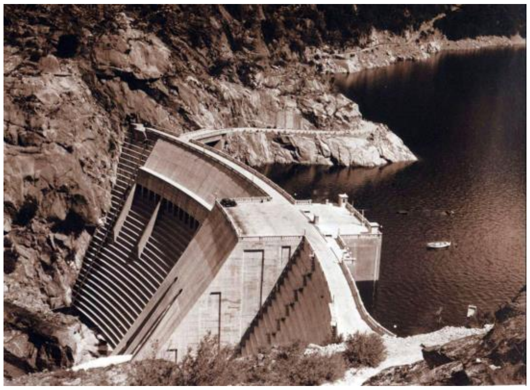
City of Hayward

2015 URBAN WATER MANAGEMENT PLAN



June 2016

CITY OF
HAYWARD
HEART OF THE BAY

ACKNOWLEDGEMENTS

Preparation of the 2015 Urban Water Management Plan was a collaborative effort by the City of Hayward Department of Utilities & Environmental Services staff. In particular, the following individuals contributed significantly to the development and preparation of this document:

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ACRONYMS

ABAG	Association of Bay Area Governments
ACWD	Alameda County Water District
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
BAWSCA	Bay Area Water Supply and Conservation Agency
BART	Bay Area Rapid Transit
CSUEB	California State University East Bay
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
DSS	Demand Side Management Least-Cost Planning Decision Support System
DWR	California Department of Water Resources
EBDA	East Bay Dischargers Authority
EBMUD	East Bay Municipal Utility District
EPA	United States Environmental Protection Agency
ERP	Emergency Response Plan
ET	Evapotranspiration
ETo	Evapotranspiration Rate
FY	Fiscal Year
gpcd	Gallons per capita per day
gpd	Gallons per day
HARD	Hayward Area Park and Recreation District
IRWMP	Integrated Regional Water Management Plan
ISA	Interim Water Supply Allocation
ISL	Interim Water Supply Limitation
MG	Million gallons
mgd	Million gallons per day
PAYS	Green Hayward Pay As You Save
PDA	Priority Development Area
RCEC	Russell City Energy Center
RHNA	Regional Housing Needs Allocation
RWS	Regional Water System
RWFP	Recycled Water Facility Plan
SB X7-7	Senate Bill X7-7 – The Water Conservation Act of 2009
SCADA	Supervisory Control and Data Acquisition System
SFPUC	San Francisco Public Utility Commission
UWMP	Urban Water Management Plan
WARN	Water Agency Response Network
WPCF	Water Pollution Control Facility
WRWC	Western Regional Water Coalition
WSA	Water Supply Agreement
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSIP	Water Supply Improvement Program

CHAPTER 1

INTRODUCTION AND OVERVIEW

Water planning is an essential function of water suppliers, particularly during extended periods of drought and diminished supplies. Since the early 1980s, the State of California has required water purveyors that provide 3,000 or more acre feet of water per year, or have 3,000 or more service connections, to prepare an Urban Water Management Plan (UWMP) every five years, in years ending in five and zero.

Under the normal cycle, the 2015 Urban Water Management Plan would have been due to the Department of Water Resources by December 31, 2015. However, with passage of Assembly Bill 2067, the State Legislature extended the deadline to July 1, 2016.

1.1 Background and Purpose

UWMPs provide a framework for long term water resource planning at the local level to ensure adequate water supplies to meet current and future demands. More specifically, the UWMP:

- Quantifies current and future water demands over a 25-year planning horizon;
- Assesses the reliability of water supplies in normal and dry years;
- Describes water shortage contingency plans;
- Describes current and planned demand management efforts; and
- Documents the progress towards meeting target water use reductions as required in the Water Conservation Bill of 2009

1.2 Urban Water Management Planning and the California Water Code

1.2.1 Urban Water Management Planning Act of 1983

Preparation and adoption of the UWMP is guided by requirements of the Urban Water Management Planning Act of 1983 (California Water Code §10610 et seq.) (CWC) and the 2015 Guidebook for Urban Water Suppliers (Guidebook). The CWC requires urban water suppliers to report, describe and evaluate water deliveries and uses, water supply sources, water use efficiency and demand management, and water shortage contingency planning. Appendix A contains the full text of the Urban Water Management Planning Act.

1.2.2 Applicable Changes to the Water Code Since 2010 UWMP

The City's 2015 UWMP incorporates all CWC requirements, including changes that have been adopted since 2010. These changes are related to reporting of demand management measures, the use of standardized forms, and added discussions about water loss and future water savings estimates.

1.2.3 Water Conservation Act of 2009 (SB X7-7)

The Water Conservation Act of 2009 (SB X7-7) requires retail urban water suppliers to report their base daily per capita water use, interim and final urban water use targets, and compliance daily per capita water use. Chapter 5 addresses these requirements and provides information about Hayward's base water use, water use targets, and progress towards achieving the targets.

1.3 URBAN WATER MANAGEMENT PLANS IN RELATION TO OTHER PLANNING EFFORTS

Effective water supply planning is best achieved when integrated with other urban planning efforts. To that end, the City has incorporated data from relevant resources into preparation of this UWMP. Documentation included:

- Hayward General Plan (2014)
- Economic Development Strategic Plan (2014)
- Recycled Water Facilities Plan (2013)
- Water Distribution System Master Plan (2014)
- Demand Management Programs

Demand projections were prepared through an "end use" model that uses historical end use data to establish baseline conditions and incorporates forecasted population and job growth, passive and active conservation savings and other relevant factors into projecting future water use.

Hayward currently purchases 100% of its potable water supply from the San Francisco Public Utilities Commission (SFPUC); thus, the City coordinated closely with the SFPUC to report on available water supplies in normal and dry years.

1.4 URBAN WATER MANAGEMENT PLAN ORGANIZATION

Hayward's UWMP has been prepared in accordance with all requirements of the CWC, and the chapters are organized to be consistent with the Guidebook. Appendix B includes the Department of Water Resources (DWR) Checklist of UWMP Requirements, cross-referenced to indicate where the requirements are addressed in this document.

CHAPTER 2

PLAN PREPARATION

Regional coordination and outreach are key elements in preparing an accurate and meaningful UWMP. The following sections detail the City's efforts to incorporate pertinent land use planning information and input from affected local and regional government entities and the community.

2.1 BASIS FOR PREPARING A PLAN

Urban water suppliers with 3,000 or more service connections or which supply 3,000 acre feet or more of water per year are required to prepare an UWMP. The City of Hayward water system serves about 34,000 connections and delivered over 15,000 acre feet of water in fiscal year 2015, and therefore meets the criteria for preparing an UWMP.

2.1.1 Public Water Systems

The California Health and Safety Code §116275 defines a Public Water System as "a System for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individual daily at least 60 days out of the year." By this definition, the City of Hayward water system is a Public Water System.

Hayward meets the threshold for preparing an UWMP, as summarized in Table 2-1. Note that 4,963 million gallons of water is equivalent to 15,230 acre feet.

Table 2-1: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015 (in MG)
110006	City of Hayward	34,000	4,963
	TOTAL	34,000	4,963

2.1.2 Agencies Serving Multiple Service Areas/Public Water Systems

The City operates only one public water system, as described in Table 2-1, thus this section is not applicable.

2.2 Regional Planning

Hayward recognizes the value in regional water supply planning and, to the extent practicable, has participated in regional efforts to improve and diversify water supplies. Hayward is an active member of the Bay Area Water Supply & Conservation Agency (BAWSCA), which was created in May 2003 to represent the interests of the 26 member agencies in Alameda, Santa Clara and San Mateo counties that purchase water on a wholesale basis from the SFPUC. BAWSCA agencies cooperatively implement water conservation programs, communicate with SFPUC regarding maintenance, operation and improvement of the Regional Water System (RWS), and as appropriate, jointly pursue development of water supplies.

Hayward has also participated in Integrated Regional Water Management Plan (IRWMP), the Western Recycled Water Coalition (WRWC), and other multi-agency efforts to increase and diversify water supplies.

2.3 Individual or Regional Planning and Compliance

While Hayward supports and participates in regional water supply planning, due to unique factors regarding water supply, land use planning, and non-residential water use, Hayward has opted to develop an individual UWMP that reports on its service area. As discussed further in Section 2.5 of this chapter, Hayward notified and coordinated with appropriate regional entities and constituents in preparing the UWMP.

2.3.1 Regional UWMP

Agencies may collaborate with other water suppliers to develop a Regional UWMP. The City has opted to prepare an individual UMPW.

2.3.2 Regional Alliance

Under the provisions of Senate Bill X7-7, the Water Conservation Act of 2009 (SB X7-7), a group of water suppliers may work cooperatively to meet regional water conservation targets. The City has opted to comply with SB X7-7 on an individual basis.

Table 2-2 documents Hayward’s intention to submit an individual UWMP.

Table 2-2: Plan Identification			
	Type of Plan		Name of RUWMP or Regional Alliance
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		

2.4 Fiscal or Calendar Year and Units of Measure

2.4.1 Fiscal or Calendar Year

To ensure accuracy and in keeping with the City's financial reporting system, the UWMP has been prepared on a fiscal year basis, July 1 through June 30. Fiscal years are used consistently throughout the document.

2.4.2 Reporting Complete 2015 Data

The 2015 UWMP includes complete data for fiscal year (FY) 2014-2015, beginning on July 1, 2014 and ending on June 30, 2015.

2.4.3 Units of Measure

Agencies may determine the units of measure for reporting water volumes. The City has elected to report water volumes in million gallons (MG). This reporting unit is maintained consistently throughout the Plan.

Table 2- 3 summarizes the reporting basis and selected units of measure.

Table 2-3: Agency Identification	
Type of Agency	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year	
☐	UWMP Tables Are in Calendar Years
☑	UWMP Tables Are in Fiscal Years
Month and Date that the Fiscal Year Begins	
July 1	
Units of Measure Used in UWMP	
Unit	Million Gallons (MG)

2.5 Coordination and Outreach

2.5.1 Wholesale and Retail Coordination

Hayward prepared its UWMP in coordination with its wholesale water supplier, the SFPUC. Hayward provided SFPUC with information regarding projected water demand for the next twenty-five (25) years, in five-year increments, as reported in Chapters 4 and 6 of this Plan, and as documented in Table 2-4. Coordination with SFPUC was facilitated by BAWSCA to maintain consistency among member agencies in terms of information about SFPUC supplies.

Table 2-4: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
San Francisco Public Utilities Commission
NOTES: Coordinated through BAWSCA

2.5.2 Coordination with Other Agencies and the Community

Besides its wholesale water supplier, Hayward coordinated preparation of the UWMP with other appropriate agencies. On January 6, 2016, well in advance of the public hearing, notices of the City's intent to update its UWMP, a copy of which is included in Appendix C, were sent to the following entities:

- The 25 other BAWSCA member agencies, which share a common wholesale water source.

- East Bay Dischargers Authority (EBDA), a joint powers authority represented by five agencies that dispose treated wastewater through a common outfall to San Francisco Bay. The City owns and operates its own wastewater treatment facility and is a member of EBDA.

- East Bay Municipal Utility District (EBMUD), which serves a small portion of the City of Hayward.

- The Hayward Area Park and Recreation District (HARD), which provides service to Hayward and surrounding communities.

- County of Alameda, as a small number of County residents outside of the Hayward city limits are served by the Hayward Water System. In addition to the notice of intent to update its UWMP, the City also notified Alameda County 60 days in advance of the public hearing.

Active involvement of diverse social, cultural and economic groups in the development of the UWMP was encouraged through postings on the City's website and notices of public hearing. Notices were published in the *Daily Review*, the local newspaper with the largest circulation in Hayward for two successive weeks, and were posted at City Hall, in Hayward public libraries and on the cable television public access channel. Copies of the draft plan were available for public review and comment prior to the hearing.

2.5.3 Notice to Cities and Counties

The City of Hayward owns, operates and governs its own municipal water system, so formal notice was not issued to the City. However, Hayward's General Plan, adopted in 2014, was used as a resource in developing water demand projections and the City's Utilities staff worked collaboratively with Planning and Economic Development Divisions to review future potential development and associated water demands. While the City's General Plan served as the principal resource, other pertinent planning documents were considered, such as Association of Bay Area Governments (ABAG) projections and specific area plans.

As noted in Section 2.5.2, written notice was provided to the County of Alameda in accordance with requirements.

CHAPTER 3

WATER SYSTEM DESCRIPTION

A description of Hayward's water system and its service area is critical to understanding Hayward's water demand projections, water conservation potential, and service reliability. This chapter includes a general description of the service area, as well as information about local climate conditions, population and demographics.

3.1 General Description

Hayward occupies an area of about 61 square miles. It is located in Southern Alameda County on the east shore of San Francisco Bay, 25 miles southeast of San Francisco, 14 miles south of Oakland, 26 miles north of San Jose and 10 miles west of the valley communities surrounding Pleasanton. Hayward is surrounded by unincorporated communities of San Lorenzo and Castro Valley in the north, Union City in the south, Pleasanton in the east and the San Francisco Bay to the west. Most of Hayward is generally flat, except for the areas east of Mission Boulevard, where the elevation increases from 100 to 1,500 feet above sea level.

Settlement in the Hayward area began in about 1851 with the opening of a general store in what is now the downtown. The City was incorporated in 1876 and remained essentially a small agrarian town until the end of World War II. Since then, Hayward has undergone substantial changes. A major increase in population occurred in the 1950s and 1960s as a result of the post-war construction boom. Hayward experienced a surge in industrial development during the 1960s and 1970s, which created employment opportunities and balanced, to some extent, the housing that was developed in earlier decades. During the last four decades, Hayward has seen continued residential and industrial growth, mostly in the form of infill development and annexation of unincorporated "island" areas. Today Hayward enjoys a large and diverse industrial sector, including food and beverage, and high-technology manufacturing, along with a growing number of biotechnology firms.

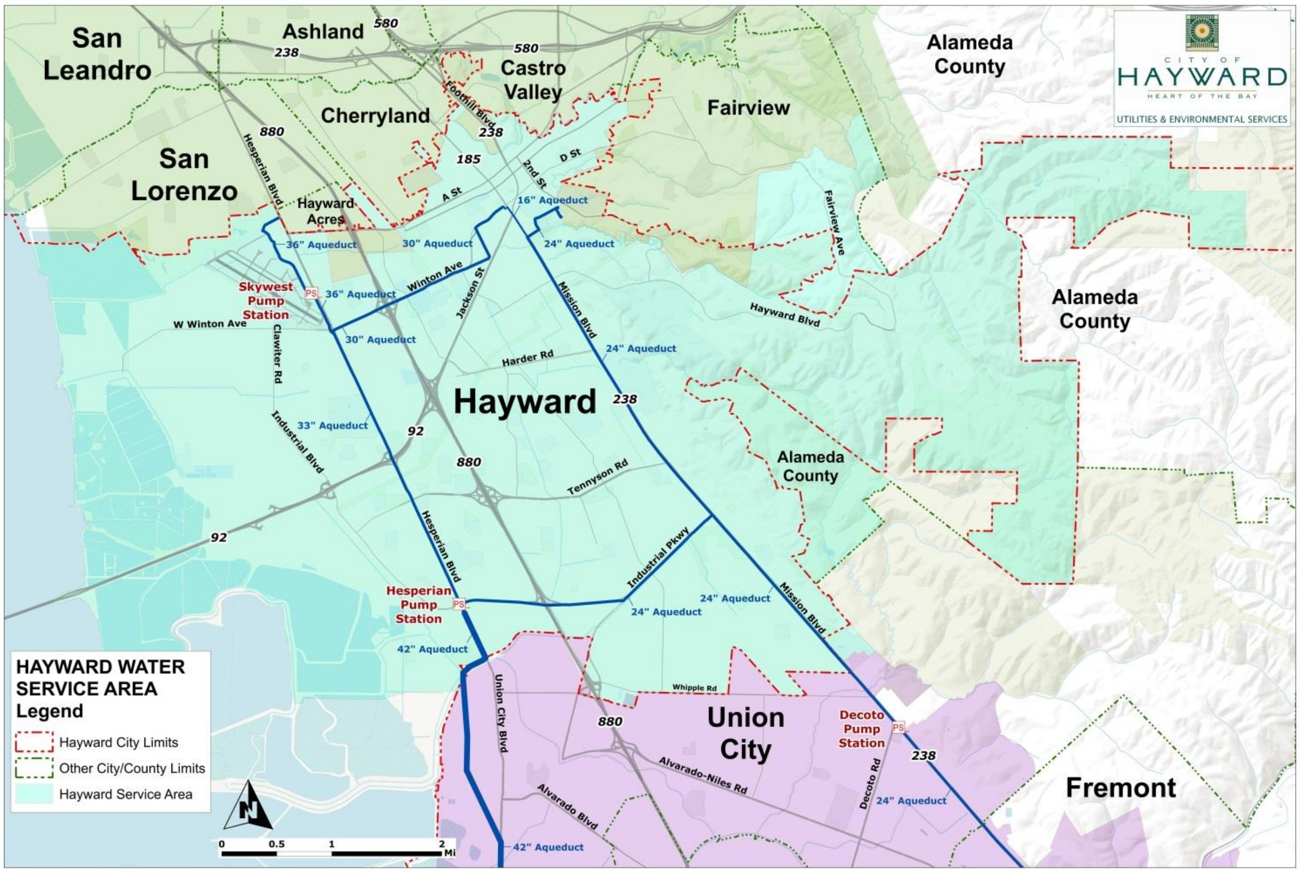
Water service is provided by the City of Hayward for residential, commercial, industrial, governmental, and fire suppression uses. Wells were originally used to supply Hayward with water. During the 1940s and 1950s, the well water was supplemented by water purchased from San Francisco's Hetch Hetchy system, owned and operated by the SFPUC. In 1962, Hayward entered into an agreement with the SFPUC to purchase all Hayward water from the SFPUC. Hayward constructed over 20 miles of aqueduct in order to deliver Hetch Hetchy water and ceased providing well water in 1963.

The City of Hayward is governed by a Council-Manager form of government, which also directs matters related to the municipal water system. The Hayward City Council is comprised of six elected at-large councilmembers and a directly elected Mayor.

3.2 SERVICE AREA BOUNDARY MAP

Figure 3-1 shows the service area boundaries for the City of Hayward Water System. There have been no significant changes to the service area since the 2010 UWMP. Note that an electronic service area map will be submitted on-line.

Figure 3-1
HAYWARD WATER SERVICE AREA



3.3 CLIMATE

Hayward has a Mediterranean coastal climate, with mild and dry summers, and cool winters. Most of the precipitation is received during the winter months, with only very occasional summer showers. Banks of fog often move inland during summer nights from the Pacific Ocean and evaporate during the day. The total water consumed in Hayward is moderately influenced by precipitation and temperature.

Table 3-1 illustrates average evapotranspiration (ET), rainfall, and temperature data. ET is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues), and is an indicator of how much water is needed for healthy growth and productivity of crops, gardens and trees. ETo refers to evapotranspiration as measured from a grass surface. The ETo data is from the Calendar Year 2015. Rainfall and temperature data is based on a ten year average from 1998 to 2008, in order to illustrate typical conditions.

Table 3-1: Climate Data

Month	Standard Monthly Average ETo (1)	Average Rainfall (inches) (2)	Average Min Temperature (Fahrenheit) (2)	Average Max Temperature (Fahrenheit) (2)
Jan	1.55	2.72	42.8	57.1
Feb	2.11	3.41	45.1	59.9
Mar	3.82	2.01	47.2	63.3
Apr	4.91	1.38	48.9	64.4
May	4.42	0.47	52.8	68.5
Jun	5.98	0.09	55.4	72.0
Jul	6.15	0.00	57.8	74.4
Aug	5.75	0.02	58.3	74.6
Sep	4.40	0.13	57.3	75.2
Oct	2.93	0.92	53.3	71.1
Nov	1.82	1.47	48.1	63.5
Dec	0.95	3.56	43.1	57.9
Annual	**44.79**	**16.18**	**50.8**	**66.8**

(1) Source: California Irrigation Management Information System (CIMIS), State of California Department of Water Resources, CIMIS Data, January 1, 2015 - December 31, 2015, taken at Union City Station #171.

(2) Source: 10-Year Monthly Climate Summary for Hayward Executive Airport, Desert Research Institute, Western Regional Climate Center, 1998 to 2008

3.3.1 Climate Change

A discussion of climate change and its potential impact on water supply is included in Section 6.10.

3.4 Service Area Population

Hayward's 2015 residential population stands at just under 153,000, based on the California Department of Finance's estimate for January 1, 2015. Table 3-2 summarizes population data from the Department of Finance for 2015 and ABAG Projections 2013 for 2020 through 2040. While the City recognizes that there are other potential sources for population projections, ABAG Projections 2013 was considered the most appropriate for the purposes of developing the water demand projections for the UWMP and are thus presented in Table 3-2.

Table 3-2: Population - Current and Projected

	2015	2020	2025	2030	2035	2040
Population Served	152,889	157,700	164,600	172,000	179,600	188,200

The vast majority of the City of Hayward is served water by the Hayward Water System. A very small portion of north Hayward, less than 3% of Hayward's total population, is served by EBMUD. A similarly small portion of unincorporated Alameda County, outside of the City limits, is served by the Hayward Water System.

3.4.1 Other Demographic Factors

The water demand projections presented in the UWMP are based, in part, on population and business trends developed by ABAG, combined with the City's knowledge of development forecasts and General Plan policies and strategies. A full discussion of specific demographic and development issues affecting water use is contained in Chapter 4, System Water Use. The following paragraphs briefly summarize demographic and economic trends in Hayward.

The population in Hayward is expected to increase by about 23% between 2015 and 2040. Over the next 25 years, increased residential water demand will result from development of new housing, primarily infill, intensification of existing residential areas, and construction of larger homes. The majority of residential growth is expected to occur in Priority Development Areas (PDAs), including the Cannery Area Neighborhood, Downtown, the vicinity of South Hayward Bay Area Rapid Transit (BART) Station, and the Mission Corridor. A Specific Plan for the Mission Boulevard Corridor Form-Based Code Area was adopted by the Hayward City Council in 2010.

Water use will also be impacted by development of the Route 238 right-of-way properties, a 350-acre noncontiguous area originally purchased by the State to accommodate construction of the Route 238 bypass. With the bypass project no longer planned, the City prepared the Rte 238 Bypass Land Use Study to identify residential development potential for these properties. Residential water use will also be impacted by rehabilitation of older homes, which are being purchased and remodeled, including installation of water efficient landscaping where little or no irrigated landscaping currently exists, which will use some water even though the use of native and low water plants and installation of water efficient irrigation systems will be required.

Institutional water use is impacted by two major higher education campuses located in Hayward, both of which are planning for increased enrollment. California State University East Bay (CSUEB), which has long had its main campus in Hayward, has developed a long-range master plan that includes increased enrollment and substantially more student and faculty housing facilities and which will impact water demand. Chabot College, a regional community college located in Hayward, has also developed a long-range master plan for major growth and development of its academic programs and facilities. Life Chiropractic College West is also located in Hayward. Although smaller than the two public institutions, Life Chiropractic is growing and has plans to nearly triple its student population.

Hayward's post-secondary educational institutions are sources of significant non-residential populations, as many of the students commute to the campuses to attend classes, while residing in other cities. These student populations are not incorporated into the City's population projections; however, water use related to increased enrollment and construction of additional facilities is included in the demand projections.

Regarding industrial and commercial water use, ABAG estimates a nearly 20% increase in the number of jobs in Hayward between 2015 and 2040, from the current 73,400 to 87,800 in 2040, with a significant portion of the new employment occurring in the manufacturing/ wholesale and health/education fields. Smaller overall increases are expected in the retail and professional services. The City's Economic Development policies, specified in the 2014 General Plan and Economic Development Strategic Plan, include a number of policies to diversify the City's economic base and support entrepreneurship and innovation.

CHAPTER 4

SYSTEM WATER USE

Accurate reporting of current water use and projected demand allows the City to plan for service reliability. Future growth and related water demand, utilizing up-to-date planning documents and resources, is key to managing water resources and ensuring adequate supplies. This chapter provides a detailed assessment of current and future water demand.

4.1 Recycled Versus Potable and Raw Water Demand

Chapter 4 addresses potable water demands only. Current and projected recycled water use is fully discussed in Chapter 6, System Supplies. However, in accordance with guidance from DWR, a summary of recycled water demand is included in Table 4-3.

4.2 Water Use by Sector

This section addresses current and projected potable water use based on available information. A brief description of the methodology used to project water use is included, as well as an overview of development factors considered.

4.2.1 Actual FY 2015 Water Demand

Table 4-1 summarizes actual water by customer sector in Fiscal Year 2015, ending June 30, 2015. The customer sectors are consistent with CWC definitions.

Table 4-1: Demands for Potable Water - Actual

Use Type	2015 Actual		
	Additional Description	Level of Treatment When Delivered	Volume (in MG)
Single Family	1 – 4 dwelling units	Drinking Water	1,710
Multi-Family	5+ dwelling units and mobile homes	Drinking Water	990
Industrial		Drinking Water	702
Commercial		Drinking Water	385
Institutional/Governmental		Drinking Water	221
Landscape	Dedicated irrigation meters only	Drinking Water	557
Losses	Apparent and Real Losses	Drinking Water	384
Other		Drinking Water	14
		TOTAL	**4,963**

4.2.2 Projected Water Demand

The City participated in the Regional Water Demand and Conservation Projections Report (Demand Study), coordinated by BAWSCA, to develop transparent, defensible and uniform demand and conservation savings projections for each SFPUC wholesale customer, using a common methodology to support both regional and individual agency planning efforts. The Demand Study: 1) quantified the total average-year water demand through 2040; 2) determined passive and active conservation water savings potential through 2040; and 3) identified conservation programs for further consideration for implementation on either a regional or local basis.

The demand model used to prepare the projections is known as the Decision Support System (DSS). The initial step in the DSS was to establish the base-year water demand at the end-use level by breaking down total historical water use for each type of water service account (single-family, multi-family, commercial, industrial and the like) to specific end uses, such as toilets, faucets, showers and irrigation. Forecasting future demand involved determining the growth in the number of water service accounts. Once the rates of change were established, they were entered into the model and applied to those account types and end-use water consumption.

The next step in developing future demand was to evaluate the cost effectiveness and water savings of a variety of potential water conservation measures to determine how much of the projected demand can be reasonably met through demand management. The potential water conservation savings were deducted from the total demand. The model also incorporated the effects of plumbing and appliance codes, or so-called passive savings, on existing and future accounts, as well as anticipated land use changes, densification and industrial development anticipated in Hayward and supported by General Plan policies and strategies.

4.2.3 Development Factors Affecting Water Demand

As noted, the water demand projections summarized in Tables 4-2 and 4-3 incorporate anticipated development factors within the City, affecting both residential and non-residential sectors. The following paragraphs provide an overview of the factors considered in preparing this UWMP.

Residential

Hayward's current housing stock, totaling about 49,000 dwelling units, is a mix of single-family detached, condominium, multi-family and mobile home units. About 65% of the total housing units are single-family detached, condominiums, and duplex to fourplex units, with remainder being multi-family and mobile home units. Hayward is continuing to add housing units through development of vacant parcels and redevelopment of low-density properties. In 2014, Hayward adopted an updated Housing Element to plan for adequate housing to meet future needs and address its obligations under the Regional Housing Need Allocation (RHNA). Among the stated goals of the Housing Elements are conservation and improvement of existing housing stock as well as development of a variety of new housing types to meet diverse needs and economic constraints.

ABAG projects that about 11,000 households will be added in Hayward through 2040, a 24% increase over 2015 (*ABAG Projections 2013*). The Sustainable Communities Strategy (SCS), a regional blueprint for transportation, housing and land use that focuses on reduced driving and greenhouse gas emissions anticipates that the majority of the residential development be located in five PDAs, specifically:

- Cannery Area – 752 units
- Downtown – 3,223 units
- South Hayward BART Corridor – 1,173 units
- South Hayward BART Neighborhood – 2,698 units
- Mission Corridor – 1,839 units

Additional potential exists in the former Route 238 right-of-way, which consists of about 350 acres of State-owned vacant or underutilized parcels that were acquired by Caltrans over 40 years ago as right-of-way for the planned Route 238 Bypass. Caltrans no longer plans to construct this project and will be relinquishing the properties to new ownership. In 2009, the City adopted a land use study that analyzed the opportunities and constraints for redevelopment of the parcels with a mix of residential and commercial uses, as well as open space. Under the most likely development scenario as indicated in Table 4-54 of the most current Housing Element, adopted in 2014, about 1,350 dwelling units may be constructed. There are about 300 existing dwelling units, of which 100 are inhabitable and boarded up, so the net change could be in the neighborhood of 1,250 new units.

Per Table 4-51 of the adopted Housing Element, there is also potential for a small amount of additional housing, less than 100 dwelling units, in the Mt. Eden area, an established neighborhood with underutilized and vacant parcels, annexed to the City in the mid 2000s. A smaller number of housing units will be constructed through infill development and intensification of underutilized properties.

In addition to the construction of new housing units, the existing housing stock is undergoing significant rehabilitation. Nearly 37% of Hayward's housing stock, about 18,000 units, was constructed prior to 1960. Some of these homes, which are more affordable than new and existing homes in other Bay Area communities, are being renovated and upgraded over time, including installation of water efficient landscaping, where it is currently minimal or non-existent. The City encourages renovation efforts with funding programs to clean up, upgrade, and landscape common areas within neighborhoods and to assist homeowners in rehabilitating private properties.

All of these factors were accounted for in the residential demand projections, with consideration of new development of both single-family and multi-family units, as well as upgrades of existing properties.

Commercial and Institutional

Commercial businesses include a typical mix of office-type services, specialty and big box retail stores, auto dealerships, eating establishments, and a regional shopping center. Hayward's economic development goals include diversification of the economic base, support of entrepreneurship and innovation, and expansion of employment opportunities. Hayward is implementing strategies to attract and retain restaurants and retail stores that will serve City residents and encourage them to do business locally.

Hayward is also continuing to encourage business activity in the downtown area so that it provides a venue for cultural events, and remains a center of social, political and civic functions. The retail space that was built as part of a 12-screen theater is nearing full capacity with food-related and other complementary uses, and other redevelopment efforts are underway throughout the area.

In addition to downtown, other areas that are specifically identified for commercial and mixed-use development include:

- South Hayward BART Area
- Mission/Foothill Corridor
- Downtown
- Hesperian Blvd Corridor, including Southland Mall

Hayward is also seeing an increase in applications for hotels and motels, particularly along the Mission Corridor. Currently, there are potentially four hotels, each with 90 to 100 rooms, proposed for construction. Other hotels in this area are typically at higher-than-average occupancy, and it is expected that new hotels would see this same level of activity given the high demand for hotel space.

Hayward is home to two regional public post-secondary educational institutions, CSUEB and Chabot Community College, both of have student populations of about 13,000. CSUEB has a Master Plan that envisions a student population of 18,000 full-time student equivalents (FTEs) and 25,000 students, an increase of about 40%. Additional student housing is expected to increase the number of on-campus beds from the current 1,200 to 5,000 at buildout in 2030. CSUEB's Master Plan projects possible additional water demand of 400,000 gallons per day (gpd), although enhanced water conservation efforts may reduce actual future demand. Chabot College is also implementing a Facilities Master Plan, completed in 2012, to guide campus development, including additional teaching space. It is estimated that 17,000 students will be enrolled at Chabot by 2025, a 30% increase.

In addition to the two public post-secondary educational facilities, Hayward is also the site of Life Chiropractic College West, a private institution for the training of chiropractors located in the City's industrial corridor. Life Chiropractic has a current enrollment of about 350 students, but its 2013 strategic plan envisions growth to about 1,000 students by 2020.

Industrial

Hayward has long had a large and diverse industrial sector, including food and beverage manufacturing, high technology research and manufacturing, biotechnical research and development, and a wide range of other businesses. Hayward's central Bay Area location, availability of land zoned for industrial use, and reasonable land and lease costs have attracted a large number and variety of businesses. There is also significant potential for underutilized properties now occupied by warehouses to be converted to research and development or manufacturing facilities. Job growth in Hayward is expected to be about 20% between 2015 and 2040 (*ABAG Projections 2013*).

The Economic Development Element of the City's General Plan includes strategies to encourage and support economic growth and diversification, including advanced and specialized manufacturing, clean and green technology, and knowledge- and innovation-based technology. Many of the businesses that locate in Hayward have significant process water use. Because it is not possible to anticipate precise future industrial water use, the City has included 400,000 gpd over and above normal expected additional industrial water use to accommodate new industries.

The results of this analysis form the basis of water demand projections through 2040, as summarized in Table 4-2.

Table 4-2: Demands for Potable Water - Projected

Use Type	Additional Description	Projected Water Use (in MG)				
		2020	2025	2030	2035	2040-opt
Single Family	1 - 4 dwelling units	3,040	3,350	3,570	3,650	3,950
Multi-Family	5+ dwelling units	1,170	1,180	1,190	1,220	1,250
Industrial		1,180	1,170	1,160	1,160	1,160
Commercial		510	570	580	590	610
Institutional/ Governmental		270	310	310	320	330
Landscape	Metered irrigation use	770	760	760	790	810
Losses	Apparent and real losses	900	970	1,020	1,080	1,140
Other		10	10	10	10	10
	TOTAL	**7,850**	**8,320**	**8,600**	**8,820**	**9,260**

There is a significant increase in 2020 projected water use, as compared to 2015 actual use. When comparing the two, it is important to consider that water use in 2015 was significantly impacted by drought conditions, which prompted a request by SFPUC to reduce water consumption by 10% and a series of directives from the State to reduce state-wide water use by 25%. The criteria by which the State determined individual cutbacks resulted in an 8% reduction requirement for Hayward in 2015, compared to the same time period in 2013, and Hayward customers far exceeded that mandated conservation goal, with savings of over 20%.

It is not yet known what portion, if any, of this decrease will be permanent and how much recovery will occur when weather conditions normalize and as economic development continues. For the purpose of projecting water use, staff conservatively assumed normal economic and climate conditions would exist during the UWMP planning period.

The projections in Table 4-2 represent the maximum potential usage, which may or may not be realized depending upon a combination of factors. Whether Hayward actually reaches these levels, and how closely the increases align with the five-year increments, will depend largely on economic activity, residential development, climate conditions, water pricing, and other factors over which the City has little control.

Table 4-3 summarizes total water use projections, including recycled water. The use of recycled water is related almost entirely to the Russell City Energy Center (RCEC), with a small amount, about 70 MG per year, projected for irrigation and industrial use. A full discussion of recycled water is included in Chapter 6.

Table 4-3: Total Water Demands (in MG)

	2015	2020	2025	2030	2035	2040
Potable Water	4,963	7,850	8,320	8,600	8,820	9,260
Recycled Water	569	1,000	1,000	1,000	1,000	1,000
TOTAL WATER DEMAND	**5,532**	**8,850**	**9,320**	**9,600**	**9,820**	**10,260**

Notes: Recycled water use reflects only the demand based on the Recycled Water Facility Plan. The City will continue to evaluate other potential uses of recycled water and may increase deliveries.

4.3 Distribution System Water Losses

Hayward has a longstanding and active commitment to monitoring and addressing distribution system water losses. Historically, unaccounted-for water has been a relatively small percentage in relation to total water deliveries, typically between 6% and 9%. However, this percentage increased beyond an acceptable level in 2010, prompting the City to take aggressive action.

In order to better understand the nature of unaccounted-for water, the City completed a detailed Water Audit and Component Analysis of Real and Apparent Losses in 2011, utilizing the American Water Works Association (AWWA) methodology. The AWWA method uses known factors, such as system input volume, authorized consumption, and revenue water, to determine water losses. These losses are further categorized into two types:

- Apparent losses – Due to meter inaccuracies, data errors and theft. The water is consumed but is not properly measured and accounted for
- Real losses – Due to system leaks and breaks.

The 2011 Water Audit indicated real losses of about 14%, based on 2009 data, the most recent year for which complete water use data was available. Although this was somewhat of an estimate because the information needed for more precise calculations was not available, the percentage was significant enough for the City to initiate immediate and aggressive action. A comprehensive leak detection and repair effort was implemented to locate leaks through the distribution system, including all service connections. Also, since some of the loss potentially resulted from high system pressure in certain locations, a pressure management program was put in place.

Through these efforts and other measures, real losses have been reduced significantly. The Water Audit for fiscal year 2014-15 indicates total losses, apparent and real, of 8%, with real losses of 4%. Table 4-4 shows the results of the Water Audit for the most recent period for which data is available, July 1, 2014 through June 30, 2015. The Water Audit is included in Appendix D.

Table 4-4: 12-Month Water Loss Audit Reporting

Reporting Period Start Date	Volume of Water Loss (in MG)
07/2014	384

4.4 Estimating Future Water Savings

The City recognizes that plumbing codes and appliance standards for toilets, urinals, faucets, clothes washers, and showerheads will continue to reduce residential and non-residential water demands in the future. This reduction in demand is accounted for in the DSS model used to develop the City's projected water demand. The DSS model accounts for these passive savings, in addition to the anticipated savings from active and aggressive demand management efforts described in Chapter 9. Appendix E fully describes the methods used to estimate future water savings from codes and standards, including sources, assumptions and examples. Projected water savings from changes in plumbing codes and appliance standards range from 300,000 gpd in 2020 to 1,200,000 gpd in 2040.

4.5 WATER USE FOR LOWER INCOME HOUSEHOLDS

The Housing Element of the City's General Plan identifies RHNA goals for the period of 2014-2022 by income level, measured as a percent of Area Median Income (AMI). In Hayward, the total number of units allocated for Extremely Low Income (up to 30% of AMI), Very Low Income (up to 50% of AMI) and Low Income (51% to 80% of AMI) is 1,331 units, a total of 34% of the City's total RHNA. Realistically, the lower income housing is expected to consist of multi-family units. The timing for construction of these housing units is uncertain. For the purposes of the UWMP, it assumed that roughly one-fifth of the units, or about 270 dwelling units, will be built during each five-year increment throughout the 25-year planning horizon.

Water usage for lower income housing units is included in the overall water demand projections, shown in Tables 4.2 and 4.3. Although it is expected that the per-unit use would decrease over time due to plumbing code changes and demand management measures, in the interest of ensuring adequate supplies to meet this critical housing need, the City maintained a conservative per-unit usage estimate of 150 gpd per dwelling unit and added about 40,000 gpd in each five-year period. Table 4.5 documents the fact that lower income residential water demands are included in the projections, and that passive water savings estimates are likewise included in the projections.

Table 4-5: Inclusion in Water Use Projections	
Are Future Water Savings included in projections?	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc. utilized in demand projections are found.	Section 4.4
Are Lower Income Residential Demands included in projections?	Yes

4.6 CLIMATE CHANGE

The City has not prepared an analysis to explicitly examine the potential impact of climate change on future water demand. While it can be reasonably assumed that water use for irrigation may increase if temperatures rise and dry weather persists, Hayward has implemented aggressive landscaping requirements that will require less water per lot than traditional landscapes and achieve other environmental benefits. The effects of the Water Efficient Landscaping Ordinance, as well as voluntary programs such as lawn replacement incentives, are accounted for the City's demand projections; however, there is insufficient data to justify further adjustments to the projections at this time. The City will continue to monitor usage and review data to determine how climate change affects future projections.

A discussion of the potential impacts of climate change on water supply is located in Section 6.10.

CHAPTER 5

SB X7-7 BASELINES AND TARGETS

Senate Bill X7-7, also known as the Water Conservation Act of 2009, was signed into law in November 2009. The intent is to reduce urban per capita water use statewide by 10% by 2015 and 20% by 2020. To this end, retail agencies that are subject to the provisions of SB X7-7 were required in 2010 to establish target water use reductions for these years, based on a selected methodology. 2015 UWMPs must verify or update the calculations prepared in 2010, as well as demonstrate compliance with 2015 water use targets and document progress towards meeting 2020 targets. This chapter addresses SB X7-7 reporting requirements and verifies the City's compliance with provisions of the Water Conservation Act of 2009, including water use targets. The full text of SB X-7-7 is included for reference in Appendix F.

5.1 Guidance for Wholesale Agencies

The City of Hayward is not a wholesale agency, and this section is not applicable.

5.2. Updating Calculations from 2010 UWMP

5.2.1 Update of Target Method

SB X7-7 requires agencies to select one of four calculation methodologies to determine interim and final water use targets. The unit of measure used in SB X7-7 calculations and compliance is gallons per capita per day (gpcd). The four methodologies are briefly described below:

Method 1	Water use target is set at 80% of base daily per capita water usage
Method 2	Water use target is based on achieving certain performance standards, including indoor residential water use of 55 gpcd, 10% reduction in baseline non-residential water use, and landscape water use efficiency equivalent to certain standards
Method 3	Water use target is set at 95% of the applicable State hydrologic region target
Method 4	Water use target is set in accordance with savings from installation of water meters, specific indoor and commercial/industrial measures, water efficient landscape, and water loss management

In June 2011, the Hayward City Council adopted a resolution stating that the City's target water use reductions would be based on Calculation Methodology 3, which is 95% of the applicable State hydrologic region target. Based on this method, and given that Hayward is situated fully in the San Francisco Bay Hydrologic region, the City's interim target water use for 2015 was determined to be 128 gpcd, with a 2020 target of 124 gpcd.

SB X7-7 further requires that that calculated targets be compared to a minimum water use reduction, which is determined by calculating average per capital use during a continuous five-year period, ending no earlier than December 2007 and no later than December 2010. This average is then multiplied by 95%. If this result is lower than the calculated 2020 goal, then the final 2020 per capital use target must be set at the minimum reduction target. For the purpose of determining the minimum water use reduction for the 2010 UWMP, the appropriate five-year period for Hayward was 2003-04 through 2007-08. The average use, based on population estimates available at that time, was 128 gpcd, and 95% of this use was 122 gpcd. Thus, the minimum use reduction was applicable to Hayward, and targets were established as follows:

- 2015 Interim Water Use Target – 126 gpcd
- 2020 Water Use Target – 122 gpcd

Provisions of SB X7-7 allow agencies to update their target method in their 2015 UWMPs and calculate water use targets based on a different methodology.

The City of Hayward has opted to retain Methodology 3.

5.2.2 Required Use of 2010 United States Census Data

One of the approved sources for SB X7-7 baseline population data is the California Department of Finance (DOF) population estimates, which are published annually. Since SB X7-7 water use targets were established in the 2010 UWMPs, DWR has determined that significant discrepancies exist between the DOF's population figures available in 2010 and subsequent revised populations based on United States Census data, published in 2012. Agencies that did not use 2010 Census data for their baseline population calculations in 2010 must update these calculations in 2015. This requirement applies Hayward.

Population estimates for Hayward were decreased by the Department of Finance for the years between 2000 and 2010. While these changes do not result in a different water use target, as calculated in accordance with Methodology 3, the City's selected methodology, the recalculations indicate that Hayward is no longer subject to the minimum water use reduction.

5.2.3 SB X7-7 Verification Form

The Department of Water Resources requires agencies to submit standardized tables related to calculation of baseline water usage, water use targets and verification that 2015 interim water use targets were achieved, in order to demonstrate compliance with the Water Conservation Act of 2009. The tables in the SB X7-7 are distinguished from the other standardized UWMP tables by their name, which always begins with "SB X7-7, followed by the table number and name.

Hayward's SB X7-7-related tables, including the compliance form, are located at the conclusion of this chapter.

5.3 Baseline Periods

Water use gpcd must be calculated for two baseline periods: 1) the 10- to 15-year baseline for the purpose of establishing a water use target in accordance with Methodology 1; and 2) the 5-year baseline for the purpose of establishing a minimum water use reduction. As noted in Section 5.2.2, the City recalculated its baseline water use using updated California Department of Finance population estimates for the period between 2000 and 2010. This recalculation resulted in a change to the City's 10-year baseline period, in terms of both the time period and water usage. The 5-year baseline period did not change, but the average water usage during the period was revised.

5.3.1 Determination of the 10-15 Year Baseline Period (Baseline GPCD)

The duration of the baseline period, either 10 years or 15 years, is dependent on recycled water use in 2008. If the percentage of recycled water use in that year was at least 10% of total water deliveries, an agency may use a baseline period of up to 15 years. A 10-year period must be used if recycled water use was less than 10% in 2008. Based on this criterion, Hayward's baseline period is 10 years. The baseline period must end no earlier than December 31, 2004 and no later than December 31, 2010.

The 10-year baseline period is 2000 through 2009. The average water usage for this period was 131 gpcd, as summarized in SB X7-7 Table 5: Gallons Per Capita Per Day. This recalculated usage is a slight increase from the baseline period in the 2010 UWMP. In 2010, the baseline usage was 130 gpcd, using water use data and population from 1996 through 2005.

5.3.2 Determination of the 5-Year Baseline Period (Target Confirmation)

A 5-year baseline period is used to confirm that the selected 2020 target meets the minimum water use reduction requirements. The minimum water use reduction is 95% of the 5-year baseline period. This continuous 5-year period must end no earlier than December 31, 2007 and no later than December 31, 2010.

Hayward's 5-year baseline period is 2004 to 2008, during which water usage averaged 134 gpcd. 95% of this usage is 127 gpcd. The 2010 UWMP utilized the same 5-year time period, but the average usage was lower at 128 gpcd, and the minimum reduction was 122 gpcd. The revised 5-year baseline period and minimum water use reduction is summarized in SB X7-7 Table 5: Gallons Per Capita Per Day and SB X7-7 Table 7-F: Minimum Reduction for 2020 Target.

5.4 Service Area Population

In order to correctly calculate annual gpcd, agencies must determine the population served for each baseline year in both of the baseline periods and for the 2015 compliance year.

5.4.1 Population Methodologies

The UWMP Guidance Document provides several alternatives for determining service area population, including California Department of Finance Estimates for cities whose service area boundaries correspond by 95% or more with the city boundaries. The City's service area is substantially the same as the City of Hayward boundaries. Thus, the population estimates from the Department of Finance are appropriate for determining the service area population and have been used by the City for all SB X7-7 calculations.

Hayward did not use 2010 Census data in 2010 and therefore recalculated baseline populations, as required by DWR. SB X7-7 Table 2: Method for Population Estimates and SB X7-7 Table 3: Service Area Population documents Hayward's method for population estimates and service area populations in the baseline period and compliance year.

5.5 Gross Water Use

Gross water is a measure of water that enters the distribution system of the supplier over a 12-month period. The gross water use utilized in the City's SB X7-7 calculations reflects the metered purchases from the wholesale supplier.

5.5.1 Gross Water Tables

SB X7-7 Table 4: Annual Gross Water Use is included in this chapter.

5.6 Baseline Daily Per Capita Water Use

The final step in determining baseline calculations is determining the daily per capita water use in each of the baseline years. Population and gross water use from each applicable year is used to calculate the gpcd for each year. Using the updated population data, Hayward's baseline daily per capita water use is 131 gpcd, as documented and summarized in SB X7-7 Tables 5 and 6: Gallons Per Capital Per Day, included at the end of this chapter.

5.7 2015 and 2020 Targets

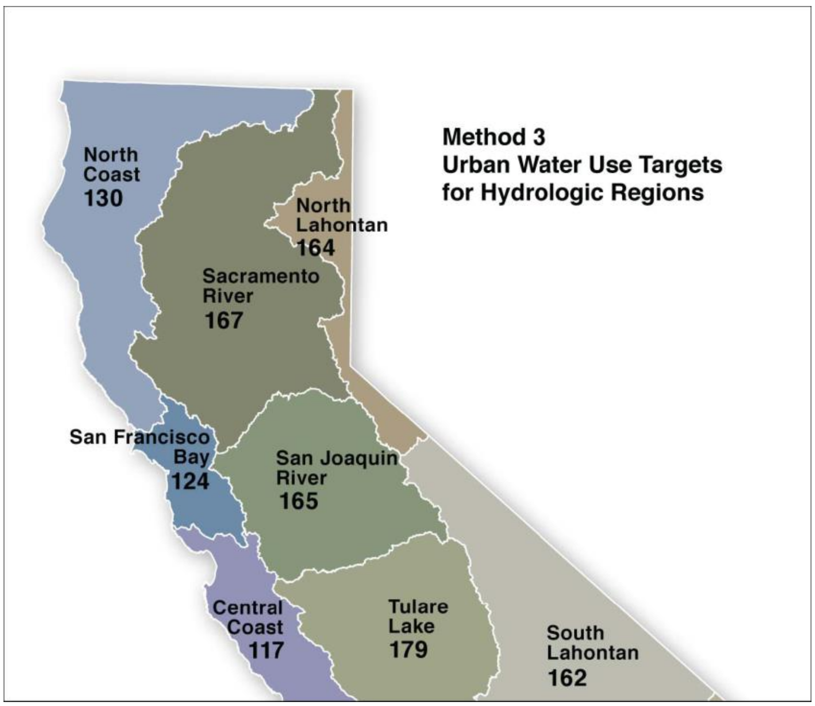
The City has opted not to select a different target method and acknowledges that, once the 2015 UWMP is submitted to the State, the target method may not be changed in any amendments to the 2015 UWMP or in the 2020 UWMP.

5.7.1 Select and Apply a Target Method

Upon reviewing its updated calculations and the target methods summarized in Section 5.2.1, Hayward has determined that Methodology 3, 95% of the applicable State hydrologic region target, is appropriate for determining the City's water use target. SB X7-7 Table 7: 2020 Target Method and Table SB X7-7 Table 7-E: Target Method 3 document this determination and are included at the end of this chapter.

Hayward is located entirely in the San Francisco Bay Region. This hydrologic region has an interim 2015 target of 144 gpcd and a 2020 target of 131 gpcd. Using a factor of 95%, Hayward's water use targets for 2015 and 2020 are 128 gpcd and 124 gpcd respectively. Figure 5-7 indicates the water use targets for each region, including the San Francisco Bay Region.

FIGURE 5-1
URBAN WATER USE TARGETS FOR HYDROLOGIC REGIONS



5.7.2 5-Year Baseline – 2020 Target Confirmation

SB X7-7 requires that the calculated target be compared to a minimum water use reduction, determined by calculating average per capita use during the continuous five-year baseline period, ending no earlier than December 2007 and no later than December 2010. This average is then multiplied by 95%. If the result is lower than the calculated 2020 target, the final 2020 per capita use target must be reduced to the minimum reduction requirement.

As indicated in SB X7-7 Table 7-F: Confirm Target, Hayward's water use target , as calculated by Method 3, is lower than the minimum water user reduction; thus, Hayward's final target is not subject to the minimum reduction.   Note: This conclusion is a change from the 2010 UWMP, which indicated that Hayward's water user target was higher than the minimum water use reduction. The change resulted from updating the population estimates for the 5-year baseline period.

5.7.3 *Calculate the 2015 Interim Urban Water Use Target*

The 2015 Interim Target is the value halfway between the 10- to 15-year Baseline gpcd (from SB X7-7 Table 5) and the confirmed 2020 Target (from SB X7-7 Table 7). The Interim 2015 Target for Hayward, per Methodology 3 and documented in SB X7-7 Table 8: 2015 Interim Target GPCD, is 128 gpcd.

5.7.4 *Baseline and Targets Summary*

The SB X7-7 verification tables, which confirm Hayward's compliance with the Water Conservation Act of 2009, are included at the end of this chapter.

Table 5-1 provides a Baseline and Targets Summary, based on the SB X7-7 verification tables.

Table 5-1: Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10 year	2000	2009	131	128	124
5 Year	2004	2008	134		
*All values are in Gallons per Capita per Day (gpcd)					
NOTES: Fiscal years					

5.8 2015 Compliance with Daily per Capita Water Use (GPCD)

5.8.1 *Meeting the 2015 Target*

Actual gross per capita water use in Hayward in 2015, as calculated in SB X7-7 Table 9: Compliance, was 89 gpcd. This usage is lower than the City's target 2015 per capita use of 128 gpcd; thus, Hayward has met its 2015 interim target.

Table 5-2 further verifies Hayward's compliance with its 2015 interim water use target.

Table 5-2: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	**Optional Adjustments to 2015 GPCD** Enter "0" for adjustments not used					2015 GPCD *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events	Economic Adjustment	Weather Normalization	TOTAL Adjustments	Adjusted 2015 GPCD		
89	128	0	0	0	0	89	89	Yes
**All values are in Gallons per Capita per Day (gpcd)*								
NOTES: Fiscal year ending June 30, 2015								

Hayward's 2015 actual gpcd usage was significantly lower than its interim target and in fact its final 2020 target. This low usage was achieved without optional adjustments or deductions for industrial process water. There were many factors that contributed to this result, including drought conditions, so this lower consumption is not expected to continue when water supplies return to normal. Nonetheless, the City has made good progress toward its final water use target and fully intends to strive to meet its 2020 targets.

It is important to note, however, that Hayward's current per capita water use is among the lowest of all the wholesale customers of SFPUC even with the presence of two major educational facilities with significant daytime populations, a regional hospital, and a large and diverse industrial sector. Further, the City also has an interest in economic development and encouraging vibrant and engaged State university and community college campuses. To the extent that these activities impact water demand, Hayward may evaluate its industrial, commercial, and institutional water use in the compliance year 2020 to determine if deductions to the gross water use are appropriate. Since both industrial process and institutional water use is expected to be an important factor in Hayward's future consumption, the water demand projections summarized in Chapter 4 are not consistent with the SB X7-7 water use targets.

5.8.2 2015 Adjustments to 2015 Gross Water Use

Hayward made no adjustments to its 2015 gross water use and therefore, Section 5.8.2 is not applicable.

5.9 Regional Alliance

SB X7-7 permits water agencies to comply with provisions of the legislation on a local or regional basis, or both. Regional alliances may be formed among agencies that purchase water from a common wholesale provider, are members of a regional agency authorized to implement water conservation, or are located in the same hydrologic region. BAWSCA, of which Hayward is member, is specifically named in the legislation as an agency that may serve as a regional entity for compliance with SB X7-7. Alliances may be formed by some or all of the member agencies.

Agencies that choose to comply with SB X7-7 requirements through a regional alliance must report compliance information on a Regional Alliance Report. The City opted to comply with SB X7-7 on an individual basis and therefore, Section 5.9 is not applicable to Hayward.

5.10 SB X7-7 Verification Forms

The following tables support and verify Hayward's SB X7-7 calculations and compliance. The forms will also be submitted electronically to DWR in Excel format.

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	7,057	Million Gallons
	2008 total volume of delivered recycled water	0	Million Gallons
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1]	10	Years
	Year beginning baseline period range	2000	
	Year ending baseline period range[2]	2009	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[3]	2008	

[1]If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.

[2]The ending year must be between December 31, 2004 and December 31, 2010.

[3]The ending year must be between December 31, 2007 and December 31, 2010.

NOTES: Based on fiscal years beginning July 1 and ending June 30.

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population	
☑	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other**

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	2000	140,030
Year 2	2001	141,444
Year 3	2002	141,850
Year 4	2003	141,263
Year 5	2004	140,681
Year 6	2005	140,530
Year 7	2006	140,305
Year 8	2007	140,720
Year 9	2008	141,495
Year 10	2009	142,642
5 Year Baseline Population		
Year 1	2004	140,681
Year 2	2005	140,530
Year 3	2006	140,305
Year 4	2007	140,720
Year 5	2008	141,495
2015 Compliance Year Population		
2015		152,889
NOTES: Fiscal years		

SB X7-7 Table 4: Annual Gross Water Use *								
	Baseline Year *Fm SB X7-7 Table 3*	**Volume Into Distribution System (MG)** *Fm SB X7-7 Table 4-A*	**Deductions**					**Annual Gross Water Use (MG)**
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water	Water Delivered for Agricultural Use	Process Water	
10 to 15 Year Baseline - Gross Water Use								
Year 1	2000	6832						6,832
Year 2	2001	6702						6,702
Year 3	2002	6427						6,427
Year 4	2003	6456						6,456
Year 5	2004	7171						7,171
Year 6	2005	6755						6,755
Year 7	2006	6675						6,675
Year 8	2007	6658						6,658
Year 9	2008	7057						7,057
Year 10	2009	6881						6,881
10 - 15 year baseline average gross water use								**4,508**
5 Year Baseline - Gross Water Use								
Year 1	2004	7,171						7,171
Year 2	2005	6,755						6,755
Year 3	2006	6,675						6,675
Year 4	2007	6,658						6,658
Year 5	2008	7,057						7,057
5 year baseline average gross water use								**6,863**
2015 Compliance Year - Gross Water Use								
2015		4,963			0		0	4,963
NOTES: Fiscal years								

SB X7-7 Table 4-A: Volume Entering the Distribution System				
Name of Source		SFPUC		
This water source is:				
☐	The supplier's own water source			
☑	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System (MG)	Meter Error Adjustment* *Optional* *(+/-)*	Corrected Volume Entering Distribution System (MG)
10 to 15 Year Baseline - Water into Distribution System				
Year 1	2000	6832		6,832
Year 2	2001	6702		6,702
Year 3	2002	6427		6,427
Year 4	2003	6456		6,456
Year 5	2004	7171		7,171
Year 6	2005	6755		6,755
Year 7	2006	6675		6,675
Year 8	2007	6658		6,658
Year 9	2008	7057		7,057
Year 10	2009	6881		6,881
5 Year Baseline - Water into Distribution System				
Year 1	2004	7,171		7,171
Year 2	2005	6,755		6,755
Year 3	2006	6,675		6,675
Year 4	2007	6,658		6,658
Year 5	2008	7,057		7,057
2015 Compliance Year - Water into Distribution System				
2015		4,963		4,963
NOTES: Fiscal years				

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use (MG) *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	2000	140,030	6,832	134
Year 2	2001	141,444	6,702	130
Year 3	2002	141,850	6,427	124
Year 4	2003	141,263	6,456	125
Year 5	2004	140,681	7,171	140
Year 6	2005	140,530	6,755	132
Year 7	2006	140,305	6,675	130
Year 8	2007	140,720	6,658	130
Year 9	2008	141,495	7,057	137
Year 10	2009	142,642	6,881	132
10-15 Year Average Baseline GPCD				**131**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use (MG) *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
Year 1	2004	140,681	7,171	140
Year 2	2005	140,530	6,755	132
Year 3	2006	140,305	6,675	130
Year 4	2007	140,720	6,658	130
Year 5	2008	141,495	7,057	137
5 Year Average Baseline GPCD				**134**
2015 Compliance Year GPCD				
2015		152,889	4,963	89
NOTES: Fiscal years				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	131
5 Year Baseline GPCD	134
2015 Compliance Year GPCD	89

SB X7-7 Table 7: 2020 Target Method		
Target Method		Supporting Documentation
☐	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D
☑	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☑	100%	San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target				**124**

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target*	Calculated 2020 Target *Fm Appropriate Target Table*	Confirmed 2020 Target
134	127	124	124

** Maximum 2020 Target is 95% of the 5 Year Baseline GPCD*

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	2015 Interim Target GPCD
124	131	128

SB X7-7 Table 9: 2015 Compliance							
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)*				2015 GPCD *(Adjusted)*	Did Supplier Achieve Targeted Reduction for 2015?
		Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments		
89	128	*0*	*0*	*0*	0	89	YES

CHAPTER 6

SYSTEM SUPPLIES

The City of Hayward's water supply portfolio is described and quantified in this chapter, including imported supplies and recycled water.

6.1 Purchased or Imported Water

Hayward's sole source of potable water since 1963 has been purchased water from the City and County of San Francisco's RWS, operated by the SFPUC. Under normal supply conditions, the SFPUC meets demand in its service area from its watersheds, which consist of the Tuolumne River, Alameda Creek and San Mateo County watersheds. In general, 85% of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15% comes from local watersheds in Alameda County.

6.2 Groundwater

Agencies that pump, or expect to pump, groundwater are required to include in their UWMPs an overview of the groundwater resources and groundwater management strategies. Hayward does not currently nor does it plan to utilize groundwater to meet any portion of its normal day-to-day water demand in the near term. Therefore, a groundwater management plan has not been prepared.

Five emergency wells located within the City, and using local groundwater, can theoretically provide up to a total of 13.6 mgd; however, these well do not run concurrently with the SFPUC source and are certified for short duration emergency use only. Because the wells are intended and permitted only for such emergency use, further discussion of this short-term water supply is located in Section 8.8.2, which addresses water supply interruption.

Apart from occasional exercising of emergency well pumps, Hayward did not pump groundwater during the years 2011 to 2015. Table 6-1 is included below to document this fact.

Table 6-1: Groundwater Volume Pumped						
☑	Supplier does not pump groundwater.					
Groundwater Type	Location or Basin Name	2011	2012	2013	2014	2015
	TOTAL	**0**	**0**	**0**	**0**	**0**

6.2.1 through 6.2.4 Groundwater Issues

These sections, which address groundwater basins, overdraft conditions and the like, are not applicable to the City and not included in the UWMP.

6.3 SURFACE WATER

Water that is self-supplied to agencies from streams, lakes and reservoirs is considered a surface water supply. Although a portion of Hayward's supply is derived from surface water, it is categorized as "purchased" water since the water is obtained from SFPUC. Hayward does not currently nor does it plan to use self-supplied surface water as part of its water supply portfolio.

6.4 STORMWATER

Hayward does not currently nor does it plan to use diverted stormwater as part of its water supply portfolio. Small amounts of rainwater may be collected by retail customers for landscape use, as discussed in Section 9.2.7; however, large-scale stormwater capture and reuse is not currently planned.

6.5 WASTEWATER AND RECYCLED WATER

For the purpose of the UWMP, recycled water is defined as municipal wastewater that has been treated to a specific quality to enable its reuse for a beneficial purpose. In 2007, the City prepared a Recycled Water Feasibility Study to assess the technical viability of delivery recycled water, the potential market for recycled water, and consumer acceptance. Based on the results of the Feasibility Study, Hayward developed a Recycled Water Facility Plan (RWFP) in 2009, subsequently updated in 2013, to confirm potential users of recycled water and anticipated quantities, develop a conceptual treatment and distribution system, and estimate project costs. This section will review Hayward's planning efforts, progress in implementing the RWFP, potential uses of recycled water, and constraints and challenges.

6.5.1 Recycled Water Coordination

The City of Hayward owns and operates a municipal wastewater collection system and treatment plant which, like the City's Water Distribution System, are managed in the Department of Utilities & Environmental Services, and allows maximum coordination within the City. Hayward is a founding member of the East Bay Dischargers Authority (EBDA), a joint powers agency that disposes of treated wastewater through a deepwater outfall to the San Francisco Bay.

The City also participates in regional efforts to increase recycled water use, such as the Western Recycled Water Coalition (WRWC) and the Bay Area Integrated Regional Water Management Plan (IRWMP). The WRWC is a collaboration of cities, water agencies and wastewater agencies with a mutual interest in securing funds to pursue locally managed recycled water projects. The IRWMP is a nine-county effort to coordinate and improve water supply reliability.

The following list identifies the entities that collect, treat and discharge municipal wastewater generated in the City of Hayward:

- City of Hayward Sewer Collection System – collects municipal wastewater and conveys it to the Water Pollution Control Facility
- City of Hayward Water Pollution Control Facility (WPCF) – Treats municipal wastewater and conveys it to the East Bay Dischargers Authority disposal facility
- East Bay Dischargers Authority – Disposes of wastewater produced by member agencies, including Hayward

6.5.2 Wastewater Collection, Treatment and Disposal

This section addresses the handling of wastewater in the City of Hayward, including collection, treatment and disposal.

6.5.2.1 Wastewater Collected Within Service Area

The City of Hayward owns and operates the wastewater collection system that collects wastewater from almost all of the residential, commercial and industrial users within the incorporated City limits. The City also serves a small number of properties in unincorporated areas of Alameda County.

The wastewater collection system is comprised of about 350 miles of sewer mains, 9 sewage lift stations, and 2.5 miles of force mains. The City maintains a comprehensive maintenance and replacement program to minimize the potential for sanitary sewer overflows and to ensure that sufficient collection capacity is available to meet demand.

Table 6-2 summarizes the collection of wastewater within the City of Hayward.

Table 6-2: Wastewater Collected Within Service Area in 2015						
100%	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
100%	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected from UWMP Service Area in 2015 (in MG)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP located within UWMP area?	Is WWTP operation contracted to third party?
City of Hayward	Metered	3,830	City of Hayward	Hayward WPCF	Yes	No
Total Wastewater Collected from Service Area in 2015:		**3,830**				

6.5.2.2 Wastewater Treatment Within Service Area

The wastewater collected by the City of Hayward is conveyed to the City-owned WPCF. All wastewater treated at the City's WPCF originates within the service area.

The WPCF is permitted to provide primary through advanced secondary treatment for up to 18.5 mgd of wastewater. All wastewater is currently treated to a secondary level utilizing:

- Primary clarification
- High-rate trickling filters
- Solids contact aeration basin
- Secondary clarification

The following diagram graphically depicts the current wastewater treatment process units utilized at the City's WPCF:

Figure 6-1

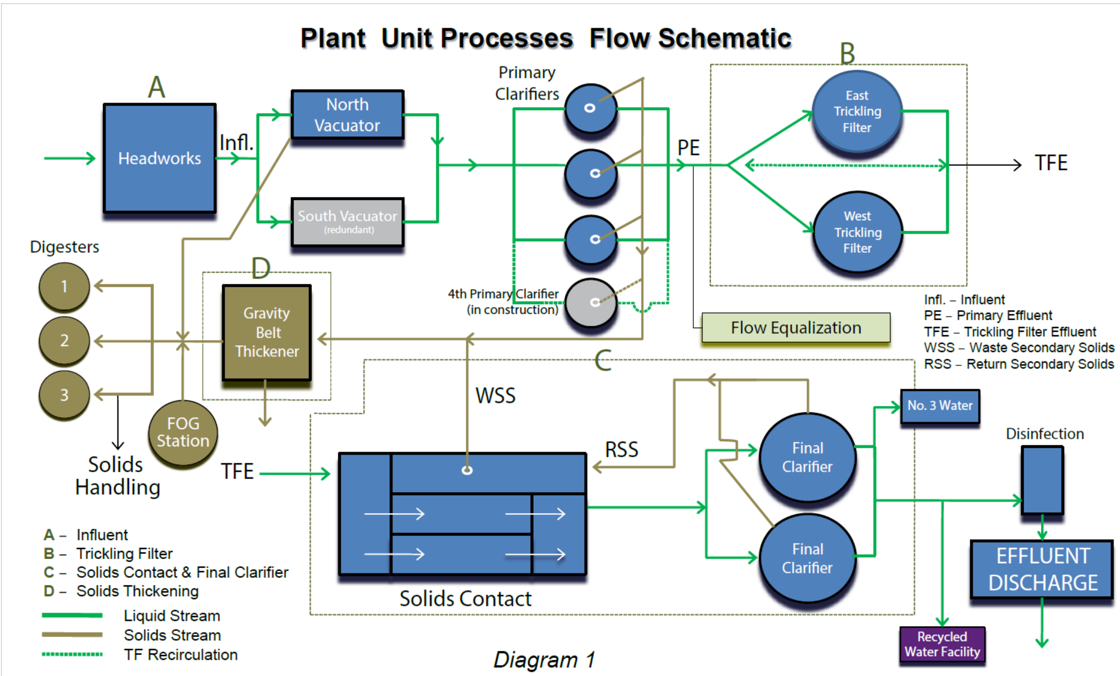


Diagram 1

Treated wastewater is disinfected with sodium hypochloride and conveyed to EBDA for final dechlorination and discharge via EBDA's common outfall to the San Francisco Bay. A portion of the secondary treated effluent is delivered to Calpine Corporation's Russell City Energy Center (RCEC). The RCEC treats the wastewater to Title 22 level and uses it in its cooling process.

Table 6-3 summarizes the treatment of wastewater within the service area.

Table 6-3: Wastewater Treatment and Discharge Within Service Area in 2015									
						2015 volumes (in MG)			
Wastewater Treatment Plant Name	Discharge Location Name	Discharge Location Description	Method of Disposal	Wastewater Treated from Outside the Service Area?	Treatment Level	Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside Service Area
Hayward WPCF	EBDA	San Francisco Bay	Bay or estuary outfall	No	Secondary, Disinfected - 2.2	3,830	3,915	569	0
					Total	**3,830**	**3,915**	**569**	**0**
Note: Hayward delivers secondary treated effluent to RCEC. RCEC further treats to Title 22 recycled water.									

6.5.3 Recycled Water System

The City's current recycled water system provides secondary treated wastewater to the RCEC, owned by Calpine Corporation. The RCEC, located adjacent to the City's WPCF, is a 600 megawatt natural gas-fired combined cycle energy generation facility. The RCEC initiated operations in August 2013. The RCEC's permit to operate, issued by the California Energy Commission, requires the facility to use recycled water for cooling. The City and RCEC entered into an agreement whereby the City delivers secondary treated wastewater, which is further treated by the RCEC to tertiary level, in accordance with Title 22 requirements. RCEC's recycled water use is a directly beneficial use as defined in the California Code of Regulations.

The entities involved are:

- City of Hayward Water Pollution Control Facility
- Russell City Energy Center (owned by Calpine Corporation)

In 2015, the City delivered 569 MG to the RCEC, an average of 1.5 mgd. During the peak summer months (June through September), deliveries averaged about 2.1 mgd. The City anticipates that future quantities will increase, however, future deliveries are difficult to determine with certainty, because the RCEC operates on demand, and demand can be impacted by factors such as weather conditions and how many other plants are operating at the time.

6.5.4 Recycled Water Beneficial Uses

6.5.4.1 Current and Planned Uses of Recycled Water

Current and planned beneficial uses of recycled water within the City of Hayward are described below.

Current Uses of Recycled Water by City of Hayward

Hayward currently delivers secondary treated wastewater to the RCEC. The wastewater is further treated by RCEC and used as cooling water. A discussion of this current use in located in Section 6.5.3.

Planned Uses of Recycled Water

Hayward expects to continue, and potentially increase, deliveries of secondary treated wastewater to RCEC for use as cooling water in the production of energy. As discussed in Section 6.5.4.2, deliveries to RCEC averaged 1.5 million gallons per day and did not meet expected volumes for various reasons outside of the City's control. There is potential, however, for increased volumes by 2020, and the City has assumed average deliveries to RCEC of 2.5 million gallons per day in the future.

In addition to recycled water use at RCEC, the City plans to implement a Recycled Water Project to deliver tertiary treated wastewater to other customers within an approximately 2-mile radius of the WPCF. In 2013, the RWFP, originally developed in 2009, was updated to assess the potential recycled water demand, customer acceptance, water quality issues and distribution system alternatives. The updated RWFP also refined construction costs and financing alternatives.

The Recycled Water Project includes construction of a storage tank and pump station, in addition to distribution pipeline, and installation of customer laterals and connections. (The City plans to reach agreement with Calpine Corporation to receive surplus tertiary treated water from the RCEC. If agreement is not reached and/or the demand for recycled water exceeds the amount that RCEC can provide, the City will construct a tertiary treatment facility at the WPCF.) The Project could deliver an estimated 90 MG of recycled water per year, an annualized average of about 250,000 gpd, to 22 customers. The majority of customers would use the recycled water for irrigation, with some industrial uses for cooling towers and boilers. All of the current and planned uses of recycled water are direct beneficial uses in accordance with California Water Code §13050(f).

The City has made significant progress in implementing the RWFP. The environmental assessment has been completed and approved by the Hayward City Council. As of the adoption of this UWMP, the City is preparing to design the distribution system. The City is also assessing the feasibility of obtaining excess tertiary treated wastewater from the RCEC versus the construction of additional on-site treatment at the WPCF.

The City has actively pursued federal and state funding to implement the Recycled Water Project in a cost effective manner. The most favorable financing option currently available to Hayward is low interest financial assistance from the California State Water Resources Control Board. The loan process is currently underway.

Table 6-4 summarizes current and planned direct beneficial uses of recycled water within the City's service area.

Table 6-4: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area								
Name of Agency Producing (Treating) the Recycled Water:		City of Hayward						
Name of Agency Operating the Recycled Water Distribution System:		City of Hayward						
Supplemental Water Added in 2015		N/A						
Source of 2015 Supplemental Water		N/A						
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment	2015 (in MG)	2020 (in MG)	2025 (in MG)	2030 (in MG)	2035 (in MG)	2040 (in MG)
Landscape irrigation (excludes golf courses)		Tertiary		70	70	70	70	70
Industrial use	Power plant cooling	Tertiary	569	930	930	930	930	930
		Total:	**569**	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**

6.5.4.2 Planned Versus Actual Use of Recycled Water

The City's 2010 UWMP included projected use of recycled water in 2015 and beyond. Table 6-5 compares the 2015 projected estimates to actual 2015 actual recycled water use, as reported in Table 6-4.

Table 6-5: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual		
Use Type	2010 Projection for 2015 (in MG)	2015 Actual Use (in MG)
Industrial use	1,132	569
Total	**1,132**	**569**

In the 2010 UWMP, Hayward projected that recycled water use in 2015 would be comprised entirely of deliveries to the Russell City Energy Center, in quantities estimated by the owner of the facility. Actual deliveries have been less than anticipated due to facility operational issues, seasonal demands and other factors outside of the City's control.

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

Approaches to Encourage the Use of Recycled Water

The City's RWFP describes the potential for optimizing recycled water use in Hayward over current levels, based on the planned infrastructure, and increasing usage by 290 acre feet per year through deliveries to customers within a 2-mile radius of the WPCF. In addition, the City will encourage additional use through some or all of the following strategies:

- Public Outreach. As the use of recycled water becomes more prevalent and accepted in Hayward, and throughout the region, there will be more opportunities to reach out to potential customers with examples of successful conversions from potable to recycled water.

- Mandatory Use Ordinance. The Hayward City Council has adopted a Mandatory Use Ordinance that goes into effect when the recycled water distribution system is constructed and will require that properties which lies within the City's recycled water service area be served with recycled water for appropriate purposes if technically feasible.

- Financial incentives. While the rate structure for recycled water delivery has not yet been established, it is expected that the cost to the customer will be less than the cost of purchasing potable water. This financial benefit, coupled with increased supply reliability, may create additional demand for recycled water.

Issues Constraining Recycled Water Implementation and Expansion

While the City will continue to explore the potential for increasing the use of recycled water, there are technical and feasibility issues that may constrain implementation and expansion, including:

- **Distribution and Storage**

  Issue: Since most of the recycled water use in Hayward is expected to be for irrigation, seasonal variation would need to be addressed to ensure sufficient quantities of recycled water during peak use periods.

  Discussion: The City must carefully evaluate storage and distribution needs to ensure that facilities are properly sized to meet year-round demand, including peak demand that typically would occur in the summer months.

- **Water Quality**

  Issue: Industrial uses, mainly cooling towers and boiler feed, require that specific water quality standards be met. There is concern among some customers that alkalinity and total dissolved solids in particular may be too high. Irrigation customers may be concerned about the impact of recycled water on plant health.

  Discussion: A monitoring program would need to be implemented to ensure ongoing and consistent maintenance of water quality standards.

- **Cost**

  Issue: The capital costs of constructing a distribution system and treatment and storage facilities are significant. Further, customer retrofits may be costly, which could discourage some customers.

  Discussion: The City will pursue funding resources for capital costs. The City may also explore the potential for providing financial assistance to customers for retrofits. Finally, recycled water may be priced such that customers are encouraged to utilize it rather than pay for the significantly increased cost of potable water.

- **Consumer Acceptance**

  Issue: Although recycled water has become far more accepted as a water supply, particularly when drought conditions limit the supply of potable water, there may still be some health and safety concerns about the use of recycled water in public areas, such as parks and schools.

  Discussion: The City would need to work closely with potential customers to address concerns and implement an extensive and effective public outreach and education program

Assessment of Potential Uses

The City's RWFP describes the potential for optimizing recycled water use in Hayward over current levels, based on the planned infrastructure. The City anticipates increasing usage by 90 MG per year through deliveries to customers within a 2-mile radius of the WPCF. This potential use assumes that 17 properties will use 70 MG for irrigation, with an additional 5 properties using 20 MG for industrial use or a combination of industrial and irrigation. In addition, for planning purposes, it is assumed that the City will increase deliveries to RCEC by about 340 MG to 910 MG per year, although it is not certain when this increase will occur. As noted above, the City cannot effectively influence the amount of recycled water used in energy production.

Based on surveys and discussions, the City believes it is feasible to assume that the 22 properties will utilize recycled water when the infrastructure is completed. Further, the Hayward City Council has adopted a mandatory use ordinance that requires properties within the City's recycled water service area be served with recycled water for appropriate purposes if technically feasible.

The City has not yet determined potential recycled water use beyond the scope of the RWFP. Once the infrastructure is constructed, there may be additional customers that connect to the system, either by implementation of the mandatory use ordinance or by customer choice, and an expansion of the recycled water distribution system may be possible. However, this potential usage has not been quantified.

Estimates of Additional Recycled Water Use

Table 6-6 estimates the volume of additional recycled water that could be realized by implementation of the actions described in this section. It should be noted that additional recycled water use is expected to result from a combination of the City's actions, but expected volume increases have been assigned to each action based on a reasonable estimate.

Table 6-6: Methods to Expand Future Recycled Water Use			
Section 6.5.5	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use (in MG)
Public Outreach	Outreach to potential customers	2017	10
Mandatory Use Ordinance	Requires properties in recycled water service area to use recycled water for appropriate purposes	2017	40
Financial Incentives	Lower cost than potable water	2017	40
Increased RCEC deliveries	Increased energy production at RCEC (not a City action)	2017	340
		Total	**430**
NOTES: Overall expected increase in recycled water use expected to result from the combination of methods. Increases in Table 6-6 for each specific method are estimates only.			

Reasons for Not Considering Recycled Water as a Potential Water Source

The City is considering recycled water as a potential water source; therefore, this section is not applicable.

Nearest Known Availability of Recycled Water and Obstacles to Accessing This Resource

This section is not applicable to the City of Hayward.

Feasibility Study

The City has prepared a Recycled Water Facility Plan, which includes a feasibility assessment. The RWFP is included in Appendix G.

6.6 Desalinated Water Opportunities

Desalinated water refers to ocean water, brackish surface water and brackish groundwater that is processed and used as a water supply. Hayward does not anticipate opportunities for development of desalinated water supplies within the planning horizon of this UWMP and this water supply is not being considered. Constraints on developing desalinated water supplies include the high cost of infrastructure and the large amount of energy required to operate a desalination facility.

6.7 Exchanges or Transfers

6.7.1 Exchanges

Water exchanges occur when water is delivered by one water user to another, with the receiving water user providing water in return at a specified time, or under conditions agreed to by both parties. Hayward does not currently nor does it plan to include water exchanges in its water supply portfolio.

6.7.2 Transfers

Water transfers are temporary or long-term changes in the point of diversion, place of use, or purpose of use due to a transfer, sale, lease or exchange of water or water rights. Temporary water transfers have a duration of one year or less, and long-term transfers have a duration of more than one year. Hayward does not currently nor does it plan to utilize water transfers as a temporary or long term water supply to meet normal demand.

6.7.3 Emergency Interties

Emergency water interties are connections between water systems that allow for the exchange or delivery of water between those systems on a short-term emergency basis. The City has established emergency interties with neighboring agencies to facilitate the short-term transfer of water in the event of an event such as an earthquake or other disruption in normal supply. More information about Hayward’s emergency interties is contained in Section 8.8, Catastrophic Supply Interruption.

6.8 Future Water Projects

6.8.1 SFPUC Water Projects

The SFPUC’s Water Supply Improvement Program (WSIP), adopted in 2008, provides goals and objectives to improve the delivery reliability of the RWS, including water supply reliability. The goals and objectives of the WSIP are:

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and wholesale customers during non-drought years for system demands through 2018. • Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

The WSIP includes projects to address water supply reliability, including the Calaveras Dam Replacement, Alameda Creek Recapture, and Regional Groundwater Storage and Recovery. Section 6.8.1 contains descriptions of these and other water supply projects that the SFPUC has or is planning to implement in order to meet the above system performance goals and objectives in both normal and dry years.

The following provides the water supply elements for all year types and the dry-year projects of the adopted WSIP to augment all year type water supplies during drought.

<u>Water Supply – All Year Types</u>

The SFPUC historically has met demand in its service area in all year types from its watersheds, which consist of:

- Tuolumne River watershed
- Alameda Creek watershed
- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted WSIP retains this mix of water supply for all year types.

<u>Water Supply – Dry-Year Types</u>

The adopted WSIP includes the following water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year:

- **Calaveras Dam Replacement Project**

  Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC is constructing a new dam of equal height downstream of the existing dam. The Environmental Impact Report was certified by the San Francisco City Planning Commission in 2011, and construction is now ongoing. Construction of the new dam is slated for completion in 2018; the entire project should be completed in 2019.

- **Alameda Creek Recapture Project**

  The Alameda Creek Recapture Project will recapture the water system yield lost due to instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir. The project's Draft Environmental Impact Report will be released in the spring of 2016, and construction will occur from spring 2017 to fall 2018.

- **Lower Crystal Springs Dam Improvements**

  The Lower Crystal Springs Dam Improvements were substantially completed in November 2011. While the project has been completed, permitting issues for reservoir operation have become significant. While the reservoir elevation was lowered due to Division of Safety of Dams restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before the original reservoir elevation can be restored.

- **Regional Groundwater Storage and Recovery Project**

  The Groundwater Storage and Recovery Project is a strategic partnership between SFPUC and three San Mateo County agencies: the California Water Service Company (serving South San Francisco and Colma), the City of Daly City, and the City of San Bruno. The project seeks to balance the management of groundwater and surface water resources in a way that safeguards supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County, allowing them to reduce the amount of groundwater that they pump from the South Westside Groundwater Basin. Over time, the reduced pumping would allow the aquifer to recharge and result in increased groundwater storage of up to 20 billion gallons.

  The project's Final Environmental Impact Report was certified in August 2014, and the project also received Commission approval that month. The well station construction contract Notice to Proceed was issued in April 2015, and construction is expected to be completed in spring 2018.

- **2 mgd Dry-Year Water Transfer**

  In 2012, the dry-year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC is having ongoing discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 mgd (2,240 acre-feet).

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 mgd for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 mgd, the net loss of water supply is 3.5 mgd. The SFPUC's participation in regional water supply reliability efforts, such as the Bay Area Regional Desalination Project (BARDP), additional water transfers, and other projects may help to make up for this shortfall.

6.8.2 City of Hayward Water Projects

Hayward is implementing a recycled water project that will deliver about 90 MG of recycled water to customers for irrigation and other non-potable uses. In addition, deliveries to RCEC are expected to increase by about 340 MG to 910 MG annually. These projects are discussed fully in Sections 6.5.3 and 6.5.4. Table 6-7 summarizes the expected future water supply project to be constructed or implemented by the City of Hayward to reduce reliance on purchased water supply.

Table 6-7: Expected Future Water Supply Projects or Programs					
Section 6.5	Provide page location of narrative in the UWMP				
Name of Future Projects or Programs	Joint Project with other agencies?	Description (if needed)	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency (in MG)
Recycled Water	No		2017	All Year Types	430
NOTES: This table includes only projects to be implemented by the City of Hayward. Projects to be constructed by SFPUC are documented in the narrative section and in the SFPUC's 2015 UWMP.					

6.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

Table 6-8 provides a summary of the actual source and volume of water supply in the year 2015. In Table 6-9, a summary of projected water supplies is provided, including volume by source.

Table 6-8: Water Supplies — Actual			
Water Supply	Additional Detail on Water Supply	**2015**	
		Actual Volume (in MG)	Water Quality
Purchased Water	From SFPUC	4,963	Drinking Water
Recycled Water		569	Recycled Water
	Total	**5,532**	

Table 6-9: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	**Projected Water Supply (in MG)**				
		2020	**2025**	**2030**	**2035**	**2040**
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Purchased Water	from SFPUC	7,850	8,320	8,600	8,820	9,260
Recycled Water		1,000	1,000	1,000	1,000	1,000
	Total	**8,850**	**9,320**	**9,600**	**9,820**	**10,260**
Notes: Recycled water use reflects only the demand based on the Recycled Water Facility Plan. The City will continue to evaluate other potential uses of recycled water and may increase deliveries.						

6.10 CLIMATE CHANGE IMPACTS TO SUPPLY

The issue of climate change has become an important factor in water resources planning in the State, and is frequently considered for urban water management planning purposes, though the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gasses have caused and will continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. Moreover, observational data show that a warming trend occurred during the latter part of the 20th century and virtually all projections indicate this will continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, and a shift in snowmelt runoff to earlier in the year;
- Changes in the timing, intensity and variability of precipitation, and an increased amount of precipitation falling as rain instead of as snow;
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quality and quantity;
- Sea level rise and an increase in saltwater intrusion;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

Both the SFPUC and BAWSCA participated in the 2013 update of the IRWMP, which includes an assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. In addition, the SFPUC continues to study the effect of climate change on the RWS. These works are summarized below.

<u>Bay Area Integrated Regional Water Management Plan</u>

Climate change adaptation was established as an overarching theme for the 2013 IRWMP update. As stated in the IRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area Region (Region). Vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with or adjust to, the adverse effects of climate change. A vulnerability assessment was conducted in accordance with the DWR's *Climate Change Handbook for Regional Water Planning* and using the most current science available for the Region. The vulnerability assessment, summarized in the table below, provides the main water planning categories applicable to the Region and a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts.

Summary of BAIRWMP Climate Change Vulnerability Assessment

Vulnerability Areas	General Overview of Vulnerabilities
Water Demand	**Urban and Agricultural Water Demand** – Changes to hydrology in the Region as a result of climate change could lead to changes in total water demand and use patterns. Increased irrigation (outdoor landscape or agricultural) is anticipated to occur with temperature rise, increased evaporative losses due to warmer temperature, and a longer growing season. Water treatment and distribution systems are most vulnerable to increases in maximum day demand.
Water Supply	**Imported Water** – Imported water derived from the Sierra Nevada sources and Delta diversions provide 66 percent of the water resources available to the Region. Potential impacts on the availability of these sources resulting from climate change directly affect the amount of imported water supply delivered to the Region. **Regional Surface Water** – Although future projections suggest that small changes in total annual precipitation over the Region will not change much, there may be changes to when precipitation occurs with reductions in the spring and more intense rainfall in the winter. **Regional Groundwater** – Changes in local hydrology could affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term in some areas. Decreased inflow from more flashy or more intense runoff, increased evaporative losses and warmer and shorter winter seasons can alter natural recharge of groundwater. Salinity intrusion into coastal groundwater aquifers due to sea-level rise could interfere with local groundwater uses. Furthermore, additional reductions in imported water supplies would lead to less imported water available for managed recharge of local groundwater basins and potentially more groundwater pumping in lieu of imported water availability.
Water Quality	**Imported Water** – For sources derived from the Delta, sea-level rise could result in increases in chloride and bromide (a disinfection by-product (DBP) precursor that is also a component of sea water), potentially requiring changes in treatment for drinking water. Increased temperature could result in an increase in algal blooms, taste and odor events, and a general increase in DBP formation **Regional Surface Water** – Increased temperature could result in lower dissolved oxygen in streams and prolong thermocline stratification in

Vulnerability Areas	General Overview of Vulnerabilities
	lakes and reservoirs forming anoxic bottom conditions and algal blooms. Decrease in annual precipitation could result in higher concentrations of contaminants in streams during droughts or in association with flushing rain events. Increased wildfire risk and flashier or more intense storms could increase turbidity loads for water treatment. **Regional Groundwater** – Sea-level rise could result in increases in chlorides and bromide for some coastal groundwater basins in the Region. Water quality changes in imported water used for recharge could also impact groundwater quality.
Sea-Level Rise	Sea-level rise is additive to tidal range, storm surges, stream flows, and wind waves, which together will increase the potential for higher total water levels, overtopping, and erosion. Much of the bay shoreline is comprised of low-lying diked baylands which are already vulnerable to flooding. In addition to rising mean sea level, continued subsidence due to tectonic activity will increase the rate of relative sea-level rise. As sea-level rise increases, both the frequency and consequences of coastal storm events, and the cost of damage to the built and natural environment, will increase. Existing coastal armoring (including levees, breakwaters, and other structures) is likely to be insufficient to protect against projected sea-level rise. Crest elevations of structures will have to be raised or structures relocated to reduce hazards from higher total water levels and larger waves.
Flooding	Climate change projections are not sensitive enough to assess localized flooding, but the general expectation is that more intense storms would occur thereby leading to more frequent, longer and deeper flooding. Changes to precipitation regimes may increase flooding. Elevated Bay elevations due to sea-level rise will increase backwater effects exacerbating the effect of fluvial floods and storm drain backwater flooding.
Ecosystem and Habitat	Changes in the seasonal patterns of temperature, precipitation, and fire due to climate change can dramatically alter ecosystems that provide habitats for California’s native species. These impacts can result in

Vulnerability Areas	General Overview of Vulnerabilities
	species loss, increased invasive species ranges, loss of ecosystem functions, and changes in vegetation growing ranges. Reduced rain and changes in the seasonal distribution of rainfall may alter timing of low flows in streams and rivers, which in turn would have consequences for aquatic ecosystems. Changes in rainfall patterns and air temperature may affect water temperatures, potentially affecting coldwater aquatic species. Bay Area ecosystems and habitat provide important ecosystem services, such as: carbon storage, enhanced water supply and quality, flood protection, food and fiber production. Climate change is expected to substantially change several of these services. The region provides substantial aquatic and habitat-related recreational opportunities, including: fishing, wildlife viewing, and wine industry tourism (a significant asset to the region) that may be at risk due to climate change effects.
Hydropower	Currently, several agencies in the Region produce or rely on hydropower produced outside of the Region for a portion of their power needs. As the hydropower is produced in the Sierra, there may be changes in the future in the timing and amount of energy produced due to changes in the timing and amount of runoff as a result of climate change. Some hydropower is also produced within the region and could also be affected by changes in the timing and amount of runoff.

Source: 2013 Bay Area Integrated Regional Water Management Plan (BAIRWMP), Table 16-3.

<u>SFPUC Climate Change Studies</u>

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. Climate change research by the SFPUC began in 2009 and continues to be refined. In its 2012 report “Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios,” the SFPUC assessed the sensitivity of runoff into Hetch Hetchy Reservoir to a range of changes in temperature and precipitation due to climate change. Key conclusions from the report include the following:

- With differing increases in temperature alone, the median annual runoff at Hetch Hetchy would decrease by 0.7-2.1 percent from present-day conditions by 2040 and by 2.6-10.2 percent from present-day by 2100. Adding differing decreases in precipitation on top of temperature increases, the median annual runoff at Hetch Hetchy would decrease by 7.6-8.6 percent from present-day conditions by 2040 and by 24.7-29.4 percent from present-day conditions by 2100.
- In critically dry years, these reductions in annual runoff at Hetch Hetchy would be significantly greater, with runoff decreasing up to 46.5 percent from present day conditions by 2100 utilizing the same climate change scenarios.
- In addition to the total change in runoff, there will be a shift in the annual distribution of runoff. Winter and early spring runoff would increase and late spring and summer runoff would decrease.
- Under all scenarios, snow accumulation would be reduced and snow would melt earlier in the spring, with significant reductions in maximum peak snow water equivalent under most scenarios.

Currently, the SFPUC is planning to conduct a comprehensive assessment of the potential effects of climate change on water supply. The assessment will incorporate an investigation of new research on the current drought and is anticipated to be completed in late 2016 or early 2017.

CHAPTER 7

WATER SUPPLY RELIABILITY ASSESSMENT

The assessment of water supply reliability is complex and dependent upon a number of factors. This chapter provides Hayward's best determination of the reliability of its water supply based on known factors and input from the City's sole water supplier, the SFPUC.

7.1 CONSTRAINTS ON WATER SOURCES

Hayward's current and projected water use is described in Chapter 4. The City expects to meet its potable water supply needs through purchases from the SFPUC's Regional Water System, as documented in Chapter 6, with recycled water for specific irrigation and industrial uses. The following narrative discusses potential issues and constraints on water supply availability. Since the City considers recycled water to be a reliable and stable water supply source, the majority of this chapter will focus mainly on the reliability of the SFPUC water supplies, with a brief recycled water assessment included in Table 7-1b. SFPUC has provided the City with a water supply assessment and reliability analysis, included in Appendix H

<u>2018 Interim Supply Limitation and Allocations</u>

As part of its adoption of the WSIP in October 2008, discussed in detail in Section 6.8.1, the SFPUC adopted a water supply limitation, the Interim Water Supply Limitation (ISL), which limits sales from the RWS watersheds to an average of 265 mgd annually through 2018. All 26 wholesale customers, including Hayward, are subject to the ISL. The wholesale customers' collective allocation under the ISL is 184 mgd and San Francisco's allocation is 81 mgd. Although the wholesale customers did not agree to the ISL, the Water Supply Agreement between the wholesale customers and SFPUC provides a framework for administering the supply limitation.

The Interim Supply Allocations (ISA) refer to San Francisco's and each individual wholesale customer's share of the ISL. On December 14, 2010, the SFPUC established each agency's ISA through 2018. In general, the SFPUC based the wholesale customers' allocation on the lesser of the fiscal year 2017-2018 purchase projections or Individual Supply Guarantees. The ISAs are effective until December 31, 2018.

As an incentive to keep RWS deliveries below the ISL of 265 mgd, the SFPUC adopted an Environmental Enhancement Surcharge for collective deliveries in excess of the ISL, effective at the beginning of fiscal year 2011-12. This volume-based surcharge would be unilaterally imposed by SFPUC on individual wholesale customers and SFPUC retail customers when an agency's use exceeds their ISA and when sales of water to the wholesale customers and San Francisco retail customers collectively exceed the ISL of 265 mgd. Actual charges would be determined based on each agency's respective amount of excess use. To date, no surcharges related to the ISL have been levied.

Because Hayward's purchases are not limited by an Individual Supply Guarantee, its ISA was based on anticipated purchases, as projected at the time of the adoption of the ISAs, and set at 22.9 mgd. Hayward does not expect to exceed its ISA in any year through 2018.

Climate Conditions

Given the SFPUC's reliance on Sierra snowmelt to meet the majority of demand, SFPUC supplies are affected by climate conditions and drought. As shown in Table 7-1a, wholesale customers, including Hayward may be required to reduce purchases depending on the severity and duration of the water supply shortage.

Impact of Recent SFPUC Actions on Dry-Year Reliability

As noted in Section 6.8.1, in adopting the Calaveras Dam Replacement and the Lower Crystal Springs Dam Improvement Projects, the SFPUC committed to providing fishery flows below Calaveras Dame and Lower Crystal Springs Dame, as well as bypass flows below Alameda Creek Diversion Dam. The fishery flow schedules for Alameda Creek and San Mateo Creek represent a potential decrease in available water supply of an average annual 9.3 mgd and 3.5 mgd respectively, with a total of 12.8 mgd average annually. The Alameda Creek Recapture Project, also described in Section 6.8.1, will replace the 9.3 mgd of supply lost to Alameda Creek fishery flows. Therefore, the remaining 3.5 mgd of fishery flows for San Mateo Creek will potentially create a shortfall in meeting the SFPUC demands of 265 mgd and slightly increase the SFPUC dry-year water supply needs.

The adopted WSIP water supply objectives include (1) meeting a target delivery of 265 mgd through 2018 and (2) rationing at no greater than 20 percent system-wide in any one year of a drought. As a result of the fishery flows, the SFPUC may not be able to meet these objectives between 2015 and 2018; however, the City does not consider this a critical supply issue, given the relatively short span of time and water reductions achieved throughout the region during the drought . Participation in the Bay Area Regional Desalination Project and additional water transfers may help manage the water supply loss associated with the fishery flows.

As a result of the Individual Supply Guarantees described above, the SFPUC has a responsibility to provide 184 mgd to its wholesale customers in perpetuity, regardless of demand. SFPUC's total target delivery of 265 mgd includes both wholesale and retail demand. In the last decade including the current drought, SFPUC deliveries have been below 265 mgd, including wholesale and retail demand, ranging from 196 mgd to 257 mgd.

Under the current drought to date, the SFPUC has called for a voluntary 10 percent system-wide reduction since January 2014. The SFPUC has not yet been compelled to declare a water shortage emergency and impose mandatory system-wide rationing because its customers have exceeded the 10 percent voluntary system-wide reduction in conjunction with the state-wide mandatory reductions assigned by the State Water Resources Control Board. The reductions assigned to each water agency by the State Water Resources Control Board to address the current drought conditions effectively reduced the demand for SFPUC water supplies.

If current drought conditions worsen between 2015 and 2018, and the SFPUC determines that system-wide rationing would need to be imposed, then the SFPUC would issue a declaration of a water shortage emergency in accordance with Water Code Section 350 and implement rationing.

Water Quality

At this time, there are no known water quality issues that would constrain water supply reliability. Water deliveries from SFPUC consistently meet or exceed all federal and state standards, and are expected to continue to meet these requirements. The water delivered to Hayward customers likewise meets all standards.

Strategies to Address Water Supply Constraints

Recycled Water

The City is implementing a Recycled Water Project that will provide a limited quantity of non-potable water for irrigation and some industrial uses. A detailed description of this project, including quantities, is provided in Section 6.5.

SFPUC Water System Improvement Program (WSIP)

SFPUC's WSIP includes projects to increase water supply reliability in both normal and dry years. Section 6.8.1 discusses the WSIP in detail, including a description of projects that specifically address SFPUC's goal to meet dry year demand with no more than 20% system-wide rationing in any one year.

Long Term Reliable Water Supply Strategy

The Bay Area Water Supply and Conservation Agency (BAWSCA) provides regional water reliability planning and conservation programming for the benefit of its 26 member agencies, including Hayward, which purchase wholesale water supplies from the SPFUC. BAWSCA developed a Long Term Reliable Water Supply Strategy to:

- Quantify the water supply reliability needs of member agencies through 2040
- Identify water management projects and programs that could be developed to meet those needs
- Prepare an implementation plan for the recommendations included in the Strategy

Phase II of the Strategy was completed in February 2015 with release of the Strategy Phase II Final Report. The water demand analysis done during Phase II of the Strategy resulted in the following key findings:

- There is no longer a regional normal year supply shortfall.
- There is a regional drought year supply shortfall of up to 43 mgd.

In addition, the project evaluation analysis done during Phase II of the Strategy resulted in the following key findings:

- Water transfers score consistently high across the various performance measures and within various portfolio constructs and thus represent a high priority element of the Strategy.
- Desalination also potentially provides substantial yield, but its high effective costs and intensive permitting requirements make it a less attractive drought year supply alternative. However, given the limited options for generating significant yield for the region, desalination warrants further investment in information as a hedge against the loss of local or other imported supplies.
- The other potential regional projects provide tangible, though limited, benefit in reducing dry year shortfalls given the small average yields in drought years.

BAWSCA is now implementing the Strategy recommendations in coordination with BAWSCA member agencies. Strategy implementation will be adaptively managed to account for changing conditions and to ensure that the goals of the Strategy are met efficiently and cost-effectively. Due to the size of the supply and reliability need, and the uncertainty around yield of some Strategy projects, BAWSCA will need to pursue multiple actions and projects in order to provide some level of increased water supply reliability for its member agencies. On an annual basis, BAWSCA will reevaluate Strategy recommendations and results in conjunction with development of the work plan for the following year. In this way, actions can be modified to accommodate changing conditions and new developments.

7.2 Reliability by Type of Year

This section addresses potable water supply reliability and vulnerability to climatic shortage. The information provided is based on data received from SFPUC. The SFPUC utilized historical hydrologic data dating back to 1921 to establish water year types and percent of available water supply expected for each type of year.

7.2.1 Types of Years

7.2.1.1 Average Year

An average year is defined as a year, or an average range of years, that most closely represents the water supply available to the City in an average or normal year.

7.2.1.2 Single-Dry Year

A single-dry year is the year that represents the lowest water supply available to the agency.

7.2.1.3 Multiple-Dry Year Period

A multiple-dry year period represents the lowest average water supply availability to the City for a consecutive multiple year period, generally consisting of three years.

7.2.2 Agencies with Multiple Sources of Water

Hayward's potable water supply source consists entirely of purchased water from SFPUC. However, since recycled water makes up a small portion of the City's water supply portfolio, a reliability assessment of this source is included.

Tables 7-1a and 7-1b document the base water years for average, single-dry and multiple-dry years for each water supply source and the percent of average supply that would be available under each supply condition.

Table 7-1a: Basis of Water Year Data – SFPUC Supplies

Year Type	Base Year *If not using a calendar year, type in the last year of the fiscal or water year, for example, water year 1999-2000, use 2000*	Available Supplies if Year Type Repeats	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	**% of Average Supply**
Average Year	2015		100%
Single-Dry Year	2015		90%
Multiple-Dry Years 1st Year	2015		90%
Multiple-Dry Years 2nd Year	2015		78%
Multiple-Dry Years 3rd Year	2015		78%
Source: Communication from SFPUC dated January 5, 2016			

Table 7-1b: Basis of Water Year Data – Recycled Water			
Year Type	**Base Year** *If not using a calendar year, type in the last year of the fiscal or water year, for example, water year 1999-2000, use 2000*	**Available Supplies if Year Type Repeats**	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	**% of Average Supply**
Average Year	2015		100%
Single-Dry Year	2015		100%
Multiple-Dry Years 1st Year	2015		100%
Multiple-Dry Years 2nd Year	2015		100%
Multiple-Dry Years 3rd Year	2015		100%
Source: City of Hayward			

7.3 SUPPLY AND DEMAND ASSESSMENT

This section evaluates the City's expected supply reliability for normal, single-dry, and multiple-dry years during the planning period. The analysis is based on information received from the City's wholesale supplier, SFPUC, regarding water supply reliability. SFPUC estimated the frequency and severity of anticipated shortages for the period 2015 through 2040 assuming that the historical hydrological period is indicative of future events and evaluated supply reliability assuming a repeat of the actual historic hydrologic period 1921 through 2011.

Water Shortage Allocation Plan

In July 2009, the wholesale customers and SFPUC adopted the Water Supply Agreement (WSA), which includes a Water Shortage Allocation Plan (WSAP) to allocate SFPUC water supplies to retail and wholesale customers during system-wide shortages of 20% or less. Subsequently, wholesale customers agreed on a methodology for allocating the wholesale share among themselves. The two components of the WSAP can be summarized as follows:

- Tier One Plan: Allocates water between San Francisco and wholesale customers collectively; and
- Tier Two Plan: Allocates the collective wholesale customer share among the wholesale customers.

The WSA has a 25-year term and expires in 2034. It may be extended for up to two five-year periods upon agreement by SPFUC and a specified number of wholesale customers. The Tier One Plan will expire at the end of the term of the WSA, unless mutually extended by SFPUC and the wholesale customers. The Tier Two Plan will expire in 2018 unless mutually extended by the wholesale customers.

The WSAP, Tiers 1 and 2, are included in Appendix I

Tier One Plan

The Tier One Plan allocates water between San Francisco and the wholesale customers collectively based on the level of shortage:

Level of System-Wide Reduction in Water Use Required	**Share of Available Water**	
	SFPUC Share	**Wholesale Customers Share**
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any wholesale customer and between wholesale customers themselves. In addition, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred.

The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under CWC Section 350. Separate from a declaration of a water shortage emergency, the SFPUC may opt to request voluntary cutbacks from San Francisco and the wholesale customers to achieve necessary water use reductions during drought periods. During the current drought to date, the SFPUC has requested, but has not mandated, a 10 percent system-wide reduction since January 2014.

The SFPUC has not yet been compelled to declare a water shortage emergency and implement the Tier One Plan because its customers have exceeded the 10 percent voluntary system-wide reduction in conjunction with the state-wide mandatory reductions assigned by the State Water Resources Control Board. The reductions assigned to each water agency by the State Water Resources Control Board to address the current drought conditions effectively reduced the demand for SFPUC water supplies.

Tier Two Plan

In 2010, the wholesale customers negotiated and adopted the Tier Two Drought Implementation Plan (Tier Two Plan), which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two Plan allocation is based on a formula that takes into account multiple factors for each wholesale customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water supplies made available from the SFPUC will be allocated to the individual wholesale customers in proportion to each wholesale customer's Allocation Basis, expressed in millions of gallons per day (mgd), which in turn is the weighted average of two components. The first component is the fixed wholesale customer's Individual Supply Guarantee as stated in the WSA. The second component is the Base/Seasonal Component, which is variable and is calculated using each wholesale customers total monthly water use from all available water supplies during the three consecutive years prior to the onset of the drought. The second component is accorded twice the weight of the first component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a minimum level of supply to meet health and safety needs for certain wholesale customers.

Each wholesale customer's Allocation Factor, which represents its percentage allocation of the total available water supplies, is calculated from its proportionate share of the total of all wholesale customers' Allocation Bases. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers' collectively under the Tier One Plan, by the wholesale customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change.

For long-term planning purposes, each wholesale customer has been provided with the Tier Two Allocation Factors calculated by BAWSCA based upon the most recent normal year to determine its share of available RWS supplies. However, actual allocations to each wholesale customer during a future shortage event will be calculated in accordance with the Tier Two plan at the onset of the shortage.

Tables 7-2 through 7-4 summarize the supply and demand assessment that resulted from SFPUC's assumed supply availability in each year type.

Table 7-2: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040
Supply totals	8,850	9,320	9,600	9,820	10,260
Demand totals	8,850	9,320	9,600	9,820	10,260
Difference	**0**	**0**	**0**	**0**	**0**

Table 7-3: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040
Supply totals	7,180	7,180	7,180	7,180	7,180
Demand totals	8,850	9,320	9,600	9,820	10,260
Difference	**(1,670)**	**(2,140)**	**(2,420)**	**(2,640)**	**(3,080)**

Table 7-4: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040
First year	Supply totals	7,180	7,180	7,180	7,180	7,180
	Demand totals	8,850	9,320	9,600	9,820	10,260
	Difference	**(1,670)**	**(2,140)**	**(2,420)**	**(2,640)**	**(3,080)**
Second year	Supply totals	6,370	6,370	6,370	6,370	6,370
	Demand totals	9,030	9,390	9,710	9,910	10,260
	Difference	**(2,660)**	**(3,020)**	**(3,340)**	**(3,540)**	**(3,890)**
Third year	Supply totals	6,370	6,370	6,370	6,370	6,370
	Demand totals	9,210	9,460	9,820	10,000	10,260
	Difference	**(2,840)**	**(3,090)**	**(3,450)**	**(3,630)**	**(3,890)**

Notes: Tables 7-3 and 7-4 are based on the current Tier Two Water Shortage Allocation Plan allocation methodology and an allocation factor of 11.1%, as calculated by BAWSCA based on the most recent normal year (2012-13). The allocation factor in the Drought Allocation Plan adopted in 2009 was 13.12%. Under the terms of the Tier Two Plan, which expires in 2018, the actual Allocation Factor will depend on consumption by Hayward and other wholesale agencies in the years immediately preceding the drought. Beyond 2018, actual supply totals will depend on the Allocation Plan in effect at the time of the shortage and actual usage by all wholesale customers.

Clearly the reductions, particularly in the later years, are unsustainable for Hayward, given the City's already very low residential consumption. However, it is important to note that these are theoretical numbers only, in that the formula is based on current usage. The actual supplies available to Hayward during a shortage will depend on the City's actual rather than projected usage in the years preceding the shortage, as well as actual usage by other wholesale customers. It is also important to note that the current Tier Two Plan expires in 2018, and at that time, Hayward will have an opportunity to address the increasing disparity between demand and available SFPUC supplies.

That said, in the event of water shortages, Hayward will implement an aggressive water shortage contingency plan, which is described in detail in Chapter 8. Hayward will also be exploring opportunities for increased use of recycled water, which is a reliable supply, unaffected by precipitation levels.

7.4 Regional Supply Reliability

The City remains committed to maximizing the use of local water supplies, to the extent it is practical, feasible and cost effective, to minimize reliance on purchased supplies and the need to important supplies from other regions. These water management tools include:

- Implementation of demand management measures – See Chapter 9 for information about current and future demand management and conservation programming
- Exploration of additional recycled water use – See Chapter 6 for information about Hayward's current and planned use of recycled water
- Continued participation in regional water management and supply development – See Section 7.1 for information about regional efforts to address water supply issues, particularly the BAWSCA Long Term Regional Water Supply Strategy, in which Hayward is a member agency

CHAPTER 8

WATER SHORTAGE CONTINGENCY PLANNING

Water shortage contingency planning prepares a community to respond to water shortages that may occur due to drought conditions, which may occur over a period of time or catastrophic events, which occur suddenly and tend to be shorter in duration. Maintaining optimum supply reliability during such occurrences reduces the impact. This chapter outlines the City's Water Shortage Contingency Plan (WSCP), including stages of actions, water use prohibitions, enforcement and penalties.

8.1 Stages of Action

Hayward's past experience with water shortages, most notably during the recent state-wide drought, has shaped its plans for managing droughts and other events. To address decreasing water supplies with increased levels of prohibitions and consumption reduction, Hayward has established a WSCP that consists of four stages, depending on the severity of the shortage, and includes a stage that addresses a reduction of 50% in the water supply.

Table 8-1 identifies the stages of action developed to respond to increasingly severe drought conditions. The stages are triggered by water supply availability.

Table 8-1: Stages of Water Shortage Contingency Plan

Stage	Percent Supply Reduction	Water Supply Condition
I	10%	Supply at 90% to 99% of normal
II	10 - 20%	Supply at 80% to 90% of normal
III	20 - 50%	Supply is 50% to 80% of normal
IV	Over 50%	Supply is less than 50% of normal

8.2 Prohibitions on End Uses

Hayward's most recent experience with water supply shortages has occurred during the current four-year drought. As a result of reduction targets set by the SFPUC and mandated State-wide cutbacks to preserve available supplies, the City made adjustments to its WSCP to reflect the severity of the drought and to incorporate State-required prohibitions. Hayward customers reduced water use by more than 20%, significantly exceeding its target reduction. A copy of the current WSCP is included in Appendix J.

Table 8-2 lists restrictions and prohibitions and the water shortage stage at which they are imposed.

Table 8-2: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
I	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
I	Landscape - Other landscape restriction or prohibition	Irrigation during and 48 hours following measurable precipitation	Yes
I	CII - Restaurants may only serve water upon request		Yes
I	CII - Lodging establishment must offer opt out of linen service		Yes
I	Water Features - Restrict water use for decorative water features, such as fountains		Yes
I	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		Yes
I	Other - Require automatic shut of hoses		Yes
I	Other - Prohibit use of potable water for washing hard surfaces		Yes
II	Pools - Allow filling of swimming pools only when an appropriate cover is in place.		Yes
II	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
II	Other - Prohibit use of potable water for construction and dust control		Yes
II	Other	Water use in excess of allocation	Yes
III	CII - Other CII restriction or prohibition	Use of potable water for cooling	Yes
III	Landscape - Other landscape restriction or prohibition	Use of potable water for golf course irrigation	Yes
III	CII - Other CII restriction or prohibition	Potable water for street sweeping	Yes
III	Landscape - Other landscape restriction or prohibition	Irrigation of landscaping in new developments	Yes
IV	Other	As needed, including further reduced customer allocations	Yes

8.2.1 Landscape Irrigation

Recognizing that water used for landscape irrigation offers the greatest opportunities for increased efficiency and use reduction, the City has incorporated a significant number of restrictions and prohibitions on landscape irrigation into the Stage I actions. These include limiting irrigation to two days per week and prohibitions on watering within 48 hours after measurable precipitation. The City prohibits significant runoff of potable water to streets, driveways and sidewalks at all times, regardless of the water supply conditions.

8.2.2 Commercial, Industrial and Institutional

Non-residential customers are subject to the same irrigation and other restrictions imposed on residential properties. In addition, lodging establishments are prohibited from washing linens and towels on a daily basis unless specifically requested by customers, and restaurants may only serve water upon request.

8.2.3 Water Features and Swimming Pools

Stage I restrictions include a prohibition on the use of potable water in decorative water features, such as decorative water fountains, unless the water is recirculated. At the Stage II level, customers are prohibited from filling or refilling swimming pools, spas and hot tubs.

8.2.4 Defining Water Features

Water features are considered by the City to be decorative features which are artificially supplied with water, including fountains and waterfalls. Water restrictions on water features are listed separately in the WSCP from limitations on swimming pools, spas and hot tubs.

8.2.5 Other Restrictions

In addition to the restrictions listed above, at various stages in the WSCP the City also includes prohibitions on such uses of potable water as washing sidewalks, driveways and the like, unless the hose is equipped with an automatic shut-off valve, washing vehicles except in commercial carwashes and controlling dust at construction sites. During the most severe stages of a drought, the City would implement additional measures as required to achieve the necessary savings.

8.3 PENALTIES, CHARGES AND OTHER ENFORCEMENT OF PROHIBITIONS

Enforcement of the WSCP ranges from written communications and warnings to administrative fines to restriction of water service, depending on the severity of the drought and the nature of the water waste. The City has provided the community with tools to easily report instances of water waste through a dedicated telephone line and email address, as well as through the City's on-line communication tool known as Access Hayward. In most cases, formal notification from the City to the property owner is sufficient to achieve compliance. If violations continue, the City may use door hangers to advise customers of the violation and potential consequences of non-compliance. The City has the authority to issue administrative fines for ongoing violations and egregious incidents of water waste, as well as the ability to terminate or restrict water service if necessary.

In the event of a Stage II shortage or higher, it is likely that excess use penalties would be implemented. During the most recent period of mandatory rationing, in the early 1990s customers were given water allocations, and excess use charges were implemented, set on a "graduated" basis. As an example, excess water use up to 10% over the allotment may be billed at a higher rate per unit, and an additional higher tier may be imposed for excess water use from 10% to 20% over the allotment, and so on. It is expected that some variation of this structure would be adopted in the event of future mandatory rationing, as approved by the City Council and based on the excess use charges imposed by the City's wholesale water supplier.

8.4 CONSUMPTION REDUCTION METHODS

The actions taken by water agencies to reduce water demand are known as consumption reduction methods. The City employs a variety of methods as documented below.

8.4.1 Categories of Consumption Reduction Methods

Table 8-3 documents the consumption reduction methods that have been or would potentially be implemented by the City to reduce water demand during drought periods.

Table 8-3: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
I	Expand Public Information Campaign	Increase number of bill inserts, create drought-related website, increase media outreach
I	Provide Rebates on Plumbing Fixtures and Devices	Expand existing programs
I	Provide Rebates for Turf Replacement	Expand and further promote existing program
I	Reduce System Water Loss	Increase water leak repair efforts beyond the City's already aggressive program
I	Decrease Line Flushing	To the extent possible while maintaining water quality standards
II	Improve Customer Billing	Include additional information on bill regarding water consumption - in coordination with implementation of AMI system
II	Offer Water Use Surveys	Expand existing program to provide water use surveys in underserved properties
II	Implement or Modify Drought Rate Structure or Surcharge	
III	Increase Water Waste Patrols	Devote additional resources to identifying and addressing water wasting activities

8.5 Determining Water Shortage Reductions

All water use in Hayward is metered, including water used by the City government and other public agencies. All meters are read bimonthly, and water bills are issued based on actual usage. Water bills include usage data from the same time period the previous year to enable customers to monitor of their water use from year to year and make adjustments if needed to meet reduction targets.

In 2014, the City implemented a new state-of-the-art utility billing system which can generate a variety of consumption data for given periods of time. The City can also readily track water use for large users. This data provides the City with detailed information about water use reductions by customer type, geographic location and other variables.

The City also operates a Supervisory Control and Data Acquisition (SCADA) System to monitor the water distribution system. Water usage at various locations in the system can be tracked virtually hourly to provide operating data and information. The SCADA is used to determine reductions in water deliveries from SFPUC, consumption trends in various locations, and other useful monitoring data.

8.6 Revenue and Expenditure Impacts

Hayward's rate structure is based on a cost-of-service method where the beneficiaries of the service pay for the cost of providing service and where one customer class does not unduly subsidize another. Water rates are reviewed regularly to ensure adequate revenues are generated to meet operating and capital expenses, and a key factor in establishing appropriate rates is anticipated consumption. Water shortages result in lower consumption and reduced revenues.

In addition to reduced revenues, Hayward also anticipates expending additional funds during a water shortage in order to implement an effective water use reduction program and water rationing. Some additional costs may include:

- Computer programming modifications to implement excess water use fees
- Computer programming needed to determine appropriate customer allocations
- Advertising and public education materials
- Additional water conservation program costs for increased rebates and incentives
- Additional customer service staff to support rationing and water conservation programs

8.6.1 Drought Rate Structures and Surcharges

Revenue and expenditure impacts would be mitigated in part by lower costs for purchasing water. However, in the event of long-term or severe water shortage, it is anticipated that Hayward would develop a rate structure, including excess use charges, to address the revenue impacts. The City's likely approach to excess use charges would be based on earlier, successful rate structures and is explained in Section 8.3.

8.6.2 Use of Financial Reserves

In the short-term, the City would also rely on the short-term use of reserves to offset the impact of water use reductions. Water system financial resources are prudently managed to maintain sufficient reserves for such purposes.

8.6.3 Other Measures

The City would seek other means of mitigating the impact of water use reductions. Short-term cost efficiencies may be implemented. Also, some types of maintenance may be deferred if such deferment would not compromise water quality or reliability.

8.7 WATER SHORTAGE RESOLUTIONS AND ORDINANCES

Sample resolutions and ordinances are contained in Appendix K. These documents are in draft form to be refined and adopted when needed to meet current conditions.

8.8 CATASTROPHIC SUPPLY INTERRUPTION

Catastrophic supply interruptions refer to occurrences of water supply interruptions due to an event such as an earthquake, regional power outage or other incidents in which water supplies are limited in a sudden and severe way. Hayward has taken significant steps to plan for supplement potable water supplies in the event of such an occurrence, with a diversity of options for meeting emergency demand.

8.8.1 Emergency Interties

Hayward has emergency water intertie agreements with two neighboring agencies, one of which, EMBUD, is fully independent of the SFPUC Regional Water System. The other agency, Alameda County Water District (ACWD) receives about 70% of its supply from sources other than SFPUC. In addition to the interties with other agencies, Hayward also has a number of locations where adjacent fire hydrants have been constructed which can be connected with portable hose to provide water for firefighting or during emergencies.

A Regional Water System Intertie, owned jointly by SFPUC and EBMUD, is located in Hayward. The purpose of the intertie is to transfer water between SFPUC and EBMUD via Hayward's distribution system during emergency conditions. Up to 30 mgd of water can be delivered in either direction. During operation of the Regional Intertie, Hayward would be first supplied with sufficient water before the remaining water is delivered to either SFPUC or EBMUD.

8.8.2 Emergency Groundwater Wells

The City maintains five emergency groundwater wells with a combined theoretical short-term pumping capacity of about 9,400 gpm or nearly 13.6 mgd. In the event that SFPUC transmission lines are not able to meet the City's demands for a limited time, due to a short-term emergency, these wells can be activated. There is an emergency power generator located at each well site.

8.8.3 Water System Emergency Response Planning

Hayward developed and maintains a comprehensive Water System Emergency Response Plan (ERP) to incorporate all aspects of emergency planning into one document. The ERP utilizes the Standardized Emergency Management System to identify roles and responsibilities during an emergency, and includes instructions for communicating with SFPUC and other key agencies.

The ERP also describes methods for communicating with customers, including the following actions that could be taken in the event of catastrophic interruption in water supplies:

- Notify customers of the need to limit water consumption. Notification could be through media contact, social media, website updates, written notices posted in public places or hand delivered, and use of an emergency notification telephone system.
- Make contact with high water using businesses and other businesses through use of the "sensitive water users" list that the City maintains.

Hayward is a member of the Water Agency Response Network, or WARN, a mutual aid agreement with water agencies throughout the State of California. WARN supports and promotes statewide emergency preparedness, disaster response, and mutual assistance for water agencies.

8.9 Minimum Supply Next Three Years

Table 8-4 provides an estimate of the minimum water supply available to Hayward during each of the next three years from SFPUC, as confirmed by SFPUC.

Table 8-4: Minimum Supply Next Three Years (in MG)			
	2016	2017	2018
Available Water Supply	5,833	5,094	5,094

CHAPTER 9

DEMAND MANAGEMENT MEASURES

The City of Hayward has a long-standing commitment to water conservation. Hayward was among the original signatories to the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding Regarding Urban Water Conservation in California, and as such, has implemented a diverse range of demand management measures across customer sectors. Aggressive demand management can be credited, in part, for the fact that Hayward's per capita water use is one of the lowest among agencies that purchase water from SFPUC. This chapter provides a comprehensive description of Hayward's current and planned water conservation efforts.

9.1 Demand Management Measures for Wholesale Agencies

This section is not applicable to the City of Hayward

9.2 Demand Management Measures for Retail Agencies

9.2.1 Water Waste Prohibition Ordinance

The Hayward City Council first adopted a water waste prohibition ordinance in 1993. An updated Ordinance was adopted in February 2010 to incorporate prohibitions on additional water wasting activities and is contained in the Hayward Municipal Code Section 11-2.47. This Ordinance is in place at all times and is not dependent on a water supply shortage. Increasingly restrictive enforcement mechanisms are included in the Ordinance.

In general, the Ordinance prohibits at all times the use of potable water for non-essential purposes, including:

- Defective or broken plumbing
- Flooding or runoff into gutters and streets
- Irrigation that results in excessive water flow, overspray, or runoff onto sidewalks, driveways, etc.
- Washing of buildings, sidewalks, driveways and the like, with a hose unless it is equipped with a positive shut-off nozzle
- Washing of vehicles with a hose unless it is equipped with a positive shut-off nozzle
- Water fountains and other decorative water features unless the water is recirculated

A copy of the Ordinance in included in Appendix L. While no changes to the Ordinance are anticipated in the near term, the City will consider revisions as the need arises to ensure that the document remains current.

9.2.2 *Metering*

The City of Hayward Water System is fully metered. Meters are read a minimum of six times annually, and all water sales are based on metered consumption.

Hayward is planning to implement an Advanced Metering Infrastructure (AMI) program over the next three to five years. This new technology will allow for comprehensive customer engagement, including the ability to monitor daily and hourly water use and receive notices of continuous water usage. The AMI system will also provide the City with extensive data regarding customer use that will inform water conservation programs and help the City target its resources more effectively.

9.2.3 *Conservation Pricing*

Conservation pricing provides economic incentives to use water efficiently. Another goal of a well-designed conservation pricing structure agencies is to recover the maximum amount of revenue from volumetric rates, in relationship to the direct costs of providing service.

Hayward implemented conservation pricing in the early 1990s, through a structure by which the volumetric rate increases as the quantity of water used increases. The tier rate structure remains in place at all times and is not dependent on a water shortage for implementation. While the tier structure itself has been modified occasionally since it was first conceived, the basic premise has remained constant: Customers pay for water in direct proportion to the cost of delivering that water and one group of customers does not subsidize the cost of service to another group. Rates are calculated in accordance with accepted principles and based on the actual cost of service for each usage tier. The current rate structure incorporates three tiers for residential customers and two tiers for non-residential accounts.

In addition to tiered usage rates, the City also encourages water conservation by maintaining a low fixed service fee. This fee is used to recover costs that do not vary with the amount of water used, such as meter reading, billing, customer service and long-term debt service. The CUWCC considers conservation pricing to be effective if the revenue from fixed fees represents no more than 30% of the water utility's total revenue. In FY 2015, Hayward's total revenue from fixed service fees comprised about 10% of the total Water Fund revenue.

Information regarding penalties, charges and other enforcement for excessive use during water shortages and impacts of water shortages on revenues and expenditures is located in Sections 8.4 and 8.6 respectively.

The City's current water usage rates and service fees are found in Appendix M. Rates are typically adjusted annually after a rigorous examination of service costs and anticipated water deliveries and in accordance with applicable laws that govern water pricing, including provisions of Proposition 218. The City implements all required public noticing, and the City Council conducts a public hearing before adopting water rates.

9.2.4 Public Education and Outreach

Hayward conducts an extensive and varied public education and outreach program to inform and encourage customers regarding water use efficiency. Program components include:

Marketing Materials

- Materials to promote rebates and no-cost replacement fixtures, such as website announcements and brochures
- Billing inserts created for a variety of topics, including education opportunities and rebate offers

Water Efficient Landscape Classes

- Four to six classes offered in a typical year
- Diverse range of topics, including drip irrigation, lawn replacement, habitat gardening and edible gardening

Water Bill Information

- Gallons per day usage
- Comparison of water use with prior year
- Usage for preceding 12 billing periods in easy-to-read chart format

School Education

- In-class curriculum, consisting of lesson plans, teaching aids, student workbook, student activities, and water wise kit for each student (home water use survey, water saving showerhead and faucet aerators, and leak detection aids)
- Assembly program, with programs tailored to specific grade levels

Information Booths

- Participation in City events like summer street fairs, Earth Day events and other relevant activities, which attract a large number of residents and businesses
- Water conservation information available to customers at City sites with high customer traffic, such as Development Services and Revenue Office

Website and Social Media

- Comprehensive website with up to date information about water conservation, tips and tools for reducing water use, rebate incentives and media updates.
- Hayward water conservation is an active presence on social media sites, including Facebook and Twitter

Water Waste Reporting

- Hotline and dedicated email address created for reporting water waste incidents
- Timely actions taken to notify property owners and ensure corrective action

9.2.5 Programs to Assess and Manage Distribution System Real Losses

Hayward maintains an aggressive program to assess and address distribution system losses. Section 4.3 includes a discussion and quantification of real system losses, current and projected. This section documents the City's actions to locate and correct distribution system leaks, and prevent future losses. Hayward actively monitors and addresses distribution system water losses.

In 2011, the City completed a detailed Water Audit and Component Analysis of Real and Apparent Losses, utilizing the AWWA methodology. Further information about this methodology is located in Section 4.3. As a result of this study, a comprehensive leak detection and repair effort was implemented in 2012 to locate leaks through the distribution system, including all service connections. During the course of this project, the entire distribution system, including 385 miles of water mains and all service lines and connections, were surveyed using the services of leak detection specialists and state-of-the-art sonic leak detection equipment. A total of 73 leaks were discovered, mostly in service lines, and were repaired. The total water savings are estimated to be about 350,000 gpd or 390 afy.

The City maintains staff dedicated to responding and repairing reported water main and distribution system leaks on an ongoing basis. As necessary, outside resources are brought to address emergency situations. The City also notifies customers when a leak on the customer side of the meter is suspected.

Since some loss potentially results from high system pressure in certain locations, a pressure management program has been put in place. Operations staff carefully monitor the pressure in key system locations in each elevation zone to reduce the potential for excessive pressure that could result in pipe breakage and leaks.

9.2.6 Program Coordination and Staffing Support

Water conservation in Hayward is a collaborative effort, utilizing both local and regional resources. A Management Analyst within the Utilities & Environmental Services Department functions as the Water Conservation Coordinator for the City. This role is currently assigned to:

Alicia Sargiotto
Email: Alicia.Sargiotto@hayward-ca.gov
Telephone: 510-583-4727

The Water Conservation Coordinator is supported by other staff members, including the Senior Utility Service Representative and the Sustainability Technician, who manage specific programs under the supervision of the Water Conservation Coordinator. The City's Community and Media Relations Officer is also a key partner in maintaining website information, water conservation messaging, and media outreach.

Hayward actively participates in regional demand management efforts, including development and implementation of the Regional Water Conservation Implementation Plan. Hayward staff participates regularly in meetings and working groups to develop effective regional programs and evaluates each conservation program to assess its benefits to Hayward customers. Hayward currently participates in the following regional efforts:

- High efficiency clothes washing machine rebates
- High efficiency toilet rebates
- Water efficient landscape classes
- School education programs (in-class and assembly)
- Landscape water budgets
- Rain barrel rebates

Other programs are implemented by the City on a local basis, examples of which include:

- Lawn replacement rebates
- Residential surveys
- Fixture replacements (showerheads, faucet aerators)
- Leak detection and repair
- Green Hayward Pay As You Save (PAYS) Program

Public information and outreach efforts are typically a mixture of regional and local messaging. Hayward has participated in regional outreach campaigns, particularly during the drought, but also maintains a robust local presence on the City's website, social media, traditional media and local event participation.

Water conservation programs are solely funded by water sales revenue. In FY 2016, a total of nearly $2 million was budgeted for water demand management, including funds for a new Green Hayward PAYS program (described further in the next section). This $2 million is in addition to staffing costs for water conservation program management, irrigation management for City-owned landscaping, and monies paid to regional entities for program development and oversight.

9.2.7 Other Demand Management Measures

In addition to the demand management measures discussed previously, Hayward is implementing the programs that are described briefly below.

Rebate Programs

Hayward currently offers financial incentives for the following water use efficiency measures:

- High Efficiency Washing Machines –A rebate of $100 for the purchase of an Energy Star certified clothes washing machine. An additional rebate is provided by PG&E.
- High Efficiency Toilets – Rebates of $75 to $125 for the replacement an existing high water using toilet with an Environmental Protection Agency (EPA) Water Sense certified toilet.
- Lawn Replacement – A rebate of $0.75 per square foot for replacement of existing front yard lawn with water efficient landscaping and $0.50 for replacement of back yard lawn.
- Rain barrels – A rebate of $50 for the purchase of a rain barrel to collect rainwater for irrigation and other non-potable uses.

Large Landscape Water Budgets

The City has contracted with Waterfluence to develop and distribute water budgets and bimonthly water use reports to selected customers with large landscapes.

Fixture Replacements

- Low Water Use Showerheads/Faucet Aerators – devices provided to single-family and multi-family residences at no cost to the customer
- Pre-rinse spray valves – devices provided to commercial food preparation businesses at no cost to the customer

Green Hayward PAYS (Pay As You Save)

A pilot program is being implemented to assess the viability of a PAYS program, whereby the City fronts the funding to upgrade water fixtures in multi-family housing units. The costs are repaid to the City through a water bill tariff that is significantly lower than the savings.

Hayward is only the second city in California and the only SFPUC wholesale customer to have implemented this water and energy efficiency program.

Residential Surveys

Working with Rising Sun Energy Services, the City offers water use surveys to single-family and multi-family residential customers, including assessment of water use, replacement of high water using fixtures, and recommendations for improving water use efficiency. This program operates during the summer, utilizing youth employees who receive job training in water and energy efficiency and customer service.

Water Efficient Landscaping of City-Owned Sites

The City's Water Fund supports staffing in the Maintenance Services Department to install and maintain low water usage irrigation and backflow devices in right-of-ways, medians and City-owned properties. This work includes monitoring and maintaining Cal Sense irrigation and water conservation devices throughout the City.

Water Efficient Landscape Ordinances and Guidelines

The Hayward City Council has adopted a variety of ordinances and guidelines for the express purpose of conserving water resources and increasing sustainability. These documents address such issues as landscape irrigation water use, indoor water efficiency standards, and water waste prohibitions. The Ordinances are included in Appendix L.

9.3 Implementation Over the Past Five Years

The following sections document implementation, numerically if feasible, of the water conservation programs listed in the previous sections over the past five years.

Water Waste Prohibition Ordinance

The City's Water Waste Prohibition Ordinance was first adopted in 1993 and was most recently updated in 2010. It serves as a cornerstone for actions taken by the City to address incidents of wasteful water use. The initial action is a written notice to alert the property owner of wasteful activities. In most cases, corrective action is taken. If not, the City follows up with a second notice, door hanger, and personal contact. If the situation is still not corrected, the City may issue administrative fines and/or limit water service.

While Water Waste Prohibition Ordinance is in effect at all times, regardless of water supply, it has been most actively used during the recent drought when over 250 reports of water waste were received and acted upon by the City.

Metering

Hayward's water system is fully metered and all water bills are based on metered water usage.

Conservation Pricing

Hayward's water rates are determined on a cost-of-service basis. Since the early 1990s, water conservation rates have been in place, whereby the volumetric rate increases as the volume of water purchased increases. Further, the City has maintained a low fixed service fee, which in FY 2015 generated about 10% of the total Water Fund Revenue.

Public Education and Outreach

The City's active and robust public education and outreach program utilizes a variety of media, as described in Section 9.2.4, to get the water conservation message out to customers.

Following are some key five-year statistics to illustrate the breadth of other efforts to educate water customers:

- School education – In the past five years, the City has provided the WaterWise in-class curriculum to over 3,000 fifth-grade students. The WaterWise curriculum includes lesson plans, teaching aids, student workbook, student activities, and water wise kit for each student (home water use survey, water saving showerhead and faucet aerators, and leak detection aids). The home water use survey and low water using devices provide opportunities for students to engage their families in conservation activities. In addition to the students involved in the classroom study, over 30,000 students have participated in grade appropriate assembly programs focused on water conservation and sustainability. Both programs are marketed through direct contact with Hayward Unified School District teachers and private schools, and programs are offered on a first-come, first served basis as long as funding is available.

- Information booths and event participation. The City participates in at least 6 to 8 events each year to distribute informational brochures and devices to the general public.

- Water Efficient Landscape Classes – The City has hosted 18 classes in the past five years, attended by about 600 people. The class size and hands-on approach serve to provide a meaningful educational experience. The primary methods used to promote the classes are billing inserts and the City's website.

Distribution System Losses

The comprehensive leak detection survey and repair effort, undertaken in 2012, uncovered 73 leaks. It is estimated that repair of these leaks resulted in water savings of about 350,000 gpd or about 390 acre feet per year. In addition, City crews respond to reports of main breaks and leaks in order to minimize system losses.

<u>Other Demand Management Measures</u>

- Rebate Programs: During the past five years the City has provided the customer rebates described below. The rebates are marketed through the City's websites, newsletters, brochures, and point-of-purchase information.

  - High Efficiency Clothes Washers – The City issued about 3,600 rebates for the purchase of an Energy Star certified model.
  - High Efficiency Toilets – The City issued rebates for the replacement of 875 existing toilets with EPA Water Sense certified high efficiency models.
  - Lawn Replacements – A total of 11 rebates have been issued for the replacement of lawn with water efficient landscaping.
  - Rain Barrels – No rebates have been issued so far for the purchase of rain barrels. This is a very new program and promotion is just getting underway.

- Large Landscape Water Budgets: Water budgets have been developed for 200 irrigation accounts for customers with a significant amount of landscaping. The program is relatively new, implemented in the fall of 2014, and coincides with the drought messaging, so it difficult to ascertain the effectiveness of the water budget and reports as a stand alone program. That said, since the inception of the program, overall irrigation water use by participants has been 44% lower than the budget quantity, with savings of about 660 acre feet. The accounts have been selected for participation by the City based on water usage and size of landscaped area.

- Fixture Replacements: About 2,500 residential units have been provided with water efficient showerheads and faucet aerators. On the commercial side, 30 water efficient pre-rinse spray valves were distributed to food-related businesses. As with rebates, the program is promoted through the website and brochures. Many customers are also referred from the Revenue Office when they call to ask for assistance in reducing water consumption.

- Green Hayward PAYS: This program is just getting underway. While upgrades have not yet been installed, the contractor is in discussion with several property owners. The approved funding for this pilot effort is sufficient to upgrade about 2,000 living units, depending upon the upgrades selected. Upon completion of the pilot the City will assess the feasibility of continuing the program. The pilot program is being marketed mainly by the installation contractor, however, the City has developed a dedicated website specific to the PAYS program.

- Residential Surveys: Working with Rising Sun Energy Services, the City has offered about 1,400 residential surveys during the past five years. This program is offered during the summer months only and is promoted through direct contact and outreach at community events.

- Water Efficient City-Owned Landscaping: The Water Fund supports four full-time staff positions, at a cost of $475,000, to install and maintain low water usage irrigation systems. During the drought, City staff reduced water usage by 30%.

- Water Efficient Landscape Ordinances and Guidelines: In addition to the Water Waste Prohibition Ordinance, the Hayward City Council has enacted the Bay Friendly Water Efficient Landscape Ordinance, Civic Bay Friendly Landscape Ordinance, and Indoor Water Efficiency Use Standards.   The City supports a full-time Landscape Architect position on staff to administrator Bay Friendly, water efficient landscape standards.

9.4 PLANNED IMPLEMENTATION TO ACHIEVE WATER USE TARGETS

Hayward's residential and gross per-capita water usage is very low compared to both the State-wide average and to neighboring communities. Hayward's service area includes a large and growing industrial sector, a state university and community college, both of which are mainly "commuter" institutions and anticipate growth, and a major regional hospital. Through a combination of factors, Hayward's demand has "hardened" such that achieving further reductions in per capita use will be challenge.

The City achieved its interim water use target in 2015 and in fact has achieved its 2020 goal. Nevertheless, Hayward will continue to implement aggressive demand management strategies. Assuming that they remain cost effective, the following measures are anticipated to remain in place. These measures are fully described in Sections 9.2 and 9.3.

- High efficiency clothes washing machine rebates
- High efficiency toilet rebates
- Rain barrel rebates
- Lawn replacement rebates
- Water efficient landscape classes
- Public outreach and education
- School education programs (in-class and assembly)
- Large landscape water budgets
- Residential surveys
- Fixture replacements (showerheads, faucet aerators)
- Leak detection and repair
- Conservation pricing
- Water efficient landscaping of City-owned sites
- Enforcement of City ordinances

The City is planning to implement AMI over the next three to five years. AMI will allow for comprehensive customer engagement, including the ability to monitor daily and hourly water use and receive notices of continuous water usage. The AMI system will provide the City with extensive data regarding customer use that will inform water conservation programs and help the City target its resources more effectively.

As water conservation is a constantly evolving field, Hayward will continue to research and evaluate programs and technology. Potential new programs may include:

- Rebates for weather-based irrigation controllers
- Commercial and industrial water use surveys
- Incentives for replacement of inefficient commercial and industrial equipment

9.5 CALIFORNIA URBAN WATER CONSERVATION COUNCIL

Hayward is an original signatory to the CUWCC Memorandum of Understanding Regarding Urban Water Conservation. The City is not exercising its option to submit the 2013-14 Best Management Practices annual report in lieu of describing demand management measures.

CHAPTER 10

Plan Adoption, Submittal and Implementation

This chapter addresses the City's adoption, submittal and implementation of the 2015 UWMP.

10.1 Inclusion of all 2015 Data

Reporting for the 2015 UWMP is based on fiscal year data and includes all available data through the close of FY 2014-15, ending on June 30, 2015.

10.2 Notice of Public Hearing

The Hayward City Council conducted a public hearing on June 14, 2016 and provided an opportunity for public input prior to adoption of the UWMP.

10.2.1 Notice to Cities and Counties

10.2.1.1 60-Day Notification

A notice was sent to the County of Alameda on January 6, 2016, well in advance of the 60-day requirement, regarding the City's intention to review its UWMP and consider changes. As the City is the owner and operator of the municipal water system, it was unnecessary to issue a notice to the City.

10.2.1.2 Notice of Public Hearing

The City sent a notice of public hearing to Alameda County on May 26, 2016, stating the time and place of the public hearing. The notice of public hearing was published in the newspaper with the largest local circulation, the *Hayward Daily Review*, in two successive weeks, with at least five days in between the two publication dates, pursuant to §10642 of the CWC. The notice included the time and place of the hearing and the locations at which the UWMP was available for public review. A copy of the public hearing notice is included in Appendix C.

Table 10-1 documents the City's notices to the County.

Table 10-1: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
N/A	☐	☐
County Name	60 Day Notice	Notice of Public Hearing
Alameda County	☑	☑

10.2.2 *Notice to the Public*

The notice of public hearing was published in the newspaper with the largest local circulation, the *Hayward Daily Review*, in two successive weeks, with at least five days in between the two publication dates. The notice included the time and place of the hearing and the locations at which the UWMP was available for public review. A copy of the public hearing notice is included in Appendix C. The draft UWMP was available for review at the Hayward City Hall, Hayward public libraries, and on the City's website.

10.3 PUBLIC HEARING AND ADOPTION

The City of Hayward City Council conducted a public hearing on the 2015 UWMP at its meeting on Tuesday, June 14, 2106. The public hearing was broadcasted on local government access cable television and on the City's website. During the public hearing, information was provided on the City's compliance with the Water Conservation Act of 2009, including baseline values, water use targets and implementation plan.

10.3.1 *Adoption*

The Hayward City Council formally adopted the 2015 UWMP at its regular meeting on Tuesday, June 14, 2016. A copy of the adoption resolution is included in Appendix C.

10.4 PLAN SUBMITTAL

10.4.1 *Submittal of the UWMP to DWR*

The adopted 2015 UWMP and all data tables are to be submitted electronically to the Department of Water Resources no later than July 1, 2016. The City understands that DWR will review the UWMP and make a determination as to whether or not the UWMP addresses the requirements.

10.4.2 Electronic Data Submittal

The City will use the online submittal tool, developed by DWR, to submit the UWMP and all tabular data as required.

10.4.3 Submittal of the UWMP to the California State Library

A copy of the adopted UWMP is to be mailed to the California State Library and the County of Alameda within 30 days of adoption. The City will comply with this submittal requirement. As supporting documentation, a copy of the cover letter to the California State Library is included in Appendix C.

10.4.4 Submittal of the UWMP to Cities and Counties

A copy of the adopted UWMP, including the City's Water Shortage Contingency Plan, is to be mailed to the County of Alameda with 30 days of adoption. As supporting documentation, a copy of the cover letter to Alameda County is included in Appendix C. The City of Hayward owns and governs the municipal water system, and will maintain a copy of the adopted UWMP.

10.5 PUBLIC AVAILABILITY

The adopted 2015 UWMP is available for review by the public during normal business hours in the City's Department of Utilities & Environmental Services and in the City Clerk's Office. A copy is also posted on the City's website.

10.6 AMENDING THE ADOPTED URBAN WATER MANAGEMENT PLAN

In the event that the City amends the adopted UWMP, all of the notification, public hearing, adoption and submittal requirements will be followed.

10.7 IMPLEMENTATION OF THE 2015 URBAN WATER MANAGEMENT PLAN

The 2015 UWMP will serve as a core land use planning document for development of housing and non-residential properties. It will also be utilized in the development and use of water supplies.

APPENDIX A

URBAN WATER MANAGEMENT PLANNING ACT

Chapter 1. General Declaration and Policy

SECTION 10610-10610.4

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

Chapter 2. Definitions

SECTION 10611-10617

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

Chapter 3. Urban Water Management Plans

Article 1. General Provisions

SECTION 10620-10621

10620. (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that

share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero, except as provided in subdivision (d).

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

(d) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.

Article 2. Contents of Plan

SECTION 10630-10634

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(A) An average water year.

(B) A single-dry water year.

(C) Multiple-dry water years.

(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.

(B) Multifamily.

(C) Commercial.

(D) Industrial.

(E) Institutional and governmental.

(F) Landscape.

(G) Sales to other agencies.

(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.

(I) Agricultural.

(J) Distribution system water loss.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(3) (A) For the 2015 urban water management plan update, the distribution system water loss shall be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss shall be quantified for each of the five years preceding the plan update.

(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

(4) (A) If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.

(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:

(i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.

(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(i) Water waste prevention ordinances.

(ii) Metering.

(iii) Conservation pricing.

(iv) Public education and outreach.

(v) Programs to assess and manage distribution system real loss.

(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

(2) For an urban wholesale water supplier, as defined in Section 10608.12, a narrative description of the items in clauses (ii), (iv), (vi), and (vii) of subparagraph (B) of paragraph (1), and a narrative description of its distribution system asset management and wholesale supplier assistance programs.

(g) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(h) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(i) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivision (f) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(j) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.1. (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.2. (a) In addition to the requirements of Section 10631, an urban water management plan may, but is not required to, include any of the following information:

(1) An estimate of the amount of energy used to extract or divert water supplies.

(2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.

(3) An estimate of the amount of energy used to treat water supplies.

(4) An estimate of the amount of energy used to distribute water supplies through its distribution systems.

(5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.

(6) An estimate of the amount of energy used to place water into or withdraw from storage.

(7) Any other energy-related information the urban water supplier deems appropriate.

(b) The department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.

10631.5. (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has

submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

(1) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions that are applicable to each stage.

(2) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(3) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(4) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(5) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are

appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(6) Penalties or charges for excessive use, where applicable.

(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(8) A draft water shortage contingency resolution or ordinance.

(9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

(b) Commencing with the urban water management plan update due July 1, 2016, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5. Water Service Reliability

SECTION 10635

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Article 3. Adoption and Implementation of Plans

SECTION 10640-10645

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.

After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) (1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(b) (1) Notwithstanding Section 10231.5 of the Government Code, the department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part.

The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(2) A report to be submitted pursuant to paragraph (1) shall be submitted in compliance with Section 9795 of the Government Code.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section 10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

Chapter 4. Miscellaneous Provisions

SECTION 10650-10656

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

APPENDIX B

DEPARTMENT OF WATER RESOURCES UWMP CHECKLIST

Checklist Arranged by Subject

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Optional Column for Agency Use)*
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	Sec 2.1 p. 2-1
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	Sec 2.5 pp. 2-4 to 2-5
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Plan Preparation	Section 2.5.2	Sec 2.5 p. 2-5 and Appendix C
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Sec 3.1 pp. 3-1 to 3-2
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Sec 3.3 p. 3-3
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Sec 3.4 p. 3-4
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Sec 3.4.1 pp. 3-4 to 3-5
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Sec 3.4 and SB X7-7 Table 3 pp. 3-4 and 5-9
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Sec 4.2 pp. 4-1 to 4-6
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	Sec 4.3 p. 4-7

10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Sec 4.5 p. 4-8
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	Sec 5.7 p. 5-5
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5 and App E	Sec 5.7 and Sec. 5.8 pp. 5-6 to 5-7
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Sec 5.7.2 pp. 5-5 to 5-6
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	Sec 5.8.1 p. 5-6
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	Sec 5.8.2 p. 5-7
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	Not applicable – Hayward is retail supplier
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	Sec 5.8 and SB X7-7 Table 9 pp. 5-7 and 5-14
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	Sec 6.9 pp. 6-14 to 6-15
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Sec 6.2 p. 6-1
10631(b)(1)	Indicate whether a groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2	Sec 6.2 p. 6-1

10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Not applicable
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Not applicable
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	Not applicable
10631(b)(3)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.4	Not applicable
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	Sec. 6.2 p. 6-1
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	Sec 6.7 p. 6-11
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	Sec 6.8 pp. 6-11 to 6-14
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Sec 6.6 p. 6-11
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	Sec 2.5.1 p. 2-4
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	Not applicable
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	Sec 6.5.1 pp. 6-2 to 6-3
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	Sec 6.5.2 pp. 6-3 to 6-5

10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2.2	Sec 6.5.2 p. 6-5
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Sec 6.5.4 p 6-6
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	Sec 6.5.4 pp. 6-6 to 6-7
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4	Sec 6.5.4 p. 6-7
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5	Sec 6.5.5 pp. 6-7 to 6-8
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Sec 6.5.5 pp. 6-9 to 6-10
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	Sec 7.4 p. 7-10
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Sec 7.1 pp. 7-1 to 7-3
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Sec 7.2.2 pp. 7-4 to 7-5
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	Sec 7.1 pp. 7-3 to 7-4
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	Sec 7.1 pp. 7-3

10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Sec 7.3 pp. 7-6 to 7-10
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	Sec 8.1 p. 8-1
10632(a)(2)	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency.	Water Shortage Contingency Planning	Section 8.9	Sec 8.9 p. 8-8
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	Sec 8.8 pp. 8-7 to 8-8
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Sec 8.2 pp. 8-2 to 8-3
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Sec 8.4 pp. 8-4 to 8-5
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Sec 8.3 pp 8-3 to 8-4
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	Sec 8.6 pp. 8-6
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Sec 8-7 p. 8-7 and Appendix K
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	Sec 8.5 pp. 8-5 to 8-6
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	Sec 9.2 and 9.3 pp. 9-1 to 9-10

10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	Not applicable – Hayward is retail supplier
10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	Not applicable – Hayward did not exercise this option
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	Sec 10.3 p. 10-2
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Sec 10.2.1 p. 10-1 and Appendix C
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Sec 10.4.1 p. 10-2
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Sec 10.4.4 p. 10-3 and Appendix C
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Sec 10.2 and 10.3 p.10-1 and Appendix C
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	Sec 10.2.1 p. 10-1 and Appendix C
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Sec 10.3 p. 10-2 and Appendix C
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	Sec 10.4.3 p.10-3 and Appendix C

10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Sec 10.4.4 p. 10.3 and Appendix C
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Sec 10.4.2 p. 10-3
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Sec 10.5 p. 10-3

APPENDIX C

PUBLIC NOTICES AND

RESOLUTION OF ADOPTION

CITY OF
HAYWARD
HEART OF THE BAY

January 6, 2016

<Agency>
<Contact>
<Street Address>
<City>, CA <Zip>

Subject: Preparation of City of Hayward's 2015 Urban Water Management Plan

Dear <Contact>:

The Urban Water Management Planning Act requires urban water suppliers that provide water to more than 3,000 customers or supply more than 3,000 acre-feet annually to update their Urban Water Management Plans (UWMP) by June 30, 2016. The City of Hayward is reviewing its current UWMP, prepared in 2011, and will be considering revisions.

Proposed revisions to the City's UWMP will be made available for public review, and the Hayward City Council will conduct a public hearing prior to adoption later this year. If you have any questions about the UWMP or the process for updating it, please contact:

Marilyn Mosher
Senior Management Analyst
Department of Utilities & Environmental Services
777 B Street
Hayward, CA 94541
Tel: 510-583-4723
Email: marilyn.mosher@hayward-ca.gov

Sincerely,

Alex Ameri
Director of Utilities & Environmental Services

CITY OF
HAYWARD
HEART OF THE BAY

January 6, 2016

County of Alameda
Chris Bazar, Director of Community Development
224 West Winton Avenue
Hayward, CA 94544

Subject: Preparation of City of Hayward's 2015 Urban Water Management Plan

Dear Mr. Bazar:

The Urban Water Management Planning Act requires urban water suppliers that provide water to more than 3,000 customers or supply more than 3,000 acre-feet annually to update their Urban Water Management Plans (UWMP) by June 30, 2016. The City of Hayward is reviewing its current UWMP, prepared in 2011, and will be considering revisions.

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Marilyn Mosher
Senior Management Analyst
Department of Utilities & Environmental Services
777 B Street
Hayward, CA 94541
Tel: 510-583-4723
Email: marilyn.mosher@hayward-ca.gov

Sincerely,

Alex Ameri
Director of Utilities & Environmental Services

The Notice of Preparation was mailed to the following entities:

Alameda County Water District
Robert Shaver, General Manager
43885 South Grimmer Boulevard
Fremont, CA 94538

California Water Service Co.
Anthony Carrasco, District Manager
341 N. Delaware St.
San Mateo, CA 94401

City of Brisbane
Randy Breault, Director of Public Works
50 Park Lane
Brisbane, CA 94005

City of Burlingame
Art Morimoto, Asst Public Works Director
501 Primrose Road
Burlingame, CA 94010

City of Daly City
Patrick Sweetland
153 Lake Merced Blvd.
Daly City, CA 94015

City of Menlo Park
Ruben Nino, Asst Public Works Director
701 Laurel Street
Menlo Park, CA 94025-3483

City of Millbrae
Peter Vorametsanti, City Engineer
621 Magnolia Avenue
Millbrae, CA 94030-1832

City of Milpitas
Nina Hawk, Director of Public Works
455 E. Calaveras Blvd.
Milpitas, CA 95034-5479

City of Mountain View
Gregg Hosfeldt, Asst Public Works Dir
500 Castro Street
Mountain View, CA 94039-7540

City of Palo Alto
Jane Ratchye, Asst Director of Utilities
250 Hamilton Ave.
Palo Alto, CA 94301-2593

City of Redwood City
Justin Chapel, Public Works Supt
1400 Broadway
Redwood City, CA 94063

City of San Bruno
Ray Razavi, Public Services Director
567 El Camino Real
San Bruno, CA 94066

City of Santa Clara
Chris De Groot
1500 Warburton Avenue
Santa Clara, CA 95050-3792

City of Sunnyvale
Mansour Nasser, Water and Sewer Mgr
P.O. Box 3707
Sunnyvale, CA 94088-3707

Coastside County Water District
David Dickson, General Manager
766 Main Street
Half Moon Bay, CA 94019

City of East Palo Alto
Maziar Bozorginia, Senior Engineer
2200 University Ave.
East Palo Alto, CA 94303

Estero Mun. Improvement Dist.
Jeff Moneda, Director of Public Works
610 Foster City Blvd.
Foster City, CA 94404-2299

Mid-Peninsula Water District
Tammy Rudock, General Manager
P. O. Box 129
Belmont, CA Belmont

North Coast County Water Dist.
Cari Lemke, General Manager
2400 Francisco Blvd.
Pacifica, CA 94044

Purissima Hills Water District
Patrick Walter, General Manager
26375 W. Fremont Road
Los Altos Hills, CA 94022

San Jose Municipal Water System
Jeff Provenzano
3025 Tuers Road
San Jose, CA 95121

Stanford University
Julia Nussbaum
327 Bonair Siding
Stanford, CA 94305-7270

Town of Hillsborough
Paul Willis, Director of Public Works
1600 Floribunda Avenue
Hillsborough, CA 94010-6498

Westborough Water District
Darryl Barrow, General Manager
2263 Westborough Blvd.
South San Francisco, CA 94080-5406

East Bay Municipal Utility District
Alex Coate, General Manager
P.O. Box 24055
Oakland, CA 94623

East Bay Dischargers Authority
Michael Connor, General Manager
2641 Grant Avenue
San Lorenzo, CA 94580-1841

San Francisco Public Utlities Commission
Ellen Levin, Deputy Mgr, Water Ent
1145 Market Street, Suite 401
San Francisco, CA 94103

County of Alameda Comm Development
Chris Bazar, Director
224 West Winton Avenue
Hayward, CA 94544

Bay Area Water Supply and
Conservation Agency
Nicole Sandkulla, CEO and General Mgr
155 Bovet Road, Suite 650
San Mateo, CA 94402

Hayward Area Park and Recreation Dist
John Gouveia, General Manager
1099 E Street
Hayward, CA 94541

06/14/16 10:25 CLK

Daily Review

c/o Bay Area News Group-East Bay
22533 Foothill Blvd.
Hayward, CA 94541
800-595-9595

2050945

HAYWARD, CITY OF/CITY CLERK
MIRIAM LENS
777 B ST.
HAYWARD, CA 94541

PROOF OF PUBLICATION

FILE NO. Urban Water Mgmt Plan

In the matter of

Daily Review

The Daily Review

I am a citizen of the United States; I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the Legal Advertising Clerk of the printer and publisher of The Daily Review, a newspaper published in the English language in the City of Hayward, County of Alameda, State of California.

I declare that the Daily Review is a newspaper of general circulation as defined by the laws of the State of California as determined by this court's decree, dated March 2, 1950, in the action entitled In the Matter of the Ascertainment and Establishment of the Standing of The Daily Review as a Newspaper of General Circulation, case number 221938. Said decree states that "'The Daily Review' has been established, printed, and published daily in the City of Hayward, County of Alameda, State of California, for one year or more next preceding the date of the filing of said petition; that it is a newspaper published for the dissemination of local and telegraphic news and intelligence of a general character and has a bona fide subscription list of paying subscribers; ... [ ] [and] THEREFORE, ... 'The Daily Review' is hereby determined and declared to be a newspaper of general circulation [within the meaning of Government Code §§ 6000 et seq.]" Said decree has not been revoked, vacated or set aside.

I declare that the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

05/27/2016, 06/03/2016

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated: June 9, 2016

Public Notice Advertising Clerk

Legal No. **0005741554**

OFFICIAL NOTICE OF PUBLIC HEARING
HAYWARD CITY COUNCIL

Date: June 14, 2016
Time: 7:00 p.m.
Place: City Hall, Council Chambers
777 B Street, Second Floor
Hayward, CA 94541

On the above date, at or about the hour noted, the Hayward City Council will hold a public hearing to obtain citizen input on the following matter:

2015 Urban Water Management Plan – The Urban Water Management Plan is updated every five years. The Urban Water Management Plan assesses Hayward's water supply reliability, and describes the City's anticipated water demand, water shortage contingency plans, and water conservation strategies. The 2015 Plan also updates water use targets for 2020, as required by Senate Bill X7-7, and assesses the City's compliance with its 2015 interim water use target and progress towards achieving the 2020 target.

The draft Urban Water Management Plan is available for review on weekdays from 8:00 a.m. to 5:00 p.m. in the Office of the City Clerk, 4th Floor of City Hall, 777 B Street, Hayward, and at the Main and Weekes Branch libraries. The Plan can also be accessed at on the City's website at http://www.hayward-ca.gov/sites/default/files/Draft%202015%20Urban%20Water%20Managment%20Plan.pdf

A copy of the staff report may be reviewed at the office of the City Clerk, 777 B Street, or at the Main City Library, 835 C Street, or the Weekes Branch, 27300 Patrick Avenue, Hayward, or on the City's website at https://hayward.legistar.com/Calendar.aspx. Staff reports are available the Friday before the hearing.

The community is encouraged to participate in the review process by attending the meeting to speak or by offering written comments.

Written comments may be directed to:
Alex Ameri,
Director of Utilities & Environmental Services
City of Hayward
777 B Street, Hayward, CA 94541
Phone number: (510) 583-4720
E-Mail: alex.ameri@hayward-ca.gov

ASSISTANCE will be provided to those requiring accommodations for disabilities in compliance with the Americans with Disabilities Act of 1990. Persons needing accommodation should contact the City Clerk's Office 48 hours in advance of the meeting at (510) 583-4400, or by using the TDD line for those with speech and hearing disabilities at (510) 247-3340.

PLEASE TAKE NOTICE that if you file a lawsuit challenging any final decision on the subject of this notice, the issues in the lawsuit may be limited to the issues which were raised at the City's public hearing or presented in writing to the City Clerk at or before the public hearing. By Resolution the City Council has imposed the 90-day time deadline set forth in C.C.P. Section 1094.6 for filing of any lawsuit challenging final action on an item which is subject to C.C.P. Section 1094.5.

DATED: May 27 and June 3, 2016
Miriam Lens, City Clerk
City of Hayward
DR #5741554; May 27; June 3, 2016

CITY OF
HAYWARD
HEART OF THE BAY

May 26, 2016

County of Alameda
Chris Bazar, Director of Community Development
224 West Winton Avenue
Hayward, CA 94544

Subject: Public Hearing Notice - City of Hayward's 2015 Urban Water Management Plan

Dear Mr. Bazar:

On June 14, 2016, at or about 7:00 pm, the Hayward City Council will hold a public hearing to obtain citizen input on the City's 2015 Urban Water Management Plan (UWMP). The UWMP assesses Hayward's water supply reliability, and describes the City's anticipated water demand, water shortage contingency plans, and water conservation strategies. The 2015 Plan also updates water use targets for 2020, as required by Senate Bill X7-7, and assesses the City's compliance with its 2015 interim water use target and progress towards achieving the 2020 target.

The draft Urban Water Management Plan is available for review on weekdays from 8:00 a.m. to 5:00 p.m. in the Office of the City Clerk, 4th Floor of City Hall, 777 B Street, Hayward, and at the Main and Weekes Branch libraries. The Plan can also be accessed at on the City's website at http://www.hayward-ca.gov/sites/default/files/Draft%202015%20Urban%20Water%20Managment%20Plan.pdf

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Written comments may be directed to:

Alex Ameri, Director of Utilities & Environmental Services
City of Hayward
777 B Street, Hayward, CA 94541
Phone number: (510) 583-4720
E-Mail: alex.ameri@hayward-ca.gov

Sincerely,

Alex Ameri
Director of Utilities & Environmental Services

HAYWARD CITY COUNCIL

RESOLUTION NO. 16-101

Introduced by Council Member Mendall

RESOLUTION ADOPTING THE 2015 URBAN WATER MANAGEMENT PLAN FOR THE CITY OF HAYWARD

WHEREAS, the 1983 Urban Water Management Act, amended through 2015, requires all California urban water agencies that supply more than 3,000 acre feet of water per year or have more than 3,000 connection to prepare an Urban Water Management Plan every five years; and

WHEREAS, the City of Hayward Water System supplies more than 15,000 acre feet of water per year and has close to 35,000 service connections, and is therefore subject to the provisions of the Act; and

WHEREAS, the next Urban Water Management Plan must be adopted by June 30, 2016; and

WHEREAS, preparation of this document involves comprehensive review and assessment of water usage data, projected water demand, water resources, water supply reliability, and water conservation; and

WHEREAS, the City of Hayward has prepared the 2015 Urban Water Management Plan in accordance with provisions of the Urban Water Management Planning Act in cooperation with the City's wholesale water supplier; and

WHEREAS, the Director of Utilities & Environmental Services has submitted to the City Council for review a copy of the draft 2015 Urban Water Management Plan and staff report dated June 14, 2016, and has made available for public review the draft 2015 Urban Water Management Plan in its entirety; and

WHEREAS, a public hearing was held on June 14, 2016, in the manner prescribed by law.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Hayward that the plan entitled "2015 Urban Water Management Plan," a copy of which is on file in the office of the Department of Utilities & Environmental Services and office of the City Clerk, is hereby adopted as the urban water management plan for the City of Hayward.

IN COUNCIL, HAYWARD, CALIFORNIA June 14, 2016

ADOPTED BY THE FOLLOWING VOTE:

AYES: COUNCIL MEMBERS: Zermeño, Mendall, Jones, Peixoto, Lamnin, Márquez
MAYOR: Halliday

NOES: COUNCIL MEMBERS: None

ABSTAIN: COUNCIL MEMBERS: None

ABSENT: COUNCIL MEMBERS: None

ATTEST: Miriam Lens

City Clerk of the City of Hayward

APPROVED AS TO FORM:

Michael S. Lawson

City Attorney of the City of Hayward

CITY OF
HAYWARD
HEART OF THE BAY

June 30, 2016

County of Alameda
Chris Bazar, Director of Community Development
224 West Winton Avenue
Hayward, CA 94544

Subject: City of Hayward's Adopted 2015 Urban Water Management Plan

Dear Mr. Bazar:

On June 14, 2016, the Hayward City Council adopted the enclosed 2015 Urban Water Management Plan.

Please contact Marilyn Mosher at 510-583-4723 or by email at marilyn.mosher@hayward-ca.gov, if you have questions regarding this document.

Sincerely,

Alex Ameri
Director of Utilities & Environmental Services

Enclosure

CITY OF
HAYWARD
HEART OF THE BAY

June 30, 2016

California State Library
Government Publications Section
P.O. Box 942837
Sacramento, CA 94237-0001
Attention: Coordinator, Urban Water Management Plans

Subject: City of Hayward's Adopted 2015 Urban Water Management Plan

Dear Coordinator, Urban Water Management Plans:

On June 14, 2016, the Hayward City Council adopted the enclosed 2015 Urban Water Management Plan. Per requirements of the California Urban Water Management Planning Act, we are submitting a copy of the document to the California State Library.

Please contact Marilyn Mosher at 510-583-4723 or by email at marilyn.mosher@hayward-ca.gov, if you have questions regarding this document.

Sincerely,

Alex Ameri
Director of Utilities & Environmental Services

Enclosure

APPENDIX D

WATER AUDIT FOR FY 2014-15

WSO

AuditSolve™

STANDARDISED WATER AUDIT SOFTWARE
FOR AMERICAN WATER SUPPLY SYSTEMS

MAIN MENU

Audit Details	Audit Results	
Infrastructure Data	System Inputs	Consumption Data
Apparent Losses	Real Losses	Variance Analysis
ILI Calculation	PI Values	PI Charts
Glossary		
License		

WATER AUDIT DETAILS

Utility

City of Hayward

System

Whole system

Audit Period Start Date	**July 01, 2014**
Audit Period End Date	**June 30, 2015**
Audit Period Duration	**365** days
Audit Identifier	**Fiscal Year 2015**

Audit Description

Water Audit for the whole system of City of Hayward.

Audit Produced By

Alicia Sargiotto, City of Hayward

Water Audit: Fiscal Year 2015

WATER AUDIT RESULTS

<table>
<tr><td rowspan="8">System Input Volume
4,963 MG (100%)</td><td rowspan="5">Authorized Consumption
4,578 MG (92%)</td><td rowspan="3">Billed Authorized
4,573 MG (92%)</td><td>Billed Metered Water Exported
- MG (0%)</td><td rowspan="3">Revenue Water
4,573 MG (92%)</td></tr>
<tr><td>Billed Metered Authorized
4,573 MG (92%)</td></tr>
<tr><td>Billed Un-metered Authorized
- MG (0%)</td></tr>
<tr><td rowspan="2">Un-billed Authorized
5 MG (0%)</td><td>Un-billed Metered Authorized
- MG (0%)</td><td rowspan="5">Non-Revenue Water
390 MG (8%)</td></tr>
<tr><td>Un-billed Un-metered Authorized
5 MG (0%)</td></tr>
<tr><td rowspan="3">Water Losses
384 MG (8%)</td><td rowspan="2">Apparent Losses
194 MG (4%)</td><td>Unauthorized Consumption
12 MG (0%)</td></tr>
<tr><td>Meter Error
182 MG (4%)</td></tr>
<tr><td colspan="2">Real Losses
190 MG (4%)</td></tr>
</table>

(Amounts are total volumes for the 365 day audit period from 7/1/2014 to 6/30/2015 inclusive)

WSO

Water Audit: Fiscal Year 2015

SYSTEM INFRASTRUCTURE DATA

WATER MAINS			
Nominal Diameter (inches)	Length (miles)	95% Confidence Limits	Confidence Grading
Distribution Mains			
Diameter 4-inch	1.80	1.0%	
Diameter 6-inch	148.30	1.0%	
Diameter 8-inch	84.50	1.0%	
Diameter 10-inch	0.60	1.0%	
Diameter 12-inch	100.20	1.0%	
Diameter Unknown	0.10	1.0%	
Hydrant Service Lines	8.74	1.0%	
Sub-total	**344.24**	**0.6%**	
Trunk Mains			
Diameter 14-inch	2.30	1.0%	
Diameter 16-inch	3.00	1.0%	
Diameter 18-inch	5.10	1.0%	
Diameter 20-inch	0.30	1.0%	
Diameter 24-inch	14.80	1.0%	
Diameter 30-inch	1.90	1.0%	
Diameter 33-inch	2.80	1.0%	
Diameter 36-inch	1.50	1.0%	
Diameter 42-inch	7.60	1.0%	
Sub-total	**39.30**	**0.5%**	
Total All Main	**383.54**	**0.5%**	

WSO

Water Audit: Fiscal Year 2015

SYSTEM INFRASTRUCTURE DATA

SERVICE CONNECTIONS			
Nominal Diameter (inches)	Number	95% Confidence Limits	Confidence Grading
SERVICE CONNECTIONS	35,201	2%	
Total All Connections	**35,201**	**2.0%**	
Average Distance from Curb-stop to Meter (ft)	-		
Service Connection Density Per Mile of Distribution Main	**102**	**2.1%**	
Service Connection Density Per Mile of All Mains	**92**	**2.1%**	

OTHER INFRASTRUCTURE			
System Component	Value	95% Confidence Limits	Confidence Grading
Number of Hydrants	3,850	5.0%	
Hydrant Density (per Mile of Main)	10.0	5.0%	
Length of Main between Hydrants (ft)	526	5.0%	
Number of Valves	6,490	5.0%	
Valve Density (per Mile of Main)	17	5.0%	
Length of Main between Valves (ft)	312	5.0%	
Number of Service Reservoirs	14	1.0%	
Total Service Reservoir Capacity (MG)	29.3	1.0%	

Water Audit: Fiscal Year 2015

SYSTEM INFRASTRUCTURE DATA

SYSTEM PRESSURE			
System Component	Average Pressure (psi)	95% Confidence Limits	Confidence Grading
Distribution Mains	92.8	15.0%	
Trunk Mains	92.8	15.0%	
Weighted Average System Value	**92.8**	**21.2%**	

COST DATA			
Item	Units	Value	Confidence Grading
Annual Wholesale Sales (exports)	US$ / MG		
Annual Retail Sales	US$ / MG		
Production Cost (variable cost only)	US$ / MG		
System Running Cost	millions US$		

WSO

Water Audit: Fiscal Year 2015

SYSTEM INFRASTRUCTURE DATA

COMMENTS

Water Audit: Fiscal Year 2015

SYSTEM INPUT DATA

System Input Component	Annual Volume (MG)	95% Confidence Limits	Confidence Grading
Newark Turnout - Meter #0070275956	1,926.104	1.5%	
Newark Turnout - Meter #0070275955	1,562.926	1.5%	
Fremont Turnout - Meter #0001255444	464.684	1.5%	
Fremont Turnout - Meter #0001255138	335.998	1.5%	
Fremont Turnout - Meter #0001255445	302.45	1.5%	
Fremont Turnout - Meter #0001190832	370.53	1.5%	
Skywest Pump Station		4.2%	
Total System Input Volume	**4,962.693**	**0.8%**	

COMMENTS

Water Audit: Fiscal Year 2015

CONSUMPTION DATA

BILLED METERED AUTHORIZED CONSUMPTION			
Consumption component	Annual Volume (MG)	95% Confidence Limits	Confidence Grading
Billed Metered Water Exported			
Skywest Pump Station		2.0%	
Hesperian Pump Station		2.0%	
Sub-total Water Exported	**-**	**0.0%**	
Billed Metered Authorized (Retail Sales)			
Standard Service	4,007.585	1.0%	
Water Only Service		1.0%	
Irrigation Service	556.678	1.0%	
Fireline Service		1.0%	
Other Service (Excl. Read Only)	8.592	1.0%	
Sub-total Retail Customers	**4,572.855**	**0.9%**	
Total Billed Metered	**4,572.855**	**0.9%**	

BILLED UN-METERED AUTHORIZED CONSUMPTION			
Consumption component	Annual Volume (MG)	95% Confidence Limits	Confidence Grading
Total Billed Un-metered	**-**	**0.0%**	

Water Audit: Fiscal Year 2015

CONSUMPTION DATA

UN-BILLED METERED AUTHORIZED CONSUMPTION			
Consumption component	Annual Volume (MG)	95% Confidence Limits	Confidence Grading
Total Un-billed Metered	**-**	**0.0%**	

UN-BILLED UN-METERED AUTHORIZED CONSUMPTION			
Consumption component	Annual Volume (MG)	95% Confidence Limits	Confidence Grading
Fire Flow Test	0.116	25.0%	
Water Main Flushings	4.424	25.0%	
Estimated Fire Fighting Use	0.800	25.0%	
Total Un-billed Un-metered	**5.340**	**21.1%**	

Water Audit: Fiscal Year 2015

CONSUMPTION DATA

COMMENTS

Water Audit: Fiscal Year 2015

APPARENT LOSSES

UNAUTHORIZED CONSUMPTION			
Consumption component	Annual Volume (MG)	95% Confidence Limits	Confidence Grading
UNAUTHORIZED CONSUMPTION	12.407	30.0%	
Total Unauthorized Consumption	**12.407**	**30.0%**	

METER ERROR					
Component	% Meter Error	Annual Consumption Volume (MG)	Apparent Losses Volume (MG)	95% Confidence Limits	Confidence Grading
5/8-inch meters		1,716.650	57.121	2.1%	
3/4-inch meters		211.723	0.812	7.9%	
1-inch meters		426.190	4.016	0.9%	
1.5-inch meters		531.823	9.280	2.1%	
2-inch meters		850.551	97.354	11.7%	
3-inch meters		205.778	1.109	2.4%	
4-inch meters		244.190	5.906	4.9%	
6-inch meters		276.658	0.916	9.0%	
8-inch meters		107.005	5.467	8.2%	
Sub-total Meter Error		**4,570.569**	**181.981**	**6.3%**	
METER DATA HANDLING ERRORS					
Component	% Meter Error	Annual Consumption Volume (MG)	Apparent Losses Volume (MG)	95% Confidence Limits	Confidence Grading
Sub-total Meter Data Handling Errors			**-**	**0.0%**	
Total Apparent Loses - Meter Error			**181.981**	**6.3%**	

APPARENT LOSSES	Apparent Losses Volume (MG)	95% Confidence Limits	Confidence Grading
Total Apparent Losses	**194.388**	**6.2%**	

Water Audit: Fiscal Year 2015

APPARENT LOSSES

COMMENTS

Water Audit: Fiscal Year 2015

REAL LOSSES

REAL LOSSES BY COMPONENT BASED ON BABE ANALYSIS				
System Component	Background Leakage (MG)	Reported Leaks (MG)	Unreported Leaks (MG)	Total (MG)
Reservoirs	**3.85**	**-**	**-**	**3.85**
Distribution Mains	100.39	23.40	-	123.80
Trunk Mains	11.46	-	-	11.46
Mains Fittings	-	1.18	-	1.18
Sub-Total Mains	**111.85**	**24.58**	**-**	**136.43**
Services - Main to Curb-Stop	400.62	1.94	-	402.57
Services - Curb-Stop to Meter	-		-	-
Meters	-	1.07	1.07	2.14
Sub-Total Services	**400.62**	**3.02**	**-**	**403.64**
Totals	**516.33**	**27.60**	**-**	**543.92**
WATER AUDIT RESULT				**190.11**
BALANCING ERROR				**- 353.81**

BACKGROUND LOSSES ON RESERVOIRS				
Reservoir	Capacity MG	Background Leakage Rate gpm / MG	Annual Volume (MG)	Confidence Grading
Reservoirs (Tanks)	29.30	0.25	3.85	
Total Background Losses on Reservoirs			**3.85**	

BACKGROUND LOSSES ON MAINS AND SERVICES						Standard Calculation		Pressure Corrected Calculation		
System Component	Units	Quantity	Component UARL Values (g/unit/d/psi)	Infrastructure Condition Factor	Average Pressure (psi)	N1 (Leakage-Pressure Exponent) Value	Annual Volume (MG)	N1 (Leakage-Pressure Exponent) Value	Annual Volume (MG)	Confidence Grading
Distribution Mains	miles	344.24	2.870	3.00	92.8	1.00	100.39	1.50	115.59	
Trunk Mains	miles	39.30	2.870	3.00	92.8	1.00	11.46	1.50	13.20	
Services - Main to Curb-Stop	number	35,201	0.112	3.00	92.8	1.00	400.62	1.50	461.28	
Services - Curb-Stop to Meter	miles	-	4.780	3.00	92.8	1.00	-	1.50	-	
Total Background Losses on Mains and Services							**512.48**		**590.06**	

Water Audit: Fiscal Year 2015

REAL LOSSES

REPORTED LEAKS AND BREAKS													
Mains by Size	Number of Leaks & Breaks per Year	Length of Main (miles)	Failure Frequency (number / 1000miles / yr)	Average Leak Flow Rate @ 70psi (gpm)	Average Pressure (psi)	N1 (Leakage-Pressure Exponent) Value	Average Leak Duration: Awareness Duration (days)	Location Duration (days)	Repair Duration (days)	Total Duration (days)	Average Annual Loss per Leak (MG)	Total Annual Loss (MG)	Confidence Grading
REPORTED LEAKS ON DISTRIBUTION MAINS													
Diameter 4-inch	-	1.80	-	44.00	92.8	0.50	0.50	-	0.08	0.58	0.04	-	
Diameter 6-inch	19	148.30	128	92.00	92.8	0.50	0.50	-	0.08	0.58	0.09	1.68	
Diameter 8-inch	4	84.50	47	92.00	92.8	0.50	0.25	-	0.10	0.35	0.05	0.21	
Diameter 12-inch	1	100.20	10	222.00	92.8	0.50	0.25	-	0.10	0.35	0.13	0.13	
			-			0.50		-		-	-	-	
			-			0.50		-		-	-	-	
			-			0.50		-		-	-	-	
			-			0.50				-	-	-	
Total Real Losses from non emer	1		-	14,847.22	70.0	0.50	1.00			1.00	21.38	21.38	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
											SUB-TOTAL REPORTED LEAKS ON DISTRIBUTION MAINS	**23.40**	
REPORTED LEAKS ON TRUNK MAINS													
			-			0.50		-		-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
											SUB-TOTAL REPORTED LEAKS ON TRUNK MAINS	**-**	
REPORTED LEAKS ON MAINS FITTINGS													
Hydrants	40	3,850	10	3.50	92.8	0.50	5.00	-	0.07	5.07	0.03	1.18	
Non_Emegrnecy Repairs Valves	-	6,490	-	3.50	92.8	0.50	8.00		13.00	21.00	0.12	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
											SUB-TOTAL REPORTED LEAKS ON MAINS FITTINGS	**1.18**	
REPORTED LEAKS ON SERVICE CONNECTIONS													
Services <1-inch	55		-	6.90	92.8	0.50	3.00	-	0.09	3.09	0.04	1.94	
Services >1-inch	15		-	13.90	92.8	0.50	3.00	-	0.10	3.10	0.07	1.07	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
											SUB-TOTAL REPORTED LEAKS ON SERVICES	**3.02**	
TOTAL REPORTED LEAKS AND BREAKS												**27.60**	

Water Audit: Fiscal Year 2015

REAL LOSSES

UNREPORTED LEAKS AND BREAKS

Mains by Size	Number of Leaks & Breaks per Year	Length of Main (miles)	Failure Frequency (number / 1000miles / yr)	Average Leak Flow Rate @ 70psi (gpm)	Average Pressure (psi)	N1 (Leakage-Pressure Exponent) Value	Average Leak Duration: Awareness Duration (days)	Location Duration (days)	Repair Duration (days)	Total Duration (days)	Average Annual Loss per Leak (MG)	Total Annual Loss (MG)	Confidence Grading
UNREPORTED LEAKS ON DISTRIBUTION MAINS													
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
										SUB-TOTAL UNREPORTED LEAKS ON DISTRIBUTION MAINS		**-**	
UNREPORTED LEAKS ON TRUNK MAINS													
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
										SUB-TOTAL UNREPORTED LEAKS ON TRUNK MAINS		**-**	
UNREPORTED LEAKS ON MAINS FITTINGS													
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
										SUB-TOTAL UNREPORTED LEAKS ON MAINS FITTINGS		**-**	
UNREPORTED LEAKS ON SERVICE CONNECTIONS													
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
			-			0.50				-	-	-	
										SUB-TOTAL UNREPORTED LEAKS ON SERVICES		**-**	
TOTAL UNREPORTED LEAKS AND BREAKS												**-**	

Water Audit: Fiscal Year 2015

VARIANCE ANALYSIS

	Annual Volume (MG)	95% Confidence Limits	Variance (g^2x10^{12})
SYSTEM INPUT VOLUME	**4,962.69**	**0.8%**	**393**
Billed Water Exported	-	0.0%	-
Billed Metered Authorized Consumption	4,572.86	0.9%	426
Billed Un-metered Authorized Consumption	-	0.0%	-
BILLED AUTHORIZED CONSUMPTION	**4,572.86**	**0.9%**	**426**
Un-billed Metered Authorized Consumption	-	0.0%	-
Un-billed Un-metered Authorized Consumption	5.34	21.1%	0
UN-BILLED AUTHORIZED CONSUMPTION	**5.34**	21.1%	**0**
AUTHORIZED CONSUMPTION	**4,578.20**	**0.9%**	**426**
NON-REVENUE WATER	**389.84**	**14.4%**	**819**
WATER LOSSES	**384.50**	**14.6%**	**819**
Unauthorized Consumption	12.41	30.0%	4
Meter Error	181.98	6.3%	34
APPARENT LOSSES	**194.39**	**6.2%**	**38**
REAL LOSSES	**190.11**	**30.2%**	**857**

Water Audit: Fiscal Year 2015

VARIANCE ANALYSIS

#	Water Audit Component	Item	Annual Volume (MG)	95% Confidence Limits	Variance	Rank
1	System Input Volume	Newark Turnout - Meter #0070275956	1,926.10	2%	217	2
2	System Input Volume	Newark Turnout - Meter #0070275955	1,562.93	2%	143	3
3	System Input Volume	Fremont Turnout - Meter #0001255444	464.68	2%	13	5
5	System Input Volume	Fremont Turnout - Meter #0001255138	336.00	2%	7	8
6	System Input Volume	Fremont Turnout - Meter #0001255445	302.45	2%	5	9
7	System Input Volume	Fremont Turnout - Meter #0001190832	370.53	2%	8	7
8	System Input Volume	Skywest Pump Station	-	4%	-	
9	Billed Water Exported	Skywest Pump Station	-	2%	-	
10	Billed Water Exported	Hesperian Pump Station	-	2%	-	
11	Billed Metered Authorized Consumption	Standard Service	4,007.59	1%	418	**1**
12	Billed Metered Authorized Consumption	Water Only Service	-	1%	-	
13	Billed Metered Authorized Consumption	Irrigation Service	556.68	1%	8	6
14	Billed Metered Authorized Consumption	Fireline Service	-	1%	-	
15	Billed Metered Authorized Consumption	Other Service (Excl. Read Only)	8.59	1%	0	17
16	Un-billed Un-metered Authorized Consumption	Fire Flow Test	0.12	25%	0	21
17	Un-billed Un-metered Authorized Consumption	Water Main Flushings	4.42	25%	0	12
18	Un-billed Un-metered Authorized Consumption	Estimated Fire Fighting Use	0.80	25%	0	15
19	Meter Error	5/8-inch meters	57.12	2%	0	11
20	Meter Error	3/4-inch meters	0.81	8%	0	19
21	Meter Error	1-inch meters	4.02	1%	0	20
22	Meter Error	1.5-inch meters	9.28	2%	0	16
23	Meter Error	2-inch meters	97.35	12%	34	4
24	Meter Error	3-inch meters	1.11	2%	0	22
25	Meter Error	4-inch meters	5.91	5%	0	14
26	Meter Error	6-inch meters	0.92	9%	0	18
27	Meter Error	8-inch meters	5.47	8%	0	13
28	Unauthorized Consumption	0	12.41	30%	4	10
29					-	
30					-	
31					-	
32					-	
33					-	
34					-	
35					-	
36					-	
37					-	
38					-	
39					-	
40					-	
41					-	
42					-	
43					-	
44					-	
45					-	
46					-	
47					-	
48					-	
49					-	
50					-	
51					-	
52					-	
53					-	
54					-	
55					-	
56					-	
57					-	
58					-	
59					-	
60					-	

Water Audit: Fiscal Year 2015

INFRASTRUCTURE LEAKAGE INDEX (ILI)

Parameter Values for Unavoidable Annual Real Loss (UARL) calculation					
Infastructure Component	Units	Real Loss Component			
		Background Leakage	Reported Leaks and Breaks	Unreported Leaks and Breaks	Total
Mains	g/mile of u.g. pipe/day/psi	2.87	1.75	0.77	5.39
Services, Main to Curb-stop	g/conn/day/psi	0.112	0.007	0.030	0.149
Services, Curb-stop to Meter	g/mile of u.g. pipe/day/psi	4.78	0.57	2.12	7.47

Unavoidable Annual Real Loss (UARL) calculation (without FAVAD correction)					
Infastructure Component	Units	Real Loss Component			
		Background Leakage	Reported Leaks and Breaks	Unreported Leaks and Breaks	Total
Mains	MG	37.28	22.73	10.00	70.02
Services, Main to Curb-stop	MG	133.54	8.35	35.77	177.66
Services, Curb-stop to meter	MG	-	-	-	-
TOTAL UARL		170.83	31.08	45.77	**247.68**

Unavoidable Annual Real Loss (UARL) calculation (with FAVAD correction)					
Infastructure Component	Units	Real Loss Component			
		Background Leakage	Reported Leaks and Breaks	Unreported Leaks and Breaks	Total
Mains	MG	42.93	19.75	8.69	71.36
Services, Main to Curb-stop	MG	153.76	7.25	31.07	192.07
Services, Curb-stop to meter	MG	-	-	-	-
TOTAL UARL		196.69	26.99	39.75	**263.44**

ILI Calculation	Lower Estimate	**Best Estimate**	Upper Estimate
Current Annual Real Losses (MG)	133	190	247
Unavoidable Annual Real Losses (MG)	263	248	248
INFRASTRUCTURE LEAKAGE INDEX	0.50	0.77	1.00

Water Audit: Fiscal Year 2015

PERFORMANCE INDICATORS

Non-Revenue Water		
Annual Volume	390	MG
Annual Volume as % of System Input (IWA F136 - Level 1 PI)	8%	
Annual Cost	-	million US$
Annual Cost as % of Operating Cost (IWA Fi37 - Level 3 PI)		
Water Losses		
Annual Volume	384	MG
Annual Volume as % of System Input	8%	
Annual Volume per connection (IWA Op22 - Level 1 PI)	10,923	g/connection/year
Volume per connection per day	30	g/connection/day
Annual Cost	-	million US$
Annual Cost as % of Operating Cost		
Apparent Losses		
Annual Volume	194	MG
Annual Volume as % of System Input	4%	
Annual Volume per connection (IWA Op23 - Level 3 PI)	5,522	g/connection/year
Volume per connection per day	15	g/connection/day
Annual Cost	-	million US$
Annual Cost as % of Operating Cost		
Real Losses		
Annual Volume	190	MG
Annual Volume as % of System Input (IWA WR1 - Level 1 PI)	4%	
Annual Volume per connection	5,401	g/connection/year
Volume per connection per day (IWA Op24 - Level 1 PI)	15	g/connection/day
Volume per connection per day per PSI of pressure	0.16	g/connection/day/psi
Infrastructure Leakage Index (IWA Op25 - Level 3 PI)	0.77	
Annual Cost	-	million US$
Annual Cost as % of Operating Cost		

GLOSSARY OF WATER AUDIT TERMS

A B C I L M N R S U W
d e f g h i j k o p q s t v

A

Apparent Losses
Apparent losses includes all types of customer metering errors such as meter inaccuracy and meter data handling errors, and all types of theft or unauthorized use of water.

Authorized Consumption
Authorized Consumption is water taken by registered customers, the water utility and others who are authorized to take water from the water supply system. Water may be taken for domestic, commerical and industrial purposes. It may also include uses such as fire fighting, flushing of mains and sewers, municipal garden watering, public fountains, blow-offs for water quality or frost protection, building water etc. Authorized consumption may be billed or un-billed, metered or un-metered.

Average Distance Curb-Stop to Meter
For those water utilities where the customer meter is located on the propoerty or at the property boundary, the average distance from the curb-stop to the customer meter is required. Losses on this section of pipe are considered seperately from the losses on the service line from the main to the curb-stop in calculating the Infrastructure Leakage Index (ILI).

Awareness Duration
Awareness Duration is the length of time taken from a leak first occurring – whether it is reported or unreported - to the time when the water utility first becomes aware that a leak exists, although not necessarily aware of its exact location. For reported leaks and breaks, this duration is usually very short, while for unreported leaks and breaks, it is a function of the active leakage control policy.

Top

B

BABE (Break And Background Estimation)
BABE is a component based approach to estimate real losses

Background Leakage
Background leaks are small individual leaks for which the rate of loss is less than 1.5gpm at 70psi pressure. These leaks typically are not detectable using normal acoustic leak detection techniques.

Billed Authorized Consumption
Billed Authorized Consumption is Authorized Consumption that is billed for and which produces revenue.

Billed Metered Authorized Consumption
Billed Metered Authorized Consumption is Billed Authorized Consumption where the billed amount is based on readings from meters attached to the customers' service lines.

Billed Metered Water Exported
Water exported across the utilities boundary to adjacent water utilities. The water is metered and billed for.

Billed Un-metered Authorized Consumption
Billed Un-metered Authorized Consumption is Billed Authorized Consumption that is billed and which produces revenue.

Top

C

Component UARL Values

These are the IWA / AWWA published values for the components of real losses associated with each infrastructure component when ILI = 1.0 . They represent the technically achievable lowest level of real losses for each infrastructure component.

(see also Unavoidable Annual Real Losses)

Confidence grades
The IWA has developed a confidence grading scheme for use with the IWA Performance Indicators. This scheme enables users to be aware of the reliability of the information from which the Performance Indicator values are derived. The IWA data confidence grading methodology utilizes an alpha numeric system combining both reliability bands and accuracy bands. Reliability bands reflect the degree of reliability in the base data that is collected to derive values for the various components of the study. For the purposes of confidence grading, accuracy is defined as the approximation between the results of a given measurement and the correct or true value for the variable being measured. The confidence grade for any given component will be an alphanumeric code that combines the reliability band with the accuracy band.

(more on confidence grades)

Top

I

Infrastructure Condition Factor (ICF)
Infrastructure Condition Factor (ICF) is effectifively the ILI of the individual infrastructure components. It is calculated in the same manner as Infrastructure Leakage Index and use the same parameter values as Unavoidable Annual Real Losses but it is applied only to the individual infrastructure components and not to the system as a whole.

Infrastructure Leakage Index (ILI)

Top

L

Location Duration
Meter Error is a component of apparent losses and includes all errors associated with metering of consumption. This includes both meter inaccuracy and meter data handling errors.

Top

M

Meter Error
Meter Error is a component of apparent losses and includes all errors associated with metering of consumption. This includes both meter inaccuracy and meter data handling errors.

Top

N

Non-Revenue Water
Non-Revenue Water comprises those items of System Input that do not generate revenue. It includes Un-billed Authorized Consumption (both metered and un-metered), Apparent Losses and Real Losses.

N1 (Leakage-Pressure Exponent Value)
N1 represents the power-law relationship between flow and pressure, taking into account the pressure dependency of discharge coefficient and cross-sectional area according to the following equation:

$Q_L = (Cd\ A\ 2\ g\ h)^{N1}$

(more on Leakage-Pressure Relationship)

Top

R

Repair Duration
Repair Duration is the time it takes to make the repair once a leak has been located

Reported Leaks and Breaks
Reported Leaks and Breaks are events brought to the attention of the water utility by customers, the general public, or the water utilities own operatives (except for members of the Leak Detection teams). A break or a leak that, under urban conditions, manifests itself at the surface will normally be reported to the water supply organization whether or not it causes nuisance such as flooding.

Revenue Water
Revenue Water comprises those items of System Input that generate revenue and includes all Billed Authorized Consumption (both metered and un-metered).

Top

S

System Input Volume
System Input volume is the volume of water that is being put into the system to which the water audit relates. It includes water from the utilities own sources plus water that is imported across the utilities boundaries from other water utilities.

Top

U

Unauthorized Consumption
Unauthorized Consumption includes consumption through illegal connections, theft of water from hydrants, wash-outs and blow-offs, by-passing of meters etc.

Unavoidable Annual Real Losses

Un-billed Authorized Consumption
Un-billed Authorized Consumption is Authorized Consumption that is not billed for and which does not produce revenue.

Un-billed Metered Authorized Consumption
Un-billed Metered Authorized Consumption is Un-billed Authorized Consumption where the amount is based on readings from meters attached to the customers' service lines.

Un-billed Un-metered Authorized Consumption
Un-billed Un-metered Authorized Consumption is Un-billed Authorized Consumption that is based on estimation methods only.

Un-reported Leaks and Breaks
Unreported Leaks and Breaks are located by leak detection teams as part of their normal everyday active leakage control duties. These breaks go undetected without some form of active leakage control.

Top

W

Water Losses
Water Losses is the difference between System Input and Authorized Consumption. It includes all forms of Real Losses and Apparent Losses

Top

CONFIDENCE GRADING SCHEME

The IWA has developed a confidence grading scheme for use with the IWA Performance Indicators. This scheme enables users to be aware of the reliability of the information from which the Performance Indicator values are derived. The IWA data confidence grading methodology utilizes an alpha numeric system combining both reliability bands and accuracy bands. Reliability bands reflect the degree of reliability in the base data that is collected to derive values for the various components of the study. For the purposes of confidence grading, accuracy is defined as the approximation between the results of a given measurement and the correct or true value for the variable being measured. The confidence grade for any given component will be an alphanumeric code that combines the reliability band with the accuracy band.

Reliability Band	Description for Actual Values	Description for Forecast Values
A *(highly reliable)*	Data is based on sound records, procedures, investigations or analyses that are properly documented and recognized as the best available assessment methods	Based on extrapolations of high-quality records covering or applicable to 100% of the undertaking's area, kept and updated for a minimum of five years (the forecast will have been reviewed during the reporting period).
B *(reliable)*	Generally as in band A, but with minor shortcomings, e.g. some of the documentation is missing, the assessment is old, or some reliance on unconfirmed reports or some extrapolations are made.	Based on extrapolations of records covering or applicable to more than 50% of the undertaking's area, kept and updated for a minimum of five years. The forecast will have been reviewed during the previous two years.
C *(unreliable)*	Data based on extrapolation from a limited sample for which band A or B is available.	Based on extrapolations of records covering more than 30% of the undertaking's area. The forecast will have been reviewed during the previous five years.
D *(highly unreliable)*	Data based on unconfirmed verbal reports and/or cursory inspections or analysis.	Based on extrapolated information not complying with bands A, B or C.

CONFIDENCE GRADING SCHEME

Accuracy Band	Description
1	Better than or equal to +/- 1%
2	Not band 1, but better than or equal to +/- 5%
3	Not band 2, but better than or equal to +/- 10%
4	Not band 3, but better than or equal to +/- 25%
5	Not band 4, but better than or equal to +/- 50%
6	Not band 5, but better than or equal to +/- 100%
X	Greater than +/-100% or very small numbers having little impact on the overall water audit accuracy.

CONFIDENCE GRADE MATRIX

Accuracy Band	Reliability Band			
	A	**B**	**C**	**D**
1 (<= 1%)	A1			
2 (>1% and <=5%)	A2	B2		
3 (>5% and <=10%)	A3	B3	C3	
4 (>10% and <=25%)	A4	B4	C4	D4
5 (>25% and <=50%)			C5	D5
6 (>50% and <=100%)				D6
X (>100%)				DX

LEAKAGE - PRESSURE RELATIONSHIP

Leakage and pressure are closely linked. An understanding of the relationship between the two is a fundamental aspect of the BABE concept. Modelling the relationship between leakage and pressure using basic hydraulic principles rather than empirical formulae enables a more robust analysis of leakage to be carried out.

The velocity of water escaping from a hole in pipe is governed by the standard velocity-head hydraulic equation as follows:

$$v = (2 g h)^{0.5} \qquad (1)$$

where
v represents the velocity of water through an individual leak,
g represents acceleration due to gravity
h represents the pressure that the individual leak is subject to
and 0.5 is the square-root power law exponent for the relationship.

Also, it is known that the flow rate for water escaping from a hole in the pipe is governed by the cross-sectional area of the hole and a discharge coefficient as follows:

$$Q_L = v \, Cd \, A \qquad (2)$$

where
Q_L represents the leakage flow rate for an individual leak,
v represents the velocity of water through the leak,
A represents the cross-sectional area of the leak
Cd represents the discharge coefficient,

and by substitution

$$Q_L = Cd \, A \, (2 g h)^{0.5} \qquad (3)$$

It is also known that both Cd and A can vary with pressure. The discharge coefficient, Cd, is variable with very small leaks such as found in small corrosion holes. The cross-sectional area, A, is also variable with leaks at joints and splits in plastic pipes where an increase in pressure will cause an increase in the cross-sectional area of the leak. So whilst the simple form of the equation (3) above indicates that leakage flow rate, Q, will be proportional to pressure to the power 0.5, it is possible that it can actually be proportional to pressure to the power 1.5. The simple form of the equation is therefore modified as follows:

$$Q_L = (Cd \, A \, 2 g h)^{N1} \qquad (4)$$

where N1 represents the power-law relationship between flow and pressure, taking into account the pressure dependency of discharge coefficient and cross-sectional area.

For fixed area leaks, N1 will be 0.5 (square root relationship) whilst for variable area leaks, N1 will be 1.5.

In any distribution network there will be a combination of fixed and variable area leakage paths and this combination will change from one part of the distribution system to another within the same distribution system.

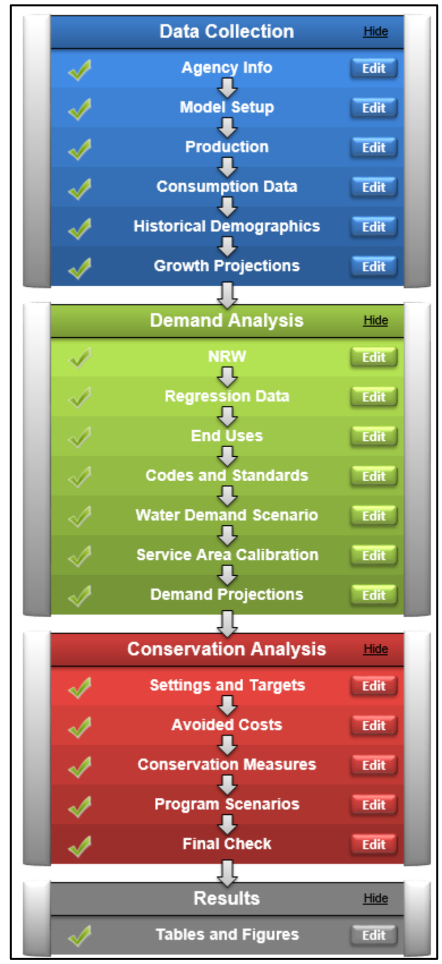
APPENDIX E

PASSIVE WATER SAVINGS PROJECTION BACKGROUND

PASSIVE SAVINGS PROJECTION BACKGROUND

Plumbing codes and appliance standards for toilets, urinals, faucets, clothes washers, and showerheads will continue to reduce indoor residential and non-residential water demands in the future. This reduction in demand is accounted for in Maddaus Water Management Decision Support System (DSS) Model. Background on the DSS Model as well as details on the method of determining plumbing code savings is presented in the following sections.

DSS Model Overview



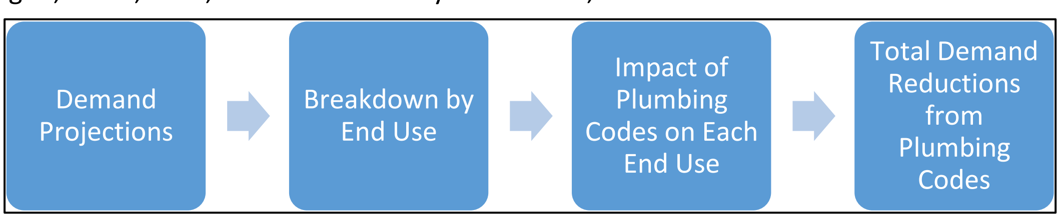
The DSS Model prepares long-range, detailed demand projections. The purpose of the extra detail is to enable a more accurate assessment of the impact of water efficiency programs on demand. A rigorous modeling approach is especially important if the project will be subject to regulatory or environmental review.

The DSS Model is an end-use model that breaks down total water production (water demand in the service area) to specific water end-uses. The model uses a bottom-up approach that allows for multiple criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The DSS Model may also use a top-down approach with a utility prepared water demand forecast.

To forecast urban water demands using the DSS Model, customer demand data are obtained from the water agency being modeled. The demand data are reconciled with available demographic data to characterize the water usage for each customer category in terms of number of users per account and per capita water use. The data are further analyzed to approximate the split of indoor and outdoor water usage in each customer category. The indoor/outdoor water usage is further divided into typical end uses for each customer category. Published data on average per-capita indoor water use and average per-capita end use are combined with the number of water users to calibrate the volume of water allocated to specific end uses in each customer category. In other words, the DSS Model checks that social norms from end studies on water use behavior (e.g., for flushes per person per day) are not exceeded.

The DSS Model evaluates conservation measures using benefit cost analysis with the present value of the cost of water saved ($/Acre-Foot). Benefits are based on savings in water and wastewater facility operations and maintenance (O&M). The figure below illustrates the process for forecasting conservation water savings, including the impacts of fixture replacement due to plumbing codes and standards already in place.

The DSS Model has been used for practical applications of conservation planning in over 230 service areas representing 20 million people including extensive efforts nationally in California, Colorado, Hawaii, Idaho, Utah, Georgia, Florida, North Carolina, Oregon, Texas, Ohio, and internationally in Australia, New Zealand and Canada.



DSS Model Assumptions

The table below shows the key assumptions used in the DSS Model in determining projected demands with and without plumbing codes. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of estimated real water losses.

***Table B-1** List of Key Assumptions*

Parameter	Model Input Value, Assumptions, and Key References
Water Demand Factor Year (Base Year)	
Residential End Uses	Key Reference: CA DWR Report "California Single Family Water Use Efficiency Study," (DeOreo, 2011 – Page 28, Figure 3: Comparison of household end-uses) and AWWARF Report “Residential End Uses of Water” (DeOreo, 1999 – Page 108, Table 5.9: Percentage of average indoor gallons per capita per day usage). Model Input Values are found in the “End Uses” section of the DSS Model on the “Breakdown” worksheet.
Non-Residential End Uses, %	Key Reference: AWWARF Report "Commercial and Institutional End Uses of Water” (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Model Input Values are found in the “End Uses” section of the DSS Model on the “Breakdown” worksheet.
Efficiency Residential Fixture Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Key Reference: California Urban Water Conservation Council Potential Best Management Practice Report "High Efficiency Plumbing Fixtures – Toilets and Urinals" (Koeller, 2005 – Page 42, Table 8 and Table 9: Residential toilet installation rates in California). Key Reference: Consortium for Efficient Energy (www.cee1.org). Model Input Values are found in the “Codes and Standards” green section of the DSS Model by customer category fixtures.
Water Savings for Fixtures, gal/capita/day	Key Reference: AWWARF Report “Residential End Uses of Water” (DeOreo, 1999 – Page 99, Table 5.5: Toilet flush volume, per capita use, and utilization, 12 study sites; Page 102, Table 5.6: Shower per capita use, volume, duration, and flow rate, 12 study sites) Key Reference: CA DWR Report "California Single Family Water Use Efficiency Study" (DeOreo, 2011 – Page 28, Figure 3: Comparison of household end-uses). WCWCD supplied data on costs and savings; professional judgment was made where no published data was available. Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Model Input Values are found in the “Codes and Standards” green section on the “Fixtures” worksheet of the DSS Model.
Non-Residential Fixture Efficiency Current Installation Rates	Key Reference: 2010 U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Assume commercial establishments built at same rate as housing, plus natural replacement. Model Input Values are found in the “Codes and Standards” green section of the DSS Model by customer category fixtures.

Parameter	Model Input Value, Assumptions, and Key References
Residential Frequency of Use Data, Toilets, Showers, Faucets, Washers, Uses/user/day	Key Reference: Falls within ranges in AWWARF Report "Residential End Uses of Water" (DeOreo, 1999 – Page 99, Table 5.5: Toilet flush volume, per capita use, and utilization, 12 study sites, Page 102, Table 5.6: Shower per capita use, volume, duration, and flow rate, 12 study sites). Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model and confirmed in each "Service Area Calibration End Use" worksheet by customer category.
Non-Residential Frequency of Use Data, Toilets, Urinals, and Faucets, Uses/user/day	Key References: Estimated based on AWWARF Report "Commercial and Institutional End Uses of Water" (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Based on three studies of office buildings in which the numbers varied from 2.0 to 3.45 toilet flushes per employee per day: Darell Rogers cited in Schultz Communications (1999); Konen Plumbing Engineer July/August 1986); and Eva Opitz cited in PMCL (1996). Fixture uses over a 5-day work week are prorated to 7 days. Non-residential 0.5gpm faucet standards per Table 2-A. Water Consumption by Water-Using Plumbing Products and Appliances - 1980-2012. PERC Phase 1 Report. Plumbing Efficiency Research Coalition. 2013. http://www.map-testing.com/content/info/menu/perc.html Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model, and confirmed in each "Service Area Calibration End Use" worksheet by customer category.
Natural Replacement Rate of Fixtures (% per year)	Residential Toilets 2% (1.28 gpf and lower), 3% (1.6 gpf toilets), 4% (3.5 gpf and higher toilets)
	Non-Residential Toilets 2% (1.6 gpf and lower), 3% (3.5 gpf and higher toilets)
	Residential Showers 4% (corresponds to 25-year life of a new fixture)
	Residential Clothes Washers 10% (based on 10-year washer life). Key References: "Residential End Uses of Water" (DeOreo, 1999) and "Bern Clothes Washer Study, Final Report" (Oak Ridge National Laboratory, 1998).
	Residential and Non-Residential Faucets 10%
	Model Input Value is found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model.
Residential Future Water Use	Increases Based on Population Growth and Demographic Forecast
Non-Residential Future Water Use	Increases Based on Employment Growth and Demographic Forecast

The DSS Model forecasts service area water fixture use. In the codes and standards part of the DSS Model, specific fixture end use type (point of use fixture or appliance), average water use, and lifetime are compiled. Additionally, state and national plumbing codes and appliance standards for toilets, urinals, showers, and clothes washers are modeled by customer category. These fixtures and plumbing codes can be added to, edited, or deleted by the user. This yields two demand forecasts: 1) with plumbing codes, and 2) without plumbing codes.

The demand projections reflect average water use under average weather conditions and **do NOT** reflect drier and hotter drought conditions. Likewise, climate change (which might alter weather patterns), increased or decreased rainfall, and possible increased irrigation demand in the spring and fall (due to a warmer climate) have **NOT** been addressed in this analysis.

Plumbing code measures are independent of any conservation program; they are based on customers following applicable current local, state and federal laws, building codes, and ordinances.

Plumbing Codes and Legislation

The DSS Model incorporates the following items as a "code" meaning that the savings are assumed to occur and are therefore "passive" savings.

- National Plumbing Code
- CALGreen
- AB 715
- AB 407
- CA Code of Regulations Title 20 Sections 1601-1608 2015 Appliance Efficiency Rulemaking New Standards

National Plumbing Code

The Federal Energy Policy Act of 1992, as amended in 2005, mandates that only fixtures meeting the following standards can be installed in new buildings:

- Toilet – 1.6 gal/flush maximum
- Urinals – 1.0 gal/flush maximum
- Showerhead – 2.5 gal/min at 80 psi
- Residential faucets – 2.2 gal/min at 60 psi
- Public restroom faucets – 0.5 gal/min at 60 psi
- Dishwashing pre-rinse spray valves – 1.6 gal/min at 60 psi

Replacement of fixtures in existing buildings is also governed by the Federal Energy Policy Act, which mandates that only devices with the specified level of efficiency (as shown above) can be sold as of 2006. The net result of the plumbing code is that new buildings will have more efficient fixtures and old inefficient fixtures will slowly be replaced with new, more efficient models. The national plumbing code is an important piece of legislation and must be carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code, the U.S. Department of Energy regulates appliances, such as residential clothes washers, further reducing indoor water demands. Regulations to make these appliances more energy efficient have driven manufactures to dramatically reduce the amount of water these machines use. Generally, front loading washing machines use 30-50% less water than conventional models (which are still available). In a typical analysis, the DSS Model forecasts a gradual transition to high efficiency clothes washers (using 12 gallons or less) so that by the year 2025 that will be the only type of machines available for purchase. In addition to the industry becoming more efficient, rebate programs for washers have been successful in encouraging customers to buy more water efficient models. Given that machines last about 10 years, eventually all machines on the market will be the more water efficient models. Energy Star washing machines have a water factor (WF) of 6.0 or less - the equivalent of using 3.1 cubic feet (or 23.2 gallons) of water per load. The maximum water factor for residential clothes washers under current federal standards is 9.5. The water factor equals the number of gallons used per cycle per cubic foot of capacity. Prior to year 2000, the water factor for a typical new residential clothes washer was about 12. In March 2015, the federal standard reduced the maximum water factor for top- and front-loading machines to 8.4 and 4.7, respectively. In 2018, the maximum water factor for top-loading machines will be further reduced to 6.5. For commercial washers, the maximum water factors were reduced in 2010 to 8.5 and 5.5 for top- and front-loading machines, respectively. Beginning in 2015, the maximum water factor for Energy Star certified washers was 3.7 for front-loading and 4.3 for top-loading machines. In 2011 the EPA estimated that Energy Star washers comprised more that 60% of the residential market and 30% of the commercial market. [Source: Energy Star Unit Shipment and Market Penetration Report Calendar year 2011 Summary. http://www.energystar.gov/ia/partners/downloads/unit_shipment_data/2011_USD_Summary_Report.pdf] A new Energy Star compliant washer uses about two-thirds less water per cycle than washers manufactured in the 1990s.

State Building Code – CALGreen

The CALGreen requirements effect all new development in the State of California after January 1, 2011. The new development requirements under CALGreen are listed in the following figure. The DSS Model includes the CALGreen requirements that effect all new development in the State of California after January 1, 2011. The DSS Model modeled water savings from the CALGreen building code by adding Multi-family and Commercial customer categories as appropriate to applicable conservation measures.

Table A-2. CALGreen Building Code Summary Table

CALGreen Building Code						
Building Class	**Component**	**Effective Date***	**Indoor Fixtures Included**	**Indoor Requirement**	**Landscaping & Irrigation Requirements**	**Are the Requirements Mandatory?**
Residential	Indoor	1/1/2011	Toilets, Showers, Lavatory & Kitchen Faucets, Urinals	Achieve 20% savings overall below baseline		Yes
	Outdoor	1/1/2011			Provide weather adjusting controllers	Yes
Non Residential	Indoor	1/1/2011	Submeter leased spaces	Only if building >50,000 sq. ft. & if leased space use >100 gpd		Yes
			Toilets, Showers, Lavatory & Kitchen Faucets, Wash Fountains, Metering Faucets, Urinals	Achieve 20% savings overall below baseline		Yes
	Outdoor	1/1/2011			Provide water budget	> 1,000 sq ft. landscaped area
					Separate meter	As per Local or DWR ordinance
					Prescriptive landscaping requirements	> 1,000 sq ft. landscaped area
					Weather adjusting irrigation controller	Yes

* Effective date is 7/1/2011 for toilets.

State Plumbing Code – AB 715

Plumbing codes for toilets, urinals, showerheads, and faucets were initially adopted by California in 1991, mandating the sale and use of ultra-low flush 1.6 gallon per flush (gpf) toilets (ULFTs), 1 gpf urinals, and low-flow showerheads and faucets. CCR Title 20 California State Law (AB 715) required High Efficiency Toilets and High Efficiency Urinals be exclusively sold in the state by 2014. Effective January 1, 2014, Assembly Bill (AB) 715 (enacted in 2007) required that toilets and urinals sold and installed in California cannot have flush ratings exceeding 1.28 and 0.5 gallons per flush, respectively.

California State Law – SB 407

SB 407 addresses plumbing fixture retrofits on resale or remodel. The DSS Model carefully takes into account the overlap with SB 407, the plumbing code (natural replacement), CALGreen, AB 715 and rebate programs (such as toilet rebates). SB 407 (enacted in 2009) requires that properties built prior to 1994 be fully retrofitted with water conserving fixtures by the year 2017 for single-family residential houses and 2019 for multi-family and commercial properties. SB 407 program length is variable and continues until all the older high flush toilets have been replaced the service area. The number of accounts with high flow fixtures is tracked to make sure that the situation of replacing more high flow fixtures than actually exist does not occur. SB 837 (enacted in 2011) requires that sellers of real property disclose on their Real Estate Transfer Disclosure Statement whether their property complies with these requirements. Additionally, SB 407 conditions issuance of building permits for major improvements and renovations upon retrofit of non-compliant plumbing fixtures. Each of these laws is intended to accelerate the replacement of older, low efficiency plumbing fixtures, and ensure that only high-efficiency fixtures are installed in new residential and commercial buildings.

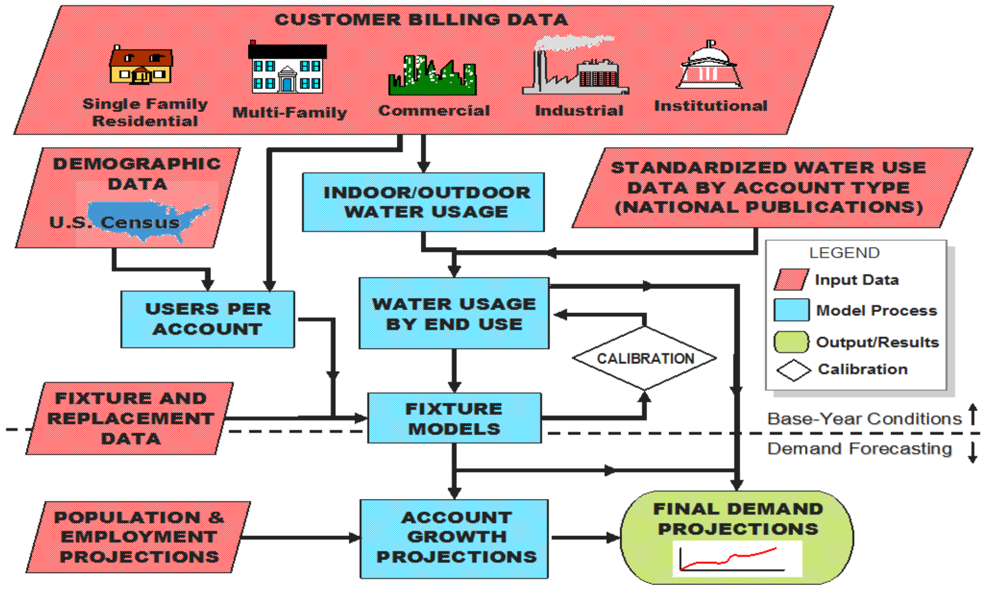
CA Code of Regulations Title 20 Sections 1601-1608

The California Energy Commission California Code of Regulations Title 20 Sections 1601-1608 "2015 Appliance Efficiency Rulemaking New Standards" applies to the following new appliances, if they are sold in California: showerheads, lavatory faucets, kitchen faucets, metering faucets, replacement aerators, wash fountains, tub spout diverters, public lavatory faucets, commercial pre-rinse spray valves, urinals, and toilets. The DSS Model accounts for plumbing code savings due to these standards effects on showerheads, faucets and aerators, urinals, and toilets.

- Showerheads: July 2016: 2.0 gpm; July 2018: 1.8 gpm
- Wall Mounted Urinals: 2016: 0.125 (pint) gpf
- Lavatory Faucets and Aerator: January 2016: 1.2 gpm at 60 psi
- Kitchen Faucets and Aerator: January 2016: 1.8 gpm with optional temporary flow of 2.2 gpm at 60 psi
- Public Lavatory Faucets: January 2016: 0.5 gpm at 60 psi
- Toilets: 1.28 gpf

The following figure conceptually describes how plumbing codes are incorporated into the flow of information in the DSS Model.

Figure A-1 DSS Model Overview Used to Make Potable Water Demand Projections



DSS Model Fixture Replacement

The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example, currently toilets can be purchased that flush at a rate of 0.8 gallons per flush (gpf), 1.0 gallon per flush or 1.28 gallons per flush. The 1.6 gpf and higher gallons per flush toilets still exist but can no longer be purchased in California. Therefore, they cannot be used for replacement or new installation of a toilet. So, the DSS Model utilizes a fixture replacement table to decide what type of fixture should be installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage, as shown in the following figure. A value of 100% would indicate that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type. The DSS Model contains a pair of replacement tables for each fixture type and customer category combination (i.e., Residential Single Family toilets, Residential Multifamily toilets, Commercial toilets, Residential clothes washing machines, Commercial washing machines, etc.).

In the following example, the DSS Model includes the effects of the Federal Policy Act and AB 715 on each toilet fixture type. This DSS Model feature determines the "saturation" of 1.6 gpf toilets as the Federal Policy Act was in effect from 1992-2014 for 1.6 gpf toilet replacements.

Figure A-2. Example Toilet Replacement Percentages by Type of Toilet

Replacement Appliance Market Shares					
Year	High Use Toilet Residential	1.6 gpf ULFT Residential	1.28 gpf HET Residential	<1.0 gpf Toilet Residential	Total
2015	0%	0%	100%	0%	100%
2020	0%	0%	90%	10%	100%
2025	0%	0%	75%	25%	100%
2030	0%	0%	65%	35%	100%
2040	0%	0%	50%	50%	100%

New Appliance Market Shares					
Year	High Use Toilet Residential	1.6 gpf ULFT Residential	1.28 gpf HET Residential	<1.0 gpf Toilet Residential	Total
2015	0%	0%	100%	0%	100%
2020	0%	0%	90%	10%	100%
2025	0%	0%	75%	25%	100%
2030	0%	0%	65%	35%	100%
2040	0%	0%	50%	50%	100%

1.3.1 DSS Model Initial Fixture Proportions

The DSS Model also needs a place to start when it comes to fixture replacement. It needs to know what the initial proportions (or percentages) of each type of fixture that is currently installed (i.e., fixture saturation rate) in the modeled service area for each customer class.

The following figure presents an example of the initial proportions determined for residential toilets in the year 2015. In the following example, the model time period started in 2015. Census data shows the age of houses in the service area, including the total number of homes built between 1992 when 1.6 gallon per flush toilets where required to be installed and 2014 when 1.28 gpf were required. Then an average natural replacement rate (rate of broken or remodeled toilet) of 4% per year for higher flush volume toilets is assumed. A replacement rate is calculated due to a rebate program that was raising the replacement rate of toilets. This gives the initial proportions of each toilet type. The following figure shows an example of a toilet fixture model and how it incorporates the changes from each of these legislative items. There are similar fixture models for showers, faucets, clothes washers, and urinals. In the DSS Model there is one fixture model for each of the following categories:

- Single family toilets
- Multifamily toilets
- Commercial toilets
- Commercial urinals
- Single family showers
- Multifamily showers
- Single family clothes washers
- Multifamily clothes washers
- Single family faucets
- Multifamily faucets
- Commercial faucets

Figure A-3. Example Residential Toilet Initial Proportions from Fixture Analysis used for DSS Fixture Model

Fixture Model:	**Multifamily**		***Toilets***								
Appliance Data									**Comments**	**Replacement Data**	
Fixture Type	Volume per Use (Gallons)[1]	Proportion of Homes by Age[2]	Net Increase due to 1.6 Replacement	Net Increase due to 1.28 Replacement	Net Increase due to 1.6 Rebate Program[3]	Net Increase due to 1.28 Rebate Program[3]	Net Increase due to 1.0 Rebate Program[3]	Initial Proportions[4]		Fixture Type	Percent Annual Replacement[5]
1.0 gal/flush High Efficiency Toilets (HET)	1	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	1.9%	1.9% as these toilets are not yet prelevant.	1.0 gal/flush High Efficiency Toilets (HET)	2.0%
1.28 gal/flush High Efficiency Toilets (HET)	1.3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0% as these toilets were not very prelevant in the year 2010.	1.28 gal/flush High Efficiency Toilets (HET)	2.0%
1.6 gal/flush Ultra Low Flow Toilets (ULFT)	1.8	33.0%	37.4%	0.0%	0.0%	0.0%	-1.3%	69.1%	33% new homes since 1990 + 37.5% natural replacement +15% retrofit program	1.6 gal/flush Ultra Low Flow Toilets (ULFT)	3.0%
High Flush and 3.5	3.5	67.0%	-37.4%	0.0%	0.0%	0.0%	-0.6%	29.0%	Remainder	High Flush and 3.5 gal/flush	4.0%

NOTES:
1a. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.
1b. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.
2. Assume homes constructed after 1992 installed ULFTs.
3. Net change due to rebate program is based on historical active conservation activity.
4. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and the rebate program minus the "free rider effect."
5a. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they where required.
5b. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.

These initial proportions, determined in the fixture model and found in the background water use data analysis workbook, are then entered into the DSS Model for each fixture's "Codes and Standards" worksheet. A screenshot of the single family toilet codes and standards worksheet is shown in the following figure. Most DSS Models include fixture models for SF and MF toilets, showers, faucets and clothes washers, and commercial toilets, faucets, and urinals.

Figure A-4.* *Example Residential Toilet Fixture Screenshot from DSS Model

Single Family_Toilets		
Single Family_Toilets	**General**	
	Measure Category	Default Plumbing Code
	Start Year	2015
	Description	The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at <1.0 gpf and 1.28 gallons per flush. The higher flush toilets (1.6 gpf and 3.5gpf) still exist but no longer can be purchased in California and cannot therefore be used for a replacement or new installation. The DSS Model utilizes a fixture replacement table to decide what type of toilet is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type. The DSS Model combines the effects of the following for the toilet fixture type: • Federal Policy Act: Determines the "saturation" of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements. • Cal Green: Determines that all "new appliance market share" toilets in "new" development will be 1.28 gpf. The year 2012 was selected for the model input as the toilet portion of the code did not go into effect until July 1, 2011 and it also takes a while to get a permit, build the facility or residence, and have the toilets functioning with the building occupied, such that the savings would not actually occur until the year 2012 rather than the year 2011. • AB 715: Determines that the "replacement appliance market" and "new appliance market" toilets will all be 1.28 gpf toilets. An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture.
Categories	Comments	1. Volumes-per-use are based on average flush volumes for age of toilet. 1.6 gpf toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf. 2. Initial proportions of fixtures installed in homes are based on the age of homes as provided in recent Census data. 3. Assume homes constructed after 1992 installed ULFTs. 4. Initial proportions consider the net change due to rebate program based on historical active conservation activity. 5. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." 6. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 3.0% for medium efficiency fixtures and 4.0% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 3.0% corresponds with a 33 year fixture life. 4% corresponds with 25 year fixture life.
	Customer Category	Single Family Residential
	End Use	Toilets
	Effected Fixtures	
	High Use Toilet Residential	☑
	1.6 gpf ULFT Residential	☑
	1.28 gpf HET Residential	☑
	<1.0 gpf Toilet Residential	☑
	<1.0 gpf Toilet Non-Residential	☐
	1.28 gpf HET Non-Residential	☐
	1.6 gpf ULFT Non-Residential	☐
	High Use Toilet Non-Residential	☐
	Initial Fixture Proportions	
	High Use Toilet Residential	29.1%
	1.6 gpf ULFT Residential	69.7%
	1.28 gpf HET Residential	0.9%
	<1.0 gpf Toilet Residential	0.3%
	Total	100.0%

DSS Model Fixture Replacement Rates

An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling, or other reason. To do this, the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, high flush toilets have a replacement rate value of 4%. Each year the number of remaining accounts with old toilets is calculated as 0.96 times the prior year's value. This value can be modified by the user for any fixture as shown in the figure below.

Also included in the following figure are example fixture efficiencies, which can be adjusted to any desired level based on service area characteristics. MWM can update data on efficiency levels found in the field and the California Single Family Water Use Efficiency Study (DeOreo, 2011) or other recent information related to fixture saturation rates.

Figure A-5. Example Future Replacement Rates of Fixtures from DSS Model

Fixture Name	End Use	Average Water Use	Units	Fixture Life (yrs)	Replacement Rate
High Use Toilet Residential	Toilets	3.50	gpf	25	4.0%
1.6 gpf ULFT Residential	Toilets	1.80	gpf	33	3.0%
1.28 gpf HET Residential	Toilets	1.30	gpf	50	2.0%
<1.0 gpf Toilet Residential	Toilets	1.00	gpf	50	2.0%
<1.0 gpf Toilet Non-Residential	Toilets	1.00	gpf	50	2.0%
High Use Urinal	Urinals	3.00	gpf	40	2.5%
1 gpf Urinal	Urinals	1.00	gpf	50	2.0%
0.5 gpf Urinal	Urinals	0.50	gpf	50	2.0%
Quart Urinal	Urinals	0.25	gpf	50	2.0%
Pint Urinal	Urinals	0.13	gpf	50	2.0%
Waterless Urinal	Urinals	0.00	gpf	50	2.0%
High Flow > 3 gpm	Showers	23.49	gal per use	25	4.0%
Low Flow 2.5 gpm	Showers	18.27	gal per use	25	4.0%
High Efficiency 2 gpm	Showers	13.92	gal per use	25	4.0%
High Efficiency 1.8 gpm	Showers	12.53	gal per use	25	4.0%
High Efficiency 1.5 gpm	Showers	10.44	gal per use	25	4.0%
Efficient Front Loader	Clothes Washers	13.00	gal per use	10	10.0%
Medium Efficient Front Loader	Clothes Washers	19.00	gal per use	10	10.0%
Top Loader	Clothes Washers	34.00	gal per use	10	10.0%
Ultra High Efficiency 1.0 gpm	Showers	6.96	gal per use	25	4.0%
1.28 gpf HET Non-Residential	Toilets	1.30	gpf	50	2.0%
1.6 gpf ULFT Non-Residential	Toilets	1.80	gpf	50	2.0%
High Use Toilet Non-Residential	Toilets	3.50	gpf	33	3.0%
1.0 gpm (Lavatory) - Residential Faucet	Faucets	0.62	gal per use	10	10.0%
1.2 gpm (Lavatory) - Residential Faucet	Faucets	0.74	gal per use	10	10.0%
1.8 gpm (Kitchen) - Residential Faucet	Faucets	1.80	gal per use	10	10.0%
2.2 gpm (Lavatory and Kitchen) - Residential Faucet	Faucets	1.36	gal per use	10	10.0%
2.5 gpm (Lavatory and Kitchen) - Residential Faucet	Faucets	1.54	gal per use	10	10.0%
>2.5 gpm - Residential Faucet	Faucets	2.16	gal per use	10	10.0%
1.8 gpm (Kitchen) - Non-Residential Faucet	Faucets	1.80	gal per use	10	10.0%
0.5 gpm (Public Lavatory) - Non-Residential Faucet	Faucets	0.13	gal per use	10	10.0%
2.2 gpm (Lavatory and Kitchen) - Non-Residential Faucet	Faucets	1.36	gal per use	10	10.0%
2.5 gpm (Lavatory and Kitchen) - Non-Residential Faucet	Faucets	1.54	gal per use	10	10.0%
>2.5 gpm - Non-Residential Faucet	Faucets	2.16	gal per use	10	10.0%

DSS Model End Uses

Indoor and outdoor residential and non-residential end use breakdowns can be found in the "End Uses" section of the DSS Model on the "Breakdown" worksheet. A screenshot example of this worksheet is shown in the following figure. The sources of these values are: 1) "California Single Family Water Use Efficiency Study" (DeOreo, 2011); 2) "Residential End Uses of Water" (AWWARF/DeOreo, 1999, 2015 update pending); 3) "Commercial and Institutional End Uses of Water" (Dziegielewski, 2000); and 4) water agency supplied data on costs and savings.

Figure A-6. End Use Breakdown Example Screenshot

Breakdown

Breakdown

Indoor

End Use Name	SF	MF	COM	IND	INST	IRR	OTH
Toilets	16.0%	18.0%	16.5%	12.0%	18.0%		
Urinals			4.0%	3.0%	5.0%		
Faucets	21.0%	12.0%	13.0%	14.0%	14.0%		
Showers	24.0%	28.0%	8.0%	8.0%	8.0%		
Dishwashers	2.0%	5.0%	6.0%	6.0%	6.0%		
Clothes Washers	13.0%	16.5%	15.0%	15.0%	15.0%		
Process			23.0%	27.0%			
Kitchen Spray Rinse			5.0%	5.0%	5.0%		
Internal Leakage	7.0%	5.0%	9.5%	10.0%	10.0%		
Baths	2.5%	1.5%					
Other	14.5%	14.0%	0.0%	0.0%	19.0%		
Total	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%

Outdoor

End Use Name	SF	MF	COM	IND	INST	IRR	OTH
Irrigation	80.0%	83.0%	95.0%	95.0%	95.0%	95.0%	
Pools	1.0%	2.0%					
Wash Down	7.0%	4.0%					
Car Washing	7.0%	4.0%					
External Leakage	5.0%	7.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Outdoor							95.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

End use breakdown values will vary between different water agencies due to differing demographics of their service area population. Residential frequency of use information for toilets, showers, and washers as well as non-residential frequency of use of toilets and urinals is included in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model. It is then confirmed in each "Service Area Calibration End Use" worksheet. Calculated frequencies of use in uses/user/day for customer end uses are presented in each customer category's "Service Area Calibration End Use" worksheet and compared to an industry-accepted use range based on AWWARF's residential, commercial and institutional end use reports mentioned previously. An example of this calibration sheet is shown in the screenshot in the figure below.

Figure A-7. ***Single Family End Use Breakdown and Fixture Use Frequency Example Screenshot***

Single Family

Single Family

End Use	Use Percentage	Uses/User/Day	Lower	Upper	State	Fixture Model
Toilets	16.0%	4.76	4.5	5.6	Calibrated	Edit
Faucets	21.0%					
Showers	24.0%	0.73	0.6	0.9	Calibrated	Edit
Dishwashers	2.0%					
Clothes Washers	13.0%	0.32	0.3	0.42	Calibrated	Edit
Internal Leakage	7.0%					
Baths	2.5%					
Other	14.5%					
Total	100.0%					

APPENDIX F

WATER CONSERVATION ACT

OF 2009

California Water Code Division 6, Part 2.55.

Chapter 1. General Declarations and Policy

SECTION 10608-10608.8

10608. The Legislature finds and declares all of the following:

(a) Water is a public resource that the California Constitution protects against waste and unreasonable use.

(b) Growing population, climate change, and the need to protect and grow California's economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.

(c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.

(d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.

(e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.

(f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.

(g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.

(h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.

(i) Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.

10608.4. It is the intent of the Legislature, by the enactment of this part, to do all of the following:

(a) Require all water suppliers to increase the efficiency of use of this essential resource.

(b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.

(c) Measure increased efficiency of urban water use on a per capita basis.

(d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.

(e) Establish consistent water use efficiency planning and implementation standards for urban water suppliers and agricultural water suppliers.

(f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.

(g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.

(h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.

(i) Require implementation of specified efficient water management practices for agricultural water suppliers.

(j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.

(k) Advance regional water resources management.

10608.8. (a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.

(2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to

January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

(3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.

(b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.

(c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.

(d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

Chapter 2 Definitions

SECTION 10608.12

10608.12. Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) "Agricultural water supplier" means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the department.

(b) "Base daily per capita water use" means any of the following:

(1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

(c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.

(d) "Commercial water user" means a water user that provides or distributes a product or service.

(e) "Compliance daily per capita water use" means the gross water use during the final year of the reporting period, reported in gallons per capita per day.

(f) "Disadvantaged community" means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(g) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.

(2) The net volume of water that the urban retail water supplier places into long-term storage.

(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.

(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

(h) "Industrial water user" means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

(i) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(j) "Interim urban water use target" means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.

(k) "Locally cost effective" means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.

(l) "Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.

(m) "Recycled water" means recycled water, as defined in subdivision (n) of Section 13050, that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:

(1) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(A) Metered.

(B) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(C) Treated to a minimum tertiary level.

(D) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(2) For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water.

(n) "Regional water resources management" means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:

(1) The capture and reuse of stormwater or rainwater.

(2) The use of recycled water.

(3) The desalination of brackish groundwater.

(4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.

(o) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.

(p) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(q) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.

(r) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

Chapter 3 Urban Retail Water Suppliers

SECTION 10608.16-10608.44

10608.16.(a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

(b) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

10608.20.(a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

(2) It is the intent of the Legislature that the urban water use targets described in paragraph (1) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

(b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

(2) The per capita daily water use that is estimated using the sum of the following performance standards:

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

(c) If the department adopts a regulation pursuant to paragraph (4) of subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

(d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.

(e) An urban retail water supplier shall include in its urban water management plan due in 2010 pursuant to Part 2.6 (commencing with Section 10610) the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

(g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

(h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:

(A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.

(B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.

(2) The department shall post the methodologies and criteria developed pursuant to this subdivision on its Internet Web site, and make written copies available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.

(i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with subdivision (l) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the

Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

(j) (1) An urban retail water supplier is granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow the use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.

(2) An urban wholesale water supplier whose urban water management plan prepared pursuant to Part 2.6 (commencing with Section 10610) was due and not submitted in 2010 is granted an extension to July 1, 2011, to permit coordination between an urban wholesale water supplier and urban retail water suppliers.

10608.22. Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph(3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

10608.24.(a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

(b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

(c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.

(d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.
(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in

paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

(e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

(f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.

(2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

10608.26.(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

(b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.

(c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the conservation of that military installation under federal Executive Order 13514.

(d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

(2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

10608.28.(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

10608.32. All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

10608.36. Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

10608.40. Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

10608.42.(a) The department shall review the 2015 urban water management plans and report to the Legislature by July 1, 2017, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

(b) A report to be submitted pursuant to subdivision (a) shall be submitted in compliance with Section 9795 of the Government Code.

10608.43. The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

(a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.

(b) Evaluation of water demands for manufacturing processes, goods, and cooling.

(c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.

(d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.

(e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

10608.44. Each state agency shall reduce water use at facilities it operates to support urban retail water suppliers in meeting the target identified in Section 10608.16.

Chapter 4 Agricultural Water Suppliers

SECTION 10608.48

10608.48.(a) On or before July 31, 2012, an agricultural water supplier shall implement efficient water management practices pursuant to subdivisions (b) and (c).

(b) Agricultural water suppliers shall implement all of the following critical efficient management practices:

(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).

(2) Adopt a pricing structure for water customers based at least in part on quantity delivered.

(c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:

(1) Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.

(2) Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils.

(3) Facilitate the financing of capital improvements for on-farm irrigation systems.

(4) Implement an incentive pricing structure that promotes one or more of the following goals:

(A) More efficient water use at the farm level.

(B) Conjunctive use of groundwater.

(C) Appropriate increase of groundwater recharge.

(D) Reduction in problem drainage.

(E) Improved management of environmental resources.

(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.

(5) Expand line or pipe distribution systems, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.

(6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits.

(7) Construct and operate supplier spill and tailwater recovery systems.

(8) Increase planned conjunctive use of surface water and groundwater within the supplier service area.

(9) Automate canal control structures.

(10) Facilitate or promote customer pump testing and evaluation.

(11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.

(12) Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:

(A) On-farm irrigation and drainage system evaluations.

(B) Normal year and real-time irrigation scheduling and crop evapotranspiration information.

(C) Surface water, groundwater, and drainage water quantity and quality data.

(D) Agricultural water management educational programs and materials for farmers, staff, and the public.

(13) Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.

(14) Evaluate and improve the efficiencies of the supplier's pumps.

(d) Agricultural water suppliers shall include in the agricultural water management plans required pursuant to Part 2.8 (commencing with Section 10800) a report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.

(e) The data shall be reported using a standardized form developed pursuant to Section 10608.52.

(f) An agricultural water supplier may meet the requirements of subdivisions (d) and (e) by submitting to the department a water conservation plan submitted to the United States Bureau of Reclamation that meets the requirements described in Section 10828.

(g) On or before December 31, 2013, December 31, 2016, and December 31, 2021, the department, in consultation with the board, shall submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented and an assessment of the manner in which the implementation of those efficient water management practices has affected and will affect agricultural operations, including estimated water use efficiency improvements, if any.

(h) The department may update the efficient water management practices required pursuant to subdivision (c), in consultation with the Agricultural Water Management Council, the United States Bureau of Reclamation, and the board. All efficient water management practices for agricultural water use pursuant to this chapter shall be adopted or revised by the department only after the department conducts public hearings to allow participation of the diverse geographical areas and interests of the state.

(i) (1) The department shall adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirement in paragraph (1) of subdivision (b).

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

Chapter 5 Sustainable Water Management

Section 10608.50

10608.50.(a) The department, in consultation with the board, shall promote implementation of regional water resources management practices through increased incentives and removal of barriers consistent with state and federal law. Potential changes may include, but are not limited to, all of the following:

(1) Revisions to the requirements for urban and agricultural water management plans.

(2) Revisions to the requirements for integrated regional water management plans.

(3) Revisions to the eligibility for state water management grants and loans.

(4) Revisions to state or local permitting requirements that increase water supply opportunities, but do not weaken water quality protection under state and federal law.

(5) Increased funding for research, feasibility studies, and project construction.

(6) Expanding technical and educational support for local land use and water management agencies.

(b) No later than January 1, 2011, and updated as part of the California Water Plan, the department, in consultation with the board, and with public input, shall propose new statewide targets, or review and update existing statewide targets, for regional water resources management practices, including, but not limited to, recycled water, brackish groundwater desalination, and infiltration and direct use of urban stormwater runoff.

Chapter 6 Standardized Data Collection

SECTION 10608.52

10608.52.(a) The department, in consultation with the board, the California Bay-Delta Authority or its successor agency, the State Department of Public Health, and the Public Utilities Commission, shall develop a single standardized water use reporting form to meet the water use information needs of each agency, including the needs of urban water suppliers that elect to determine and report progress toward achieving targets on a regional basis as provided in subdivision (a) of Section 10608.28.

(b) At a minimum, the form shall be developed to accommodate information sufficient to assess an urban water supplier's compliance with conservation targets pursuant to Section 10608.24 and an agricultural water supplier's compliance with implementation of efficient water management practices pursuant to subdivision (a) of Section 10608.48. The form shall accommodate reporting by urban water suppliers on an individual or regional basis as provided in subdivision (a) of Section 10608.28.

Chapter 7 Funding Provisions

Section 10608.56-10608.60

10608.56.(a) On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

(b) On and after July 1, 2013, an agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

(c) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions. The supplier may request grant or loan funds to achieve the per capita reductions to the extent the request is consistent with the eligibility requirements applicable to the water funds.

(d) Notwithstanding subdivision (b), the department shall determine that an agricultural water supplier is eligible for a water grant or loan even though the supplier is not implementing all of the efficient water management practices described in Section 10608.48, if the agricultural water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the efficient water management practices. The supplier may request grant or loan funds to implement the efficient water management practices to the extent the request is consistent with the eligibility requirements applicable to the water funds.

(e) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community.

(f) The department shall not deny eligibility to an urban retail water supplier or agricultural water supplier in compliance with the requirements of this part and Part 2.8 (commencing with Section 10800), that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the requirements of this part or Part 2.8 (commencing with Section 10800).

10608.60.(a) It is the intent of the Legislature that funds made available by Section 75026 of the Public Resources Code should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for grants to implement this part. In the allocation of funding, it is the intent of the Legislature that the department give consideration to disadvantaged communities to assist in implementing the requirements of this part.

(b) It is the intent of the Legislature that funds made available by Section 75041 of the Public Resources Code, should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for direct expenditures to implement this part.

Chapter 8 Quantifying Agricultural Water Use Efficiency

SECTION 10608.64

10608.64. The department, in consultation with the Agricultural Water Management Council, academic experts, and other stakeholders, shall develop a methodology for quantifying the efficiency of agricultural water use. Alternatives to be assessed shall include, but not be limited to, determination of efficiency levels based on crop type or irrigation system distribution uniformity. On or before December 31, 2011, the department shall report to the Legislature on a proposed methodology and a plan for implementation. The plan shall include the estimated implementation costs and the types of data needed to support the methodology. Nothing in this section authorizes the department to implement a methodology established pursuant to this section.

APPENDIX G

RECYCLED WATER FACILITY PLAN

CITY OF
HAYWARD
HEART OF THE BAY

City of Hayward
Recycled Water Facility Plan

State Water Resources Control Board Project # 07-465-550

Prepared by:

RMC
Water and Environment

Original: September 2009
Updated: September 2013

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List of Abbreviations

AFY	acre-feet per year
ccf	hundred cubic foot
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
City	City of Hayward
DHS	Department of Health Services
EIR	Environmental Impact Report
GIS	Geographical Information System
gpd	gallons per day
gpm	gallons per minute
HARD	Hayward Area Recreation and Park District
HUSD	Hayward Unified School District
mg/L	milligrams per liter
mgd	million gallons per day
MND	mitigated negative declaration
MPN	most probable number
NPDES	National Pollutant Discharge Elimination System
Plan	Facilities Plan
Project	Hayward Recycled Water Project
psi	pounds per square inch
RMC	RMC Water and Environment
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
Title 22	Title 22 California Code of Regulations
WPCF	Hayward Water Pollution Control Facility

Chapter 1 Introduction

This chapter includes background on the City of Hayward (City) and the Recycled Water Facility Plan (Plan), documentation of the goals and drivers for considering implementation of a Recycled Water Project (Project) in the City, discussion of the Plan objectives and approach, description of stakeholder involvement during the course of the Plan, and summary of the report organization.

1.1 Background

The City of Hayward is located in the San Francisco Bay Area in the southern portion of Alameda County. The City had approximately 146,000 residents in 2005. The City boundaries extend from the San Francisco Bay on the west to the East Bay hills on the east. **Figure 1-1** illustrates the project location.

Figure 1-1: Project Location

The City operates the City-owned utilities, including water and wastewater services, within the City boundaries.

In 1993, the City participated in the preparation of a Recycled Water Master Plan by East Bay Dischargers Authority (EBDA) to investigate potential recycled water projects.

In 2007, the City completed a Recycled Water Feasibility Study (RMC 2007), including preliminary market and recycled water supply assessment and evaluation of two conceptual alternatives to serve recycled water customers to assess overall feasibility of expanding the City's water supply portfolio to include recycled water.

As a result of the Feasibility Study, the City decided to prepare a Recycled Water Facility Plan (this Plan) for treatment and distribution facilities to assist the City in making informed decisions about the use of recycled water in Hayward.

1.2 Project Goals and Drivers

The primary objective of implementing a Recycled Water Project in the City would be to allow the City to maximize recycled water as a supplemental non-potable water source.

As further discussed in Chapter 2, there are several drivers for the need to develop a recycled water resource including:

- Expected growth in the City in both residential and industrial sectors
- Increases in SFPUC water charges and potential decreases in SFPUC water availability at current reliability levels
- Potential for increasingly stringent discharge requirements to the San Francisco Bay
- City's desire to evaluate more sustainable alternatives to using potable water for certain applications

In addition, Calpine is currently developing a power generation facility that would be located on the property adjacent to the City's Water Pollution Control Facility. Calpine is obligated to use tertiary treated recycled water at their power generation facility. Construction of the power generation facility is anticipated to start no later than September 2010 and the facility to be operational by June 2013. As of this writing, the City and Calpine are in the process of negotiating terms for the construction and operation of the treatment facilities necessary to produce tertiary recycled water sufficient for Calpine's needs. For the purposes of this Plan, it's assumed the City will be responsible for developing and operating tertiary treatment facilities at their existing Water Pollution Control Facility site. Calpine has indicated that if they are to construct and operate the tertiary facilities, they will agree to provide surplus tertiary treated recycled water back to the City for reuse.

1.3 Study Objectives and Approach

The objectives of this Plan are fourfold:

1. Refine the recycled water market assessment prepared as part of the Feasibility Study
2. Refine and evaluate the project alternatives identified in the Feasibility Study
3. Develop a Facility Plan for the recommended project, including target customers, planning-level facilities design criteria, and planning-level cost estimate.
4. Prepare an implementation plan for the recommended project, including implementation schedule, construction financing plan and preliminary environmental checklist.

Technical activities performed by RMC for this Plan include market analysis, survey of customers, alternative development and evaluation, environmental checklist, and construction financing plan. The details of these services, including specific approach, are presented and discussed in Chapter 2 through 5.

1.4 Stakeholder Involvement

During the preparation of this Plan, stakeholder involvement and outreach focused on potential customers through customer survey of industrial and commercial customers and individual meetings with the Hayward Unified School District (HUSD) and the Hayward Area Recreation and Park District (HARD). Further discussion on their involvement can be found in Chapter 3 - Market Assessment and in Appendix A -HARD and HUSD Meeting Notes. The City staff has also been keeping the City elected officials appraised of the Plan and regularly communicating with Calpine.

Outreach to the general public beyond the public forum provided by the City Council was not initiated as part of this Plan for two main reasons:

- Most of the potential use for recycled water considered in this Plan is for irrigation of public spaces and recycled water for irrigation of public spaces has become more common and broadly accepted in California; and
- The City has a successful history of recycled water use at the Skywest golf course.

Should the City decide to move forward with a recycled water project, it would initiate more extensive public involvement – at a minimum, through the environmental review process.

1.5 Report Content

- **Chapter 1 – Introduction (this section).**
- **Chapter 2 – Study Area Characteristics**. This section includes information on the service area, water supplies and wastewater treatment.
- **Chapter 3 – Market Assessment.** This section includes information on the market for recycled water in the City including estimates of customer demands, and water quality analysis.
- **Chapter 4 – Alternatives Assessment**. This section includes information on three recycled water project alternatives including customer base and cost estimates.
- **Chapter 5 – Recommended Project.** This section includes detailed information on the Recommended Project including benefits, implementation plan, and recycled water market assurances.

Chapter 2 Study Area Characteristics

This chapter includes additional background information on the City including characteristics of the City's study area, a discussion of water supply and wastewater management issues facing the City, which prompted the need to evaluate recycled water use, and a description of existing recycled water uses in the City.

2.1 Study Area Setting

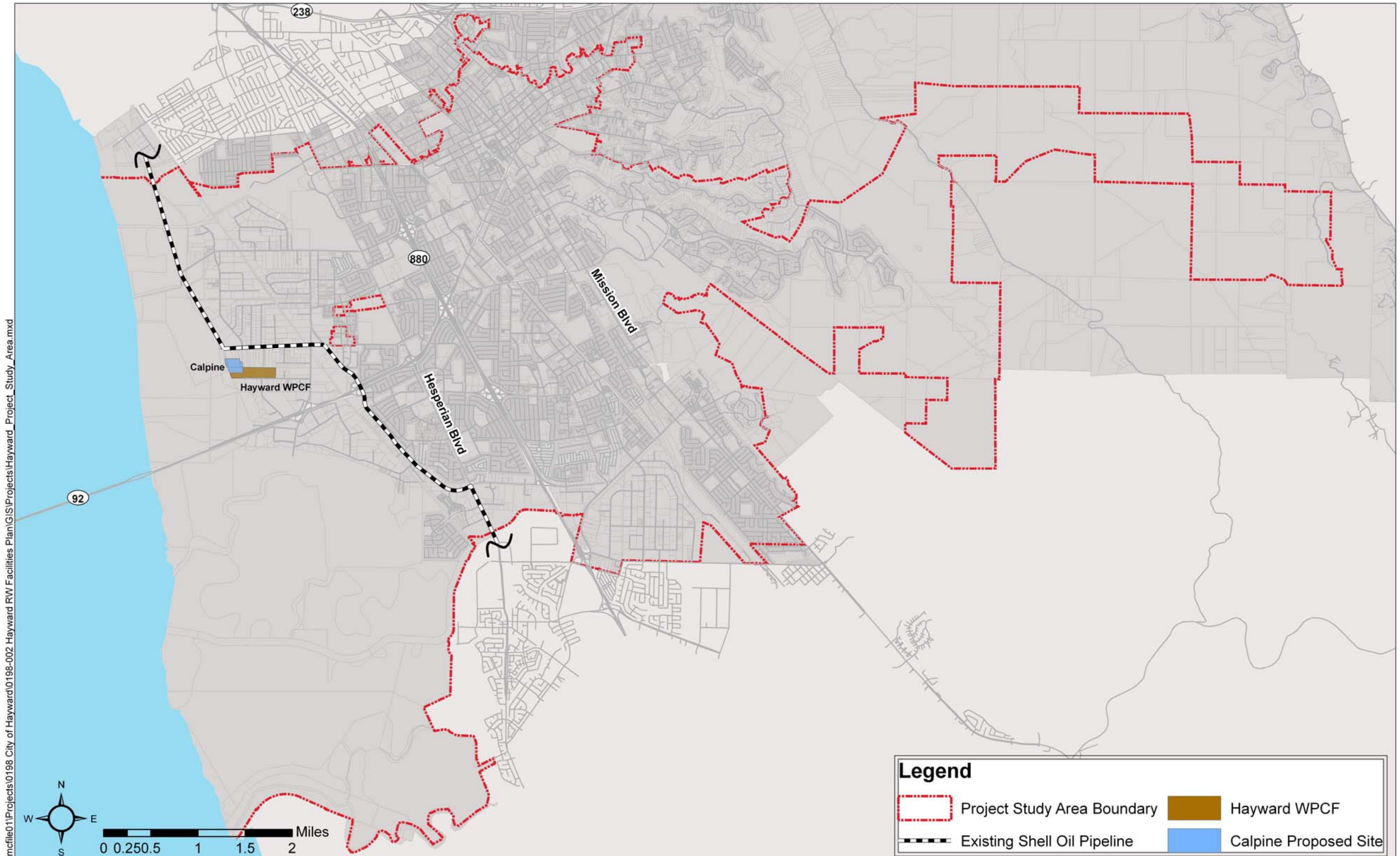
The study area for this Plan is defined as the City in its entirety. The City covers approximately 61 square miles including a large portion of tidal wetlands on the San Francisco Bay shoreline. **Figure 2-1** illustrates the project study area boundary.

The City has a Mediterranean coastal climate, with mild dry summers and cool winters. Temperatures vary from average highs September of 73.5 degrees Fahrenheit (deg F) to average lows in January of 42 deg F. Rainfall averages 18 inches annually with most rain occurring between October and April.

There is a mixture of industrial parks, office parks, commercial areas, golf courses, recreational parks, residential areas, an airport, schools and open space throughout the City. The City has a large and diverse industrial section including food and beverage processors and high-technology manufacturing. Additionally, the City is home to two regional public post-secondary educational institutions - California State University – East Bay and Chabot Community College.

The City operates the City-owned utilities, including water distribution and wastewater collection and treatment services, within the City boundaries.

Figure 2-1: Project Study Area



Data Sources: City of Hayward, TerraServer, RMC Water and Environment

December 2008

2.2 Water Supply Management Issues

With increasing water demands forecasted over the next 20 years, the City's exclusive dependence on the SFPUC for water supplies raises several water supply management issues that recycled water could help address.

2.2.1 Water Demand

Per ABAG Projections 2007, the population in Hayward is expected to increase by 15.7% between 2008 and 2010. In addition to residential growth, the City targeting industrial economic growth in both information-based and traditional industries, with the latter contributing increased water demands in the future. **Table 2-1** summarizes the current and projected water demands in the City between 2005 and 2030. Values are shown as acre-foot per year (AFY).

Table 2-1: Current and Projected Water Demands

	2005	2010	2015	2020	2025	2030
Demand (AFY)	22,009	24,923	26,135	27,96	30,022	32,062

Source: UWMP, 2005

2.2.2 Water Supply

Since 1962, the City's sole source of potable water has been the City and County of San Francisco's regional system, operated by the San Francisco Public Utilities Commission (SFPUC). The SFPUC system supply is predominantly snowmelt from the Sierra Nevada Mountains, delivered through the Hetch Hetchy aqueducts.

The City also has five emergency groundwater wells located within City boundaries that can supply up to 13.6 mgd during short duration emergency use (UWMP 2005).

The City's dependence on SFPUC for potable water supplies leads to several potential issues that may be addressed or reduced by the use of recycled water in the City:

- **Water Supply Availability during Average Year.** Per the City's contract with SFPUC, the City has no cap on water supply usage from SFPUC. However, mounting pressure and competition for water supplied by SFPUC may put strain on SFPUC's ability to meet the City's demand. On October 30, 2008, SFPUC approved the Phased Water System Improvement Program (WSIP) Goals and Objectives and adopted the associated California Environmental Quality Act (CEQA) Findings. Per the PEIR on SFPUC WSIP (ESA+Orion 2008), SFPUC is planning on limiting average annual water deliveries supplied from its watersheds to 265 million gallons per day (mgd) at least through 2018, whereas the demand on the SFPUC regional water system by 2018 is projected to be 285 mgd. To bridge the 20 mgd gap, the SFPUC proposes development of 10 mgd of local conservation, recycled water, and groundwater projects within San Francisco and an additional 10 mgd of local conservation, recycled water, and groundwater projects within the overall San Francisco Bay service area. Three approaches are proposed to develop the 10 mgd of local conservation, recycled water, and groundwater projects within the overall San Francisco Bay service area:
    - The SFPUC, wholesale customers, and Bay Area Water Supply and Conservation Agency (BAWSCA) partner to develop an additional 10 mgd; or
    - BAWSCA and the wholesale customers develop an additional 10 mgd, independent of SFPUC; or
    - Individual wholesale customers develop 10 mgd on their own within their individual services areas.

BAWSCA and the wholesale customers are currently determining the best approach to develop the additional 10 mgd of local supply/conservation needed. Supplying recycled water in the City could potentially help meet the 10 mgd gap.

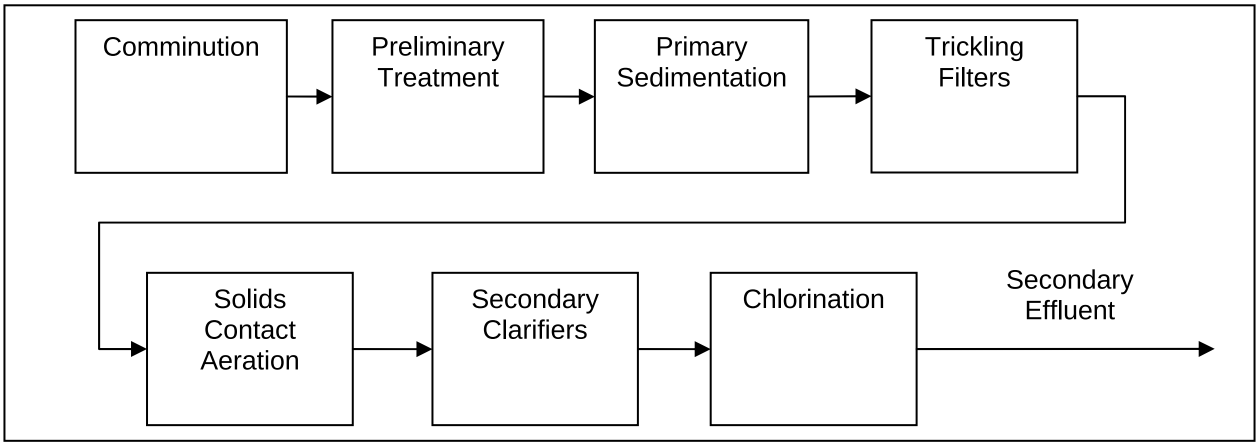
- **Water Supply Reliability during Periods of Drought.** The majority of SFPUC water supplies are surface water and susceptible to drought conditions. The City estimates that in the third year of a drought, the supplies from SFPUC could be reduced to 76% of normal. Supplying recycled water to non-potable demands would dampen drought impacts on potable water supply.
- **Water Supply Reliability during Service Disruptions.** The majority of SFPUC water supplies are piped in from outside the City's immediate area. The City's exclusive dependence on the SFPUC for potable water leaves the City in a vulnerable position to service disruptions and outages if an event (e.g. earthquake) damages the transmission system. To address this issue, SFPUC is in the midst of undertaking the WSIP to address reliability, and seismic protection in their system. In addition, recycled water would allow for the use of a local, reliable water supply for non-potable demands in the event of service disruptions.
- **Water Supply Cost.** SFPUC wholesale water currently costs an average of $1.43 per hundred cubic feet (ccf) or about $623 per acre-foot (AF). The City's potable water rates range between $2.15 and $3.12/ccf depending on water usage. The City anticipates increases in the cost of SFPUC water as the result of implementing the WSIP capital improvement projects. Reducing the need to purchase potable water for non-potable uses will lessen the impact to the City of the increasing SFPUC costs. Based on the most recent projections from SFPUC, the wholesale water cost will rise to $1,500/AF by 2016.

2.3 Wastewater Discharge Management Issues

The City owns and operates its own wastewater treatment facility, the Hayward Water Pollution Control Facility (WPCF), and is a member of EBDA. EBDA is a joint powers authority of five agencies that dispose of treated wastewater in the San Francisco Bay through a common deepwater outfall.

The Hayward WPCF is permitted to treat up to 16.5 mgd of wastewater with primary through advanced secondary treatment. This capacity will increase to 18.5 mgd after certain improvements to the WPCF, namely two new final clarifiers, have been constructed and placed in service. The WPCF utilizes primary clarification, a high-rate trickling filter, secondary clarification, and chlorination. The chlorine residual is removed within the EBDA system before disposal to San Francisco Bay. **Figure 2-2** illustrates the existing wastewater treatment process at the Hayward WPCF.

Figure 2-2: Existing Wastewater Treatment Process at the Hayward WPCF



Source: Adapted from NPDES Permit, 2000

The WPCF is regulated by an NPDES permit issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB). The NPDES permit is issued to EBDA. The WPCF currently meets all the NPDES permit requirements, however, the RWQCB has begun to set lower discharge limits for pollutants during permit renewal.

As a San Francisco Bay discharger, the WPCF may in the future be required to meet increased water quality restrictions for effluent discharges.

Implementation of a recycled water project as envisioned in this plan could aid in achieving future NPDES permit limits in two ways:

- By decreasing mass loading of regulated constituents to the San Francisco Bay through reduction of effluent flows being discharged to the Bay; or
- By decreasing both mass loading and concentration of certain regulated constituents should all effluent flow be treated to a tertiary level.

Implementation of a recycled water project as envisioned in this plan is not anticipated to have any negative effects on the receiving waters (deepwater outfall in San Francisco Bay).

2.4 Existing Recycled Water Uses

There are two existing recycled water customers within Hayward's city limits – the Skywest Golf Course operated by the HARD, which uses combined secondary treated effluent from the EBDA pipeline; and the Hayward Marsh operated by EBDA, Union Sanitary District and the East Bay Regional Parks District, which uses secondary treated effluent from Union Sanitary District. The golf course and marsh utilize 180 AFY and 3,475 AFY of secondary treated water, respectively (UWMP 2005).

The WPCF also has a small on-site treatment facility to produce recycled water for use at the WPCF (No. 3 Water).

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Chapter 3 Market Assessment

A preliminary recycled water market assessment was conducted as part of the Recycled Water Feasibility Study in 2007. The assessment consisted of three major tasks: preliminary demand assessment, preliminary water supply assessment, and preliminary water quality assessment.

For the purpose of this Plan, the preliminary recycled water market assessment needed to be refined as follows:

- **Confirm preliminary demand estimates and expand the potential user base to include other existing and future customers** – the Feasibility Study only considered the largest existing potable water customers. Other potential customers (existing and future) in the Study Area should be considered.
- **Confirm available quantities of recycled water** – the Feasibility Study made assumptions relative to availability of recycled water from Calpine and/or City-owned sources; these assumptions need to be confirmed based on latest discussions with Calpine.
- **Confirm the water quality assessment** – the Feasibility Study included a cursory water quality assessment based on typical water quality objectives for certain category of customers; this assessment should be refined based on direct input from potential customers, additional water quality data, and other considerations such as local soil types.
- **Identify any retrofit issues or other potential user concerns** – the Feasibility Study made assumptions about potential retrofit needs and potential user concerns (including water quality, retrofit costs) based on experience from other recycled water projects in the San Francisco Bay Area. This assessment should identify retrofit issues and potential concerns specific to this Project based on direct input from potential customers in the Study area.

This refined market assessment will form the basis for refining the recycled water project alternatives described in the Feasibility Study and updating the evaluation.

3.1 Potential User Base and Demand Assessment

3.1.1 Potential Uses & Customers

A list of potential uses for the City of Hayward was developed in the Feasibility Study based on recyclable water uses allowable under Title 22 of the California Code of Regulations. A preliminary database of potential recycled water customers based on the identified uses was developed in the Feasibility Study. The main potential uses and associated recycled water customers within the Study Area identified in the Feasibility Study are summarized in **Table 3-1**. The full database of customers is included in **Appendix B -Potential Recycled Water Customers.** No other uses other than those identified in the Feasibility Study were considered herein.

Table 3-1: Main Potential Uses & Recycled Water Customers

Allowable Uses [a]	Minimum Treatment Level	Applicable Uses within the Study Area	Potential Recycled Water Customers
Irrigation	Tertiary	Parks and Playgrounds	Parks and playgrounds under the jurisdiction of the Hayward Area Recreation and Park District (HARD).
Irrigation	Tertiary	School Yards	School yards under the jurisdiction of the Hayward Unified School District (HUSD) or private schools (e.g. Moreau Catholic High School).
Irrigation	Tertiary	Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	Landscaped areas at business parks, colleges and universities.
Irrigation	Disinfected Secondary	Restricted Access Golf Courses	Skywest Golf Course (managed by HARD) is already being served with recycled water from the EBDA pipeline. Additional golf courses within Hayward city limit (Mission Hills, managed by HARD, and Stonebrae, private).
Irrigation	Disinfected Secondary	Cemeteries	Cemeteries within Hayward city limit (e.g. Holy Sepulchre Cemetery).
Irrigation	Disinfected Secondary	Freeway Landscaping	Caltrans-owned landscaped parcels underneath freeway ramp.
Industrial/ Commercial	Tertiary	Industrial cooling or air conditioning involving a cooling tower, evaporative condenser, or mister	Industrial customers in the Top 90 Private Water Users.
Industrial/ Commercial	Tertiary	Commercial Laundries	Commercial laundry operators in the Top 90 Private Water Users.
Industrial/ Commercial	Tertiary	Automatic Commercial Car Washes	Commercial car washes in the Top 90 Private Water Users.
Industrial/ Commercial	Disinfected Secondary	Industrial cooling or air conditioning not involving a cooling tower, evaporative condenser, or mister	Industrial customers in the Top 90 Private Water Users.
Industrial/ Commercial	Disinfected Secondary	Industrial boiler feed	Industrial customers in the Top 90 Private Water Users.

Notes:
a. Per California Code of Regulations Title 22, Division 4, Chapter 3, Article 3, Sections 60303-60307

It is not practical to serve tertiary and disinfected secondary water to two separate sets of customers (except for Skywest Golf Course, which is already supplied with disinfected secondary from the EBDA pipeline). It is therefore assumed that tertiary treated water will be provided to all potential customers to maximize the potential recycled water market within the City.

3.1.2 Refinement of Potential Customers

As part of this Plan, the preliminary database was reviewed with the City to determine if there were additional existing and future recycled water customers within the identified uses listed in Table 3-1. The review approaches and conclusions are summarized in **Table 3-2**. Based on Table 3-2 conclusions, the list of potential customers developed in the Feasibility Study and included in Appendix B -Potential Recycled Water Customers was not modified.

Table 3-2: Other Potential Uses

Review Approach	Conclusions
Identification of additional existing commercial/industrial customers within a two-mile radius of the WPCF [a]	No additional significant commercial/industrial water customers were identified in consultation with the City of Hayward. However, it was noted in the review that there are small customers (e.g. businesses with greenscapes) along the pipe alignments that can be served without the need for changes to the Project definition.
Identification of potential customers associated with future redevelopment in the Study Area.	Although the 2005 Urban Water Management Plan identifies an increase in water demand associated with industry, no specific redevelopment projects were identified based on conversations with the City's Planning Department [b]. However, it was noted during Project development that the existing industrial area north of the Hayward WPCF along Whitesell Road could transition into an area for water-intensive industries that would be able to use recycled water in their operations. There was no basis for evaluating this potential recycled water demand but this information was used in the development of the pipeline alignment discussed in Chapter 4. It is recommended that future updates of the Facility Plan include information from the upcoming 2010 Urban Water Management Plan.

Notes:
a. Two-mile radius was selected to maximize the customer base closest to the WPCF while trying to avoid crossings of major roadways (e.g. Highway 880).
b. Conversations held by Marilyn Mosher with the Planning Department in May 2008.

3.1.3 Demand Estimate Methodologies

The methodologies listed below were used in the Feasibility Study to estimate recycled water demands based on available data and user type:

Method 1

- **Customers with Irrigation as primary potential recycled water use (with separate irrigation accounts)** – Demand for these customers was estimated based on the assumption that 100 percent of their 2006 water use as recorded on the separate irrigation meter could be converted to recycled water. As noted in the Feasibility Study, 2006 data were used – which was a relatively wet year. The demand might therefore be slightly underestimated but deemed appropriate for the Facility Plan.

Method 2

- **Customers without separate accounts to track indoor and outdoor water use** – Potential recycled water demand was derived from 2006 potable water usage by applying a conversion factor based on business code for each user. The list of business codes and corresponding conversion factors is included in the Feasibility Study. Conducting a customer survey was recommended as part of the Feasibility Study to confirm the conversion factor and potential recycled water demand, particularly for large customers.

Method 3

- **Stonebrae Golf Course** – Potential recycled water demand for the Stonebrae Golf Course was estimated based on peak month demand data for Stonebrae, provided by the City, as well as an average annual demand calculated based on the demand pattern for the another golf course in the City, Skywest Golf Course.

As part of this Facility Plan, the preliminary demand estimates associated with customers for which Method 2 was applied were refined as described below (Method 4). No refinements were made to the demand estimates associated with customers for which Method 1 and Method 3 were applied, as the estimates were considered fairly representative (Method 1), or because no new information was available (Method 3).

Method 4

- **Telephone Survey for Specific Existing, Large Water Customers -** A telephone survey was conducted for specific existing water customers for which Method 2 above was originally used. The customers that were contacted are listed in **Table 3-3**. The survey list was developed in collaboration with the City and includes fifteen potential recycled water customers located approximately within a 2-mile radius of the Hayward WPCF, with significant water use and the potential for utilizing recycled water for one of the following applications: landscape irrigation, industrial cooling, industrial boiler feed, or commercial laundries purposes. A copy of the telephone survey questions and survey results is provided in Appendix C -Customer Survey Results Summary.

Table 3-3: Customer Survey Contact List and Results Summary

ID	Customer Name	Business Type	Primary Use for Recycled Water	Prelim. Average Demand [a] (mgd)	Revised Planning Demand (mgd)	Revised Planning Demand (AFY)
1	Bottling Group LLC (Pepsi)	Beverage Manufacturing	Irrigation [d]	0.008	0.027	31
2	Berkeley Farms	Dairy Processing	Irrigation [d]	0.002	0.014	16
3	Kobe Precision	Wafer Products Reclamation	Industrial	-	0.002	2
4	Shasta Beverages	Beverage Manufacturing	Industrial	-	0.007	8
5	Rohm & Haas	Chemicals Water-based Paints Manufacturing	Industrial	0.02	0.02	22
7	Kaiser Medical Center	Hospital	Irrigation [d]	0.001	0.005	6
10	Cell Genesys	Biological Product Manufacturing	Industrial	0.002	0	0
12	St. Rose Hospital	Hospital	Irrigation [d]	0.003	0.003	4
14	Columbus Manufacturing	Food Manufacturing	Irrigation [d]	0.002	0.003	4
19	Henkel Adhesive Corp.	Adhesive Manufacturing	Industrial	0.003	0.006	7

26	Baxter Healthcare Corp.	Medical Equipment Manufacturing	Irrigation	0.004	0.004	5
28	Food Depot and United Catering	Food Product Manufacturing	Irrigation	-	0.002	3
29	Life Chiropractic College	Educational Institution	Industrial	0.003	0.003	3
30	SCA Packaging	Packaging Manufacturing	Industrial	0.003	0.001	2
37	Friendly Wash Coin Laundry [b]	Coin-Operated Laundromat	Industrial	0.009	0.0	0
38	Pentagon Industries	Semiconductor Manufacturing	Industrial	0.001	0.0	0
63	Gilllig Corp.	Bus Manufacturing	Industrial	0.004	0.001	1
65	Fairfield Inn and Suites	Hotel	Commercial	0.001	0.001	1
74	Novo Nordisk Delivery [c]	Medical Equipment Manufacturing	Industrial	0.002	0.0	0
			TOTAL [e]	**0.1**	0.1	114

Notes:
a. Preliminary estimates reported in the Feasibility Study.
b. Removed from survey list after determining that the use of recycled water is unsuitable for publicly accessible coin-operated laundries.
c. Removed from survey list due to ceasing of operations in June 2008
d. Overall primary potable water use at this site is industrial, but industrial recycled water use is precluded based on product or service type (e.g. food processing, public exposure).
e. Rounded to nearest 1 AFY or 0.1 mgd.

3.1.4 Demand Estimate

Table 3-4 summarizes the potential recycled water demand for three major categories of customers within the Study area. **Figure 3-1** shows the locations of potential recycled water customers in the City of Hayward and associated demand. The detailed list of potential customers, including user names, business code, recycled water use type, 2006 potable water use, potential recycled water demand (average and peak), and methodology used is attached in Appendix B -Potential Recycled Water Customers.

Table 3-4: Recycled Water Demand Estimate

Type of Use	No. of Customers [a]	Average Annual Demand (mgd)	Average Annual Demand (AFY)	Peak Month Demand (mgd)
Calpine	1	3.1	3,475	4.0
Irrigation	126	1.5	1,662	3.4
Industrial/Commercial	49	0.1	165	0.1
Total	176	4.7	5,302	7.6

Notes:
a. Customers with both irrigation and industrial uses were counted in each group.

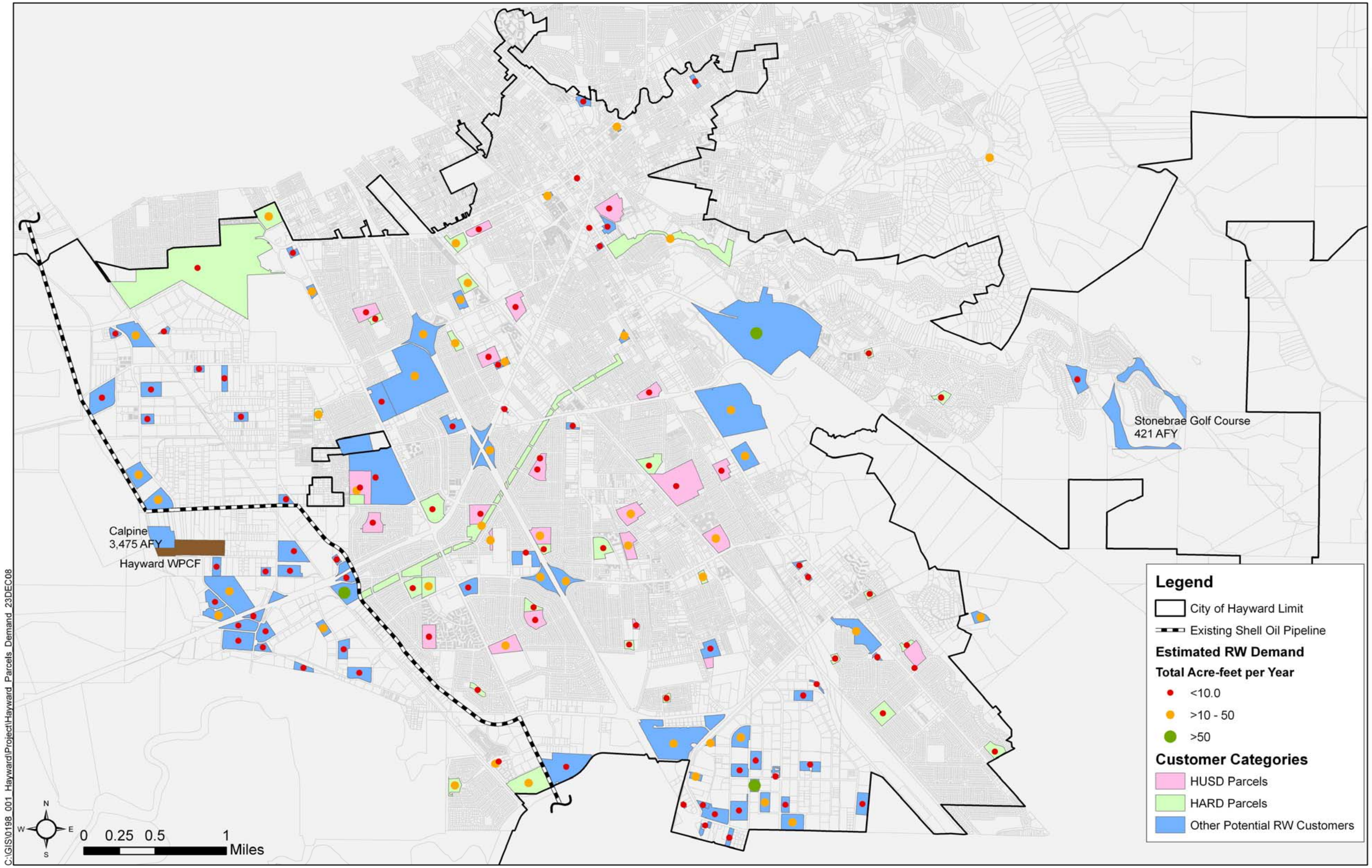
Average Annual Demand

- Average annual demand is the existing or potential average annual recycled water demand for each potential recycled water customer established based on methods 1, 3 or 4.

Peak Demand

- Peak monthly demand - A monthly peaking factor was applied to the average monthly flow to obtain the average daily flow for a peak month. Using data from City of Hayward bi-monthly irrigation meter water records, a monthly peaking factor was estimated at 2.3.
- Peak hourly demand – An hourly peaking factor was applied to the maximum month, average day peak to obtain the maximum month, average day, peak hour flow. A peaking factor of 3.0 was used for irrigation demand assuming an 8-hour irrigation period from 10pm to 6am. See Appendix B -Potential Recycled Water Customers for peak hour demand by customer.

Figure 3-1: Potential Recycled Water Customers and Demand Estimate



Source: City of Hayward, RMC Water and Enviroment

3.2 Recycled Water Supply Assessment

The WPCF does not currently produce tertiary treated water. This section provides information on the secondary treated water flows at the WPCF that correspond to the available flows for tertiary treatment. The information in this section was used in Chapter 4 and Chapter 5 to define tertiary treatment and storage facilities planning-level design criteria.

The recycled water supply assessment was completed by utilizing projected wastewater flows prepared by the City for their 2005 UWMP and actual 2006 effluent flows from the City.

The current and projected secondary-treated average dry weather wastewater flows (ADWF), which correspond to the total amount of water available for tertiary treatment, are shown in **Table 3-5.**

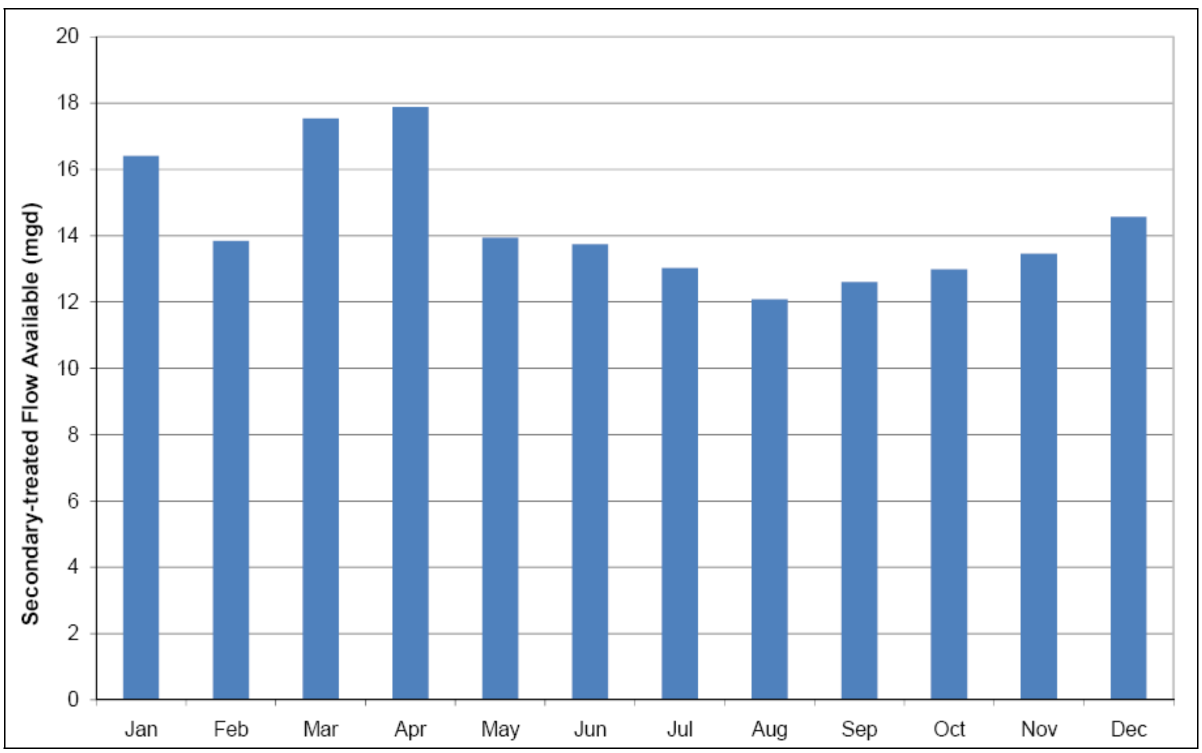
Table 3-5: Secondary-Treated Wastewater Flows Available for Tertiary Treatment

	Actual	Projected			
	2006	2010	2015	2020	2025
Permitted Capacity, ADWF (mgd)	16.5	16.5	18.5 [a]	18.5	18.5
Produced, ADWF (mgd) [b]	13.2	12.5	15.2	16.3	18.5

Notes:
a. The City plans to upgrade the WPCF to raise the permitted plant capacity from 16.5 to 18.5 mgd
b. Sources: 2005 UWMP, with updates by City based on 2008 ADWF.

Figure 3-2 shows the projected monthly availability of secondary-treated water supplies in Year 2010. The Year 2010 monthly variations in wastewater flows were apportioned from the Year 2006 monthly flows provided by the City.

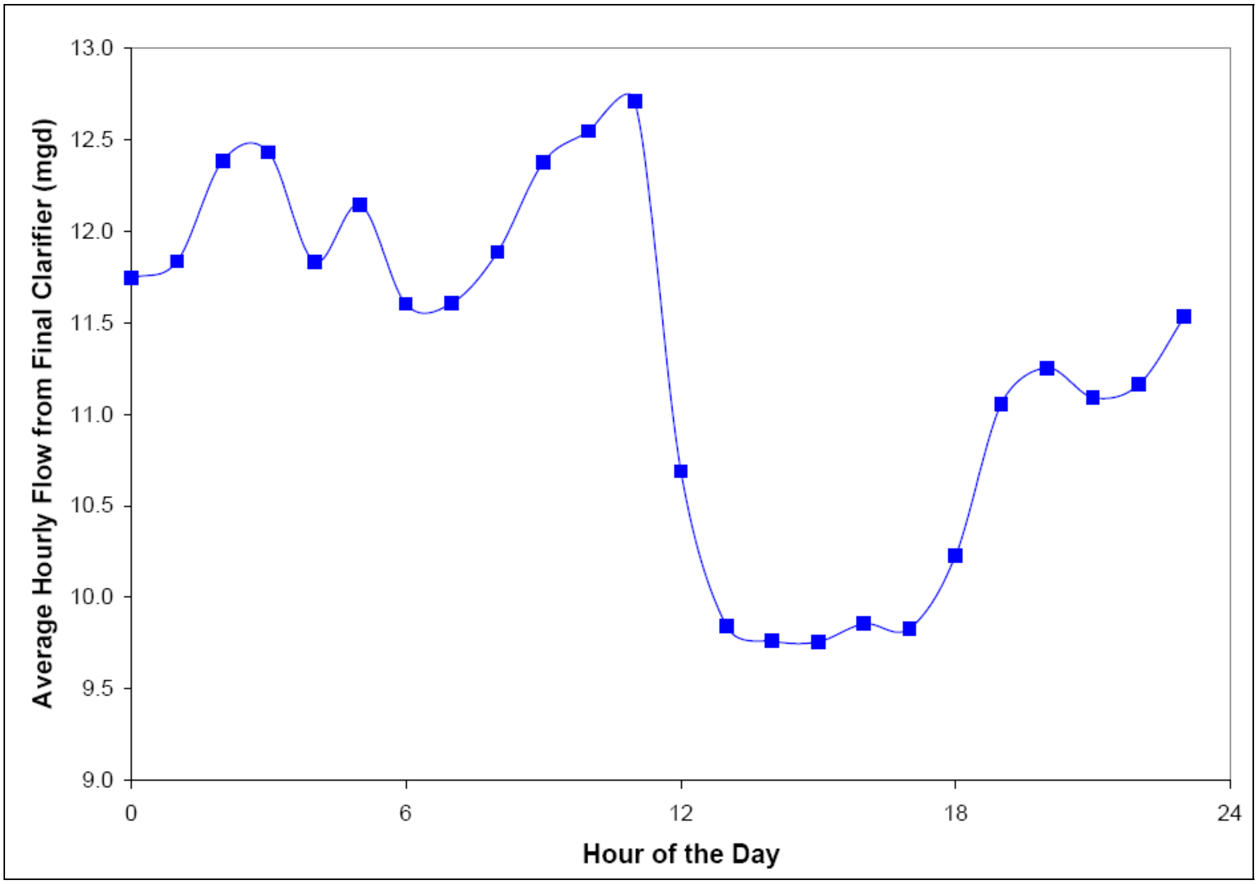
Figure 3-2: Estimated Monthly Flows Available for Tertiary Treatment in Year 2010



Source: 2010 average annual projected wastewater flows from 2005 UWMP; apportioned based on 2006 City monthly flow data.

Typical, summer time diurnal variations in secondary-treated flows from the WPCF are shown in **Figure 3-3**. The daily variations in wastewater flows were derived from 10-minute interval flow data from the final clarifier at the Hayward WPCF for the month of July 2008.

Figure 3-3: Diurnal Variations in Secondary-Treated Wastewater Flows



Source: July 2008 10-minute interval flow data from WPCF, 2008

3.3 Recycled Water Quality Assessment

The Feasibility Study included a cursory recycled water quality assessment based on typical water quality objectives for certain category of customers.

As part of this Plan, the preliminary water quality assessment performed in the Feasibility Study was refined through the following:

- Updating the list of representative constituents and associated water quality targets for various categories of customers based on information collected through the customer survey results (see Appendix C -Customer Survey Results Summary**). Table 3-6** lists the target concentrations for industrial and landscape irrigation applications within the Study area.
- Refining future recycled water quality estimates based on final clarifier effluent water quality data collected in April 2008, after upgrades to the City's secondary treatment processes were completed. The refined estimates are reflected in Table 3-6.
- Considering hydrogeological and soil characteristics, including soil drainage class and depth to water table. **Figure 3-4** shows the soil drainage characteristics in the vicinity of the project area. Soil drainage characteristics are important to consider in the use of recycled water for irrigation because the permeability of the soil will influence the potential accumulation of salts from the

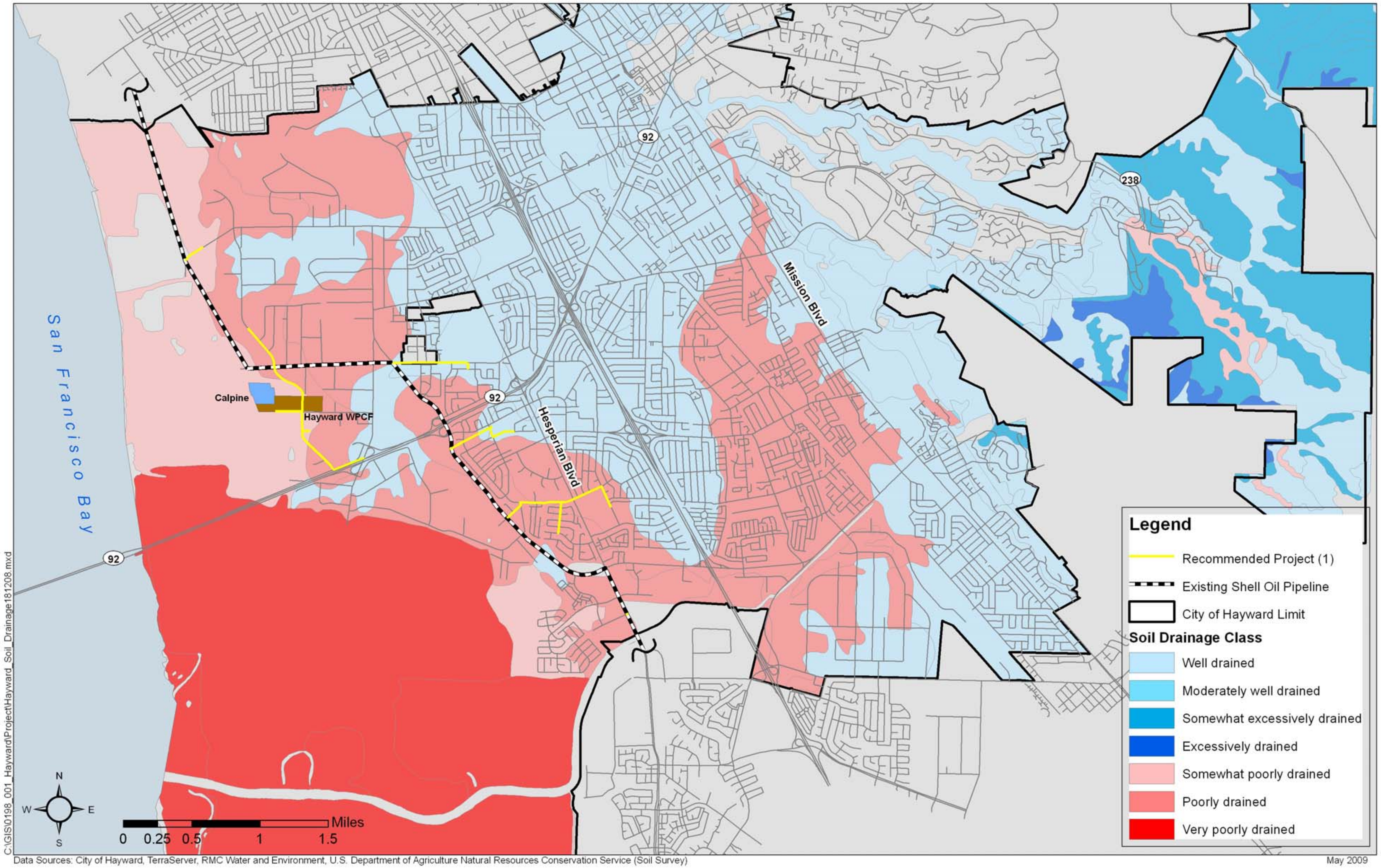
recycled water in the root zone. Soil drainage characteristics are also important in determining whether flushing should be implemented as a salinity management technique. **Figure 3-5 s**hows the average minimum depth to the water table. Minimum depth to the water table and other hydrogeological features such as presence of an aquitard are parameters to be considered when assessing the potential impact of recycled water on local groundwater quality. The soil drainage and depth to the water table information was obtained from the Soil Survey Geographic Database compiled by the United States Department of Agriculture, Natural Resources Conservation Service.

Table 3-6: Recycled Water Quality Assessment

Representative Constituent	Projected RW Quality based on Current Hayward WPCF WQ and Title 22 Requirements [a]	Category of Customers	Maximum Target Concentration	Notes
Turbidity	<2 NTU [c]	All	2 NTU[c]	No issue
Total Suspended Solids (TSS)	<3.0 mg/L	Industrial Boiler Feed Water	10 mg/L (<150 psig Pressure Level) [d]	No issue
		Industrial Cooling Water Processes	100-300 mg/L [d, e]	No issue
Total Dissolved Solids (TDS)	430 - 640 mg/L [b]	Irrigation	500-700 mg/L [f]	Potential issue (refer to Section 3.3.1)
		Industrial Boiler Feed Water	700 mg/L (<150 psig Pressure Level) [d]	No issue except for Calpine [h]
		Industrial Cooling Water Processes	4,000 mg/L [d, e]	No issue
Sodium	83 - 88 mg/L	Irrigation	60-100 mg/L [f]	Potential issue (refer to Section 3.3.1)
Chloride	81 - 88 mg/L	Irrigation	<100 mg/L	No issue
		Industrial	200 mg/L [d]	No issue
Adjusted Sodium Absorption Ratio (SAR)	1.8	Irrigation	<5.0 [g]	No issue
Silica	13 -15 mg/L	Industrial Boiler Feed Water	30 mg/L (<150 psig Pressure Level) [d]	No issue
		Industrial Cooling Water Processes	150 mg/L as SiO_2 [d, e]	No issue
Total Alkalinity	250 - 268 mg/L as $CaCO_3$	Industrial Cooling Water Processes	30 mg/L as $CaCO_3$ (without scale inhibitor), 50 mg/L as $CaCO_3$ (with scale inhibitor) [d, e]	Potential issue (refer to Section 3.3.2)
		Industrial Boiler Feed Water	350 mg/L (<150 psig Pressure Level) [d]	No issue

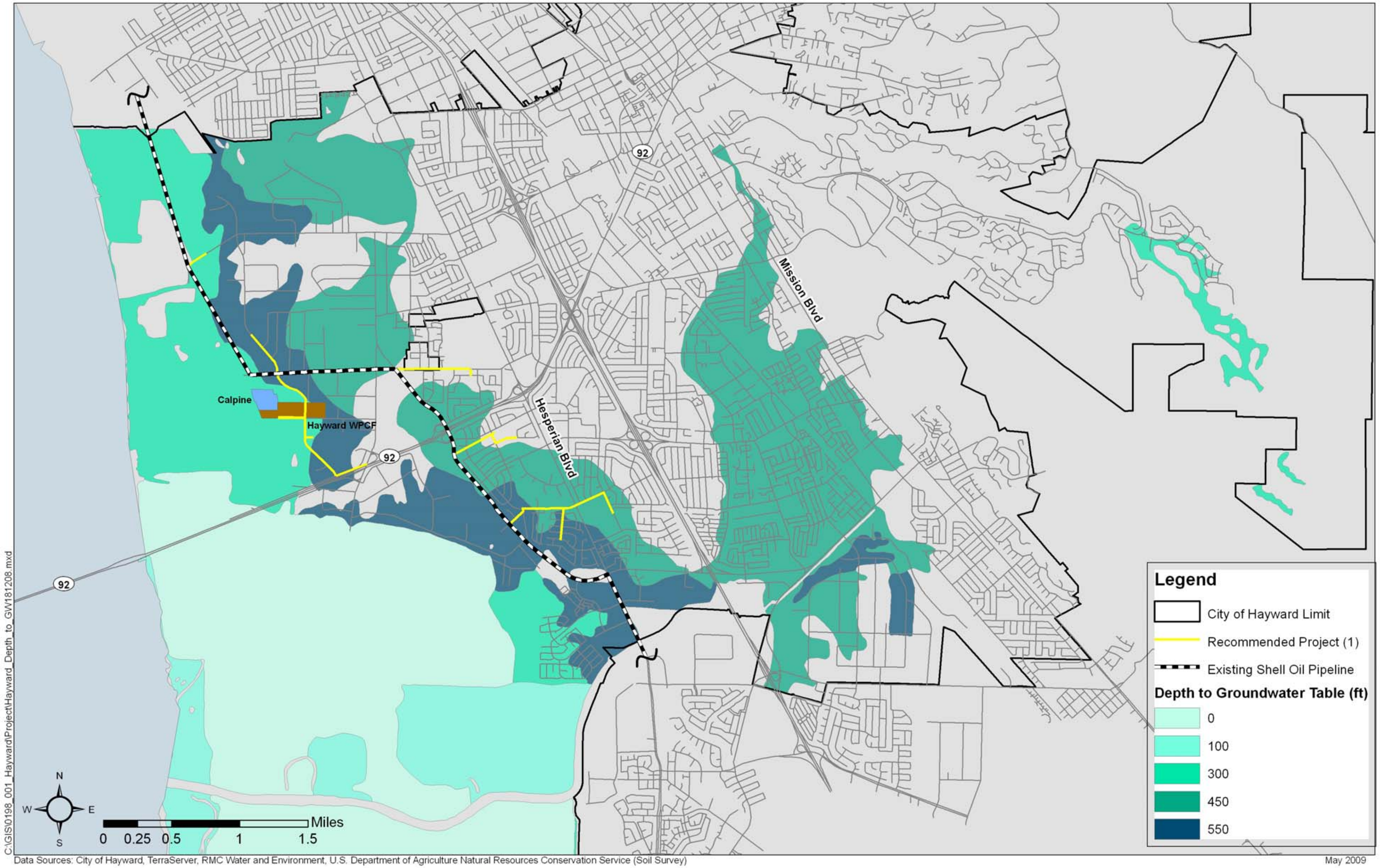
Notes:
a. Water quality data for all constituents except Turbidity were obtained from final clarifier effluent sampling over a normal week in April 2008. Turbidity data was obtained from final clarifier effluent sampling over a normal week in July 2008.
b. TDS data obtained from the treatment suggest seasonal variations in TDS concentrations in the source of wastewater entering the Hayward WPCF. At this point, these seasonal variations are not expected to impact the suitability of the recycled water for irrigation or industrial applications.
c. Title 22 requirement. Current WPCF WQ is 12.4 NTU.
d. Loretitsch, G. Puckorius & Associates. Table 2.01.
e. DiFillippo, M.N. (2006) Table 2-1.
f. Based on typical irrigation guidelines and experience with operating recycled water projects in the Bay Area. May vary by plant and soil type.
g. Maximum recommended concentration may vary with soil type.
h. Calpine plans to utilize a microfiltration/reverse osmosis unit, or equivalent, on-site to meet TDS requirements for industrial boiler feed water.

Figure 3-4: Soil Drainage Characteristics



Notes:
1. See Chapter 5 for discussion of Recommended Project

Figure 3-5: Depth to Groundwater Table



Notes:
1. See Chapter 5 for discussion of Recommended Project

Table 3-7 summarizes the specific water quality-related elements to be incorporated in the Project alternative definition or Implementation Plan based on information presented in Table 3-6 and Figure 3-4 and Figure 3-5, and analysis provided in the paragraphs below for each water quality category.

Table 3-7: Water Quality-Related Project Elements to Be Considered

Water-Quality Related Element	Recommendations	
Irrigation	Project Definition	▪ No treatment needs anticipated above and beyond Title 22 requirements.
	Implementation Plan	▪ Monitor water quality for constituents of concern to customers (above and beyond Title 22 requirements). ▪ Communicate with potential customers on potential constituents of concern for plant health and develop salinity management strategies (e.g. Best Management Practices) as needed.
Industrial Cooling	Project Definition	▪ Reduce high alkalinity levels (which may lead to scaling problems) with onsite treatment methods such as lime softening and the addition of acid, if on-site treatment is not already provided. ▪ Reduce TDS for Calpine's needs with onsite treatment methods such as microfiltration/reverse osmosis (MF/RO)
	Implementation Plan	▪ Monitor water quality for constituents of concern to customers (above and beyond Title 22 requirements). ▪ Additional treatment onsite at Calpine (MF/RO)
Boiler Feed	Project Definition	▪ No treatment needs anticipated above and beyond Title 22 requirements.
	Implementation Plan	▪ Monitor water quality for constituents of concern to customers (above and beyond Title 22 requirements).
Groundwater Impacts	Project Definition	▪ No major issue was identified at this time. ▪ Further consideration of the potential impact to groundwater quality associated with the percolation of recycled water from landscape irrigation will occur during CEQA review.

3.3.1 Irrigation Uses

- The suitability of recycled water for landscape irrigation is in part related to the concentration of salt in the water, the amount applied and the physical characteristics of the soil. Good permeability or drainage keeps the potential accumulation of salts in the root zone at manageable levels and allows the leaching of excess salts from the root zone when subjected to heavier irrigation or flushing.
- Based on the City's current effluent water quality monitoring data, salinity levels (measured by Total Dissolved Solids) are within the acceptable ranges for landscape irrigation uses. It should be noted that some species such as Redwood trees have shown sign of being more sensitive to salt than other species. Openly communicating with potential customers on recycled water quality in terms of constituents of potential concerns for plant health is therefore important.

- The area in the vicinity of the Hayward WPCF and Calpine and areas along the Shell Oil pipeline are generally characterized by poor soil drainage (Figure 3-4).
- Input obtained from HARD indicated that water quality and soil drainage is one of their major concerns for the use of recycled water (see Appendix A -HARD and HUSD Meeting Notes).
- Best Management Practices such as monitoring of soil salinity levels, occasional flushing of additional water through the soil, or annual flushing of the soil with potable water to decrease the concentration of salt, will likely need to be implemented to prevent or reduce salinity impacts. These Best Management Practices would be applied by individual customers. A more "regional" approach to managing recycled water quality, such as adding gypsum to the recycled water at the treatment plant, or blending recycled water with potable water to lower salt concentrations is not anticipated to be necessary in the short term.

3.3.2 Industrial Cooling Use

- Water quality sampling data collected after completion of the upgrades to the City's secondary treatment process indicate that total suspended solids (TSS), total dissolved solids (TDS), and silica concentrations in the treated effluent are within the recommended ranges for water-cooled industrial processes. Alkalinity and turbidity levels in the sampled effluent currently do not fulfill the criteria for industrial cooling water, but may be reduced through treatment methods listed below.
    - Alkalinity:
        - High alkalinity levels may cause scaling problems, but this can be treated through lime softening, which involves the use of lime to increase the pH of the water to approximately 11 to allow calcium and magnesium to precipitate out. The alkalinity of the water may then be decreased by the addition of acid.
    - Turbidity:
        - High turbidity levels may be indicative of water quality issues, but this can be addressed with treatment through a flocculating clarifier followed by filtration during the tertiary treatment process.
- Based on results of the water quality sampling, recycled water produced at the treatment plant should be suitable for water-cooled industrial processes, with proper alkalinity reduction measures and turbidity treatment in place.
- Surveyed customers have existing onsite treatment systems and will not need additional onsite treatment beyond Title 22 requirements.

3.3.3 Boiler Feed Use

- Total suspended solids (TSS), total dissolved solids (TDS), silica and alkalinity concentrations measured in the sampled effluent are within the recommended ranges for boiler feed water users. This indicates that recycled water produced at the treatment plant should be suitable for boiler feed uses.
- Some customers interviewed in the phone survey expressed concern over the potential for bacterial regrowth, which can be mitigated by maintaining a chlorine residual in recycled water (standard O&M practice).

3.3.4 Potential Impact to Groundwater Quality

- Potential impact to groundwater quality associated with percolation of recycled water from landscape irrigation is typically addressed during CEQA review and in the Regional Water Quality Control Board water recycling permit.

- A preliminary evaluation was performed as part of this water quality assessment to identify any potential fatal flaw or facilities to be incorporated in the project definition or implementation plan.
- The main aquifer in the Project area is the Niles Cone Subbasin of the Santa Clara Valley Groundwater Basin. The Niles Cone Subbasin west of the Hayward Fault is composed of a series of gently westward dipping aquifers separated by extensive clay aquitards: the Newark Aquifer, which is confined except at the forebay area, and deeper confined aquifers including Centerville and Fremont. The Newark aquifer is an extensive permeable gravel and sand layer between 40 to 140 feet below ground surface, except in the forebay area where it begins near the surface. The aquifer is overlain by a thick layer of Young Bay Mud, which may be considered a restrictive layer with very low permeability, extending to the east of I-880. The immediate underlying geology in the vicinity of the Project area consists mainly of Young Bay Mud (California Groundwater Bulletin 118).
- Based on the City's current treated effluent water quality and the underlying hydrogeological and soil characteristics of the area, no potential issues are anticipated with the use of recycled water for irrigation. Impact on groundwater quality would be further analyzed in the environmental impact report.

3.4 General Retrofit Issues or Other Potential Customer Concerns

The Feasibility Study made assumptions about potential retrofit needs and potential user concerns (including water quality, costs) based on experience from other recycled water projects in the San Francisco Bay Area.

This assessment gathered more specific information on retrofit issues and potential concerns specific to this Project based on direct input from potential customers in the Study area obtained through the customers' survey, and individual meetings with HARD and HUSD.

3.4.1 Issues and Concerns

Table 3-8 summarizes the issues and concerns raised by potential customers during the customer survey (see Appendix C -Customer Survey Results Summary for details) and subsequent meetings with the School Board and Recreation and Park Department (see Appendix A -HARD and HUSD Meeting Notes for meeting minutes).

It was determined that these concerns should not eliminate any customers from consideration in this Plan.

Table 3-8: Customer Issues and Concerns

Issue	HARD	HUSD	Industrial Customers	Calpine [d]
Onsite retrofits [b,c]	None.	Concerned with public perception of health and safety and will need bilingual (English and Spanish) signage on school sites.	Concerned with the cost and logistics of onsite re-plumbing of existing water systems to incorporate recycled water use.	None.

Issue	HARD	HUSD	Industrial Customers	Calpine [d]
Delivery pressure needs	Requires recycled water to be delivered at the same pressure as the existing potable supply.	Requires recycled water to be delivered at the same pressure as the existing potable supply.	Requires recycled water to be delivered at the same pressure as the existing potable supply.	Requires recycled water to be delivered at the same pressure as the existing potable supply.
Reliability	None.	None.	None.	Reliability of recycled water supply is a key factor.
Landscape sensitivities	Concerned with the cumulative water quality effects on the soil and drainage.	Concerned with (1) possible contact of students and recycled water if sprinklers automatically turn on mid-day when children are out on the fields and (2) Type of residue that would be left on the grass from the use of recycled water and the potential risk of body contact cross-contamination.	None.	None.
Willingness to use recycled water	Highly receptive to the use of recycled water in view of the potential cost savings, but will need to address public health concerns and queries from the public.	Somewhat receptive to the use of recycled water in view of the potential cost savings and conservation benefits, but will need extensive public education and outreach, and will require School Board approval for implementation.	Generally receptive to the use of recycled water in view of the potential cost savings but has limited applications in their industrial processes. Mostly suitable only for cooling tower and boiler feed water systems.	Advocate for the use of recycled water.

Notes:
a. Sources: Meetings with HARD and HUSD, Customer Telephone Survey
b. All existing irrigation systems will be retrofitted to include an additional meter for recycled water and provided with an air gap for the potable system. Other onsite retrofits include purple sprinkler heads installation; recycled water valve boxes covers, prevention of cross-connection, and any irrigation pattern changes needed to isolate the recycled water system from water fountains, picnic areas, etc.
c. Existing industrial customers will have to ensure separation between their potable and non-potable water systems which may require replumbing and valving to isolate each supply stream. Industrial customers in the telephone survey generally understand the piping process at their facilities and did not anticipate extensive retrofits should they being using recycled water at their sites.
d. Calpine issues and concerns are assumed based on prior experience with other Calpine facilities.

3.4.2 Potential Solutions

Table 3-9 identifies potential solutions associated with the issues and concerns identified in Table 3-8 that will need to be considered in the project definition or implementation plan in addition to those listed in Section 2.3.

Table 3-9: Potential Solutions to Customer Issues

Potential Solution	HARD	HUSD	Industrial Users	Calpine
Public Outreach and Education	Conduct informational workshops on recycled water use.	Conduct informational workshops on recycled water use and invite representatives from other School Districts that have successfully implemented recycled water use to share their experiences.	Conduct onsite informational visits to industrial customers to address retrofit concerns.	None.
Reliability	Provide potable backup supply.	Provide potable backup supply.	Provide potable backup supply.	Provide recycled water storage and potable backup supply.
Salinity Management Strategies [a]	Develop tree and soil condition monitoring programs; Provide outreach materials regarding best management practices (BMPs) and training on water quality and appropriate irrigation techniques (e.g. irrigation flushing)	Develop tree and soil condition monitoring programs; Provide outreach materials regarding best management practices (BMPs) and training on water quality and appropriate irrigation techniques (e.g. irrigation flushing)	Irrigation: Provide outreach materials regarding best management practices (BMPs) and training on water quality and appropriate irrigation techniques if landscape irrigation is involved. Industrial: Onsite treatment at individual sites, as needed.	Onsite treatment at Calpine.
Monetary Incentives to Secure Recycled Water Market			Grants for onsite retrofits; discounts on utility bills	

Notes:
a. Other salinity management strategies exist beyond those listed here (e.g. source control to reduce TDS in WPCF influent, advanced treatment processes) but are not currently warranted for this project.

Chapter 4 Alternatives Assessment

This Chapter documents the Project recycled water production assumptions, development of Project alternatives and the process of determining the near-term Recommended Project.

4.1 Recycled Water Production

As noted in Chapter 3, new treatment facilities will be required at the Hayward WPCF to produce recycled water meeting Title 22 standards for disinfected, tertiary filtered recycled water to serve potential recycled water customers.

4.1.1 Treatment Process

Updated Process Options

There are two options for developing tertiary recycled water supplies for customers in Hayward. For the first option (Calpine Option), Calpine can provide to the City tertiary recycled water in excess of the amount that Calpine needs for its energy production. For the second option (City Option), the City can construct its own tertiary facilities to treat the water needed to serve its recycled water customers, except Calpine, who would continue to treat its own water. The following sections on process selection pertain to the City Option where the City constructs its own tertiary facilities.

Approved Processes

There are a number of available filtration and disinfection treatment processes that are approved by the Department of Public Health (DPH) to meet Title 22 Water Quality Standards for recycled water. For example, granular media filters, cloth media filters, microfiltration (membranes), are some available filtration options, and chlorination and ultraviolet (UV) disinfection are available disinfection options. For this Plan, the selection of the treatment train was limited to currently approved processes.

Actual Process Train for Calpine Option in Updated Facilities Plan

The tertiary treatment facilities have been constructed at the Calpine facility. The tertiary treatment process train at Calpine is show in **Figure 4-2**. The process train is:

- Filtration:
  - Pre-treatment using incline plate clarifiers (lamella clarifier)
  - Granular media filtration (Brand: Parkson-Dynasand)
- Disinfection:
  - Chlorine disinfection

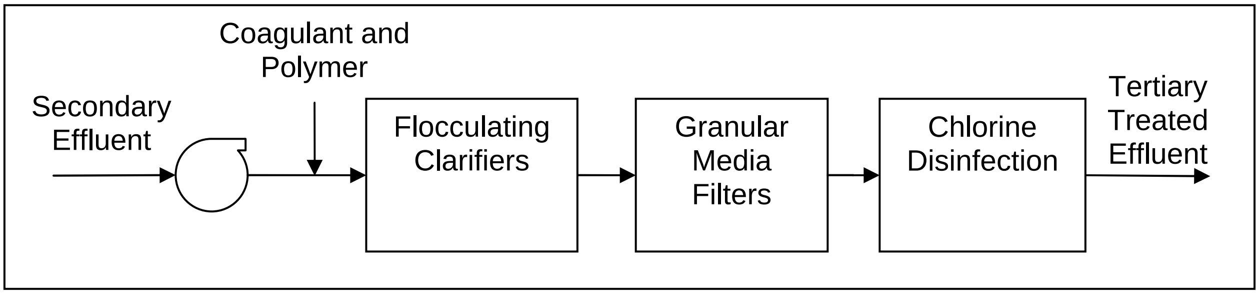
Assumed Process Train for City Option in Updated Facilities Plan

The final selection for filtration and disinfection alternatives would be determined during the pre-design (e.g. cloth media filters could be preferred to granular media filters). The Facility Planning-level process train for the City Option, to be finalized during pre-design, is:

- Filtration:
  - Pre-treatment using flocculating clarifier
  - Granular media filtration
- Disinfection:
  - Chlorine disinfection

The recommended tertiary treatment process train is shown in **Figure 4-1**.

Figure 4-1: Tertiary Treatment Train Assumed for City Option in Updated Facility Plan



- **Filtration.** The treatment train selection considered both approved treatment processes and the existing secondary effluent characteristics (turbidity, total suspended solids, etc.). As noted in Chapter 2, the WPCF utilizes trickling filters and solids contact aeration in its secondary treatment processes. The City has recently upgraded the WPCF and would not likely modify the secondary treatment process train. Pilot testing at the City of Watsonville demonstrated that secondary effluent produced from trickling filters (with solids contact aeration) cannot meet Title 22 requirements without pre-treatment upstream of filtration. Therefore, the recommended filtration processes include both a pre-treatment step with flocculating clarifiers and filtration with granular media filters. This combination of filtration processes was assumed for this Plan and should be confirmed with on-site pilot testing at the WPCF during pre-design.
- **Disinfection.** Due to the small size of the tertiary facilities and no compelling reason to consider UV disinfection for water quality reasons, chlorine disinfection is assumed as a lower cost option to UV disinfection.

4.1.2 Treatment Facilities Planning-Level Design Criteria and Layout for Updated Facilities Plan

Design Criteria

In determining updated planning-level design criteria for the recommended treatment facilities, one sizing option was considered.

Layout

At the time of the update, the City was conducting an update to the WPCF master plan. The master planning team identified an area on the WPCF property that will be available after future upgrades for tertiary facilities (see **Figure 4-3**). For the City Option, the proposed layout includes tertiary treatment facilities as well as recycled water storage and a distribution pump station. For the Calpine Option, facilities at the WPCF property are limited to recycled water storage and a distribution pump station.

Figure 4-2: Tertiary Treatment Train at Calpine Facility

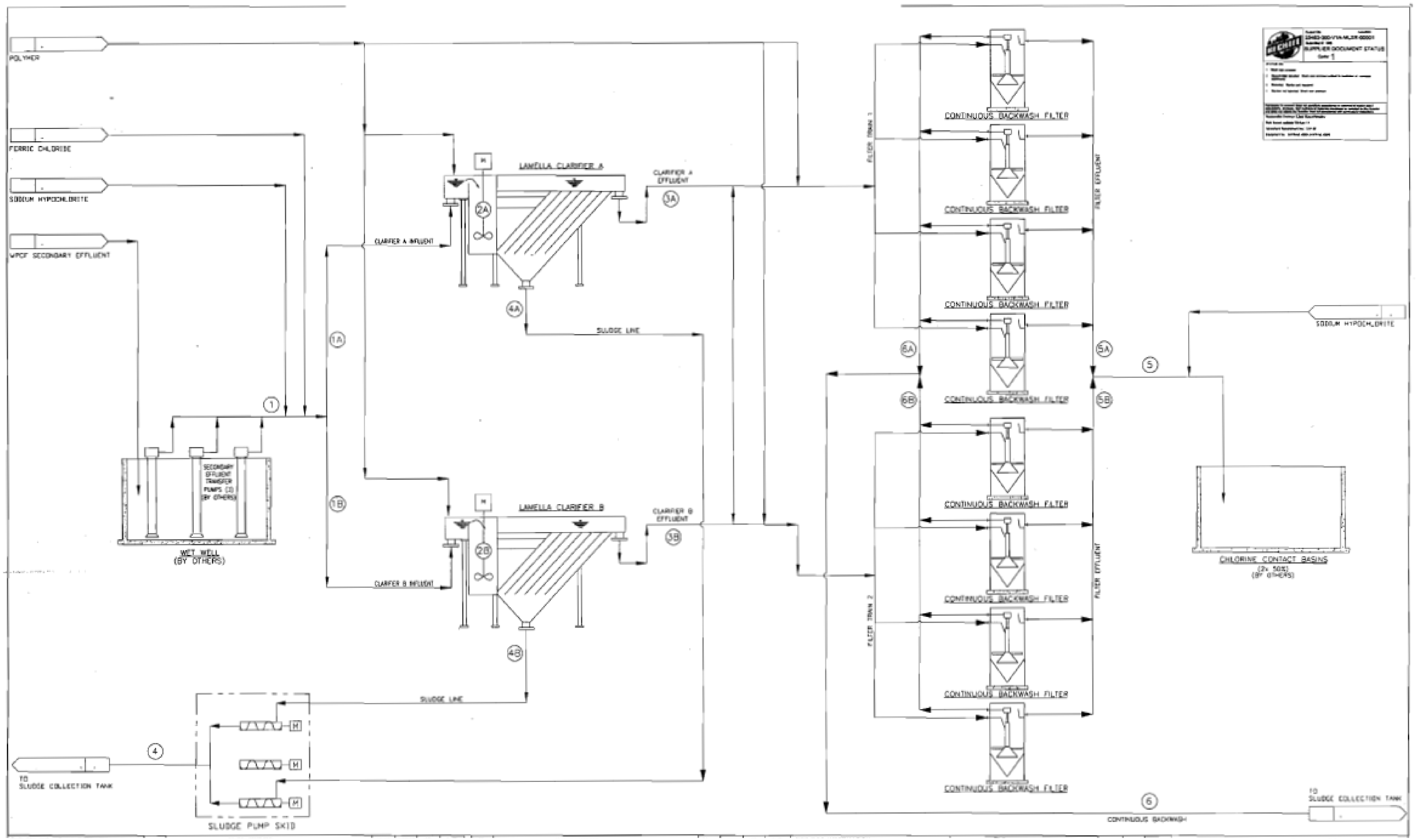
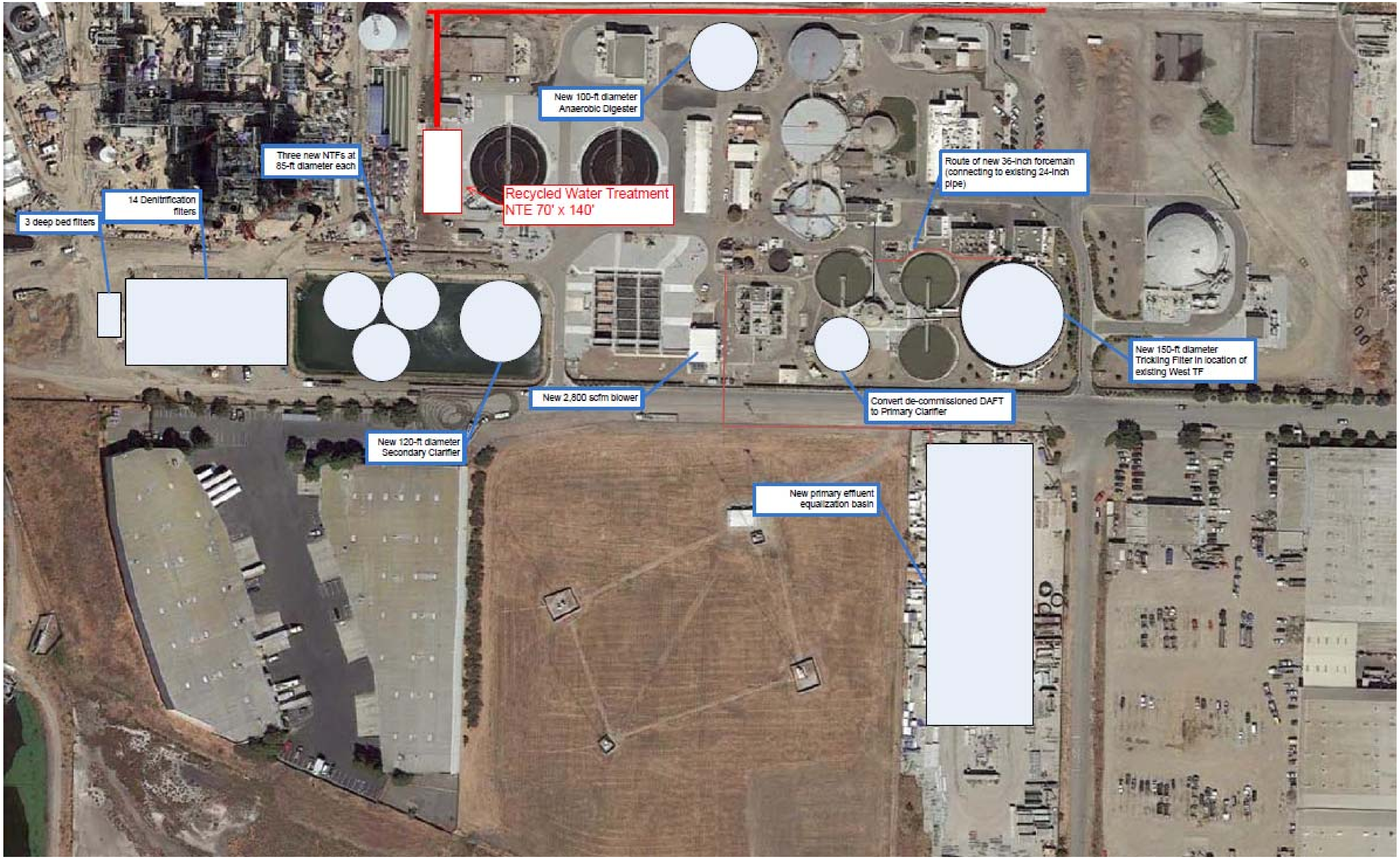


Figure 4-3: City Option Facility-Planning Level Tertiary Treatment Layout



4.2 Recycled Water Project Alternatives

4.2.1 Updated Recycled Water Project Alternatives

Based on the needs of the City for the Updated Facilities plan, two alternatives were developed and evaluated:

- Calpine Option, which would use excess tertiary treated water produced by the Calpine facility, and
- City Option, which would use tertiary treated water produced by the City at a new treatment facility at the Hayward WPCF.

Both options would serve local urban non-residential customers, located approximately within a two-mile radius of the Hayward WPCF for local urban reuse. Customers include irrigation customers, industrial and combined customers in the Top 90 Private Water Users list. Industrial customers in this Project were surveyed as part of the market assessment to determine the proportion of their water demand that could be converted to recycled water.

4.2.2 Updated Project Alternatives Target Customers

The Calpine Option and the City Option would both serve the same customer base but with different sources of tertiary water. The customer base for either option is summarized in **Table 4-1**. Note that the Skywest Golf Course (existing recycled water use of 180 AFY) was not included as a target user in any of the alternatives since this customer is currently being served and will not benefit from the addition of tertiary treatment (no expected decrease in TDS from the tertiary treatment).

4.2.3 Updated Project Alternatives Facilities

Table 4-2 lists the major facilities for the Calpine Option and City Option respectively. **Figure 4-4** illustrates the location of major facilities for the alternatives.

Both alternatives assume that the existing 8-inch Shell Oil pipeline identified by the City will be useable for recycled water conveyance with limited retrofits. For the purposes of this plan, it is assumed that retrofit of the Shell Oil pipeline will not require lining; instead potential retrofit activities could include:

- Dewatering and cleaning of any petroleum residue;
- Television inspection (if possible);
- Pressure testing for leaks;
- Corrosion analysis (if possible);
- Determination of nearest existing isolation valves (if any);
- Right-of-way identification; and
- Installation of valves, flanges, meters, etc.

Table 4-1: Updated Project Alternatives Customers and Demand

Customer No.	Customer Name	Type of Use	Average Demand (AFY) [b]	Average Demand (mgd) [c]	Peak Month Demand (mgd) [c]
Calpine or City Option Customers					
1	Bottling Group LLC (Pepsi)	Combined [a]	31	0.03	0.04
4	Shasta Beverages	Industrial	8	0.01	0.01
5	Rohm & Haas	Industrial	22	0.02	0.02
8	Chabot-Las Positas Community College	Irrigation	6	0.005	0.01
29	Life Chiropractic College	Combined [a]	3	0.003	0.003
30	SCA Packaging	Industrial	2	0.001	0.001
40	Bay Center II	Irrigation	20	0.02	0.001
42	BB&K Franklin Township	Irrigation	13	0.01	0.03
72	Robert Chang & Associates	Irrigation	10	0.01	0.02
79	Caltrans D-4 HDWS	Irrigation	9	0.01	0.02
80	Caltrans D-4	Irrigation	8	0.01	0.02
91	Mt. Eden High School	Irrigation	43	0.04	0.09
98	Eden Garden School	Irrigation	3	0.003	0.01
105	Loren Eden High School	Irrigation	8	0.01	0.02
114	Oliver Sports Park	Irrigation	35	0.03	0.07
116	Mt. Eden Park	Irrigation	21	0.02	0.04
119	Eden Greenway – Part 1	Irrigation	10	0.01	0.02
129	Brenkwitz School	Irrigation	8	0.01	0.02
132	Christian Penke Park	Irrigation	7	0.01	0.01
135	Rancho Arroyo Park	Irrigation	7	0.01	0.01
160	Bay Center II	Irrigation	7	0.01	0.02
163	Winton Industrial Center	Irrigation	7	0.01	0.01
	Total		**285**	**0.3**	**0.5**

Notes:
a. Either has irrigation as a primary use and industrial as a secondary use, or vice-versa.
b. Rounded to the nearest 1 AFY.
c. Total rounded to the nearest 0.1 mgd.

Table 4-2: Updated Project Alternatives Facilities

Description	Units	Calpine Option	City Option
Customers			
Number of Customers	#	22	22
Annual Average Demand	AFY	285	285
Peak Month Demand	mgd	0.5	0.5
Peak Hour Demand	mgd	0.5	0.5
Treatment Facilities			
Influent Pump Station	hp	NA	20
Flocculating Clarifiers [a]	mgd	NA	0.5
Granular Media Filters [a]	mgd	NA	0.5
Chlorine Disinfection	mgd	NA	0.5
Treated Recycled Water Storage			
Storage Tank [b]	MG	0.4	0.4
Distribution Pump Station(s)			
Calpine Pump Station [c]	hp	NA	NA
Other Customers Pump Station [c, d]	hp	165	165
Distribution System			
Total Pipeline Length [e]	LF	23,900	23,900
14” Pipe	LF	0	0
8” Pipe	LF	7,100	7,100
6” Pipe	LF	16,800	16,800
Retrofit of Abandoned Shell Oil Pipeline for Conveyance	LF	7,460	7,460
Connections to Retrofitted Shell Oil Pipeline	#	11	11

Notes:
a. Facilities are oversized to account for 3-4% water consumption/loss through treatment processes.
b. Storage tank was sized using the SWRCB Office of Water Recycling Storage Excel Workbook and maximum drawdown criteria of 2 feet. See Appendix D -Facility Technical Information.
c. Pumps were sized based on peak hour flow, pipeline headloss, and downstream required pressures
d. Summary of total distribution pumping needs for each alternative. One or more distribution pump stations may be utilized in each alternative.
e. Pipelines were sized based on peak hour flow, pipeline headloss, and existing pipeline sizes (Shell Oil pipeline)

4.2.4 Updated Project Alternatives Cost Estimates and Conclusions

Cost Estimates

Table 4-3 summarizes the cost estimates for each alternative. Estimated costs are referenced to the September 2013 Engineering Construction Cost Index (ENR CCI) for San Francisco of 10,389.59.

Table 4-3: Project Alternatives Conceptual-Level Cost Estimates

Description	Calpine Option	City Option
Treatment Facilities	$0	$1,160,000
Treated Recycled Water Storage	$720,000	$720,000
Potable Backup Water Supply	$106,000	$106,000
Distribution Pump Station	$1,030,000	$1,030,000
Main Pipelines	$1,188,000	$1,188,000
Lateral Pipelines	$1,815,000	$1,815,000
User Connections	$385,000	$385,000
Subtotal Raw Construction Cost	**$5,244,000**	**$6,404,000**
Contractor Overhead and Profit (10%)	$524,000	$640,000
Change Order Allowance (5%)	$262,000	$320,000
Level of Estimate Contingency (30%)	$1,573,000	$1,921,000
Total Construction Cost	**$7,603,000**	**$9,285,000**
Engineering and Construction Management/Environmental/ Administration/Legal (35%)	$2,661,000	$3,250,000
Total Capital Cost	**$10,264,000**	**$12,535,000**
Annualized Capital Costs [a] ($/year)	$545,000	$665,000
Annual O&M Costs ($/year)	$204,000	$349,000
Total Annualized Cost ($/year)	$749,000	$1,014,000
Estimated Recycled Water Yield (AFY)	285	285
Unit Cost, Annualized ($/AF)	**$2,630/AF**	**$3,560/AF**

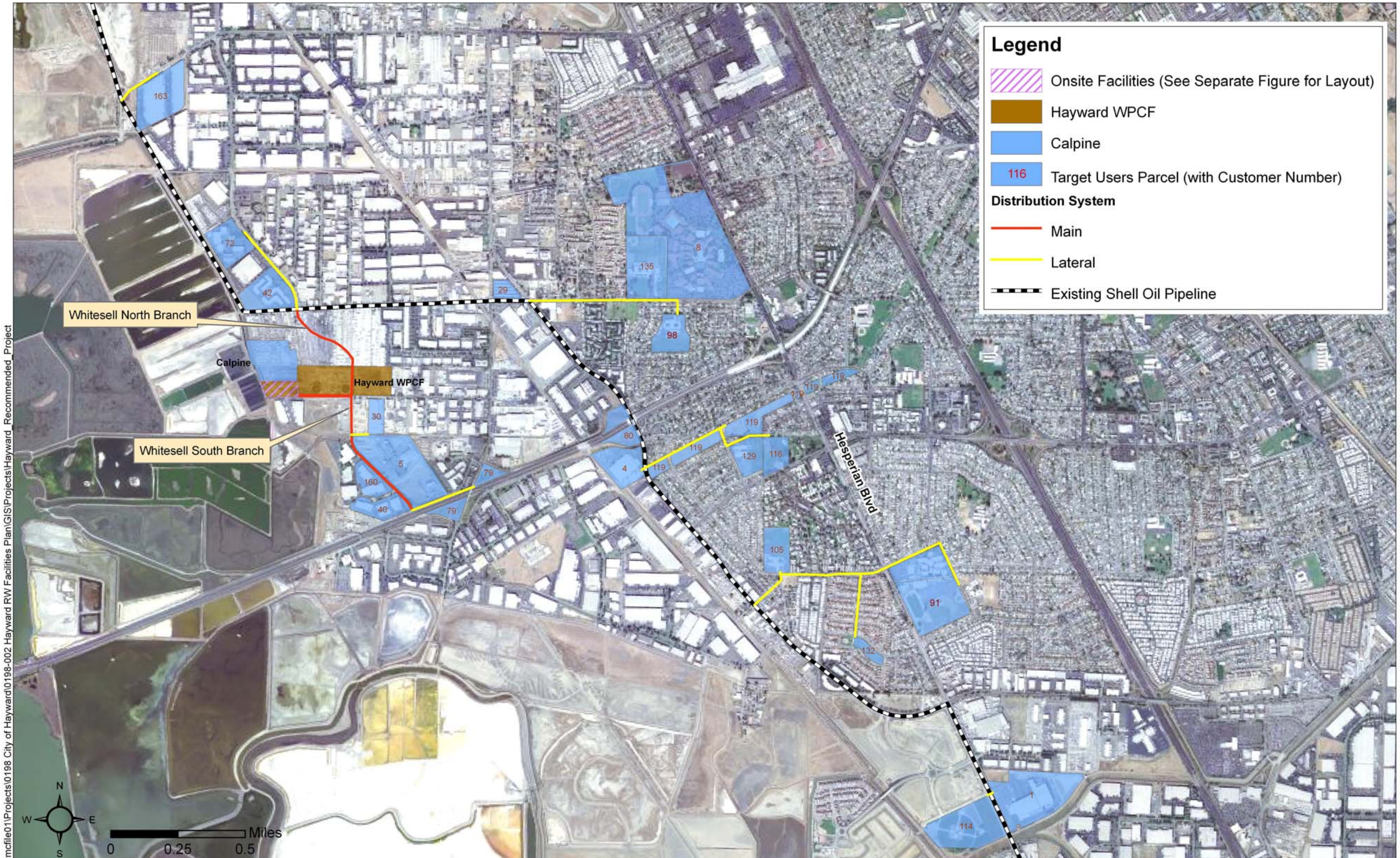
Notes:
a. Annualized at 30 years, 3.30%

Conclusions

The Calpine Option was recommended:

- Incremental construction cost of approximately $7.6 million would bring an additional 285 AFY of recycled water use now and provide the ability to several additional recycled water customers along Whitesell Road in the future.

Figure 4-4: Major Facilities for Alternatives



Data Sources: City of Hayward, TerraServer, RMC Water and Environment

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Chapter 5 Recommended Project

This chapter develops the Recommended Recycled Water Project (Recommended Project) identified in Chapter 4 at the facility-plan level. It includes target customers, project facilities descriptions, cost estimates, project benefits, and an implementation plan (including construction financing plan).

5.1 Updated Facilities Description

The Recommended Project involves connection to the Calpine tertiary treatment facilities, 1.5 miles of distribution lines to the north and south of the WPCF, rehabilitation and connections to the existing Shell Oil pipeline, over three miles of customer laterals to 22 customers, and installation of customer connections and retrofits. The Project would deliver an estimated 285 AFY of recycled water, in addition to 3,475 AFY of recycled water being used at the Calpine facility. The majority of recycled water customers will utilize recycled water for irrigation. Some small industrial use for cooling towers and boilers is also included.

Figure 5-1 illustrates the recommended recycled water target customers and major facilities.

Table 5-1 provides the estimated average annual demand for each customer.

Figure 5-2 illustrates the recommended, planning-level layout for the new recycled water treatment facilities at the WPCF.

The Project begins with connection to the Calpine tertiary facility. Calpine disinfected tertiary effluent will be pumped to a steel storage tank. From storage, tertiary flow will be pumped to the distribution system to be delivered to customers.

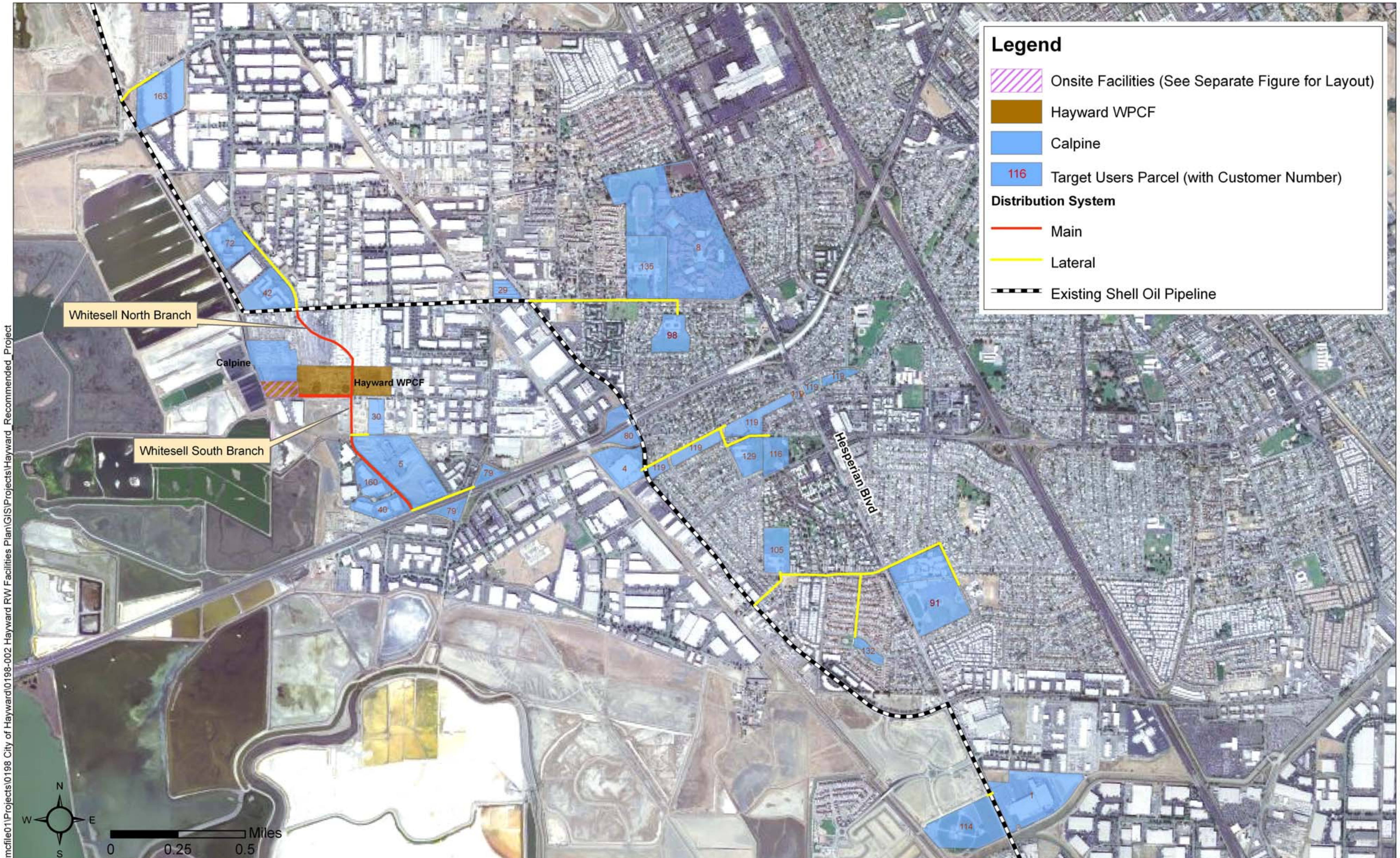
Distribution from the WPCF will be through two parallel 8-inch main pipelines to serve the north and south branches of Whitesell Road. The south branch will serve a cluster of recycled water customers in the area between the WPCF and Highway 92. The north branch will connect to the existing Shell Oil pipeline (8-inch), which will be rehabilitated for water use. Flow through the Shell Oil pipeline will split to customers on the north and south ends of the pipeline. Connections will be made into the Shell Oil pipeline for 6-inch laterals to a single customer or customer grouping. These customer laterals vary from a few feet to three quarters of a mile.

Table 5-1: Updated Recommended Project Customers and Demand

Customer No.	Customer Name	Type of Use	Average Demand (AFY) [b]	Average Demand (mgd) [c]	Peak Month Demand (mgd) [c]
Calpine or City Option Customers					
1	Bottling Group LLC (Pepsi)	Combined [a]	31	0.03	0.04
4	Shasta Beverages	Industrial	8	0.01	0.01
5	Rohm & Haas	Industrial	22	0.02	0.02
8	Chabot-Las Positas Community College	Irrigation	6	0.005	0.01
29	Life Chiropractic College	Combined [a]	3	0.003	0.003
30	SCA Packaging	Industrial	2	0.001	0.001
40	Bay Center II	Irrigation	20	0.02	0.001
42	BB&K Franklin Township	Irrigation	13	0.01	0.03
72	Robert Chang & Associates	Irrigation	10	0.01	0.02
79	Caltrans D-4 HDWS	Irrigation	9	0.01	0.02
80	Caltrans D-4	Irrigation	8	0.01	0.02
91	Mt. Eden High School	Irrigation	43	0.04	0.09
98	Eden Garden School	Irrigation	3	0.003	0.01
105	Loren Eden High School	Irrigation	8	0.01	0.02
114	Oliver Sports Park	Irrigation	35	0.03	0.07
116	Mt. Eden Park	Irrigation	21	0.02	0.04
119	Eden Greenway – Part 1	Irrigation	10	0.01	0.02
129	Brenkwitz School	Irrigation	8	0.01	0.02
132	Christian Penke Park	Irrigation	7	0.01	0.01
135	Rancho Arroyo Park	Irrigation	7	0.01	0.01
160	Bay Center II	Irrigation	7	0.01	0.02
163	Winton Industrial Center	Irrigation	7	0.01	0.01
	Total		**285**	**0.3**	**0.5**

Notes:
a. Either has irrigation as a primary use and industrial as a secondary use, or vice-versa.
b. Rounded to the nearest 1 AFY.
c. Total rounded to the nearest 0.1 mgd.

Figure 5-1: Recommended Project Recycled Water Customers and Facilities



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Data Sources: City of Hayward, TerraServer, RMC Water and Environment

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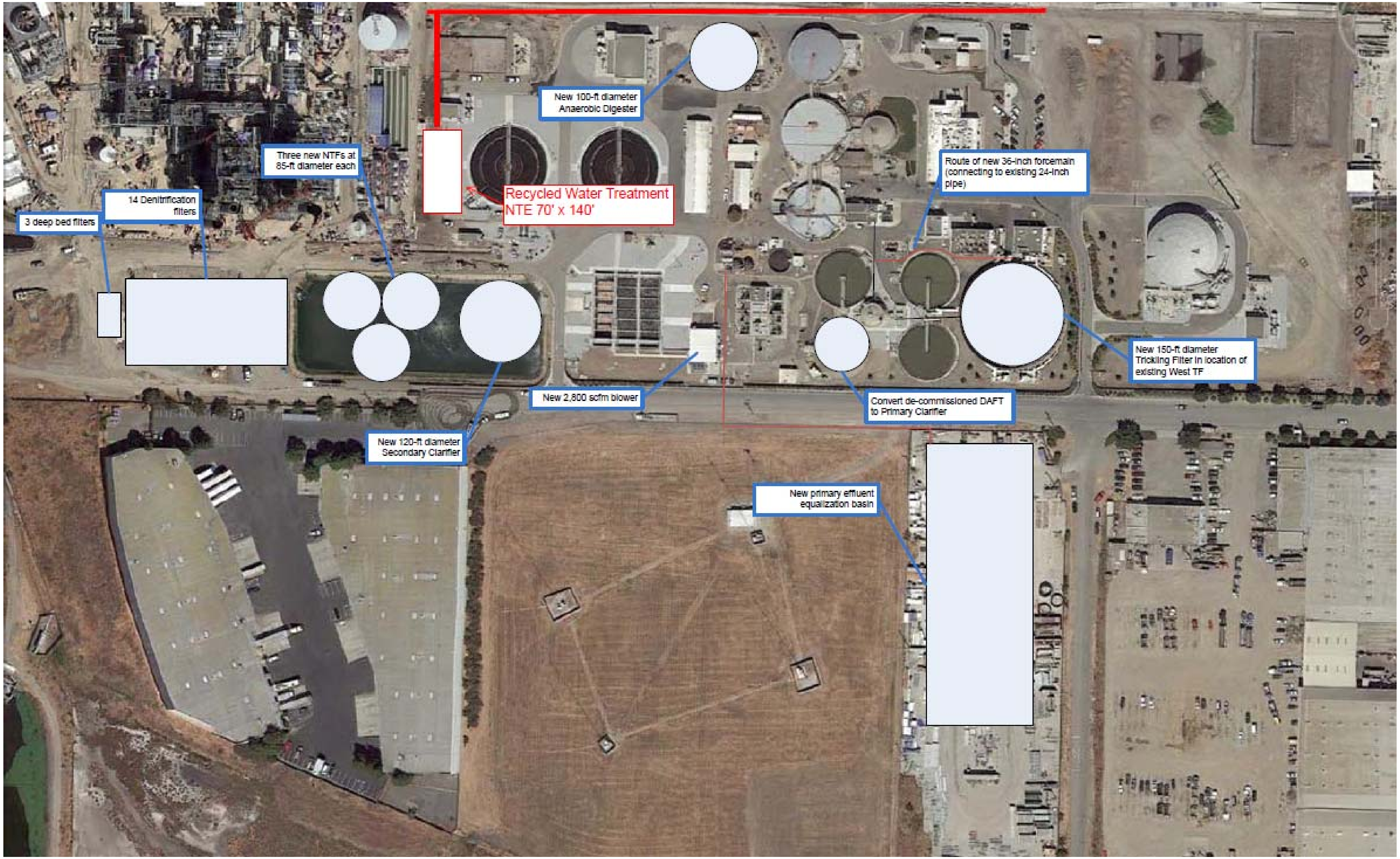
Figure 5-2: Proposed Location of Tertiary Treatment Facilities at Hayward WPCF



5.2 Updated Cost Estimate

Table 5-2 summarizes the cost information for the Recommended Project. Estimated costs are referenced to the September 2013 Engineering Construction Cost Index (ENR CCI) for San Francisco of 10,389.59.

Table 5-2: Cost Estimate Summary

Description	Cost [b,c]
Treatment Facilities	$0
Treated Recycled Water Storage	$720,000
Potable Backup Water Supply	$106,000
Distribution Pump Station	$1,030,000
Main Pipelines	$1,188,000
Lateral Pipelines	$1,815,000
User Connections	$385,000
Subtotal	**$5,244,000**
Contractor Overhead and Profit (10%)	$524,000
Change Order Allowance (5%)	$262,000
Level of Estimate Contingency (30%)	$1,573,000
Total Construction Cost	**$7,603,000**
Engineering and Construction Management/Environmental/Administration/Legal (35%)	$2,661,000
Total Capital Cost	**$10,264,000**
Annualized Capital Costs [a] ($/year)	$545,000
Annual O&M Costs ($/year)	$204,000
Total Annualized Cost ($/year)	$749,000
Estimated Recycled Water Yield (AFY)	285
Unit Cost, Annualized ($/AF)	**$2,630/AF**

Notes:
a. Annualized at 30 years, 3.30%
b. Costs are referenced to September 2013 ENR CCI for San Francisco of 10,389.59.
c. See Appendix E -Cost Estimate for detailed cost information.

5.3 Updated Benefits

Overall, the Recommended Project helps the City to address the project drivers listed in Chapter 1 while also leveraging the investment of a single industrial customer to maximize the public benefit of recycled water use. The Recommended Project provides the City with the key benefits summarized in **Table 5-3** at an incremental construction cost of $7.6 million. **Table 5-4** identifies benefits to stakeholders other than the City.

Table 5-3: Key Benefits to the City

Benefit Category	Description
Economic Growth and Development	▪ Provides water to for non-potable industrial uses. ▪ Provide water to support redevelopment of industrial areas near WPCF.
Diversifying Water Sources	▪ Provides 285 AFY of locally controlled, drought-proof water supply for non-potable uses. ▪ Reduces dependence on SFPUC imported water
Environmental Protection	▪ Reduces mass loading of regulated constituents to the San Francisco Bay.
Sustainability	▪ Conserves potable water for its highest uses. ▪ Beneficial reuse of an existing City-owned resource.

Table 5-4: Potential Benefits to Other Stakeholders

Stakeholder	Key Benefits
SFPUC/BAWSCA	▪ Reduces demand on SFPUC imported water system.
SWRCB	▪ Assists in meeting statewide recycled water use targets. ▪ Extends State water supply with 285 AFY of drought-proof, non-potable water.

5.4 Updated Construction Financing Plan

5.4.1 City/Calpine Partnership

As discussed in Chapter 1, Calpine's interest in utilizing tertiary treated recycled water at its power generation facility was one of the drivers for the City's development of this Plan. Calpine and the City are still in negotiations on the partnership but it is assumed that Calpine will provide tertiary treated water to the City. For the purpose of this Plan, Calpine was assumed to provide tertiary treated water at no cost to the City while the City is the primary funding source for the distribution system.

5.4.2 Outside Funding/Financing Sources

There are various sources of outside funding the City can choose to pursue to aid in funding/financing the Project. **Table 5-5** summarizes the recommended outside funding/financing sources including potential contribution.

Table 5-5: Potential Outside Funding/Financing Sources

Partner / Method	Description / Project Benefits to Partner	Potential Contribution to Recommended Project
SWRCB Construction Grant	SWRCB operates a Recycled Water Construction Financing Grant program. The City obtained a SWRCB Facilities Planning Grant to complete this Plan for the project and is therefore expected to be a high priority for obtaining a construction grant. SWRCB grants can cover up to 25% of eligible project costs up to a $4 million cap. Funds are allocated through a competitive process when available.	$2.6 million [a]
Proposition 84 through the IRWMP	SWRCB and DWR operate an Integrated Regional Water Management Planning (IRWMP) Grants program. Current funding for the IRWMP Grant program comes from Proposition 84, passed by California voters in 2006. Through the Bay Area IRWMP, the City may have access to Proposition 84 grants. Funds are allocated through a competitive process.	--- [b]
Federal Grant	Federal Bureau of Reclamation (USBR) operates the Title XVI Grant Program and other programs. Through the Bay Area Regional Water Recycling Program (BARWRP), the City may have access to Federal grants. National Environmental Policy Act (NEPA) coverage would be required for the project in addition to meeting CEQA requirements. City would need to enter into agreement with the USBR	--- [b]
SWRCB State Revolving Fund (SRF) Loan	Low-interest construction loans are available to public agencies based on a prioritized list of projects. The City will need to apply to put the Project on the priority lists for the loan program. The SRF loan program has a 20 year payback at low-interest rates. The City can consider using program to help finance the Project.	Loan (no set amount); savings are on annual debt service

Notes:

a. These costs total approximately $10.3 million, of which 25% is $2.6 million.

b. Access to these funding sources is highly competitive, requiring active engagement by the City in ongoing planning and advocacy, and was therefore not assumed as potential contributions at this time.

5.4.3 City Funds

To fund the remaining portion of the project, the City would add the Project to its Capital Improvement Plan (CIP) and finance the facilities' construction through rates. The City will need to determine whether all water utility customers should support financing the Project (recycled water surcharge applied to all water customers), because this water supply benefits all customers by making the entire City supply more reliable, or only the recycled water customers (recycled water unit cost charged to recycled water customers based on usage), or both.

5.4.4 Cash Flow Analysis

Monthly cash flows during the design and construction of the Project were analyzed along with assumed payments from the City, and outside funding sources based on costs at the midpoint of construction. From this analysis, the City can expect to have average project payments of $0.5 million per month during construction. A spreadsheet with the complete cash flow analysis is included in **Appendix G - Construction Financing Plan.**

5.5 Updated Comparison to Freshwater Alternative

Demands being supply by recycled water in the Project will be present even if the Project is not implemented. Without the Project, these demands would continue to be met using freshwater supplies from the SFPUC. **Table 5-6** shows a comparison between implementation of the Project or utilizing more freshwater supplies from SFPUC.

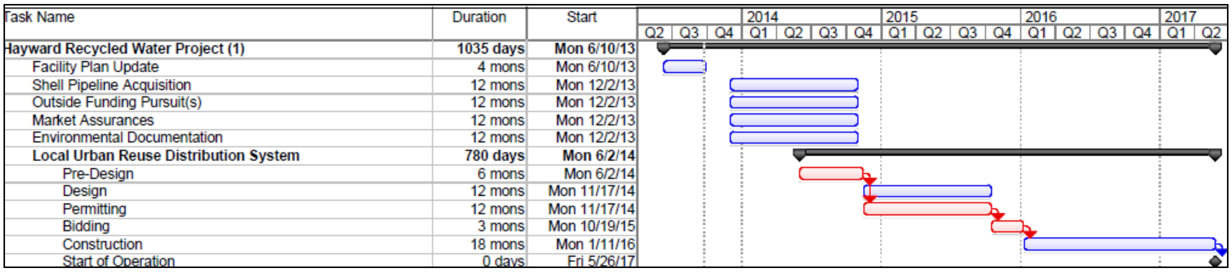
Table 5-6: Recommended Project vs. Freshwater Alternative Comparison

Criteria	Hayward Recycled Water Project	Status Quo – Supply from SFPUC
Summary		
Description	Development of treatment and distribution systems to provide recycled water for irrigation and industrial uses	Status quo. No additional facilities required.
Water Supply	Recycled water from the Hayward WPCF, treated to Title 22 standards for unrestricted reuse	Surface water from Tuolumne and Alameda watersheds
Benefits		
Diversifying Water Sources	285 AFY of drought-proof locally controlled water supply for non–potable uses	
Sustainability	Conserves potable water for its highest beneficial use	
Economic Development	Provides additional non-potable water source suitable for industrial uses	
Costs		
Capital Cost	$10.2 million (Sept 2013 dollars)	None
Unit Cost ($/AF)	$2,630/AF (delivered; without funding)	$1,500/AF in 2016 (wholesale – see Chapter 2)
Other Potential Future Costs/Risks	▪ Cost of salinity and nitrogen management program ▪ Cost of groundwater monitoring	▪ Risk of unavailable supplies during periods of drought ▪ Risk of supply interruption following a catastrophic event (e.g. earthquake) ▪ Risk of additional future cost increases

5.6 Updated Implementation Plan

Figure 5-3 shows the proposed implementation schedule for the Recommended Project. The schedule includes implementation of the tertiary treatment facilities and the distribution system.

Figure 5-3: Project Implementation Schedule



Task Name	Duration	Start
Hayward Recycled Water Project (1)	**1035 days**	**Mon 6/10/13**
Facility Plan Update	4 mons	Mon 6/10/13
Shell Pipeline Acquisition	12 mons	Mon 12/2/13
Outside Funding Pursuit(s)	12 mons	Mon 12/2/13
Market Assurances	12 mons	Mon 12/2/13
Environmental Documentation	12 mons	Mon 12/2/13
Local Urban Reuse Distribution System	**780 days**	**Mon 6/2/14**
Pre-Design	6 mons	Mon 6/2/14
Design	12 mons	Mon 11/17/14
Permitting	12 mons	Mon 11/17/14
Bidding	3 mons	Mon 10/19/15
Construction	18 mons	Mon 1/11/16
Start of Operation	0 days	Fri 5/26/17

1. Ongoing activities such as project management and stakeholder/public outreach are not represented. Schedule subject to changes based on negotiations with Calpine.
2. Tertiary treatment plant implementation from pre-design through construction could be compressed significantly should Calpine be the lead contracting agency. For example, all activities from pre-design through construction were complete in 24 months for the Calpine/DDSD project.

Facility Plan

As of September 2013, the Facility Plan (this report) is in final form.

Shell Oil Pipeline Acquisition

As of December 2008, the City is reinitiating discussions with the Shell Corporation to acquire the Shell Oil pipeline. These discussions had occurred previously with Shell but had not been finalized. Based on the transfer of abandoned pipelines to other public agencies in the area (e.g. Central Contra Costa Sanitary District), it is anticipated acquisition could occur in 12 months or less.

Outside Funding Pursuits/Negotiations with Calpine

As discussed in the Construction Financing section, the City plans to pursue outside funding from the SWRCB for a portion of the Project costs. The City will likely apply for the 2014/15 funding cycle as environmental documentation would need to be ready.

Market Assurances

To ensure the use of recycled water by the targeted market if the Recommended Project is built, the City is planning to issue a Recycled Water Ordinance. A copy of a sample ordinance similar to what the City plans to adopt is provided in **Appendix H -Sample Recycled Water Ordinance.**

The City has already signed a Will Serve letter with Calpine. A copy of this letter is included in **Appendix I -Calpine Will Serve Letter (2001).** Recycled water flows identified in the Will Serve letter are being reevaluated and this Plan contains the latest available information.

Environmental Documentation

An initial analysis of the environmental impacts that would be expected to occur from construction and operation of the Recommended Project has been conducted. The analysis shows that the majority of the impacts would be less than significant or less than significant with mitigation incorporated. Because no significant, unavoidable impacts were identified during this preliminary analysis, an Initial Study/Mitigated Negative Declaration (IS/MND) appears to be the appropriate level of environmental review for this project. The IS/MND will provide a more detailed description of the project as well as explain the thresholds used in the determination of environmental impacts. In addition, the IS/MND would elaborate on the mitigation measures that are proposed to avoid or reduce potential impacts to less-than-significant levels. Refer to **Appendix F -Environmental Checklist** for the detailed Environmental Checklist.

Tertiary Treatment Plant Facilities and Local Urban Reuse Distribution System

- **Pre-Design**. Following completion and approval of this Plan, the City could commence on the pre-design of the tertiary treatment plant facilities to finalize the treatment processes, sizing and layout to be used in the final design. Additionally, following the completion of this Plan, the City will commence its pre-design of the distribution system to finalize the pipeline alignments, materials, sizing, and customer connections to be used in the final design. The pre-design information would be needed to complete the IS/MND.
- **Permitting**. In conjunction with pre-design of the treatment and distribution facilities, the City would begin acquiring permits for the additional treatment facilities and the distribution system/recycled water use. **Table 5-7** summarizes the expected stakeholders and agencies that will be involved in permitting or review of the tertiary treatment facilities and the local urban reuse distribution system.

Table 5-7: Jurisdictional and Stakeholder Agencies for Permitting or Review for the Facilities and Recycled Water Use

Agency Name	Permits or Special Topics
California Regional Water Quality Control Board	Waste Discharge Requirements and/or Water Recycling Requirements [a,b,c]
California Department of Public Health	Title 22 Engineers' Report for the Distribution and Use of Recycled Water
San Francisco Bay Air Quality Management District	Permit to Construct
San Francisco Bay Conservation and Development Commission	Construction near the San Francisco Bay Shoreline
City of Hayward Department of Public Works	▪ Grading and clearing ▪ Encroachment Permit
California Department of Fish and Game	Stream Bed Alteration Agreement/Waiver, if necessary
Caltrans	Encroachment Permit
Pacific Gas and Electric, cable and telecommunications providers	Infrastructure review, as applicable

Notes

a. The Waste Discharge Requirements and/or Water Recycling Requirements will cover the production, distribution, and use of recycled water.

b. Various permitting strategies (e.g. Master Permit, Project Specific Permit) can be employed for this project. The best strategy should be defined as the project moves forward.

c. In February 2009, SWRCB passed Resolution No. 2009-0011: Policy for Water Quality Control for Recycled Water Policy. This policy requires every basin and sub-basin in California to develop a Salt/Nutrient Management Plan to protect the region's water quality as part of the recycled water project permitting process by 2014. The degree of detail will depend on site specific factors such as basin size, basin complexity, hydrogeology, recycled water quality, aquifer water quality, etc.

- **Design and Construction**. Assuming acquisition of the Shell Oil pipeline and adequate funding can be secured in 2013/14, the City could commence design of the local urban reuse distribution system in 2014 and begin construction in early 2016. **Appendix J -Customer Connection Schedule** includes the schedule for customer connections that will need to occur before startup of the distribution system and commencement of recycled water deliveries.

References

California's Groundwater Bulletin 118 (2006). Santa Clara Valley Groundwater Basin, Niles Cone Subbasin.

City of Hayward (2005). Urban Water Management Plan.

DiFillippo, M.N. Cooling Tower Water Quality Parameters for Degraded Water, Table 2-1. Prepared for the California Energy Commission, April 2006 (CEC-500-2005-170).

ESA+Orion (2008). Final Programmatic Environmental Impact Report for SFPUC Water System Improvement Program. Case No. 2005.0159E.

Loretitsch, G. Puckorius & Associates (2002). Guidelines for Managing Water in Cooling Systems for Owners, Operators, and Environmental Managers, Table 2.01.

RMC Water and Environment. (2007). City of Hayward Recycled Water Feasibility Study.

Appendix A - HARD and HUSD Meeting Notes

City of Hayward
Recycled Water Facilities Plan
Meeting with Potential Recycled Water Customer

September 2, 2008

RMC *Innovative Solutions for Water and the Environment*

Meeting Agenda

- Introduction and Background
- Project Overview
- Project Schedule and Next Steps
- Questions or Comments

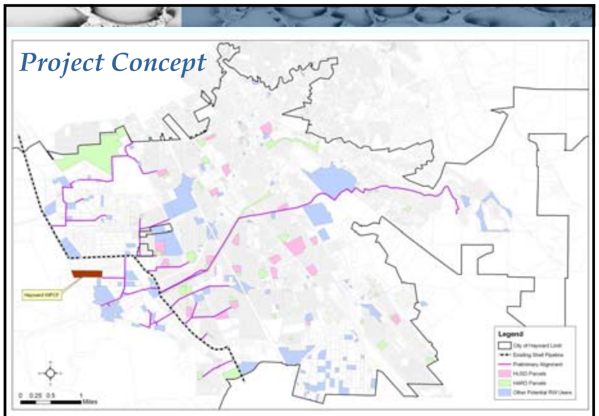
Driving Factors for Recycled Water Use

- Expected growth
- Increases in SFPUC water charges
- Potential for increasingly stringent discharge requirements
- Provides sustainable alternative to using potable water for certain applications

Purpose of Facility Plan

- Evaluate the recycled water potential within the City and confirm the quantity and quality of available recycled water supplies.
- Evaluate and improve conceptual alternatives for treatment, storage, and distribution of recycled water.
- Develop an implementation plan for the selected alternative, including construction financing.

Project Concept



Source: Recycled Water Feasibility Study (RMC, 2007)

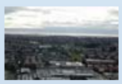
Primary Benefits to Potential Customers

- Provides reliable, locally controlled supply
- Reduces water rationing in droughts
- Is in-line with green business practices
- Results in potential cost savings on your water bill

Who is a Potential Customer?



- Anyone along the pipeline path with irrigation or other uses for non-potable water.
- The greater your usage of non-potable water, the more we are interested in your participation to make this project work.


RMC

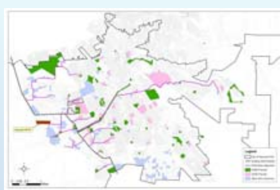
Project Schedule

- Facility Planning work is in progress, scheduled to be completed in February 2009.
- If the City decides to move forward with implementation
  - Design could start in late 2009/2010
  - Recycled water could be available in 2012

RMC

Immediate Next Steps

- Refining Project Alternatives and Facilities
- Defining Project Phases
- Developing Construction Financing Plan; Pursuing Outside Sources of Funding
- Getting Potential Customer Input/Feedback



RMC

Questions or Comments?

Marilyn Mosher
Marilyn.Mosher@hayward-ca.gov

Helene Kubler
hkubler@rmcwater.com

RMC

From: Helene Kubler
Sent: Tuesday, September 09, 2008 5:56 PM
To: Marilyn.Mosher@hayward-ca.gov
Cc: Joanne Siew
Subject: Recycled Water Facilities Plan - Summary Notes from HARD and HUSD Meetings and Progress Meeting #2

Marilyn,

Please find below a brief summary of discussion and action items from our September 2 meetings for your records.
Let us know if you have any additions or clarifications.

Helene
415-321-3423

HARD Meeting
Date: Tuesday, Sept 2, 2008
Time: 10 – 11 am

Attendees: Larry Lepore (HARD, Park Superintendent), Karl Zabel (HARD), Alex Ameri, Marilyn Mosher (Hayward), Helene Kubler, Joanne Siew (RMC)

Agenda: Introductions/Meeting Objectives; Project Overview; Project Schedule and Next Steps; Questions or Comments

Main Discussion Items:

Skywest Golf Course
- Larry mentioned that HARD has been irrigating the golf course with disinfected secondary effluent from the EBDA pipeline for approximately 20 years.
- Disinfected secondary effluent is used to irrigate both greens and fairways.
- HARD does not water within 30 feet of the fence line of Skywest Town Homes, which is located next to the golf course.
- Larry noted that HARD had to redo 8 of the greens and noted the poor drainage (largely due to the tarmac layer that underlies the soil).

HARD Parks
- Larry noted that there were two new parks which were not indicated on the HARD parcels map: Lewis Park and Jalquin Vista Park.
- He also noted that Rancho Arroyo Park is considered part of the Ochoa School's property.

Impact of Water Rationing on HARD
- Alex indicated that Hayward may have to implement water rationing next year if drought conditions continue, and the impact on HARD could be a reduction of 10-30% in their water allocation.

Potential Water Quality Issues/Concerns
- Larry noted that the main concerns regarding the use of recycled water for irrigation (based on their experience with Skywest Golf Course) could be the cumulative water quality effects on the soil and drainage; however Larry noted that he would still support its use.

- Larry also noted the need to address potential questions from the public on water quality issues associated with recycled water as it relates to public health.
- Larry noted that there are groundwater wells located at the following parks in Hayward: Mission Hills (>500 ft); Kennedy Park (300 ft); Elridge Park. Well water is used for irrigation of Kennedy Park and Mission Hills Park. Some of the wells are not in used for cost reasons (e.g., San Lorenzo Park)

Other Questions

- Karl queried if the project could supply recycled water to irrigate parks in areas just outside Hayward's boundary (within EBMUD service area), such as San Lorenzo and San Felipe parks. Alex responded that the City would need to explore this possibility with EBMUD.
- Karl asked whether homeowners' associations were being targeted as well. Marilyn indicated that the target users at this point have been focused on public and commercial/industrial users. Helene added that demand associated with homeowners' associations is usually small, unless there is a major new development; this demand could therefore be served if the recycled water pipeline is aligned in a nearby street. This does not impact the Facility Plan and project definition, but could be considered in later phases of the project (design).
- Karl asked whether recycled water could be used at cemeteries.Yes - it can.
- Larry asked about the possibility of using emergency wells at nearby parks (for regular use). The City could explore this possibility as part of the upcoming Groundwater Management Plan.

Follow-Up Tasks

- Larry/Karl will review the HARD parks shown on the map and highlight any <u>large</u> parks that might not have been included to Marilyn by the end of next week.
- Larry/Karl will also provide Marilyn with a list of wells at parks, indicating if possible which ones are in used and what percentage of the demand they serve, by the end of next week.
- Marilyn will coordinate with HARD to obtain the address/parcel information for Lewis and Jalquin Vista Parks.

HUSD Meeting
Date: Tuesday, Sept 2, 2008
Time: 2 - 3 pm

Attendees: Billy Martin (HUSD; Director Maintenance Operations & Transportation), Alex Ameri, Marilyn Mosher (Hayward), Helene Kubler, Joanne Siew (RMC)

Agenda: Introductions/Meeting Objectives; Project Overview; Project Schedule and Next Steps; Questions or Comments

Main Discussion Items:
Potential Concerns Relative to Recycled Water Use for Schoolyard Irrigation

- The irrigation sprinklers are timed to water in the evenings when students are not around; but in case of a power loss at night, they may come on mid-day when children are on the fields and contact with the water from the sprinklers.
- Type of residue that would be left on the grass from the use of recycled water in view of the potential risk of body contact cross-contamination.
- Posting up notices that recycled water is used on school premises may raise concerns among parents. Education would be needed and should account for language diversity.
- In conclusion, Billy said that outreach and education would likely be needed to get Board approval to use recycled water for school yard irrigation.

Suggestions for Building School Board Support

- Provide substantial evidence on the safety of using recycled water for irrigation from the CA Department of Public Health.
- Provide a list of schools (as recent as possible) using recycled water for irrigation in California and nearby counties.
- Give a presentation to the School Board providing project background, CA Department of Public Health perspective and examples of places where it has been done before, and clearly articulating the upside and downside of using recycled water.

Other

- Some schools are currently using well water for irrigation.
- The Board is currently looking into LEED Certification, solar program, and Green certification for its facilities.

Follow-Up Tasks

- Billy will review the HUSD parcel map to identify and potentially missing or mislabeled schools and will compile a list of schools that have wells and use the wells for irrigation. Billy will provide that information to Marilyn by the end of next week.
- The City will provide Billy example of schools using recycled water for irrigation.

Appendix B - Potential Recycled Water Customers

#	Potential Customer	Customer Type	Primary Type of RW Use	Secondary Type of RW Use	Method of Estimate	Irrigation - Average Annual RW Demand (AFY)	Irrigation - Annual RW Demand Estimate (mgd)	Irrigation - Peak Month RW Demand Estimate (mgd)	Revised Industrial - Average Annual RW Demand (AFY)	Industrial - Annual RW Demand Estimate (mgd)	Industrial - Peak Month RW Demand Estimate (mgd)	Total - Average Annual RW Demand (AFY)	Total - Annual RW Demand Estimate (mgd)	Total - Peak Month RW Demand Estimate (mgd)	Business Code Calcuations: Total Water Use (AFY) (2006)	Business Code Calcuations: Original Non-Irrigation Use Factor	Business Code Calcuations: Revised Non-Irrigation Use Factor	Business Code Calcuations: Revised Industrial Average Annual RW Demand (AFY) (loops back to K Column)	Irrigation - Peak Hour Demand (mgd)	Industrial - Peak Hour Demand (mgd)	Total - Peak Hour Demand (mgd)
0	Calpine		Industrial						3475.0	3.100	4.000	3475.0	3.100	4.000					0	4.000	4
1	Bottling Group LLC (Pepsi)	Beverage Manufacturer	Irrigation	Industrial	4	9.1	0.008	0.018	21.8	0.019	0.019	30.9	0.027	0.037	435	0%	5%	21.8	0.054	0.038	0.092
2	Berkeley Farms	Dairy Processor	Irrigation	Industrial	4	2.4	0.002	0.005	13.6	0.012	0.012	16.0	0.014	0.017	272.6	0%	5%	13.6	0.015	0.024	0.039
3	Kobe Precision	Coating, Engraving and Allied Services	Industrial		4	2.4	0.002	0.005	0.0	0.000	0.000	2.4	0.002	0.005	76.8	0%	0%	0.0	0.015	0	0.015
4	Shasta Beverages	Beverage Manufacturer	Industrial		4		0.000	0.000	7.5	0.007	0.007	7.5	0.007	0.007	149.5	0%	5%	7.5	0	0.014	0.014
5	Rohm & Haas	Paints Manufacturer	Industrial		4		0.000	0.000	22.4	0.020	0.020	22.4	0.020	0.020	112	20%	20%	22.4	0	0.04	0.04
6	California State University	School	Irrigation		1	98.9	0.088	0.202		0.000	0.000	98.9	0.088	0.202					0.606	0	0.606
7	Kaiser Medical Center	Hospital	Irrigation	Industrial	4	1.4	0.001	0.002	4.5	0.004	0.004	5.9	0.005	0.006	44.9	2%	10%	4.5	0.006	0.008	0.014
8	Chabot-Las Positas Community College	School	Irrigation *		2	6.1	0.005	0.012		0.000	0.000	6.1	0.005	0.012					0.036	0	0.036
9	City Center Commercial	Operators of Non-Residential Bldgs	Irrigation		2	9.8	0.009	0.021		0.000	0.000	9.8	0.009	0.021					0.063	0	0.063
10	Cell Genesys	Pharmaceutical/Medical Product Manufacturer	Industrial		4		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000	26.1	10%	0%	0.0	0	0	0
11	St. Michael Convalescent Hospital	Hospital	Commercial		2		0.000	0.000	3.4	0.003	0.003	3.4	0.003	0.003					0	0.006	0.006
12	St. Rose Hospital	Hospital	Irrigation	Industrial	4	3.9	0.003	0.007	0.1	0.000	0.000	4.0	0.003	0.007	22	1%	1%	0.1	0.021	0	0.021
13	Holy Sepulchre Cemetery	Cemetary	Irrigation *		2	23.5	0.021	0.048		0.000	0.000	23.5	0.021	0.048					0.144	0	0.144
14	Columbus Manufacturing	Food Manufacturer	Irrigation	Industrial	4	2.7	0.002	0.005	1.0	0.001	0.001	3.7	0.003	0.006	20.4	0%	5%	1.0	0.015	0.002	0.017
15	La Quinta Inn	Motel/Hotel	Commercial		2		0.000	0.000	2.0	0.002	0.002	2.0	0.002	0.002					0	0.004	0.004
16	BART Maintenance Yard	Maintenance Facility	Industrial		2		0.000	0.000	5.2	0.005	0.005	5.2	0.005	0.005					0	0.01	0.01
17	Tom's Laundromat	Laundromat	Commercial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
18	Best Express Foods	Food-related Business	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
19	Henkel Adhesive Corp	Adhesive Manufacturer	Industrial		4		0.000	0.000	6.9	0.006	0.006	6.9	0.006	0.006	17.2	20%	40%	6.9	0	0.012	0.012
20	Caltrans D-4	ROW	Irrigation		1	16.9	0.015	0.035		0.000	0.000	16.9	0.015	0.035					0.105	0	0.105
21	Azuma Foods	Food-related Business	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
22	Islander Motel	Motel/Hotel	Commercial		2		0.000	0.000	1.6	0.001	0.001	1.6	0.001	0.001					0	0.002	0.002
23	Caltrans	ROW	Irrigation		1	15.3	0.014	0.032		0.000	0.000	15.3	0.014	0.032					0.096	0	0.096
24	Caltrans	ROW	Irrigation		1	15.1	0.013	0.030		0.000	0.000	15.1	0.013	0.030					0.09	0	0.09
25	Legacy Partners (Gruma Foods)	Food-related Business	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
26	Baxter Healthcare Corp.	Pharmaceutical/Medical Product Manufacturer	Irrigation	Industrial	4	4.5	0.004	0.009	0.0	0.000	0.000	4.5	0.004	0.009	14.9	0%	0%	0.0	0.027	0	0.027
27	Discovery Foods (American Avenue facility)	Food-related Business	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
28	Food Depot and United Catering	Food-related Business	Industrial	Irrigation	4	1.6	0.001	0.002	1.5	0.001	0.001	3.1	0.002	0.003	30.7	0%	5%	1.5	0.006	0.002	0.008
29	Life Chiropractic College	School	Industrial		4		0.000	0.000	3.0	0.003	0.003	3.0	0.003	0.003	14.9	20%	20%	3.0	0	0.006	0.006
30	SCA Packaging	Food/Medical Packaging Manufacturer	Industrial		4		0.000	0.000	1.5	0.001	0.001	1.5	0.001	0.001	14.9	20%	10%	1.5	0	0.002	0.002
31	RREEF America REIT II	Business Park	Irrigation		1	14.5	0.013	0.030		0.000	0.000	14.5	0.013	0.030					0.09	0	0.09
32	Southland Mall	Retail Center	Irrigation		1	12.8	0.011	0.025		0.000	0.000	12.8	0.011	0.025					0.075	0	0.075
33	RREEF American REIT II	Business Park	Irrigation		1	12.9	0.012	0.028		0.000	0.000	12.9	0.012	0.028					0.084	0	0.084
34	Alameda County Corporation Yard	Maintenance Facility	Industrial		2		0.000	0.000	5.6	0.005	0.005	5.6	0.005	0.005					0	0.01	0.01
35	Morgan Advanced Ceramics	Construction Materials Manufacturer	Industrial		2		0.000	0.000	5.6	0.005	0.005	5.6	0.005	0.005					0	0.01	0.01
36	Hayward Point Eden	Business Park	Irrigation		1	31.6	0.028	0.064		0.000	0.000	31.6	0.028	0.064					0.192	0	0.192
37	Friendly Wash Coin Laundry	Laundromat	Commercial		4		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000	13.3	80%	0%	0.0	0	0	0
38	Pentagon Technologies	Semi-conductor Manufacturer	Industrial		4		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000	14.4	10%	0%	0.0	0	0	0
39	Prologis Trust	Operators of Non-Residential Bldgs	Irrigation		1	14.6	0.013	0.030		0.000	0.000	14.6	0.013	0.030					0.09	0	0.09
40	Bay Center II	Business Park	Irrigation		1	20.2	0.018	0.041		0.000	0.000	20.2	0.018	0.041					0.123	0	0.123
41	Central Concrete Supply	Construction Materials Manufacturer	Industrial		2		0.000	0.000	9.7	0.009	0.009	9.7	0.009	0.009					0	0.018	0.018
42	BB&K Franklin Township	Business Park	Irrigation		1	12.8	0.011	0.025	0.0	0.000	0.000	12.8	0.011	0.025					0.075	0	0.075
43	American Food Distribution	Operators of Non-Residential Bldgs	Irrigation		2	2.5	0.002	0.005		0.000	0.000	2.5	0.002	0.005					0.015	0	0.015
44	Clarmil Manufacturing	Food Manufacturer	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
45	Moreau High School	School	Irrigation		1	12.4	0.011	0.025		0.000	0.000	12.4	0.011	0.025					0.075	0	0.075
46	Jackson-Winton Laundry	Laundromat	Commercial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
47	Pacific Bell	Small Generator?	Irrigation		1	8.6	0.008	0.018	7.1	0.006	0.006	15.7	0.014	0.024					0.054	0.012	0.066
48	Ho Yuan Chan	Automobile-related business	Irrigation		1	11.6	0.010	0.023		0.000	0.000	11.6	0.010	0.023					0.069	0	0.069
49	Home Depot	Retail Center	Irrigation		1	11.6	0.010	0.023		0.000	0.000	11.6	0.010	0.023					0.069	0	0.069
50	Hutch's Car Wash	Carwash	Industrial		2		0.000	0.000	10.4	0.009	0.009	10.4	0.009	0.009					0	0.018	0.018
51	Balch Business Center IV	Business Park	Irrigation		2	2.4	0.002	0.005		0.000	0.000	2.4	0.002	0.005					0.015	0	0.015
52	Olive Garden	Food-related Business	Irrigation		1	1.3	0.001	0.002		0.000	0.000	1.3	0.001	0.002					0.006	0	0.006
53	Wing Nien	Food-related Business	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
54	24-Hour Fitness	Fitness Facility	Irrigation		1	1.6	0.001	0.002		0.000	0.000	1.6	0.001	0.002					0.006	0	0.006
55	Caltrans D-4	ROW	Irrigation		1	10.7	0.010	0.023		0.000	0.000	10.7	0.010	0.023					0.069	0	0.069
56	Calwest Industrial Properties	Business Park	Industrial		2		0.000	0.000	2.1	0.002	0.002	2.1	0.002	0.002					0	0.004	0.004
57	RREEF American REIT II	Business Park	Irrigation		1	7.5	0.007	0.016		0.000	0.000	7.5	0.007	0.016					0.048	0	0.048
58	Garin Regional Park (EBRPD)	Park	Irrigation		1	10.5	0.009	0.021		0.000	0.000	10.5	0.009	0.021					0.063	0	0.063
59	The Clean Machine	Laundromat	Commercial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
60	Dobake Inc.	Unclassified	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
61	Atalaya Properties	Retail Center	Irrigation		1	7.9	0.007	0.016		0.000	0.000	7.9	0.007	0.016					0.048	0	0.048
62	Hayward Community Garden	Park	Irrigation		1	13.3	0.012	0.028		0.000	0.000	13.3	0.012	0.028					0.084	0	0.084
63	Gillig Corp	Automobile-related business	Industrial		4		0.000	0.000	1.0	0.001	0.001	1.0	0.001	0.001	10.2	40%	10%	1.0	0	0.002	0.002
64	Hayward 880 LLC	Business Park	Irrigation		1	9.8	0.009	0.021		0.000	0.000	9.8	0.009	0.021					0.063	0	0.063
65	Fairfield Inn and Suites	Motel/Hotel	Commercial		4		0.000	0.000	1.0	0.001	0.001	1.0	0.001	0.001	9.8	10%	10%	1.0	0	0.002	0.002
66	Home Depot #635	Retail Center	Irrigation		1	11.9	0.011	0.025	0.0	0.000	0.000	11.9	0.011	0.025					0.075	0	0.075
67	Mi Pueblo Food Center	Food-related Business	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
68	Target Corporation	Retail Center	Irrigation		1	9.7	0.009	0.021		0.000	0.000	9.7	0.009	0.021					0.063	0	0.063
69	Hayward Convalescent Hospital	Hospital	Commercial		2		0.000	0.000	1.4	0.001	0.001	1.4	0.001	0.001					0	0.002	0.002

#	Potential Customer	Customer Type	Primary Type of RW Use	Secondary Type of RW Use	Method of Estimate	Irrigation - Average Annual RW Demand (AFY)	Irrigation - Annual RW Demand Estimate (mgd)	Irrigation - Peak Month RW Demand Estimate (mgd)	Revised Industrial - Average Annual RW Demand (AFY)	Industrial - Annual RW Demand Estimate (mgd)	Industrial - Peak Month RW Demand Estimate (mgd)	Total - Average Annual RW Demand (AFY)	Total - Annual RW Demand Estimate (mgd)	Total - Peak Month RW Demand Estimate (mgd)	Total Water Use (AFY) (2006)	Original Non-Irrigation Use Factor	Revised Non-Irrigation Use Factor	Revised Industrial Average Annual RW Demand (AFY) (loops back to K Column)	Irrigation - Peak Hour Demand (mgd)	Industrial - Peak Hour Demand (mgd)	Total - Peak Hour Demand (mgd)
70	Pacific Cheese	Food Manufacturer	Irrigation		1	5.9	0.005	0.012		0.000	0.000	5.9	0.005	0.012					0.036	0	0.036
71	Clean Xpress	Drycleaner	Commercial		2		0.000	0.000	7.6	0.007	0.007	7.6	0.007	0.007					0	0.014	0.014
72	Robert Chang & Associates	Business Park	Irrigation		1	10.3	0.009	0.021		0.000	0.000	10.3	0.009	0.021					0.063	0	0.063
73	American Hotel/Green Shutter	Retail Center	Commercial		2		0.000	0.000	0.9	0.001	0.001	0.9	0.001	0.001					0	0.002	0.002
74	Novo Nordisk Delivery	Management Services	Industrial		4		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000	9.1	20%	0%	0.0	0	0	0
75	Linchen Inc.	Specialty Wine	Irrigation		1	0.9	0.001	0.002		0.000	0.000	0.9	0.001	0.002					0.006	0	0.006
76	International Window Corp	Construction Materials	Industrial		2		0.000	0.000	7.8	0.007	0.007	7.8	0.007	0.007					0	0.014	0.014
77	Hayward Whipple Association	Commercial Center	Irrigation		2	1.0	0.001	0.002		0.000	0.000	1.0	0.001	0.002					0.006	0	0.006
78	Motel 6	Motel/Hotel	Commercial		2		0.000	0.000	0.8	0.001	0.001	0.8	0.001	0.001					0	0.002	0.002
79	Caltrans D-4 HDWS	ROW	Irrigation		1	8.7	0.008	0.018		0.000	0.000	8.7	0.008	0.018					0.054	0	0.054
80	Caltrans D-4	ROW	Irrigation		1	7.7	0.007	0.016		0.000	0.000	7.7	0.007	0.016					0.048	0	0.048
81	Mission Car Wash	Carwash	Commercial		2		0.000	0.000	7.7	0.007	0.007	7.7	0.007	0.007					0	0.014	0.014
82	Bay Cities Auto Auction	Automobile-related business	Irrigation		1	18.3	0.016	0.037		0.000	0.000	18.3	0.016	0.037					0.111	0	0.111
83	TIAA Realty	Business Park	Irrigation		1	8.9	0.008	0.018		0.000	0.000	8.9	0.008	0.018					0.054	0	0.054
84	Hampton Inn	Motel/Hotel	Irrigation		1	2.3	0.002	0.005		0.000	0.000	2.3	0.002	0.005					0.015	0	0.015
85	Domino's Commissary	Food-related Business	Industrial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
86	R&R Laundry	Laundromat	Commercial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
87	Friendly Wash	Laundromat	Commercial		2		0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000					0	0	0
88	Honda of Hayward	Car Dealershiip	Irrigation		1	8.1	0.007	0.016		0.000	0.000	8.1	0.007	0.016					0.048	0	0.048
89	Arden Industrial Center	Business Park	Irrigation		1	7.8	0.007	0.016		0.000	0.000	7.8	0.007	0.016					0.048	0	0.048
90	RREEF Management Company	Business Park	Irrigation		1	7.6	0.007	0.016		0.000	0.000	7.6	0.007	0.016					0.048	0	0.048
91	Mt. Eden High School	School	Irrigation		1	43.1	0.038	0.087		0.000	0.000	43.1	0.038	0.087					0.261	0	0.261
92	Tennyson High School	School	Irrigation		2	5.38	0.005	0.012		0.000	0.000	5.4	0.005	0.012					0.036	0	0.036
93	Ochoa Middle School	School	Irrigation		1	18.4	0.016	0.037		0.000	0.000	18.4	0.016	0.037					0.111	0	0.111
94	King Middle School	School	Irrigation		1	11.8	0.011	0.025		0.000	0.000	11.8	0.011	0.025					0.075	0	0.075
95	Cesar Chavez School	School	Irrigation		1	11.3	0.010	0.023		0.000	0.000	11.3	0.010	0.023					0.069	0	0.069
96	Southgate School	School	Irrigation *		2	0.76	0.001	0.002		0.000	0.000	0.8	0.001	0.002					0.006	0	0.006
97	Bowman School	School	Irrigation		2	3.22	0.003	0.007		0.000	0.000	3.2	0.003	0.007					0.021	0	0.021
98	Eden Garden School	School	Irrigation *		2	2.88	0.003	0.007		0.000	0.000	2.9	0.003	0.007					0.021	0	0.021
99	Eldridge School	School	Irrigation		1	10.7	0.010	0.023		0.000	0.000	10.7	0.010	0.023					0.069	0	0.069
100	Shepherd School	School	Irrigation		1	10.4	0.009	0.021		0.000	0.000	10.4	0.009	0.021					0.063	0	0.063
101	Ruus School	School	Irrigation		1	9.9	0.009	0.021		0.000	0.000	9.9	0.009	0.021					0.063	0	0.063
102	Longwood School	School	Irrigation		1	9.7	0.009	0.021		0.000	0.000	9.7	0.009	0.021					0.063	0	0.063
103	Tyrrell School	School	Irrigation		1	11	0.010	0.023		0.000	0.000	11.0	0.010	0.023					0.069	0	0.069
104	Peixoto School	School	Irrigation		1	1.48	0.001	0.002		0.000	0.000	1.5	0.001	0.002					0.006	0	0.006
105	Loren Eden School	School	Irrigation		1	7.8	0.007	0.016		0.000	0.000	7.8	0.007	0.016					0.048	0	0.048
106	Harder School	School	Irrigation		1	5.2	0.005	0.012		0.000	0.000	5.2	0.005	0.012					0.036	0	0.036
107	Treeview School	School	Irrigation		1	6.7	0.006	0.014		0.000	0.000	6.7	0.006	0.014					0.042	0	0.042
108	Schafer Park School	School	Irrigation		2	1.16	0.001	0.002		0.000	0.000	1.2	0.001	0.002					0.006	0	0.006
109	Park School	School	Irrigation		1	5.8	0.005	0.012		0.000	0.000	5.8	0.005	0.012					0.036	0	0.036
110	Bret Harte School	School	Irrigation		1	4.8	0.004	0.009		0.000	0.000	4.8	0.004	0.009					0.027	0	0.027
111	Burbank School	School	Irrigation		1	2.4	0.002	0.005		0.000	0.000	2.4	0.002	0.005					0.015	0	0.015
112	Palma Ceia School	School	Irrigation *		2	1.36	0.001	0.002		0.000	0.000	1.4	0.001	0.002					0.006	0	0.006
113	Winton Jr. High	School	Irrigation		2	0.84	0.001	0.002		0.000	0.000	0.8	0.001	0.002					0.006	0	0.006
114	Oliver Sports Park	Park	Irrigation		1	35.0	0.031	0.071		0.000	0.000	35.0	0.031	0.071					0.213	0	0.213
115	Kennedy Park	Park	Irrigation		1	21.5	0.019	0.044		0.000	0.000	21.5	0.019	0.044					0.132	0	0.132
116	Mt. Eden Park	Park	Irrigation		1	20.5	0.018	0.041		0.000	0.000	20.5	0.018	0.041					0.123	0	0.123
117	Tennyson Park	Park	Irrigation		1	18.8	0.017	0.039		0.000	0.000	18.8	0.017	0.039					0.117	0	0.117
118	Centennial Park	Park	Irrigation		1	17.4	0.016	0.037		0.000	0.000	17.4	0.016	0.037					0.111	0	0.111
119	Eden Greenway - Part 1	Park	Irrigation		1	10.0	0.009	0.021		0.000	0.000	10.0	0.009	0.021					0.063	0	0.063
120	Skywest Golf Course	Golf Course	Irrigation		1	7.5	0.007	0.016		0.000	0.000	7.5	0.007	0.016					0.048	0	0.048
121	Eden Shores Park	Park	Irrigation		1	12.7	0.011	0.025		0.000	0.000	12.7	0.011	0.025					0.075	0	0.075
122	Five Canyons Park	Park	Irrigation		1	12.1	0.011	0.025		0.000	0.000	12.1	0.011	0.025					0.075	0	0.075
123	Greenwood Park	Park	Irrigation		1	11.7	0.010	0.023		0.000	0.000	11.7	0.010	0.023					0.069	0	0.069
124	Birchfield Park	Park	Irrigation		1	10.8	0.010	0.023		0.000	0.000	10.8	0.010	0.023					0.069	0	0.069
125	Cannery Park	Park	Irrigation		1	10.3	0.009	0.021		0.000	0.000	10.3	0.009	0.021					0.063	0	0.063
126	Schafer Park	Park	Irrigation		1	9.9	0.009	0.021		0.000	0.000	9.9	0.009	0.021					0.063	0	0.063
127	Palma Ceia Park	Park	Irrigation		1	9.7	0.009	0.021		0.000	0.000	9.7	0.009	0.021					0.063	0	0.063
128	Gansburger Park	Park	Irrigation		1	8.2	0.007	0.016		0.000	0.000	8.2	0.007	0.016					0.048	0	0.048
129	Brenkwitz School	School	Irrigation		1	8.0	0.007	0.016		0.000	0.000	8.0	0.007	0.016					0.048	0	0.048
130	Longwood Park	Park	Irrigation		1	7.6	0.007	0.016		0.000	0.000	7.6	0.007	0.016					0.048	0	0.048
131	Weekes Park	Park	Irrigation		1	8.4	0.007	0.016		0.000	0.000	8.4	0.007	0.016					0.048	0	0.048
132	Christian Penke Park	Park	Irrigation		1	7.2	0.006	0.014		0.000	0.000	7.2	0.006	0.014					0.042	0	0.042
133	Eldridge Park	Park	Irrigation		1	7.0	0.006	0.014		0.000	0.000	7.0	0.006	0.014					0.042	0	0.042
134	Stratford Village Park	Park	Irrigation		1	6.9	0.006	0.014		0.000	0.000	6.9	0.006	0.014					0.042	0	0.042
135	Rancho Arroyo Park	Park	Irrigation		1	6.5	0.006	0.014		0.000	0.000	6.5	0.006	0.014					0.042	0	0.042
136	Bidwell Park	Park	Irrigation		1	6.3	0.006	0.014		0.000	0.000	6.3	0.006	0.014					0.042	0	0.042
137	Twin Bridges Park	Park	Irrigation		1	6.0	0.005	0.012		0.000	0.000	6.0	0.005	0.012					0.036	0	0.036
138	Memorial Park/Plunge	Park	Irrigation		1	13.2	0.012	0.028		0.000	0.000	13.2	0.012	0.028					0.084	0	0.084
139	El Rancho Verde School	School	Irrigation		1	5.1	0.005	0.012		0.000	0.000	5.1	0.005	0.012					0.036	0	0.036
140	Canyon View Park	Park	Irrigation		1	5.1	0.005	0.012		0.000	0.000	5.1	0.005	0.012					0.036	0	0.036
141	Ruus Park	Park	Irrigation		1	7.5	0.007	0.016		0.000	0.000	7.5	0.007	0.016					0.048	0	0.048
142	Sorensdale Park	Park	Irrigation		1	4.1	0.004	0.009		0.000	0.000	4.1	0.004	0.009					0.027	0	0.027
143	Stonybrook Park	Park	Irrigation		1	4.1	0.004	0.009		0.000	0.000	4.1	0.004	0.009					0.027	0	0.027

#	Potential Customer	Customer Type	Primary Type of RW Use	Secondary Type of RW Use	Method of Estimate	Irrigation - Average Annual RW Demand (AFY)	Irrigation - Annual RW Demand Estimate (mgd)	Irrigation - Peak Month RW Demand Estimate (mgd)	Revised Industrial - Average Annual RW Demand (AFY)	Industrial - Annual RW Demand Estimate (mgd)	Industrial - Peak Month RW Demand Estimate (mgd)	Total - Average Annual RW Demand (AFY)	Total - Annual RW Demand Estimate (mgd)	Total - Peak Month RW Demand Estimate (mgd)	Total Water Use (AFY) (2006)	Original Non-Irrigation Use Factor	Revised Non-Irrigation Use Factor	Revised Industrial Average Annual RW Demand (AFY) (loops back to K Column)	Irrigation - Peak Hour Demand (mgd)	Industrial - Peak Hour Demand (mgd)	Total - Peak Hour Demand (mgd)
144	College Heights Park	Park	Irrigation		1	2.8	0.002	0.005		0.000	0.000	2.8	0.002	0.005					0.015	0	0.015
145	Fairway Greens Park	Park	Irrigation		1	3.0	0.003	0.007		0.000	0.000	3.0	0.003	0.007					0.021	0	0.021
146	CITY OF HAYWARD	Park	Irrigation		1	13.3	0.012	0.028		0.000	0.000	13.3	0.012	0.028					0.084	0	0.084
147	City of Hayward	Park	Irrigation		1	11.5	0.010	0.023		0.000	0.000	11.5	0.010	0.023					0.069	0	0.069
148	City of Hayward	Park	Irrigation		1	9.9	0.009	0.021		0.000	0.000	9.9	0.009	0.021					0.063	0	0.063
149	CITY OF HAYWARD	Park	Irrigation		1	8.3	0.007	0.016		0.000	0.000	8.3	0.007	0.016					0.048	0	0.048
150	CITY OF HAYWARD	City Hall	Irrigation		1	10.3	0.009	0.021		0.000	0.000	10.3	0.009	0.021					0.063	0	0.063
151	CITY OF HAYWARD	Wastewater Lift Station	Irrigation		1	5.4	0.005	0.012		0.000	0.000	5.4	0.005	0.012					0.036	0	0.036
152	Shaklee Corporation	R&D	Irrigation		1	2.7	0.002	0.005		0.000	0.000	2.7	0.002	0.005					0.015	0	0.015
153	LBA Realty (formerly ETEC)	Business Park	Irrigation		1	11.7	0.010	0.023		0.000	0.000	11.7	0.010	0.023					0.069	0	0.069
154	David Himy	Business Park	Irrigation		1	7.7	0.007	0.016		0.000	0.000	7.7	0.007	0.016					0.048	0	0.048
155	PNK, LLC	Business Park	Irrigation		1	7.8	0.007	0.016		0.000	0.000	7.8	0.007	0.016					0.048	0	0.048
156	Prologis Trust	Business Park	Irrigation		1	7.4	0.007	0.016		0.000	0.000	7.4	0.007	0.016					0.048	0	0.048
157	Hayward Point Eden I LP	Business Park	Irrigation		1	7.6	0.007	0.016		0.000	0.000	7.6	0.007	0.016					0.048	0	0.048
158	Gahrahmat Properties	Business Park	Irrigation *		2	7.9	0.007	0.016		0.000	0.000	7.9	0.007	0.016					0.048	0	0.048
159	Brittania Point Eden	Business Park	Irrigation		1	7.3	0.007	0.016		0.000	0.000	7.3	0.007	0.016					0.048	0	0.048
160	Bay Center II	Business Park	Irrigation		1	7.3	0.007	0.016		0.000	0.000	7.3	0.007	0.016					0.048	0	0.048
161	Sprinkler Fitters	Business Park	Irrigation		1	7.1	0.006	0.014		0.000	0.000	7.1	0.006	0.014					0.042	0	0.042
162	Hayward FGHK	Business Park	Irrigation		1	7.1	0.006	0.014		0.000	0.000	7.1	0.006	0.014					0.042	0	0.042
163	Winton Industrial Center	Business Park	Irrigation		1	7.1	0.006	0.014		0.000	0.000	7.1	0.006	0.014					0.042	0	0.042
164	Stonebrae Golf Course	Golf Course	Irrigation		3	420.7	0.375	0.863		0.000	0.000	420.7	0.375	0.863					2.589	0	2.589
165	Stonebrae Elementary School	School	Irrigation		1	6.7	0.006	0.014		0.000	0.000	6.7	0.006	0.014					0.042	0	0.042
166	Jalquin Vista Park	Park	Irrigation		1	2.3	0.002	0.005		0.000	0.000	2.3	0.002	0.005					0.015	0	0.015
167	Eden Greenway - Part 2	Park	Irrigation		1	10.0	0.009	0.021		0.000	0.000	10.0	0.009	0.021					0.063	0	0.063
168	Eden Greenway - Part 3	Park	Irrigation		1	10.0	0.009	0.021		0.000	0.000	10.0	0.009	0.021					0.063	0	0.063
			Total			**1661.8**	**1.5**	**3.4**	**3639.7**	**3.2**	**4.1**	**5301.5**	**4.7**	**7.6**				85.8	10.239	4.294	14.533

Appendix C - Customer Survey Results Summary

Hayward Recycled Water Feasibility Study – Telephone Survey Results Summary
Water Demand

Cust ID	Customer Name	Major Indoor Water-consuming Applications	Water Use Proportion			Water Use Variations		Potential Indoor Applications for RW	Planning Level Demand			Specialized Onsite Water Treatment
			Product Manufacturing	Boiler	Cooling	Daily	Seasonal		Total Non-Irrigation Water Demand (AFY)	Revised Factor of Usage (%)	Revised Industrial Recycled Water Demand (AFY)	(excluding anti-scaling chemical treatment)
1	Bottling Group LLC (Pepsi)	▪ Beverage production ▪ Sanitation of production equipment (bottles), production lines and floors. ▪ Boiler (used for sanitizing bottling machines and filler – requires drinking water standards) ▪ Industrial cooling (evaporative condenser, AC) ▪ Wastewater pretreatment system	90%	Less than cooling	90,000-150,000 gal/mth	16h/day, 8 h shifts (beginning at 4 am)	Peaks during Spring/Summer/Early Fall.	▪ Evaporative condenser ▪ Cooling towers ▪ Boilers	435	5	22	▪ RO minimal treatment system
2	Berkeley Farms	▪ Cleaning of tanks, silos, fillers ▪ Cooling Towers ▪ Boilers (used for steam sterilization) ▪ Lube system (water used as lubricant for chains) ▪ Case washers	▪ 10% (orange drink production) ▪ 90% (dairy processing – incl. cooling, boilers, cleaning)	No info provided	No info provided	24/7, 6pm-6am (peak)	Relatively consistent year round.	▪ Cooling towers ▪ Evaporative condensers (located next to cooling towers on the roof) ▪ Boilers ▪ Lube system	273	5	14	▪ None
3	Kobe Precision	▪ Semi-conductor operations (reclamation of wafer products – cleaning with R/O water)	▪ 95%	No info provided	No info provided	24/7, 5 days a week	Production fluctuates with demand.	▪ Not identified – RO water is recycled through the entire production process for use in cooling applications.	77	0	0	▪ RO treatment
4	Shasta Beverages	▪ Beverage production	No info provided	No info provided	No info provided	No info provided	No info provided	▪ Assumed similar operations to Pepsi.	150	5	8	▪ Not identified
5	Rohm & Haas Chemicals	▪ Production of water-based emulsions (using de-ionized water). ▪ Boiler feed use ▪ Cooling towers/blowers	40% (de-ionized)	Less than cooling	10-15%	24/7	Higher production from Apr-Sep.	▪ General rinsing off of emulsion coating from production equipment. ▪ Boiler ▪ Cooling towers/blowers	112	20	22	▪ Deionizers
7	Kaiser Medical Center	▪ Restrooms (1 in every hospital room) ▪ Cooling tower ▪ Chillers (closed loop) ▪ Autoclaves – generates steam for equipment sterilization.	Autoclaves for sterilization: 20 gal/min	No info provided	In the order of hundreds of gallons per month	24/7 Offices A/C: 6am-7pm	Higher patient load from Jan-Mar and on hot days (for cooling).	▪ Cooling tower	45	10	5	▪ None
10	Cell Genesys	▪ Pharmaceuticals manufacturing ▪ Boiler ▪ AC cooling	>80% (manufacturing process)	<20% (General utility – incl. showers, sinks, industrial boilers, cooling)	No info provided	No info provided	No info provided	▪ Not identified – piping is co-mingled, so other industrial processes receive the same water used in pharmaceutical production.	26	0	0	▪ Deionizers ▪ UF ▪ Distillers
12	St. Rose Hospital	▪ High-pressure steam boiler for sterilization ▪ Cooling tower	No info provided	1200 gal/mth	1200-1500 gal/mth	No info provided	Cooling – higher load in summer. Boiler – relatively consistent with heavier use in winter.	▪ Cooling tower	22	1	0.1	▪ None
14	Columbus Manufacturing	▪ Food Products Manufacturing ▪ Boilers (1 operational, 1 backup) ▪ Cooling tower ▪ Excess sanitation procedures (e.g. wash down)	▪ 90%	No info provided	No info provided	5-6 days/wk Day (8h)shift: boiling & cooling Night shift:: sanitation	No info provided	▪ Cooling tower ▪ Boilers	20	5	1	▪ None
19	Henkel Adhesive Corporation	▪ Formula component of adhesive product ▪ Cleaning of tanks ▪ Steam generation ▪ Cooling (recirculation of water)	>50%	10-15%	25-30%	5 days/wk, 5am-5pm	Relatively consistent year round.	▪ Boiler ▪ Cooling ▪ Two labs	17	40	7	▪ None
26	Baxter Healthcare Corporation	▪ Pharmaceutical production ▪ Medical device production	63% (Manufacturing process – incl. boilers/HVACs/3 chillers/cooling tower/restrooms/labs/cafeteria)	No info provided	No info provided	9am-5pm	Production fluctuates according to demand.	▪ No suitable applications within production process but is considering re-using water for irrigation after routing the wastewater through neutralization systems.	15	0	0	▪ Filtration system ▪ Neutralization system
28	Food Depot/United Catering	▪ Food products manufacturing	No info provided	No info provided	No info provided	No info provided	No info provided	▪ Assumed similar operations to Columbus Manufacturing.	31	5	2	▪ Not identified.
29	Life Chiropractic College	▪ Restrooms ▪ Cooling towers	No info provided	No info provided	No info provided	9 am – 5pm	Relatively consistent year round.	▪ Assumed water use factor based on business code.	15	20	3	▪ None

Hayward Recycled Water Feasibility Study – Telephone Survey Results Summary
Water Demand

Cust ID	Customer Name	Major Indoor Water-consuming Applications	Water Use Proportion			Water Use Variations		Potential Indoor Applications for RW	Planning Level Demand			Specialized Onsite Water Treatment
30	SCA Packaging	▪ Injection molding ▪ Temperature-controlled packaging (used for vaccines, food – subject to strict regulations) ▪ Boiler (heating medium) ▪ Cooling tower (uses same water from the boiler that is recycled in a closed loop).	80% (after going through boiler)	80% (used in product after running through boiler)	10%	5 days/wk 16 h/day	20-30% increase in last quarter of the year.	▪ Not identified – piping is all linked sequentially.	15	10	1.5	▪ Micro-metalllic treatment
38	Pentagon Technologies	▪ High-purity DI water for use at the site ▪ Cleaning of parts for semi-conductor industry.	80% DI (production process)	DI water from production processes is reused for scrubber (flushing) and cooling tower needs		5 days/wk, 16 h/day	Production fluctuates with demand.	▪ Not identified – DI water is recycled through the entire production process for use in the scrubber and cooling tower.	14	0	0	▪ RO ▪ Deionizers
63	Gillig Corporation	▪ Rinsing of buses after assembly for painting. ▪ Restrooms for 500-600 employees	5-10% (rinsing of buses for painting); Remainder (restrooms)	No info provided	No info provided	2 shifts, 5am-1.30pm (peak)	No.	▪ Could be used for rinsing applications if water does not contain residues.	10	10	1	▪ None
65	Fairfield Inn & Suites **Customer did not return telephone calls**	▪ Restrooms ▪ Laundry Washing ▪ Cooling towers	No info provided	No info provided	No info provided	No info provided	No info provided	▪ In-house laundry	10	10	1	▪ None
								TOTAL	1287		87.6	

Cust ID	Customer Name	Business Type	Major Water-consuming Applications	RW Potential Applications	Water Quality Issues	Onsite Treatment Facilities	Onsite Storage	Booster Pumps	Retrofit Issues	Improvement Plans	Additional Comments
1	Bottling Group LLC (Pepsi)	Beverage Manufacturer	▪ Beverage production ▪ Sanitation of production equipment (bottles), production lines and floors. ▪ Landscape irrigation ▪ Boiler feed use ▪ Industrial cooling (evaporative condenser, AC) ▪ Wastewater pretreatment system	▪ Landscape irrigation ▪ Evaporative condenser	Pepsi HQ has water quality mandates for boiler feed water quality and evaporative cooling water quality. ▪ Hardness - boiler	▪ R/O Treatment ▪ Minimal Treatment System ▪ WW Pretreatment System	20,000 gal surge tank to store water that is processed for production purposes.	No.	Will take significant amount of effort since most piping is underground.	Dependent on national initiative implemented at HQ level.	▪ Steam from the boiler does not come into contact with beverage. ▪ The feasibility of using RW at this facility is dependent upon an assessment by the Engineering Division at the HQ.
2	Berkeley Farms	Dairy Processor	▪ Cleaning of tanks, silos, fillers ▪ Cooling Towers ▪ Boilers (used for steam sterilization) ▪ Lube system (water used as lubricant for chains) ▪ Case washers	▪ Cooling towers ▪ Evaporative condensers (located next to cooling towers on the roof) ▪ Boilers ▪ Lube systems ▪ Case washing ▪ Landscaping	▪ Water used for boilers need to be in line with steam sterilization requirements. ▪ City water is currently run through water softeners before going into boilers. ▪ City water is currently fed directly into cooling towers.	▪ Water softeners	No.	No.	Currently one input source from the City. Will take significant amount of effort since most piping is underground.	No.	▪ Berkeley Farms is considering using "cow water" (water that is evaporated from milk in the skim milk production process) for their case washers, lube systems and cooling towers.
5	Rohm & Haas Chemicals	Water-based Paint Manufacturer	▪ Production of water-based emulsions (using de-ionized water) ▪ Boiler feed use ▪ Cooling towers/blowers	▪ General rinsing off of emulsion coating from production equipment. ▪ Boilers ▪ Cooling towers/blowers	▪ De-ionized water is used for the product. ▪ Water used for boiler feed and cooling towers are treated with anti-scaling chemicals. ▪ Conductivity must not be too high. ▪ City water is currently treated for high pH. ▪ Product is very susceptible to bacterial growth. ▪ Heavy metals conc. needs to be low as facility has a WW discharge limit of 1 ppm.	De-ionizers	Refrigerated water tank (0.24 mil gal) for cooling towers.	No.	Not identified – incoming city water goes into a single input source.	No.	▪ Rohm & Haas is very interested to explore the potential for RW use on their facility. ▪ They were close to making an agreement with Calpine to receive treated discharge water from the proposed Calpine project a few years ago.
7	Kaiser Medical Center	Hospital	▪ Restrooms (1 in every hospital room) ▪ Cooling tower ▪ Chillers (closed loop) ▪ Autoclaves – generates steam for equipment sterilization.	▪ Cooling tower ▪ Restrooms	▪ No critical water quality concerns for cooling tower feed, except typical treatments for anti-scaling, etc.	▪ Charcoal filters for drinking water.	10,000 gal drinking water tank for emergencies.	No.	No significant issues identified with retrofitting condensers to receive RW water since they are isolated systems.	No.	▪ Condensers appear to be the only system available for RW applicable, and are subject to OSHA requirements.
10	Cell Genesys	Pharmaceutical Manufacturer	▪ Pharmaceuticals manufacturing ▪ Industrial boiler ▪ AC cooling	Not identified – piping is co-mingled, so other industrial processes receive the same water used in pharmaceutical production.	▪ Nature of product does not allow for use of RW – not supported by industry. ▪ Due to co-mingling of piping, other manufacturing and some industrial processes receive the same supplies as the product. ▪ Industrial boiler and AC systems have separate water feeds, and are not subject to the same WQ regulations.	▪ De-ionizers ▪ UF ▪ Distiller Use of each system varies acc. to level of purity needed for the process.	No info provided	No info provided	All piping is co-mingled and would be difficult to separate.	No info provided	▪ There is a lab/office facility onsite that uses treated water from the main production process for AC cooling, but the amount of water used is very small.
12	St. Rose Hospital	Hospital	▪ High-pressure steam boiler for sterilization ▪ Cooling tower ▪ Landscape irrigation	▪ Cooling tower ▪ Landscape irrigation	▪ Water for boiler is currently treated with softeners for hardness. ▪ Water for cooling towers is treated with for corrosion inhibition, sulfite injection, and TSS.	Boiler – softener	Three 1000 gal hot water tanks.	Bladder tanks	Not identified. - All piping underground.	Facility retrofits ongoing, but would not impact plumbing.	▪ Boiler and cooling towers could be easily adapted for RW application. ▪ The hospital previously looked at installing a storage tank but found it to be cost prohibitive.
14	Columbus Manufacturing	Food Manufacturer	▪ Boilers (1 operational, 1 backup) ▪ Cooling Tower ▪ Excess sanitation procedures (e.g. wash down)	▪ Cooling tower	▪ Water is currently treated with anti-scaling chemicals.	No info provided	No.	No info provided	No info provided	No info provided	▪ Columbus previously considered using RW for the cooling towers (multi-vac, water cooling, run once per year).

Hayward Recycled Water Feasibility Study – Telephone Survey Results Summary
Water Quality and Other Retrofit Issues

Cust ID	Customer Name	Business Type	Major Water-consuming Applications	RW Potential Applications	Water Quality Issues	Onsite Treatment Facilities	Onsite Storage	Booster Pumps	Retrofit Issues	Improvement Plans	Additional Comments
19	Henkel Adhesive Corporation	Adhesive Manufacturer	▪ Formula component of adhesive product ▪ Cleaning of tanks ▪ Steam generation ▪ Cooling (recirculation of water)	▪ Boiler ▪ Cooling ▪ Two labs ▪ Several restrooms	▪ Product is highly susceptible to bacterial growth. ▪ Water used for boiler/steam generation needs to be of a certain quality so as not to decrease efficiency.	No.	No.	No.	Relatively simple piping and fairly segregated (e.g. cooling). - Incoming city water goes into a single input source.	No info provided	▪ Henkel has expressed a very positive interest in using RW for their cooling and possibly boiler system.
26	Baxter Healthcare Corporation	Pharmaceuticals and Medical Device Manufacturer	▪ Pharmaceutical production ▪ Medical device production ▪ Boilers ▪ HVAC ▪ Chillers (3) ▪ Cooling tower	No suitable applications within production but is considering re-using water for irrigation after routing the wastewater through neutralization systems.	▪ Water quality needs to comply with the manufacturing standards set forth by the FDA. ▪ Iron and Zinc levels cannot be too high.	▪ pH neutralization system ▪ Filtration system (to filter input from City)	No.	No.	Not identified – incoming city water goes into a single input source.	Baxter is conducting a water audit in August 2008 and will evaluate the need for improvements.	▪ Baxter has expressed interest if it is economically feasible, and would provide water that would meet FDA's manufacturing standards.
29	Life Chiropractic College **Customer did not return phone calls**	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided
30	SCA Packaging	Packaging Manufacturer	▪ Injection molding ▪ Temperature-controlled packaging ▪ Boiler (heating medium) ▪ Cooling tower (uses same water from the boiler that is recycled in a closed loop)	Not identified – piping is all linked sequentially.	▪ Product is subject to strict regulations since it is used for vaccines and food. ▪ Discharge requirements are source-controlled. ▪ Metals testing in discharge conducted monthly.	▪ Water softeners ▪ Micro-metallic treatment to remove metals and balance pH. ▪ Anti-scaling treatment.	2000 gal for raw storage (reserved for boiler)	Yes (20-30 pumps – series of pumps for cooling tower, boiler feed)	Piping is all interlinked sequentially. (Water runs through boilers then into product then into cooling towers) - Would have to separate out cooling tower to serve RW separately.	No info provided	No info provided
38	Pentagon Technologies	Semi-conductor Manufacturer	▪ High-purity DI water for use at the site ▪ Cleaning of semi-conductor parts	Not identified - DI water is recycled through the entire production process for use in the scrubber and cooling tower.	▪ Extremely high purity water needed for semi-conductor parts cleaning. ▪ Water that is used for the cooling tower needs to be treated with anti-scaling chemicals.	R/O system for de-ionized water production.	3000 gal (DI-reuse water tanks)	No.	There are potential sections that could be isolated for RW input to cooling and scrubber systems.	No. Because they are at permit discharge limit.	▪ There is currently a significant amount of onsite recycling of DI water because of permit limits in discharge (e.g. scrubbing, cooling systems are all fed by water recycled from DI processes). ▪ Would be interested in the cost-benefit of using RW. ▪ Would need to consider discharge permit issues since they are already at the limit.
63	Gillig Corporation	Bus Manufacturer	▪ Rinsing of buses after assembly for painting ▪ Restrooms for 500-600 employees	Could be used for rinsing applications if water does not contain residues.	▪ Water that is used for rinsing buses cannot contain residues – unsuitable for painting. ▪ Salt and chlorine are potential constituents of concern.	Recycling facility for water from car wash station.	300 gal in the recycling facility.	No.	All piping is underground.	No info provided	▪ Requires water that does not contain residues for the cleaning of buses. ▪ No health issues are anticipated with the use of RW for bus cleaning as they are conducted in automated stations.
65	Fairfield Inn & Suites **Customer did not return telephone calls**	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided	No info provided

Appendix D - Facility Technical Information

Assuming Calpine needs 700,000 gallons - CALPINE ONLY STORAGE

Volume Needed to Serve Demand	764,341	gallons	

Change height and diameter until Cells H20 and H27 are equal.

Tank Height	24	feet	8-ft increments for steel tank
Tank Diameter	74	feet	
Tank Volume	103,220	cubic ft	
Tank Volume	772,087	gallons	
Tank Volume (rounded)	780,000	gallons	
Minimum Draw Down	2	feet	
Minimum Volume	8,602	cubic ft	
Minimum Volume	64,341	gallons	

Assuming Calpine needs 700,000 gallons

Volume Needed to Serve Demand	1,094,068	gallons	

Change height and diameter until Cells C20 and C27 are equal.

Tank Height	24	feet	8-ft increments for steel tank
Tank Diameter	89	feet	
Tank Volume	149,307	cubic ft	
Tank Volume	1,116,819	gallons	
Tank Volume (rounded)	1,120,000	gallons	
Minimum Draw Down	2	feet	
Minimum Volume	12,442	cubic ft	
Minimum Volume	93,068	gallons	

	Item		Units	Notes
Given	Pipe Diameter	14	inch	
Given	Pipe Diameter	1.167	feet	
Calc	Pipe X-Sectional Area	1.07	sq ft	
Given	Peak Hour Demand	4.510	MGD	
Calc	Peak Hour Demand	4,510,000	gal/day	
Calc	Peak Hour Demand	3,132	gal/min	
Calc	Peak Hour Demand	602,941	ft3/day	
Calc	Peak Hour Demand	6.98	ft3/sec	
Calc	Flow Velocity	6.5	ft/sec	CHECK BTWN 5-7 ft/sec
Given	Downstream Pressure Requirement	11	psi	to fill 24-foot tall tank
Given	Pipe Length to Storage PS	20	feet	From Disinfection to Storage
Given	Hazen Williams C factor	130		
Calc	Total Headloss	0.1989091	ft	
Calc	Total Headloss	0	psi	
Calc	Required Upstream Pressure	11	psi	
Calc	Required Head at Pump	25	feet	
Calc	Distribution Pump Horsepower	28.25	hp	
		30 hp is next available standard size motor		

	Item		Units	Notes	
Given	Pipe Diameter	14	inch		
Given	Pipe Diameter	1.167	feet		
Calc	Pipe X-Sectional Area	1.07	sq ft		
Given	Peak Hour Demand	4.650	MGD		
Calc	Peak Hour Demand	4,650,000	gal/day		
Calc	Peak Hour Demand	3,229	gal/min		
Calc	Peak Hour Demand	621,658	ft3/day		
Calc	Peak Hour Demand	7.20	ft3/sec		
Calc	Flow Velocity	6.7	ft/sec	CHECK BTWN 5-7 ft/sec	
Given	Downstream Pressure Requirement	4.5	psi		10.395
Given	Pipe Length to Floc Clarifiers	350	feet	Piping from Influent PS to FC	
Given	Hazen Williams C factor	130			
Calc	Total Headloss	3.6834434	ft		
Calc	Total Headloss	2	psi		
Calc	Required Upstream Pressure	6.5	psi		
Calc	Required Head at Pump	15	feet		
Calc	Distribution Pump Horsepower	17.47	hp		
		20 hp is next available standard size motor			

	Item		Units	Notes
Given	Pipe Diameter	14	inch	
Given	Pipe Diameter	1.167	feet	
Calc	Pipe X-Sectional Area	1.07	sq ft	
Given	Peak Hour Demand	4.000	MGD	
Calc	Peak Hour Demand	4,000,000	gal/day	
Calc	Peak Hour Demand	2,778	gal/min	
Calc	Peak Hour Demand	534,759	ft3/day	
Calc	Peak Hour Demand	6.19	ft3/sec	
Calc	Flow Velocity	5.8	ft/sec	CHECK BTWN 5-7 ft/sec
Given	Downstream Pressure Requirement	80	psi	
Given	Pipe Length to Calpine Facility	600	feet	This is assumed for the purpose of the hydraulic analysis.
Given	Hazen Williams C factor	130		
Calc	Total Headloss	4.7792552	ft	
Calc	Total Headloss	2	psi	
Calc	Required Upstream Pressure	82	psi	
Calc	Required Head at Pump	189	feet	
Calc	Distribution Pump Horsepower	189.39	hp	
		200 hp is next available standard size motor		

	Item		Units	Notes
Given	Pipe Diameter	8	inch	
Given	Pipe Diameter	0.667	feet	
Calc	Pipe X-Sectional Area	0.349	sq ft	
Given	Peak Hour Demand	0.267	MGD	
Calc	Peak Hour Demand	267,000	gal/day	
Calc	Peak Hour Demand	185	gal/min	
Calc	Peak Hour Demand	35,695	ft3/day	
Calc	Peak Hour Demand	0.41	ft3/sec	
Calc	Flow Velocity	1.2	ft/sec	CHECK BTWN 5-7 ft/sec
Given	Downstream Pressure Requirement	80	psi	
Given	Pipe Length to Caltrans	4,100	feet	
Given	Hazen Williams C factor	130		
Calc	Total Headloss	3.3389222	ft	
Calc	Total Headloss	1.4	psi	
Calc	Required Upstream Pressure	81.4	psi	
Calc	Required Head at Pump	188	feet	
Calc	Distribution Pump Horsepower	12.58	hp	
		15 hp is next available standard size motor		

	Item		Units	Notes
Given	Pipe Diameter	8	inch	
Given	Pipe Diameter	0.667	feet	
Calc	Pipe X-Sectional Area	0.349	sq ft	
Given	Peak Hour Demand	1.216	MGD	
Calc	Peak Hour Demand	1,216,000	gal/day	
Calc	Peak Hour Demand	844	gal/min	
Calc	Peak Hour Demand	162,567	ft3/day	
Calc	Peak Hour Demand	1.88	ft3/sec	
Calc	Flow Velocity	5.4	ft/sec	CHECK BTWN 5-7 ft/sec
Given	Downstream Pressure Requirement	80	psi	
Given	Pipe Length to Oliver/Pepsi	19,985	feet	
Given	Hazen Williams C factor	130		
Calc	Total Headloss	268.91057	ft	
Calc	Total Headloss	116	psi	
Calc	Required Upstream Pressure	196	psi	
Calc	Required Head at Pump	453	feet	
Calc	Distribution Pump Horsepower	138.00	hp	
		150 hp is next available standard size motor		

Table J: Treatment plant operational supply and demand summa

Operational Flow			
Hr	Supply	Demand	Storage
	GPM	GPM	Gallons
1	2	3	4
1	451	1,008	301000
2	451	1,008	267604.2242
3	451	1,008	234208.4483
4	451	1,008	200812.6725
5	451	1,008	167416.8967
6	451	35	192386.3914
7	451	35	217355.8861
8	451	35	242325.3809
9	451	35	267294.8756
10	451	35	292264.3703
11	451	35	301000
12	451	35	301000
13	451	35	301000
14	451	35	301000
15	451	35	301000
16	451	35	301000
17	451	35	301000
18	451	35	301000
19	451	35	301000
20	451	35	301000
21	451	1,008	267,604
22	451	1,008	234,208
23	451	1,008	200,813
24	451	1,008	167,417
25	451	1,008	134,021
26	451	1,008	100,625
27	451	1,008	67,230
28	451	1,008	33,834
29	451	1,008	438
30	451	35	25,408
31	451	35	50,377
32	451	35	75,347
33	451	35	100,316
34	451	35	125,285
35	451	35	150,255
36	451	35	175,224
37	451	35	200,194
38	451	35	225,163
39	451	35	250,133
40	451	35	275,102
41	451	35	300,072
42	451	35	301,000
43	451	35	301,000
44	451	35	301,000
45	451	1,008	267,604
46	451	1,008	234,208
47	451	1,008	200,813

Figure J-1: Hourly Supply and Demand

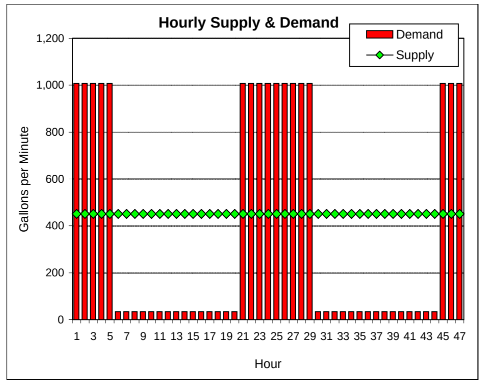


Figure J-2: Water Storage by hour (gallons)

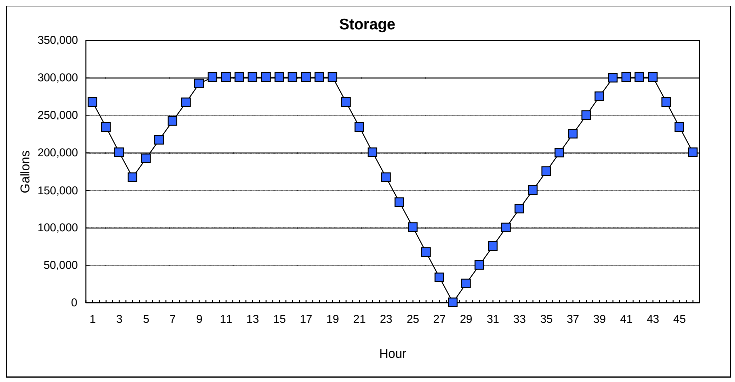


Table K: Project summary

SUMMARY				
Amount of storage used:		300,562		Gallons
Amount of potable used:		0		Gallons
Based on-				
Treatment capacity of:		0.65		MGD
Pumping capacity of:		451		GPM
Supply/Demand Ratio of:		1.17		GPM

Remarks:

(a) Current secondary flow estimated at 11.3 MGD
(b) Same as current flow
(c) Max. amount to be pumped, limited by treatment capacity of 4.65 mgd
(d) Project irrigation demand
(e) N/A
(f) Maximum amount to be treated and pumped, limited by tertiary treatment capacity of 4.65 mgd
(g) Calculations based on starting with full storage at hour 1
(h) Secondary treatment plant flows are always above 4.65 mgd so no diurnal variation of secondary supply is needed.

NOTE: This analysis is only for Operational Storage needs related to City Recycled Water Demands. Calpine demands and storage are excluded from this analysis.

Appendix E - Cost Estimate

RMC
Water and Environment

Project: Hayward Recycled Water Facilities Plan

Aspect: Recommended Project Alternatives

Date: Updated September 2013
Project Number: 0198-002

Prepared by: CDB

Estimate Type: Facilities Planning (10%)

Item		Unit Cost $	Unit	Calpine Option	Total Cost - B $	City Option	Total Cost - C $	Notes
Treatment Facilities and Plant Upgrades		$ 1,160,000	Allowance	0	$ -	1	$ 1,160,000	0.5 mgd tertiary facilities
Pump Station to Serve Irrigation & Industrial Customers								
Base Cost		$ 472,000	Allowance	1	$ 472,000	1	$ 472,000	
Cost per horsepower		$ 3,380	hp	165	$ 558,000	165	$ 558,000	
Calpine Pump Station								
Base Cost		$ 472,000	Allowance	0	$ -	0	$ -	Calpine pumps will be combined into a distribution pump station to other customers, if available
Cost per horsepower		$ 3,380	hp	0	$ -	0	$ -	
Distribution Pipeline to Calpine								
Pipeline to Calpine Facility (14" PVC Pipe)		$ 252	LF	0	$ -	0	$ -	Includes installation, trenching, backfill, etc.
Storage Tank		$ 1.80	gal	400,000	$ 720,000	400,000	$ 720,000	
Distribution Pipelines								
Whitesell South Branch (8" PVC Pipe)		$ 144	LF	3,800	$ 548,000	3800	$ 548,000	Includes installation, trenching, backfill, etc.
Whitesell North Branch (8" PVC Pipe)		$ 144	LF	3,300	$ 476,000	3300	$ 476,000	Includes installation, trenching, backfill, etc.
Retrofit of Shell Pipeline		$ 106,000	Allowance	1	$ 106,000	1	$ 106,000	Based on City description of pipe condition, a low retrofit cost is assumed. Retrofit requirements will be verified with the Dept of Public Health
Connections to Shell Pipeline		$ 58,000	Allowance	1	$ 58,000	1	$ 58,000	
Eastside Mainline (14" PVC Pipe)		$ 252	LF	0	$ -	0	$ -	Includes installation, trenching, backfill, etc.
Laterals to Customers								
6" PVC Pipe		$ 108	LF	16,800	$ 1,815,000	16,800	$ 1,815,000	Includes installation, trenching, backfill, etc.
Use Site Retrofits								
To Property Line		$ 18,300	Customers	21	$ 385,000	21	$ 385,000	Retrofits to the customer's property line will include piping from distribution system to property line, meter, isolation valve
Onsite Retrofits		.			NA		NA	
Potable Backup line		$ 106,000	Allowance	1	$ 106,000	1	$ 106,000	
	Capital Costs			Raw Construction Cost	$ 5,244,000		$ 6,404,000	
		10%		Contractor Overhead and Profit	$ 524,000		$ 640,000	
		5%		Change Order Allowance	$ 262,000		$ 320,000	
		30%		Level of Estimate Contingency	$ 1,573,000		$ 1,921,000	
				Total Construction Cost	**$ 7,603,000**		**$ 9,285,000**	
		35%		Env/Eng/CM/Admin/Legal	$ 2,661,000		$ 3,250,000	
				Total Capital Cost	**$ 10,264,000**		**$ 12,535,000**	
	O&M	13%		Treatment Facilities Ops & Maintenance	$ -		$ 150,800	
		0.50%		Storage Tank Maintenance	$ 3,600		$ 3,600	
		0.50%		Distribution System Maintenance	$ 14,195		$ 9,075	
				Calpine Pump Station Operation Cost	$ -		$ -	Assuming PS run 300 days, 12 hrs a day
				City Pump Station Operation Cost	$ 30,900		$ 30,900	Assuming PS run 260 days, 8 hrs a day
		15%		Pump Station Maintenance Cost	$ 154,500		$ 154,500	
				Total O&M Cost	**$ 204,000**		**$ 349,000**	
				Annual Capital Cost	$ 545,000		$ 665,000	30 years, 3.301% - Municipal Bond Rate retrieved 07Nov12 from Bloomberg.com
				Total Annual Cost	$ 749,000		$ 1,014,000	
				RW Yield (AFY)	285		285	
				Unit Cost	$ 2,630		$ 3,560	

Appendix F - Environmental Checklist

Introduction

The purpose of this preliminary evaluation is to identify expected environmental impacts from implementation (construction and operation) of the Hayward Recycled Water Recommended Project. In addition, this analysis is intended to help the City determine the level of environmental documentation that will be needed at the next stage of CEQA environmental review. The environmental topics discussed in this document are based on Appendix G of the CEQA Guidelines. The anticipated environmental impacts are identified for each resource area. The level of significance for each resource area uses CEQA terminology as specified below:

- No Impact:
- Less than Significant:
- Less than Significant Impact with Mitigation Incorporation:
- Potentially Significant Impact:

Project Description

Chapter 5 of the Hayward Recycled Water Facility Plan provides a discussion of the Hayward Recycled Water Recommended Project[1]. The figures in that section identify the locations of the proposed above-ground facilities within the WPCF and the proposed pipeline alignments within the City's boundaries. For the purposes of this preliminary analysis, it is assumed that construction activities would involve grading, excavation, erection of facilities, installation of pipelines using open-trench construction, retrofitting of the existing Shell Oil pipeline, and backfilling. Typical construction equipment would be used, including but not limited bulldozers, backhoes, water trucks, dump trucks, excavators, and concrete trucks. Construction activities would likely last a total of 2 years overall but would be less for each component (e.g., above-ground facilities at the WPCF and the proposed pipeline segments). Details of the construction scenarios will be developed as the project progresses into design, and will be evaluated in more depth in the upcoming environmental analysis. The following preliminary analysis is based on the current understand of the project construction and operation as described Chapter 5 of the Hayward Recycled Water Facility Plan. This analysis shows that the majority of the impacts would be less than significant. Where potential significant impacts are anticipated, they would be reduced to less than significant with implementation of mitigation measures that will be further developed during the CEQA process. No significant, unavoidable impacts have been identified.

[1] It should be noted that this preliminary analysis does not cover proposed Calpine facilities. Calpine will conduct its own CEQA analysis.

Environmental Topics	Expected Impact	Discussion of Major, Potential Environmental Effects
Aesthetics		
Adverse effect on a scenic vista	NI	• There are no scenic vistas, ridgeline, or roads within the City of Hayward as identified by the City of Hayward General Plan and Caltrans Scenic Highway Program. Construction of all proposed facilities would temporarily alter the visual quality of the affected area due to the presence of construction equipment, but would not result in any permanent visual changes. • Above-ground facilities (e.g., tertiary treatment facilities, tank, and pump) proposed within the WPCF would be expected to integrate in appearance with existing, surrounding industrial facilities. Therefore, visual impacts are not anticipated at the site. • Proposed pipelines would ultimately be buried underground and out of sight. No visual impacts would occur.
Substantial degradation of the existing visual character or quality of the site and its surroundings	LTS	
Creation of a new source of substantial light or glare which would adversely affect day or nighttime views in the area	LTS	
Agricultural Resources		
Conversion oft Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) or conflict with existing zoning for agricultural use or a Williamson Act contract	NI	• The proposed Project is located within an urban area consisting of residential, commercial, and industrial uses. No agricultural lands are located within the project area.
Air Quality		
Conflict with or obstruction of implementation of the applicable air quality plan or cumulative considerable net increase of any criteria pollutant for which the project region is non-attainment	LTS	• Construction activities would generate dust and criteria pollutant emissions that could exceed Bay Area Air Quality Management District (BAAQMD) standards. These emissions have not yet been quantified. However, it is expected that project construction activities would not exceed BAAQMD standards due to the minimal size of the project. Construction emissions would be quantified and confirmed as part of the environmental analysis for the project. In addition, inclusion of dust abatement measures as mitigation would reduce dust emissions. • Sensitive receptors are located more than 1 mile from proposed facilities at the WPCF and within 50 feet of the proposed pipeline alignments. See above regarding emissions resulting from construction of the project. Due to the distance of sensitive receptors from the WPCF, and the continually moving, short-term nature of construction activities along the pipeline route, proposed project construction is not expected to
Violation of any air quality standard or substantial contribution to an existing or projected air quality violation	LTSM	

Exposure of sensitive receptors to substantial pollutant concentrations	LTSM	expose sensitive receptors to substantial pollutant concentrations. See above regarding dust abatement measures. • Operation of the facilities would generate minimal emissions associated with maintenance vehicle trips; such emissions would be expected to be less than significant. • Constructions activities may generate odors associated with use of diesel. However, such odors would be short-term and are not expected to significantly affect the public. Operation of the proposed Project is not expected to generate substantial odors due to the high level of treatment of the wastewater to recycled water.
Creation of objectionable odors affecting a substantial number of people	LTS	
Biological Resources		
Effects on candidate, sensitive, or special status species or sensitive habitat,	LTSM	• A California Natural Diversity Database (CNDDB) search for sensitive resources was conducted for information regarding the locations of known observations of Federal and State-listed sensitive species and habitats in the vicinity of the Project area. Information on wetlands, creeks, and/or other water bodies was derived from the U.S. Fish and Wildlife Service's Wetland Digital Database. Biological resources surveys have not been completed for this preliminary analysis. • Due to the developed nature of the WPCF, no sensitive biological resources are expected at the site. Therefore, impacts to sensitive habitats or special status species from development of the proposed facilities at the WPCF are expected to be less than significant. • Construction and retrofit of the proposed pipeline segments may occur in areas containing sensitive biological resources (e.g., creeks, low-lying areas, etc.). Any direct or indirect effects on sensitive habitats have the potential to also affect associated plant and wildlife species. This would be a potentially significant impact and would require implementation of mitigation measures that avoid or reduce such effects. • Construction and retrofit of the proposed pipeline segments may require the removal of trees, including protected trees designated by the City of Hayward Tree Preservation Ordinance. Such removal would require appropriate mitigation to offset the loss of such sensitive resources.
Substantial interference with the movement of fish or wildlife species, their or native wildlife nursery sites	LTSM	
Conflicts with any local plans, policies or ordinances protecting biological resources	LTSM	
Cultural Resources		
Alteration of or damage to cultural resources (i.e., historical and archaeological resources, including human remains, and paleontological resources	LTSM	• A record search through the Northwest Information Center of the California Historical Research Information System, and cultural resources surveys have not been conducted as part of this preliminary analysis. • Excavation activities could disturb known or unrecorded cultural resources. Any damage or alteration to these resources would be considered significant. However, mitigation measures are available to reduce potential impacts to less than significant levels.
Geology, Soils, and Seismicity		
Exposure of people or	LTS	• Proposed facilities are not habitable structures.

structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic risks or landslides		• The project sites would not be located within an Alquist-Priolo "Earthquake Fault Zone" for fault rupture hazard; Thus, harm to people or damage to proposed facilities from fault rupture are not expected to occur. Proposed facilities would be located within a seismically active region of Northern California and are subject to groundshaking. Design and construction of the facilities would comply with 2001 California Building Code (based on 1997 Uniform Building Code). Secondary seismic effects are not expected in the project area as liquefaction potential is anticipated to be low to moderately low (ABAG 2008) and the project area is located on flat terrain (not subject to landslide hazards). Therefore, the project is not expected to result in significant impacts associated with the exposure of people or structures to harm or damage. • The project area is subject to soil erosion during construction activities. However, implementation of typical Best Management Practices (BMPs) and the required Stormwater Pollution Prevention Plan (SWPPP) would ensure that effects would be minimal. • The proposed project would be located on expansive soil. Potential impacts of building on such soils are considered potentially significant. Implementation of mitigation measures would be required to reduce such effects to less than significant.
Substantial soil erosion or the loss of topsoil	LTS	
Exposure of people or structures to unstable soils	LTSM	
Hazards and Hazardous Materials		
Creation of a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; or accident involving the release of hazardous materials into the environment	LTSM	• Operation of the proposed tertiary facilities at the WPCF and the pipelines would not require the routine transport, use or disposal of hazardous materials, and therefore, is not expected to create a significant hazard to the public or the environment through normal operations. However, UV lamps used for treatment of the wastewater would contain mercury that may be a hazard if accidentally broken or disposed of improperly; the City would be required to properly dispose of broken or spent lamps in compliance with lamp recycling regulations. • Construction activities would involve the use of certain potentially hazardous materials such as fuels, oils and solvents. Accidental releases of these materials into the environment could occur during construction activities and constitute a significant impact on public health and the environment.. Mitigation measures would be implemented to reduce potential impacts to less than significant levels. • Retrofit of the existing Shell Oil Pipeline may result in the release of residual hazardous materials that may pose a threat to public health. It is expected that mitigation measures would be available to reduce impacts to a less than significant level. • A Department of Toxic Substances Control list of hazardous materials sites search was conducted to determine the proximity of proposed Project Area to Federal Superfund Sites, State Response Site, Voluntary Cleanup Sites, and School Cleanup Sites. The Project area is located near a number of voluntary cleanup sites, one State Response site, a Hazardous Waste Permit site, and a Hazardous Waste Correction Action Site. The project may encounter these and unknown or unrecorded hazardous material sites (e.g., potentially in the vicinity of the existing Shell Oil pipeline). Encountering contaminated soils and/or
Emission or handling of hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LTSM	
Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5	LTS	

Located within two miles of a public airport or private airstrip and result in a safety hazard for people residing or working in the project area.	NI	groundwater may result in a public health hazard. Mitigation measures would be available to address this issue and reduce potential impacts to less than significant. • There are no existing or proposed schools located within one-quarter mile of the proposed tertiary facilities at the WPCF. Five educational institutions (Mt. Eden High School, Loren Eden High School, Brenkwitz School, Chabot Las-Positas Community College and Life Chiropractic College) are located within one-quarter mile of the proposed pipeline alignments. In addition, other facilities used by children, including Christian Penke Park, Oliver Sports Fields, Mt. Eden Park and Eden Greenway are located nearby. Operation of the pipelines would not result in emissions of hazardous waste. Please see above for a discussion of construction activities. • Proposed project facilities would not be located within any sites included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 (Cortese List). The only site identified on the list within the City of Hayward is located within the Hayward Executive Airport, which is located approximately two miles away from the nearest project facilities • The proposed tertiary facilities are located within two miles of the Hayward Executive Airport. New above-ground structures are not expected to interfere with any airport operations or result in a safety hazard for people working in the WPCF site. • Construction is not anticipated to interfere with an emergency response plan or emergency evacuation plan. • The proposed Project is located within an urban setting and would not expose people to wildfire risks; therefore, no impacts are anticipated.
Exposure of people or structures to significant risk of loss, injury or death involving wildland fires	NI	
Hydrology and Water Quality		
Violation of water quality standards or waste discharge requirements or degrade water quality	LTS	• The proposed Project would involve the treatment of wastewater to recycled water quality standards (Title 22) for use as non-potable supply (e.g. outdoor irrigation and industrial uses such as cooling and/or boiler feed systems). Compliance with Title 22 standards would ensure protection of public health. • The proposed tertiary treatment facilities at the WPCF would improve effluent water quality from the WPCF by eliminating common by-products of chlorine disinfection. • Water quality effects from construction would be reduced with standard erosion control techniques, implementation of BMPs and the SWPPP, • The proposed Project would not require the withdrawal of groundwater resources. Dewatering associated with construction activities may occur but is not expected to result in substantial depletion of groundwater supplies or interference with groundwater recharge. • The tertiary treatment facilities would be located on an existing disturbed dirt site within the WPCF property that was used as a construction staging area for the recent treatment plant upgrades. The proposed pipeline alignments would be located primarily within disturbed, paved road rights-of-way. Therefore, impacts associated with substantial alteration of the existing drainage pattern of the site or area are
Substantial depletion of groundwater supplies or interference with groundwater recharge	LTS	
Substantial alteration of the existing drainage pattern of the site or area	LTS	
Creation of contribution of runoff water which would exceed the capacity of	LTS	

existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff		expected to be less than significant. • The locations of the proposed facilities are designated as C flood zone, defined by FEMA as Areas of Minimal Flooding. Therefore flood impacts are expected to be less than significant. • The Project area is not subject to tsunamis or mudflows. However, due to the location of the WPCF adjacent to the Bay shore, seiches could occur although they would be unlikely.
Placement of housing within a 100-year flood hazard area, or structures within a 100-year flood hazard area which would impede or redirect flood flows	NI	
Exposure of people or structures to a significant risk or loss, injury or death involving flooding.	LTS	
Inundation by seiche, tsunami or mudflow	LTS	
Land Use and Planning		
Physically divide an established community or conflict with applicable land use plan, or regulation	NI	• The proposed Project is located within Hayward city limits in Alameda County. Above-ground facilities would be located on City-owned WPCF property and would be consistent with the City's General Plan land use designation for the area (Industrial). The proposed pipeline alignments would be placed underground along existing roadways and/or utility corridors within commercial, industrial, and residential land use designations and would not conflict with land use designations. • Proposed Project facilities would not conflict with existing uses and thus would not divide established communities.
Mineral Resources		
Loss of availability of a known mineral resource	NI	• Proposed Project facilities would be located in an urbanized area that does not contain significant mineral resources. Therefore, no impacts are anticipated.
Noise		
Exposure of persons to or generation of noise levels in	LTSM	• Construction of the proposed Project would require the use of the equipment that has potential to generate noise in excess of relevant local noise regulations and groundbourne vibration. Exposure of sensitive

excess of standards or excessive groundbourne vibration		receptors to noise may occur where sensitive receptors are located near construction sites, such as along the proposed pipeline alignments. Implementation of appropriate mitigation measures would reduce potential adverse effects on sensitive receptors. • Once constructed, the pipelines would not create any new sources of operational noise. The proposed pump station, located within the WPCF property, would generate operational noise. However, since it would be located away from sensitive receptors (more than one mile away), such noise levels would not be expected to result in a significant permanent noise impact. Appropriate mitigation measures would be required to ensure that the facility is designed and constructed to meet the City's noise standards.
Substantial permanent or periodic increase in ambient noise levels in the project vicinity	LTSM	
Population and Housing		
Induction of substantial population growth in an area either directly or indirectly	LTS	• The primary objective of implementing a recycled water project in the City would be to allow the City to maximize recycled water as a supplemental non-potable water source. The proposed Project would accommodate population growth because the Project would provide recycled water, making potable supplies more available, thus increasing the overall supply of water indirectly. However, as growth in the City of Hayward is controlled by the General Plan, the new water supply as a result of the proposed Project is not expected to result in increase development. Therefore, the Project is not anticipated to substantially change existing water demands and induce population growth in the area. • Construction, operation and maintenance of the proposed Project would not displace people or housing, or increase the numbers of permanent workers.
Displacement of substantial numbers of existing people or housing	NI	
Public Services		
Substantial adverse physical impacts to public services including but not limited to fire and police protection, schools and parks	NI	• The proposed Project would involve the provision of recycled water treatment and distribution facilities and would not increase the use of or demand for public services, (e.g. schools, parks, fire, police or other public facilities) such that new facilities necessitating physical construction would be required.
Recreation		
Substantial physical deterioration of park facilities	NI	• The proposed Project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of these facilities would occur, or be accelerated.
Transportation/Traffic		
Increase in traffic which is	LTSM	• Construction of above-ground facilities would occur within the existing WPCF property, away from public

substantial in relation to the existing traffic load and capacity of the street system		streets. Pipeline installation activities (primarily involving open-trench construction along public rights-of-way) would temporarily disrupt traffic patterns in the vicinity of the construction zones through the potential reduction of roadway width or blockage of roads/intersections. Potential conflicts between construction traffic, bicyclists, pedestrians and emergency vehicles could also occur in the vicinity of construction zones. Appropriate traffic control mitigation measures would be required to reduce potential traffic-related effects.
Changes in air traffic patterns, resulting in substantial safety risks	NI	• In addition, construction-related traffic associated with the import and export of equipment, soils, and material would increase truck traffic on city streets and potentially result in a significant impact on traffic flow of they were to occur during peak traffic periods. Implementation of available traffic control mitigation measures would be expected to reduce potential traffic effects to a less than significant level.
Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses	LTS	• The Hayward Executive Airport is located within two miles of the proposed above-ground project facilities near the WPCF. The proposed Project would not involve any changes to the air traffic patterns, and no significant impact on air traffic patterns is anticipated.
Inadequate emergency access or parking capacity	LTSM	• The proposed Project would create temporary parking demand for construction workers and construction vehicles at the WPCF and along pipeline installation roadways. Implementation of mitigation measures would be required to reduce potential impacts on parking capacity to a less than significant level.
Utilities and Service Systems		
Exceedence of wastewater requirements of the applicable Regional Water Quality Control Board	LTS	• The proposed Project would treat secondary effluent to the Department of Public Health's Title 22 standards and use the tertiary-treated recycled water for various non-potable purposes, including irrigation. The use of recycled water would not involve discharging wastewater into the environment except to irrigate the lands of specific customers. Irrigation would be expected to occur at agronomic rates such than additional run-off would not occur. In addition, tertiary-treated recycled water would not exceed the requirements of typical secondary-treated wastewater.
Expansions of, or construction of new water, wastewater, or stormwater facilities cause significant environmental effects or physical deterioration of a public facility due to increased use as a result of the project	NI	• Recycled water has the potential to result in salt accumulation in the root zones of irrigated parcels. This may be a concern for plants sensitive to salt. BMPs would be implemented to address this issue. • For industrial users, including Calpine, additional on-site treatment of the recycled water would be necessary to achieve the water quality standards for the industrial uses. Additional treatment beyond Title 22 standards for individual customers is not evaluated as part of this analysis. • Solid waste generated from the proposed project is expected to be accommodated by existing landfills. No long-term solid waste generation would be associated with the proposed Project.
Sufficient water supplies or capacity to serve the project	NI	• The proposed Project is limited tertiary treatment facilities at the WPCF and distribution facilities, and would not add significant use to a public facility. Therefore, it would not result in a substantial physical deterioration of a public facility due to increased use.
Have sufficient capacity at a landfill to accommodate the project's solid waste disposal needs and compliance with	LTS	

statues and regulations related to solid waste		
Mandatory Findings of Significance		
Substantial environmental degradation (e.g., reduction of sensitive habitat, endangered plant or animal species, or cultural resources,	LTSM	• Please refer to environmental topics above regarding potential impacts to biological resources. Mitigation measures are available to reduce potential impacts to a less than significant level. • Construction impacts of the proposed Project would be temporary, although it may contribute to cumulatively considerable impacts when considered in combination with other past, present and probable futures projects that would be constructed. In particular, air quality emissions from construction activities may contribute to global climate change. Currently, thresholds for determining global climate change impacts have not yet been established. Further evaluation in the follow-up CEQA environmental would be needed to disclose the project's incremental effects. • Please refer to the environmental topics above for noise and air quality for a discussion of potential to adversely affect human beings. Mitigation measures would be available to reduce potential impacts to a less than significant level.
Contribution to cumulative impacts	LTSM	
Substantial adverse effects on human beings.	LTSM	

Note: PS = Potentially significant; LTSM = Less than Significant with Mitigation Incorporation; LTS = Less than Significant; NI = No Impact

Appendix G - Construction Financing Plan

City of Hayward Recycled Water Project
SWRCB WRFP Project # 07-465-550

Design and Construction Cash Flow Analysis[1]

		Design									
	TOTALS	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15
DESIGN/CONSTRUCTION COSTS[2]											
Eligible Design/Construction Costs	$ 11,500,000	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882
Engineering/Construction Management Costs by Consultant	$ 3,000,000	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882
Project Construction Costs	$ 8,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL	**$ 11,500,000**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**
PAYMENTS FROM PROJECT ACCOUNT											
Design/Construction Payment	$ 11,500,000	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882
TOTAL	**$ 11,500,000**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**
PAYMENTS TO PROJECT ACCOUNT											
City of Hayward	$ 8,925,000	$ 1,563,750									
SWRCB Construction Grant	$ 2,575,000	$ 386,250									
TOTAL	**$ 11,500,000**	**$ 1,950,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
PROJECT ACCOUNT END OF MONTH BALANCE		**$ 1,844,118**	**$ 1,738,235**	**$ 1,632,353**	**$ 1,526,471**	**$ 1,420,588**	**$ 1,314,706**	**$ 1,208,824**	**$ 1,102,941**	**$ 997,059**	**$ 891,176**

	Design							Advertise, Bidding & Award			Construction
	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16
DESIGN/CONSTRUCTION COSTS											
Eligible Design/Construction Costs	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 50,000	$ 50,000	$ 50,000	$ 596,875
Engineering/Construction Management Costs by Consultant	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 50,000	$ 50,000	$ 50,000	$ 65,625
Project Construction Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 531,250
TOTAL	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 50,000**	**$ 50,000**	**$ 50,000**	**$ 596,875**
PAYMENTS FROM PROJECT ACCOUNT											
Design/Construction Payment	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 105,882	$ 50,000	$ 50,000	$ 50,000	$ 596,875
TOTAL	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 105,882**	**$ 50,000**	**$ 50,000**	**$ 50,000**	**$ 596,875**
PAYMENTS TO PROJECT ACCOUNT											
City of Hayward											$ 7,361,250
SWRCB Construction Grant											$ 1,591,875
TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 8,953,125**
PROJECT ACCOUNT END OF MONTH BALANCE	**$ 785,294**	**$ 679,412**	**$ 573,529**	**$ 467,647**	**$ 361,765**	**$ 255,882**	**$ 150,000**	**$ 100,000**	**$ 50,000**	**$ 0**	**$ 8,356,250**

	Construction										
	Mar-16	**Apr-16**	**May-16**	**Jun-16**	**Jul-16**	**Aug-16**	**Sep-16**	**Oct-16**	**Nov-16**	**Dec-16**	**Jan-17**
EXPENSES (Payments from Project Account)											
Eligible Design/Construction Costs	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875
Engineering/Construction Management Costs by Consultant	$ 65,625	$ 65,625	$ 65,625	$ 65,625	$ 65,625	$ 65,625	$ 65,625	$ 65,625	$ 65,625	$ 65,625	$ 65,625
Project Construction Costs	$ 531,250	$ 531,250	$ 531,250	$ 531,250	$ 531,250	$ 531,250	$ 531,250	$ 531,250	$ 531,250	$ 531,250	$ 531,250
TOTAL	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**
PAYMENTS FROM PROJECT ACCOUNT											
Design/Construction Payment	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ 596,875
TOTAL	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**
PAYMENTS TO PROJECT ACCOUNT											
City of Hayward											
SWRCB Construction Grant											
TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
PROJECT ACCOUNT END OF MONTH BALANCE	**$ 7,759,375**	**$ 7,162,500**	**$ 6,565,625**	**$ 5,968,750**	**$ 5,371,875**	**$ 4,775,000**	**$ 4,178,125**	**$ 3,581,250**	**$ 2,984,375**	**$ 2,387,500**	**$ 1,790,625**

	Construction				Initiation of Operations/Operations						
	Feb-17	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Jul-17**	**Aug-17**	**Aug-17**	**Sep-17**	**Oct-17**	**Nov-17**
EXPENSES (Payments from Project Account)											
Eligible Design/Construction Costs	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Engineering/Construction Management Costs by Consultant	$ 65,625	$ 65,625	$ 65,625	$ 65,625							
Project Construction Costs	$ 531,250	$ 531,250	$ 531,250	$ 531,250							
TOTAL	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
PAYMENTS FROM PROJECT ACCOUNT											
Design/Construction Payment	$ 596,875	$ 596,875	$ 596,875	$ 596,875	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ 596,875**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
PAYMENTS TO PROJECT ACCOUNT											
City of Hayward											
SWRCB Construction Grant				$ 596,875							
TOTAL	**$ -**	**$ -**	**$ -**	**$ 596,875**	**$ -**	**$ -**					
PROJECT ACCOUNT END OF MONTH BALANCE	**$ 1,193,750**	**$ 596,875**	**$ -**	**$ -**	**$ -**	**$ -**					

Notes:

1. Cash flow analysis does not consider the financing costs, which would be paid back over a period longer than project implementaion, so the financing mechanism (e.g. bonds, SRF, etc.) is not considered here.
2. Capital costs were escalated from Plan estimate in September 2013 dollars to estimated mid-point of construction in October 2016. An annual inflation rate of 3% was applied.

City of Hayward Recycled Water Project
SWRCB WRFP Project # 07-465-550

Capital Cost Estimate for Recommended Project

Item	Present Cost (Sep 2013) [a]		Cost Escalated to Construction Mid-Point (Oct 2016) [a,b,c]
Treatment Facilities	$ -		
Distribution Pump Station	$ 1,030,000		
Potable Backup Line	$ 106,000		
Calpine Pump Station	$ -		
Storage Tank	$ 720,000		
Distribution Pipeline	$ 1,188,000		
User Retrofits and Connections	$ 385,000		
Laterals to Customers	$ 1,815,000		
Raw Construction Costs	**$ 5,244,000**		
Contractor Overhead and Profit (10% of Raw Construction Cost)	$ 524,400		
Change Order Allowance (5% of Raw Construction Cost)	$ 262,200		
Project Contingency (30% of Raw Construction Costs)	$ 1,573,200		
Total Construction Cost	**$ 7,603,800**		**$ 8,500,000**
Engineering and Construction Management (35%)	$ 2,661,000		$ 3,000,000
			$ -
Total Capital Costs	**$ 10,264,800**		**$ 11,500,000**
Annualized Capital Costs	$544,000		$800,000
Annual O&M Costs	$ 204,000		$ 200,000
Total Annualized Costs	**$ 748,000**		**$ 1,000,000**
Estimated Recycled Water Yield (AFY)	285		285
Total Annualized Costs	**$ 2,620**		**$ 3,510**

a. Numbers might not exactly add up due to rounding
b. Used for Cash Flow Analysis
c. Assumes 3% inflation rate

Appendix H - Sample Recycled Water Ordinances

October 10, 2001

MODEL WATER RECYCLING ORDINANCE

Ordinance No.
An Ordinance of the
Establishing A Water Recycling Master Plan
And Implementing Procedures

WHEREAS, the people of the state of California have a primary interest in the development of facilities to recycle water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the state (California Water Code, Section 13510); and

WHEREAS, conservation of all available water resources requires the maximum reuse of wastewater for beneficial uses of water (Water Code Section 461); and

WHEREAS, continued use of potable water for irrigation of greenbelt areas and other non-potable uses may be an unreasonable use of such water where recycled water is available;

NOW, THEREFORE, the (District)(City)(County)
Does hereby ordain:

SECTION 1. FINDINGS

The state policies described above are in the best interest of the__________. This ordinance is necessary to protect the common water supply of the region which is vital to public health and safety, and to prevent endangerment of public and private property. ____________________ is highly dependent on limited imported water for domestic, agricultural and industrial uses. The reliability of the supply of imported water is uncertain. By developing and utilizing recycled water, the need for additional imported water can be reduced. In light of these circumstances, certain uses of potable water may be considered unreasonable where recycled water is available. Recycled water should be more readily available in seasons of drought when the supply of potable water for nonessential uses may be uncertain.

SECTION 2: WATER RECYCLING POLICY

It is the policy of ____________________that recycled water determined to be available pursuant to Section 13550 of the Water Code shall be used for nonpotable uses within the designated Recycled Water Use Areas set forth by within the jurisdiction wherever there is not an alternative higher or better use for the recycled water, its use is economically justified, financially and technically feasible, and consistent with legal requirements, preservation of public health, safety and welfare, and the environment.

SECTION 3: DEFINITIONS The following terms are defined for purposes of this ordinance:

3.1 AGRICULTURAL PURPOSES: Agricultural purposes include the growing of field and nursery crops, row crops, trees, and vines and the feeding of fowl and livestock.

3.2 ARTIFICIAL LAKE: A human-made lake, pond, lagoon, or other body of water that is used wholly or partly for landscape, scenic or noncontact recreational purposes.

3.3 COMMERCIAL OFFICE BUILDING:Any building for office or commercial uses with water requirements which include, but are not limited to, landscape irrigation, toilets, urinals and decorative fountains.

3.4 RECYCLED WATER DISTRIBUTION SYSTEM: A piping system intended for the delivery of recycled water only and which is separate from any potable water distribution system.

3.5 GREENBELT AREAS: A greenbelt area includes, but is not limited to, golf courses, cemeteries, parks and landscaping.

3.6 INDUSTRIAL PROCESS WATER: Water used by any industrial facility with process water requirements which include, but are not limited to, rinsing, washing, cooling and circulation, or construction, including any facility regulated by the industrial waste discharge ordinance of ________________.

3.7 OFF-SITE FACILITIES: Water facilities from the source of supply to the point of connection with the on-site facilities, including the water meter.

3.8 ON-SITE FACILITIES: Water facilities under the control of the owner, downstream from the water meter.

3.9 POTABLE WATER: Water which conforms to the federal, state and local standards for human consumption.

3.10 RECYCLED WATER:
Recycled water means water which, as a result of treatment of wastewater, is suitable for a direct beneficial use or controlled use that would not otherwise occur. (See Water Code Section 13050(n).)

SECTION 4: WATER RECYCLING MASTER PLAN

4.1 GENERAL: Upon adoption of this ordinance, the _______________ shall prepare and adopt a Water Recycling Master Plan to define, encourage, and develop the use of recycled water within its boundaries. The Master Plan shall be updated not less often than every five years.

5.4 CONTENTS OF THE WATER RECYCLING MASTER PLAN: The Master Plan shall include, but not be limited to, the following:

4.2.1 PLANTS AND FACILITIES. Evaluation of the location and size of present and future reclamation treatment plants, distribution pipelines, pump stations, reservoirs, and other related facilities, including cost estimates and potential financing methods.

4.2.2 RECYCLED WATER SERVICE AREAS. A designation, based on the criteria set forth in Section 2 and the information derived from Section 4.2.1 and 4.2.2, of the areas within the boundaries of __________________ that can or may in the future use recycled water in lieu of potable water. Recycled water uses may include, but are not limited to, the irrigation of greenbelt and *agricultural areas, filling of artificial lakes, and appropriate industrial and commercial uses.*

4.2.3 MANDATORY RECYCLED WATER USE. For each recycled water service area, evaluate whether greenbelt irrigation, agricultural irrigation, commercial office buildings, filling of artificial lakes, or industrial processes shall be limited to the use of recycled water. As appropriate, mandate construction of recycled water distribution systems or other facilities in new and existing developments for current or future recycled water use as a condition of any development approval or continued water service if future water recycling facilities are proposed in the Master Plan that could adequately serve the development, in accordance with the procedures described in Section 5. Identify resources and adopt measures to assist water users in the financing of necessary conversions.

4.2.4 RULES AND REGULATIONS. Establish general rules and regulations governing the use and distribution of recycled water.

SECTION 5. PROCEDURES

5.1 EXISTING POTABLE WATER SERVICE:

5.1.1 PRELIMINARY DETERMINATION. Based upon the Master Plan, upon the designation of each recycled water service area or the commencement of the design of new recycled water facilities, the shall make preliminary determinations as to which existing potable water customers shall be converted to the use of recycled water. Each water customer shall be notified of the basis for a determination that conversion to recycled water service will be required, as well as the proposed conditions and schedule for conversion.

5.1.2 NOTICE. The notice of the preliminary determination, including the proposed conditions and time schedule for compliance, and a recycled water permit application shall be sent to the water customer by certified mail.

5.1.3 OBJECTIONS; APPEALS. The water customer may file a notice of objection with the within (30) days after any notice of determination to comply is delivered or mailed to the customer, and may request reconsideration of the determination or modification of the proposed conditions or schedule for conversion. The objection must be in writing and specify the reasons for the objection. The preliminary determination shall be final if the customer does not file a timely objection. Staff (to be specified) shall review the objection and shall confirm, modify or abandon the preliminary determination. Upon issuance of a final *determination by staff, customer may appeal the determination as follows: (The desired appeal process should here be described.)*

5.2 DEVELOPMENT AND WATER SERVICE APPROVALS:

5.2.1 CONDITIONS. Upon application by a developer, owner or water customer (herein referred to as "applicant") for a new industrial, commercial, or residential subdivisions located within the designated Recycled Water Use Areas for which a tentative map or parcel map is required pursuant to Government Code Section 66426 [or for new or altered water service ~Note: Applicable to water districts only], the staff shall review the Master Plan and make a preliminary determination whether the current or proposed use of the subject property is required to be served with recycled water or to include facilities designed to accommodate the use of recycled water in the future. Based upon such determination, use of recycled water and provision of recycled water distribution systems or other facilities for the use of recycled water, and application for a permit for such use may be required as a condition of approval of any such application, in addition to any other conditions of approval [or service.(Note: Applicable in water districts only; such Conditions should normally be placed upon projects at the earliest possible stage, e.g. subdivision map approval.)]

5.2.2 ALTERATIONS AND REMODELING. On a case by case basis, upon application for a permit for the alteration or remodeling of multi-family, commercial or industrial structures (including, for example, commercial office buildings), the staff shall review the Master Plan and make a preliminary determination whether the subject property shall be required to be served with recycled water or to include facilities designed to accommodate the use of recycled water in the future. Based upon such determination, use of recycled water and provision of recycled water distribution systems or other facilities for the use of recycled water, and application for a permit for such use, may be required as a condition of approval of the application.

5.2.3 NOTICE OF DETERMINATION. A notice of the basis for the preliminary determination, proposed conditions of approval and schedule for compliance shall be provided to the applicant prior to approval of the development application [or application for water service (Water districts only.)]. (Note: Since in most cases, development conditions can be negotiated or appealed through established procedures, no new process is provided here.)

5.2.4 REQUESTED SERVICE. On a case by case basis, upon application for a permit to use recycled water on a property not covered by Sections 5.1.1, 5.2.1, or 5.2.2 above, the shall review *the Master Plan and make a determination whether the subject property shall be served with recycled water. Based upon such determination, the application for the permit shall be accepted and processed subject to Section 5.3.*

5.3 RECYCLED WATER PERMIT PROCESS: Upon a final determination by the______________that a property shall be served with recycled water, or adoption of a condition of development approval [or water service (Water districts only)] requiring use or accommodation of the use of recycled water, the water customer, owner or applicant shall obtain a recycled water permit.

5.3.1 PERMIT CONDITIONS. The permit shall specify the design and operational requirements for the applicant's water distribution facilities and schedule for compliance, based on the rules and regulations adopted pursuant to Section 4.2 and shall require compliance with both the California Department of Health Services Wastewater Recycling Criteria (see California Code of Administrative Regulations, Title 22), and requirements of the Regional Water Quality Control Board.

5.3.2 PLAN APPROVAL. Plans for the recycled and non recycled water distribution systems for the parcel shall be reviewed by the_________________and a field inspection conducted before the permit is granted.

5.3.3 PERMIT ISSUANCE. Upon approval of plans the permit shall be issued. Recycled water shall not be supplied to a property until inspection by the ___________________determines that the applicant is in compliance with the permit conditions. Recycled water service shall not commence within the designated Recycled Water Use Area in any service area of a private utility, as defined in Section 1502 of the Public Utilities Code, or to any service area of a public agency retail water supplier that is not a city, county or city and county, except in accordance with a written agreement between the recycled water producer and the private utility or public agency retail water supplier.

5.4 TEMPORARY USE OF POTABLE WATER:
At the discretion of the _____________, potable water may be made available on a temporary basis, until recycled water is available. Before the applicant receives temporary potable water, a water recycling permit, as described in Section 5.3, must be obtained for new on-site distribution facilities. Prior to commencement of recycled water service, an inspection of the on-site facilities will be conducted to verify that the facilities have been maintained and are in compliance with the recycled water permit and current requirements for service. Upon verification of

compliance, recycled water shall be served to the parcel for the intended use. If the facilities are not in compliance, the applicant shall be notified of the corrective actions necessary and shall have at least thirty (30) days to take such actions prior to initiation of enforcement proceedings.

5.5 RECYCLED WATER RATE: The rate charged for recycled water shall be established by resolution of the ____________________.

SECTION 6. SANCTIONS

6.1 PUBLIC NUISANCE:Discharge of wastes or the use of recycled water in any manner in violation of this ordinance or of any permit issued hereunder is hereby declared a public nuisance and shall be corrected or abated as directed by _______________. Any person creating such a public nuisance is guilty of a misdemeanor.

6.2 INJUNCTION: Whenever a discharge of wastes or use of recycled water is in violation of this ordinance or otherwise causes or threatens to cause a condition of nuisance, the ______________may seek injunctive relief as may be appropriate to enjoin such discharge or use.

6.3 PERMIT REVOCATION: In addition to any other statute or rule authorizing termination of water service, the __________________may revoke a permit issued hereunder if a violation of any provision of this ordinance is found to exist or if a discharge of wastes or use of recycled water causes or threatens to cause a nuisance.

6.4 PENALTY: Any owner andlor operator who violates this ordinance shall, for each day of violation, or portion thereof, be subject to a fine not exceeding $1,000. In addition, water service to the property may be discontinued.

SECTION 7. VALIDITY

If any provision of this ordinance or the application thereof to any person or circumstance is held invalid, the remainder of the ordinance and the application of such provisions to other persons or circumstances shall not be affected thereby.

Appendix I - Calpine Will Serve Letter (2001)

CITY OF
HAYWARD
HEART OF THE BAY

May 4, 2001

Mr. William I. Toman
Development Manager
Calpine/Bechtel Joint Development
6700 Koll Center Parkway, Suite 320
Pleasanton, California 94566

Subject: Water Service to the Proposed Russell City Energy Center

Dear Mr. Toman:

The purpose of this letter is to indicate the City of Hayward's ("City") willingness to serve and to describe the general terms upon which the City would provide water service to the proposed 600 Megawatt Russell City Energy Center (RCEC).

Potable water

- The City will provide potable water for use at the site for domestic needs and as required to meet fire service needs for the RCEC. This service is to be provided on the same terms as service is provided for similar uses throughout the City. We anticipate providing a two-inch service connection and meter to provide domestic service to the site and a ten-inch unmetered connection with leak detector to provide fire flow capabilities.

Process and Cooling Water

- The City is prepared to serve the RCEC with recycled water derived from the effluent of the City's Water Pollution Control Facility (WPCF) in accordance with the following terms and conditions:
  - Calpine will construct and transfer to the City an advanced wastewater treatment (AWT) plant to provide high-quality recycled water for use at the RCEC. The AWT will be designed to mutually acceptable standards to provide approximately 4,000 acre-feet per year of desalinated tertiary effluent to the RCEC at peak flows of up to 4.17 million gallons per day (MGD).

OFFICE OF THE CITY MANAGER
777 B STREET, HAYWARD, CA 94541-5007
TEL: 510/583-4300 • FAX: 510/583-3601 • TDD: 510/247-3340

Mr. William Toman
Calpine/Bechtel Joint Development
May 4, 2001

- The treatment process used to produce the recycled water for the RCEC will produce waste streams that will be further treated prior to discharge from the WPCF. Therefore, the total flow of secondary effluent that will be utilized to produce the recycled peak flow of 4.17 MGD would be approximately 5.73 MGD. The City has sufficient effluent available to ensure the availability of adequate supplies to meet these requirements.

- The City will require Calpine/Bechtel to pay all costs for the AWT, including but not limited to construction, operation and maintenance.

- The City will take necessary steps to secure rights and construct facilities to obtain secondary effluent from the East Bay Dischargers Authority discharge system as a back-up supply of secondary effluent to supply the AWT during periods when maintenance or other outages of the WPCF make the source of supply unavailable. Calpine/Bechtel will pay all costs for this backup connection, including but not limited to construction, operation and maintenance.

The City's willingness to provide this service is dependant upon compliance with the provisions of the California Environmental Quality Act. The detailed commercial terms for operation and maintenance of the AWT plant will be established by a detailed service contract, to be negotiated in the future, which will be subject to approval of the Hayward City Council.

If you have questions or require further information please call me at 510-583-4305.

Sincerely,

Jesús Armas

Jesús Armas
City Manager

Appendix J - Customer Connection Schedule

Hayward Recycled Water Facilities Plan

Customer Connection Schedule

#	Potential Customer	Location	Primary Type of RW Use	Secondary Type of RW Use	Irrigation - Average Annual RW Demand (AFY)	Revised Industrial - Average Annual RW Demand (AFY)	Total - Average Annual RW Demand (AFY)	Status [a]	Projected Connection Date [b]	Assurance Type [c]	Retrofit Required (Y/N) [d]	Current Fresh Water Supplier [e]	Annual Demand (mgd)	Peak Month Demand (mgd)	Peak Hour Demand (mgd)
								Connection Information					Recycled Water Demands (mgd)		
0	Calpine		Industrial			3475.0	3475.0	D	Jan-2013	C	N/A	N/A	3.100	4.000	4
1	Bottling Group LLC (Pepsi)	29000 HESPERIAN BLVD	Irrigation	Industrial	9.1	21.8	30.9	E	Jan-2013	M	N	City	0.027	0.037	0.092
4	Shasta Beverages	26901 INDUSTRIAL BLVD	Industrial			7.5	7.5	E	Jan-2013	M	N	City	0.007	0.007	0.014
5	Rohm & Haas	25500 WHITESELL ST	Industrial			22.4	22.4	E	Jan-2013	M	N	City	0.020	0.020	0.04
8	Chabot-Las Positas Community College	25555 HESPERIAN BLVD	Irrigation *		6.1		6.1	E	Jan-2013	M	Y	City	0.005	0.012	0.036
29	Life Chiropractic College	24801 INDUSTRIAL BLVD	Industrial			3.0	3.0	E	Jan-2013	M	N	City	0.003	0.003	0.006
30	SCA Packaging	3466 ENTERPRISE AVE	Industrial			1.5	1.5	E	Jan-2013	M	N	City	0.001	0.001	0.002
40	Bay Center II	3832 BAY CENTER PL	Irrigation		20.2		20.2	E	Jan-2013	M	N	City	0.018	0.041	0.123
42	BB&K Franklin Township	23575 CABOT BLVD	Irrigation		12.8	0.0	12.8	E	Jan-2013	M	N	City	0.011	0.025	0.075
72	Robert Chang & Associates	21325 CABOT BLVD	Irrigation		10.3		10.3	E	Jan-2013	M	N	City	0.009	0.021	0.063
79	Caltrans D-4 HDWS	SAN MATEO BRIDGE	Irrigation		8.7		8.7	E	Jan-2013	M	N	City	0.008	0.018	0.054
80	Caltrans D-4	JACKSON @ INDUSTRIAL PKWY	Irrigation		7.7		7.7	E	Jan-2013	M	N	City	0.007	0.016	0.048
91	Mt. Eden High School	2300 PANAMA	Irrigation		43.1		43.1	E	Jan-2013	M	N	City	0.038	0.087	0.261
98	Eden Garden School	2184 THAYER AVE	Irrigation *		2.88		2.9	E	Jan-2013	M	Y	City	0.003	0.007	0.021
105	Loren Eden School	27790 PORTSMOUTH AVE	Irrigation		7.8		7.8	E	Jan-2013	M	N	City	0.007	0.016	0.048
114	Oliver Sports Park	2580 EDEN PARK PL	Irrigation		35.0		35.0	E	Jan-2013	M	N	City	0.031	0.071	0.213
116	Mt. Eden Park	2451 W. TENNYSON	Irrigation		20.5		20.5	E	Jan-2013	M	N	City	0.018	0.041	0.123
119	Eden Greenway - Part 1	VARIOUS	Irrigation		10.0		10.0	E	Jan-2013	M	N	City	0.009	0.021	0.063
129	Brenkwitz School	2560 DARWIN ST	Irrigation		8.0		8.0	E	Jan-2013	M	N	City	0.007	0.016	0.048
132	Christian Penke Park	TAHOE & MORNINGSIDE	Irrigation		7.2		7.2	E	Jan-2013	M	N	City	0.006	0.014	0.042
135	Rancho Arroyo Park	2121 DEPOT RD	Irrigation		6.5		6.5	E	Jan-2013	M	N	City	0.006	0.014	0.042
160	Bay Center II	3825 BAY CENTER PL	Irrigation		7.3		7.3	E	Jan-2013	M	N	City	0.007	0.016	0.048
163	Winton Industrial Center	2660 W WINTON	Irrigation		7.1		7.1	E	Jan-2013	M	N	City	0.006	0.014	0.042
			Total		**230.2**	**3531.1**	**3761.3**						**3.4**	**4.5**	**5.504**

a. E = Use site exists and currently uses freshwater
   D = Use site under development and will be ready to take recycled water upon completion of RW project construction

b. Connection dates for customer sites are estimates. Actual connection are pending CDPH approval to operated irrigation/industrial systems.

c. M = Mandatory Use Ordinance
   C = User Contract

d. Assumed based on preliminary customer information.

e. Either the City of Hayward, groundwater, or a combination of both.

Appendix K - Original Alternatives and Recommendation Project (Chapters 4 and 5 from the September 2009 Facility Plan)

Chapter 4 Alternatives Assessment

This Chapter documents the Project recycled water production assumptions, development of Project alternatives and the process of determining the near-term Recommended Project.

4.1 Recycled Water Production

As noted in Chapter 3, new treatment facilities will be required at the Hayward WPCF to produce recycled water meeting Title 22 standards for disinfected, tertiary filtered recycled water to serve potential recycled water customers.

4.1.1 Treatment Process

Approved Processes

There are a number of available filtration and disinfection treatment processes that are approved by the Department of Public Health (DPH) to meet Title 22 Water Quality Standards for recycled water. For example, granular media filters, cloth media filters, microfiltration (membranes), are some available filtration options, and chlorination and ultraviolet (UV) disinfection are available disinfection options. For this Plan, the selection of the treatment train was limited to currently approved processes.

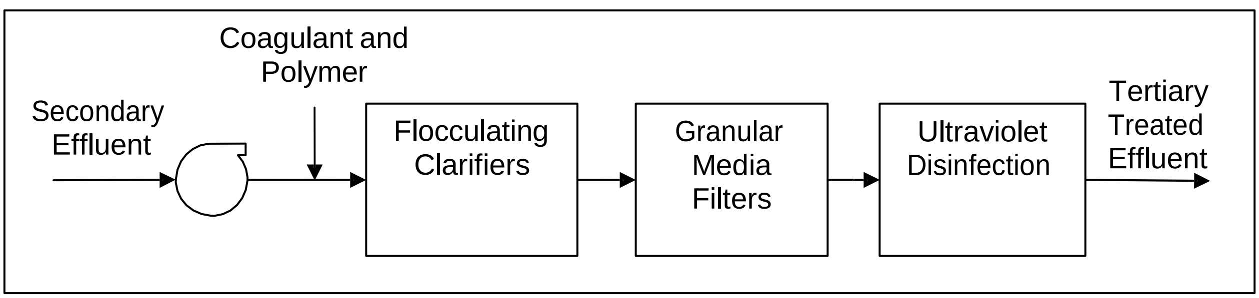
Assumed Process Train

The final selection for filtration and disinfection alternatives would be determined during the pre-design (e.g. cloth media filters could be preferred to granular media filters). The Facility Planning-level process train, to be finalized during pre-design, is:

- Filtration:
    - Pre-treatment using flocculating clarifier
    - Granular media filtration
- Disinfection:
    - Ultraviolet (UV) disinfection

The recommended tertiary treatment process train is shown in **Figure 4-1**.

Figure 4-1: Tertiary Treatment Train Assumed for Facility Plan



- **Filtration.** The treatment train selection considered both approved treatment processes and the existing secondary effluent characteristics (turbidity, total suspended solids, etc.). As noted in Chapter 2, the WPCF utilizes trickling filters and solids contact aeration in their secondary treatment processes. The City has recently upgraded the WPCF and would not likely modify the secondary treatment process train. Pilot testing at the City of Watsonville demonstrated that secondary effluent produced from trickling filters (with solids contact aeration) cannot meet Title 22 requirements without pre-treatment during filtration. Therefore, the recommended filtration processes include both a pre-treatment step through flocculating clarifiers and filtration through granular media filters. This combination of filtration processes was assumed for this Plan and should be confirmed with on-site pilot testing at the WPCF during pre-design.

- **Disinfection.** Due to the site constraints at the WPCF and based on recent project experience with City of Watsonville and Delta Diablo Sanitary District, UV disinfection was assumed for the disinfection step of the tertiary treatment process. Based on comparisons developed for the City of Palo Alto, UV lamps have a similar life-cycle cost to chlorine contact basins and are less space intensive.

4.1.2 Treatment Facilities Planning-Level Design Criteria and Layout

Design Criteria

In determining planning-level the design criteria for the recommended treatment facilities, several sizing options were analyzed for the City.

Table 4-1 summarizes the three options for treatment train sizing. The difference in cost between the basic option – Option 1 – and the other two options is shown as a percentage. These costs were preliminarily developed for the City's information; however detailed cost estimates were only developed for the recommended option as discussed in Chapter 5. To balance present needs and future costs, Option 2 was selected as the recommended treatment train sizing.

Table 4-1: Options for Treatment Train Sizing

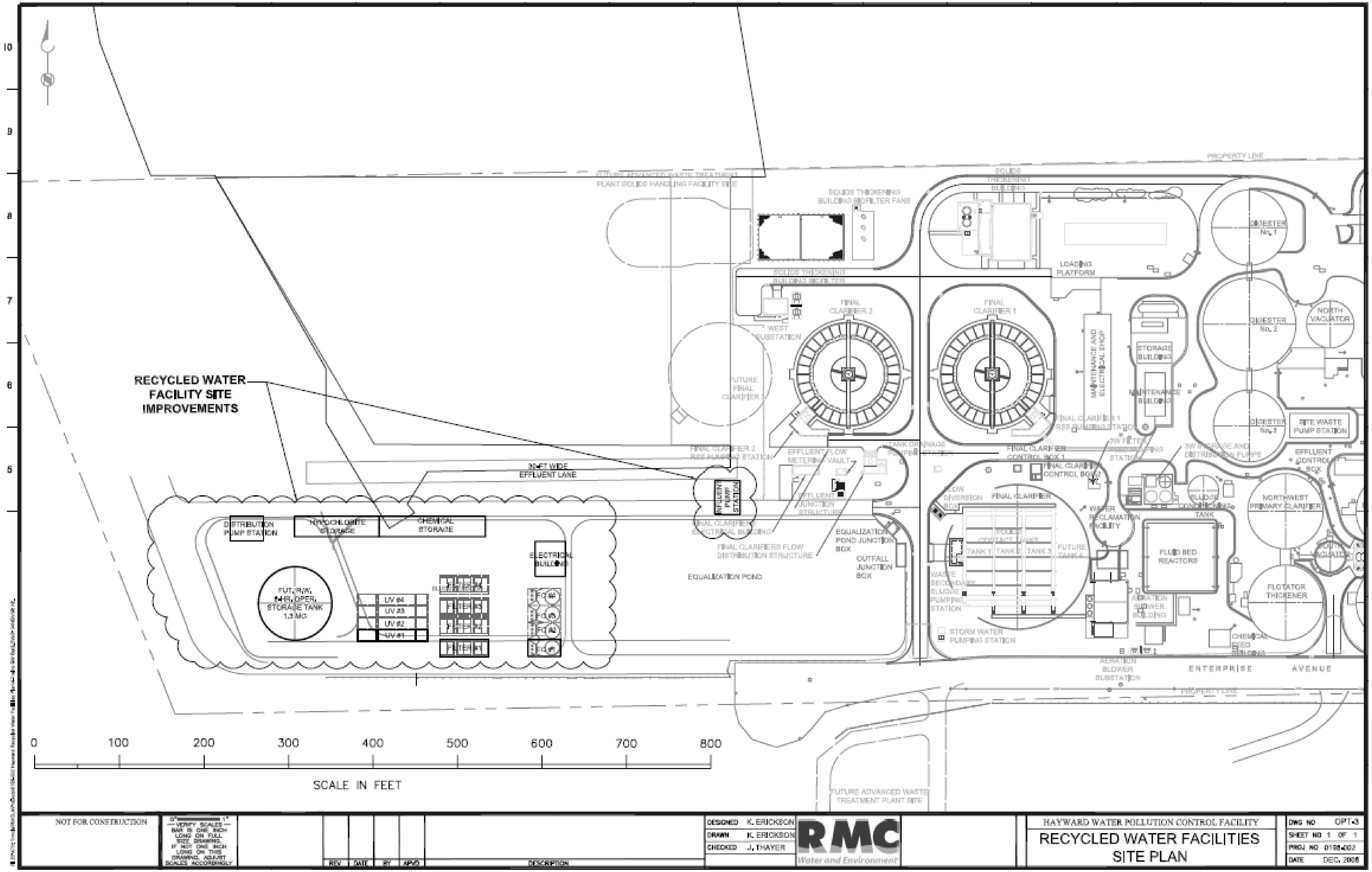
	Option 1	Option 2	Option 3
Description	Facilities sized to treat 4.65 mgd	Mechanical equipment (pumps, filter package units) sized to treat 4.65 mgd. Civil facilities (concrete, piping) sized for future expansion to 18.5 mgd.	Facilities sized to treat full future permitted capacity of 18.5 mgd. Tertiary water beyond RW customer demand would be discharged through the EBDA system.
Treatment Capacity (mgd)	4.65	4.65	18.5
# of Treatment Trains	1	1	4
Construction Cost (2008 $) [a]	$9.2 million	$14.3 million	$23.0 million

Notes:
a. These construction costs were based on order of magnitude cost estimates (approximately ±40% variability) to allow the City to select a preferred option as an intermediate step in the development of this Plan. The refined detailed cost estimate for the Recommended Project is provided in Chapter 5.

Layout

Discussions were held with the WPCF plant manager on the potential site for the tertiary treatment facilities including storage and a distribution pump station. Based on the information from the plant manager and from analyzing the layout of existing facilities, the southwestern corner of the WPCF property was selected for the proposed layout of the tertiary treatment facilities. A conceptual layout for the tertiary treatment facilities at the WPCF is included in Figure 4-2 that shows the footprint for the four treatment trains (Option 3).

Figure 4-2: Recommended Project Facility-Planning Level Tertiary Treatment Layout



4.2 Recycled Water Project Alternatives

Based on the results from the market assessment and geographical proximity analysis, three Project Alternatives were developed and evaluated:

- **Project A, also referred to as Baseline Project,** which would serve the new Calpine power generation facility only whose demand was considered large enough to constitute a project on its own. This Project was developed based on information from the Feasibility Study, and through consultation with the City. In Project A, the City would install tertiary treatment facilities and storage at the WPCF to serve only the demand from Calpine.
- **Project B, also referred to as Baseline plus Local Urban Reuse Project,** which would serve the new Calpine power generation facility and local urban non-residential customers located approximately within a two-mile radius of the Hayward WPCF for local urban reuse. Customers include irrigation customers, industrial and combined customers in the Top 90 Private Water Users list. Industrial customers in this Project were surveyed as part of the market assessment to determine the proportion of their water demand that could be converted to recycled water.
- **Project C, also referred to as Baseline plus Expanded Local Urban Reuse Project,** which would serve the new Calpine power generation facility and non-residential customers in the eastern hills of Hayward such as the California State University (East Bay Campus), Stonebrae Golf Course, and other customers. Due to the upward sloping topography of the service area from the WPCF, Project C will involve pumping water from the WPCF to these customers. Additional Project C customers apart from CSU-East Bay and Stonebrae Golf Course are not specifically identified in the Facility Plan; but based on the Feasibility Study, these customers could include the Holy Sepulchre Cemetery, sections of the Eden Greenway, and schools on the eastern side of Hayward.

4.2.1 Project Alternatives Target Customers

Table 4-2 summarizes the target customers associated with each alternative. Note that the Skywest Golf Course (existing recycled water use of 180 AFY) was not included as a target user in any of the alternatives since this customer is currently being served and will not benefit from the addition of tertiary treatment (no expected decrease in TDS from the tertiary treatment).

Table 4-2: Project Alternatives Customers and Demand

Customer No.	Customer Name	Type of Use	Average Demand (AFY) [b]	Average Demand (mgd) [c]	Peak Month Demand (mgd) [c]
Project A (Baseline)					
0	Calpine	Industrial	3,475	3.1	4.0
	Total (A)		**3,475**	**3.1**	**4.0**
Project B (Baseline + Local Urban Reuse)					
1	Bottling Group LLC (Pepsi)	Combined [a]	31	0.03	0.04
4	Shasta Beverages	Industrial	8	0.01	0.01
5	Rohm & Haas	Industrial	22	0.02	0.02
8	Chabot-Las Positas Community College	Irrigation	6	0.005	0.01
29	Life Chiropractic College	Combined [a]	3	0.003	0.003
30	SCA Packaging	Industrial	2	0.001	0.001
40	Bay Center II	Irrigation	20	0.02	0.001
42	BB&K Franklin Township	Irrigation	13	0.01	0.03
72	Robert Chang & Associates	Irrigation	10	0.01	0.02
79	Caltrans D-4 HDWS	Irrigation	9	0.01	0.02
80	Caltrans D-4	Irrigation	8	0.01	0.02
91	Mt. Eden High School	Irrigation	43	0.04	0.09
98	Eden Garden School	Irrigation	3	0.003	0.01
105	Loren Eden High School	Irrigation	8	0.01	0.02
114	Oliver Sports Park	Irrigation	35	0.03	0.07
116	Mt. Eden Park	Irrigation	21	0.02	0.04
119	Eden Greenway – Part 1	Irrigation	10	0.01	0.02
129	Brenkwitz School	Irrigation	8	0.01	0.02
132	Christian Penke Park	Irrigation	7	0.01	0.01
135	Rancho Arroyo Park	Irrigation	7	0.01	0.01
160	Bay Center II	Irrigation	7	0.01	0.02
163	Winton Industrial Center	Irrigation	7	0.01	0.01
	Total (B) (includes A)		**3,760**	**3.4**	**4.5**
Project C (Baseline + Expanded Urban Reuse)					
6	California State University	Irrigation	98.9	0.09	0.2
164	Stonebrae Golf Course	Irrigation	420.7	0.4	0.9
Various	Other customers	Irrigation/Industrial	138	0.1	0.2
	Total (C) (includes A)		**4,133**	**3.7**	**5.3**

Notes:
a. Either has irrigation as a primary use and industrial as a secondary use, or vice-versa.
b. Rounded to the nearest 1 AFY.
c. Total rounded to the nearest 0.1 mgd.

4.2.2 Project Alternatives Facilities

Table 4-3 lists the major facilities for Project A, B, and C respectively. **Figure 4-3** illustrates the location of major facilities for Project A, B and C.

Projects A and B assume that the existing 8-inch Shell Oil pipeline identified by the City is useable for recycled water conveyance with limited retrofits. Project C (which extends service to customers in the eastern part of Hayward) requires a recycled water transmission line larger than the existing 8-inch Shell Oil pipeline and therefore does not assume utilization of the Shell Oil pipeline. For the purposes of this plan, it is assumed that retrofit of the Shell Oil pipeline will not require lining; instead potential retrofit activities could include:

- Dewatering and cleaning of any petroleum residue;
- Television inspection (if possible);
- Pressure testing for leaks;
- Corrosion analysis (if possible);
- Determination of nearest existing isolation valves (if any);
- Right-of-way identification; and
- Installation of valves, flanges, meters, etc.

Table 4-3: Project Alternatives Facilities

Description	Units	Project A	Project B	Project C
Customers				
Number of Customers	#	1	22	34
Annual Average Demand	AFY	3,475	3,760	4,133
Peak Month Demand	mgd	4.0 [f]	4.51	5.2
Peak Hour Demand	mgd	4.0	4.51	11.5
Treatment Facilities				
Influent Pump Station	hp	20	20	20
Flocculating Clarifiers [a]	mgd	4.85	4.85	5.35 [g]
Granular Media Filters [a]	mgd	4.85	4.85	5.35 [g]
UV Disinfection	mgd	4.65	4.65	5.2 [g]
Treated Recycled Water Storage				
Storage Tank [b]	MG	0.8	1.1	2.0
Distribution Pump Station(s)				
Calpine Pump Station [c]	hp	200	200	200
Other Customers Pump Station [c, d]	hp	NA	165	275
Distribution System				
Total Pipeline Length [e]	LF	600	23,900	46,000
14" Pipe	LF	600	0	45,400
8" Pipe	LF	0	7,100	0
6" Pipe	LF	0	16,800	600
Retrofit of Abandoned Shell Oil Pipeline for Conveyance	LF	N/A	7,460	N/A
Connections to Retrofitted Shell Oil Pipeline	#	0	11	0

Notes:

a. Facilities are oversized to account for 3-4% water loss through treatment processes.

b. Storage tank was sized using the SWRCB Office of Water Recycling Storage Excel Workbook and maximum drawdown criteria of 2 feet. See Appendix D -Facility Technical Information.

c. Pumps were sized based on peak hour flow, pipeline headloss, and downstream required pressures

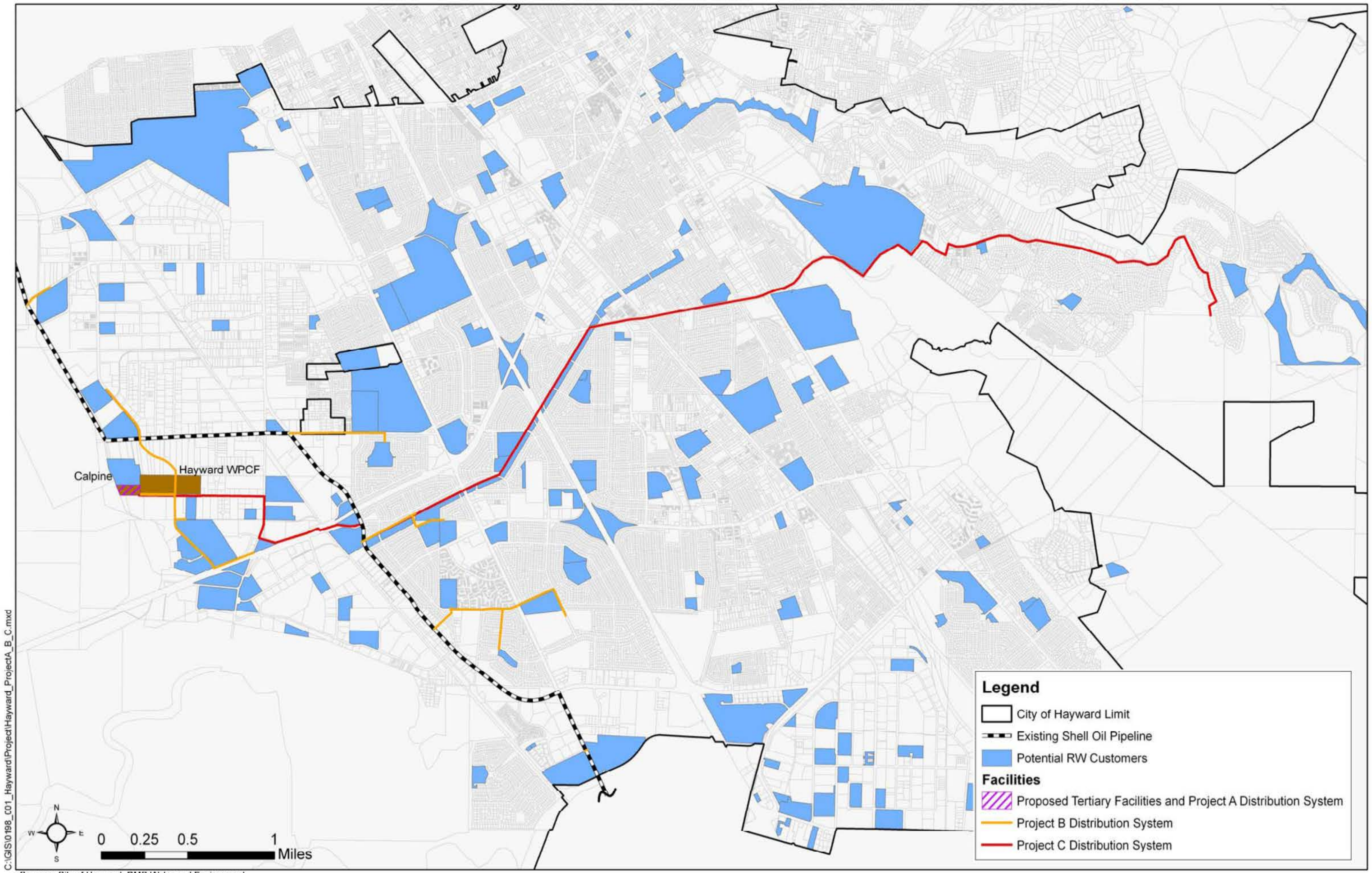
d. Summary of total distribution pumping needs for each alternative. One or more distribution pump stations may be utilized in each alternative.

e. Pipelines were sized based on peak hour flow, pipeline headloss, and existing pipeline sizes (Shell Oil pipeline)

f. Per December 8, 2008, conversation with Marilyn Mosher (City), Calpine requires approximately 3.9 mgd of disinfected tertiary water for their plant operations.

g. Size of treatment train would have to be increased above 4.65 mgd to accommodate Project C.

Figure 4-3: Project A, B and C Major Facilities



Sources: City of Hayward, RMC Water and Environment

4.2.3 Project Alternatives Cost Estimates and Conclusions

Cost Estimates

Table 4-4 summarizes the cost estimates for each alternative. Estimated costs are referenced to the October 2008 Engineering Construction Cost Index (ENR CCI) for San Francisco of 9853.42.

Table 4-4: Project Alternatives Conceptual-Level Cost Estimates

Description	Project A	Project B	Project C
Treatment Facilities	$6,669,000	$6,669,000	$7,436,000
Treated Recycled Water Storage	$800,000	$1,100,000	$2,000,000
Potable Backup Water Supply	$100,000	$100,000	$100,000
Distribution Pump Station	$1,088,000	$1,616,000	$1,968,000
Main Pipelines	$168,000	$1,347,000	$12,880,000
Lateral Pipelines	$0	$2,520,000	$90,000
User Connections	$0	$366,000	$575,000
Subtotal Raw Construction Cost	**$8,855,000**	**$13,748,000**	**$25,049,000**
Contractor Overhead and Profit (10%)	$886,000	$1,375,000	$2,505,000
Change Order Allowance (5%)	$443,000	$687,000	$1,252,000
Level of Estimate Contingency (30%)	$2,657,000	$4,124,000	$7,515,000
Total Construction Cost	**$12,841,000**	**$19,934,000**	**$36,321,000**
Engineering and Construction Management/Environmental/ Administration/Legal (35%)	$4,494,000	$6,977,000	$12,712,000
Total Capital Cost	**$17,335,000**	**$26,911,000**	**$49,033,000**
Annualized Capital Costs [a]	$1,177,000	$1,828,000	$3,329,000
Annual O&M Costs	$1,103,000	$1,233,000	$2,000,000
Total Annualized Cost	$2,280,000	$3,061,000	$5,329,000
Estimated Recycled Water Yield	3,475	3,760	4,133
Unit Cost, Annualized ($/AFY)	**$700/AF**	**$810/AF**	**$1,290/AF**

Notes:
a. Annualized at 30 years, 5.38%

Conclusions

Based on discussions with City, Project B was recommended:

- Incremental construction cost of approximately $7 million would bring an additional 285 AFY of recycled water use now and provide the ability to several additional recycled water customers along Whitesell Road in the future.
- Compared to Project B, Project C requires a significantly larger investment by the City in both capital costs for additional treatment and pipeline capacity and higher operations costs for pumping recycled water to the customers in the East Bay hills.

Chapter 5 Recommended Project

This chapter develops the Recommended Recycled Water Project (Recommended Project) identified in Chapter 4 at the facility-plan level. It includes target customers, project facilities descriptions, cost estimates, project benefits, and an implementation plan (including construction financing plan).

5.1 Facilities Description

The Recommended Project involves the construction of tertiary treatment facilities designed to treat a peak flow of 4.65 mgd, 1.5 miles of distribution lines to the north and south of the WPCF, rehabilitation and connections to the existing Shell Oil pipeline, over three miles of customer laterals to 21 customers and the Calpine facility, and installation of customer connections and retrofits. The Project would deliver an estimated 3,760 AFY of recycled water, including 3,475 AFY to Calpine. The majority of other recycled water customers will utilize recycled water for irrigation. Some small industrial use for cooling towers and boilers is also included.

Figure 5-1 illustrates the recommended recycled water target customers and major facilities.

Table 5-1 provides the estimated average annual demand for each customer.

Figure 5-2 illustrates the recommended, planning-level layout for the new recycled water treatment facilities at the WPCF. Additional information on the facilities sizing and technical details is available in Appendix D -Facility Technical Information.

The Project begins with connection to the WPCF's secondary effluent supply. Secondary effluent would be pumped through a Tertiary Influent Pump Station to a single flocculation clarifier package unit. The effluent will then flow by gravity to a granular media package filtration unit and then to UV disinfection channel. Disinfection tertiary effluent will be pumped to a steel storage tank. From storage, tertiary flow will be pumped to the distribution system to customers or to Calpine. All tertiary treatment process will be arranged and sized with adjoining space/capacity for future expansions up to full permitted treatment plant capacity (18.5 mgd).

Distribution from the WPCF will be through two parallel 8-inch main pipelines to serve the north and south branches of Whitesell Road. The south branch will serve a cluster of recycled water customers in the area between the WPCF and Highway 92. The north branch will connect to the existing Shell Oil pipeline (8-inch), which will be rehabilitated for water use. Flow through the Shell Oil pipeline will split to customers on the north and south ends of the pipeline. Connections will be made into the Shell Oil pipeline for 6-inch laterals to a single customer or customer grouping. These customer laterals vary from a few yards to three quarters of a mile.

Figure 5-1: Recommended Project Recycled Water Customers and Facilities

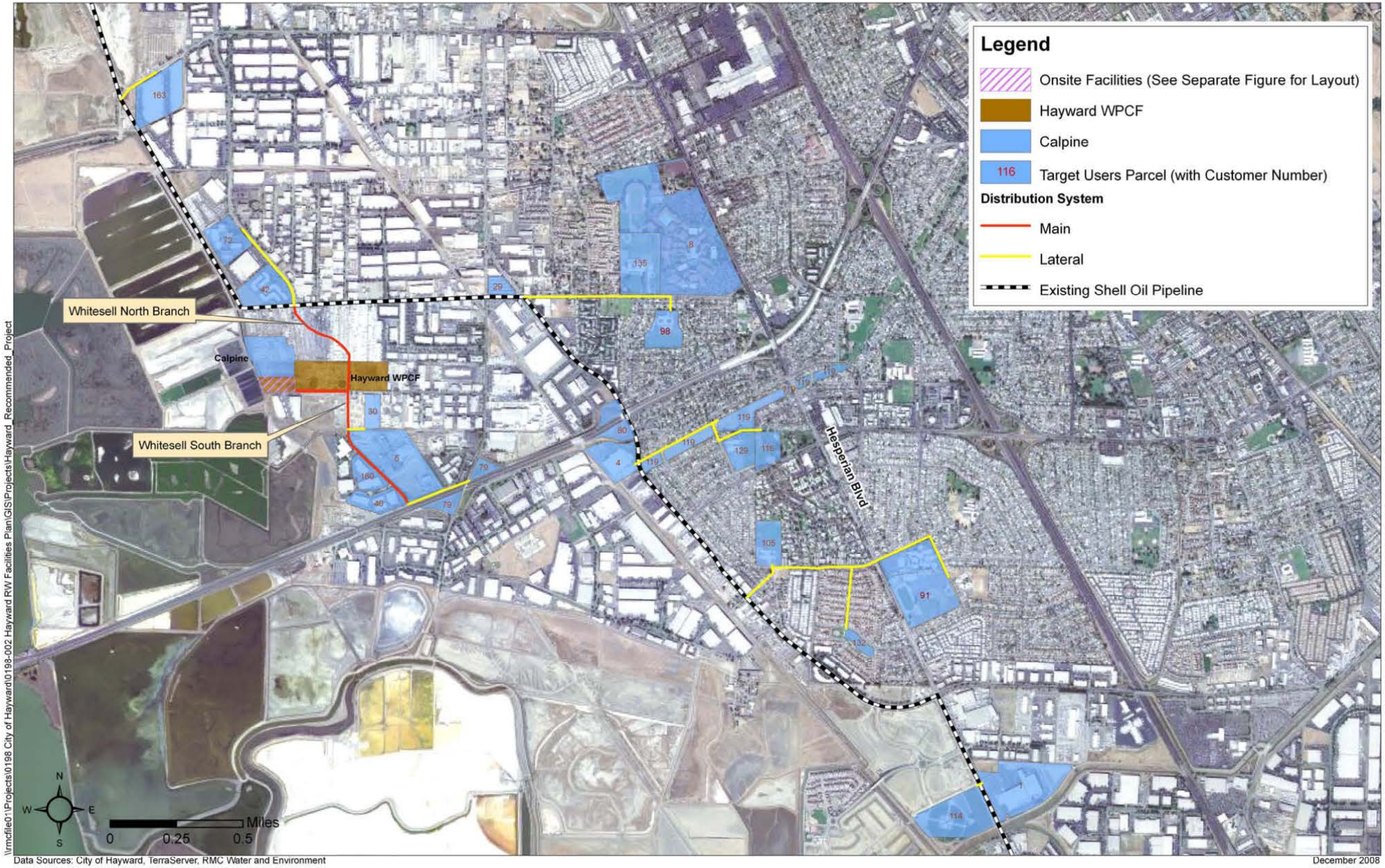


Table 5-1: Recommended Project Recycled Water Customers

Customer No.	Customer Name	Primary Type of Use	Average Annual Demand (mgd)	Average Annual Demand (AFY)	Peak Month Demand (mgd)
0	Calpine	Industrial	3.10	3,475	4.00
1	Bottling Group LLC (Pepsi)	Combined [a]	0.03	30.9	0.04
4	Shasta Beverages	Industrial	0.01	7.5	0.01
5	Rohm & Haas	Industrial	0.02	22.4	0.02
8	Chabot-Las Positas Community College	Irrigation	0.005	6.1	0.01
29	Life Chiropractic College	Combined [a]	0.003	3.0	0.003
30	SCA Packaging	Industrial	0.001	1.5	0.001
40	Bay Center II	Irrigation	0.02	20.1	0.001
42	BB&K Franklin Township	Irrigation	0.01	12.8	0.03
72	Robert Chang & Associates	Irrigation	0.01	10.3	0.02
79	Caltrans D-4 HDWS	Irrigation	0.01	8.7	0.02
80	Caltrans D-4	Irrigation	0.01	7.7	0.02
91	Mt. Eden High School	Irrigation	0.04	43.1	0.09
98	Eden Garden School	Irrigation	0.003	2.9	0.01
105	Loren Eden School	Irrigation	0.01	7.8	0.02
114	Oliver Sports Park	Irrigation	0.03	35.0	0.07
116	Mt. Eden Park	Irrigation	0.02	20.5	0.04
119	Eden Greenway – Part 1	Irrigation	0.01	10.0	0.02
129	Brenkwitz School	Irrigation	0.01	8.0	0.02
132	Christian Penke Park	Irrigation	0.01	7.2	0.01
135	Rancho Arroyo Park	Irrigation	0.01	6.5	0.01
160	Bay Center II	Irrigation	0.01	7.3	0.02
163	Winton Industrial Center	Irrigation	0.01	7.1	0.01
		TOTAL	**3.3**	**3760**	**4.52**

Notes:
a. Either has irrigation as a primary use and industrial as a secondary use, or vice-versa.

Figure 5-2: Recommended Project Facility-Planning Level Tertiary Treatment Layout

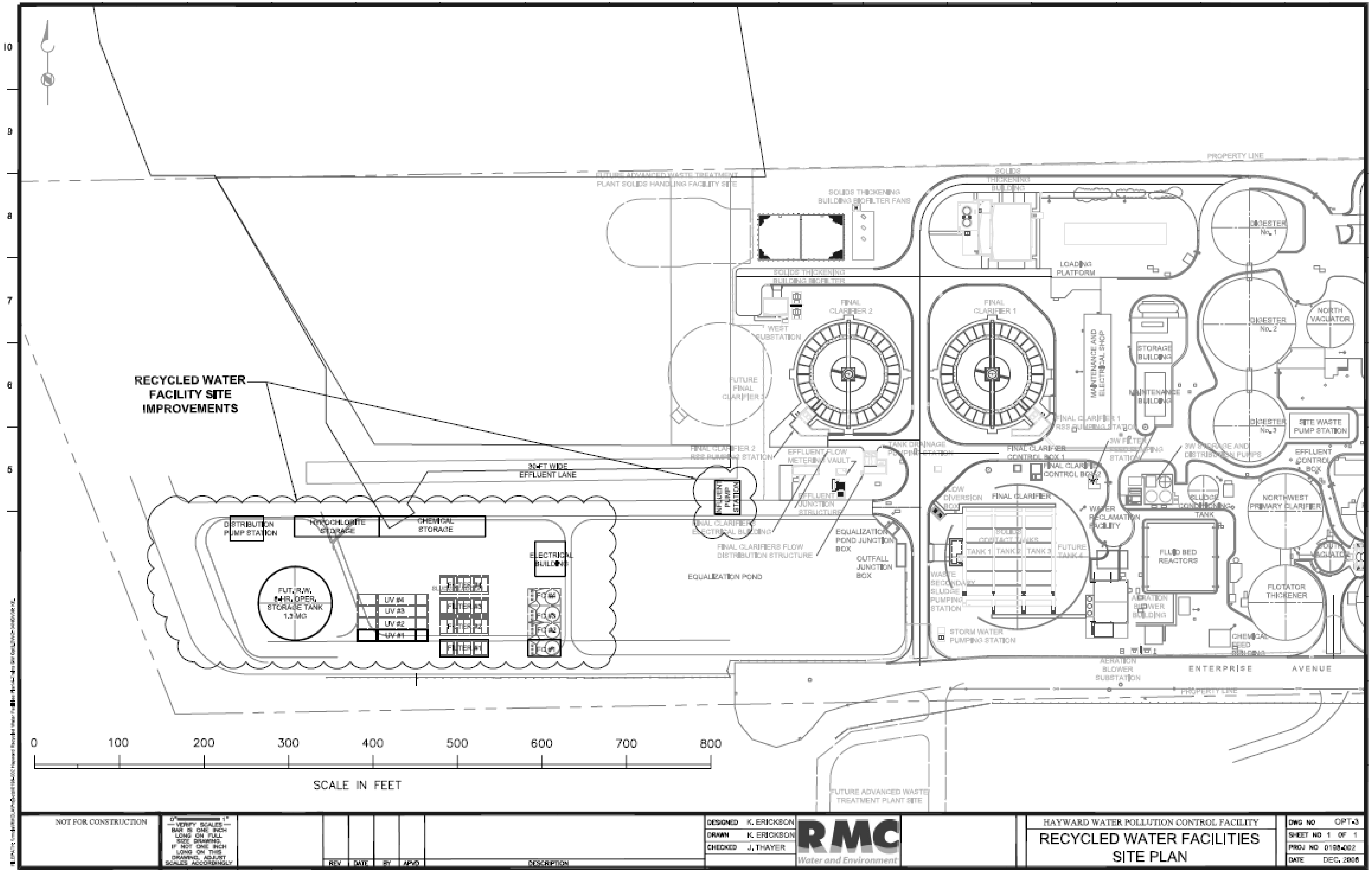


Table 5-2 summarizes key planning-level design criteria for the recommended facilities. Additional information on the facilities sizing and technical details is available in Appendix D -Facility Technical Information.

Table 5-2: Recommended Project Facilities

Description	Units	Quantity
Customers		
Number of Project Customers	---	22
Annual Average Demand	AFY	3,760
Peak Month Demand	mgd	4.58 mgd
Peak Hour Demand	mgd gpm	5.50 mgd 3900 gpm
Treatment Facilities [a]		
Flocculating Clarifiers	mgd	4.65
Granular Media Filters	mgd	4.65
UV Disinfection Facilities	mgd	4.65
Distribution Pump Station to North Branch		
Peak Hour Flowrate	gpm	845
Peak Flow TDH Required	FT	455
Pump Capacity	HP	150
Distribution Pump Station to South Branch		
Peak Hour Flowrate	gpm	185
Peak Flow TDH Required	FT	190
Pump Capacity	HP	15
Distribution System		
Total New Pipeline Length	LF	23,900
8” Pipe	LF	7,100
6” Pipe	LF	16,800
Retrofit of Shell Oil Pipeline (8”)	LF	7,460
Shell Oil Pipeline Connections	---	11

Notes:
a. Treatment facilities are sized to allow for up to 3 percent of influent flow being recycled and returned to the WPCF during treatment.

Table 5-3 summarizes the total capacity of the project facilities and the capacity that is utilized to serve the customer group.

Table 5-3: Total versus Utilized Capacity in Recommended Project

Facility	Total Capacity	Utilized Capacity
Shell Oil Pipeline (8 inch)	1.58 mgd	1.22 mgd (Peak Hour)
Whitesell South Branch (8 inch)	1.58 mgd	0.27 (Peak Hour)
Whitesell North Branch (8 inch)	1.58 mgd	1.22 mgd (Peak Hour)
Treatment Facilities (4.65 mgd)	4.65 mgd (Peak Month)	4.51 mgd (Peak Month)

5.2 Cost Estimate

Table 5-4 summarizes the cost information for the Recommended Project. Estimated costs are referenced to the October 2008 Engineering Construction Cost Index (ENR CCI) for San Francisco of 9853.42.

Table 5-4: Cost Estimate Summary

Description	Cost [b,c]
Treatment Facilities	$6,669,000
Treated Recycled Water Storage	$1,100,000
Potable Backup Water Supply	$100,000
Distribution Pump Station	$1,616,000
Main Pipelines	$1,347,000
Lateral Pipelines	$2,520,000
User Connections	$366,000
Subtotal	**$13,748,000**
Contractor Overhead and Profit (10%)	$1,375,000
Change Order Allowance (5%)	$687,000
Level of Estimate Contingency (30%)	$4,124,000
Total Construction Cost	**$19,934,000**
Engineering and Construction Management/Environmental/Administration/Legal (35%)	$6,977,000
Total Capital Cost	**$26,911,000**
Annualized Capital Costs [a]	$1,828,000
Annual O&M Costs	$1,233,000
Total Annualized Cost	$3,061,000
Estimated Recycled Water Yield	3,760
Unit Cost, Annualized ($/AFY)	**$810/AF**

Notes:
a. Annualized at 30 years, 5.38%
b. Costs are referenced to October 2008 ENR CCI for San Francisco of 9853.42.
c. See Appendix E -Cost Estimate for detailed cost information.

5.3 Benefits

Overall, the Recommended Project helps the City to address the project drivers listed in Chapter 1 while also leveraging the water needs of a single industrial customer to maximize the public benefit of recycled water use. The Recommended Project provides the City with the key benefits summarized in **Table 5-5** at an incremental construction cost of $7.1 million (see difference in Project A and Project B cost estimates in Table 4-4). **Table 5-6** identifies benefits to stakeholders other than the City.

Table 5-5: Key Benefits to the City

Benefit Category	Description
Economic Growth and Development	▪ Provides water to for non-potable industrial uses. ▪ Provide water to support redevelopment of industrial areas near WPCF.
Diversifying Water Sources	▪ Provides 3,760 AFY of locally controlled, drought-proof water supply for non-potable uses. ▪ Reduces dependence on SFPUC imported water
Environmental Protection	▪ Reduces mass loading of regulated constituents to the San Francisco Bay.
Sustainability	▪ Conserves potable water for its highest uses. ▪ Beneficial reuse of an existing City-owned resource.

Table 5-6: Potential Benefits to Other Stakeholders

Stakeholder	Key Benefits
SFPUC/BAWSCA	▪ Reduces demand on SFPUC imported water system.
SWRCB	▪ Assists in meeting statewide recycled water use targets. ▪ Extends State water supply with 3,760 AFY of drought-proof, non-potable water.

5.4 Construction Financing Plan

5.4.1 City/Calpine Partnership

As discussed in Chapter 1, Calpine's interest in utilizing tertiary treated recycled water at their proposed power generation facility is one of the drivers for the City's development of this Plan. Calpine and the City are still in negotiations on the partnership but it is assumed that Calpine will participate at some level in the financing of the tertiary treatment facilities. For the purpose of this Plan, Calpine was assumed to be the primary funding source for the tertiary facilities while the City is the primary funding source for the distribution system.

5.4.2 Outside Funding/Financing Sources

There are various sources of outside funding the City can choose to pursue to aid in funding/financing the Project. **Table 5-7** summarizes the recommended outside funding/financing sources including potential contribution.

Table 5-7: Potential Outside Funding/Financing Sources

Partner / Method	Description / Project Benefits to Partner	Potential Contribution to Recommended Project
SWRCB Construction Grant	SWRCB operates a Recycled Water Construction Financing Grant program. The City obtained a SWRCB Facilities Planning Grant to complete this Plan for the project and is therefore expected to be a high priority for obtaining a construction grant. SWRCB grants can cover up to 25% of eligible project costs up to a $4 million cap. Funds are allocated through a competitive process when available.	$2.1 million [a]
Proposition 84 through the IRWMP	SWRCB and DWR operate an Integrated Regional Water Management Planning (IRWMP) Grants program. Current funding for the IRWMP Grant program comes from Proposition 84, passed by California voters in 2006. Through the Bay Area IRWMP, the City may have access to Proposition 84 grants. Funds are allocated through a competitive process.	--- [b]
Federal Grant	Federal Bureau of Reclamation (USBR) operates the Title XVI Grant Program and other programs. Through the Bay Area Regional Water Recycling Program (BARWRP), the City may have access to Federal grants. National Environmental Policy Act (NEPA) coverage would be required for the project in addition to meeting CEQA requirements. City would need to enter into agreement with the USBR	--- [b]
SWRCB State Revolving Fund (SRF) and Water Recycled Fund Loans	There are two low-interest construction loan programs available from the State that the City could apply for: 1) SRF and 2) Water Recycling Fund. These loans are available to public agencies based on a prioritized list of projects. The City will need to apply to put the Project on the priority lists for both loan programs. Both loan programs have a 20 year payback at low-interest rates. The City can consider using one or both low programs to help financing the Project.	Loan (no set amount); savings are on debt service

Notes:
a. Only the portion of the Project paid for directly by the City (no reimbursement from or cost sharing with Calpine) is assumed not to be eligible for this grant. These costs total approximately $8.4 million, of which 25% is $2.1 million.
b. Access to these funding sources is highly competitive, requiring active engagement by the City in ongoing planning and advocacy, and was therefore not assumed as potential contributions at this time.

5.4.3 City Funds

To fund the remaining portion of the project, the City would add the Project to its Capital Improvement Plan (CIP) and finance the facilities' construction through rates. The City will need to determine whether all water utility customers should support financing the Project (recycled water surcharge applied to all water customers) or only the recycled water customers (recycled water unit cost charged to recycled water customers based on usage).

5.4.4 Cash Flow Analysis

Monthly cash flows during the design and construction of the Project were analyzed along with assumed payments from the City, Calpine, and outside funding sources based on costs at the midpoint of construction. From this analysis, the City can expect to have average Project payments of $1.7 million per months during construction. A spreadsheet with the complete cash flow analysis is included in **Appendix G -Construction Financing Plan.**

5.5 Comparison to Freshwater Alternative

Demands being supply by recycled water in the Project will be present even if the Project is not implemented. Without the Project, these demands would continue or commence by being met using freshwater supplies from the SFPUC. **Table 5-8** shows a comparison between implementation of the Project or utilizing more freshwater supplies from SFPUC.

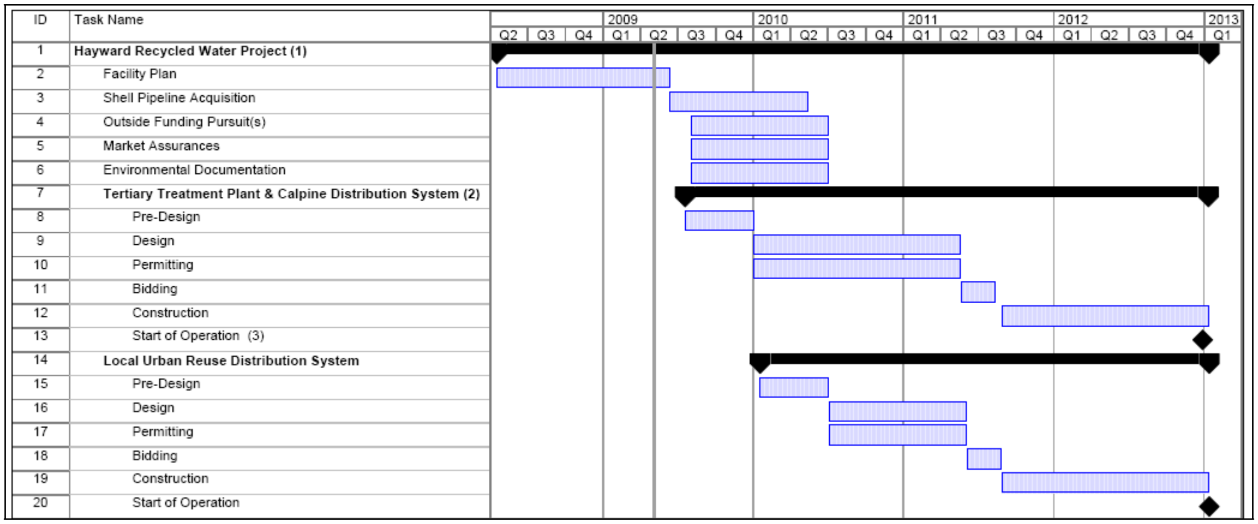
Table 5-8: Recommended Project vs. Freshwater Alternative Comparison

Criteria	Hayward Recycled Water Project	Status Quo – Supply from SFPUC
Summary		
Description	Development of treatment and distribution systems to provide recycled water for irrigation and industrial uses	Status quo. No additional facilities required.
Water Supply	Recycled water from the Hayward WPCF, treated to Title 22 standards for unrestricted reuse	Surface water from Tuolumne and Alameda watersheds
Benefits		
Diversifying Water Sources	3,670 AFY of drought-proof locally controlled water supply for non–potable uses	
Sustainability	Conserves potable water for its highest beneficial use	
Economic Development	Provides additional non-potable water source suitable for industrial uses	
Costs		
Capital Cost	$26.9 million (Oct 2008 dollars)	None
Unit Cost ($/AF)	$810/AF (delivered)	$1,500/AF in 2016 (wholesale – see Chapter 2)
Other Potential Future Costs/Risks	▪ Cost of salinity management program ▪ Cost of groundwater monitoring ▪ Cost of nitrogen management program	▪ Risk of unavailable supplies during periods of drought ▪ Risk of supply interruption following a catastrophic event (e.g. earthquake) ▪ Risk of additional future cost increases

5.6 Implementation Plan

Figure 5-3 shows the proposed implementation schedule for the Recommended Project. The schedule includes implementation of the tertiary treatment facilities and the distribution system.

Figure 5-3: Project Implementation Schedule



1. Ongoing activities such as project management and stakeholder/public outreach are not represented. Schedule subject to changes based on negotiations with Calpine.
2. Tertiary treatment plant implementation from pre-design through construction could be compressed significantly should Calpine be the lead contracting agency. For example, all activities from pre-design through construction were complete in 24 months for the Calpine/DDSD project.
3. Start of construction no later than September 2010 and completion by June 2013 per discussion with City on November 4, 2008.

Facility Plan

As of September 2009, the Facility Plan (this report) is in final form.

Shell Oil Pipeline Acquisition

As of December 2008, the City is reinitiating discussions with the Shell Corporation to acquire the Shell Oil pipeline. These discussions had occurred previously with Shell but had not been finalized. Based on the transfer of abandoned pipelines to other public agencies in the area (e.g. Central Contra Costa Sanitary District), it is anticipated acquisition could occur in 12 months or less.

Outside Funding Pursuits/Negotiations with Calpine

As discussed in the Construction Financing section, the City plans to pursue outside funding from the SWRCB for a portion of the Project costs. The City will likely apply for the 2010/2011 funding cycle as environmental documentation would need to be ready. Additionally, the City may receive financial support for the Project from Calpine.

Market Assurances

To ensure the use of recycled water by the targeted market if the Recommended Project is built, the City is planning to issue a Recycled Water Ordinance. A copy of a sample ordinance similar to what the City plans to issue is provided in **Appendix H -Sample Recycled Water Ordinance.**

The City has already signed a Will Serve letter with Calpine. A copy of this letter is included in **Appendix I -Calpine Will Serve Letter (2001).** Recycled water flows identified in the Will Serve letter are being reevaluated and this Plan contains the latest available information.

Environmental Documentation

An initial analysis of the environmental impacts that would be expected to occur from construction and operation of the Recommended Project has been conducted. The analysis shows that the majority of the impacts would be less than significant or less than significant with mitigation incorporated. Because no significant, unavoidable impacts were identified during this preliminary analysis, an Initial Study/Mitigated Negative Declaration (IS/MND) appears to be the appropriate level of environmental document for this project. The IS/MND will provide a more detailed description of the project as well as explain the thresholds used in the determination of environmental impacts. In addition, the IS/MND would elaborate on the mitigation measures that are proposed to avoid or reduce potential impacts to less-than-significant levels. Refer to **Appendix F -Environmental Checklist** for the detailed Environmental Checklist.

Tertiary Treatment Plant Facilities and Local Urban Reuse Distribution System

- **Pre-Design**. Following completion and approval of this Plan, the City could commence on the pre-design of the tertiary treatment plant facilities to finalize the treatment processes, sizing and layout to be used in the final design. Additionally, following the completion of this Plan, the City will commence on the pre-design of the distribution system to finalize the pipeline alignments, materials, sizing, and customer connections to be used in the final design. The pre-design information would be needed to complete the IS/MND.
- **Permitting**. In conjunction with pre-design of the treatment and distribution facilities, the City would begin acquiring permits for the additional treatment facilities and the distribution system/recycled water use. **Table 5-9** summarizes the expected stakeholders and agencies that will be involved in permitting or review of the tertiary treatment facilities and the local urban reuse distribution system.

Table 5-9: Jurisdictional and Stakeholder Agencies for Permitting or Review for the Tertiary Treatment Facilities and Recycled Water Use

Agency Name	Permits or Special Topics	
	Tertiary Treatment Facilities	**Distribution System**
California Regional Water Quality Control Board	Waste Discharge Requirements and/or Water Recycling Requirements [a,b,c]	
California Department of Public Health	Title 22 Engineers' Report for the Production, Distribution and Use of Recycled Water	
San Francisco Bay Air Quality Management District	Permit to Construct	
San Francisco Bay Conservation and Development Commission	Construction near the San Francisco Bay Shoreline	
City of Hayward Department of Public Works	Grading and clearing	▪ Grading and clearing ▪ Encroachment Permit
California Department of Fish and Game	None	Stream Bed Alteration Agreement/Waiver, if necessary
Caltrans	None	Encroachment Permit
Pacific Gas and Electric, cable and telecommunications providers	None	Infrastructure review, as applicable

Notes

a. The Waste Discharge Requirements and/or Water Recycling Requirements will cover the production, distribution, and use of recycled water.

b. Various permitting strategies (e.g. Master Permit, Project Specific Permit) can be employed for this project. The best strategy should be defined as the project moves forward.

c. In February 2009, SWRCB passed Resolution No. 2009-0011: Policy for Water Quality Control for Recycled Water Policy. This policy requires every basin and sub-basin in California to develop a Salt/Nutrient Management Plan to protect the region's water quality as part of the recycled water project permitting process by 2014. The degree of detail will depend on site specific factors such as basin size, basin complexity, hydrogeology, recycled water quality, aquifer water quality, etc.

- **Design and Construction**. Assuming negotiations with Calpine and adequate funding can be secured in 2009/2010, the City could commence design of the tertiary treatment facilities in 2010 and begin construction by mid-2011. Assuming acquisition of the Shell Oil pipeline and adequate funding can be secured in 2010/2011, the City could commence design of the local urban reuse distribution system in mid-2010 and begin construction in mid to late 2011 (timed to coincide with treatment facilities construction). **Appendix J -Customer Connection Schedule** includes the schedule for customer connections that will need to occur before startup of the distribution system

APPENDIX H

WATER SUPPLY ASSESSMENT AND RELIABILITY ANALYSIS

San Francisco
Water Power Sewer
Operator of the Hetch Hetchy Regional Water System

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January 5, 2016

Andree Johnson
Water Resources Specialist
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Dear Ms. Johnson,

Attached please find the information you requested on the Regional Water System's supply reliability for use in the Wholesale Customer's 2015 Urban Water Management Plan (UWMP) updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected single dry year supply for base year 2015[1],
- Projected multiple dry year supply beginning with base year 2015, and
- Projected supply reliability for base year 2015 through 2040.

Table 1 summarizes deliveries to the Wholesale Customers for projected single dry year supply for base year 2015 and projected multiple dry year supply beginning base year 2015.

With regards to future demands, the SFPUC proposes to expand their water supply portfolio by increasing the types of water supply resources. Table 2 summarizes the water supply resources assumed to be available by 2040, as well as other assumptions affecting supply. These assumptions differ from those used in the reliability analysis for the previous 2010 UWMP update, and lead to slightly different reliability projections explained further below.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan (WSAP) was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The WSAP implements a method for allocating water between the SFPUC retail customers and wholesale customers collectively which has been adopted by the Wholesale Customers

[1] Fiscal Year 2015 is used as the base year to run the water supply reliability analysis in the Hetch Hetchy Local Simulation Model (HHLSM). This base year reflects a wholesale Supply Assurance of 184 million gallons per day, as well as Regional Water System reservoir and pipeline capacities and instream flow requirements as they exist in 2015 (pre-Water System Improvement Program [WSIP] completion).

per the July 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County. The wholesale customers have adopted the Tier Two Plan, the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers.

Finally, the SFPUC estimated the frequency and severity of anticipated shortages for the period 2015 (base year) through 2040. For this analysis, we assumed that the historical hydrologic period is indicative of future events and evaluated the supply reliability assuming a repeat of the actual historic hydrologic period 1921 through 2011. The results of this analysis are summarized in Table 3.

Compared to the reliability projections that were provided previously for the 2010 UWMP update, Table 1 indicates slightly higher shortages and lower Wholesale allocations for dry years 2 and 3. Also, Table 3 shows slightly higher estimates of required rationing in multi-year droughts as compared to those provided previously. These differences are due to the inclusion of a temporary constraint on Crystal Springs Reservoir storage and an in-stream flow requirement below Crystal Springs Reservoir, which are shown in Table 2, but were not included in the previous reliability analysis.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact me at (415) 554-0792.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 1: Projected Deliveries for Three Multiple Dry Years

	Base Year 2015 (Non-Dry)	One Critical Dry Year	Deliveries During Multiple Dry Years		
			Year 1	Year 2	Year 3
System-Wide Shortage	0%	10%	10%	22%	22%
Wholesale Allocation (MGD)	184.0	152.6	152.6	129.2	129.2

MGD = million gallons per day

Table 2: Water Supply Modeling Assumptions for Fiscal Years 2015 through 2040

	2015	2020	2025	2030	2035	2040
Water Supply Resource						
Westside Basin Groundwater (AF/yr)		8,100	8,100	8,100	8,100	8,100
Districts Transfer (AF/yr)		2,240	2,240	2,240	2,240	2,240
Crystal Springs Reservoir Capacity (20.3 BG) [1]			x	x	x	x
Calaveras Reservoir at Full Capacity		x	x	x	x	x
Alameda Creek Recapture (9.3 MGD)		x	x	x	x	x
Reservoir Operation Affecting Supply						
Crystal Springs Reservoir Release for In-Stream Flow to San Mateo Creek (3.5 MGD) [2]	x	x	x	x	x	x
Calaveras Reservoir Release and Alameda Creek Diversion Dam Bypass for In-Stream Flow to Alameda Creek (9.3 MGD)		x	x	x	x	x

AF/yr = acre-feet per year, BG = billion gallons, MGD = million gallons per day, x = in operation

Notes:

1. Schedule for restoration of Crystal Springs Reservoir storage is tied to permitting requirements for endangered plants.
2. Release from Crystal Springs Reservoir to meet minimum in-stream flow requirement in San Mateo Creek began in January 2015.

Table 3: Projected System Supply Reliability Based on Hydrologic Period

	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
Fiscal Year	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
1920-21	184.0	184.0	184.0	184.0	184.0	184.0
1921-22	184.0	184.0	184.0	184.0	184.0	184.0
1922-23	184.0	184.0	184.0	184.0	184.0	184.0
1923-24	184.0	184.0	184.0	184.0	184.0	184.0
1924-25	152.6	184.0	184.0	184.0	184.0	184.0
1925-26	184.0	184.0	184.0	184.0	184.0	184.0
1926-27	184.0	184.0	184.0	184.0	184.0	184.0
1927-28	184.0	184.0	184.0	184.0	184.0	184.0
1928-29	184.0	184.0	184.0	184.0	184.0	184.0
1929-30	184.0	184.0	184.0	184.0	184.0	184.0
1930-31	184.0	184.0	184.0	184.0	184.0	184.0
1931-32	129.2	152.6	152.6	152.6	152.6	152.6
1932-33	184.0	184.0	184.0	184.0	184.0	184.0
1933-34	184.0	184.0	184.0	184.0	184.0	184.0
1934-35	152.9	184.0	184.0	184.0	184.0	184.0
1935-36	184.0	184.0	184.0	184.0	184.0	184.0
1936-37	184.0	184.0	184.0	184.0	184.0	184.0
1937-38	184.0	184.0	184.0	184.0	184.0	184.0
1938-39	184.0	184.0	184.0	184.0	184.0	184.0
1939-40	184.0	184.0	184.0	184.0	184.0	184.0
1940-41	184.0	184.0	184.0	184.0	184.0	184.0
1941-42	184.0	184.0	184.0	184.0	184.0	184.0
1942-43	184.0	184.0	184.0	184.0	184.0	184.0
1943-44	184.0	184.0	184.0	184.0	184.0	184.0
1944-45	184.0	184.0	184.0	184.0	184.0	184.0
1945-46	184.0	184.0	184.0	184.0	184.0	184.0
1946-47	184.0	184.0	184.0	184.0	184.0	184.0
1947-48	184.0	184.0	184.0	184.0	184.0	184.0
1948-49	184.0	184.0	184.0	184.0	184.0	184.0
1949-50	184.0	184.0	184.0	184.0	184.0	184.0
1950-51	184.0	184.0	184.0	184.0	184.0	184.0
1951-52	184.0	184.0	184.0	184.0	184.0	184.0
1952-53	184.0	184.0	184.0	184.0	184.0	184.0
1953-54	184.0	184.0	184.0	184.0	184.0	184.0
1954-55	184.0	184.0	184.0	184.0	184.0	184.0
1955-56	184.0	184.0	184.0	184.0	184.0	184.0
1956-57	184.0	184.0	184.0	184.0	184.0	184.0
1957-58	184.0	184.0	184.0	184.0	184.0	184.0
1958-59	184.0	184.0	184.0	184.0	184.0	184.0
1959-60	184.0	184.0	184.0	184.0	184.0	184.0
1960-61	152.6	184.0	184.0	184.0	184.0	184.0

Fiscal Year	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
	2015	**2020**	**2025**	**2030**	**2035**	**2040**
1961-62	129.2	152.6	152.6	152.6	152.6	152.6
1962-63	184.0	184.0	184.0	184.0	184.0	184.0
1963-64	184.0	184.0	184.0	184.0	184.0	184.0
1964-65	184.0	184.0	184.0	184.0	184.0	184.0
1965-66	184.0	184.0	184.0	184.0	184.0	184.0
1966-67	184.0	184.0	184.0	184.0	184.0	184.0
1967-68	184.0	184.0	184.0	184.0	184.0	184.0
1968-69	184.0	184.0	184.0	184.0	184.0	184.0
1969-70	184.0	184.0	184.0	184.0	184.0	184.0
1970-71	184.0	184.0	184.0	184.0	184.0	184.0
1971-72	184.0	184.0	184.0	184.0	184.0	184.0
1972-73	184.0	184.0	184.0	184.0	184.0	184.0
1973-74	184.0	184.0	184.0	184.0	184.0	184.0
1974-75	184.0	184.0	184.0	184.0	184.0	184.0
1975-76	184.0	184.0	184.0	184.0	184.0	184.0
1976-77	152.6	184.0	184.0	184.0	184.0	184.0
1977-78	129.2	152.6	152.6	152.6	152.6	152.6
1978-79	184.0	184.0	184.0	184.0	184.0	184.0
1979-80	184.0	184.0	184.0	184.0	184.0	184.0
1980-81	184.0	184.0	184.0	184.0	184.0	184.0
1981-82	184.0	184.0	184.0	184.0	184.0	184.0
1982-83	184.0	184.0	184.0	184.0	184.0	184.0
1983-84	184.0	184.0	184.0	184.0	184.0	184.0
1984-85	184.0	184.0	184.0	184.0	184.0	184.0
1985-86	184.0	184.0	184.0	184.0	184.0	184.0
1986-87	184.0	184.0	184.0	184.0	184.0	184.0
1987-88	152.6	184.0	184.0	184.0	184.0	184.0
1988-89	129.2	152.6	152.6	152.6	152.6	152.6
1989-90	129.2	152.6	152.6	152.6	152.6	152.6
1990-91	129.2	132.5	132.5	132.5	132.5	132.5
1991-92	129.2	132.5	132.5	132.5	132.5	132.5
1992-93	129.2	132.5	132.5	132.5	132.5	132.5
1993-94	184.0	184.0	184.0	184.0	184.0	184.0
1994-95	184.0	184.0	184.0	184.0	184.0	184.0
1995-96	184.0	184.0	184.0	184.0	184.0	184.0
1996-97	184.0	184.0	184.0	184.0	184.0	184.0
1997-98	184.0	184.0	184.0	184.0	184.0	184.0
1998-99	184.0	184.0	184.0	184.0	184.0	184.0
1999-00	184.0	184.0	184.0	184.0	184.0	184.0
2000-01	184.0	184.0	184.0	184.0	184.0	184.0
2001-02	184.0	184.0	184.0	184.0	184.0	184.0
2002-03	184.0	184.0	184.0	184.0	184.0	184.0
2003-04	184.0	184.0	184.0	184.0	184.0	184.0

Fiscal Year	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
	2015	**2020**	**2025**	**2030**	**2035**	**2040**
2004-05	184.0	184.0	184.0	184.0	184.0	184.0
2005-06	184.0	184.0	184.0	184.0	184.0	184.0
2006-07	184.0	184.0	184.0	184.0	184.0	184.0
2007-08	184.0	184.0	184.0	184.0	184.0	184.0
2008-09	184.0	184.0	184.0	184.0	184.0	184.0
2009-10	184.0	184.0	184.0	184.0	184.0	184.0
2010-11	184.0	184.0	184.0	184.0	184.0	184.0

MGD = million gallons per day

APPENDIX I

TIER 1 AND TIER 2

DROUGHT ALLOCATION PLANS

ATTACHMENT H

WATER SHORTAGE ALLOCATION PLAN

This Interim Water Shortage Allocation Plan ("Plan") describes the method for allocating water between the San Francisco Public Utilities Commission ("SFPUC") and the Wholesale Customers collectively during shortages caused by drought. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The Plan includes provisions for transfers, banking, and excess use charges. The Plan applies only when the SFPUC determines that a system-wide water shortage due to drought exists, and all references to "shortages" and "water shortages" are to be so understood. This Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County ("Agreement").

SECTION 1. SHORTAGE CONDITIONS

1.1. Projected Available SFPUC Water Supply. The SFPUC shall make an annual determination as to whether or not a shortage condition exists. The determination of projected available water supply shall consider, among other things, stored water, projected runoff, water acquired by the SFPUC from non-SFPUC sources, inactive storage, reservoir losses, allowance for carryover storage, and water bank balances, if any, described in Section 3.

1.2 Projected SFPUC Purchases. The SFPUC will utilize purchase data, including volumes of water purchased by the Wholesale Customers and by Retail Customers (as those terms are used in the Agreement) in the year immediately prior to the drought, along with other available relevant information, as a basis for determining projected system-wide water purchases from the SFPUC for the upcoming year.

1.3. Shortage Conditions. The SFPUC will compare the available water supply (Section 1.1) with projected system-wide water purchases (Section 1.2). A shortage condition exists if the SFPUC determines that the projected available water supply is less than projected system-wide water purchases in the upcoming Supply Year (defined as the period from July 1 through June 30). When a shortage condition exists, SFPUC will determine whether voluntary or mandatory actions will be required to reduce purchases of SFPUC water to required levels.

1.3.1 Voluntary Response. If the SFPUC determines that voluntary actions will be sufficient to accomplish the necessary reduction in water use throughout its service area, the SFPUC and the Wholesale Customers will make good faith efforts to reduce their water purchases to stay within their annual shortage allocations and associated monthly water use budgets. The SFPUC will not impose excess use charges during periods of voluntary rationing, but may suspend the prospective accumulation of water bank credits, or impose a ceiling on further accumulation of bank credits, consistent with Section 3.2.1 of this Plan.

1.3.2 Mandatory Response. If the SFPUC determines that mandatory actions will be required to accomplish the necessary reduction in water use in the SFPUC service area, the SFPUC may implement excess use charges as set forth in Section 4 of this Plan.

1.4. Period of Shortage. A shortage period commences when the SFPUC determines that a water shortage exists, as set forth in a declaration of water shortage emergency issued by the SFPUC pursuant to California Water Code Sections 350 et seq. Termination of the water shortage emergency will be declared by resolution of the SFPUC.

SECTION 2. SHORTAGE ALLOCATIONS

2.1. Annual Allocations between the SFPUC and the Wholesale Customers. The annual water supply available during shortages will be allocated between the SFPUC and the collective Wholesale Customers as follows:

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The water allocated to the SFPUC shall correspond to the total allocation for all Retail Customers.

2.2 Annual Allocations among the Wholesale Customers. The annual water supply allocated to the Wholesale Customers collectively during system wide shortages of 20 percent or less will be apportioned among them based on a methodology adopted by all of the Wholesale Customers, as described in Section 3.11(C) of the Agreement. In any year for which the methodology must be applied, the Bay Area Water Supply and Conservation Agency ("BAWSCA") will calculate each Wholesale Customer's individual percentage share of the amount of water allocated to the Wholesale Customers collectively pursuant to Section 2.1. Following the declaration or reconfirmation of a water shortage emergency by the SFPUC, BAWSCA will deliver to the SFPUC General Manager a list, signed by the President of BAWSCA's Board of Directors and its General Manager, showing each Wholesale Customer together with its percentage share and stating that the list has been prepared in accordance with the methodology adopted by the Wholesale Customers. The SFPUC shall allocate water to each Wholesale Customer, as specified in the list. The shortage allocations so established may be transferred as provided in Section 2.5 of this Plan. If BAWSCA or all Wholesale Customers do not provide the SFPUC with individual allocations, the SFPUC may make a final allocation decision after first meeting and discussing allocations with BAWSCA and the Wholesale Customers.

The methodology adopted by the Wholesale Customers utilizes the rolling average of each individual Wholesale Customer's purchases from the SFPUC during the three immediately preceding Supply Years. The SFPUC agrees to provide BAWSCA by November 1 of each year a list showing the amount of water purchased by each Wholesale Customer during the immediately preceding Supply Year. The list will be prepared using Customer Service Bureau report MGT440 (or comparable official record in use at the time), adjusted as required for any reporting errors or omissions, and will be transmitted by the SFPUC General Manager or his designee.

2.3. Limited Applicability of Plan to System Wide Shortages Greater Than Twenty Percent. The allocations of water between the SFPUC and the Wholesale Customers collectively, provided for in Section 2.1, apply only to shortages of 20 percent or less. The SFPUC and Wholesale Customers recognize the possibility of a drought occurring which could create system-wide shortages greater than 20 percent despite actions taken by the SFPUC aimed at reducing the probability and severity of water shortages in the SFPUC service area. If the SFPUC determines that a system wide water shortage greater than 20 percent exists, the SFPUC and the Wholesale Customers agree to meet within 10 days and discuss whether a change is required to the allocation set forth in Section 2.1 in order to mitigate undue hardships that might otherwise be experienced by individual Wholesale Customers or Retail Customers. Following these discussions, the Tier 1 water allocations set forth in Section 2.1 of this Plan, or a modified version thereof, may be adopted by mutual written consent of the SFPUC and the Wholesale Customers. If the SFPUC and Wholesale Customers meet and cannot agree on an appropriate Tier 1 allocation within 30 days of the SFPUC's determination of water shortage greater than 20 percent, then (1) the provisions of Section 3.11(C) of the Agreement will apply, unless (2) all of the Wholesale Customers direct in writing that a Tier 2 allocation methodology agreed to by them be used to apportion the water to be made available to the Wholesale Customers collectively, in lieu of the provisions of Section 3.11(C).

The provisions of this Plan relating to transfers (in Section 2.5), banking (in Section 3), and excess use charges (in Section 4) shall continue to apply during system-wide shortages greater than 20 percent.

2.4. Monthly Water Budgets. Within 10 days after adopting a declaration of water shortage emergency, the SFPUC will determine the amount of Tier 1 water allocated to the Wholesale Customers collectively pursuant to Section 2.1. The SFPUC General Manager, using the Tier 2 allocation percentages shown on the list delivered by BAWSCA pursuant to Section 2.2, will calculate each Wholesale Customer's individual annual allocation. The SFPUC General Manager, or his designee, will then provide each Wholesale Customer with a proposed schedule of monthly water budgets based on the pattern of monthly water purchases during the Supply Year immediately preceding the declaration of shortage (the "Default Schedule"). Each Wholesale Customer may, within two weeks of receiving its Default Schedule, provide the SFPUC with an alternative monthly water budget that reschedules its annual Tier 2 shortage allocation over the course of the succeeding Supply Year. If a Wholesale Customer does not deliver an alternative monthly water budget to the SFPUC within two weeks of its receipt of the Default Schedule, then its monthly budget for the ensuing Supply Year shall be the Default Schedule proposed by the SFPUC.

Monthly Wholesale Customer water budgets will be derived from annual Tier 2 allocations for purposes of accounting for excess use. Monthly Wholesale Customer water budgets shall be adjusted during the year to account for transfers of shortage allocation under Section 2.5 and transfers of banked water under Section 3.4.

2.5. Transfers of Shortage Allocations. Voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customers, and between any Wholesale Customers, will be permitted using the same procedure as that for transfers of banked water set forth in Section 3.4. The SFPUC and BAWSCA shall be notified of each transfer. Transfers of shortage allocations shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC. Transfers of shortage allocations shall be in compliance with Section 3.05 of the Agreement. The transferring parties will meet with the SFPUC, if requested, to discuss any effect the transfer may have on its operations.

SECTION 3. SHORTAGE WATER BANKING

3.1. Water Bank Accounts. The SFPUC shall create a water bank account for itself and each Wholesale Customer during shortages in conjunction with its resale customer billing process. Bank accounts will account for amounts of water that are either saved or used in excess of the shortage allocation for each agency; the accounts are not used for tracking billings and payments. When a shortage period is in effect (as defined in Section 1.4), the following provisions for bank credits, debits, and transfers shall be in force. A statement of bank balance for each Wholesale Customer will be included with the SFPUC's monthly water bills.

3.2. Bank Account Credits. Each month, monthly purchases will be compared to the monthly budget for that month. Any unused shortage allocation by an agency will be credited to that agency's water bank account. Credits will accumulate during the entire shortage period, subject to potential restrictions imposed pursuant to Section 3.2.1. Credits remaining at the end of the shortage period will be zeroed out; no financial or other credit shall be granted for banked water.

3.2.1. Maximum Balances. The SFPUC may suspend the prospective accumulation of credits in all accounts. Alternatively, the SFPUC may impose a ceiling on further accumulation of credits in water bank balances based on a uniform ratio of the bank balance to the annual water allocation. In making a decision to suspend the prospective accumulation of water bank credits, the SFPUC shall consider the available water supply as set forth in Section 1.1 of this Plan and other reasonable, relevant factors.

3.3. Account Debits. Each month, monthly purchases will be compared to the budget for that month. Purchases in excess of monthly budgets will be debited against an agency's water bank account. Bank debits remaining at the end of the fiscal year will be subject to excess use charges (see Section 4).

3.4. Transfers of Banked Water. In addition to the transfers of shortage allocations provided for in Section 2.5, voluntary transfers of banked water will also be permitted between the SFPUC and any Wholesale Customer, and among the Wholesale Customers. The volume of transferred water will be credited to the transferee's water bank account and debited against the transferor's water bank account. The transferring parties must notify the SFPUC and BAWSCA of each transfer in writing (so that adjustments can be made to bank accounts), and will meet with the SFPUC, if requested, to discuss any affect the transfer may have on SFPUC operations. Transfers of banked water shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC.

If the SFPUC incurs extraordinary costs in implementing transfers, it will give written notice to ~~the transferring parties within ten (10) business days after receipt of notice of the transfer.~~ Extraordinary costs means additional costs directly attributable to accommodating transfers and which are not incurred in non-drought years nor simply as a result of the shortage condition itself. Extraordinary costs shall be calculated in accordance with the procedures in the Agreement and shall be subject to the disclosure and auditing requirements in the Agreement. In the case of transfers between Wholesale Customers, such extraordinary costs shall be considered to be expenses chargeable solely to individual Wholesale Customers and shall be borne equally by the parties to the transfer. In the case of transfers between the SFPUC and a Wholesale Customer, the SFPUC's share of any extraordinary transfer costs shall not be added to the Wholesale Revenue Requirement.

3.4.1. Transfer Limitations. The agency transferring banked water will be allowed to transfer no more than the accumulated balance in its bank. Transfers of estimated prospective banked credits and the "overdrafting" of accounts shall not be permitted. The price of transfer water originally derived from the SFPUC system is to be determined by the transferring parties and is not specified herein. Transfers of banked water shall be in compliance with Section 3.05 of the Agreement.

SECTION 4. WHOLESALE EXCESS USE CHARGES

4.1. Amount of Excess Use Charges. Monthly excess use charges shall be determined by the SFPUC at the time of the declared water shortage consistent with the calendar in Section 6 and in accordance with Section 6.03 of the Agreement. The excess use charges will be in the form of multipliers applied to the rate in effect at the time the excess use occurs. The same excess use charge multipliers shall apply to the Wholesale Customers and all Retail Customers. The excess use charge multipliers apply only to the charges for water delivered at the rate in effect at the time the excess use occurred.

4.2 Monitoring Suburban Water Use. During periods of voluntary rationing, water usage greater than a customer's allocation (as determined in Section 2) will be indicated on each SFPUC monthly water bill. During periods of mandatory rationing, monthly and cumulative water usage greater than a Wholesale Customer's shortage allocation and the associated excess use charges will be indicated on each SFPUC monthly water bill.

4.3. Suburban Excess Use Charge Payments. An annual reconciliation will be made of monthly excess use charges according to the calendar in Section 6. Annual excess use charges will be calculated by comparing total annual purchases for each Wholesale Customer with its annual shortage allocation (as adjusted for transfers of shortage allocations and banked water, if any). Excess use charge payments by those Wholesale Customers with net excess use will be paid according to the calendar in Section 6. The SFPUC may dedicate excess use charges paid by Wholesale Customers toward the purchase of water from the State Drought Water Bank or other willing sellers in order to provide additional water to the Wholesale Customers. Excess use charges paid by the Wholesale Customers constitute Wholesale Customer revenue and shall be included within the SFPUC's annual Wholesale Revenue Requirement calculation.

SECTION 5. GENERAL PROVISIONS GOVERNING WATER SHORTAGE ALLOCATION PLAN

5.1. Construction of Terms. This Plan is for the sole benefit of the parties and shall not be construed as granting rights to any person other than the parties or imposing obligations on a party to any person other than another party.

5.2. Governing Law. This Plan is made under and shall be governed by the laws of the State of California.

5.3. Effect on Agreement. This Plan describes the method for allocating water between the SFPUC and the collective Wholesale Customers during system-wide water shortages of 20 percent or less. This Plan also provides for the SFPUC to allocate water among the Wholesale Customers in accordance with directions provided by the Wholesale Customers through BAWSCA under Section 2.2, and to implement a program by which such allocations may be voluntarily transferred among the Wholesale Customers. The provisions of this Plan are intended to implement Section 3.11(C) of the Agreement and do not affect, change or modify any other section, term or condition of the Agreement.

5.4. Inapplicability of Plan to Allocation of SFPUC System Water During Non-Shortage Periods. The SFPUC's agreement in this Plan to a respective share of SFPUC system water during years of shortage shall not be construed to provide a basis for the allocation of water between the SFPUC and the Wholesale Customers when no water shortage emergency exists.

5.5. Termination. This Plan shall expire at the end of the Term of the Agreement.. The SFPUC and the Wholesale Customers can mutually agree to revise or terminate this Plan prior to that date due to changes in the water delivery capability of the SFPUC system, the acquisition of new water supplies, and other factors affecting the availability of water from the SFPUC system during times of shortage.

SECTION 6. ALLOCATION CALENDAR

6.1. Annual Schedule. The annual schedule for the shortage allocation process is shown below. This schedule may be changed by the SFPUC to facilitate implementation.

6.1.1

In All Years	Target Dates
1. SFPUC delivers list of annual purchases by each Wholesale Customer during the immediately preceding Supply Year	November 1
2. SFPUC meets with the Wholesale Customers and presents water supply forecast for the following Supply Year	February
3. SFPUC issues initial estimate of available water supply	February 1
4. SFPUC announces potential first year of drought (if applicable)	February 1
5. SFPUC and Wholesale Customers meet upon request to exchange information concerning water availability and projected system-wide purchases	February 1-May 31
6. SFPUC issues revised estimate of available water supply, and confirms continued potential shortage conditions, if applicable	March 1
7. SFPUC issues final estimate of available water supply	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.
8. SFPUC determines amount of water available to Wholesale Customers collectively	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.

In Drought Years	Target Dates
9. SFPUC formally declares the existence of water shortage emergency (or end of water shortage emergency, if applicable) under Water Code Sections 350 et. seq.	April 15-31
10. SFPUC declares the need for a voluntary or mandatory response	April 15-31
11. BAWSCA submits calculation to SFPUC of individual Wholesale Customers' percentage shares of water allocated to Wholesale Customers collectively	April 15- 31
12. SFPUC determines individual shortage allocations, based on BAWSCA's submittal of individual agency percentage shares to SFPUC, and monthly water budgets (Default Schedule)	April 25—May 10
13. Wholesale Customers submit alternative monthly water budgets (optional)	May 8-May 24
14. Final drought shortage allocations are issued for the Supply Year beginning July 1 through June 30	June 1
15. Monthly water budgets become effective	July 1
16. Excess use charges indicated on monthly Suburban bills	August 1 (of the beginning year) through June 30 (of the succeeding year)
17. Excess use charges paid by Wholesale Customers for prior year	August of the succeeding year

EXHIBIT A

TIER 2 DROUGHT IMPLEMENTATION PLAN AMONG WHOLESALE CUSTOMERS

This Tier 2 Drought Implementation (Plan) describes the method for allocating the water made available by the San Francisco Public Utilities Commission (SFPUC) among the Wholesale Customers during shortages caused by drought. This Plan is adopted pursuant to Section 3.11.C of the July 2009 Water Supply Agreement between the City and County of San Francisco and the Wholesale Customers (Agreement).

SECTION 1. APPLICABILITY AND INTEGRATION

Section 1.1 Applicability. This Plan applies when, and only when, the SFPUC determines that a system-wide water shortage of 20 percent or less exists, as set forth in a declaration of water shortage emergency adopted by the SFPUC pursuant to California Water Code Sections 350 *et seq.* This Plan applies only to water acquired and distributed by the SFPUC to the Wholesale Customers and has no effect on water obtained by a Wholesale Customer from any source other than the SFPUC.

Section 1.2 Integration with Tier 1 Water Shortage Allocation Plan. The Agreement contains, in Attachment H, a Water Shortage Allocation Plan which, among other things, (a) provides for the allocation by the SFPUC of water between Direct City Water Users (e.g., retail water customers within the City and County of San Francisco) and the Wholesale Customers collectively during system-wide water shortages of 20 percent or less, (b) contemplates the adoption by the Wholesale Customers of this Plan for allocation of the water made available to Wholesale Customers collectively among the 26 individual Wholesale Customers, (c) commits the SFPUC to implement this Plan, and (d) provides for the transfer of both banked water and shortage allocations between and among the Wholesale Customers and commits the SFPUC to implement such transfers. That plan is referred to as the Tier 1 Plan.

The Tier 1 Plan also provides the methodology for determining the Overall Average Wholesale Customer Reduction, expressed as a percentage cutback from prior year's normal SFPUC purchases, and Overall Wholesale Customer Allocation, in million gallons per day, both of which are used in determining the Final Allocation Factor for each Wholesale Customer. The Overall Average Wholesale Customer Reduction is determined by dividing the volume of water available to the Wholesale Customers (the Overall Wholesale Customer Allocation), shown as a share of available water in Section 2 of the Tier 1 Plan, by the prior year's normal total Wholesale Customers SFPUC purchases and subtracting that value from one.

This Plan is referred to in the Agreement as the Tier 2 Plan. It is intended to be integrated with the Tier 1 Plan described in the preceding paragraph. Terms used in this Plan are intended to have the same meaning as such terms have in the Tier 1 Plan.

SECTION 2. ALLOCATION OF WATER AMONG WHOLESALE CUSTOMERS

Section 2.1 **Annual Allocations Among the Wholesale Customers**. The annual water supply allocated by the SFPUC to the Wholesale Customers collectively during system-wide shortages of 20 percent or less shall be apportioned among them based on the methodology described in this Section.

Section 2.2 **Methodology for Allocating Water Among Wholesale Customers**. The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Factor, adjusted as described in the following subsections below. The Wholesale Customer Allocation Factors will only be calculated at the onset of a drought and will remain the same until such time as the SFPUC declares the shortage condition over. The Wholesale Customer Allocation Factors will be recalculated during subsequent shortage periods for use during those specific periods.

Section 2.2.1 **Step One: Determination of Base/Seasonal Purchase Cutback For Each Wholesale Customer**. The first step requires calculating the Wholesale Customer's Base/Seasonal Purchase Cutback. This calculation has seven parts. An example of Steps 1b-1f is presented in Table 2. Step 1g is shown in columns 3-6 in Table 3. For steps 1b-1g, the calculation uses average monthly production values for the three years preceding the drought for all potable supply sources, expressed as a monthly value in hundred cubic feet:

- Step 1a: Each agency's total annual purchases from the SFPUC will be compared to its Individual Supply Guarantee (ISG), with any annual purchases above its ISG subtracted from that agency's total annual SFPUC purchases by subtracting the amount on a monthly basis in proportion to the agency's monthly SFPUC purchase pattern,

- Step 1b: Calculate Average Monthly and Total Production for the three fiscal years immediately preceding the drought, excluding years during which shortage allocations were in effect, based on monthly production data from the SFPUC and Wholesale Customers,

- Step 1c: Calculate Base Component which is equal to the Average Monthly Production during the base months of December, January, February and March, multiplied by 12,

- Step 1d: Calculate Seasonal Component as the difference between Total Production and Base Component,

- Step 1e: Calculate an agency's Base/Seasonal Allocation , expressed in hundred cubic feet, by multiplying the Base Component by one minus the Base Reduction Percentage, or 90%, and the Seasonal Component by the percentage needed (Seasonal Reduction Percentage) to achieve the required Overall Average Wholesale Customer Reduction, which is expressed as a percentage,

- Step 1f: Calculate the Base/Seasonal Allocation Cutback Percentage for each agency by dividing its Base/Seasonal Allocation by the agency's Total Production, and

- Step 1g: Calculate the Base/Seasonal Purchase Cutback Percentage by multiplying the Base/Seasonal Allocation Cutback percentage times the lesser of: (a) the immediately preceding SFPUC purchases or (b) ISG, adjusting the Seasonal percentage above until the total reduction equals the Overall Average Wholesale Customer Reduction.

Additionally, adjustments to the Base Component for Stanford University will be made to remove that two week time period that the University is completely closed during the winter break per policy set by the University President as long as that policy remains in place. This adjustment will be removed at such time as the seasonal closure policy is terminated by Stanford University.

Section 2.2.2 <u>Step Two: First Adjustment for San Jose and Santa Clara</u>. The resulting Base/Seasonal Purchase Cutback Percentage in Section 2.2.1 for San Jose and Santa Clara will be compared to the highest Base/Seasonal Purchase Cutback percentage of the other Wholesale Customers. If both San Jose's and Santa Clara's percentage reductions are larger than the highest percentage reduction among any other Wholesale Customers, the Base/Seasonal Purchase Cutback percentage established under Section 2.2.1 will remain unchanged. If either San Jose's percentage cutback or Santa Clara's percentage cutback, or both, is smaller than the highest Base/Seasonal Purchase Cutback percentage of other Wholesale Customers, the Base/Seasonal Allocation (in mgd) of San Jose or Santa Clara, or both, will be reduced so that the percentage cutback of each is no smaller than that of the Wholesale Customers' otherwise highest percentage cutback. The amount of shortage allocation (in mgd) removed from San Jose and/or Santa Clara will be reallocated among the remaining Wholesale Customers in proportion to the Base/Seasonal Allocation of each.

Section 2.2.3 <u>Step Three: Determination of Weighted Purchase Cutback For Each Wholesale Customer</u>. Each agency's weighted allocation is calculated by multiplying its Adjusted Base/Seasonal Allocation in Section 2.2.2 by 66.66% and its Fixed Component by 33.33%. The Fixed Component is (i) the Wholesale Customer's ISG provided for in the Agreement, or (ii) in the case of Hayward, 25.11 mgd, or (iii) in the case of San Jose and Santa Clara, consistent with the limit on purchases from SFPUC set forth in Section 4.05 of the Agreement, e. g., 4.5 mgd each. The amount of the Fixed Component for each Wholesale Customer is shown on Table 1.

Section 2.2.4 <u>Step Four: Second Adjustment for San Jose and Santa Clara</u>. The resulting Weighted Allocations for San Jose and Santa Clara will be compared to the highest Weighted Purchase Cutback, shown as a percentage, of the other Wholesale Customers. If both San Jose's and Santa Clara's percentage cutback is larger than the highest percentage cutback among other Wholesale Customers, the Weighted Purchase Cutbacks established under Section 2.2.3 will remain unchanged. If either San Jose's percentage cutback or Santa Clara's percentage cutback, or both, is smaller than the highest percentage cutback of any other Wholesale Customers, the Weighted Shortage Allocation (in mgd) of San Jose or Santa Clara, or both, will be reduced so that the percentage reduction of each is no smaller than that of the Wholesale Customers' otherwise highest Weighted Percentage Cutback. The amount of allocation (in mgd) removed from San Jose and/or Santa Clara will be reallocated among the remaining Wholesale Customers in proportion to the Weighted Shortage Allocation of each.

Section 2.2.5 Step Five: Adjustment for Minimum and Maximum Cutbacks. Using the Adjusted Weighted Purchase Cutbacks, either a 10% minimum cutback or maximum cutback, as defined below, is applied to any agency whose Adjusted Weighted Purchase Cutback falls outside this range:

- A minimum 10% cutback is applied to the individual agency Adjusted Weighted Allocation, with the reapportioned water being placed in the hardship bank for allocation to East Palo Alto.

- A maximum cutback of the average cutback plus 20% (e.g. 15% average cutback results in a maximum cutback of 15% + 20% = 35%) is applied to the individual agency Adjusted Weighted Allocation, with the water necessary to meet that level being subtracted in proportion to each Wholesale Customer's Adjusted Weighted Allocation from all remaining agencies, except those at agencies subject to the minimum cutback above.

The result is the Adjusted Minimum/Maximum Purchase Cutback, expressed as a percentage.

Section 2.2.6 Step Six: Adjustment to Provide Sufficient Supply for East Palo Alto. In order to provide for sufficient water supply for water customers served by the City of East Palo Alto (EPA), the maximum Final Purchase Cutback applied at any given time to EPA will be equal to 50% of the Overall Average Wholesale Customer Reduction. The water needed to accommodate the guaranteed maximum cutback to EPA will be provided in two ways:

- First, water from the hardship bank provided by the 10% minimum cutback will be first added to the EPA Adjusted Weighted Purchase Allocation, and

- Second, the balance of water needed for EPA will be deducted on a prorated basis from those agencies with a pre-drought residential per capita water use greater than 55 gallons per capita per day (as documented in the most recent BAWSCA Annual Survey) in proportion to each agency's Min./Max. Adjusted Allocation and who are not subject to the minimum and maximum reductions already applied per Section 2.2.5

The result is the Allocation with EPA Adjustment, expressed as an mgd.

Section 2.2.7 Step Seven: Determination of Final Allocation Factor. Each Wholesale Customer's Final Allocation Factor is the fraction expressed as a percentage, the numerator of which is the particular Wholesale Customer's "Final Allocation with EPA Adjustment" (in mgd) as calculated in Steps One through Six and the denominator of which is the Overall Wholesale Customer Allocation (in mgd), a number provided by the SFPUC during the drought period as determined by the SFPUC in the Tier 1 Plan.

Section 2.2.8 Example Calculation. Table 2 presents a sample of the calculations involved in Steps 1b-1f. Table 3 presents a sample of the calculations involved in Step 1g and Steps Two through Seven, using the values from Tables 1 and 2 and recent water use data for the other values. Tables 2 and 3 are presented for illustrative purposes only and do not supersede the foregoing provisions of this Section 2.2. In the event of any inconsistency between this Section 2.2 and Tables 2 and 3, the text of this section will govern.

Section 2.3 Calculation of Individual Wholesale Customer Allocation Factors; Directions to SFPUC. The Tier 1 Plan contemplates that in any year in which the methodology described above must be applied, the Bay Area Water Supply and Conversation Agency (BAWSCA) will calculate each Wholesale Customer's individual percentage share of the amount of water made available to the Wholesale Customers collectively, following the methodology described above and defined above as Wholesale Customer Allocation Factors. The Tier 1 Plan requires SFPUC to allocate water to each Wholesale Customer in accordance with calculations delivered to it by BAWSCA.

Each Wholesale Customer authorizes BAWSCA to perform the calculations required, using water sales data furnished to it by the SFPUC, and to deliver to SFPUC a list of individual Wholesale Customer Allocation Factors so calculated as contemplated by the Tier 1 Plan. Neither BAWSCA nor any officer or employee of BAWSCA shall be liable to any Wholesale Customer for any such calculations made in good faith, even if incorrect.

SECTION 3. GENERAL PROVISIONS

Section 3.1 No Third-Party Beneficiaries. This Plan is for the sole benefit of the Wholesale Customers and shall not be construed as granting rights to any person other than another Wholesale Customer.

Section 3.2 Governing Law. This Plan is made under and shall be governed by the laws of the State of California.

Section 3.3 Effect on Water Supply Agreement. This Plan describes the method for allocating water from the SFPUC among the Wholesale Customers during system-wide water shortages of 20 percent or less declared by the SFPUC. The provisions of this Plan, and the Tier 1 Plan contained in Attachment H to the Agreement with which it is integrated, are intended to implement Section 3.11 of the Agreement. The Plans do not affect, change or modify any other section, term or condition of the Agreement or of the individual Water Sales Contracts between each Wholesale Customer and San Francisco.

Section 3.4 **Amendment**. This Plan may be amended only by the written agreement of all Wholesale Customers.

Section 3.5 **Termination**. This Plan shall expire on December 31, 2018. It may be terminated prior to that date only by the written agreement of all Wholesale Customers.

APPENDIX J

WATER SHORTAGE

CONTINGENCY PLAN

CITY OF HAYWARD
WATER SHORTAGE CONTINGENCY PLAN
(ADOPTED BY THE HAYWARD CITY COUNCIL ON APRIL 7, 2015)

In response to a water shortage due to climate conditions, emergency event or other causes, the City would implement a Water Shortage Contingency Plan.

Stages of Action

Hayward's past experience with water shortages, most notably in 1977 and from 1987-1992, has shaped its current plans for managing such an event in the future. The following stages have been developed to respond to increasingly severe drought conditions and are triggered by water supplies.

Table 5-12
Water Shortage Stages of Action

Stage	Water Supply Conditions	% Shortage
I	• Single or multiple dry year(s) • Supply is 90 to 99% of normal	Up to 10%
II	• Critically dry year • Supply is 80 to 90% of normal	10 – 20%
III	• Second dry year or critically dry year • Supply is 50 to 80% of normal • Loss of 20 to 50% of supply due to emergency	20 – 50%
IV	• Supply is less than 50% of normal • Loss of 50% or more of supply due to emergency	Over 50%

Source: City of Hayward

Hayward's most recent experience with severe water supply shortages was during the state-wide drought of the early 1990s, in which Hayward customers reduced water use by 27%. The rationing program implemented was modeled on the very successful effort launched in 1977, in which Hayward customers reduced water usage by about 32%. More recently, a Stage I rationing effort was implemented following SFPUC's requested voluntary reduction of 10% in 2007. Although no mandatory prohibitions were implemented, the voluntary actions taken by Hayward customers resulted in Hayward exceeding the reduction target.

However, given the programmatic water conservation measures which have been implemented in recent years and resulting decreases in water usage, it will be more difficult to achieve further savings during a drought through voluntary measures alone. The actions associated with a Stage I water supply condition contain a mix of mandatory prohibitions and voluntary actions.

Succeeding stages of action mandate additional restrictions. Because water supply conditions vary, even during periods of dry conditions, the Water Shortage Contingency Plan is flexible and may be adapted to fit current conditions.

Stage I - Voluntary Conservation Actions and Mandatory Prohibitions

The following list identifies specific voluntary and mandatory conservation actions that Hayward customers are asked to take during a Stage I rationing effort. Hayward would implement a public information campaign to specifically address the situation.

Voluntary Actions

- Limit irrigation to early morning and evening hours to reduce evaporation
- Install water saving fixtures and appliances
- Ensure full loads in dishwashers and clothes washing machines

Mandatory Prohibitions

- Any use of water that results in significant runoff to streets, driveways or sidewalks
- Irrigation of lawns, landscaping or other vegetated areas in a manner that allows significant amounts of potable water to flow onto adjacent property, non-irrigated areas, private and public walkways, roadways, or parking lots
- Irrigation of lawns, landscaping or other vegetated areas more than two days per week
- Irrigation of lawns, landscaping or other vegetated areas during and 48 hours following measureable precipitation
- Serving water in restaurants and bars (unless specifically asked by customer)
- Washing towels and linens on a daily basis in hotels and motels (unless specifically asked by the customer)
- Use of potable water due to broken or defective plumbing or irrigation systems
- Use of potable water to wash sidewalks, driveways, parking lots, buildings, and other outdoor areas and structures
- Use of a hose for any purpose, including vehicle washing, unless the hose is equipped with a shut-off nozzle that causes it to cease dispensing water immediately when not in use
- Use of potable water in decorative water fountains or other ornamental water features unless water is recirculated

Stage II and III – Additional Mandatory Actions

Table 5-13 lists additional mandatory prohibitions and the rationing stage at which they would be implemented.

Table 5-13
Water Use Prohibitions

Prohibition	Stage When Prohibition Becomes Mandatory
• Water use in excess of allocation (implement rate structure appropriate to the shortage) • Filling or refilling swimming pools, spas or hot tubs • Washing vehicles, except in commercial carwashes • Using potable water in construction activities unless no other water is available	Stage II (10% to 20% reduction)
• Continuation of all Stage II prohibitions • Using potable water for cooling purposes and commercial car washes, unless recycled • Using potable water for golf course irrigation • Use of potable water for street sweeping • Use of potable water to irrigate landscaping in new developments	Stage III (20 to 50% reduction)

Source: City of Hayward draft ordinances and resolutions

Stage IV – Additional Reductions

In a Stage IV rationing effort, the City would intensify all of the prohibitions as listed in Table 6-13. Additional measures would be added to achieve savings. The majority of additional savings would come from further reduced customer allocations.

APPENDIX K

SAMPLE WATER SHORTAGE ORDINANCES AND RESOLUTIONS

ORDINANCE NO. ________ C.S.

AN ORDINANCE ENACTED AS AN EMERGENCY MEASURE ESTABLISHING RULES AND REGULATIONS FOR RATIONING WATER DURING A WATER SHORTAGE EMERGENCY AND ESTABLISHING PENALTIES FOR VIOLATIONS THEREOF

THE CITY COUNCIL OF THE CITY OF HAYWARD DOES ORDAIN AS FOLLOWS:

SECTION 1. FINDINGS AND DETERMINATIONS.

(a) A water shortage emergency condition prevails within the area served by the City of Hayward Water System.

(b) The San Francisco Public Utilities Commission has requested that all wholesale customers, including the Hayward Water System, immediately institute a water conservation program designed to effect a [TBD] percent reduction in water usage.

(c) The rules, regulations and restrictions set forth in this ordinance are intended to conserve the water supply of the Hayward Water System for the greatest public benefit with particular regard to domestic use, sanitation and fire protection.

(d) The specific uses prohibited or restricted by this ordinance are nonessential and, if allowed, would constitute wastage of Hayward Water System water, and should be prohibited pursuant to the City of Hayward's general authority under its charter as well as the authority granted by State Water Code Section 350 et seq. and the common law.

(e) The actions taken hereinafter are exempt from the provisions of Sections 21000 et seq. of the Public Resources Code as a project undertaken as immediate action necessary to prevent or mitigate an emergency pursuant to Title 14, California Code of Regulations Section 15269 (State CEQA Guidelines).

(f) The following measures are therefore found to be necessary as an emergency measure for preserving the public peace, health or safety.

SECTION 2. DEFINITIONS.

(a) The "Hayward Water System" is the Hayward Municipal Water System operated under the City of Hayward Department of Utilities & Environmental Services.

(b) “Director” is Director of Utilities & Environmental Services of the City of Hayward.

(c) “Person” means any person, firm, partnership association, corporation, company, organization or governmental entity.

(d) “Customer” means any person, whether within or without the geographic boundaries of the City of Hayward, who uses water supplied by the Hayward Water System.

(e) “Process Water” means water used to manufacture, alter, convert, clean, heat or cool a product, including water used in laundries and recycled car wash facilities.

(f) “Unit of Water” is 100 cubic feet of water.

(g) “Water” is water from the Hayward Water System.

SECTION 3. PROHIBITION OF NONESSENTIAL WATER USES.

It shall be unlawful for any person to use water obtained from the Hayward Water System for nonessential uses as hereinafter defined.

SECTION 4. NONESSENTIAL WATER USES DEFINED.

The following uses of water are hereby determined to be nonessential, except as further provided herein:

(a) Use of water in excess of those certain allotments set forth in Schedule A entitled “Allotment System For Water Use During Water Shortage Emergency” attached hereto and hereby made a part hereof.

Allotments as established herein shall be based on [Year TBD] use with adjustments for unusual conditions. New services or services without [Year TBD] history shall be allotted on comparable customer usage.

The City Council is hereby authorized from time to time to establish by resolution allotments different from the allotments set forth in said Schedule A due to changes in circumstances.

(b) Use of water through any meter when the customer has been given 10 days written notice to repair broken or defective plumbing, sprinkler, watering or irrigation systems and has failed to effect such repairs.

(c) Use of water that results in significant runoff to streets, driveways or sidewalks.

(d) Irrigation of lawns, landscaping or other vegetated areas in a manner than allows significant amounts of potable water to flow onto adjacent properties, non-irrigated areas, private and public walkways, roadways, or parking lots.

(e) Irrigation of lawns, landscaping or other vegetated areas during and 48 hours following measureable precipitation.

(f) Serving water in restaurants and bars (unless specifically asked by customers).

(g) Washing towels and linens on a daily basis in hotels and motels (unless specifically asked by customers).

(h) Use of a hose for any purpose, including vehicle washing, unless the hose is equipped with a shutoff nozzle that causes it to cease dispensing water immediately when not in use.

(i) Use of water to wash sidewalks, driveways, parking lots, buildings, and other outdoor areas and structures.

(j) Use of water in decorative water fountains or other ornamental water features, unless the water is recirculated.

Nothing in this Section 4 restricts the use of recycled water when otherwise lawful.

SECTION 5. EXCEPTIONS.

Written application for an exception or adjustment may be made to:

City of Hayward
Department of Utilities & Environmental Services
777 B Street
Hayward, California 94541-5007

The Director may grant permits for the uses of water otherwise prohibited or adjust the established allotments if it is found that:

(1) The person billed for the water service has demonstrated that to do otherwise would cause an emergency condition adversely affecting the health, sanitation, fire protection, or safety of the person served or the public, or would result in loss of production or jobs; or

(2) The person billed for the water service has demonstrated to the Director's satisfaction that circumstances have changed warranting a change in the customer's allotment.

(3) The person billed for the water service has demonstrated to the Director's satisfaction that an adjustment in the allotment based upon [TBD] gallons per day per person in a single-family household or [TBD] gallons per day in a multifamily living unit is warranted.

No permit shall be granted or allotment adjusted unless the person billed for the service has adopted all practicable water conservation measures and has demonstrated to the Director's satisfaction that there are no alternatives to the use of water from the Hayward Water System and that Hayward's water will be used efficiently and without waste.

Upon the filing of a written request for an exception, the owner of a multiple residential development or a single-family household shall include a certification that the following water conservation efforts, at a minimum, have been implemented in every toilet and shower in the multiple residential development or single-family household:

(1) All toilet tanks have been tested for leaks with leak detection dye tablets;

(2) Toilets that use no more than 1.28 gallons per flush are installed in all bathrooms; and

(3) Low flow showerheads and faucet aerators are installed in all appropriate locations.

The Director's denial of an application for an exception or adjustments is final.

The following service charges or other charges approved from time to time by City Council resolution shall be applied to allotment changes:

(1) Temporary residents – a fee of [Fee TBD] for changing existing allotments;

(2) Adjustments to prior billings – a minimum fee of [Fee TBD] to adjust prior billings.

SECTION 6. EXCESS WATER USE CHARGE.

In addition to regular metered service charges under Section 11-2.38 of the Hayward Municipal Code, every person billed for water service shall pay for each billing period an excess use charge for water delivered in excess of established allotments. This excess use charge shall be based upon a rate schedule as specified from time to time by resolution of the City Council.

The excess use charge shall not apply to any residential customer whose consumption is [TBD] cubic feet or less per bi-monthly billing period.

In addition to the exception set forth in the preceding paragraph and notwithstanding any other provision of law, the Director is authorized to adopt rules and regulations providing for waiver of excess use or other charges where their imposition would give rise to a civil right of action against the City by the person billed or would constitute a manifest and gross miscarriage of fairness and equity.

SECTION 7. BANKING OF WATER ALLOCATION.

An unused portion of a customer's water allocation during a given billing period may be used in the next billing period to offset excess water usage in that period as provided in rules and regulations promulgated by the Director in compliance with direction from the City Council.

SECTION 8. ENFORCEMENT AND PENALTIES.

(a) Installation of Flow-Restricting Devices: In lieu of or in addition to the penalties provided for in Section 11-2.47(d) of the Water Code, the Hayward Water System may, after one written warning, install a flow-restricting device on the service line of any customer violating any of the provisions of this ordinance, including use of water in excess of the established allotments.

(b) Charges for Installation and Removal of Flow-Restricting Devices: Charges for installation and removal of flow-restricting devices shall be based upon a rate schedule as specified from time to time by resolution of the City Council.

(c) Reduction or Discontinuance of Water Service: Verified water waste consisting of continued water consumption in violation of the provisions of this ordinance will serve as prima facie evidence that the allotment to the water account is excessive and may result in the reduction or discontinuance of water service by the Hayward Water System. A charge shall be paid prior to reactivating a service which has been discontinued as provided herein. The charge shall be specified from time to time by resolution of the City Council.

(d) Any person or customer violating or failing to comply with the provisions of this ordinance or any code or regulation adopted by reference shall constitute an infraction. Upon conviction of an infraction, a violator shall be subject to payment of a fine, not to exceed the limits set forth in California Government Code section 36900. After a third conviction for a violation of the same provision, subsequent violations within a twelve-month period may be charges as a misdemeanor. Upon conviction of a misdemeanor, a violator shall be subject to payment of a fine or imprisonment, or both, not to exceed the limits set forth in California Government Code section 36901.

(e) Each violator shall be guilty of a separate offense for each and every day during any portion of which any violation of any provision of this ordinance or of any code or regulation adopted by reference is committed, continued, or permitted by such person, and such person shall be punished accordingly.

(f) Whenever this ordinance or any code or regulation adopted by reference makes any act or omission unlawful, it shall include causing, permitted, aiding, abetting, suffering, or concealing the fact of such act or omission.

(g) Any violation of this ordinance or of any code or regulation adopted by reference shall constitute a public nuisance. In addition to any other remedies provided in this ordinance, the City may summarily abate such nuisance and may bring a civil suit to enjoin or abate the violation.

(h) The remedies provided for herein shall be cumulative and not exclusive.

(i) In addition to the punishment provided by law, a violator convicted of a misdemeanor or an infraction shall be liable for such costs, expenses, or disbursements paid or incurred by the City or any of its contractors in connection with the abatement or prosecution of the violation.

SECTION 9. SEVERABILITY.

If any provision of this ordinance is held by any court or by any federal, state, or local agency of competent jurisdiction to be invalid, then said provision shall be considered a separate, distinct, and independent part of this ordinance, and such holding shall not affect the validity and enforceability of all other provisions hereof.

SECTION 10. OPERATIVE DATE.

The requirements of this ordinance shall be operative as of [Date TBD].

INTRODUCED at a regular meeting of the City Council of the City of Hayward, held the [Date TBD], by Councilmember _______________.

ORDINANCE NO._______ C.S.

AN ORDINANCE ENACTED TO ESTABLISH RULES AND REGULATIONS FOR INCREASED WATER RATIONING DURING A WATER SHORTAGE EMERGENCY AND ESTABLISHING PENALTIES FOR VIOLATIONS THEREOF

THE CITY COUNCIL OF THE CITY OF HAYWARD DOES ORDAIN AS FOLLOWS:

SECTION 1. <u>FINDINGS AND DETERMINATIONS</u>.

(a) A water shortage emergency condition prevails within the area served by the City of Hayward Water System.

(b) On [Date TBD), the San Francisco Public Utilities Commission requested that all wholesale customers, including the Hayward Water System, immediately institute a water conservation program designed to effect a [TBD] percent reduction in water usage.

(c) Such action was taken by the City of Hayward's adoption of Ordinance No. [TBD] C.S.

(d) On [Date TBD], the San Francisco Public Utilities Commission requested that all wholesale customers, including the Hayward Water System adopt additional water use restrictions to enhance their water conservation programs.

(e) The rules, regulations and restrictions set forth in this ordinance are intended to conserve the water supply of the Hayward Water System for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection.

(f) The specific uses prohibited or restricted by this ordinance are nonessential and, if allowed, would constitute wastage of Hayward Water System water, and should be prohibited pursuant to the City of Hayward's general authority under its Charter as well as the authority granted by State Water Code sections 350 et seq. and the common law.

(g) The actions taken hereinafter are exempt from the provisions of sections 21000 et seq. of the Public Resources Code as a project undertaken as immediate action necessary to prevent or mitigate an emergency pursuant to Title 14, California Administrative Code section 15071 (State of California Environmental Impact Report Guidelines).

(h) The following measures are therefore found to be necessary as an emergency measure for preserving the public peace, health, and safety.

SECTION 1.5 AMENDED ORDINANCE.

This ordinance supersedes Ordinance No. [TBD] C.S.

SECTION 2. DEFINITIONS.

(a) The "Hayward Water System" as operated under the City of Hayward Department of Utilities & Environmental Services.

(b) "Director" is Director of Utilities & Environmental Services of the City of Hayward.

(c) "Person" means any person, firm, partnership, association, corporation, company, organization, or governmental entity.

(d) "Customer" means any person, whether within or without the geographic boundaries of the City of Hayward, who uses water supplied by the Hayward Water System.

(e) "Process Water" means water used to manufacture, alter, convert, clean, heat, or cool a product, including water used in laundries and recycled car wash facilities.

(f) "Unit of water" is 100 cubic feet of water.

(g) "Water" is water from the Hayward Water System.

SECTION 3. PROHIBITION OF NON-ESSENTIAL WATER USES.

It shall be unlawful for any person to use water obtained from the Hayward Water System for nonessential uses as hereinafter defined.

SECTION 4. NONESSENTIAL WATER USES DEFINED.

The following uses of water are hereby determined to be nonessential, except as further provided herein:

(a) Use of water in excess of those certain allotments set forth in Schedule A entitled "Allotment System For Water Use During Water Shortage Emergency" attached hereto and hereby made a part hereof.

Allotments as established herein shall be based on [Year TBD] use with adjustments for unusual conditions. New services or services without [Year TBD] history shall be allotted on comparable customer usage.

The City Council is hereby authorized from time to time to establish by resolution allotments different from the allotments set forth in said Schedule A due to changes in circumstances.

(b) Use of water through any meter when the customer has been given 10 days written notice to repair broken or defective plumbing, sprinkler, watering or irrigation systems and has failed to effect such repairs.

(c) Use of water that results in significant runoff to streets, driveways or sidewalks.

(d) Irrigation of lawns, landscaping or other vegetated areas in a manner than allows significant amounts of potable water to flow onto adjacent properties, non-irrigated areas, private and public walkways, roadways, or parking lots.

(e) Irrigation of lawns, landscaping or other vegetated areas during and 48 hours following measureable precipitation.

(f) Serving water in restaurants and bars (unless specifically asked by customers).

(g) Washing towels and linens on a daily basis in hotels and motels (unless specifically asked by customers).

(h) Washing vehicles except in commercial carwashes.

(i) Use of water to wash sidewalks, driveways, parking lots, buildings, and other outdoor areas and structures.

(j) Use of water for filling any existing or new swimming pool, spa or hot tub.

(k) Use of water in decorative water fountains or other ornamental water features unless the water is recirculated.

(l) Use of water for construction activities unless no other source of water or other method is available.

Nothing in this Section 4 restricts the use of recycled water when otherwise lawful.

SECTION 5. <u>EXCEPTIONS</u>.

Written application for an exception or adjustment may be made to:

City of Hayward
Department of Utilities & Environmental Services
777 B Street
Hayward, California 94541-5007

After written application, the Director may grant permits for the uses of water otherwise prohibited or adjust the established allotments if the Director finds that:

(1) The person billed for the water service has demonstrated that to do otherwise would cause an emergency condition adversely affecting the health, sanitation, fire protection, or safety of the person served or the public, or would result in loss of production or jobs; or

(2) The person billed for the water service has demonstrated to the Director's satisfaction that circumstances have changed, warranting a change in the allotment.

(3) The person billed for the water service has demonstrated to the Director's satisfaction that an adjustment in the allotment based upon [TBD] gallons per day per person in a single-family household or [TBD] gallons per day in a multifamily living unit is warranted.

No permit shall be granted or allotment adjusted unless the person billed for the service has adopted all practicable water conservation measures and has demonstrated to the Director's satisfaction that there are no alternatives to the use of water from the Hayward Water System and that Hayward's water will be used efficiently and without waste.

Upon the filing of a written request for an exception, the owner of a multiple residential development or a single-family household shall include a certification that the following water conservation efforts, at a minimum, have been implemented in every toilet and shower in the multiple residential development or single-family household:

(1) All toilet tanks have been tested for leaks with leak detection dye tablets;

(2) Toilets that use no more than 1.28 gallons per flush are installed in all bathrooms; and

(3) Low flow showerheads and faucet aerators are installed in all appropriate locations.

The Director's denial of an application for an exception or adjustments is final.

The following service charges or other charges approved from time to time by City Council resolution shall be applied to allotment changes:

(1) Temporary residents – a fee of [Fee TBD] for changing existing allotments;

(2) Adjustments to prior billings – a minimum fee of [Fee TBD] to adjust prior billings.

SECTION 6. <u>EXCESS WATER USE CHARGE</u>.

In addition to regular metered service charges under Section 11-2.38 of the Hayward Municipal Code, every person billed for water service shall pay for each billing period an excess use charge for water delivered in excess of established allotments. This excess use charge shall be based upon a rate schedule as specified from time to time by resolution of the City Council.

The excess use charge shall not apply to any residential customer whose consumption is [TBD] cubic feet or less per bi-monthly billing period.

In addition to the exception set forth in the preceding paragraph and notwithstanding any other provision of law, the Director is authorized to adopt rules and regulations providing for waiver of excess use or other charges where their imposition would give rise to a civil right of action against the City by the person billed or would constitute a manifest and gross miscarriage of fairness and equity.

SECTION 7. <u>BANKING OF WATER ALLOCATION</u>.

An unused portion of a customer's water allocation during a given billing period may be used in the next billing period to offset excess water usage in that period as provided in rules and regulations promulgated by the Director in compliance with direction from the City Council.

SECTION 8. <u>ENFORCEMENT AND PENALTIES</u>.

(a) Installation of Flow-Restricting Devices: In lieu of or in addition to the penalties provided for in Section 11-2-47(d) of the Water Code, the Hayward Water System may, after one written warning, install a flow-restricting device on the service line of any customer violating any of the provisions of this ordinance, including use of water in excess of the established allotments.

(b) Charges for Installation and Removal of Flow-Restricting Devices: Charges for installation and removal of flow-restricting devices shall be based upon a rate schedule as specified from time to time by resolution of the City Council.

(c) Reduction or Discontinuance of Water Service: Verified water waste consisting of continued water consumption in violation of the provisions of this ordinance will serve as prima facie evidence that the allotment to the water account is excessive and may result in the reduction or discontinuance of water service by the Hayward Water System.
A charge shall be paid prior to reactivating a service which has been discontinued as provided herein. The charge shall be specified from time to time by resolution of the City Council.

(d) Any person or customer violating or failing to comply with the provisions of this ordinance or any code or regulation adopted by reference shall constitute an infraction. Upon conviction of an infraction, a violator shall be subject to payment of a fine, not to exceed the limits set forth in California Government Code section 36900. After a third conviction for a violation of the same provision, subsequent violations within a twelve-month period may be charges as a misdemeanor. Upon conviction of a misdemeanor, a violator shall be subject to payment of a fine or imprisonment, or both, not to exceed the limits set forth in California Government Code section 36901.

(e) Each violator shall be guilty of a separate offense for each and every day during any portion of which any violation of any provision of this ordinance or of any code or regulation adopted by reference is committed, continued, or permitted by such person, and such person shall be punished accordingly.

(f) Whenever this ordinance or any code or regulation adopted by reference makes any act or omission unlawful, it shall include causing, permitted, aiding, abetting, suffering, or concealing the fact of such act or omission.

(g) Any violation of this ordinance or of any code or regulation adopted by reference shall constitute a public nuisance. In addition to any other remedies provided in this ordinance, the City may summarily abate such nuisance and may bring a civil suit to enjoin or abate the violation.

(h) The remedies provided for herein shall be cumulative and not exclusive.

(i) In addition to the punishment provided by law, a violator convicted of a misdemeanor or an infraction shall be liable for such costs, expenses, or disbursements paid or incurred by the City or any of its contractors in connection with the abatement or prosecution of the violation.

SECTION 9. SEVERABILITY.

If any provision of this ordinance is held by any court or by any federal, state, or local agency of competent jurisdiction to be invalid, then said provision shall be considered a separate, distinct, and independent part of this ordinance, and such holding shall not affect the validity and enforceability of all other provisions hereof.

SECTION 10. OPERATIVE DATE.

The requirements of this ordinance shall be operative as of [TBD].

INTRODUCED at a regular meeting of the City Council of the City of Hayward, held the [Date TBD], by Councilmember _________.

ORDINANCE NO. _______ C.S.

AN ORDINANCE ENACTED AS AN EMERGENCY MEASURE
TO ESTABLISH RULES AND REGULATIONS FOR
INCREASED WATER RATIONING DURING A WATER
SHORTAGE EMERGENCY AND ESTABLISHING
PENALTIES FOR VIOLATIONS THEREOF

THE CITY COUNCIL OF THE CITY OF HAYWARD DOES ORDAIN AS FOLLOWS:

SECTION 1. FINDINGS AND DETERMINATIONS.

(a) A water shortage emergency condition prevails within the area served by the City of Hayward Water System.

(b) On [Date TBD], the San Francisco Public Utilities Commission requested that all wholesale customers, including the Hayward Water System, immediately institute a water conservation program designed to effect a [TBD] percent reduction in water usage.

(c) Such action was taken by the City of Hayward's adoption of Ordinance No. [TBD] C.S.

(d) The severity of the water shortage has prompted the Governor of the State of California to call upon all communities to adopt water rationing plans to effect a 50 percent reduction in water usage.

(e) On [Date TBD], the San Francisco Public Utilities Commission requested that all wholesale customers, including the Hayward Water System, immediately increase water conservation programs to effect a 50 percent reduction in water usage.

(f) The rules, regulations and restrictions set forth in this ordinance are intended to conserve the water supply of the Hayward Water System for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection.

(g) The specific uses prohibited or restricted by this ordinance are nonessential and, if allowed, would constitute wastage of Hayward Water System water, and should be prohibited pursuant to the City of Hayward's general authority under its Charter as well as the authority granted by State Water Code sections 350 et seq. and the common law.

(h) The actions taken hereinafter are exempt from the provisions of sections 21000 et seq. of the Public Resources Code as a project undertaken as immediate action necessary to prevent or mitigate an emergency pursuant to Title 14, California Administrative Code section 15071 (State of California Environmental Impact Report Guidelines).

(i) The following measures are therefore found to be necessary as an emergency measure for preserving the public peace, health, and safety.

SECTION 1.5 AMENDED ORDINANCE.

This ordinance supersedes Ordinance No. [TBD] C.S.

SECTION 2. DEFINITIONS.

(a) The "Hayward Water System" as operated under the City of Hayward Department of Utilities & Environmental Services.

(b) "Director" is Director of Utilities & Environmental Services of the City of Hayward.

(c) "Person" means any person, firm, partnership, association, corporation, company, organization, or governmental entity.

(d) "Customer" means any person, whether within or without the geographic boundaries of the City of Hayward, who uses water supplied by the Hayward Water System.

(e) "Process Water" means water used to manufacture, alter, convert, clean, heat, or cool a product, including water used in laundries and recycled car wash facilities.

(f) "Unit of Water" is 100 cubic feet of water.

(g) "Water" is water from the Hayward Water System.

SECTION 3. PROHIBITION OF NONESSENTIAL WATER USES.

It shall be unlawful for any person to use water obtained from the Hayward Water System for nonessential uses as hereinafter defined.

SECTION 4. NONESSENTIAL USES DEFINED.

The following uses of water are hereby determined to be nonessential, except as further provided herein:

(a) Use of water in excess of those certain allotments set forth in Schedule A entitled "Allotment System For Water Use During Water Shortage Emergency" attached hereto and hereby made a part hereof.

Allotments as established herein shall be based on [Year TBD] use with adjustments for unusual conditions. New services or services without [Year TBD] history shall be allotted on comparable customer usage.

The City Council is hereby authorized from time to time to establish by resolution allotments different from the allotments set forth in said Schedule A due to changes in circumstances.

(b) Use of water through any meter when the customer has been given 10 days written notice to repair broken or defective plumbing, sprinkler, watering or irrigation systems and has failed to effect such repairs.

(c) Use of water that results in significant runoff to streets, driveways or sidewalks.

(d) Irrigation of lawns, landscaping or other vegetated areas in a manner than allows significant amounts of potable water to flow onto adjacent properties, non-irrigated areas, private and public walkways, roadways, or parking lots.

(e) Irrigation of lawns, landscaping or other vegetated areas during and 48 hours following measureable precipitation.

(f) Serving water in restaurants and bars (unless specifically asked by customers).

(g) Washing towels and linens on a daily basis in hotels and motels (unless specifically asked by customers).

(h) Washing vehicles except in commercial carwashes.

(i) Use of water to wash sidewalks, driveways, parking lots, buildings, and other outdoor areas and structures.

(j) Use of water for filling any existing or new swimming pool, spa or hot tub.

(k) Use of water in decorative water fountains or other ornamental water features unless the water is recirculated.

(l) Use of water for construction activities unless no other source of water or other method is available.

(m) The use of potable water for cooling purposes and commercial car washes, unless it is recycled water.

(n) The use of potable water for street sweeping.

(o) The use of potable water for golf course irrigation.

(p) The use of potable water to irrigate landscaping in new developments.

Nothing in this Section 4 restricts the use of recycled water when otherwise lawful.

SECTION 5. EXCEPTIONS.

Written application for an exception or adjustment may be made to:

City of Hayward
Department of Utilities & Environmental Services
777 B Street
Hayward, California 94541-5007

After written application, the Director may grant permits for the uses of water otherwise prohibited or adjust the established allotments if the Director finds that:

(a) The person billed for the water service has demonstrated that to do otherwise would cause an emergency condition adversely affecting the health, sanitation, fire protection or safety of the person served or the public, or would result in loss of production or jobs; or

(b) The person billed for the water service has demonstrated to the Director's satisfaction that circumstances have changed, warranting a change in the allotment; or

(c) The person billed for the water service has demonstrated to the Director's satisfaction that an adjustment in the allotment based upon [TBD] gallons per day per person in a single-family household or [TBD] gallons per day in a multifamily living unit is warranted.

No permit shall be granted or allotment adjusted unless the person billed for the service has adopted all practicable water conservation measures and has demonstrated to the Director's satisfaction that there are no alternatives to the use of water from the Hayward Water System and that Hayward's water will be used efficiently and without waste.

Upon the filing of a written request for an exception, the owner of a multiple residential development or a single-family household shall include a certification that the following water conservation efforts, at a minimum, have been implemented in every toilet and shower in the multiple residential development or single-family household:

(1) All toilet tanks have been tested for leaks with leak detection dye tablets;

(2) Toilets that use no more than 1.28 gallons per flush are installed in all bathrooms; and

(3) Low flow showerheads and faucet aerators are installed in all appropriate locations.

The Director's denial of an application for an exception or adjustments is final.

The following service charges or other charges approved from time to time by City Council resolution shall be applied to allotment changes:

(a) Temporary residents – a fee of [Fee TBD] for changing existing allotments;

(b) Adjustments to prior billings – a minimum fee of [Fee TBD] to adjust prior billings.

SECTION 6. <u>EXCESS WATER USE CHARGE.</u>

In addition to regular metered service charges under Section 11-2.38 of the Hayward Municipal Code, every person billed for water service shall pay for each billing period an excess use charge for water delivered in excess of established allotments. This excess use charge shall be based upon a rate schedule as specified from time to time by resolution of the City Council.

The excess use charge shall not apply to any residential customer whose consumption is [TBD] cubic feet or less per bi-monthly billing period.

In addition to the exception set forth in the preceding paragraph and notwithstanding any other provision of law, the Director is authorized to adopt rules and regulations providing for waiver of excess use or other charges where their imposition would give rise to a civil right of action against the City by the person billed or would constitute a manifest and gross miscarriage of fairness and equity.

SECTION 7. <u>BANKING OF WATER ALLOCATION</u>.

An unused portion of a customer's water allocation during a given billing period may be used in the next billing period to offset excess water usage in that period as provided in rules and regulations promulgated by the Director in compliance with direction from the City Council.

SECTION 8. <u>ENFORCEMENT AND PENALTIES</u>.

(a) Installation of Flow-Restricting Devices: In lieu of or in addition to the penalties provided for in Section 11-2-47(d) of the Water Code, the Hayward Water System may, after one written warning, install a flow-restricting device on the service line of any customer violating any of the provisions of this ordinance, including use of water in excess of the established allotments.

(b) Charges for Installation and Removal of Flow-Restricting Devices: Charges for installation and removal of flow-restricting devices shall be based upon a rate schedule as specified from time to time by resolution of the City Council.

(c) Reduction or Discontinuance of Water Service: Verified water waste consisting of continued water consumption in violation of the provisions of this ordinance will serve as prima facie evidence that the allotment to the water account is excessive and may result in the reduction or discontinuance of water service by the Hayward Water System.
A charge shall be paid prior to reactivating a service which has been discontinued as provided herein. The charge shall be specified from time to time by resolution of the City Council.

(d) Any person or customer violating or failing to comply with the provisions of this ordinance or any code or regulation adopted by reference shall constitute an infraction. Upon conviction of an infraction, a violator shall be subject to payment of a fine, not to exceed the limits set forth in California Government Code section 36900. After a third conviction for a violation of the same provision, subsequent violations within a twelve-month period may be charges as a misdemeanor. Upon conviction of a misdemeanor, a violator shall be subject to payment of a fine or imprisonment, or both, not to exceed the limits set forth in California Government Code section 36901.

(e) Each violator shall be guilty of a separate offense for each and every day during any portion of which any violation of any provision of this ordinance or of any code or regulation adopted by reference is committed, continued, or permitted by such person, and such person shall be punished accordingly.

(f) Whenever this ordinance or any code or regulation adopted by reference makes any act or omission unlawful, it shall include causing, permitted, aiding, abetting, suffering, or concealing the fact of such act or omission.

(g) Any violation of this ordinance or of any code or regulation adopted by reference shall constitute a public nuisance. In addition to any other remedies provided in this ordinance, the City may summarily abate such nuisance and may bring a civil suit to enjoin or abate the violation.

(h) The remedies provided for herein shall be cumulative and not exclusive.

(i) In addition to the punishment provided by law, a violator convicted of a misdemeanor or an infraction shall be liable for such costs, expenses, or disbursements paid or incurred by the City or any of its contractors in connection with the abatement or prosecution of the violation.

SECTION 9. SEVERABILITY.

If any provision of this ordinance is held by any court or by any federal, state, or local agency of competent jurisdiction to be invalid, then said provision shall be considered a separate, distinct, and independent part of this ordinance, and such holding shall not affect the validity and enforceability of all other provisions hereof.

SECTION 10. OPERATIVE DATE.

The requirements of this ordinance shall be operative as of [TBD].

INTRODUCED at a regular meeting of the City Council of the City of Hayward, held the [Date TBD], by Councilmember ___________________________.

HAYWARD CITY COUNCIL

RESOLUTION NO. __________

Introduced by Councilmember ___________

RESOLUTION ESTABLISHING EXCESS WATER USE CHARGES AND ENFORCEMENT CHARGES FOR RATIONING WATER DURING A WATER SHORTAGE EMERGENCY

WHEREAS, by Ordinance No. [TBD] C.S. the City Council adopted an emergency ordinance establishing rules and regulations operative [Date TBD], for water rationing during the current water emergency; and

WHEREAS, excess water use charges and enforcement charges shall be based upon rate schedules specified from time to time by resolution of the City Council.

NOW, THEREFORE, be it resolved by the City Council of the City of Hayward that said Council does hereby adopt the following charges:

Section 1. In addition to regular meter service charges, charges based upon the amount of water supplied and surcharges under Section 11-2.38 of the Hayward Municipal Code, the following amounts will be charged for water delivered in excess of established allotments.

EXCESS USE CHARGES IN ADDITION TO ALL OTHER WATER CHARGES FOR ALL HAYWARD WATER CUSTOMERS

Excess Use Range	Percent of Water Used In Excess of Allotment	Excess Use Charge per 100 Cubic Feet for all Water Used in Excess of Allotment
A	0% to 10% over allotment	
B	10.01% to 20% over allotment	Charges TBD
C	Over 20.01% over allotment	

Section 2. In accordance with Section 6 of Ordinance No. [TBD] C.S. the following charges shall be established for enforcement purposes:

(a) Charges for installation and removal of flow-restricting devices shall be as follows:

Meter Size	Installation Charge	Removal Charge
5/8" to 1" 1-1/2" and 2"	Charges TBD	

(b) A charge of [Charge TBD] shall be paid prior to reactivating a service which has been discontinued as provided in Ordinance No. [TBD] C.S.

IN COUNCIL HAYWARD, CALIF. ________________________, ___________

ADOPTED BY THE FOLLOWING VOTE:

AYES: COUNCILMEMBERS:
MAYOR:
NOES: COUNCILMEMBERS:

ABSENT: COUNCILMEMBERS:

ATTEST: __________________________________
City Clerk of the City of Hayward

SCHEDULE A

ALLOTMENT SYSTEM FOR WATER USE DURING WATER SHORTAGE EMERGENCY

SINGLE FAMILY RESIDENTIAL UNITS:

Allotments to provide for a minimum overall decrease of 50% of [Year TBD] use. (Table 1.)

BI-MONTHLY BILLING-in CCF	% REDUCTION
0 to 10	None.
11 to 40	Sliding scale from 5% to 50%.
All use over 40	90% all over 40

MULTIPLE RESIDENTIAL UNITS:

DESCRIPTION	REDUCTION
Domestic with irrigation water	50%
Domestic without irrigation water	20%
Irrigation Only Services	90%

COMMERCIAL AND INDUSTRIAL:

DESCRIPTION	REDUCTION
Process Water	20%
Domestic Water	50%
Irrigation Only Services	90%

GOVERNMENTAL:

Domestic Water	50%
Irrigation Services	90%

CONSTRUCTION SERVICES:

Allowed by permit only.	---

Water from other sources will be used where available.

TABLE 1
WATER RATIONING ORDINANCE
RESIDENTIAL SLIDING SCALE

Use in Base Year			Allotment			
Billing Cubic Ft.	Gallons	GPD (60 days)	Billing Cubic Feet	Gallons	GPD (60 days)	Percent Reduction
100	748	12	100	748	12	0%
200	1496	25	200	1496	25	0%
300	2244	37	300	2244	37	0%
400	2992	50	400	2992	50	0%
500	3740	62	500	3740	62	0%
600	4488	75	600	4488	75	0%
700	5236	87	700	5236	87	0%
800	5984	100	800	5984	100	0%
900	6732	112	900	6732	112	0%
1000	7480	125	1000	7480	125	0%
1100	8228	137	1033	7727	129	6%
1200	8976	150	1066	7974	133	11%
1300	9724	162	1099	8221	137	15%
1400	10472	175	1132	8467	141	19%
1500	11220	187	1165	8714	145	22%
1600	11968	199	1198	8961	149	25%
1700	12716	212	1231	9208	153	28%
1800	13464	224	1264	9455	158	30%
1900	14212	237	1297	9702	162	32%
2000	14960	249	1330	9948	166	34%
2100	15708	262	1363	10195	170	5%
2200	16456	274	1396	10442	174	37%
2300	17204	287	1429	10689	178	38%
2400	17952	299	1462	10936	182	39%
2500	18700	312	1495	11183	186	40%
2600	19448	324	1528	11429	190	41%
2700	20196	337	1561	11676	195	42%
2800	20944	349	1594	11923	199	43%
2900	21692	362	1627	12170	203	44%
3000	22440	374	1660	12417	207	45%
3100	23188	386	1693	12664	211	45%
3200	23936	399	1726	12910	215	46%
3300	24684	411	1759	13157	219	47%
3400	25432	424	1792	13404	223	47%
3500	26180	436	1825	13651	228	48%
3600	26928	449	1858	13898	232	48%
3700	27676	461	1891	14145	236	49%
3800	28424	474	1924	14392	240	49%
3900	29172	486	1957	14638	244	50%
4000	29920	499	1990	14885	248	50%

All water use over 40 units will be reduced by 90 percent

1 cubic foot + 7.48 gallons
100 cubic foot (CCF) = 748 gallons

APPENDIX L

WATER CONSERVATION ORDINANCES

SEC. 11-2.47 PROHIBITION OF NONESSENTIAL WATER USE. No person shall use water obtained from the Water System for nonessential uses as herein defined.

a. Nonessential Uses Defined. The following uses of water are hereby determined to be nonessential, except as further provided herein:

(1) Excessive use, loss or escape of water due to broken or defective plumbing, sprinkler, watering, or irrigation systems, for any period of time after such use of water should have reasonably been discovered and corrected, and in no event more than seventy-two hours after the customer has received written notice from the City.
(2) Use of water that results in flooding or runoff in gutters or streets.
(3) Use of water for irrigation of any lawn, landscaping or other vegetated area in a manner that causes or allows excessive water flow, overspray or runoff onto an adjoining sidewalk, driveway, street, alley, gutter or ditch.
(4) Use of water through a hose for washing buildings, structures, mobile homes, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or other hard-surface areas, unless the hose is equipped with a positive shut-off nozzle.
(5) The washing of all vehicles through a hose, including but not limited to automobiles, motorcycles, recreational vehicles, trucks, transit vehicles, trailers, boats, trains and airplanes, unless the hose is equipped with a positive shut-off nozzle.

b. Other Water Use Prohibitions. The following devices shall not be installed in new applicable facilities unless the City specifically approves a waiver:

(1) Water fountains or other decorative water features that do not use re-circulated water.
(2) Single-pass cooling systems in new buildings.
(3) Non-recirculating water systems in new commercial car washes.
(4) Non-recirculating water systems in new industrial laundries.

c. Application. The provisions of this section shall apply to any person in the use of potable water provided by the Water System, except for uses of water necessary to protect public health or safety or for essential government services such as police and fire service and water system maintenance services.

d. Enforcement. The Director of Public Works is authorized to enforce all provisions of this section. The provisions of this section may be enforced by one or more of the following measures:

(1) Correction Notice. When the City becomes aware of a violation of the provisions of this section, a correction notice shall be delivered to the property and to the customer of record (if mailing address is different) for the property. Said notice shall: 1) describe the date, approximate time, address or description of the location of the violation; 2) describe the violation and the subsection violated; 3) order that the violation be corrected and abated immediately, or within a specified time as the Director of Public Works determines is reasonable; and 4) explain the consequences of failure to correct the violation, including a monetary fine.

(2) Administrative Citation. In addition to other remedies available to the City, violations of this section may be subject to an administrative citation. The amount of the fine shall be set forth by Resolution of the City Council. Citations shall be issued and administered in accordance with Chapter 1, Article 7 of the Hayward Municipal Code. Administrative citations may be issued to the property owner, customer of record for the property, or to any other person causing wasteful use of water as described in this section.

(3) Installation of Flow Restricting Measures. The City may, after one written notice, install a flow-restricting device on the service line of any customer violating any of the provisions of this section.

(4) Reduction or Discontinuance of Water Service. Water waste consisting of continued water consumption in violation of the provisions of this section may result in the reduction or discontinuance of water service by the City. The City may reduce or discontinue water service after two correction notices, as described in Section 11-2.47.d.i, have been delivered to the property and to the customer of record (if mailing address is different) and if the corrective actions required are not taken within the time frame specified.

(5) Injunctive Relief.

Costs incurred by the City for the reduction or discontinuance of water service and for the resumption of water service will be the responsibility of the customer. Water service shall not be resumed until the Director of Public Works is satisfied that the violation has been fully corrected.

e. Penalties. Violation of this section shall not constitute a crime and may be enforced only through civil measures as stated herein.

ARTICLE 12

CITY OF HAYWARD
BAY-FRIENDLY WATER EFFICIENT LANDSCAPE ORDINANCE

INDEX

APPENDICES

ARTICLE 12

BAY-FRIENDLY WATER-EFFICIENT LANDSCAPE ORDINANCE

SEC. 10-12.01 AUTHORITY. This Article is enacted pursuant to California Government Code of Regulations, Title 23, Division 2, Chapter 2.7. Waters and is a "water-efficient landscape ordinance" adopted by a local agency under the provisions of said article.

SEC.10-12.02 PURPOSE. The City Council finds and declares that it is in the public interest to promote integrated landscape practices that go beyond the conservation and efficient use of water and to prevent the waste of this valuable resource while recognizing the values and benefits of landscapes as essential to the quality of life in California. Landscapes provide areas for active and passive recreation and enhance the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development. The purpose of the regulations set forth in this article is to establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects by:

(a) Utilizing the whole systems approach of Bay-Friendly Landscaping;

(b) Encouraging the use of a watershed approach and reducing compaction, incorporating organic matter that increases water retention, and promoting productive plant growth that leads to more carbon storage, oxygen production, shade, habitat and esthetic benefits;

(c) Establishing provisions for water management practices and water waste prevention for existing landscapes;

(d) Setting a Maximum Applied Water Allowance as an upper limit for water use and reducing water use to the lowest practical amount;

(e) Adopting the Bay-Friendly Landscape Guidelines, Bay-Friendly Landscape Scorecards and Bay-Friendly Gardening Guide, as they may be amended from time to time, as Agency reference documents.

This Article shall be applied in a manner that achieves the maximum consistency with the landscaping performance standards contained in the Hayward Zoning ordinance, Article 12 of Chapter 10 of the Hayward Municipal Code. To the extent that a conflict exists between this Article and the Zoning Ordinance, the requirements of this Article shall control.

SEC.10-12.03 APPLICABILITY.

(a) After December 1, 2015, and consistent with Executive Order No. B-29-15, this ordinance shall apply to all of the following landscape projects:

(1) New construction projects with an aggregate landscape area equal to or greater than 500 square feet requiring a building or landscape permit, plan check or design review;

(2) Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review;

(3) Existing landscapes limited to Section 10-12.18; and

(4) Cemeteries. Recognizing the special landscape management needs of cemeteries, new and rehabilitated cemeteries are limited to Sections 10-12.05, 10-12.10, and 10-12.11; and existing cemeteries are limited to Section 10-12.18.

(b) Any project with an aggregate landscape area of 2,500 square feet or less may comply with the performance requirements of this ordinance or conform to the prescriptive measures contained in Appendix D.

(c) For projects using treated or untreated graywater or rainwater captured on site, any lot or parcel within the project that has less than 2500 square feet of landscape and meets the lot or parcel's landscape water requirement (Estimated Total Water Use) entirely with treated or untreated graywater or through stored rainwater captured on site is subject only to Appendix D.

(d) This ordinance does not apply to:

(1) registered local, state or federal historical sites;

(2) ecological restoration projects that do not require a permanent irrigation system;

(3) mined-land reclamation projects that do not require a permanent irrigation system; or

(4) existing plant collections, as part of botanical gardens and arboretums open to the public.

<u>SEC.10-12.04 DEFINITIONS</u>. The terms used in this ordinance have the meaning set forth below:

(a) "applied water" means the portion of water supplied by the irrigation system to the landscape.

(b) "automatic irrigation controller" means timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers are able to self-adjust and schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

(c) “backflow prevention device” means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

(d) “Bay-Friendly Landscape Guidelines” means the most recent version of the guidelines developed by StopWaste.Org for use in the professional design, construction and maintenance of landscapes. Agency staff shall maintain the most recent version of the “Bay-Friendly Landscape Guidelines” at all times.

(e) “Bay-Friendly Maintenance Manual” means the most recent version of the manual outlining Bay-Friendly maintenance practices administered by the Bay-Friendly Landscaping and Gardening Coalition.

(f) “Bay-Friendly Rated Scorecard” means the most recent version of the Bay-Friendly points system for Landscaping administered by the Bay-Friendly Landscaping and Gardening Coalition.

(g) “Certificate of Completion” means the document required under Section 492.9.

(h) “certified irrigation designer” means a person certified to design irrigation systems by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency’s WaterSense irrigation designer certification program and Irrigation Association’s Certified Irrigation Designer program.

(i) “certified landscape irrigation auditor” means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency’s WaterSense irrigation auditor certification program and Irrigation Association’s Certified Landscape Irrigation Auditor program.

(j) “check valve” or “anti-drain valve” means a valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.

(k) “common interest developments” means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351.

(l) “compost” means the safe and stable product of controlled biologic decomposition of organic materials that is beneficial to plant growth.

(m) “conversion factor (0.62)” means the number that converts acre-inches per acre per year to gallons per square foot per year.

(n) “distribution uniformity” means the measure of the uniformity of irrigation water over a defined area.

(o) “drip irrigation” means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(p) “ecological restoration project” means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

(q) “effective precipitation” or “usable rainfall” (Eppt) means the portion of total precipitation which becomes available for plant growth.

(r) “emitter” means a drip irrigation emission device that delivers water slowly from the system to the soil.

(s) “established landscape” means the point at which plants in the landscape have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.

(t) “establishment period of the plants” means the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth. Native habitat mitigation areas and trees may need three to five years for establishment.

(u) “Estimated Total Water Use” (ETWU) means the total water used for the landscape as described in Section 10-12.05.

(v) “ET adjustment factor” (ETAF) means a factor of 0.55 for residential areas and 0.45 for non-residential areas, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. The ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0. The ETAF for existing non-rehabilitated landscapes is 0.8.

(w) “evapotranspiration rate” means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

(x) “flow rate” means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

(y) “flow sensor” means an inline device installed at the supply point of the irrigation system that produces a repeatable signal proportional to flow rate. Flow sensors must be connected to an automatic irrigation controller, or flow monitor capable of receiving flow signals and operating master valves. This combination flow sensor/controller may also function as a landscape water meter or submeter.

(z) “friable” means a soil condition that is easily crumbled or loosely compacted down to a minimum depth per planting material requirements, whereby the root structure of newly planted material will be allowed to spread unimpeded.

(aa) “Fuel Modification Plan Guideline” means guidelines from a local fire authority to assist residents and businesses that are developing land or building structures in a fire hazard severity zone.

(bb) "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers. Health and Safety Code Section 17922.12.

(cc) “hardscapes” means any durable material (pervious and non-pervious).

(dd) “hydrozone” means a portion of the landscaped area having plants with similar water needs and rooting depth. A hydrozone may be irrigated or non-irrigated.

(ee) “infiltration rate” means the rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).

(ff) “invasive plant species” means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. Invasive species may be regulated by county agricultural agencies as noxious species. Lists of invasive plants are maintained at the California Invasive Plant Inventory and USDA invasive and noxious weeds database.

(gg) “irrigation audit” means an in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule. The audit must be conducted in a manner consistent with the Irrigation Association’s Landscape Irrigation Auditor Certification program or other U.S. Environmental Protection Agency “Watersense” labeled auditing program.

(hh) “irrigation efficiency” (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The irrigation efficiency for purposes of this ordinance are 0.75 for overhead spray devices and 0.81 for drip systems.

(ii) "irrigation survey" means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

(jj) "irrigation water use analysis" means an analysis of water use data based on meter readings and billing data.

(kk) "landscape architect" means a person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.

(ll) "landscape area" means all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

(mm) "landscape contractor" means a person licensed by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

(nn) "Landscape Documentation Package" means the documents required under Section 10-12.07.

(oo) "landscape project" means total area of landscape in a project as defined in "landscape area" for the purposes of this ordinance, meeting requirements under Section 10-12.03

(pp) "landscape water meter" means an inline device installed at the irrigation supply point that measures the flow of water into the irrigation system and is connected to a totalizer to record water use.

(qq) land clearing debris" includes trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing. Exceptions are vegetation or soil contaminated by toxic substances.

(rr) lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

(ss) "local agency" means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. The local agency is also responsible for the enforcement of this ordinance, including but not limited to, approval of a permit and plan check or design review of a project.

(tt) "local water purveyor" means any entity, including a public agency, city, county, or private water company that provides retail water service.

(uu) “low volume irrigation” means the application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(vv) “main line” means the pressurized pipeline that delivers water from the water source to the valve or outlet.

(ww) “master shut-off valve” is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system. A master valve will greatly reduce any water loss due to a leaky station valve.

(xx) “Maximum Applied Water Allowance” (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 10-12.05. It is based upon the area’s reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance. Special Landscape Areas, including recreation areas, areas permanently and solely dedicated to edible plants such as orchards and vegetable gardens, and areas irrigated with recycled water are subject to the MAWA with an ETAF not to exceed 1.0. MAWA = (ETo) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]

(yy) “median” is an area between opposing lanes of traffic that may be unplanted or planted with trees, shrubs, perennials, and ornamental grasses.

(zz) “microclimate” means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

(aaa) “mined-land reclamation projects” means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

(bbb) “mulch” means any organic material such as leaves, arbor or wood chips, recycled wood waste, straw, compost, or inorganic mineral materials such as rocks, gravel, or decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

(ccc) “new construction” means, for the purposes of this ordinance, a new building with a landscape or other new landscape, such as a park, playground, or greenbelt without an associated building.

(ddd) “non-residential landscape” means landscapes in multifamily with five or more units, commercial, institutional, industrial and public settings that may have areas designated for recreation or public assembly. It also includes portions of common areas of common interest developments with designated recreational areas.

(eee) "operating pressure" means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

(fff) "overhead sprinkler irrigation systems" or "overhead spray irrigation systems" means systems that deliver water through the air (e.g., spray heads and rotors).

(ggg) "overspray" means the irrigation water which is delivered beyond the target area.

(hhh) "parkway" means the area between a sidewalk and the curb or traffic lane. It may be planted or unplanted, and with or without pedestrian egress.

(iii) "permit" means an authorizing document issued by local agencies for new construction or rehabilitated landscapes.

(jjj) "pervious" means any surface or material that allows the passage of water through the material and into the underlying soil.

(kkk) "plant factor" or "plant water use factor" is a factor, when multiplied by ETo, estimates the amount of water needed by plants. For purposes of this ordinance, the plant factor range for very low water use plants is 0 to 0.1, the plant factor range for low water use plants is 0.1 to 0.3, the plant factor range for moderate water use plants is 0.4 to 0.6, and the plant factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this ordinance are derived from the publication "Water Use Classification of Landscape Species". Plant factors may also be obtained from horticultural researchers from academic institutions or professional associations as approved by the California Department of Water Resources (DWR).

(lll) "project applicant" means the individual or entity submitting a Landscape Documentation Package required under Section 10-12.07, to request a permit, plan check, or design review from the local agency. A project applicant may be the property owner or his or her designee.

(mmm) "rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.

(nnn) "record drawing" or "as-built" means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

(ooo) "recreational area" means areas, excluding private single family residential areas, designated for active play, recreation or public assembly in parks, sports fields, picnic grounds, pools or spas, amphitheaters or golf course tees, fairways, roughs, surrounds and greens.

(ppp) “recycled water,” “reclaimed water,” or “treated sewage effluent water” means treated or recycled waste water of a quality suitable for nonpotable uses such as landscape irrigation and water features. This water is not intended for human consumption.

(qqq) “reference evapotranspiration” or “ETo” means a standard measurement of environmental parameters which affect the water use of plants. ETo is expressed in inches per day, month, or year as represented in Appendix A, and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated.

(rrr) “rehabilitated landscape” means any re-landscaping project that requires a permit, plan check, or design review, meets the requirements of Section 10-12.03, and the modified landscape area is equal to or greater than 2,500 square feet.

(sss) “residential landscape” means landscapes surrounding single or multifamily homes with four or less units.

(ttt) “run off” means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, run off may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

(uuu) “sheet mulching” uses a layering system of cardboard, compost and mulch or other materials to enhance weed suppression and provide soil building benefits. (Source: A Bay-Friendly Guide to Mulch.)

(vvv) “soil moisture sensing device” or “soil moisture sensor” means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

(www) “soil texture” means the classification of soil based on its percentage of sand, silt, and clay.

(xxx) “Special Landscape Area” (SLA) means an area of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

(yyy) “sprinkler head” or “spray head” means a device which delivers water through a nozzle.

(zzz) “static water pressure” means the pipeline or municipal water supply pressure when water is not flowing.

(aaaa) “station” means an area served by one valve or by a set of valves that operate simultaneously.

(bbbb) "swing joint" means an irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.

(cccc) "subsurface irrigation" means irrigation placed either under the soil or under the mulch on top of the soil.

(dddd) "turf" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.

(eeee) "valve" means a device used to control the flow of water in the irrigation system.

(ffff) "water conserving plant species" means a plant species identified as having a very low or low plant factor.

(gggg) "water feature" means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in the high water use hydrozone of the landscape area. Constructed wetlands used for on-site wastewater treatment or stormwater best management practices that are not irrigated and used solely for water treatment or stormwater retention are not water features and, therefore, are not subject to the water budget calculation.

(hhhh) "watering window" means the time of day irrigation is allowed.

(iiii) "WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension and the Department of Water Resources 2014.

<u>SEC.10-12.05 WATER EFFICIENT LANDSCAPE WORKSHEET</u>.

(a) A project applicant shall complete the Water Efficient Landscape Worksheet in Appendix B which contains information on the plant factor, irrigation method, irrigation efficiency, and area associated with each hydrozone. The ET Adjustment Factor (ETAF) for a landscape project is based on the plant factors and irrigation methods selected. The Maximum Applied Water Allowance (MAWA) is calculated based on the maximum ETAF allowed (0.55 for residential areas and 0.45 for non-residential areas) and expressed as annual gallons required. The Estimated Total Water Use (ETWU) is calculated based on the plants used and irrigation method selected for the landscape design. ETWU must be below the MAWA.

(1) Calculations are then made to show that the evapotranspiration adjustment factor (ETAF) for the landscape project does not exceed a factor of 0.55 for residential areas and 0.45 for non-residential areas, exclusive of Special Landscape Areas.

(2) In calculating the MAWA and ETWU, a project applicant shall use the ETo values of 44.2 of Union City from the Reference Evapotranspiration Table in Appendix A.

(b) Water budget calculations shall adhere to the following requirements:

(1) The plant factor used shall be from any published plant reference book approved by the California Department of Water Resources (DWR). The plant factor ranges from 0 to 0.1 for very low water using plants, 0.1 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

(2) Published plant reference books may include the following:

(A) California Native Plants for the Garden, Carol Bornstein, David Fross and Bart O'Brien, Cachuma Press, 2005. (CNP)

(B) Plants and Landscapes for Summer-Dry Climates, Nora Harlow (ed.), East Bay Municipal Utility District, 2004. (EBMUD)

(C) Landscape Plants for California Gardens, Robert C. Perry, Land Design Publisher, 2010.

(D) Sunset Western Garden Book, editors of Sunset Magazine, Oxmoor House, 2012.

(E) University of California Division of Agriculture and Natural Resources, Water Use Classification of Landscape Species (WUCOLS IV), www.ucanr.edu/sites/WUCOLS

(3) All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.

(4) All Special Landscape Areas shall be identified and their water use calculated as shown in Appendix B.

(5) ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

SEC.10-12.06 SOIL MANAGEMENT REPORT

(a) In order to reduce runoff and encourage healthy plant growth, a soil management report shall be completed by the project applicant, or his/her designee, as follows:

(1) Submit soil samples to a laboratory for analysis and recommendations.

(A) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

(B) The soil analysis shall include:

1. soil texture;
2. infiltration rate determined by laboratory test or soil texture infiltration rate table;
3. pH;
4. total soluble salts;
5. sodium;
6. percent organic matter; and
7. recommendations for amending the soil with organic compost to bring the soil organic matter to a minimum of 5% by dry weight and incorporating organic fertilizers to recommended levels for planting area. Acceptable organic fertilizers and amendment products are those allowed for use in crop production by at least one of the following:
   i. Organic Materials Review Institute's Generic Materials List
   ii. California Department of Food and Agriculture's Organic Input Materials Program
   iii. U.S. Department of Agriculture's National Organic Program

(C) In projects with multiple landscape installations (i.e. production home developments) a soil sampling rate of one (1) in seven (7) lots or approximately fifteen percent (15%) will satisfy this requirement. Large landscape projects shall sample at a rate equivalent to one (1) in seven (7) lots.

(2) The project applicant, or his/her designee, shall comply with one of the following:

(A) If significant mass grading is not planned, the soil analysis report shall be submitted to the local agency as part of the Landscape Documentation Package; or

(B) If significant mass grading is planned, the soil analysis report shall be submitted to the local agency as part of the Certificate of Completion.

(3) The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans to make any necessary adjustments to the design plans.

(4) The project applicant, or his/her designee, shall submit documentation verifying implementation of soil analysis report recommendations to the local agency with Certificate of Completion.

<u>SEC.10-12.07 LANDSCAPE DESIGN PLAN</u>.

(a) For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. A landscape design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

(1) Applicable projects are required to divert (reuse or recycle) 100% of excavated soil and plant and land clearing debris. Alternative Daily Cover is not an acceptable form of diversion for plant material.

(2) Plant Material

(A) The Estimated Total Water Use of selected plants in the landscape area shall not exceed the Maximum Applied Water Allowance. Methods to achieve water efficiency shall include one or more of the following:

1. protection and preservation of native species and natural vegetation;
2. at least seventy five percent (75%) of the total number of water-conserving plants shall require occasional, little or no summer water, especially local native plants;
3. selection of plants based on local climate suitability, disease and pest resistance;
4. selection of trees based on applicable local tree ordinances or tree shading guidelines, and size at maturity as appropriate for the planting area;
5. selection of plants from local and regional landscape program plant lists; and
6. selection of plants from local Fuel Modification Plan Guidelines.

(B) Each hydrozone shall have plant materials with similar water use, with the exception of hydrozones with plants of mixed water use, as specified in Section 10.12-08(a)(2).

(C) Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site. Methods to achieve water efficiency shall include one or more of the following:

1. use the Sunset Western Climate Zone System which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate;
2. recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots) to minimize damage to property or infrastructure [e.g., buildings, sidewalks, power lines]; allow for adequate soil volume for healthy root growth; plants located adjacent to buildings, sidewalks, roads or other obstructions are installed to accommodate their minimum spread, according to a published third-party reference; and
3. consider the solar orientation for plant placement to maximize summer shade and winter solar gain.

(D) Turf is not allowed on slopes greater than twenty five percent (25%) where the toe of the slope is adjacent to an impermeable hardscape and where twenty five percent (25%) means one (1) foot of vertical elevation change for every four (4) feet of horizontal length (vertical elevation change divided by horizontal length multiply by 100 = slope percent).

(E) Turf is not allowed in multifamily and non-residential areas unless it is a recreational area. Turf is allowed in single family residential areas as long as the water budget is met.

(F) High water use plants, characterized by a plant factor of 0.7 to 1.0, are prohibited in street medians.

(G) A landscape design plan for projects in fire-prone areas shall address fire safety and prevention. A defensible space or zone around a building or structure is required per Public Resources Code Section 4291(a) and (b). Fire-prone plant materials and highly flammable mulches shall be prohibited. Refer to the local Fuel Modification Plan guidelines.

(H) The use of invasive plant species, such as those listed by the California Invasive Plant Council, shall be prohibited.

(I) The architectural guidelines of a common interest development, which include community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.

(3) Water Features

(A) Recirculating water systems shall be used for water features

(B) Where available, recycled water shall be used as a source for decorative water features.

(C) Surface area of a water feature shall be included in the high water use hydrozone area of the water budget calculation.

(D) Pool and spa covers shall be required.

(4) Soil Preparation, Mulch and Amendments

(A) Prior to the planting of any materials, compacted soils shall be transformed to a friable condition. On engineered slopes, only amended planting holes need meet this requirement.

(B) Soil amendments shall be incorporated according to recommendations of the soil report and appropriateness for the plants selected (see Section 10-12.06).

(C) For landscape installations, organic compost at a rate of a minimum of four (4) cubic yards per 1,000 square feet shall be incorporated to a depth of six (6) inches into the soil in the landscape area. Soils with greater than five percent (5%) organic matter in the top six (6) inches of soil are exempt from adding compost and tilling. Organic matter must be confirmed by an accredited soil testing laboratory. Projects that incorporate sheet mulching may choose to install the compost above the cardboard layer instead of tilling it into the soil. Projects that are sheet mulching lawn in place are exempt from the tilling requirement.

(D) A minimum three inch (3″) layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, areas receiving closely spaced grass plugs as a lawn alternatives, or direct seeding applications where mulch is contraindicated. To provide habitat for beneficial insects and other wildlife, up to five percent (5%) of the landscape area may be left without mulch. Designated insect habitat must be included in the landscape design plan as such. Specifying organic recycled chipped wood mulch is strongly encouraged in the shade of Dark Brown color where arbor chip from the project site is unavailable.

(E) Stabilizing mulching products shall be used on slopes that meet current engineering standards.

(F) The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement.

(G) Organic mulch materials made from recycled or post-consumer shall take precedence over inorganic materials or virgin forest products unless the recycled post-consumer organic products are not locally available. Organic mulches are not required where prohibited by local Fuel Modification Plan Guidelines or other applicable local ordinances.

(b) The landscape design plan, at a minimum, shall:

(1) delineate and label each hydrozone by number, letter, or other method;

(2) identify each hydrozone as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation;

(3) identify recreational areas;

(4) identify areas permanently and solely dedicated to edible plants;

(5) identify areas irrigated with recycled water;

(6) identify type of mulch and application depth;

(7) identify soil amendments, type, and quantity;

(8) identify slopes equal or greater than 3:1 to receive erosion control material

(9) identify type and surface area of water features;

(10) identify hardscapes (pervious and non-pervious);

(11) identify location, installation details, and 24-hour retention or infiltration capacity of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater. Project applicants shall refer to the local agency or regional Water Quality Control Board for information on any applicable stormwater technical requirements. Stormwater best management practices shall be incorporated in the landscape design plan;

(12) identify any applicable rain catchment technologies as discussed in Section 10-12.15 and their 24-hour retention or infiltration capacity;

(13) identify any applicable graywater discharge piping, system components and area(s) of distribution;

(14) identify landfill diversion verification requirement that Landscape Contractor shall be required to submit Appendix C. Certification of Completion, PART 7;

(15) contain the following statement: "I have complied with the criteria of the ordinance and applied them for the efficient use of water in the landscape design plan"; and

(16) bear the signature of a licensed landscape architect, licensed landscape contractor, or any other person authorized to design a landscape. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agriculture Code.)

SEC.10-12.08 IRRIGATION DESIGN PLAN.

(a) This section applies to landscaped areas requiring permanent irrigation, not areas that require temporary irrigation solely for the plant establishment period. For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance. An irrigation design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

(1) System

(A) Dedicated irrigation water service meters shall be installed for all non-residential irrigated landscapes of 1,000 square feet and residential irrigated landscapes of 5,000 square feet or greater.

(B) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data utilizing non-volatile memory shall be required for irrigation scheduling in all irrigation systems.

(C) If the water pressure is below or exceeds the recommended pressure of the specified irrigation devices, the installation of a pressure regulating device is required to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance:

1. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices such as inline pressure regulators, booster pumps, or other devices shall be installed to meet the required dynamic pressure of the irrigation system; and
2. Static water pressure, dynamic or operating pressure, and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.

(D) Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.

(E) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply, to minimize water loss in case of an emergency (such as a main line break) or routine repair.

(F) Backflow prevention devices shall be required to protect the water supply from contamination by the irrigation system. A project applicant shall conform to the City Standard Detail.

(G) Flow sensors that detect high flow conditions created by system damage or malfunction are required for all on non-residential landscapes and residential landscapes of 5000 sq. ft. or larger.

(H) Master shut-off valves are required on all projects except landscapes that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features.

(I) The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.

(J) Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.

(K) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

(L) The irrigation system must be designed and installed to meet, at a minimum, the irrigation efficiency criteria as described in Section 10-12.05regarding the Maximum Applied Water Allowance.

(M) All irrigation emission devices must meet the requirements set in the American National Standards Institute (ANSI) standard, American Society of Agricultural and Biological Engineers'/International Code Council's (ASABE/ICC) 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard, All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.

(N) It is highly recommended that the project applicant inquire with Department of Utilities and Environmental Services about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.

(O) Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

(P) Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.

(Q) Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to hardscapes or in high traffic areas of turf.

(R) Check valves or anti-drain valves are required on all sprinkler heads where low point drainage could occur.

(S) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.

(T) Overhead irrigation shall not be permitted within twenty four inches (24") of any non-permeable surface. Allowable irrigation within the setback from non-permeable surfaces may include drip, drip line, or other low flow non-spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:

1. the landscape area is adjacent to permeable surfacing; or
2. the adjacent non-permeable surfaces are designed and constructed to drain entirely back to landscaping.

(U) Slopes greater than twenty five percent (25%) shall not be irrigated with an irrigation system with an application rate exceeding 0.75 inches per hour. Prevention of runoff and erosion must be confirmed during the irrigation audit.

(2) Hydrozone

(A) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

(B) Bio-treatment area shall be on a separate valve.

(C) Trees shall be on a separate valve. Trees with different watering requirements shall be on separate valves. The mature size and extent of the root zone shall be considered when designing irrigation for the tree.

(D) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.

(E) Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:

1. plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
2. the plant factor of the higher water using plant is used for calculations.

(F) Individual hydrozones that mix high and low water use plants shall not be permitted.

(G) On the landscape design plan and irrigation design plan, hydrozone areas shall be designated by number, letter, or other designation. On the irrigation design plan, designate the areas irrigated by each valve, and assign a number to each valve. Use this valve number in the Water Efficient Landscape Worksheet (see Appendix B). This table can also assist with the irrigation audit and programming the controller.

(b) The irrigation design plan, at a minimum, shall contain:

(1) location and size of separate water meters for landscape;

(2) location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;

(3) static water pressure at the point of connection to the public water supply;

(4) flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station (valve);

(5) recycled water irrigation systems as specified in Section 10-12.13;

(6) the following statement: “I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan”; and

(7) the signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an

irrigation system. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agricultural Code.)

SEC.10-12.09 CERTIFICATE OF COMPLETION.

(a) The Certificate of Completion (see Appendix C) shall include the following seven (7) elements:

(1) project information sheet that contains:

(A) date;

(B) project name;

(C) project applicant name, telephone, and mailing address;

(D) project address and location; and

(E) property owner name, telephone, and mailing address;

(2) certification by either the signer of the landscape design plan, the signer of the irrigation design plan, or the licensed landscape contractor that the landscape project has been installed per the approved Landscape Documentation Package;

(A) where there have been significant changes made in the field during construction, these “as-built” or record drawings shall be included with the certification;

(B) A diagram of the irrigation plan showing hydrozones shall be kept with the irrigation controller for subsequent management purposes.

(B) irrigation scheduling parameters used to set the controller;

(C) landscape and irrigation maintenance schedule (see Section 10-12.10);

(D) irrigation audit report (see Section 10-12.11); and

(E) soil analysis report, if not submitted with Landscape Documentation Package, and documentation verifying implementation of soil report recommendations (see Section 10-12.06); and

(F) landfill diversion verification statement (see Appendix C. Part 7)

(b) The project applicant shall:

(1) submit the signed Appendix C - Certificate of Completion to the City for review;

(2) ensure that copies of the approved Certificate of Completion are submitted to the property owner or his or her designee.

(c) The City shall:

(1) receive the signed Appendix C - Certificate of Completion from the project applicant;

(2) perform a verification field inspection by City Landscape Architect upon receipt of the Certificate of Completion prior to issuance of Certificate of Occupancy. If the inspection fails, City Landscape Architect shall provide a correction list to the project applicant.

SEC.10-12.10 LANDSCAPE AND IRRIGATION MAINTENANCE SCHEDULE.

(a) Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

(b) A regular maintenance schedule shall include, but not be limited to, routine inspection; auditing, adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; topdressing with compost, replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing obstructions to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(c) Repair of all irrigation equipment shall be done with the originally installed components or their equivalents or with components with greater efficiency.

(d) A project applicant is encouraged to implement established landscape industry sustainable Best Practices for all landscape maintenance activities:

(1) Use the “Bay-Friendly Landscape Model Maintenance Manual” as an official reference document in the landscape maintenance contract and/or with on-site landscape staff

SEC.10-12.11 IRRIGATION AUDIT, IRRIGATION SURVEY, AND IRRIGATION WATER USE ANALYSIS.

(a) All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed the landscape or installed the landscape.

(b) In large projects or projects with multiple landscape installations (i.e. production home developments) an auditing rate of one (1) in seven (7) lots or approximately fifteen (15%) will satisfy this requirement.

(c) For new construction and rehabilitated landscape projects installed after December 1, 2015, as described in Section 10-12.03:

(1) the project applicant shall submit an irrigation audit report with the Appendix C - Certificate of Completion to the City that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming;

(2) the City shall administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.

SEC.10-12.12 IRRIGATION EFFICIENCY.

(a) For the purpose of determining Estimated Total Water Use, average irrigation efficiency is assumed to be 0.75 for overhead spray devices and 0.81 for drip system devices.

SEC.10-12.13 RECYCLED WATER.

(a) The installation of recycled water irrigation systems shall allow for the current and future use of recycled water.

(b) All recycled water irrigation systems shall be designed and operated in accordance with all applicable local and State laws.

(c) Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

SEC.10-12.14 GRAYWATER SYSTEMS.

(a) Graywater systems promote the efficient use of water and are encouraged to assist in on-site landscape irrigation.

(b) New single-family residential projects which meet the criteria of applicability as defined in Section 10-12.03 shall install basic “laundry to landscape” plumbing in each residence.

(c) All graywater systems shall confirm to the California Plumbing Code (Title 24, part 5, Chapter 16) and any applicable local ordinance standards.

(d) Refer to Section 10-12.03(c) for the applicability of this ordinance to landscape areas less than 2,500 square feet with the Estimated Total Water Use met entirely by graywater.

SEC.10-12.15 STORMWATER MANAGEMENT, RAINWATER RETENTION, AND RAINWATER CATCHMENT.

(a) Stormwater management practices minimize runoff and increase infiltration which recharges groundwater and improves water quality. Implementing stormwater best management practices into the landscape and grading design plans to minimize runoff and to increase on-site rainwater retention and infiltration are encouraged.

(b) Project applicants shall refer to the local agency or Regional Water Quality Control Board for information on any applicable stormwater technical requirements.

(c) All planted landscape areas are required to have friable soil to maximize water retention and infiltration. Refer to Section 10.12.07(a)(4).

(d) It is strongly recommended that landscape areas be designed for capture and infiltration capacity that is sufficient to prevent runoff from impervious surfaces (i.e. roof and paved areas) from either: the one inch, 24-hour rain event or the 85th percentile, 24-hour rain event, and/or additional capacity as required by any applicable local, regional, state or federal regulation.

(e) It is recommended that storm water projects incorporate any of the following elements to improve on-site storm water and dry weather runoff capture and use:

(1) Grade impervious surfaces, such as driveways, during construction to drain to vegetated areas.

(2) Minimize the area of impervious surfaces such as paved areas, roof and concrete driveways.

(3) Incorporate pervious or porous surfaces (e.g., gravel, permeable pavers or blocks, pervious or porous concrete) that minimize runoff.

(4) Direct runoff from paved surfaces and roof areas into planting beds or landscaped areas to maximize site water capture and reuse.

(5) Incorporate rain gardens, cisterns, and other rain harvesting or catchment systems.

(6) Incorporate infiltration beds, swales, basins and drywells to capture storm water and dry weather runoff and increase percolation into the soil.

(7) Consider constructed wetlands and ponds that retain water, equalize excess flow, and filter pollutants.

(f) New single-family residential projects which meet the criteria of applicability as defined in Section 10-12.03 shall install a minimum fifty (50) gallon covered rain catchment device per residence.

SEC.10-12.16 PUBLIC EDUCATION.

(a) Publications. Education is a critical component to promote the efficient use of water in landscapes. The use of appropriate principles of design, installation, management and maintenance that save water is encouraged in the community.

(1) The City shall provide information to owners of permitted renovations and new, single-family residential homes regarding the design, installation, management, and maintenance of water efficient landscapes based on a water budget.

(b) Model Homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described in this ordinance.

(1) Signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme. Signage shall include information about the site water use as designed per the local ordinance; specify who designed and installed the water efficient landscape; and demonstrate low water use approaches to landscaping such as using native plants, graywater systems, and rainwater catchment systems.

(2) Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

SEC.10-12.17 ENVIRONMENTAL REVIEW.

(a) The City must comply with the California Environmental Quality Act (CEQA), as appropriate.

SEC.10-12.18 EXISTING LANDSCAPE IRRIGATION AUDIT, IRRIGATION SURVEY, AND IRRIGATION WATER USE ANALYSIS.

(a) This section shall apply to all existing landscapes that were installed before December 1, 2015 and are over one acre in size.

(1) For all existing landscapes that have a water meter, the City shall may require, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: MAWA = (0.8) (ETo)(LA)(0.62).

(2) For all existing landscapes that do not have a meter, the City may require, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

(b) All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

SEC.10-12.19 EFFECTIVE PRECIPITATION.

(a) A local agency may consider Effective Precipitation (25% of annual precipitation) in tracking water use and may use the following equation to calculate Maximum Applied Water Allowance:
MAWA= (ETo - Eppt) (0.62) [(0.55 x LA) + (0.45 x SLA)] for residential areas.
MAWA= (ETo-EPPT) (0.62) [(0.45 x LA) + (0.55 x SLA)] for non-residential areas.

Appendix A - Reference Evapotranspiration (ETo) Table*

County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
ALAMEDA													
Fremont	1.5	1.9	3.4	4.7	5.4	6.3	6.7	6.0	4.5	3.4	1.8	1.5	47.0
Livermore	1.2	1.5	2.9	4.4	5.9	6.6	7.4	6.4	5.3	3.2	1.5	0.9	47.2
Oakland	1.5	1.5	2.8	3.9	5.1	5.3	6.0	5.5	4.8	3.1	1.4	0.9	41.8
Oakland Foothills	1.1	1.4	2.7	3.7	5.1	6.4	5.8	4.9	3.6	2.6	1.4	1.0	39.6
Pleasanton	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
Union City **	1.4	1.8	3.1	4.2	5.4	5.9	6.4	5.7	4.4	3.1	1.5	1.2	44.2

* The values in this table were derived from:

1) California Irrigation Management Information System (CIMIS);

2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999; and

3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922;

4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426

**ETo of Union City shall be used for City of Hayward.

Appendix B – Water Efficient Landscape Worksheet.

WATER EFFICIENT LANDSCAPE WORKSHEET
This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package.

City of Hayward Reference Evapotranspiration (ETo) 44.2

Hydrozone # /Planting Description[a]	Plant Factor (PF)	Irrigation Method[b]	Irrigation Efficiency (IE)[c]	ETAF (PF/IE)	Landscape Area (sq, ft,)	ETAF x Area	Estimated Total Water Use (ETWU)[e]
Regular Landscape Areas							
				Totals	(A)	(B)	
Special Landscape Areas							
				1			
				1			
				1			
				Totals	(C)	(D)	
			ETWU Total				
			Maximum Allowed Water Allowance (MAWA)[e]				

[a]***Hydrozone #/Planting Description***
E.g
1.) front lawn
2.) low water use plantings
3.) medium water use planting

[b]***Irrigation Method***
overhead spray or drip
or drip

[c]***Irrigation Efficiency***
0.75 for spray head
0.81 for drip

[d]***ETWU* (Annual Gallons Required) =**
Eto x 0.62 x ETAF x Area
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year.

[e]***MAWA (Annual Gallons Allowed) =***
(Eto) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year, LA is the total landscape area in square feet, SLA is the total special landscape area in square feet, and ETAF is .55 for residential areas and 0.45 for non-residential areas.

ETAF Calculations
All Landscape Areas

Total ETAF x Area	(B+D)
Total Area	(A+C)
Sitewide ETAF	**(B+D) ÷ (A+C)**

Regular Landscape Area

Total ETAF x Area	(B)
Total Area	(A)
Sitewide ETAF	**B ÷ A**

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas and 0.45 or below for non-residential areas.

Appendix C – Certificate of Completion.

PART 1. CERTIFICATE OF COMPLETION
This certificate is filled out by the project applicant upon completion of the landscape project.

Project Street Address:	Building Permit Number:	
City:	State:	Zip Code:

Property Owner:

Name:	Telephone No.:	
	Fax No.:	
Title:	Email Address:	
Company:	Street Address:	
City:	State:	Zip Code:

Property Owner
"I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule."

____

Property Owner Signature Date

PART 2. CERTIFICATION OF INSTALLATION
"I/we certify that based upon periodic site observations, the work has been completed in accordance with the ordinance and that the landscape planting and irrigation installation conform with the criteria and specifications of the approved Landscape Documentation Package."

Signature*	Date	
Name (print)	Telephone No.	
	Fax No.	
Title	Email Address	
License No. or Certification No.		
Company	Street Address	
City	State	Zip Code

***Signer of the landscape design plan, signer of the irrigation plan, or a licensed landscape contractor.

PART 3. IRRIGATION SCHEDULING
Attach parameters for setting the irrigation schedule on controller per ordinance Section 10.12-08.

PART 4. SCHEDULE OF LANDSCAPE AND IRRIGATION MAINTENANCE
Attach schedule of Landscape and Irrigation Maintenance per ordinance Section 10.12-10.

PART 5. LANDSCAPE IRRIGATION AUDIT REPORT
Attach Landscape Irrigation Audit Report per ordinance Section 10-12.11.

PART 6. SOIL MANAGEMENT REPORT
Attach soil analysis report, if not previously submitted with the Landscape Documentation Package per ordinance Section 10-12.07.
Attach documentation verifying implementation of recommendations from soil analysis report per ordinance Section 10-12-06.

PART 7. LANDFILL DIVERSION VERIFICATION
Attach Landfill Diversion Verification Statement per ordinance Section 10-12.07

APPENDIX C – PART 7
LANDFILL DIVERSION VERIFICATION STATEMENT

100% of excavated soil and plant and land clearing debris are required to divert for reuse or recycled purposes, and shall be delivered to an authorized facility to maximize recycling. Contaminated materials shall not be calculated as a part of the diversion. Be sure to share this information with your contractor, as s/he shall be required to submit the lower half of this form as a part of Certificate of Completion before scheduling a final inspection by City Landscape Architect.

Permit Number: ________________________ Project Address: ____

Check the boxes and sign below:

- ☐ I understand that debris may only be removed from the project site per the requirements on the back of this form.
- ☐ If I use a roll-off container, I understand that it must be from Waste Management of Alameda County.
- ☐ I understand that if debris is not hauled by Waste Management of Alameda County[1], an authorized hauler and facility must be used.

Applicant Signature: ____________________________________ **Date:** ____________________

CONTRACTOR: Prior to requesting a final inspection, submit all weigh tags and this form documenting tons recycled or landfilled to:

Mail: Department of Development Services, Hayward City Hall, 777 B Street, Hayward, CA 94541
Fax: 510-583-3649;
Email: landscape@hayward-ca.gov

Contractor Name: _______________________ Phone: _____________________ Email:________________

Vehicle [1]	Material [2]	Tons or Cubic Yards		Name of Facility(s) [3]	Weigh Tags [4] (Y/N)
		Recycled	Landfilled		
	Mixed Debris				
	Separated Recyclable Materials *(Asphalt, concrete, bricks, doors, fixtures, cardboard, dirt, unpainted drywall& wood, pallets, scrap metal, plant debris)*				
	Garbage *(must be less than 5% recyclable material)*	N/A		Waste Management of Alameda County	

1 For "Vehicle", please indicate one of the following: roll-off container, pick-up truck, stake-side truck, or end-dump truck.

2 Plant debris must be separated and taken to designated facility, in accordance with the Alameda County Landfill Ban of 2009.

3 If you indicated "Roll-Off" in the first column, then you must indicate "**Waste Management of Alameda County"** or **"WMAC"** as the name of the facility.

4 Weigh tags must be provided and must indicate City of Hayward as the jurisdiction of origin.

APPROVAL TO SCHEDULE FINAL INSPECTION

City Staff Initials: ________________ Date Approved: ________________

Appendix D – Prescriptive Compliance Option

(a) This appendix contains prescriptive requirements which may be used as a compliance option to the Model Water Efficient Landscape Ordinance.

(b) Compliance with the following items is mandatory and must be documented on a landscape plan in order to use the prescriptive compliance option:

(1) Submit a Landscape Documentation Package which includes the following elements:
  (A) date
  (B) project applicant
  (C) project address (if available, parcel and/or lot number(s))
  (D) total landscape area (square feet), including a breakdown of turf and plant material
  (E) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed)
  (F) water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well
  (G) contact information for the project applicant and property owner
  (H) applicant signature and date with statement, "I agree to comply with the requirements of the prescriptive compliance option to the MWELO".

(2) Incorporate compost at a rate of at least four cubic yards per 1,000 square feet to a depth of six (6) inches into landscape area (unless contra-indicated by a soil test).

(3) Plant material shall comply with all of the following:
  (A) For residential areas, install climate adapted and native plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for seventy five percent (75%) of the plant area excluding edibles and areas using recycled water; For non-residential areas, install climate adapted and native plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 100% of the plant area excluding edibles and areas using recycled water;
  (B) A minimum three inch (3″) layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, groundcover areas receiving closely spaced grass plugs as a lawn alternative, or direct seeding applications where mulch is contraindicated.

(4) Turf shall comply with all of the following:
  (A) Turf shall not exceed twenty five percent (25%) of the landscape area in residential areas, and there shall be no turf in non-residential areas;
  (B) Turf shall not be planted on sloped areas which exceed twenty five percent (25%), a slope of one (1) foot vertical elevation change for every four (4) feet of horizontal length; and
  (C) Turf is prohibited in parkways less than ten feet (10') wide, unless the parkway is adjacent to a parking strip and used to enter and exit vehicles. Any turf in parkways must be irrigated by sub-surface irrigation or by other technology that creates no overspray or runoff.

(5) Irrigation systems shall comply with the following:

(A) Automatic irrigation controllers are required and must use evapotranspiration or soil moisture sensor data and utilize a rain sensor.

(B) Irrigation controllers shall be of a type which does not lose programming data in the event the primary power source is interrupted.

(C) Pressure regulators shall be installed on the irrigation system to ensure the dynamic pressure of the system is within the manufacturers recommended pressure range.

(D) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be installed as close as possible to the point of connection of the water supply.

(E) All irrigation emission devices must meet the requirements set in the ANSI standard, ASABE/ICC 802-2014. "Landscape Irrigation Sprinkler and Emitter Standard," All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.

(F) Areas less than ten feet (10') in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.

(6) For non-residential projects with landscape areas of 1,000 square feet or more, a dedicated irrigation water service meter shall be installed.

(7) Alameda County law prohibits disposal of plant debris in county landfills. ACWMA Plant Debris Landfill Ban Ordinance 2008-01 requires landscape professionals, to separate all plant debris from garbage. http://www.recyclingrulesac.org/docs/Landfill-Ban-WMA-Ordinance2008-01.pdf

(c) At the time of final inspection, the permit applicant must provide the owner of the property with a certificate of completion, certificate of installation, irrigation schedule and a schedule of landscape and irrigation maintenance.

Repealed and Replaced by Ord. 09-16, adopted December 15, 2009.
Repealed and Replaced by Ord. 15-25, adopted October 27, 2015.

ARTICLE 23

INDOOR WATER USE EFFICIENCY ORDINANCE

ARTICLE 23

INDOOR WATER USE EFFICIENCY ORDINANCE

SEC. 10-23.01 TITLE. This Ordinance shall be known as the City of Hayward Indoor Water Use Efficiency Ordinance.

SEC. 10-23.02 DEFINITIONS.

(a) "Applicable standard" means the water use standard as set forth in the Indoor Water Use Efficiency Table in Section 10-23.05 of the Hayward Municipal Code.

(b) "Certified professional" means a licensed contractor, licensed architect or licensed professional engineer.

(c) "City" shall mean the City of Hayward, a charter city.

(d) "Energy Star Qualified" means that a given fixture meets the United States Environmental Protection Agency standard for an energy efficient product.

(e) "gal/cycle" means gallons per cycle.

(f) "gal/100 lbs ice" means gallons per hundred pounds of ice.

(g) "gpf" means gallons per flush.

(h) "gpm" means gallons per minute.

(i) "Hayward Water System" means the system owned and operated by the City for the storage and distribution of potable water.

(j) "LSI" means Langlier Saturation Index providing an indication of the degree of saturation of water with respect to calcium carbonate related to cooling tower efficiency.

(k) "Permit" means the document issued by City in connection with new construction, remodels or renovations and which authorizes the lawful initiation of construction, improvements or repairs to a building or structure.

(l) "Project applicant" means the individual or entity submitting a Indoor Water Use Efficiency Checklist as required under Section 10-23.06, and requesting a permit, plan check, design review, or new or expanded water service application from City. A project applicant may be the property owner or his or her designee.

(m) "RMF" means residential multi-family.

(n) "sq. ft." means square feet.

(o) “Water Factor” means the number of gallons per cycle per cubic foot used by a clothes washer.

SEC. 10-23.03 COORDINATION WITH PLUMBING CODE. To the extent the provisions of this Ordinance conflict with any provisions in the existing Plumbing Code, as amended, or the California Building Standards Code, as amended, the provisions of this Ordinance shall supersede and control with regard to the indoor fixture requirements described herein.

SEC. 10-23.04 APPLICABILITY.

(a) The provisions of this Ordinance shall apply to the following projects:

(1) All new construction, regardless of building classification, requiring a building permit, plan check or design review, or requiring new or expanded water service. For new construction, all fixtures and appliances that are being installed by the Project applicant shall comply with the applicable water use efficiency standards.

(2) All kitchen and bathroom remodels requiring a building permit, plan check, or design review, or requiring new or expanded water service, except that the provisions of this Ordinance will only apply to the fixtures normally included in the kitchen or bathroom, as the case may be, to be remodeled, as follows:

(A) Residential Projects.

i. Kitchens. Faucets shall comply with the applicable standard. Project applicants are not required to upgrade existing dishwashers as part of the project; however, if replacement dishwashers are installed as part of the project, they shall comply with the applicable standard.

ii. Bathrooms. Faucets and showerheads shall comply with the applicable standards. Existing toilets that use more than 1.6 gpf shall be replaced with toilets that meet the applicable standard.

(B) Non-Residential Projects.

i. Kitchen and Food Processing Facilities. Faucets, food steamers, ice machines, and pre-rinse spray valves shall comply with applicable standards. Commercial refrigeration shall comply with applicable standards. Project applicants are not required to upgrade existing dishwashers as part of the project; however, if replacement dishwashers are installed as part of the project, they shall comply with the applicable standard.

ii. Bathrooms. Faucets and showerheads shall comply with the applicable standards. Existing toilets that use more than 1.6 gpf shall be replaced with toilets that meet the applicable standard. Existing urinals that use more than 0.5 gpf shall be replaced with urinals that meet the applicable standard.

(3) Any remodel:

(A) the cost of which exceeds $50,000; or

(B) the size of which exceeds 500 square feet, as determined by the City, in its sole discretion; or

(C) that requires new or expanded water service.

(b) The provisions of this Ordinance shall not apply to:

(1) Existing buildings not seeking a building permit, plan check or design review;

(2) Registered local, state or federal historical sites;

(3) Remodels where, in the discretion of the City Building Official, the unique configuration of the building, its drainage system or portions of the public sewer, or both, are incompatible with efficiency standards listed in the Indoor Water Use Efficiency Table and require a greater quantity of water to flush the system in a manner that is consistent with public health.

(4) Projects that are not served potable water from the Hayward Water System.

SEC. 10-23.05 MINIMUM INDOOR FIXTURE REQUIREMENTS. All new construction and applicable remodels will have, at a minimum, fixtures that comply with the efficiency standards listed below (the "Indoor Water Use Efficiency Table"):

INDOOR WATER USE EFFICIENCY TABLE

Fixture	Residential	Non-Residential
Toilets	≤ 1.28 gpf	≤ 1.28 gpf
Urinals	≤ 0.5 gpf	≤ 0.5 gpf
Showerheads	≤ 2.0 gpm	≤ 2.0 gpm
Bathroom faucets	≤ 1.5 gpm	≤ 0.5 gpm
Kitchen faucets	≤ 2.2 gpm	≤ 2.2 gpm
Clothes washers	≤ 6.0 Water Factor	≤ 6.0 Water Factor
Dishwashers	≤ 6.5 gal/cycle, or Energy Star Qualified	Energy Star Qualified
Cooling towers	≥ 5 - 10 cycles, or ≥ 2.5 LSI	≥ 5 - 10 cycles, or ≥ 2.5 LSI
Food steamers	--	Boilerless, or Self-contained
Ice machines	--	≤ 25 gal/100 lbs ice, or Air-cooled
Pre-rinse spray valves	--	≤ 1.15 gpm
Automatic vehicle wash facilities	--	≥ 50% of water that is recycled on site
Commercial refrigeration	--	Closed loop, or Air-cooled
Meters	Submeters for RMF [(1)], and Separate meter for outdoor if landscape >5000 sq. ft.	Submeters [(1)], and Separate meter for outdoor if landscape >5000 sq. ft.

[(1)] Submeters shall only be required for new multi-family residential and non-residential projects.

SEC. 10-23.06 COMPLIANCE WITH ORDINANCE.

(a) The Project applicant shall:

(1) Meet the minimum water use efficiency standards for indoor fixtures and appliances provided for in the Indoor Water Use Efficiency Table and Checklist; and

(2) Prior to construction, complete and submit all portions of the Indoor Water Use Efficiency Checklist, on a form approved by the City, to the Building Division for verification.

(b) The Building Division shall:

(1) Review the Indoor Water Use Efficiency Checklist submitted by the Project applicant;

(2) Approve or deny the Project applicant's Indoor Water Use Efficiency Checklist submittal;

(3) Only upon approval of the Indoor Water Use Efficiency Checklist, issue a permit or approve the plan check, design review or new or expanded water service application for the Project applicant; and

(4) At its discretion, inspect the installation of the water efficient fixtures and appliances to verify that they have been installed and are performing at the required use levels.

SEC 10-23.07 COMPONENTS OF THE INDOOR WATER USE EFFICIENCY CHECKLIST. The Indoor Water Use Efficiency Checklist shall require, at a minimum, the following:

(a) Project Information, including applicant name and phone number, project type, site address and project size;

(b) Quantity and unit water use factors of all indoor fixtures and appliances relative to the standards listed in the Indoor Water Use Efficiency Table and Checklist;

(c) The following statement to be completed by the Project applicant: "I certify that the subject project meets the specified requirements of the Indoor Water Use Efficiency Ordinance"; and

(d) Signature of the Project applicant, or that of a certified professional.

SEC. 10-23.08 PENALTIES AND ENFORCEMENT. The City Building Official is authorized to enforce all provisions of this Ordinance. It is unlawful for any person, firm, partnership, association, or corporation subject to the requirements of this Ordinance to fail to comply with the water use efficiency requirements or to alter or replace the fixtures and appliances required by this Ordinance with other noncompliant fixtures or appliances after the completion of construction or remodel. The provisions of this Ordinance may be enforced by one or more of the following measures:

(a) Violation and Notice of Correction. Whenever the City Building Official determines that a violation of this Ordinance has occurred, the City Building Official may serve a notice of correction on the owner(s) of the property on which the violation is situated. The owner(s) of record shall have ninety (90) days to take corrective action.

(b) Administrative Citation. In addition to other remedies available to the City, violations of this Ordinance may be subject to an administrative citation. The amount of the fine shall be set forth by Resolution of the City Council. Citations shall be issued and administered in accordance with Chapter 1, Article 7 of the Hayward Municipal Code.

SEC. 10-23.09 Public Education. The City shall provide information to all Project applicants regarding the installation of water efficient fixtures and appliances.

APPENDIX M

WATER SERVICE RATES FOR

FY 2016 AND FY 2017

CITY OF HAYWARD
HEART OF THE BAY

FY 2016 AND FY 2017
WATER SERVICE RATES

WATER SERVICES

WATER RATES

Single Family Residential

Cost Per CCF of Metered Water Consumption

Inside City of Hayward	Eff. Oct 1, 2015	Eff. Oct 1, 2016
1 to 8 ccf (hundred cubic feet)	$5.42	$5.80
9 to 25 ccf	$6.58	$7.14
Over 25 ccf	$7.75	$8.41

Outside City of Hayward	Eff. Oct 1, 2015	Eff. Oct 1, 2016
1 to 8 ccf	$6.23	$6.67
9 to 25 ccf	$7.57	$8.21
Over 25 ccf	$8.91	$9.67

2 – 4 Dwelling Unit Residential (Duplex, Triplex and Fourplex Accounts)

Cost Per CCF of Metered Water Consumption
Per Dwelling Unit, Based on Average Usage Per Dwelling Unit

Inside City of Hayward	Eff. Oct 1, 2015	Eff. Oct 1, 2016
1 to 8 ccf (hundred cubic feet)	$5.93	$6.43
9 to 25 ccf	$6.61	$7.15
Over 25 ccf	$7.85	$8.52

Outside City of Hayward	Eff. Oct 1, 2015	Eff. Oct 1, 2016
1 to 8 ccf	$6.82	$7.39
9 to 25 ccf	$7.60	$8.22
Over 25 ccf	$9.03	$9.80

Multi-Family (five or more dwelling units per account, including mobile home parks)

Cost Per CCF of Metered Water Consumption
Per Dwelling Unit, Based on Average Usage Per Dwelling Unit

Inside City of Hayward	Eff. Oct 1, 2015	Eff. Oct 1, 2016
1 to 8 ccf (hundred cubic feet)	$6.41	$6.97
9 to 20 ccf	$6.64	$7.23
Over 20 ccf	$7.33	$7.94

Outside City of Hayward	Eff. Oct 1, 2015	Eff. Oct 1, 2016
1 to 8 ccf	$7.37	$8.02
9 to 20 ccf	$7.64	$8.31
Over 20 ccf	$8.43	$9.13

Non-Residential

	Cost Per CCF of Metered Water Consumption	
Inside City of Hayward	**Eff. Oct 1, 2015**	**Eff. Oct 1, 2016**
1 to 200 ccf	$6.41	$6.95
Over 200 ccf	$7.64	$8.29
Outside City of Hayward		
1 to 200 ccf	$7.37	$7.99
Over 200 ccf	$8.79	$9.50

Note: hundred cubic feet = approximately 748 gallons of water

SERVICE CHARGES (Two-Month Billing Period)

Effective October 1, 2015

Meter Size	Charge Inside City	Charge Outside City
Low Income Residential	$3.50	$4.03
5/8” (Standard)	$14.00	$16.10
3/4”	$19.05	$21.91
1”	$28.90	$33.24
1 1/2”	$63.30	$72.80
2”	$111.40	$128.11
3”	$281.15	$323.32
4”	$556.90	$640.43
6”	$982.45	$1,129.82
8”	$1360.00	$1,564.00

Effective October 1, 2016

Meter Size	Charge Inside City	Charge Outside City
Low Income Residential	$5.60	$6.44
5/8” (Standard)	$16.00	$18.40
3/4”	$21.75	$25.01
1”	$32.95	$37.89
1 1/2”	$72.15	$82.97
2”	$127.00	$146.05
3”	$320.50	$419.64
4”	$634.90	$730.14
6”	$1120.00	$1288.00
8”	$1,550.50	$1,783.08