutional/Governmental	-	1.0%	1.2%	0.9%	1.1%	0.4%	0.4%	2005 UWMP tables updated in 2008, Table 15
Landscape	-	1.0%	1.0%	1.0%	1.0%	0.5%	0.5%	2005 UWMP tables updated in 2008, Table 15

*2035 extrapolated

A-3: Demand projection revisions using actual 2009 potable demand held steady for 5 years + 2010 recycled water demand as starting point; Revised recycled water demand

	2009	2010	2015	2020	2025	2030	2035	Notes
Single Family Residential	10,441	10,441	10,441	10,936	11,427	12,113	12,840	
Multi Family Residential	4,019	4,019	4,019	4,224	4,440	4,552	4,667	
Commercial/Industrial/Institutional	5,684	5,684	5,684	5,974	6,279	6,437	6,599	Commercial/Industrial/Institutional are reported together by the City
Landscape	1,266	1,266	1,266	1,331	1,399	1,433	1,468	
Total Demand	**21,410**	**21,410**	**21,410**	**22,465**	**23,546**	**24,536**	**25,575**	
Potential Non-Potable Demand	**96**	**96**	**96**	**96**	**96**	**96**	**96**	RW demand of existing system
Potable Demand	**21,314**	**21,314**	**21,314**	**22,369**	**23,450**	**24,440**	**25,479**	
Unaccounted-For Water**	1,043	1,043	1,043	1,573	1,648	1,717	1,790	2005 UWMP tables updated in 2008, Table 16
Total Demand + Unaccounted	**22,357**	**22,453**	**22,453**	**24,038**	**25,194**	**26,253**	**27,365**	

*2035 extrapolated

Appendix B - Wells

Pomona Integrated Water Supply Plan

Appendix B: Summary of Wells

Well No.	Groundwater Basin	Year Drilled	Design Pumping Rate (gpm)	Current Pumping Rate (gpm)	Treated or Untreated	Status	08/09 Production - Untreated Wells (AFY)	08/09 Production - Treated Wells (AFY)
2	Chino	1967	1200	1214	Treated	Active	1539	
3	Pomona	1954	600	600	Treated	Active		495
5b	Chino	1991	1000	820	Treated	Active	1136	
6	Chino	1933	1000	--	Treated	Inactive		369
7	Pomona	1957	600	565	Treated	Active		520
8b	Pomona	1993	900	940	Treated	Active		830
9b	Pomona	1991	350	285	Treated	Active		114
10	Chino	1965	900	880	Treated	Active		1241
11	Chino	1947	450	--	Treated	Inactive		--
12	Chino	1947	1100	--	Treated	Inactive		--
13	Pomona	NA	175	--	Treated	Inactive		95
14	Chino	1951	650	--	Treated	Inactive		157
15	Chino	1951	720	--	Treated	Inactive		0
16	Chino	1953	900	--	Treated	Inactive		781
17	Chino	1954	700	--	Treated	Inactive		--
18	Chino	1954	850	--	Treated	Inactive		--
20	Lower Claremont Heights	1927	600	--	Treated	Inactive	--	
21	Chino	1926	750	729	Treated	Active		1208
23	Chino	1964	1000	840	Treated	Active		615
24	Chino	1927			Treated	Inactive		0
25	Chino	1968	900	996	Treated	Active		1573
26	Chino	1971	600	600	Treated	Active		985
27	Chino	1973	1000	575	Untreated	Active	720	
28	Spadra	1973	350	305	Untreated	Inactive	316	
29	Chino	1975	550	--	Treated	Inactive		--
30	Chino	1977	300	--	Untreated	Inactive		--
32b	Pomona	1996	500 / 600	--	Treated	Inactive		--
34	Chino	1993	1,200	1,045	Treated	Active		1752
35	Chino	1993	700	565	Untreated	Active	472	
36	Chino	1996	1000	721	Treated	Active		1181
37	Pomona	1997	700 / 800	732	Treated	Active		180
TW-1	Upper Claremont Heights	1926	300	434	Untreated	Active	599	
TW-2	Upper Claremont Heights	1986	350	--	Untreated	Inactive	66	
TW-3	Upper Claremont Heights	1904	300	--	Untreated	Inactive	--	
TW-4	Upper Claremont Heights	1989	300	374	Untreated	Active	480	
						TOTAL AFY	5328	12096

Notes:

1. List does not include non-potable Wells 19 and 31.
2. Wells that require blending for water quality reasons are considered "treated" wells.

Appendix C - Baseline Unit Costs & Water Quality

	Groundwater without Treatment	*Year of Replacement*	*Years until Replacement*		*Capital Cost of Replacement (2010 $)*	*P/F*	*A/P*	**Groundwater With Treatment**	**Imported Water**	**Surface Water Treatment**
						0.024	25			
Operations & Maintenance										
Labor & Personnel Overhead	$79,443							$810,320	$90,792	$131,649
Chemicals - Alum at Pedley										$12,000
Chemicals - Hypochlorite	$20,000							$48,000		$12,000
Electricity	$340,000							$1,533,000		$28,000
Electricity for New ClO4 Plant								$168,000		
Other Utilities/ Energy Costs	$5,157							$5,157		$5,157
Capital Investment										
Full Replacement										
Well #3		2024	14		$1,500,000	$1,076,197	$57,746	$57,746		
Well #6		2003	-7		$1,500,000	$1,500,000	$80,486	$80,486		
Well #7		2027	17		$1,500,000	$1,002,287	$53,780	$53,780		
Well #10		2035	25		$1,500,000	$829,072	$44,486	$44,486		
Well #11		2017	7		$1,500,000	$1,270,549	$68,174	$68,174		
Well #12		2017	7		$1,500,000	$1,270,549	$68,174	$68,174		
Well #13		2031	21		$1,500,000	$911,575	$48,912	$48,912		
Well #14		2021	11		$1,500,000	$1,155,558	$62,004	$62,004		
Well #15		2021	11		$1,500,000	$1,155,558	$62,004	$62,004		
Well #16		2023	13		$1,500,000	$1,102,026	$59,131	$59,131		
Well #17		2023	13		$1,500,000	$1,102,026	$59,131	$59,131		
Well #18		2024	14		$1,500,000	$1,076,197	$57,746	$57,746		
Well #20		1997	-13		$1,500,000	$1,500,000	$80,486	$80,486		
Well #21		1996	-14		$1,500,000	$1,500,000	$80,486	$80,486		
Well #23		2034	24		$1,500,000	$848,970	$45,553	$45,553		
Well #TW-1	$80,486	1996	-14		$1,500,000	$1,500,000	$80,486			
Well #TW-3	$80,486	1996	-14		$1,500,000	$1,500,000	$80,486			
Refurbishment/ Rehabilitation		Every ten years: 2015, 2025, and 2035								
Well #2								$15,398		
Well #3								$15,398		
Well #5b								$15,398		
Well #6								$15,398		
Well #7								$15,398		
Well #8								$15,398		
Well #9								$15,398		
Well #10								$15,398		
Well #11								$15,398		
Well #12								$15,398		
Well #13								$15,398		
Well #14								$15,398		
Well #15								$15,398		
Well #16								$15,398		
Well #17								$15,398		
Well #18								$15,398		
Well #20								$15,398		
Well #21								$15,398		
Well #23								$15,398		
Well #24								$15,398		
Well #25								$15,398		
Well #26								$15,398		
Well #27	$15,398									
Well #28	$15,398									
Well #29								$15,398		
Well #30	$15,398									
Well #32								$15,398		
Well #34								$15,398		
Well #35	$15,398									
Well #36								$15,398		
Well #37								$15,398		
Well #TW-1	$15,398									
Well #TW-2	$15,398									
Well #TW-3	$15,398									
Well #TW-4	$15,398									
Calibrate Analyzers & Instrumentation - AEP								$3,000		
Calibrate Analyzers & Instrumentation - 10 & Towne								$3,000		
Calibrate Analyzers & Instrumentation - Pedley										$3,000
Purchase of Parts - AEP								$2,000		
Purchase of Parts - 10 & Towne								$5,000		
Purchase of Parts - Pedley										$2,000
Control Valve Maintenance - AEP								$2,000		
Filter Media Replacement - Pedley										$16,361
Resin Replacement at AEP								$55,035		
New AEP Construction - Downstream Perchlorate Plant			5		$11,000,000	$9,769,963	$524,227	$524,227		
Resin Replacement at new ClO4 Plant								$869,000		
AEP-1 Replacement								$312,813		
AEP-2 Replacement								$84,466		
10 & Towne Replacement								$52,423		
Harrison Replacement								$193,704		
Debt Service	$9,518							$35,616	$12,427	$3,907

	Groundwater without Treatment	*Year of Replacement*	*Years until Replacement*		*Capital Cost of Replacement (2010 $)*	*P/F*	*A/P*	**Groundwater With Treatment**	**Imported Water**	**Surface Water Treatment**
Commodity Costs										
Chino Basin Assessments	$392,000							$1,008,000		
Six Basins Assessments	$20,000							$20,000		
Brine Disposal								$31,000		
Salt								$680,000		
Imported Water Purchase									$6,420,388	
Miscellaneous Administration & Insurance Expense	$54,100							$551,817	$61,828	$89,651
Annual Expenses	$1,204,371							$8,341,616	$6,585,435	$303,724
Historical Production (AFY)	5,328							12,096	6,956	2,187
Production after 2015	5,328							19,937	6,956	2,187
Total Life Cycle Cost ($/AF)	**$226**							**$418**	**$947**	**$139**
Operations & Maintenance	$83							$129	$13	$86
Capital Investment	$55							$175	$2	$12
Commodity Costs	$87							$115	$932	$41

Historical production: last 5 years of data for imported water and surface water from Production tables. Well data is from FY2008-2009 production data

Well Rehabilitation Costs					
well rehab cost	**op cost of capital**	**time until first rehab**	**time until second rehab**		**time until third rehab**
$134,000	0.024	5	15	20	25

	P/F	**A/P**
2015	$119,016	
2025	$93,887	
2035	$74,064	
Total	$286,967	$15,398

Sand (2010)	Anthracite (2010)
$2,783	$82,500

Filter Media Replacement Pedley	Sand	Anthracite
2015	$2,472	$73,275
2020	$2,195	$65,081
2025	$1,950	$57,804
2030	$1,732	$51,340
2035	$1,538	$45,599
Total	$9,887	$293,098
		$302,985
$402,270		

Resin Purchase at AEP		
2015	$357,288	
2025	$281,850	
2035	$222,341	
Total	$861,478	$46,224

Imported			
(see "Alternative Costs" tab)			
			$923

Debt service	**P/A**	**A/P**
$75,790	$1,145,576	$61,468

AEP-2 Replacement	**2010 $**	**P/F**	**A/P**
2035	$2,830,000	$1,564,183	$84,466

AEP-1 Replacement	**2010 $**	**P/F**	**A/P**
2022	$7,700,000	$5,792,836	$312,813

10 & Towne Replacement	**2010 $**	**P/F**	**A/P**
2030	$1,560,000	$970,790	$52,423

Harrison GWT Replacement	**2010 $**	**P/F**	**A/P**
2035	$6,490,000	$3,587,119	$193,704

Pomona Integrated Water Supply Plan
Appendix C - Water Quality Data

Historical Water Quality - 24 month period (Jan 2008 through Dec 2009)

					Disinfection Byproducts						
Water Sources	**Notes**	**Turbidity (NTU)**	**TDS**	**Chlorine Residual (mg/L)**	**HAAs (µg/l)**	**THMs (µg/l)**	**Bromate (µg/l)**	**Arsenic (µg/l)**	**Chromium, Total (µg/l)**	**Chromium VI (µg/l)**	**Lead (µg/l)**
CDPH Water Quality Standards											
Maximum Contaminant Level (MCL)			1000		60	80	10	10	50	--	15
Public Health Goal (PHG)					--	--	--	0.004	--	--	0.2
Imported Water											
Imported	MWD- Weymouth Filtration Plant	Min:	Min: 510	Min: 1.5	Min: 1.5	Min: 15					
		Max:	Max: 660	Max: 3	Max: 30	Max: 81					
		Avg: 0.06	**Avg: 620**	**Avg: 2.4**	**Avg: 14**	**Avg: 39**					
Imported	TVMWD - Miramar Filtration Plant:	Min:	Min: 210	Min: 2.23	Min: 10.3	Min: 35.7					
		Max:	Max: 350	Max: 2.51	Max: 18.8	Max: 47.1					
		Avg: 0.11	**Avg: 279**	**Avg: 2.39**	**Avg: 15.6**	**Avg: 42.2**					
Groundwater (Treated and Untreated)											
Groundwater - Raw	all wells	Min:	Min: 220					Min: ND	Min:	Min: ND	Min:
		Max:	Max: 780					Max: 6.3	Max:	Max: 7.3	Max:
		Avg:	**Avg: 407**					**Avg: ND**	**Avg:**	**Avg: 1.8**	**Avg:**
AEP Wells	Wells: 4(I), 6, 10, 11, 14, 15, 16, 17, 18, 21, 23, 24(I), 26, 34, 36(I)	Min: 0.13	Min:					Min: 0.42	Min: 3.37	Min:	Min:
		Max: 1.5	Max:					Max: 1.5	Max: 49	Max:	Max:
		Avg: 0.74	**Avg:**					**Avg: 0.73**	**Avg: 11.46**	**Avg:**	**Avg:**
AEP- Feed	Wells: 4(I), 6, 10, 11, 12, 14, 15, 16, 17, 18, 21, 23, 24(I), 26, 34, 36(I)	Min:	Min:					Min: 1.1	Min: 6.64	Min: 4.8	Min:
		Max:	Max:					Max: 1.2	Max: 9.83	Max: 7	Max:
		Avg:	**Avg:**					**Avg: 1.15**	**Avg: 7.90**	**Avg: 5.70**	**Avg:**
AEP- Treated		Min:	Min:	Min:	Min:	Min: 3.39	Min:	Min:	Min: ND	Min: ND	Min:
		Max:	Max:	Max:	Max:	Max: 9.56	Max:	Max:	Max: ND	Max: ND	Max:
		Avg:	**Avg:**	**Avg:**	**Avg:**	**Avg: 6.48**	**Avg:**	**Avg:**	**Avg: ND**	**Avg: ND**	**Avg:**
AEP- Blended	Reservoir 6	Min:	Min: 448	Min: 0.1	Min:	Min:	Min:	Min:	Min: 2.03	Min: 2.1	Min:
		Max:	Max: 511	Max: 1.6	Max:	Max:	Max:	Max:	Max: 3.14	Max: 3.1	Max:
		Avg:	**Avg: 483**	**Avg: 0.9**	**Avg:**	**Avg:**	**Avg:**	**Avg:**	**Avg: 2.47**	**Avg: 2.50**	**Avg:**
Harrison GWTF (at Well 37) - Influent	Well 37	Min: 0.22	Min:					Min: 1.1	Min:	Min: 1.46	Min:
		Max: 6.1	Max:					Max: 1.7	Max:	Max: 5	Max:
		Avg: 3.16	**Avg:**					**Avg: 1.4**	**Avg:**	**Avg: 3.23**	**Avg:**
Harrison GWTF (at Well 37) - Treated		Min: 0.3	Min: 476	Min: 0.4	Min:	Min:	Min:	Min: 0.72	Min:	Min:	Min:
		Max: 0.62	Max: 525	Max: 1.29	Max:	Max:	Max:	Max: 0.91	Max:	Max:	Max:
		Avg: 0.49	**Avg: 499**	**Avg: 0.65**	**Avg:**	**Avg:**	**Avg:**	**Avg: 0.82**	**Avg:**	**Avg:**	**Avg:**
10 & Towne Air Stripper - Feed	Wells 7, 8b	Min:	Min:					Min:	Min:	Min:	Min:
		Max:	Max:					Max:	Max:	Max:	Max:
		Avg:	**Avg:**					**Avg:**	**Avg:**	**Avg:**	**Avg:**
10 & Towne Air Stripper - Treated		Min:	Min:	Min: 0.59	Min:	Min:	Min:	Min:	Min:	Min:	Min:
		Max:	Max:	Max: 1.93	Max:	Max:	Max:	Max:	Max:	Max:	Max:
		Avg:	**Avg:**	**Avg: 1.13**	**Avg:**	**Avg:**	**Avg:**	**Avg:**	**Avg:**	**Avg:**	**Avg:**
Well 3 Air Stripping Plant - Feed	Well 3	Min: 0.12	Min:					Min: 9.9	Min:	Min: 4.2	Min:
		Max: 0.12	Max:					Max: 9.9	Max:	Max: 4.5	Max:
		Avg: 0.12	**Avg:**					**Avg: 9.9**	**Avg:**	**Avg: 4.3**	**Avg:**
Well 3 Air Stripping Plant - Treated		Min:	Min:	Min: 0.59	Min:	Min:	Min:	Min:	Min:	Min:	Min:
		Max:	Max:	Max: 1.93	Max:	Max:	Max:	Max:	Max:	Max:	Max:
		Avg:	**Avg:**	**Avg: 1.13**	**Avg:**	**Avg:**	**Avg:**	**Avg:**	**Avg:**	**Avg: 14.5**	**Avg:**
Reservoir 5 Air Stripping Facility - Treated	Reservoir 5	Min: 0.16	Min:	Min: 0.2	Min:	Min: 6.61	Min:	Min: 0.57	Min:	Min:	Min:
		Max: 0.23	Max:	Max: 1.9	Max:	Max: 64.2	Max:	Max: 2.2	Max:	Max:	Max:
		Avg: -	**Avg:**	**Avg: 0.8**	**Avg:**	**Avg: 32.97**	**Avg:**	**Avg: 1.05**	**Avg:**	**Avg:**	**Avg:**
Local Surface Water											
Surface - Raw	Pedley Filtration Plant influent from Canyon Surface Diversion	Min: 0.02	Min: 180								
		Max: 5.6	Max: 210								
		Avg: 0.41	**Avg: 195**								
Surface - Finished (Pedley)	Pedley Filtration Plant effluent	Min: 0.01	Min:	Min: 0.9	Min:	Min: 3.39					
		Max: 0.6	Max:	Max: 4.0	Max:	Max: 9.56					
		Avg: 0.25	**Avg:**	**Avg: 2.0**	**Avg:**	**Avg: 6.48**					

Historical Water Quality - 24 month period (Jan 2008 through De

				Volatile Synthetic Organic Compounds			Year
Water Sources	**Notes**	**Nitrate (NO3) (mg/l)**	**Perchlorate (µg/l)**	**Trichloroethylene (TCE) (µg/l)**	**Tetrachloroethylene (PCE) (µg/l)**	**1,1-Dichloroethylene (DCE) (µg/l)**	
CDPH Water Quality Standards							
Maximum Contaminant Level (MCL)		45	6	5	5	6	
Public Health Goal (PHG)		45	6	1.7	0.06	10	
Imported Water							
Imported	MWD- Weymouth Filtration Plant						2009
							2009
							2009
Imported	TVMWD - Miramar Filtration Plant:						2009
							2009
							2009
Groundwater (Treated and Untreated)							
Groundwater - Raw	all wells	Min: 2.9	Min: ND	Min: ND	Min: ND	Min: ND	2009
		Max: 34	Max: 5.6	Max: 4.1	Max: 3.14	Max: 2.15	2009
		Avg: 19	**Avg: ND**	**Avg: 2.05**	**Avg: 1.48**	**Avg: 0.81**	**2009**
AEP Wells	Wells: 4(I), 6, 10, 11, 14, 15, 16, 17, 18, 21, 23, 24(I), 26, 34, 36(I)	Min: 34	Min: 2.10	Min: 0.5	Min: 0.52	Min: 0.52	2008/2009
		Max: 100	Max: 15.00	Max: 46	Max: 12.4	Max: 10.5	2008/2009
		Avg: 60.97	**Avg: 8.09**	**Avg: 4.86**	**Avg: 4.99**	**Avg: 3.33**	**2008/2009**
AEP- Feed	Wells: 4(I), 6, 10, 11, 12, 14, 15, 16, 17, 18, 21, 23, 24(I), 26, 34, 36(I)	Min: 44	Min:	Min: 5.7	Min: 2.29	Min: 1.06	2008/2009
		Max: 66.3	Max:	Max: 10	Max: 2.7	Max: 1.5	2008/2009
		Avg: 55.83	**Avg: 6.95 (a)**	**Avg: 7.64**	**Avg: 2.54**	**Avg: 1.34**	**2008/2009, a: Apr 2010**
AEP- Treated		Min: 1.9	Min: 2	Min: 2.05	Min: 2.32	Min: 1.43	2008/2009
		Max: 15	Max: 4.8	Max: 3.57	Max: 2.9	Max: 2.00	2008/2009
		Avg: 4.54	**Avg: 2.62**	**Avg: 2.77**	**Avg: 2.61**	**Avg: 1.66**	**2008/2009**
AEP- Blended	Reservoir 6	Min: 17	Min: 2.2	Min: 1.9	Min: 1.68	Min: 1.45	2008/2009
		Max: 27	Max: 6.4	Max: 3.45	Max: 2.6	Max: 1.60	2008/2009
		Avg: 21.35	**Avg: 4.13**	**Avg: 2.54**	**Avg: 2.29**	**Avg: 1.53**	**2008/2009**
Harrison GWTF (at Well 37) - Influent	Well 37	Min: 35	Min: 2	Min:	Min:	Min:	2008/2009
		Max: 67.1	Max: 4.7	Max:	Max:	Max:	2008/2009
		Avg: 53.72	**Avg: 2.9**	**Avg:**	**Avg:**	**Avg:**	**2008/2009**
Harrison GWTF (at Well 37) - Treated		Min: 2.34	Min: 0	Min:	Min:	Min:	2008/2009
		Max: 30	Max: 3	Max:	Max:	Max:	2008/2009
		Avg: 18	**Avg: 0.47**	**Avg:**	**Avg:**	**Avg:**	**2008/2009**
10 & Towne Air Stripper - Feed	Wells 7, 8b	Min: 21	Min: 5.4	Min: 2.8	Min: ND	Min: 23	2008/2009
		Max: 66	Max: 8.4	Max: 4.3	Max: ND	Max: 49	2008/2009
		Avg: 56.9	**Avg: 13**	**Avg: 3.7**	**Avg: ND**	**Avg: 36**	**2008/2009**
10 & Towne Air Stripper - Treated		Min:	Min:	Min: ND	Min: ND	Min: ND	2008/2009
		Max:	Max:	Max: ND	Max: ND	Max: 1.7	2008/2009
		Avg:	**Avg:**	**Avg: ND**	**Avg: ND**	**Avg: 0.49**	**2008/2009**
Well 3 Air Stripping Plant - Feed	Well 3	Min: 65	Min: 7.4	Min: 1.4	Min: Not reported	Min: 3.8	2008/2009
		Max: 96	Max: 10	Max: 1.8	Max: Not reported	Max: 5.3	2008/2009
		Avg: 70.84	**Avg: 9.17**	**Avg: 2.1**	**Avg: Not reported**	**Avg: 4.7**	**2008/2009**
Well 3 Air Stripping Plant - Treated		Min:	Min:	Min: ND	Min: Not reported	Min: ND	2009/2010
		Max:	Max:	Max: ND	Max: Not reported	Max: ND	2009/2010
		Avg:	**Avg:**	**Avg: ND**	**Avg: Not reported**	**Avg: ND**	**2009/2010**
Reservoir 5 Air Stripping Facility - Treated	Reservoir 5	Min: 4.8	Min: 2.00	Min: 0.5	Min: 0.5	Min: 0.5	2008/2009
		Max: 28	Max: 5.30	Max: 3.79	Max: 2.44	Max: 1.74	2008/2009
		Avg: 21.68	**Avg: 3.73**	**Avg: 1.61**	**Avg: 1.3**	**Avg: 0.98**	**2008/2009**
Local Surface Water							
Surface - Raw	Pedley Filtration Plant influent from Canyon Surface Diversion						2008/2009
							2008/2009
							2008/2009
Surface - Finished (Pedley)	Pedley Filtration Plant effluent						2008/2009
							2008/2009
							2008/2009

Appendix D - Options

Table D-1: Groundwater Options

				Option Description	Facilities	Quantity (AFY)	Quality	Sustainability[1]	Adaptability/ Flexibility	O&M	Screening/ Considerations
Ground-water	Chino Basin	Increase Production	Increase Treatment	**Rehabilitate/ Modify Well 24:** Will add new liner to prevent sand intrusion	*Existing* Well 24 *New* Well liner	340-450 afy at 70% 300-400 gpm	• High nitrate treated through AEP • Sand production may require filters if not mitigated	Depends on ability to mitigate sand production	Provides operational flexibility with other wells	Depends on ability to mitigate sand; Periodic well maintenance	**KEEP:** • Will increase production but in combination with other options may max out AEP
				Rehabilitate/ Modify Well 29: Increased treatment for MTBE will allow further use	*Existing* Well 29 *New* Wellhead treatment facilities for MTBE	450 afy at 70% 400 gpm	High MTBE treated through additional well head facilities	May require supplemental treatment if Cr6+ MCL is established	Provides operational flexibility with other wells	Periodic well maintenance and increased treatment upgrades	**KEEP:** • Will increase production but in combination with other options may max out AEP
			No Treament	**Rehabilitate Well 35**	*Existing* Well 35	700 afy at 70% 400 gpm	No water quality issues	• May require supplemental treatment if Cr6+ MCL is established	Increases the amount of cheaper water pumped from the basin	Periodic well maintenance	**KEEP**
				Rehabilitate/Modify Well 30	*Existing* Well 30	340 afy at 70% 300 gpm	No water quality issues	• May require supplemental treatment if Cr6+ MCL is established	Increases the amount of cheaper water pumped from the basin	Periodic well maintenance	**KEEP**
				Replace Well 30	*New* Well 30	500 to 1,000 gpm 560 to 1,130 afy at 70%	No water quality issues	New wells have a 70-yr life expectancy	Increases the amount of cheaper water pumped from the basin	Periodic well maintenance	**KEEP** • May need to destroy the existing well; would be more expensive than rehabilitation but could have higher yield
	Chino Basin	Same or Decrease Production	Lease Rights	**Lease water rights from other producers:** Lease rights in basin prior to purchasing replenishment (MWD) water for overproduction	N/A	1,000 - 3,000 af	N/A	• Short-term agreement will require renegotiation • May not be sustainable long-term due to subsidence potential	May allow for lower cost of makeup water	N/A	**SCREEN OUT:** • Opportunistic - Relies on available rights of other producers and variable volumes needed to purchase
				Lease Rights to CVWD/Upland	*Existing* Select wells would go off-line	(500 - Maximum Water Right)	Could diminish need for treatment	Lease will need to be re-negotiated or ended	• Once rights are leased, can't access water in near-term • Can re-instate supply in long-term to meet future demand	Decrease in O&M given decrease in facilities	**KEEP:** • Would be a source of revenue for Pomona

Table D-1: Groundwater Options

				Option Description	Facilities	Quantity (AFY)	Quality	Sustainability[1]	Adaptability/ Flexibility	O&M	Screening/ Considerations
Ground-water	Six Basins Palomares Cienega	Increase Production	Increase Treatment	**Activate Well 32b**	*Existing* Well 32b	560-680 afy (500 / 600 gpm)	High nitrate; requires treatment and/or blending		Provides operational flexibility with other wells	Periodic well maintenance	**KEEP:** • Could be combined with other wells as part of a special project, or may be able to partner with TVMWD's Palomares Study. • Note that Well 32b would need ot be treated at same air stripper as Wells 7 & 8, but there may not be sufficient capacity to treat all three wells
				Maximize Well 3: Install larger pump	*Existing* Well 3 *New* Pump Motor	200 gpm (above current pumping rate) (225 afy with 70 % Utilization)	High nitrate; High perchlorate; High VOCs	Approximate 14 years of remaining well life	• Provides operational flexibility with other wells • Less expensive than drilling new well	Periodic well maintenance	**KEEP:** • Would have to be evaluated to avoid capturing area VOC plumes Need to evaluate treatment plant capacity and blending
				Additional wells for special project(s)	*New:* Wells, as necessary	500 to 600 gpm/well; Total to be determined based on analysis to determine pumping necessary to mitigate liquefaction potential	May require nitrate, perchlorate and/or VOC treatment	New wells have a 70-yr life expectancy	Can provide liquefaction mitigation; can provide additional production without assessment; may be coupled with conjunctive use storage in north basin	Periodic well maintenance	**SCREEN OUT:** • Opportunistic Could be made into a special project. Issues to be addressed prior to implementation: 1) Production rates necessary to lower groundwater to acceptable levels 2) Treatment needs
				Rehabilitate Simpson Paper Wells	*Existing:* Three existing wells *New:* Pumps Appurtenances	1,600 gpm; (1,800 afy at 70% utilization)	May have significant water quality issues and will need to be tested	Age of wells is unknown but they will require significant rehabilitation and possible repair	Provides a significant source of irrigation water that may not require treatment	Periodic well maintenance	**KEEP** • The condition and water quality from these wells will have to be verified before they can be considered a viable option for use.
		Same or Decrease Production	Lease Rights	**Lease to WVMWD or RMWD:** Allows external agency to pump and treat water for PWR Joint Pipeline	*Existing:* PWR Joint Line *New* Wells Treatment facilities	(500 - Maximum Water Right)	Quality issues will be dealt with by external agency	May not be able to get rights back in order to justify investment of treatment facility by external agency	Increased flexibility for region but less to Pomona	Decreases O&M given fewer wells on-line to decrease production	**KEEP:** • Necessary if regional project is to be implemented

Table D-1: Groundwater Options

				Option Description	Facilities	Quantity (AFY)	Quality	Sustainability[1]	Adaptability/ Flexibility	O&M	Screening/ Considerations
Ground-water	Six Basins North Pomona	Increase Production	ASR	**Recharge through spreading:** Identify artificial recharge spreading basin sites for conjunctive use storage and recovery	*New:* Artificial recharge facilities and associated property	To be determined based on artificial recharge area and infiltration rates	Sources of water can include imported water and recycled water	Can enhance the sustainability of the Pomona Basin	Can be coupled with Special Project to improve water quality of the basin	Spreading basins require regular maintenance to maintain infiltration rates	**KEEP:** • Necessary for storage of excess surface water. • A major limitation with this option is the availablity of land for spreading. • Implementation may require acquisition of sites outside the City boundaries. • Spreading at the Pedley site would require rehab.
				Convert Well 37 to ASR Well	*Existing* Well 37 Injection facilities	300 to 400 gpm of injection; (200-300 afy recharge)	Will need to utilize imported water; water quality impacts will need to be evaluated	Can enhance the sustainability of the Pomona Basin	Can be coupled with Special Project to improve water quality of the basin	ASR wells require frequent maintenance to maintain injection rates	**KEEP**
				Construct New ASR Wells	*New:* Wells	300 to 400 gpm of injection; (200-300 afy recharge)	Will need to utilize imported water	Can enhance the sustainability of the Pomona Basin	Can be coupled with Special Project to improve water quality of the basin	ASR wells require frequent maintenance to maintain injection rates	**KEEP**
		Same or Decrease Production	Maintain Rights	**Reduce pumping:** Keep within right when coupled with increased 6 Basins production options by reducing pumping in areas with deeper groundwater	*Existing:* Wells 9b and 37	To be determined based on production in the Palomares Cienega area (0 to 1,600 afy reduction)	No water quality impacts	Allows for groundwater level recovery in the north part of the Pomona Basin	Provides operational flexibility with other wells	Periodic well maintenance	**KEEP** • Must be coupled with project that will increase pumping in another area of Six Basins • Will have to be evaluated with respect to the ability to serve pressure zones in the north basin.
	Six Basins Claremont	Increase Production	Treatment	**Activate then Replace Well 20:** Provides two-step rehab and the replacement option	*Existing* Well 20 *New:* Well 20	600 gpm; (680 afy at 70% utilization)	• Near-term blending required • Long-term- designed to reduce nitrate	Provides a near-term rehab options coupled with a longer-term option	Allows for production in a subbasin that Pomona does not currently utilize	• Periodic well maintenance • May need to destroy the existing well	**KEEP**
			No Treatment	**Replace/Supplement selected Tunnel Wells**	*New:* Wells Pumping appurtenances	200 to 500 gpm/well	May be designed to reduce nitrate in discharge	New wells have a 70-yr life expectancy	Provides operational flexibility with other wells; may provide a blending source	Periodic well maintenance	**KEEP** • May require supplemental treatment if Cr6+ MCL is established • May need to destroy the existing wells wells are sited near or on the Pedley property • Needs to be coupled with increased recharge at Pomona SG

Table D-1: Groundwater Options

				Option Description	Facilities	Quantity (AFY)	Quality	Sustainability[1]	Adaptability/ Flexibility	O&M	Screening/ Considerations
Ground-water	Six Basins Claremont	Same or Decrease Production	Maintain Rights	**Lease water produced**: Lease unused pumping rights to other pumpers	*Existing:* Wells *New:* Conveyance facilities	(500 - Maximum Water Right)	Very high quality of water supply	Maintain water rights allowing supply to be available for long-term need	Can sell produced water on an annual basis as opposed to leasing right which requires longer-term commitment	Less flexible since Pomona would be committed to O&M on specific wells	**KEEP** • Maintains current operations but as a source of revenue
			Lease Rights	**Lease rights to TVMWD to pump near Miramar**	N/A	To be determined	N/A	Maintain water rights allowing supply to be available for long-term need	• Temporary leases allow for near-term revenue and preservation of right for long-term needs		**KEEP** • Provides a source of revenue for Pomona
				Exceed Pomona's rights but lease to cover: Lease water rights from other producers in basin prior to purchasing replenishment water for overproduction	N/A	Variable and to be determined	N/A	Short-term agreement will require renegotiation	May allow for lower cost of makeup water	N/A	**KEEP**
	Spadra Basin	Increase Production - Non-potable		**Construct new wells for non-potable use:** Multiple well sites across entire Basin	*New:* Wells Pumping appurtenances	300-400 gpm/well (340-450 afy with 70% Utilization)	Will likely have high TDS; will have to be used for non-potable supply or desalted	New wells have a 70-yr life expectancy; production will have to be monitored to avoid exceeding the basin yield	The only limitation to pumping is sustainable yield of the basin	Periodic well maintenance	**KEEP** • May require supplemental treatment if Cr6+ MCL is established
		Treatment - Potable	Blend	**Construct a new well in East Spadra**	*New:* Well Pumping appurtenances	500 to 600 gpm; (560 to 680 afy at 70% utilization)	Water quality is unknown	New wells have a 70-yr life expectancy	Provides operational flexibility with other wells; may provide a blending source	Periodic well maintenance	**KEEP** • Excessive pumping in this area will have to be monitored with respect to land subsidence from groundwater withdrawal
			Desalter	**Construct Desalter Facilities for Wells 19 and 31**	*Existing:* Wells 19 and 31 *New:* Reverse osmosis treatment facilities	600 gpm supply water; 480 gpm product water (20 percent reject); 540 afy production (70% utilization)	Produces potable water	Approximate 11 to 16 years of remaining well life; production will have to be within the basin yield	Provides operational flexibility with other wells; may provide a blending source	Periodic well maintenance; periodic treatment plant maintenance	**KEEP** • The wells are relatively old and will need to be replaced within approximately 20 yrs • Brine disposal method will need to be identified

Note: It is assumed that the water right of each groundwater basin can be maximized while maintaining an overall balance of recharge and discharge such that the groundwater supply is sustainable.

Table D-2: Local Surface Water Options

				Option Description	Facilities	Quantity (afy)	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Surface Water	No Pedley	No Treatment	Ground-water Recharge	**Spread Raw Water at Pomona Spreading Grounds**: Raw surface water will bypass Pedley and be used for recharge credit	*Existing:* • Pomona Spreading Grounds • Canon Water Line and Weir *New:* None	• Min 1,700 afy • Max 5,400 afy • Depends on pumping credit achievable in adjudication • A significant portion of the recharged flow is not captured by Pomona	• Eliminates Pedley treatment turbidity issue • Potential waste of high-quality, affordable blending water	• Spreading grounds are under Pomona's control • Poses very little regulatory risk • Stormwater recharge will remain highly accepted	• Limited by recharge credit in adjudication and basin losses • No opportunity for exchange or revenue	• Eliminates Pedley O&M • Periodic future basin rehab necessary to keep this supply permanent	**KEEP:** Provides low-investment, low revenue option within Pomona control Couple with groundwater option
Surface Water	No Pedley	No Treatment	Ground-water Recharge	**Spread Raw Water at San Antonio Spreading Grounds:** Removes need for weir and diverts 100% raw water to San Antonio Spreading Grounds for credit	*Existing:* • San Antonio Spreading Grounds • Canon Water Line and Weir is eliminated *New:* • New pipeline may be required depending on capacity of existing pipeline to San Antonio spreading grounds	• Min 1,700 afy • Max 5,400 afy • Depends on pumping credit achievable in adjudication • A significant portion of the recharged flow is not captured by Pomona	• Eliminates Pedley treatment turbidity issue • Potential waste of high-quality, affordable blending water	• Spreading grounds not owned nor operated by Pomona • Poses very little regulatory risk • Stormwater recharge will remain highly accepted	• Limited by recharge credit in adjudication and basin losses • No major changes to delivery infrastructure • Impacts recharge for current pumping in Pomona basin	• Eliminates Pedley O&M • Periodic future basin rehab necessary to keep this supply permanent - but not Pomona responsibility	**KEEP:** Provides low-investment, low revenue option that limits Pomona control and operations Couple with groundwater option
Surface Water	No Pedley	No Treatment	Lease Rights	**Temporary Lease of Rights to SAWC/Upland:**	*Existing:* • 60-40 splitter box *New:* • Potential pipes to SAWC	(4,480 afy)	• Eliminates Pedley treatment turbidity issue • Potential waste of high-quality, affordable blending water	• Temporary agreements for leasing the water will need to be re-negotiated or allowed to end	• Temporary leases may not be worth facility upgrades • Temporary leases allow for near-term revenue and	• Eliminates Pedley O&M • Other O&M responsibility of SAWC	**KEEP:** Will need to chose which of the Lease Rights options is most advantageous to Pomona
Surface Water	No Pedley	No Treatment	Lease Rights	**Temporary Lease of Rights to CVMWD:** channel into Cucamonga basin at Edison box (weir)	*Existing:* • Canon Waterline (rehab portion)-CVWD would pay for in exchange for water supply *New* • Pipeline from Canon Waterline to the spreading box owned and operated by San Antonio Water Company.	(4,480 afy)	• Eliminates Pedley treatment turbidity issue • Potential waste of high-quality, affordable blending water	• Temporary agreements for leasing the water will need to be re-negotiated or allowed to end	• Temporary leases may not be worth facility upgrades • Temporary leases allow for near-term revenue and preservation of right for long-term needs	• Eliminates Pedley O&M • Other O&M responsibility of SAWC	**KEEP:** • Will need to chose which of the Lease Rights options is most advantageous to Pomona

Table D-2: Local Surface Water Options

			Option Description	Facilities	Quantity (afy)	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Surface Water	No Pedley	Treat Elsewhere	**Treat entire right at TVMWD Miramar:** Route flows to Miramar and pay treatment surcharge to TVMWD	*Existing:* TVMWD waterline to Pomona *New:* • Raw Water Connection	4,480 afy	• Turbidity issues be dealt with outside of Pedley • Maintains or improves current water quality	• Treated supply dependant upon TVMWD • Contract would eventually need to be re-negotiated	• No real flexibility in treatment and production changes • Maintains rights • Potential permanent abandonment of Pedley to fund treatment upgrades at Miramar	• Eliminates Pedley O&M • Other O&M responsibility of TVMWD	**KEEP**: • Only viable with long-term agreement with TVMWD to justify Pedley abandonment
Surface Water	Same Pedley	Same Treatment	**Baseline:** Maintain status-quo at Pedley	*Existing:* • Pedley WTP as-is	2,240 afy	N/A	• Risk of plant obsolescence • Risk of process malfunction increases with age	• Limited production based on raw water availability • Other options could be implemented at a later date	• Maintains same O&M but threat of aging infrastructure	**KEEP**: • The easiest and cheapest option
Surface Water	Same Pedley	Increase Treatment	**Upgrade Pedley with Retrofitted Superpulsator**: New presedimentation basin; no flocculation	*Existing:* • Retrofitted Superpulsator, Rapid Mix Vault • Conversion of portion of spreading grounds to presedimentation basin *New:* • New filters • New drying beds • New ultraviolet reactors	4,480 afy	• Process improvements would mitigate turbidity spikes	• Process improvements limit risk of obsolescence	• Ability to send water to lower pressure zones by gravity	• Reduces O&M cost per unit of water produced, compared to existing situation	**KEEP**: Preservation and enhancement of existing asset. Cheaper than Option 2
Surface Water	Same Pedley	Increase Treatment	**Upgrade Pedley with Flocculation:** Converts portion of spreading grounds for use as presedimentation basin as well as flocculation facilities	*Existing:* • Decommission Superpulsator • Convert portion of spreading grounds to presedimentation basin *New:* • Flocculation Basin • Filters • Sludge Drying Beds	4,480 afy	• Process improvements would mitigate turbidity spikes	• Process improvements limit risk of obsolescence	• Ability to send water to lower pressure zones by gravity	• Reduces O&M cost per unit of water produced, compared to existing situation	**SCREEN OUT:** Provides same benefits as Retrofitted Superpulsator option, but is more expensive

Table D-2: Local Surface Water Options

				Option Description	Facilities	Quantity (afy)	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Surface Water	Same Pedley	Improve Blending		**Improve Quality through Blending:** Use Rialto feeder water to improve quality	Existing: • Pedley WTP as-is	4,480 afy	• Raw water turbidity reduction due to source water blending • Lower THMs, age of water	• Long-term ability to purchase raw water may not be reliable • Risk of plant obsolescence • Risk of process malfunction increases with age • Risk of new CDPH requirements making conventional treatment obsolete	• Maximizes production of existing asset • Ability to switch between raw source and surface source	• Reduces O&M cost per unit of water produced, compared to existing situation (higher plant production with the same facilities)	**KEEP**: Potential for minimal capital investment while doubling production
Surface Water	Expand Pedley	6mgd Capacity		**Increase Capacity though Seasonal Storage:** Convert portion of Pomona spreading grounds to seasonal stormwater storage with overflow to remaining spreading grounds	*Existing:* • Pomona Spreading Grounds *New:* • Seasonal storage spreading grounds, 100 MG lake	6,720 afy	• Provides more opportunity to use surface water for blending down nitrates, instead of imported water • Less risk of system THMs • Must be combined with a treatment upgrade option	• Increases source water availability and long-term sustainability • Upgrades to increase plant service life	• Allows Pomona to switch between storage and recharge • Increases dry weather production	• Significantly reduces O&M cost per unit of water produced • Increases basin O&M due to lake maintenance/upkeep	**KEEP**: Provides maximum flexibility between stormwater storage, on-site recharge, and expanded treatment
Surface Water	Expand Pedley	6mgd Capacity		**Capture Additional Local Stormwater:** Local surface flows can augment San Antonio Creek supply for treatment	*Existing:* • Connections to existing storm drains *New:* • Pipelines to route additional flows	6,720 afy w/ SP Floc & Season storage	• Provides more opportunity to use surface water for blending down nitrates, instead of imported water • Less risk of system THMs	• Increases source water availability and long-term sustainability • Upgrades to increase plant service life	• Additional stormwater flows are available in wet season only • Not viable stand-alone, must be used in addition to other options	• Significantly reduces O&M cost per unit of water produced • Increases basin O&M due to lake maintenance/upkeep	**SCREEN OUT:** Would require connection to non-City storm drain system

Table D-2: Local Surface Water Options

				Option Description	Facilities	Quantity (afy)	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Surface Water	Expand Pedley	6mgd Capacity		**Raw water blending Rialto feeder:** Process improvements plus capacity expansion to 6 mgd	*Existing:* • Decommission Superpulsator • Convert portion of spreading grounds to presedimentation basin *New:* • Flocculation Basin • Filters • Sludge Drying Beds	6 mgd (6,720 afy)	• Expanded Pedley provides more opportunity to use surface water for blending down nitrates, instead of imported water • Less risk of system THMs with expanded Pedley • Process improvements would mitigate turbidity spikes	• Measures to increase source water availability are sustainable long-term • Expanded plant will include upgrades to increase plant service life • CDPH regulatory input will be incorporated into modified facilities	• Provides backup water source • Supports continuous production at capacity by avoiding extreme wet weather and dry weather shutdowns	• Significantly reduces O&M cost per unit of water produced, compared to existing situation • O&M cost lower than for surface water storage option because there is no lake maintenance/upkeep	**KEEP:** Blending may be necessary to provide 6 mgd continuous production
		10 mgd Capacity		**Increase Capacity though Seasonal Storage:** Convert portion of Pomona spreading grounds to seasonal stormwater storage requires larger volume of seasonal storage than 6 mgd option. The footprint of the 10 mgd option is larger than the footprint of the 6 mgd facilities.	*Existing:* • Decommission Superpulsator • Convert portion of spreading grounds to presedimentation basin *New:* • Flocculation Basin • Filters • Sludge Drying Beds • 150 MG lake	10 mgd (11,200 afy)	• Expanded Pedley provides more opportunity to use surface water for blending down nitrates, instead of imported water • Process improvements would mitigate turbidity spikes • Less risk of system THMs with expanded Pedley	• Risk of inadequate source water availability • Expanded plant will include upgrades to increase plant service life • CDPH regulatory input will be incorporated into modified facilities • Addition of stormwater detention does not pose significant risk of regulatory change	• Allows Pomona to switch between treatment and recharge '• Storage increases dry weather production	• Significantly reduces O&M cost per unit of water produced, compared to existing situation • O&M cost higher than for raw water blending option because of lake maintenance/upkeep	**KEEP**: • Viability will depend on amount of additional stormwater capture available
				Capture Additional Local Stormwater: Pipe new sources of surface water to Pedley new pipelines with new sources of stormwater flow	*Existing:* • Decommission Superpulsator • Convert portion of spreading grounds to presedimentation basin *New:* • Flocculation Basin • Filters • Sludge Drying Beds	10 mgd (11,200 afy)	• Expanded Pedley provides more opportunity to use surface water for blending down nitrates, instead of imported water • Less risk of system THMs with expanded Pedley • Process improvements would mitigate turbidity spikes	• Risk of inadequate source water availability • Expanded plant will include upgrades to increase plant service life • CDPH regulatory input will be incorporated into modified facilities	• New Stormwater sources may not solve dry weather slump in production without storage	• Significantly reduces O&M cost per unit of water produced, compared to existing situation • O&M cost higher than for raw water blending option because of lake maintenance/upkeep	**SCREEN OUT:** • Expanding plant to 10 mgd will be wasted investment unless stormwater storage is added • Add new surface water sources to option above

Table D-2: Local Surface Water Options

				Option Description	Facilities	Quantity (afy)	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Surface Water	Expand Pedley	10 mgd Capacity		**Raw water blending Rialto feeder:** Process improvements plus capacity expansion to 10 mgd	*Existing:* • Decommission Superpulsator • Convert portion of spreading grounds to presedimentation basin *New:* • Flocculation Basin • Filters • Sludge Drying Beds	10 mgd (11,200 afy)	• Expanded Pedley provides more opportunity to use surface water for blending down nitrates, instead of imported water • Less risk of system THMs with expanded Pedley • Process improvements would mitigate turbidity spikes	• Risk of inadequate source water availability • Measures to increase source water availability are sustainable long-term • Expanded plant will include upgrades to increase plant service life • CDPH regulatory input will be incorporated into modified facilities	• Provides backup water source • Supports continuous production at capacity by avoiding extreme wet weather and dry weather shutdowns	• Significantly reduces O&M cost per unit of water produced, compared to existing situation • O&M cost lower than for surface water storage option because there is no lake maintenance/ upkeep	**KEEP:** • Blending may be necessary to provide 10 mgd continuous production

Table D-3: Imported Water Options

		Option Description	Facilities	Quantity (AFY)	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Imported Water (IW)	Same Purchase (SP)	**Use OC Feeder (Instead of JWL) for IW blending:** Would move Pomona's OC Waterline Turnout (PM-11) to Arrow and E for blending at Reservoir 5. This would allow for upstream agencies to send lesser quality water to Walnut and Rowland.	*Existing:* • PWR-JWL *New:* • Connection to OC feeder • Pipeline from new connection to delivery system	3,000 afy	High quality, treated water	• IW may not be reliable over long term • Reduces the connection size from 40 cfs to 10 cfs, which may not be sufficient to meet demand	• Provides greater imported water use flexibility	No O&M considerations	**KEEP:** • Does not provide a supply benefit, but may be a source of revenue.
Imported Water (IW)	Same Purchase (SP)	**Move JWL connection to allow impaired GW to be sent downstream:** Impaired GW Pipeline to collect high nitrate GW upstream of Pomona and connect to JWL downstream of Pomona connection	*Existing:* • PWR-JWL • Wells in high nitrate areas *New:* • Impaired GW pipeline to JWL	3,000 afy	Nitrate levels would need to be closely monitored for blending	• IW may not be reliable over long term • Six basins production varies with GW level, which would cause the revenue generated to vary	• Provides greater imported water use flexibility • CDPH would have to approve the delivery of GW to the PWR-JWL	No O&M considerations	**SCREEN OUT:** • This option is similar to the option is a regional level variation on the one above and does not involve Pomona
Imported Water (IW)	Same Purchase (SP)	**TVMWD Interconnection:** Create interconnection to TVMWD at Pedley to take treated IW instead of through PWR JWL (Pomona would decrease water taken from PWR - when available)	*New:* • Connection to IW lines at TVMWD Pedley WTP	3,000 mgd	High quality, treated water	• IW may not be reliable over long term	• Provides greater imported water use flexibility	No O&M considerations	**SCREEN OUT:** • Opportunistic in that water would only be taken from new connection when available. To be beneficial would need to allow for upstream users to use PWR on a regular basis.
Imported Water (IW)	Same Purchase (SP)	**Raw imported purchase:** Purchase raw IW instead of treated IW and treat SWP water at Pedley	*New:* • Connection to IW line near Pedley	3,000 mgd	High quality, treated water	• IW may not be reliable over long term	• Provides flexibility for the use of Pedley	No O&M considerations	**KEEP:** • Required to combine with some Local Surface options.
Imported Water (IW)	Decrease Purchase (DP)	**WVWD or RWD through PWR JPA**	*Existing:* Existing agency connections to IW lines	Up to (6,800 afy)	High quality, treated water	• IW may not be reliable over long term • Revenue would end when the lease is up • Agencies may only be interested in sale	• Lease amounts can be scaled according to agency needs	No O&M considerations	**KEEP:** • Does not provide a supply benefit, but may be a source of revenue.
Imported Water (IW)	Decrease Purchase (DP)	**CVMWD/Upland**	*Existing:* Existing agency connections to IW lines	Up to (6,800 afy)	High quality, treated water	• IW may not be reliable over long term • Revenue would end when the lease is up • Agencies may only be interested in sale	• Lease amounts can be scaled according to agency needs	No O&M considerations	**KEEP:** • Does not provide a supply benefit, but may be a source of revenue.

Table D-4: Recycled Water Options

			Option Description	Facilities	Quantity	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Recycled Water	Increase Use	NPR	**RWMP Recommended Alternative:** Expand non-potable system to serve more external customers and southwestern in-City demands	*Existing:* • Pomona WRP • Current RW System *New:* • Segment 2, 3, 4a, 6, 7, 9, Braun Linen	1,523 afy	Can be used for non-potable supply only	• Depends upon maintenance of current flows at PWRP • Depends upon stable customer use • Can be used for only very specific customers	• Can easily be phased to meet changing setting • May select alternate routes/customers for implementation • Can be combined with other RW projects *except* IPR options	• Need to work with customers to maintain system • Need to coordinate with LACSD on any quality/supply issues	**KEEP:** • Provides cost-effective NPR use based upon current supply available
			Increase Existing Customer Use: Called out in RWMP as potential increases by 2030 for existing customers (increased external customer use)	*Existing:* • Pomona WRP • Current RW System	645 afy	Can be used for non-potable supply only	• Depends upon increase of specific customer use at PWRP • Provides no imported water offset to Pomona	• Can easily be met with no extra facilities • Can be combined with other RW projects *except* IPR options	Should have no new issues for increase in supply	**KEEP:** • Provides the most cost-effective NPR use based upon current supply available, but is not used to offset Pomona IW Supply
			RWMP Modified Alternative: Does not increase service to external customers and instead builds system to eastern border of San Antonio Creek	*Existing:* • Pomona WRP • Existing RW System *New:* • Segments 6, 7	445 afy	Can be used for non-potable supply only	• Depends upon maintenance of current flows at PWRP • Depends upon stable customer use • Does not bring on larger customers	• Can be combined with IPR *and* other NPR projects • Need to complete both sections and IPR to make cost-effective	• Need to work with customers to maintain system • Need to coordinate with LACSD on any quality/supply issues	**KEEP:** • Segment 6 was planned to take IEUA supply - so may need to determine hydraulic feasibility to take PWRP water instead
		GWR/IPR	**Chino Basin Tertiary Spreading**: Uses remaining RW supply after NPR3 to recharge Chino Basin. Blend with San Antonio Creek water	*Existing:* • Pomona WRP • Existing RW System *New:* • NPR2 Facilities • Creek diversion for blend	3,721 to 4,366 afy (NPR 2+3 to NPR 3)	Quality will need to be monitored to meet blending requirements and impacts on current GW contamination	• IPR programs can be difficult to implement given public and permitting issues • Heavily depends upon maintenance of current flows at PWRP	• Depends upon implementation of NPR 2 • Limits NPR use •Blend water is easily available at San Antonio Creek	• Easy to maintain spreading operation • Will require regular monitoring • Provides help with subsidence issues in Chino Basin	**SCREEN OUT:** • Insufficient blend water available to meet CDPH requirements
			Six Basins Spreading: Spread at Pomona Spreading Grounds	*Existing:* • Pomona WRP • Existing RW System • Pomona Spreading Grounds *New:* • Line to Pomona Spreading Grounds	To be determined	Will need to take high production tunnel wells off-line due to travel time requirements	• Depends upon maintenance of current flows at PWRP • IPR programs can be difficult to implement given public and permitting issues	• Need to create a new alignment through Claremont with no Pomona customers • Limits use of Pedley area facilities	• Easy to maintain spreading operation since it is Pomona facility • Will require regular monitoring	**SCREEN OUT:** • Too close to production wells and no NPR system backbone due to lack of demand. • High water levels in Six Basins may pose issue

Table D-4: Recycled Water Options

			Option Description	Facilities	Quantity	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Recycled Water	Increase Use	GWR/IPR	**Advanced Treated Injection:** Advance Treat water for injection in Pomona or Chino basins closer to PWRP	*Existing:* • Pomona WRP *New:* • AWT Facility • Injection wells	4,811 afy	Very high quality water but issues with travel time given production wells near-by	• Depends upon maintenance of current flows at PWRP • IPR programs can be difficult to implement given public and permitting issues	• AWT siting will be difficult and require heavy permitting and other compliance • Large facility development is inflexible or adaptable once built	• AWT and injection wells require high level of O&M	**SCREEN OUT:** • Not enough recycled water supply available to justify construction of AWT Facility nor is there a suitable place for injection
	Decrease Use	Lease Rights	**Lease to Walnut Valley MWD:** Allow Walnut Valley to take over 100% of PWRP recycled water allocation (including existing customers)	N/A	(6,000 afy)	N/A	• Since contract is not permanent sale, it will need to be negotiated again	• Will need to determine fair price with Walnut Valley • Will need to transition operation of current RWM system/customers to WVMWD	Removes any O&M previously required for RW system but maintains Spadra wells for local customers	**KEEP:** • Should be evaluated within an alternative
			Lease to Central Basin Agencies: Allow PWRP allocation to continue to go to Los Coyotes for use by agencies in Central Basin	N/A	(6,000 afy)	N/A	• Since contract is not permanent sale, it will need to be negotiated again	• Will need to determine fair price with agencies • Will need to transition operation of current RWM system/customers to WVMWD	Removes any O&M previously required for RW system but maintains Spadra wells for local customers	**KEEP:** • Should be evaluated within an alternative - but will be more complicated than leasing to Walnut Valley MWD

Table D-5: Conservation Options

		Option Description	Quantity	Quality	Sustainability	Adaptability/ Flexibility	O&M	Screening/ Considerations
Conservation	Level 1	**Maintain 2007 gpcd:** Continue with existing program	0 afy	n/a	Won't be able to meet 20x2020 targets	A limited program is less adaptable and flexible to determine what is working	Program must have a dedicated conservation coordinator and funding	**KEEP:** • Least expensive option • Couple with Recycled Water option to meet SB7
	Level 2	**Meet 20x2020 goal:** Conservation programming	1,500 afy	n/a	Retrofits are expensive and will require a high level of customer follow through	Program is highly flexible and has the potential for phasing.	Program must have a dedicated conservation coordinator and funding	**KEEP:** Will require additional staff and funding
	Level 3	**Maintain 2009 gpcd:** Conservation programming	6,500 afy	n/a	Larger systems will most likely have bigger impacts and higher level of sustainability. Turf removal has a higher level of sustainability	Program is highly flexible and has the potential for phasing.	Program must have a dedicated conservation coordinator and funding	**KEEP:** Will require additional staff and funding

Appendix E - Detailed Alternatives

Pomona Integrated Water Supply Plan
Appendix E: Alternative Yields and Costs

	No Ped 2		No Ped 2 (NPR)		Same Ped 4		Same Ped 4 (NPR)		Mid Ped 5	
	Pomona	Regional	Pomona	Regional	Pomona	Regional	Pomona	Regional	Pomona	Regional
Treated Imported Water ($/AF)	$923		$923		$923		$923		$786	
Treated Imported Water (AFY)	1,500	0	1,500	0	1,500	0	1,500	0	1,500	0
Total	**$1,384,718**		**$1,384,500**		**$1,384,718**		**$1,384,500**		**$2,358,000**	
Conservation ($/AF)	$1,000		$1,000		$1,000		$1,000		$1,000	
Conservation (AFY)	1,500	0	1,500	0	1,500	0	1,500	0	1,500	0
Total	**$1,500,000**	**$0**	**$1,500,000**	**$0**	**$1,500,000**	**$0**	**$1,500,000**	**$0**	**$1,500,000**	**$0**
NonPotable ($/AF)			$2,567				$2,567			
Non-Potable (AFY)	0	7,000	1,500	5,500	0	7,000	1,500	5,500	0	7,000
Total	**$0**	**$0**	**$3,850,500**	**$0**	**$0**	**$0**	**$3,850,500**	**$0**	**$0**	**$0**
Local Surface ($/AF)					$139		$139		$236	
Local Surface (AFY)	0	0	0	0	2,000	0	2,000	0	4,000	0
Total	**$0**	**$0**	**$0**	**$0**	**$278,000**	**$0**	**$278,000**	**$0**	**$944,000**	**$0**
Six Basins Total (afy)	6,900	1,300	6,500	1,700	4,900	1,300	4,500	1,700	4,000	1,700
Six Base ($/AFY)	$318		$318		$300		$300		$300	
Six Base (AFY)	4,000	0	4,000	0	4,000	0	4,000	0	4,000	0
Total	**$1,272,000**	**$0**	**$1,272,000**	**$0**	**$1,200,000**	**$0**	**$1,200,000**	**$0**	**$1,200,000**	**$0**
Six Stage 2 ($/AF)	$147		$147		$147		$147			
Six Stage 2 (AFY)	750	0	750	0	500	0	500	0	0	0
Total	**$110,250**	**$0**	**$110,250**	**$0**	**$73,500**	**$0**	**$73,500**	**$0**	**$0**	**$0**
Six Stage 3 ($/AF)	$209		$209							
Six Stage 3 (AFY)	1,750	0	1,750	0	0	0	0	0	0	0
Total	**$365,750**	**$0**	**$365,750**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Six Stage 4 ($/AF)	$758				$758					
Six Stage 4 (AFY)	400	1,300	0	1,700	400	1,300	0	1,700	0	1,700
Total	**$303,200**	**$0**	**$0**	**$0**	**$303,200**	**$0**	**$0**	**$0**	**$0**	**$0**
Chino Basin Total (afy)	17,600	0	16,500	1,100	17,600	0	16,500	1,100	16,500	1,100
Chino Base ($/AF)	$376		$376		$376		$376		$376	
Chino Base (AFY)	16,900	0	15,800	1,100	16,900	0	15,800	1,100	15,800	1,100
Total	**$6,354,400**	**$0**	**$5,940,800**	**$0**	**$6,354,400**	**$0**	**$5,940,800**	**$0**	**$5,940,800**	**$0**
Chino Stage 2 ($/AF)	$355		$355		$355		$355		$355	
Chino Stage 2 (AFY)	700	0	700	0	700	0	700	0	700	0
Total	**$248,500**	**$0**	**$248,500**	**$0**	**$248,500**	**$0**	**$248,500**	**$0**	**$248,500**	**$0**
Total Pomona/Regional (AFY)	27,500	8,300	27,500	8,300	27,500	8,300	27,500	8,300	27,500	9,800
Total Produced (AFY)	35,800		35,800		35,800		35,800		37,300	
Total Cost	$11,173,068	$0	$14,306,550	$0	$11,342,318	$0	$14,475,800	$0	$12,191,300	$0
Total Unit Cost ($/AFY)	$406	$0	$520	$0	$412	$0	$526	$0	$443	$0

Pomona Integrated Water Supply Plan
Appendix E: Alternative Yields and Costs

	Mid Ped 5 (No Conservation)		Mid Ped 5 (NPR)		Big Ped 7		Big Ped 7 (NPR)	
	Pomona	**Regional**	**Pomona**	**Regional**	**Pomona**	**Regional**	**Pomona**	**Regional**
Treated Imported Water ($/AF)	$786		$786		$731		$731	
Treated Imported Water (AFY)	1,500	0	1,500	0	1,500	0	1,500	0
Total	**$2,358,000**		**$2,358,000**		**$3,655,000**		**$3,655,000**	
Conservation ($/AF)			$1,000		$1,000		$1,000	
Conservation (AFY)	0	0	1,500	0	1,500	0	1,500	0
Total	**$0**	**$0**	**$1,500,000**		**$1,500,000**	**$0**	**$1,500,000**	**$0**
NonPotable ($/AF)			$2,567				$2,567	
Non-Potable (AFY)	0	7,000	1,500	5,500	0	7,000	1,500	5,500
Total	**$0**	**$0**	**$3,850,500**		**$0**	**$0**	**$3,850,500**	**$0**
Local Surface ($/AF)	$236		$236		$334		$334	
Local Surface (AFY)	4,000	0	4,000	0	6,000	0	6,000	0
Total	**$944,000**	**$0**	**$944,000**		**$2,004,000**	**$0**	**$2,004,000**	**$0**
Six Basins Total (afy)	4,400	1,300	4,000	1,700	4,000	1,700	4,000	1,700
Six Base ($/AFY)	$300		$300		$300		$300	
Six Base (AFY)	4,000	0	4,000	0	4,000	0	4,000	0
Total	**$1,200,000**	**$0**	**$1,200,000**		**$1,200,000**	**$0**	**$1,200,000**	**$0**
Six Stage 2 ($/AF)								
Six Stage 2 (AFY)	0	0	0	0	0	0	0	0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Six Stage 3 ($/AF)								
Six Stage 3 (AFY)	0	0	0	0	0	0	0	0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Six Stage 4 ($/AF)	$758							
Six Stage 4 (AFY)	400	1,300	0	1,700	0	1,700	0	1,700
Total	**$303,200**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Chino Basin Total (afy)	17,600	0	15,000	2,600	14,500	3,100	13,000	4,600
Chino Base ($/AF)	$376		$376		$376		$376	
Chino Base (AFY)	16,900	0	14,300	2,600	13,800	3,100	12,300	4,600
Total	**$6,354,400**	**$0**	**$5,376,800**	**$0**	**$5,188,800**	**$0**	**$4,624,800**	**$0**
Chino Stage 2 ($/AF)	$355		$355		$355		$355	
Chino Stage 2 (AFY)	700	0	700	0	700	0	700	0
Total	**$248,500**	**$0**	**$248,500**	**$0**	**$248,500**	**$0**	**$248,500**	**$0**
Total Pomona/Regional (AFY)	27,500	8,300	27,500	9,800	27,500	11,800	27,500	11,800
Total Produced (AFY)	35,800		37,300		39,300		39,300	
Total Cost	$11,408,100	$0	$15,477,800	$0	$13,796,300	$0	$17,082,800	$0
Total Unit Cost ($/AFY)	$415	$0	$563	$0	$502	$0	$621	$0

Appendix F - Alternative Cost Estimates

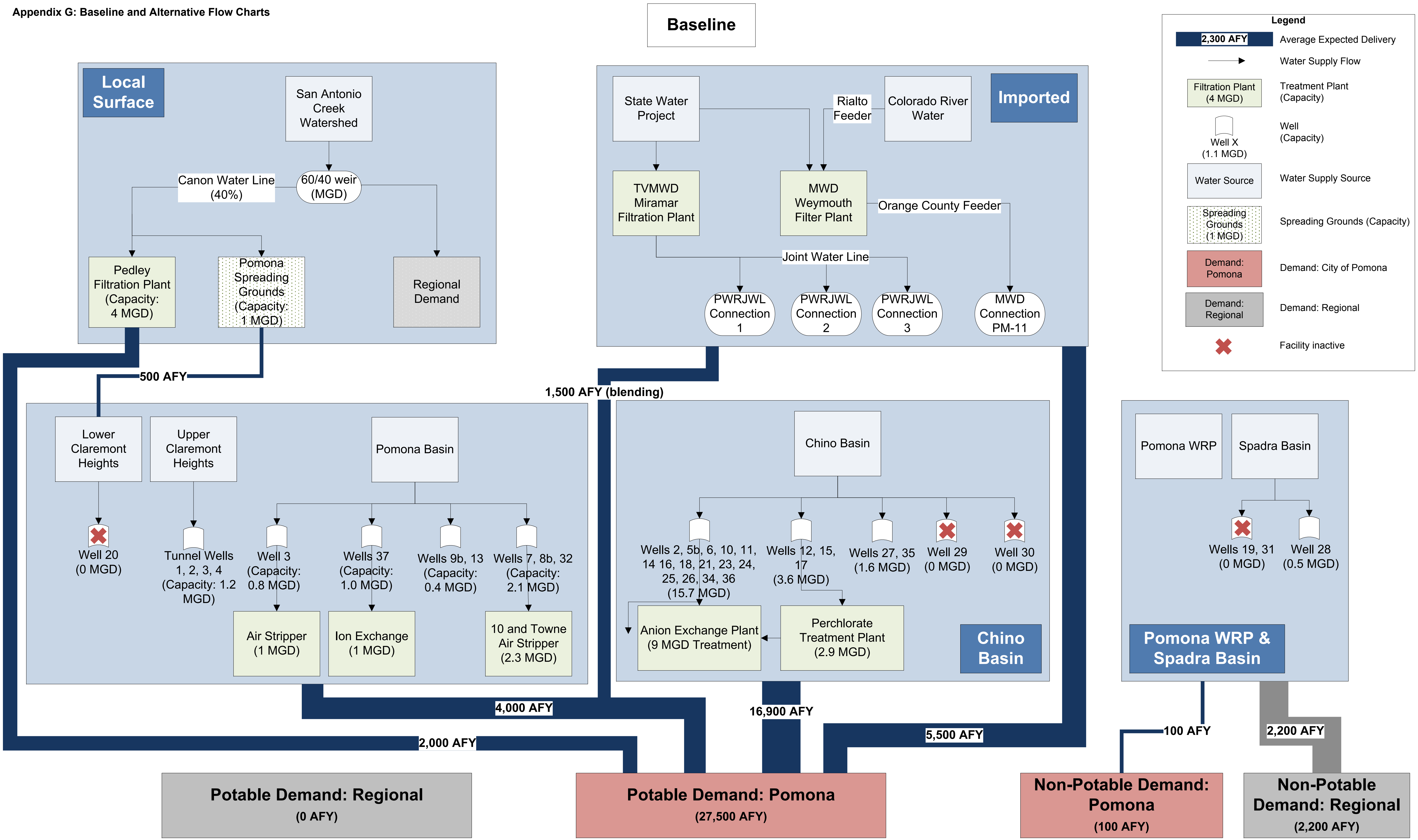
	No Ped 2	No Ped 2 (NPR)	Same Ped 4	Same Ped 4 (NPR)	Mid Ped 5 (no RW, no conservation)	Mid Ped 5 (NPR)	Big Ped 7	Big Ped 7 (NPR)
Imported Water								
IW Treated Yield (afy)	**1,500**	**1,500**	**1,500**	**1,500**	**1,500**	**1,500**	**1,500**	**1,500**
current $/AF - Treated Tier 1	$701	$701	$701	$701	$701	$701	$701	$701
Year 2035 $/AF - Treated [2035 Dollars] - Tier 1	$1,971	$1,971	$1,971	$1,971	$1,971	$1,971	$1,971	$1,971
Year 2020 $/AF - Treated [2020 Dollars] - Tier 1	$1,265	$1,265	$1,265	$1,265	$1,265	$1,265	$1,265	$1,265
assumed baseline inflation rate (general costs of goods and services)	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Year 2035 $/AF - Treated [2010 Dollars] - Tier 1	$1,063	$1,063	$1,063	$1,063	$1,063	$1,063	$1,063	$1,063
Year 2020 $/AF - Treated [2010 Dollars] - Tier 1	$988	$988	$988	$988	$988	$988	$988	$988
Gradient ($/yr) 2010 to 2020 - Treated	$29	$29	$29	$29	$29	$29	$29	$29
Gradient ($/yr) 2020 to 2035 - Treated	$5	$5	$5	$5	$5	$5	$5	$5
P/F for 2020 to 2035 Gradient	473,363	473,363	473,363	473,363	473,363	473,363	473,363	473,363
P/G - Treated 2010 to 2020	1,637,131	1,637,131	1,637,131	1,637,131	1,637,131	1,637,131	1,637,131	1,637,131
F/G - Treated 2020 to 2035	606,875	606,875	606,875	606,875	606,875	606,875	606,875	606,875
P/A for first ten years (2010 to 2020)	9,253,200	9,253,200	9,253,200	9,253,200	9,253,200	9,253,200	9,253,200	9,253,200
F/A for last 15 years (2020 to 2035)	18,306,701	18,306,701	18,306,701	18,306,701	18,306,701	18,306,701	18,306,701	18,306,701
P/F for last 15 years (2020 to 2035)	14,279,227	14,279,227	14,279,227	14,279,227	14,279,227	14,279,227	14,279,227	14,279,227
total Present Worth - Treated	$25,642,921	$25,642,921	$25,642,921	$25,642,921	$25,642,921	$25,642,921	$25,642,921	$25,642,921
Equivalent Uniform Annual Cost [2010 dollars] - Treated	$1,384,718	$1,384,718	$1,384,718	$1,384,718	$1,384,718	$1,384,718	$1,384,718	$1,384,718
IW Raw (afy)					**1,500**	**1,500**	**3,500**	**3,500**
current $/AF - Raw Tier 1					$484	$484	$484	$484
Year 2035 $/AF - Raw [2035 Dollars] - Tier 1					$1,391	$1,391	$1,391	$1,391
Year 2020 $/AF - Raw [2020 Dollars] - Tier 1					$893	$893	$893	$893
assumed baseline inflation rate (general costs of goods and services)					0	0	0	0
Year 2035 $/AF - Raw [2010 Dollars] - Tier 1					$750	$750	$750	$750
Year 2020 $/AF - Raw [2010 Dollars] - Tier 1					$698	$698	$698	$698
Gradient ($/yr) 2010 to 2020 - Raw					$21	$21	$21	$21
Gradient ($/yr) 2020 to 2035 - Raw					$4	$4	$4	$4
P/F for 2020 to 2035 Gradient					332,846	332,846	776,640	776,640
P/G - Raw 2010 to 2020					1,217,578	1,217,578	2,841,015	2,841,015
F/G - Raw 2020 to 2035					426,725	426,725	995,692	995,692
P/A for first ten years (2010 to 2020)					6,388,800	6,388,800	14,907,200	14,907,200
F/A for last 15 years (2020 to 2035)					12,923,228	12,923,228	30,154,200	30,154,200
P/F for last 15 years (2020 to 2035)					10,080,118	10,080,118	23,520,276	23,520,276
total Present Worth - Raw					$18,019,342	$18,019,342	$42,045,131	$42,045,131
Equivalent Uniform Annual Cost [2010 dollars] - Raw					$973,044	$973,044	$2,270,437	$2,270,437
Total Equivalent Uniform Annual Cost - Raw + Treated ($/yr)	1,384,718	1,384,718	1,384,718	1,384,718	2,357,762	2,357,762	3,655,155	3,655,155
Total afy for Raw + Treated	**1,500**	**1,500**	**1,500**	**1,500**	**3,000**	**3,000**	**5,000**	**5,000**
Equiv. Annual Cost ($/yr)	**$1,384,718**	**$1,384,718**	**$1,384,718**	**$1,384,718**	**$2,357,762**	**$2,357,762**	**$3,655,155**	**$3,655,155**
Unit Cost for Imported Water ($/af)	**$923**	**$923**	**$923**	**$923**	**$786**	**$786**	**$731**	**$731**

	No Ped 2	No Ped 2 (NPR)	Same Ped 4	Same Ped 4 (NPR)	Mid Ped 5 (no RW, no conservation)	Mid Ped 5 (NPR)	Big Ped 7	Big Ped 7 (NPR)
Conservation								
Yield (afy)	**1,500**	**1,500**	**1,500**	**1,500**	**-**	**1,500**	**1,500**	**1,500**
Equiv. Annual Cost ($/yr)	**$1,500,000**	**$1,500,000**	**$1,500,000**	**$1,500,000**	**$0**	**$1,500,000**	**$1,500,000**	**$1,500,000**
Unit Cost for Conservation ($/af)	**$1,000**	**$1,000**	**$1,000**	**$1,000**	**$1,000**	**$1,000**	**$1,000**	**$1,000**
Non-Potable Water								
NPR - Existing System Yield (afy)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Existing System Unit Capital Cost ($/af)	$50	$50	$50	$50	$50	$50	$50	$50
Existing System Unit O&M Cost ($/af)	$128	$128	$128	$128	$128	$128	$128	$128
Non-Potable Water Cost ($/af)	$150	$150	$150	$150	$150	$150	$150	$150
NPR -Future System Yield (afy)	**-**	**1,500**	**-**	**1,500**	**-**	**1,500**	**-**	**1,500**
Future System Unit Capital Cost ($/af)	$2,207	$2,207	$2,207	$2,207	$2,207	$2,207	$2,207	$2,207
Future System Unit O&M Cost ($/af)	$200	$200	$200	$200	$200	$200	$200	$200
Non-Potable Water Cost ($/af)	$150	$150	$150	$150	$150	$150	$150	$150
Total afy for Pomona NPR	**-**	**1,500**	**-**	**1,500**	**-**	**1,500**	**-**	**1,500**
Equiv. Annual Cost for Pomona NPR ($/yr)	**$0**	**$3,835,500**	**$0**	**$3,835,500**	**$0**	**$3,835,500**	**$0**	**$3,835,500**
Unit Cost for Pomona NPR ($/af)	**$0**	**$2,557**	**$0**	**$2,557**	**$0**	**$2,557**	**$0**	**$2,557**
Local Surface Water								
Baseline plant production (afy)	**-**	**-**	**2,000**	**2,000**	**2,000**	**2,000**	**2,000**	**2,000**
Pedley Treatment - SW (afy)	-	-	2,000	2,000	2,000	2,000	2,000	2,000
Pedley Treatment - IW (afy)	-	-	-	-	2,000*	2,000*	4,000*	4,000*
Baseline to remain			2,000	2,000	2,000	2,000	2,000	2,000
current baseline cost of production ($/AF)	$139	$139	$139	$139	$139	$139	$139	$139
increment of additional production (afy)		0	0	0	2,000	2,000	4,000	4,000
total capital cost for additional production and new facilities ($)	$0	$0	$0	$0	$7,875,000	$7,875,000	$26,250,000	$26,250,000
A/P for capital cost	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
total equiv annual cost for capital investment ($/yr)	$0	$0	$0	$0	$425,250	$425,250	$1,417,500	$1,417,500
annual cost for O&M	$0	$0	$0	$0	$908,500	$908,500	$1,173,500	$1,173,500
Spread (afy)	**2,000**	**2,000**	**-**	**-**	**-**	**-**	**-**	**-**
Total afy for LSW	**-**	**-**	**2,000**	**2,000**	**4,000**	**4,000**	**6,000**	**6,000**
Equiv. Annual Cost ($/yr)	**$0**	**$0**	**$278,000**	**$278,000**	**$1,333,750**	**$1,333,750**	**$2,591,000**	**$2,591,000**
Weighted Unit Cost ($/af)	**$0**	**$0**	**$139**	**$139**	**$236**	**$236**	**$334**	**$334**

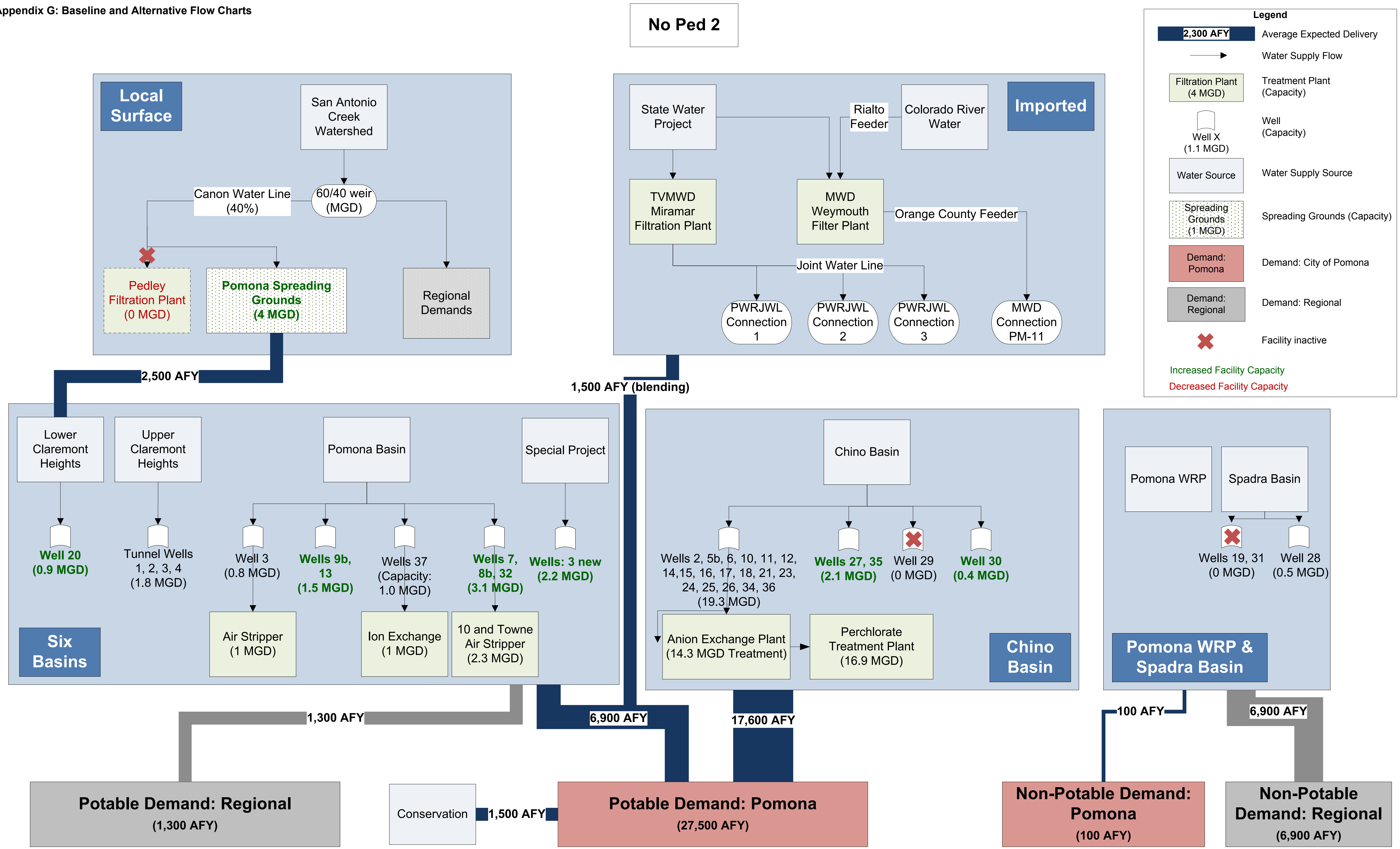
	No Ped 2	No Ped 2 (NPR)	Same Ped 4	Same Ped 4 (NPR)	Mid Ped 5 (no RW, no conservation)	Mid Ped 5 (NPR)	Big Ped 7	Big Ped 7 (NPR)
Groundwater - Six Basins								
(Recharge Costs for Alternative 2)								
recharge - total capital cost	$875,000	$875,000						
recharge - A/P	47,250	47,250						
recharge - annual O&M	25,000	25,000						
recharge - total annual cost	72,250	72,250						
Existing Baseline Production for Six Basins (afy)	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**
baseline untreated in Six Basins (afy)	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
baseline treated in Six Basins (afy)	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
($/AF) for untreated	$215	$215	$215	$215	$215	$215	$215	$215
($/AF) for treated	$337	$337	$337	$337	$337	$337	$337	$337
aggregate baseline ($/AF)	**$318**	**$318**	**$300**	**$300**	**$300**	**$300**	**$300**	**$300**
Total afy for Six Basins - Baseline	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**
Equiv. Annual Cost - Baseline ($/yr)	**$1,273,850**	**$1,273,850**	**$1,201,600**	**$1,201,600**	**$1,201,600**	**$1,201,600**	**$1,201,600**	**$1,201,600**
Weighted Unit Cost - Baseline ($/af)	**$318**	**$318**	**$300**	**$300**	**$300**	**$300**	**$300**	**$300**
Increment of additional production (afy)-Stage 2	**750**	**750**	**750**	**750**	**750**	**750**	**750**	**750**
total capital cost for additional production up to Stage 2 ($)	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
A/P for capital cost	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
capital component of total annual cost for additional production ($/yr)	$2,700	$2,700	$2,700	$2,700	$2,700	$2,700	$2,700	$2,700
O&M $/yr for additional production-Stage 2	$107,909	$107,909	$107,909	$107,909	$107,909	$107,909	$107,909	$107,909
$/AF cost for adjusted Stage 2	$147	$147	$147	$147	$147	$147	$147	$147
Total afy for Six Basins - Stage 2	**750**	**750**	**750**	**750**	**750**	**750**	**750**	**750**
Equiv. Annual Cost - Stage2 ($/yr)	**$110,609**	**$110,609**	**$110,609**	**$110,609**	**$110,609**	**$110,609**	**$110,609**	**$110,609**
Weighted Unit Cost - Stage2 ($/af)	**$147**	**$147**	**$147**	**$147**	**$147**	**$147**	**$147**	**$147**
Increment of additional production (afy)-Stage 3a	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**
total capital cost for additional production up to Stage 3a ($)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
A/P for capital cost	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
capital component of total annual cost for additional production ($/yr)	$10,800	$10,800	$10,800	$10,800	$10,800	$10,800	$10,800	$10,800
O&M $/yr for additional production-Stage 3a	$179,848	$179,848	$179,848	$179,848	$179,848	$179,848	$179,848	$179,848
$/AF cost for adjusted Stage 3a	$153	$153	$153	$153	$153	$153	$153	$153
Total afy for Six Basins - Stage 3a	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**	**1,250**
Equiv. Annual Cost - Stage 3a ($/yr)	**$190,648**	**$190,648**	**$190,648**	**$190,648**	**$190,648**	**$190,648**	**$190,648**	**$190,648**
Weighted Unit Cost - Stage 3a ($/af)	**$153**	**$153**	**$153**	**$153**	**$153**	**$153**	**$153**	**$153**
Increment of additional production (afy)-Stage 3b	**700**	**700**	**700**	**700**	**700**	**700**	**700**	**700**
total capital cost for additional production up to Stage 3b ($)	$1,897,000	$1,897,000	$1,897,000	$1,897,000	$1,897,000	$1,897,000	$1,897,000	$1,897,000
A/P for capital cost	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
capital component of total annual cost for additional production ($/yr)	$102,438	$102,438	$102,438	$102,438	$102,438	$102,438	$102,438	$102,438
O&M $/yr for additional production-Stage 3b	$114,115	$114,115	$114,115	$114,115	$114,115	$114,115	$114,115	$114,115
$/AF cost for adjusted Stage 3b	$309	$309	$309	$309	$309	$309	$309	$309
Total afy for Six Basins - Stage 3b	**700**	**700**	**700**	**700**	**700**	**700**	**700**	**700**
Equiv. Annual Cost - Stage 3b ($/yr)	**$216,553**	**$216,553**	**$216,553**	**$216,553**	**$216,553**	**$216,553**	**$216,553**	**$216,553**
Weighted Unit Cost - Stage 3b ($/af)	**$309**	**$309**	**$309**	**$309**	**$309**	**$309**	**$309**	**$309**
Increment of additional production (afy)-Stage 4	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**
total capital cost for additional production up to Stage 4 ($)	$16,651,250	$16,651,250	$16,651,250	$16,651,250	$16,651,250	$16,651,250	$16,651,250	$16,651,250
A/P for capital cost	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
capital component of total annual cost for additional production ($/yr)	$899,168	$899,168	$899,168	$899,168	$899,168	$899,168	$899,168	$899,168
O&M $/yr for additional production-Stage 4	$390,100	$390,100	$390,100	$390,100	$390,100	$390,100	$390,100	$390,100
$/AF cost for adjusted Stage 4	$758	$758	$758	$758	$758	$758	$758	$758
Total afy for Six Basins - Stage 4	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**	**1,700**
Equiv. Annual Cost - Stage 4 ($/yr)	**$1,289,268**	**$1,289,268**	**$1,289,268**	**$1,289,268**	**$1,289,268**	**$1,289,268**	**$1,289,268**	**$1,289,268**
Weighted Unit Cost - Stage 4 ($/af)	**$758**	**$758**	**$758**	**$758**	**$758**	**$758**	**$758**	**$758**

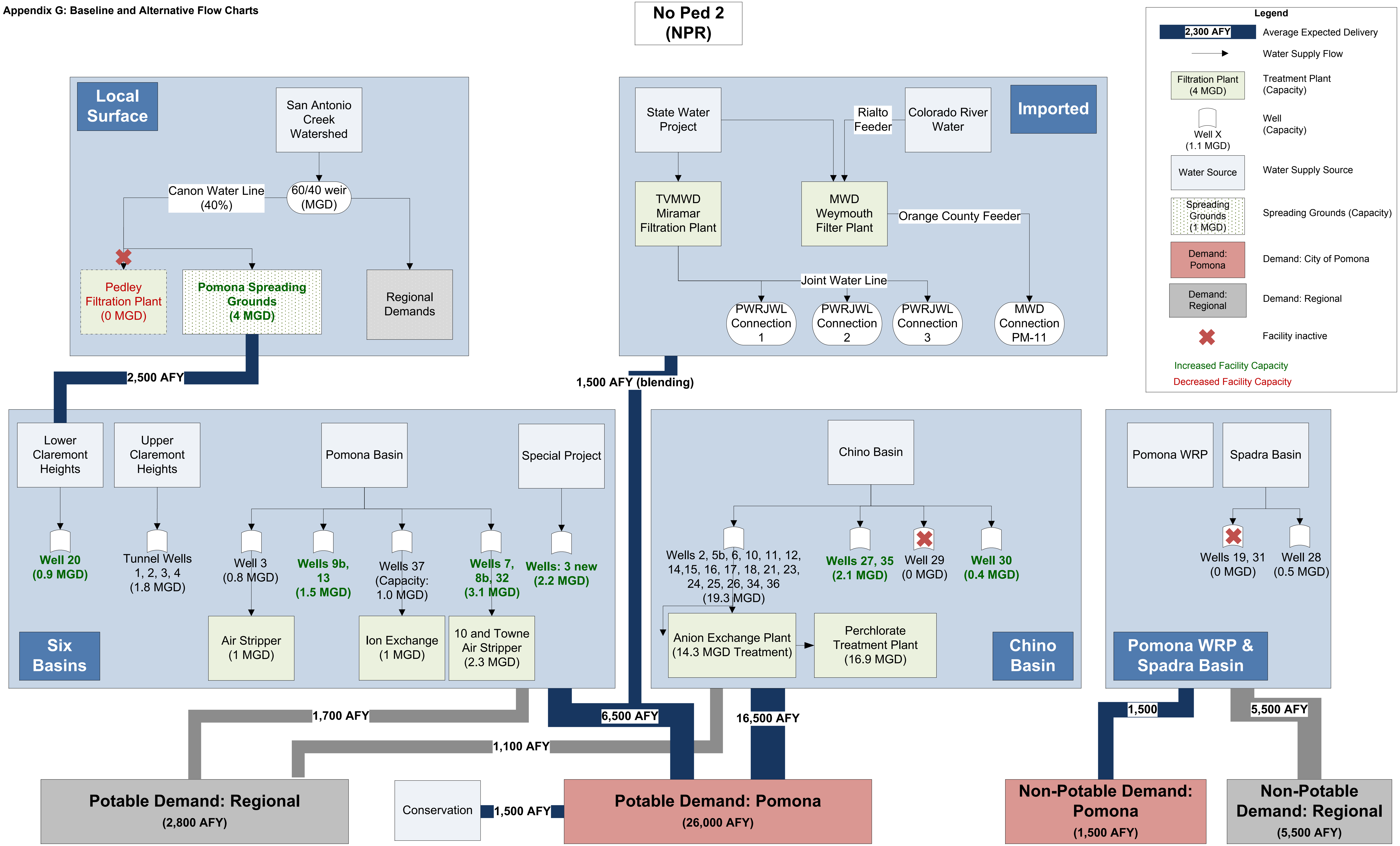
	No Ped 2	No Ped 2 (NPR)	Same Ped 4	Same Ped 4 (NPR)	Mid Ped 5 (no RW, no conservation)	Mid Ped 5 (NPR)	Big Ped 7	Big Ped 7 (NPR)
Groundwater - Chino Basin								
Existing Baseline Production for Chino Basin (afy)	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**
baseline untreated in Chino Basin (afy)	4,110	4,110	4,110	4,110	4,110	4,110	4,110	4,110
baseline treated in Chino Basin (afy)	12,790	12,790	12,790	12,790	12,790	12,790	12,790	12,790
($/AF) for untreated	$245	$245	$245	$245	$245	$245	$245	$245
$/AF for treated	$418	$418	$418	$418	$418	$418	$418	$418
Total afy for Chino Basin - Baseline	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**	**16,900**
Equiv. Annual Cost - Baseline ($/yr)	**$6,353,170**	**$6,353,170**	**$6,353,170**	**$6,353,170**	**$6,353,170**	**$6,353,170**	**$6,353,170**	**$6,353,170**
Weighted Unit Cost - Baseline ($/af)	**$376**	**$376**	**$376**	**$376**	**$376**	**$376**	**$376**	**$376**
Increment of additional production for Chino Basin (afy)-Tier 2	**700**	**700**	**700**	**700**	**700**	**700**	**700**	**700**
capital component of total annual cost for additional production ($/yr)-Stage 2	$30,051	$30,051	$30,051	$30,051	$30,051	$30,051	$30,051	$30,051
O&M $/yr for additional production-Stage 2	$218,400	$218,400	$218,400	$218,400	$218,400	$218,400	$218,400	$218,400
Total afy for Chino Basin - Stage 2	**700**	**700**	**700**	**700**	**700**	**700**	**700**	**700**
Equiv. Annual Cost - Stage 2 ($/yr)	**$248,451**	**$248,451**	**$248,451**	**$248,451**	**$248,451**	**$248,451**	**$248,451**	**$248,451**
Weighted Unit Cost - Stage 2 ($/af)	**$355**	**$355**	**$355**	**$355**	**$355**	**$355**	**$355**	**$355**

Appendix G - System Flow Charts

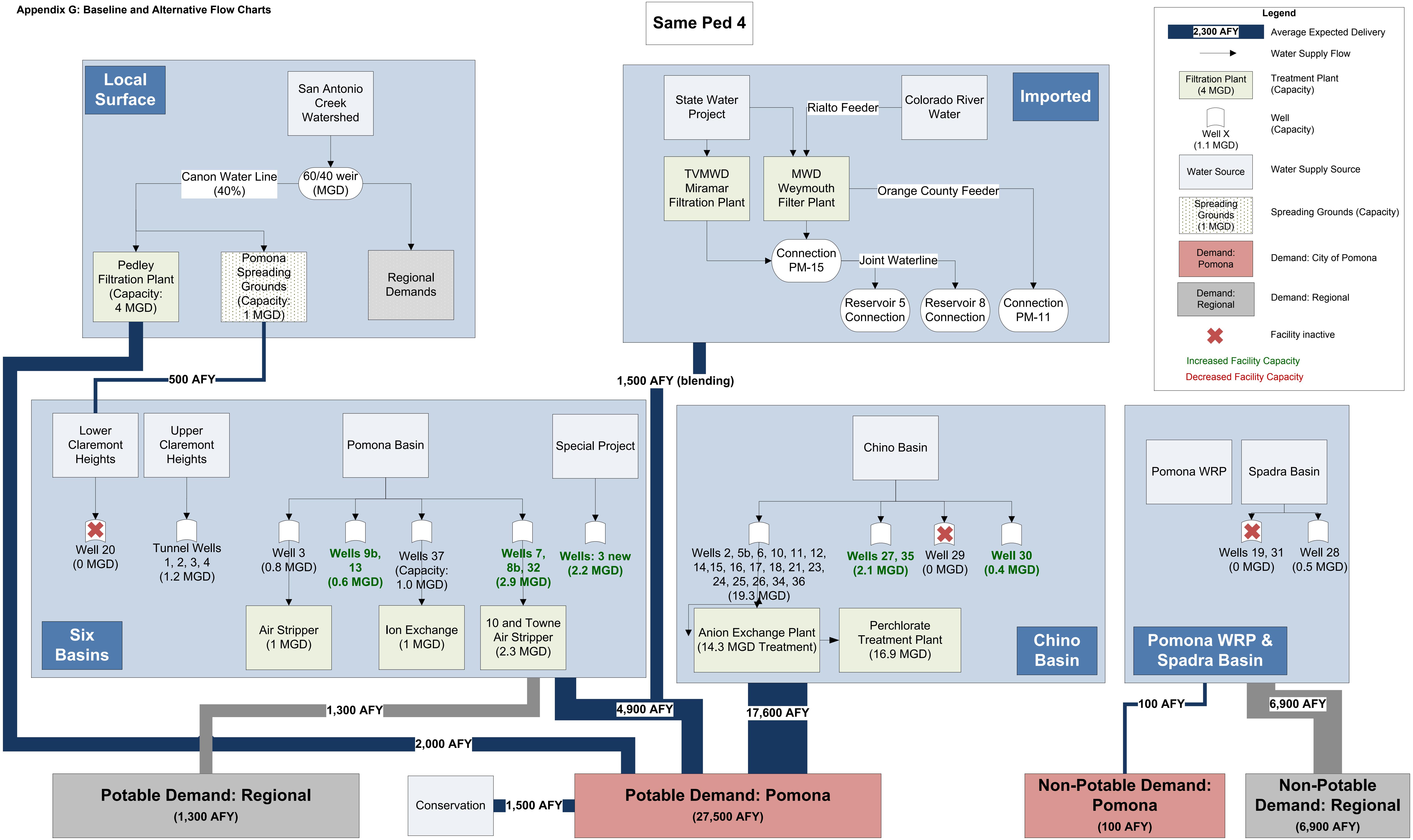

Baseline
Legend
2,300 AFY
Average Expected Delivery
Water Supply Flow
Filtration Plant (4 MGD)
Treatment Plant (Capacity)
Well X (1.1 MGD)
Well (Capacity)
Water Source
Water Supply Source
Spreading Grounds (1 MGD)
Spreading Grounds (Capacity)
Demand: Pomona
Demand: City of Pomona
Demand: Regional
Demand: Regional
Facility inactive
Local Surface
San Antonio Creek Watershed
60/40 weir (MGD)
Canon Water Line (40%)
Pedley Filtration Plant (Capacity: 4 MGD)
Pomona Spreading Grounds (Capacity: 1 MGD)
Regional Demand
Imported
State Water Project
Rialto Feeder
Colorado River Water
TVMWD Miramar Filtration Plant
MWD Weymouth Filter Plant
Orange County Feeder
Joint Water Line
PWRJWL Connection 1
PWRJWL Connection 2
PWRJWL Connection 3
MWD Connection PM-11
500 AFY
1,500 AFY (blending)
Lower Claremont Heights
Upper Claremont Heights
Pomona Basin
Well 20 (0 MGD)
Tunnel Wells 1, 2, 3, 4 (Capacity: 1.2 MGD)
Well 3 (Capacity: 0.8 MGD)
Wells 37 (Capacity: 1.0 MGD)
Wells 9b, 13 (Capacity: 0.4 MGD)
Wells 7, 8b, 32 (Capacity: 2.1 MGD)
Air Stripper (1 MGD)
Ion Exchange (1 MGD)
10 and Towne Air Stripper (2.3 MGD)
Chino Basin
Wells 2, 5b, 6, 10, 11, 14 16, 18, 21, 23, 24, 25, 26, 34, 36 (15.7 MGD)
Wells 12, 15, 17 (3.6 MGD)
Wells 27, 35 (1.6 MGD)
Well 29 (0 MGD)
Well 30 (0 MGD)
Anion Exchange Plant (9 MGD Treatment)
Perchlorate Treatment Plant (2.9 MGD)
Chino Basin
Pomona WRP
Spadra Basin
Wells 19, 31 (0 MGD)
Well 28 (0.5 MGD)
Pomona WRP & Spadra Basin
4,000 AFY
2,000 AFY
16,900 AFY
5,500 AFY
100 AFY
2,200 AFY
Potable Demand: Regional (0 AFY)
Potable Demand: Pomona (27,500 AFY)
Non-Potable Demand: Pomona (100 AFY)
Non-Potable Demand: Regional (2,200 AFY)

Appendix G: Baseline and Alternative Flow Charts

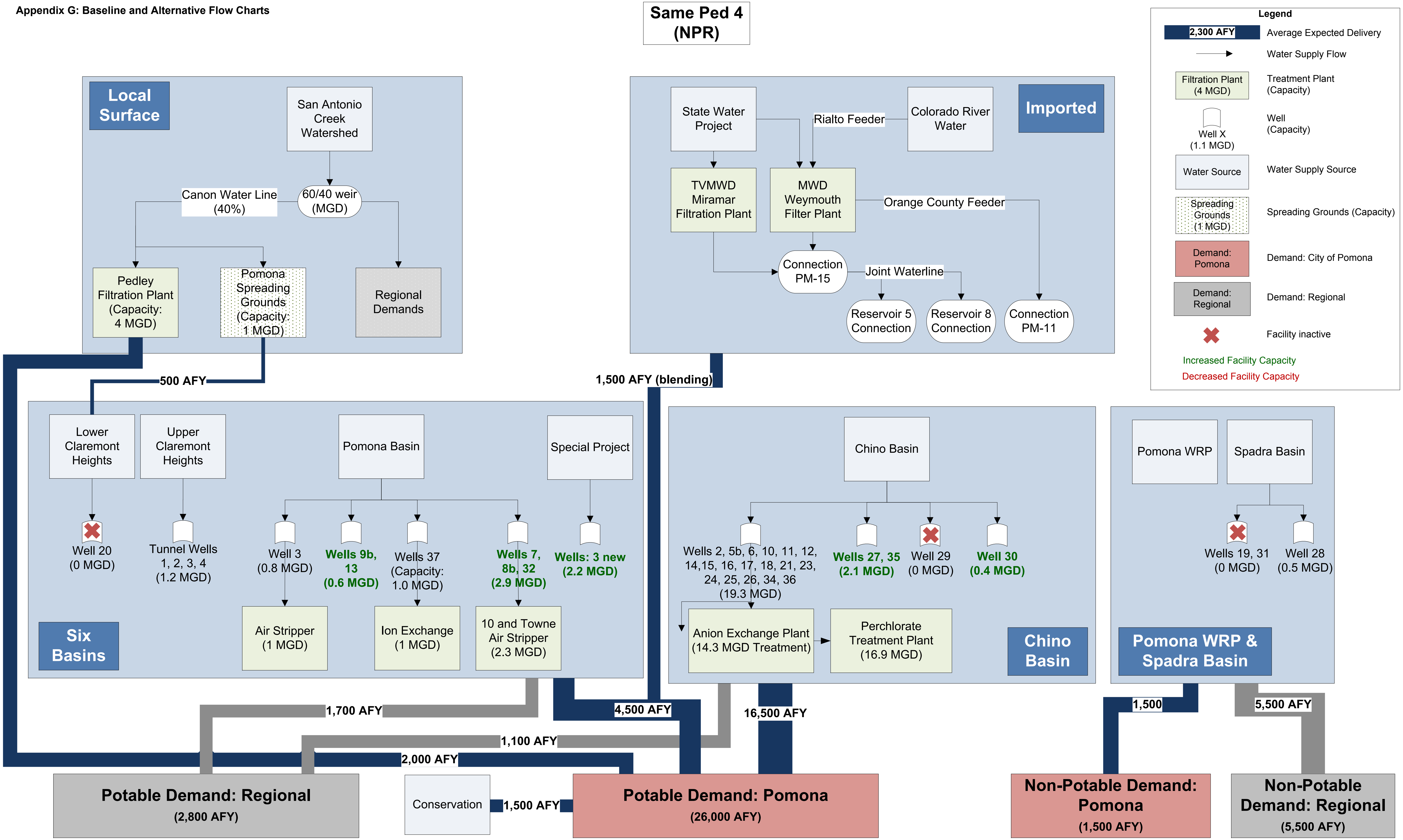



No Ped 2 (NPR)
Legend
2,300 AFY Average Expected Delivery
Water Supply Flow
Filtration Plant (4 MGD) Treatment Plant (Capacity)
Well X (1.1 MGD) Well (Capacity)
Water Source Water Supply Source
Spreading Grounds (1 MGD) Spreading Grounds (Capacity)
Demand: Pomona Demand: City of Pomona
Demand: Regional Demand: Regional
Facility inactive
Increased Facility Capacity
Decreased Facility Capacity
Local Surface
San Antonio Creek Watershed
60/40 weir (MGD)
Canon Water Line (40%)
Pedley Filtration Plant (0 MGD)
Pomona Spreading Grounds (4 MGD)
Regional Demands
Imported
State Water Project
Rialto Feeder
Colorado River Water
TVMWD Miramar Filtration Plant
MWD Weymouth Filter Plant
Orange County Feeder
Joint Water Line
PWRJWL Connection 1
PWRJWL Connection 2
PWRJWL Connection 3
MWD Connection PM-11
2,500 AFY
1,500 AFY (blending)
Lower Claremont Heights
Upper Claremont Heights
Pomona Basin
Special Project
Well 20 (0.9 MGD)
Tunnel Wells 1, 2, 3, 4 (1.8 MGD)
Well 3 (0.8 MGD)
Wells 9b, 13 (1.5 MGD)
Wells 37 (Capacity: 1.0 MGD)
Wells 7, 8b, 32 (3.1 MGD)
Wells: 3 new (2.2 MGD)
Air Stripper (1 MGD)
Ion Exchange (1 MGD)
10 and Towne Air Stripper (2.3 MGD)
Six Basins
Chino Basin
Wells 2, 5b, 6, 10, 11, 12, 14,15, 16, 17, 18, 21, 23, 24, 25, 26, 34, 36 (19.3 MGD)
Wells 27, 35 (2.1 MGD)
Well 29 (0 MGD)
Well 30 (0.4 MGD)
Anion Exchange Plant (14.3 MGD Treatment)
Perchlorate Treatment Plant (16.9 MGD)
Chino Basin
Pomona WRP
Spadra Basin
Well 19, 31 (0 MGD)
Well 28 (0.5 MGD)
Pomona WRP & Spadra Basin
1,700 AFY
6,500 AFY
16,500 AFY
1,100 AFY
1,500
5,500 AFY
Potable Demand: Regional (2,800 AFY)
Conservation
1,500 AFY
Potable Demand: Pomona (26,000 AFY)
Non-Potable Demand: Pomona (1,500 AFY)
Non-Potable Demand: Regional (5,500 AFY)

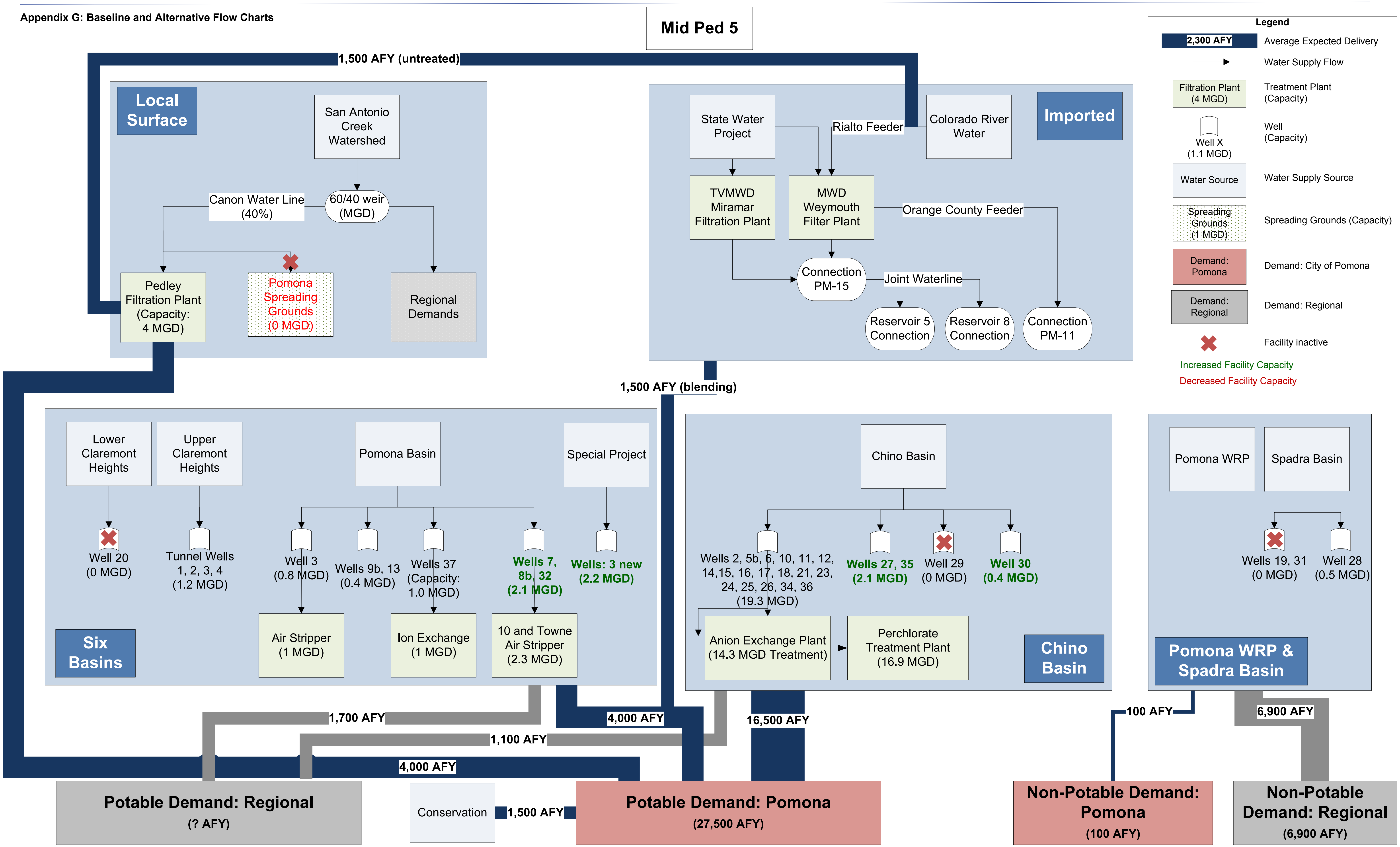
Appendix G: Baseline and Alternative Flow Charts

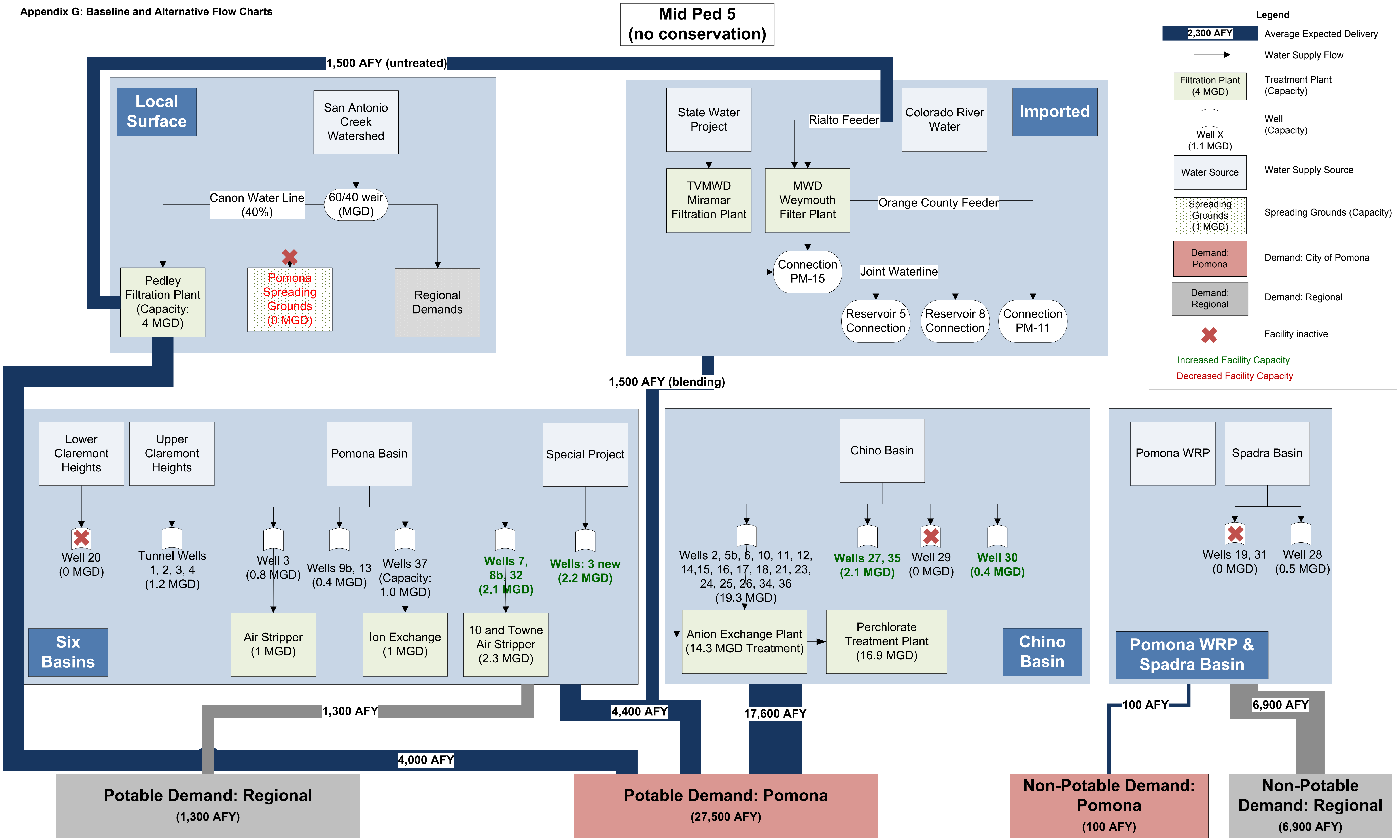


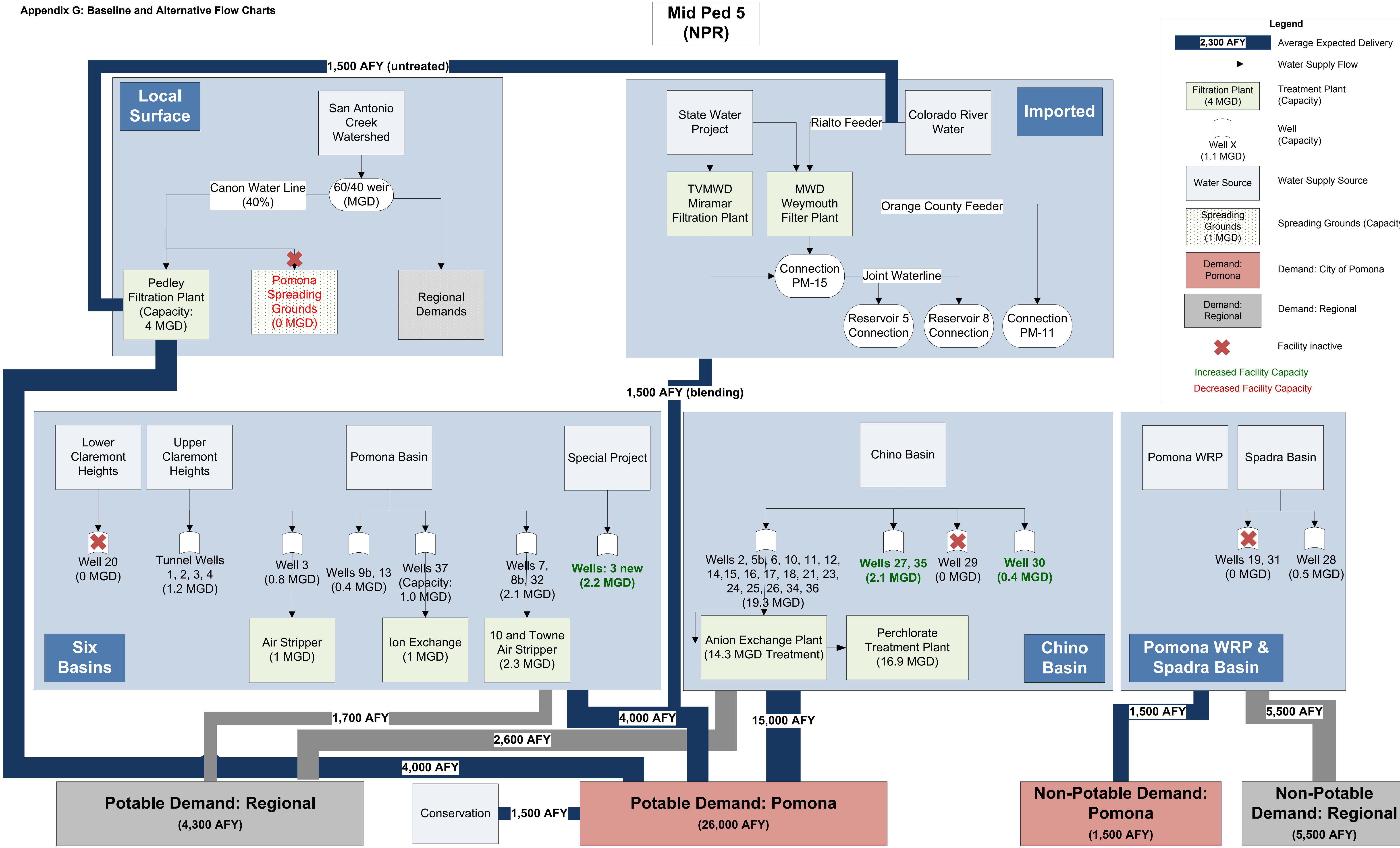
Appendix G: Baseline and Alternative Flow Charts

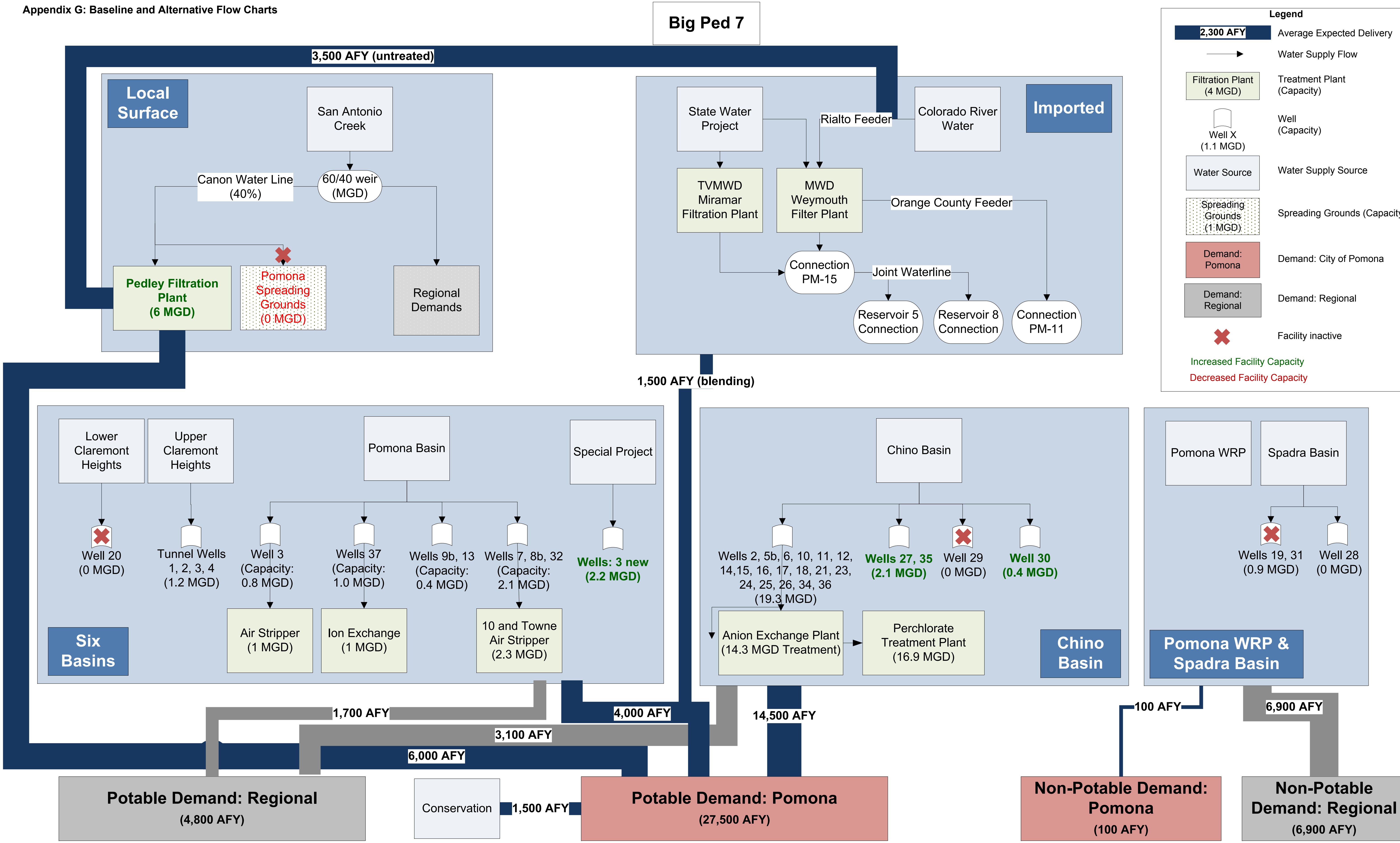


Appendix G: Baseline and Alternative Flow Charts

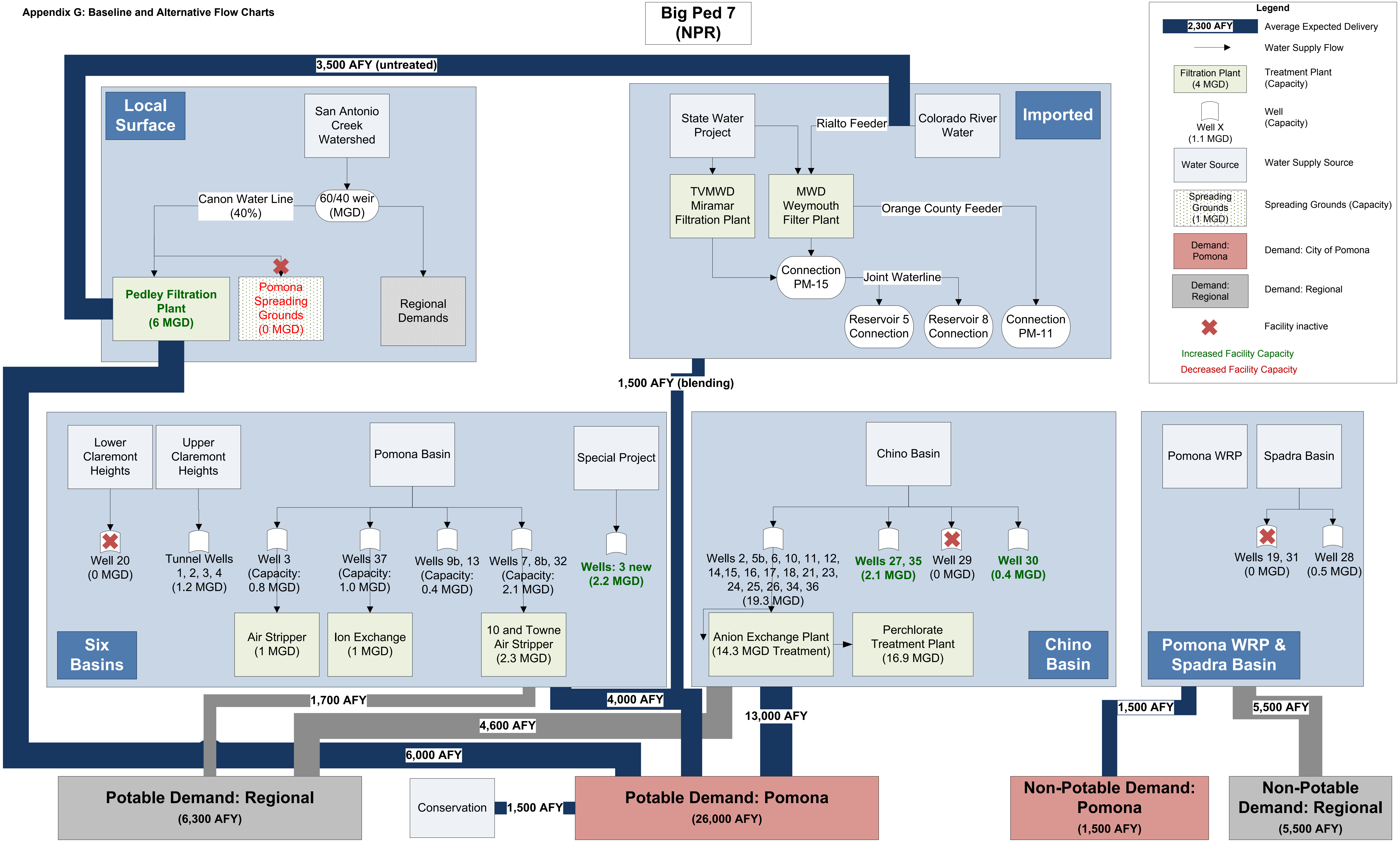



Mid Ped 5
(no conservation)
Legend
2,300 AFY
Average Expected Delivery
Water Supply Flow
Filtration Plant (4 MGD)
Treatment Plant (Capacity)
Well X (1.1 MGD)
Well (Capacity)
Water Source
Water Supply Source
Spreading Grounds (1 MGD)
Spreading Grounds (Capacity)
Demand: Pomona
Demand: City of Pomona
Demand: Regional
Demand: Regional
Facility inactive
Increased Facility Capacity
Decreased Facility Capacity
1,500 AFY (untreated)
Local Surface
San Antonio Creek Watershed
Canon Water Line (40%)
60/40 weir (MGD)
Pedley Filtration Plant (Capacity: 4 MGD)
Pomona Spreading Grounds (0 MGD)
Regional Demands
Imported
State Water Project
Rialto Feeder
Colorado River Water
TVMWD Miramar Filtration Plant
MWD Weymouth Filter Plant
Orange County Feeder
Connection PM-15
Joint Waterline
Reservoir 5 Connection
Reservoir 8 Connection
Connection PM-11
1,500 AFY (blending)
Lower Claremont Heights
Upper Claremont Heights
Pomona Basin
Special Project
Well 20 (0 MGD)
Tunnel Wells 1, 2, 3, 4 (1.2 MGD)
Well 3 (0.8 MGD)
Wells 9b, 13 (0.4 MGD)
Wells 37 (Capacity: 1.0 MGD)
Wells 7, 8b, 32 (2.1 MGD)
Wells: 3 new (2.2 MGD)
Air Stripper (1 MGD)
Ion Exchange (1 MGD)
10 and Towne Air Stripper (2.3 MGD)
Six Basins
Chino Basin
Wells 2, 5b, 6, 10, 11, 12, 14,15, 16, 17, 18, 21, 23, 24, 25, 26, 34, 36 (19.3 MGD)
Wells 27, 35 (2.1 MGD)
Well 29 (0 MGD)
Well 30 (0.4 MGD)
Anion Exchange Plant (14.3 MGD Treatment)
Perchlorate Treatment Plant (16.9 MGD)
Chino Basin
Pomona WRP
Spadra Basin
Wells 19, 31 (0 MGD)
Well 28 (0.5 MGD)
Pomona WRP & Spadra Basin
1,300 AFY
4,400 AFY
17,600 AFY
100 AFY
6,900 AFY
4,000 AFY
Potable Demand: Regional (1,300 AFY)
Potable Demand: Pomona (27,500 AFY)
Non-Potable Demand: Pomona (100 AFY)
Non-Potable Demand: Regional (6,900 AFY)


Mid Ped 5 (NPR)
Legend
2,300 AFY Average Expected Delivery
Water Supply Flow
Filtration Plant (4 MGD) Treatment Plant (Capacity)
Well X (1.1 MGD) Well (Capacity)
Water Source Water Supply Source
Spreading Grounds (1 MGD) Spreading Grounds (Capacity)
Demand: Pomona Demand: City of Pomona
Demand: Regional Demand: Regional
Facility inactive
Increased Facility Capacity
Decreased Facility Capacity
1,500 AFY (untreated)
Local Surface
San Antonio Creek Watershed
60/40 weir (MGD)
Canon Water Line (40%)
Pedley Filtration Plant (Capacity: 4 MGD)
Pomona Spreading Grounds (0 MGD)
Regional Demands
Imported
State Water Project
Rialto Feeder
Colorado River Water
TVMWD Miramar Filtration Plant
MWD Weymouth Filter Plant
Orange County Feeder
Connection PM-15
Joint Waterline
Reservoir 5 Connection
Reservoir 8 Connection
Connection PM-11
1,500 AFY (blending)
Lower Claremont Heights
Upper Claremont Heights
Pomona Basin
Special Project
Well 20 (0 MGD)
Tunnel Wells 1, 2, 3, 4 (1.2 MGD)
Well 3 (0.8 MGD)
Wells 9b, 13 (0.4 MGD)
Wells 37 (Capacity: 1.0 MGD)
Wells 7, 8b, 32 (2.1 MGD)
Wells: 3 new (2.2 MGD)
Air Stripper (1 MGD)
Ion Exchange (1 MGD)
10 and Towne Air Stripper (2.3 MGD)
Six Basins
Chino Basin
Wells 2, 5b, 6, 10, 11, 12, 14,15, 16, 17, 18, 21, 23, 24, 25, 26, 34, 36 (19.3 MGD)
Wells 27, 35 (2.1 MGD)
Well 29 (0 MGD)
Well 30 (0.4 MGD)
Anion Exchange Plant (14.3 MGD Treatment)
Perchlorate Treatment Plant (16.9 MGD)
Chino Basin
Pomona WRP
Spadra Basin
Wells 19, 31 (0 MGD)
Well 28 (0.5 MGD)
Pomona WRP & Spadra Basin
1,700 AFY
4,000 AFY
2,600 AFY
4,000 AFY
15,000 AFY
1,500 AFY
5,500 AFY
Potable Demand: Regional (4,300 AFY)
Conservation
1,500 AFY
Potable Demand: Pomona (26,000 AFY)
Non-Potable Demand: Pomona (1,500 AFY)
Non-Potable Demand: Regional (5,500 AFY)


Big Ped 7
Legend
2,300 AFY Average Expected Delivery
Water Supply Flow
Filtration Plant (4 MGD) Treatment Plant (Capacity)
Well X (1.1 MGD) Well (Capacity)
Water Source Water Supply Source
Spreading Grounds (1 MGD) Spreading Grounds (Capacity)
Demand: Pomona Demand: City of Pomona
Demand: Regional Demand: Regional
Facility inactive
Increased Facility Capacity
Decreased Facility Capacity
3,500 AFY (untreated)
Local Surface
San Antonio Creek
Canon Water Line (40%)
60/40 weir (MGD)
Pedley Filtration Plant (6 MGD)
Pomona Spreading Grounds (0 MGD)
Regional Demands
Imported
State Water Project
Rialto Feeder
Colorado River Water
TVMWD Miramar Filtration Plant
MWD Weymouth Filter Plant
Orange County Feeder
Connection PM-15
Joint Waterline
Reservoir 5 Connection
Reservoir 8 Connection
Connection PM-11
1,500 AFY (blending)
Lower Claremont Heights
Upper Claremont Heights
Pomona Basin
Special Project
Well 20 (0 MGD)
Tunnel Wells 1, 2, 3, 4 (1.2 MGD)
Well 3 (Capacity: 0.8 MGD)
Wells 37 (Capacity: 1.0 MGD)
Wells 9b, 13 (Capacity: 0.4 MGD)
Wells 7, 8b, 32 (Capacity: 2.1 MGD)
Wells: 3 new (2.2 MGD)
Air Stripper (1 MGD)
Ion Exchange (1 MGD)
10 and Towne Air Stripper (2.3 MGD)
Six Basins
Chino Basin
Wells 2, 5b, 6, 10, 11, 12, 14,15, 16, 17, 18, 21, 23, 24, 25, 26, 34, 36 (19.3 MGD)
Wells 27, 35 (2.1 MGD)
Well 29 (0 MGD)
Well 30 (0.4 MGD)
Anion Exchange Plant (14.3 MGD Treatment)
Perchlorate Treatment Plant (16.9 MGD)
Chino Basin
Pomona WRP
Spadra Basin
Wells 19, 31 (0.9 MGD)
Well 28 (0 MGD)
Pomona WRP & Spadra Basin
1,700 AFY
4,000 AFY
3,100 AFY
6,000 AFY
14,500 AFY
100 AFY
6,900 AFY
1,500 AFY
Potable Demand: Regional (4,800 AFY)
Conservation
Potable Demand: Pomona (27,500 AFY)
Non-Potable Demand: Pomona (100 AFY)
Non-Potable Demand: Regional (6,900 AFY)

Appendix G: Baseline and Alternative Flow Charts



Appendix H - Regional Calculations

Pomona Integrated Water Supply Plan
Appendix H: Potential Regional Supply Funding

	NP2	NP2NPR	SP4	SP4NPR	MP5	MP5-C	MPNPR	BP7	BP7NPR
6 Basins JWL (AFY)	*1300*	*1700*	*1300*	*1700*	*1700*	*1300*	*1700*	*1700*	*1700*
Supply Acquisition/Treatment	$758	$758	$758	$758	$758	$758	$758	$758	$758
Transmission to JWR	$330	$300	$330	$300	$300	$330	$300	$300	$300
Administration and O&M	$38	$38	$38	$38	$38	$38	$38	$38	$38
Total Unit Cost ($/AF)	$1,126	$1,096	$1,126	$1,096	$1,096	$1,126	$1,096	$1,096	$1,096
Maximum Unit Price	$923	$923	$923	$923	$923	$923	$923	$923	$923
Potential Unit Funding	$0	$0	$0	$0	$0	$0	$0	$0	$0
Potential Maximum Annual Funding	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Chino Basin Perchlor Sell MV (AFY)	*0*	*1100*	*0*	*1100*	*1100*	*0*	*2600*	*3100*	*3200*
Supply Acquisition/Treatment	$0	$366	$0	$366	$366	$0	$366	$366	$366
Transmission to MV	$0	$290	$0	$290	$290	$0	$220	$210	$210
Administration and O&M	$0	$18	$0	$18	$18	$0	$18	$18	$18
Total Unit Cost ($/AF)	$0	$674	$0	$674	$674	$0	$604	$594	$594
Maximum Unit Price	$0	$923	$0	$923	$923	$0	$923	$923	$923
Potential Unit Funding	$0	$249	$0	$249	$249	$0	$319	$329	$329
Potential Maximum Annual Funding	**$0**	**$273,570**	**$0**	**$273,570**	**$273,570**	**$0**	**$828,620**	**$1,018,970**	**$1,051,840**
Chino Basin Perchlor Sell U/SA (AFY)	*0*	*1100*	*0*	*1100*	*1100*	*0*	*2600*	*3100*	*3200*
Supply Acquisition/Treatment	$0	$366	$0	$366	$366	$0	$366	$366	$366
Transmission to U/SA	$0	$720	$0	$720	$720	$0	$540	$510	$520
Administration and O&M	$0	$18	$0	$18	$18	$0	$18	$18	$18
Total Unit Cost ($/AF)	$0	$1,104	$0	$1,104	$1,104	$0	$924	$894	$904
Maximum Unit Price	$0	$923	$0	$923	$923	$0	$923	$923	$923
Potential Unit Funding	$0	$0	$0	$0	$0	$0	$0	$29	$19
Potential Maximum Annual Funding	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$88,970**	**$59,840**
Chino Basin Lease (AFY)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1400*
Recent Annual Price	$0	$0	$0	$0	$0	$0	$0	$0	$540
Longer-Term Mark up	$0	$0	$0	$0	$0	$0	$0	$0	$54
Total Unit Cost ($/AF)	$0	$0	$0	$0	$0	$0	$0	$0	$594
Maximum Unit Price	$0	$0	$0	$0	$0	$0	$0	$0	$923
Potential Unit Funding	$0	$0	$0	$0	$0	$0	$0	$0	$329
Potential Maximum Annual Funding	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$460,600**
Unused Recycled Water Lease (AFY)	*4100*	*2600*	*4100*	*2600*	*4100*	*4100*	*2600*	*4100*	*2600*
Estimate of Long Term Lease Worth	$200	$200	$200	$200	$200	$200	$200	$200	$200
Potential Maximum Annual Funding	**$820,000**	**$520,000**	**$820,000**	**$520,000**	**$820,000**	**$820,000**	**$520,000**	**$820,000**	**$520,000**
COMBINED POTENTIAL NEW FUNDING	**$820,000**	**$793,570**	**$820,000**	**$793,570**	**$1,093,570**	**$820,000**	**$1,348,620**	**$908,970 - $1,838,970**	**$1,040,440 - $2,032,440**
Current and Projected Recycled Water Sales (AFY)	*2700*	*2700*	*2700*	*2700*	*2700*	*2700*	*2700*	*2700*	*2700*
Selling price - LAG cost	$400	$400	$400	$400	$400	$400	$400	$400	$400
Potential Maximum Annual Funding	**$1,080,000**	**$1,080,000**	**$1,080,000**	**$1,080,000**	**$1,080,000**	**$1,080,000**	**$1,080,000**	**$1,080,000**	**$1,080,000**
COMBINED EXISTING AND NEW FUNDING	**$1,900,000**	**$1,873,570**	**$1,900,000**	**$1,873,570**	**$2,173,570**	**$1,900,000**	**$2,428,620**	**$2,096,970 - $3,026,970**	**$2,228,400 - $3,220,440**

Appendix I - Baseline Cost Estimate

Pomona Integrated Water Supply Plan

Appendix I: Alternative Yields and Costs for Baseline

	Baseline
	Pomona
Treated Imported Water ($/AF)	$923
Treated Imported Water (AFY)	7,000
Total	**$6,462,016**
Conservation ($/AF)	$1,000
Conservation (AFY)	0
Total	**$0**
NonPotable ($/AF)	$328
Non-Potable (AFY)	100
Total	**$32,800**
Local Surface ($/AF)	$139
Local Surface (AFY)	2,000
Total	**$278,000**
Six Basins Total (afy)	4,000
Six Base ($/AFY)	$300
Six Base (AFY)	4,000
Total	**$1,200,000**
Six Stage 2 ($/AF)	$147
Six Stage 2 (AFY)	0
Total	**$0**
Six Stage 3 ($/AF)	$209
Six Stage 3 (AFY)	0
Total	**$0**
Six Stage 4 ($/AF)	$758
Six Stage 4 (AFY)	0
Total	**$0**
Chino Basin Total (afy)	14,400
Chino Base ($/AF)	$441
Chino Base (AFY)	14,400
Total	**$6,350,400**
Chino Stage 2 ($/AF)	$355
Chino Stage 2 (AFY)	0
Total	**$0**
Total Pomona/Regional (AFY)	27,500
Total Produced (AFY)	27,500
Total Cost	$14,323,216
Total Unit Cost ($/AFY)	$521

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